

# Metals and Mining

## The Diversified Debate

- **The game has changed and mining companies are starting to react** — We have highlighted for some time through our [Super Cycle Sunset...](#) and [Sweating for Success](#) notes that we believe the demand backdrop of higher commodity prices is over and the sector is returning to a pre – 2000 level on supply and demand. Against this backdrop we expect the mining companies that will outperform during the coming decade will be those that focus on asset performance and cash returns to shareholders.
- **Volume growth has disappointed** — Collectively Anglo American, Rio Tinto and BHP Billiton have spent around \$284bn on capex and M&A and this has delivered a CAGR on volume of around 1%, between 2004 and 2012. We therefore believe that the true sustaining capex over this period has been around ~4x higher than that reported by the companies or ~ 3x higher than depreciation to maintain production flat. This phenomenon is likely to improve going forward as large growth projects are delivered.
- **Cost inflation is expected to improve** — On our calculations for the period of 2004 to 2012 unit operating costs have risen by 7.7% per annum for BHPB, 16% for Rio Tinto and 1% for Anglo American. Rio Tinto's unit costs increased dramatically in 2008 with the purchase of Alcan, while Anglo's unit costs benefitted from the divestment of Anglo Gold and Mondri. Going forward we are forecasting a slight reduction in unit costs for both BHPB and Rio, and a 2.9% per annum cost increase for Anglo.
- **Where to from here?** — In an environment where the revenue stream is being capped by commodity prices, and costs are flat, the driver of share price performance is likely to stem from volume 'growth + dividend yield'. With the sector yielding around 3% and volume growth of 4%, we expect the sector to deliver 7% nominal returns - below that of the market. We continue to sit with a Neutral view on the sector for 2013.
- **The delta is on cash returns and buy backs** — To outperform the market the mining companies will have to [Spin, Shrink and Grow](#) and the delta is likely to come from increased cash returns and buy backs. Interestingly on a 20 year view 50% of the TSR of the mining sector has come from dividends. We believe the alpha delta is with Rio Tinto this year and our key underweight remains Anglo American.

### Equities

**Heath R Jansen**  
+44-20-7986-3921  
heath.jansen@citi.com

**Jatinder Goel, CFA**  
+44-20-7986-9924  
jatinder.goel@citi.com

**Jon H Bergtheil**  
+44-20-7986-4453  
jon.bergtheil@citi.com

**Thomas O'Hara**  
+44-20-7986-4557  
thomas.joseph.ohara@citi.com

**Michael E Flitton**  
+44-20-7986-3943  
michael.flitton@citi.com

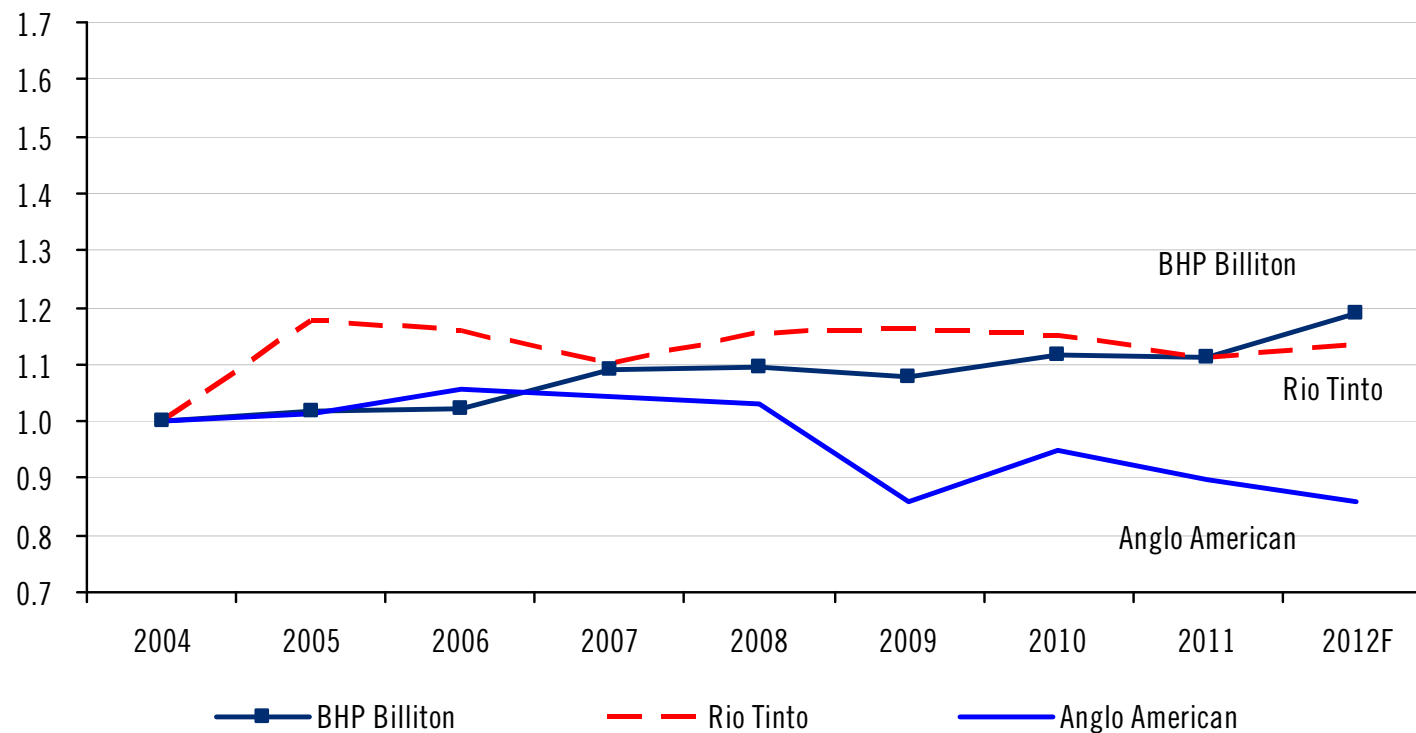
### See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the Firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

## Volume growth to date has been disappointing

- On a copper equivalent volume basis - converting all production to a unit of copper on long term commodity prices - we calculate that BHPB has delivered a CAGR in production of 2.3%, which is slightly higher than that of Rio Tinto at 1.9% and Anglo American at a negative 1.5%.
- This volume growth includes M&A and divestures and could be viewed as disappointing given that Rio Tinto has spent around \$108bn over this period on sustaining capex, development capex, and M&A, BHPB around \$109bn and Anglo American \$67bn.

Figure 1. Copper equivalent volume growth 2004 to 2012F – indexed to 2004.

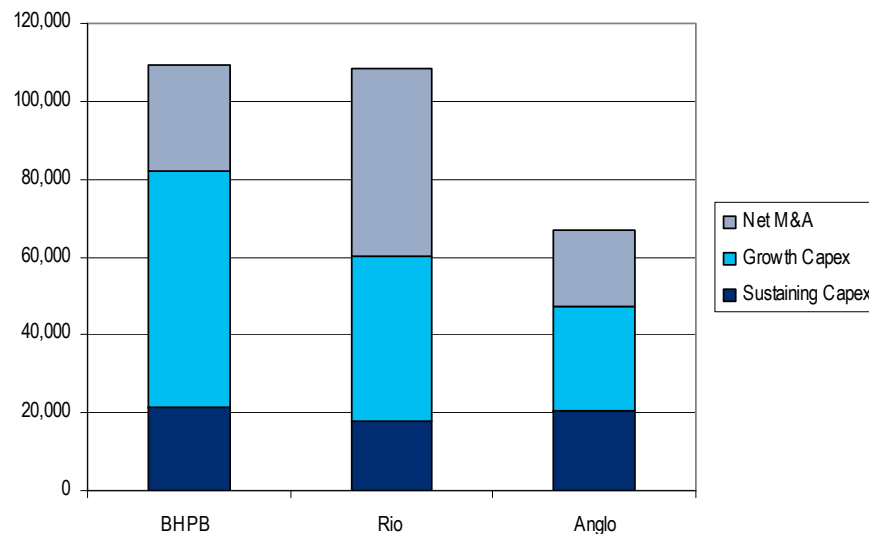


Source: Company Reports, Citi Research

## What is the true sustaining capex?

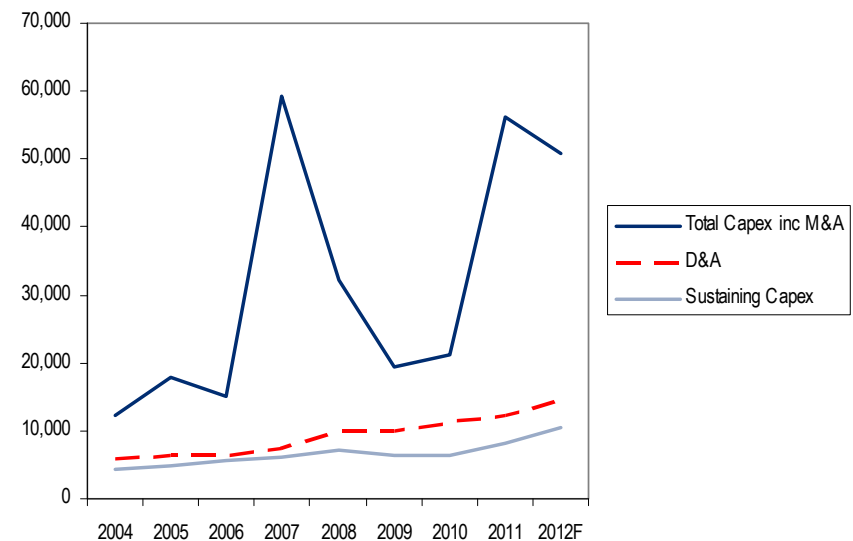
- The market generally perceives that sustaining capex is sufficient to maintain production; however sustaining capex is purely an accounting term to maintain the current plant and equipment not to maintain production.
- We have tried to calculate the true sustaining capex to maintain production for the large mining companies. Over the period of 2004 to 2012 the average total capex to sustaining capex has been 4.7x and interestingly total capex has been around 3.3x that of Depreciation.
- Dividing the total capex (inc M&A) by the volume growth we have calculated the true level of sustaining capex needed to maintain production. For the period of 2004 to 2012 we calculate that the true sustaining capex to maintain production at BHPB has been 4.6x, Rio Tinto 6.0x and Anglo American 3.3x that reported as sustaining capex by the companies.

Figure 2. Total Capex including net M&A 2004-2012 – large miners



Source: Company Reports, Citi Research

Figure 3. Capex to Depreciation – large miners

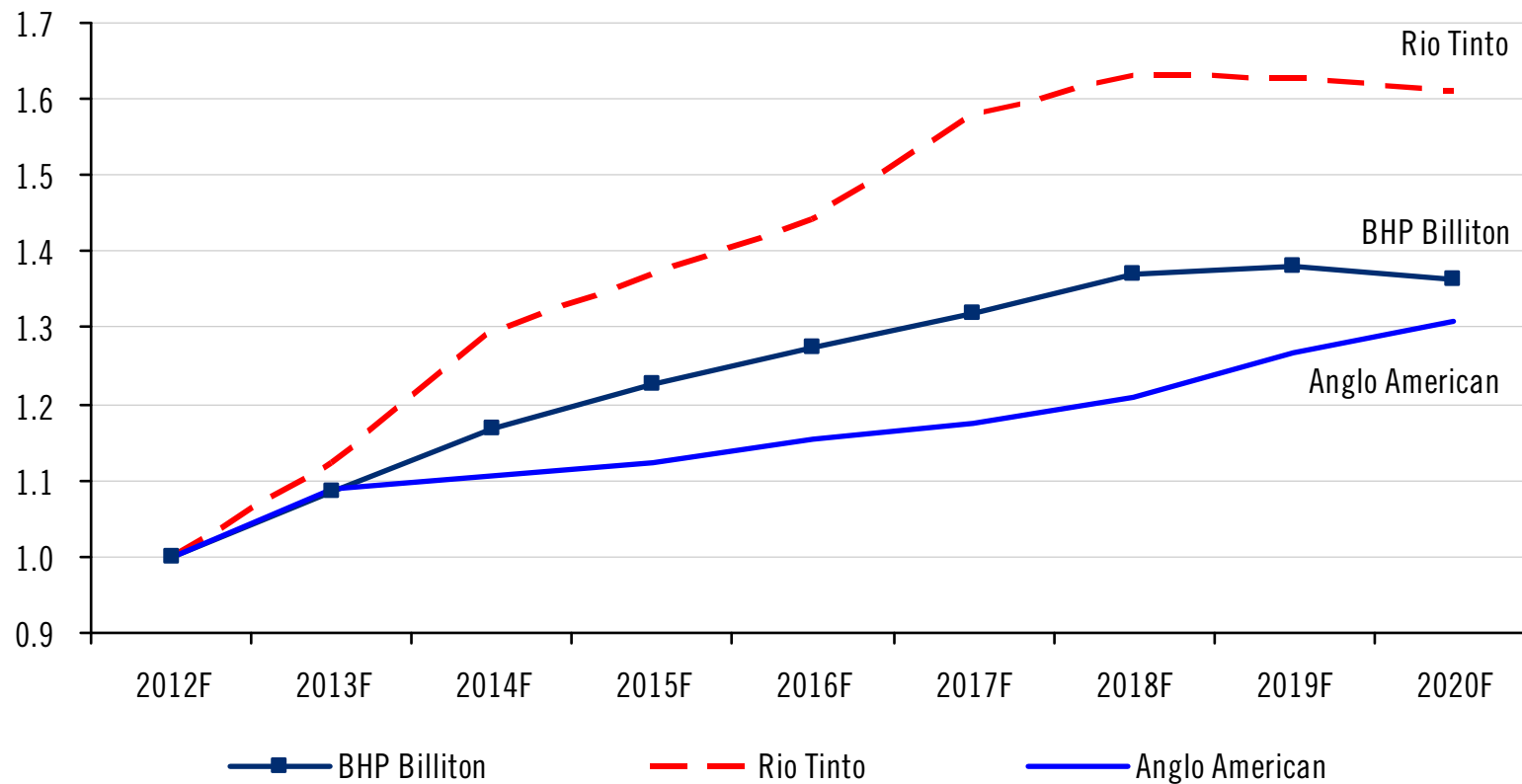


Source: Company Reports, Citi Research

## The analysis doesn't cover timing of projects

- An issue in the above analysis is the timing difference between spending capital and realizing volume growth
- Going forward we calculate that BHPB is likely to deliver a 4% CAGR, Rio Tinto 5% CAGR and Anglo 4% on volume growth.

Figure 4. Copper equivalent Volume growth from 2012 to 2020E



Source: Company Reports, Citi Research

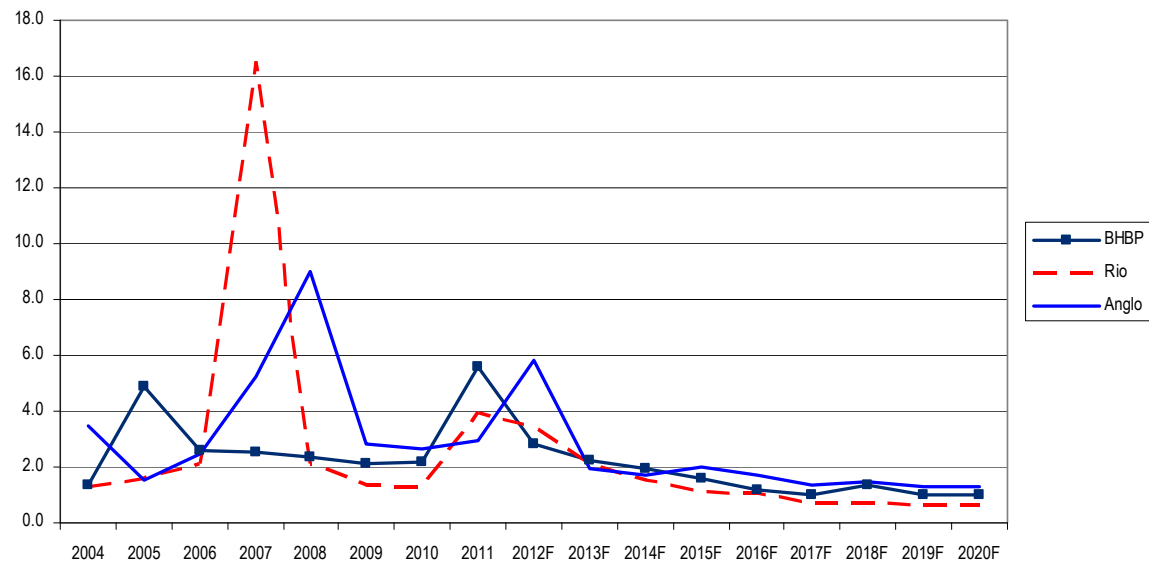
- Going forward the capex to depreciation is expected to improve for the mining companies as they scale back on capex spend.
- Nevertheless on our calculations, dividing the expected volume growth until 2020 by the total capex would suggest that to maintain a flat production profile BHPB would have to spend 1.5x its depreciation rate, Rio Tinto 1.3x, and Anglo American 2.0x. The difference between BHPB and Rio Tinto can be put down to the petroleum business which requires higher capex spending. Anglo American is, in our view, a function of asset quality and deep level mining in the case of Anglo Platinum.
- Interestingly if we adjust the D&A charge coming through the P&L for each company to maintain flat production, it would result in a massive increase in PE multiples for the majors and it would suggest that Anglo would be in a loss making scenario.

Figure 5. Calculated PE, adjusting the D&amp;A charge

Implied True P/E	2010	2011	2012E	2013E
BLT	12.8	12.2	27.8	27.1
RIO	8.7	8.7	27.6	13.2
AAL	28.9	18.9	-55.7	-55.9

Source: Company reports, Citi Research

Figure 6. Capex to Depreciation

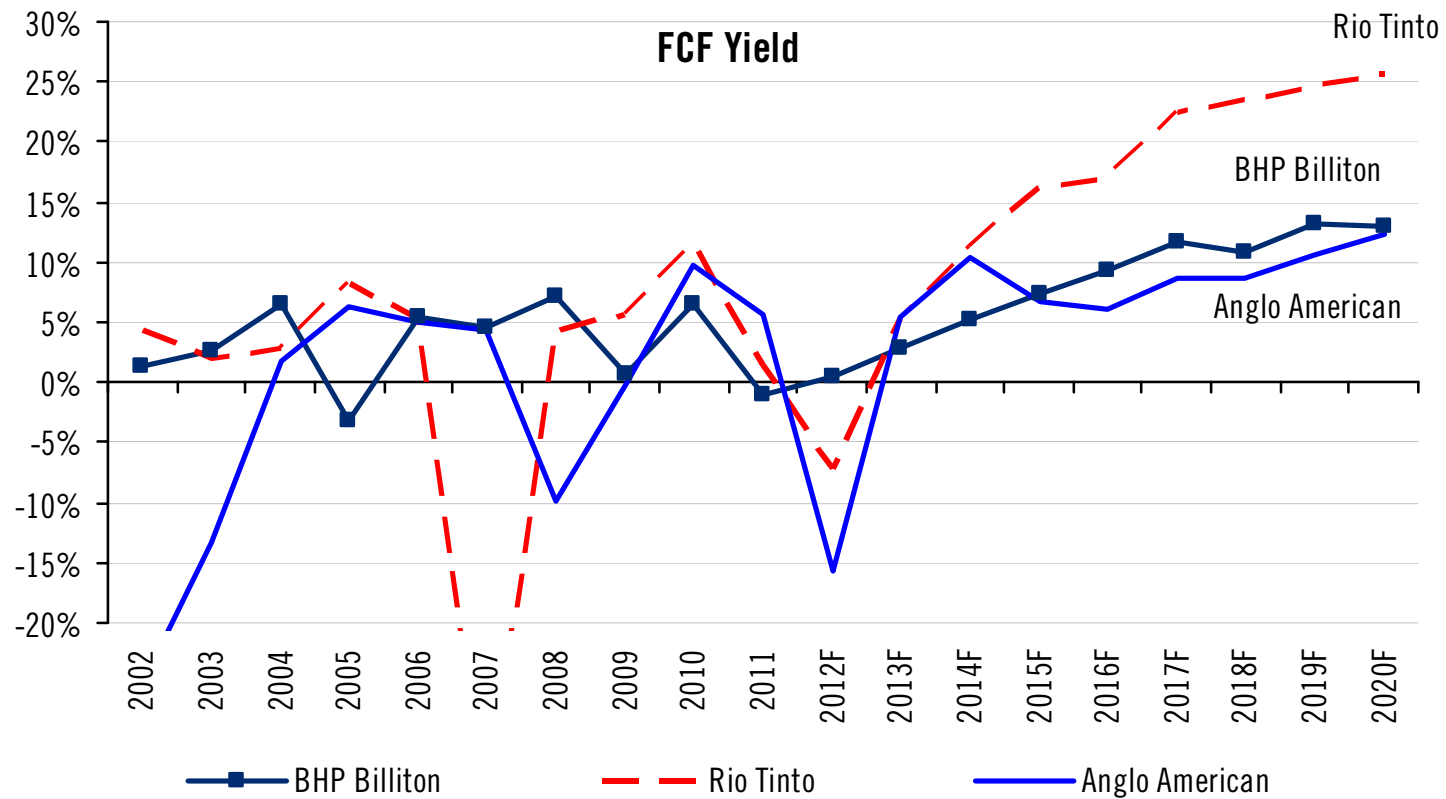


Source: Company Reports, Citi Research

## Free cash flow after capex

■ Free cash flow post capex favors Rio Tinto and is a key reason why it is our key pick amongst the large diversified miners.

Figure 7. Free Cash Flow for the miners – post Capex

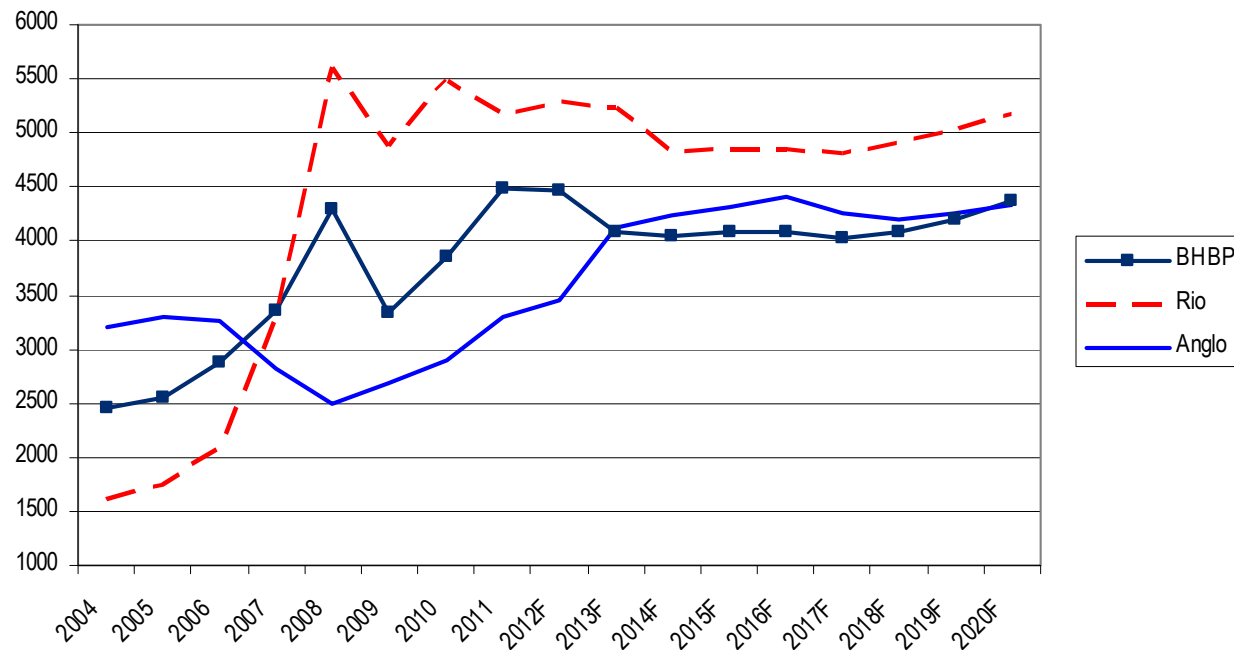


Source: Company Reports, Citi Research

## Unit Costs

- We have divided total production (copper equivalent tonnes) by total operating costs to calculate a unit cash cost for each of the large diversifieds.
- On calculations for the period of 2004 to 2012 unit operating costs have risen by 7.7% per annum for BHPB, 16% for Rio Tinto and 1% for Anglo American.
- Rio Tinto's unit costs increased dramatically in 2008 with the purchase of Alcan, while Anglo's unit costs benefitted from the divestment of Anglo Gold and Mondi.
- Going forward we are forecasting a slight reduction in unit costs for both BHPB and Rio, and a 2.9% per annum cost increase for Anglo.

Figure 8. Unit Costs (\$/tonne of copper equivalent)

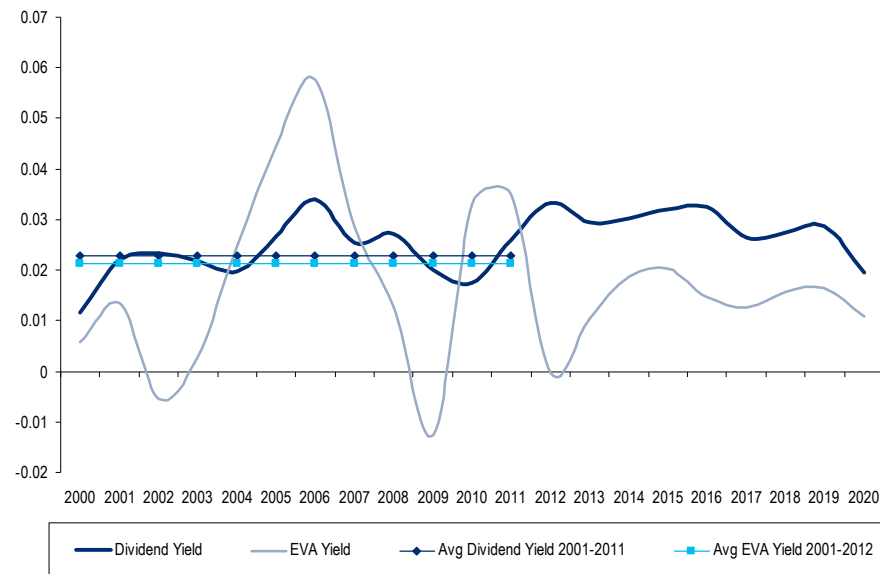


Source: Company Reports, Citi Research

## Dividend Yield versus value creation

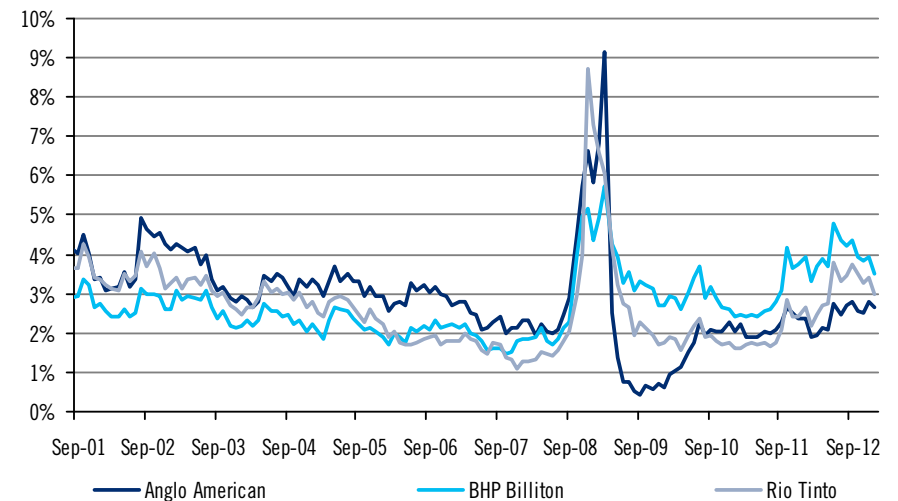
- Historically, (pre super cycle) the mining companies traded on a forward dividend yield of around 3.5%-4%. This de-rated to below 2% and has since been increasing.
- Our view is with commodity prices likely to remain range bound over the next decade and with the cost base of the miners likely to remain flat at best then the major driver of stock performance is likely to be a function of volume growth and cash return.
- Interestingly when plotting EVA yield ((ROIC – WACC)/Market Cap) against dividend yield it highlights that the mining sector has been paying out dividends close to or less than it has been earning on its invested capital case, depending on company. This is expected to switch going forward, which raises the concern that the mining sector will struggle to maintain its dividend payments on its current invested capital base.

Figure 9. Sector EVA yield versus dividend Yield



Source: dataCentral, Citi Research

Figure 10. Forward Dividend Yield for the mining sector - (%)



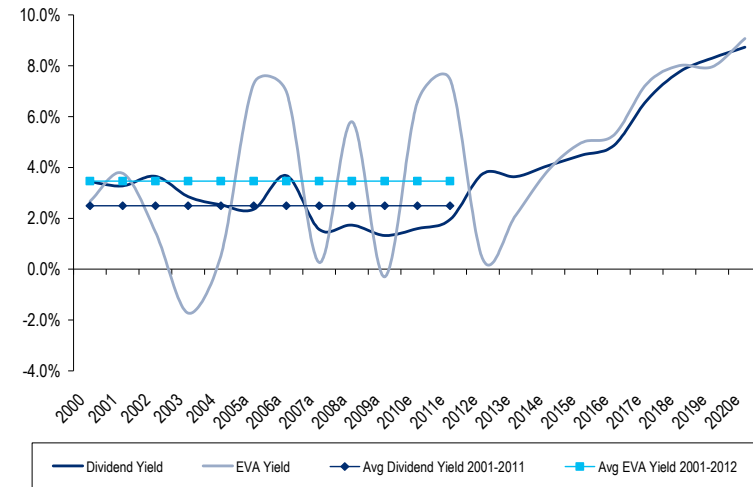
Source: Datastream, Citi Research



## Looking at the individual companies

- BHPB has had the largest gap between EVA and dividend yield, going forward its dividend growth looks defendable from its existing asset base, although cash returns above the expected dividend profile look unlikely in our view.
- Rio Tinto has the largest pick up both in expectations of dividends and EVA yield which raises the possibility of higher cash returns on a shorter time period.
- Anglo American has a worrying EVA versus dividend yield profile, suggesting the company will struggle to meet its dividend payments from its existing asset base (ie the returns profile is not strong enough to defend the dividend against the cash requirements of the business). The only way out, in our view, is to spin the underperforming, cash consuming assets and focus on a mix of cash cows and high returning growth.

Figure 11. Rio Tinto – EVA versus dividend yield



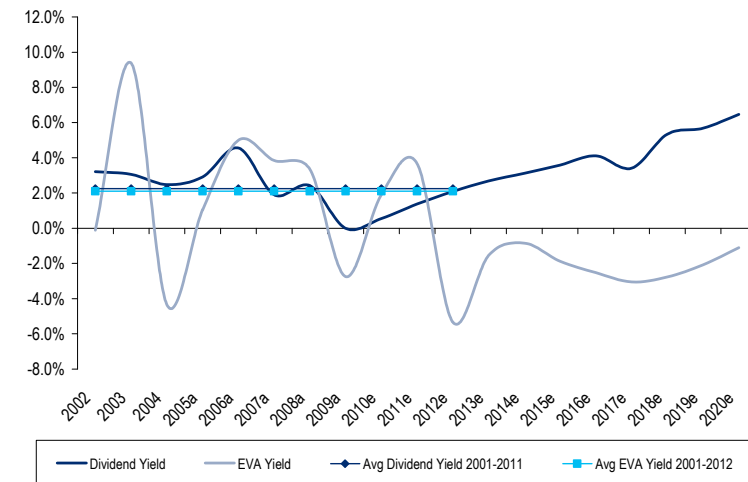
Source: dataCentral, Citi Research

Figure 12. BHP Billiton – EVA versus dividend yield



Source: dataCentral, Citi Research

Figure 13. Anglo American – EVA versus dividend yield

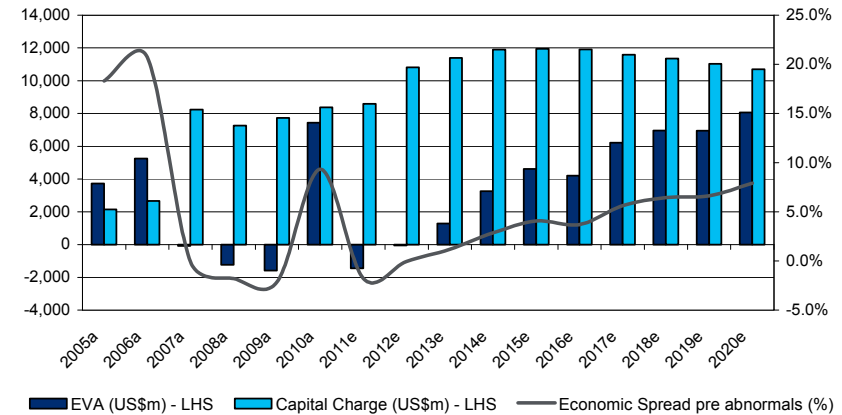


Source: dataCentral, Citi Research

## EVA creation

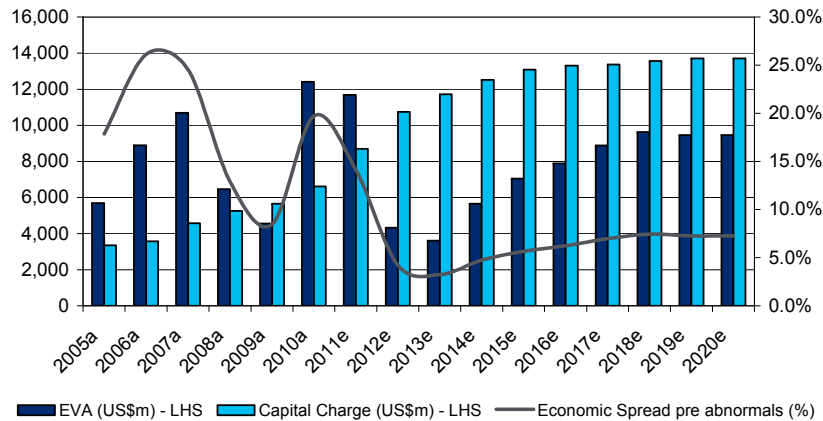
- EVA creation has favoured BHP Billiton over the past seven years.
- Rio Tinto has experienced two periods of negative EVA creation following its Alcan acquisition and again in 2012 following a large capex hurdle and M&A spree.
- Anglo is forecast to remain constrained on EVA creation for the coming decade.

Figure 14. Rio Tinto



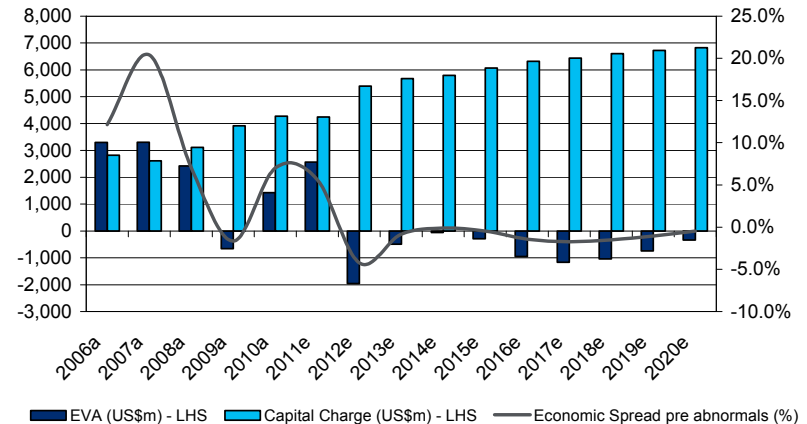
Source: dataCentral, Citi Research

Figure 15. BHP Billiton – EVA creation



Source: dataCentral, Citi Research

Figure 16. Anglo American – EVA creation

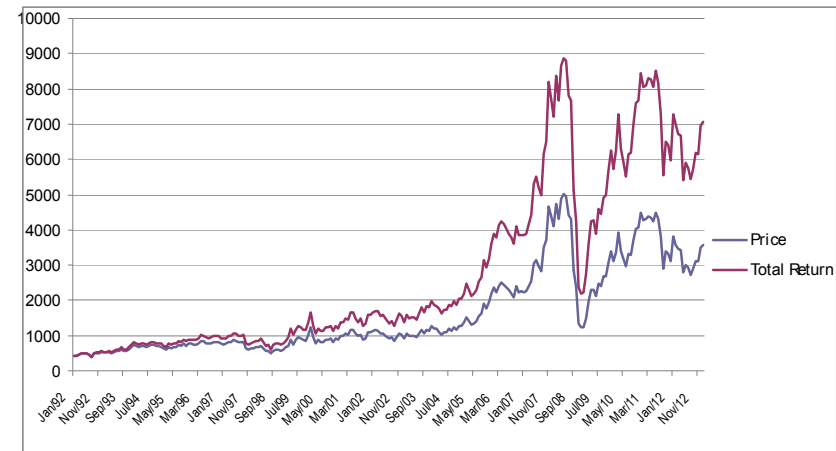


Source: dataCentral, Citi Research

## Total Shareholder Return

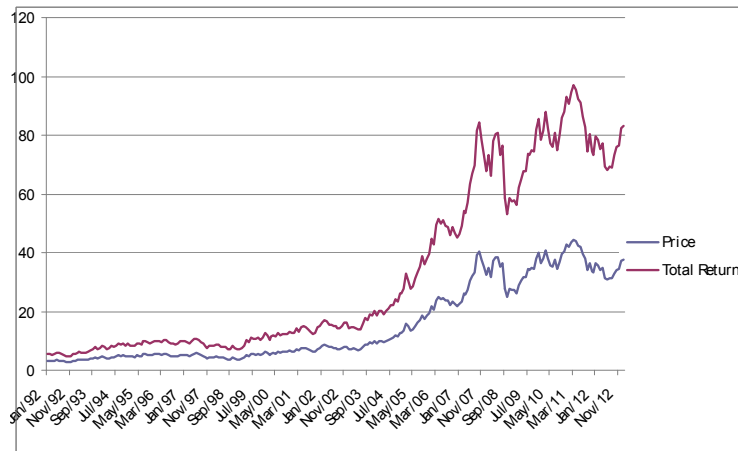
- One of arguments against the mining companies has been the persistent approach for growth over cash returns.
- It is worth highlighting that on a TSR basis around 50% of the mining companies TSR has come from dividends since 1990. We expect this to have fallen to around 35% during 2000 to 2013.
- Going forward we expect the balance of yield and share price appreciation to mean revert closer to a 50:50 split. On balance a 3% dividend yield and a 3-4% growth rate should deliver a 6-7% return (excluding the impact of commodity prices and costs) which is likely to result in the mining sector underperforming the broader market in our view.
- This is unless we see the companies spin, shrink and grow.

Figure 17.Rio Tinto - TSR



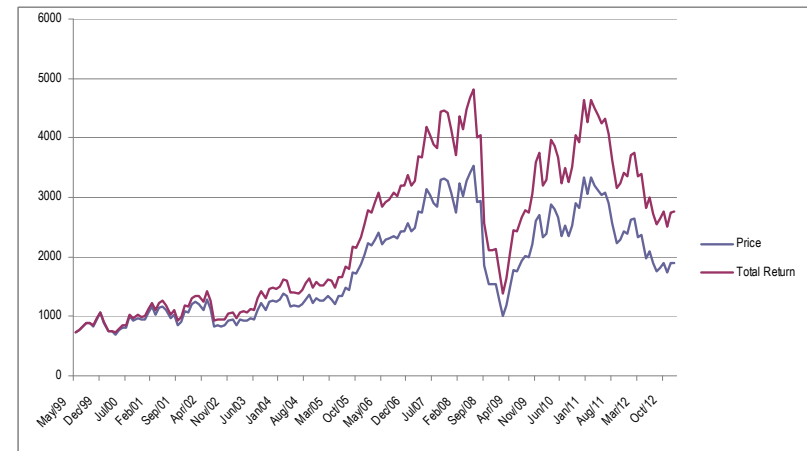
Source: Bloomberg, Citi Research

Figure 18.BHP Billiton - TSR



Source: Bloomberg, Citi Research

Figure 19.Anglo American - TSR

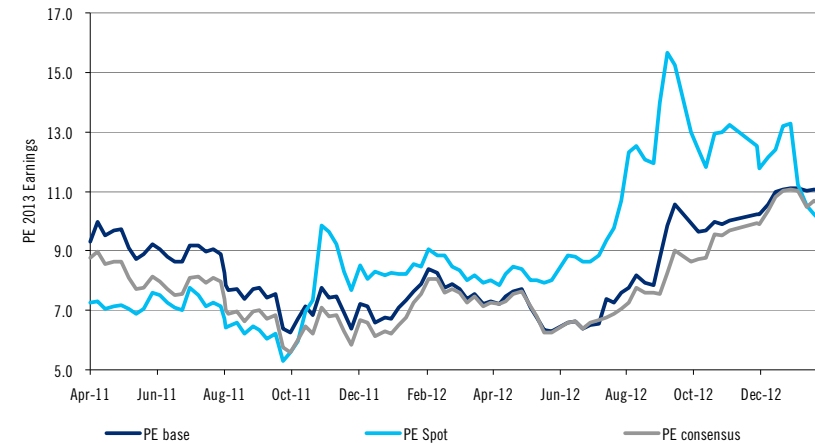


Source: Bloomberg, Citi Research

## Earnings momentum has turned positive

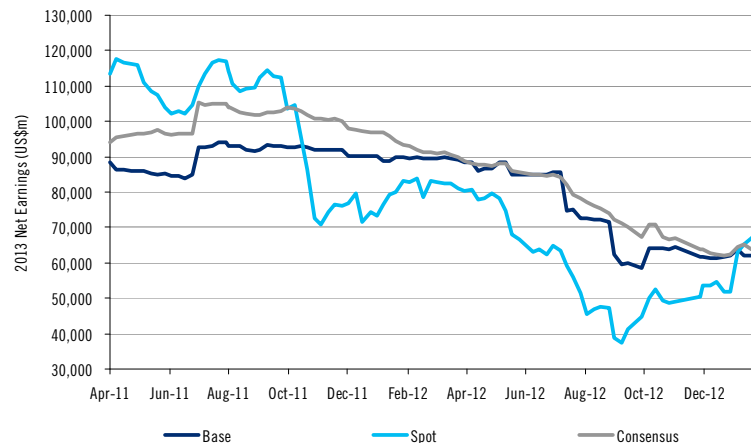
- The PE multiples of the sector remain stretched and we believe the sector is fully valued given the earnings stream.
- However amongst the majors we prefer Rio on a view that the company can drive a PE expansion from reducing capex, cutting costs and improving free cash flow.

Figure 20. Forward PE multiples mining sector



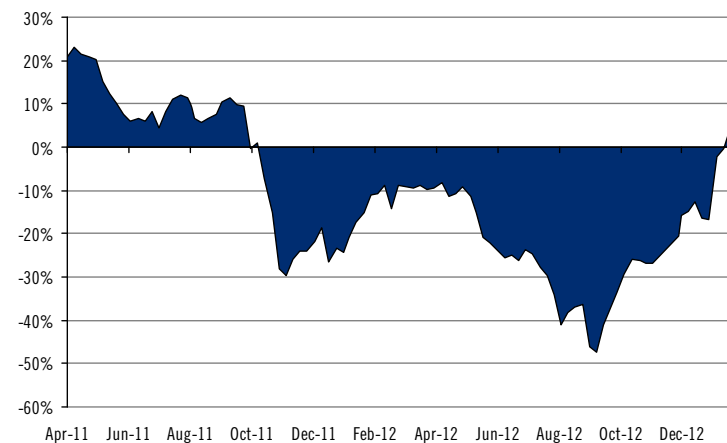
Source: dataCentral, Citi Research

Figure 21. Earnings total for European miners



Source: dataCentral, Citi Research

Figure 22. 2013 Spot vs. Consensus Earnings



Source: dataCentral, Citi Research

Figure 23. PE multiples

PE Multiples	RIC	Rating	Listing	Price	Target	Citi Base Case				Spot Fx/Prices				IBES Consensus			
Calendar Years			Ccy	30/1/13		2012E	2013E	2014E	12E-14E CAGR	2012E	2013E	2014E	12E-14E CAGR	2012E	2013E	2014E	12E-14E CAGR
<b>Diversified</b>																	
Anglo American PLC	AAL.L	Neutral	GBP	18.83	20.00	15.5	12.0	10.3	22%	15.7	12.9	11.9	15%	14.6	11.7	9.9	22%
BHP Billiton PLC	BLT.L	Buy	GBP	21.49	22.00	12.1	12.9	10.9	6%	14.1	11.1	10.0	19%	11.6	11.7	10.3	6%
ENRC	ENRC.L	Sell	GBP	3.31	1.70	10.9	11.1	11.1	0%	11.0	9.6	8.8	12%	10.3	10.0	6.9	22%
Norilsk	NKELYq.L	Buy	USD	19.94	23.00	11.8	8.7	7.6	25%	11.8	10.3	11.3	2%	10.6	9.6	9.2	7%
Rio Tinto PLC	RIO.L	Buy	GBP	35.50	40.00	11.2	9.0	7.6	22%	11.3	7.7	7.0	27%	11.1	9.2	8.2	17%
Vedanta Resources	VED.L	Neutral	GBP	11.53	12.00	10.0	8.5	6.4	25%	10.0	7.7	5.8	31%	11.2	7.2	5.5	43%
<b>Weighted Average</b>						<b>12.3</b>	<b>11.3</b>	<b>9.4</b>	<b>14%</b>	<b>13.2</b>	<b>10.3</b>	<b>9.3</b>	<b>20%</b>	<b>11.8</b>	<b>10.6</b>	<b>9.3</b>	<b>13%</b>
<b>Bulks</b>																	
African Minerals	AMlq.L	Buy	GBP	3.01	4.40	nm	6.2	4.3	na	nm	3.2	2.4	na	nm	9.4	4.7	na
Ferrexpo PLC	FXPO.L	Buy	GBP	2.60	3.20	11.1	8.8	5.6	40%	11.1	4.3	3.3	82%	10.4	7.5	7.3	19%
London Mining	LOND.L	Buy	GBP	1.69	2.00	nm	9.9	2.6	na	nm	2.6	1.4	na	nm	5.1	3.5	na
New World Resources	NWRR.L	Neutral	GBP	2.90		42.4	-11.5	11.4	93%	42.1	nm	nm	na	61.7	nm	11.4	133%
Zanaga	ZIOC.L	Neutral	GBP	0.26		nm	nm	nm	na	nm	nm	nm	na	nm	nm	nm	na
<b>Base Metals</b>																	
Antofagasta PLC	ANTO.L	Sell	GBP	11.39	9.90	14.6	13.4	15.1	-2%	14.6	13.3	13.7	3%	13.5	12.2	13.1	1%
Boliden	BOL.ST	Sell	SEK	116.80	109.00	9.1	10.2	9.1	0%	9.1	9.8	7.8	8%	9.6	9.2	7.5	13%
First Quantum Minerals	FQM.L	Sell	GBP	13.08	11.00	20.2	17.2	13.4	23%	20.8	18.1	15.4	16%	18.9	12.4	10.9	32%
Kazakhmys Plc	KAZ.L	Neutral	GBP	7.54	8.40	9.2	7.5	7.0	15%	9.2	7.1	6.2	22%	9.9	9.0	9.1	4%
Nyrstar	NYR.BR	Buy	EUR	4.47	5.90	nm	9.2	7.0	na	nm	nm	15.9	na	nm	11.2	5.5	na
Talvivaara	TALV.L	Neutral	GBP	0.94		nm	-14.8	4.3	na	nm	nm	nm	na	nm	nm	4.5	na
<b>Aluminium</b>																	
Norsk Hydro	NHY.OL	Sell	NOK	26.36	26.00	115.3	20.7	15.1	176%	115.3	31.1	27.7	104%	110.3	23.7	13.6	185%
UC Rusal	0486.HK	Neutral	HKD	4.69	5.18	60.0	6.1	4.5	265%	55.8	19.3	12.9	108%	28.8	10.1	6.8	106%
<b>Precious Metals</b>																	
African Barrick Gold	ABGL.L	Sell	GBP	3.57	3.35	14.1	8.0	8.1	32%	14.4	8.2	8.0	35%	15.2	8.5	8.0	38%
Aquarius Platinum Plc	AQP.L	Buy	GBP	0.63	0.92	nm	19.6	32.9	na	nm	23.6	nm	na	nm	53.5	15.3	na
Centamin Egypt	CEY.L	Neutral	GBP	0.57		5.3	3.6	5.0	3%	5.3	3.6	5.0	3%	4.9	3.4	4.6	2%
Fresnillo Plc	FRES.L	Neutral	GBP	16.77	19.56	22.5	18.8	21.3	3%	22.5	18.5	18.1	12%	25.9	22.2	19.4	16%
Gem Diamonds	GEMD.L	Buy	GBP	1.64	1.95	14.2	11.7	10.5	16%	nm	11.0	10.6	na	19.6	12.8	12.6	25%
Hochschild Mining	HOCM.L	Neutral	GBP	4.27	5.16	26.5	19.5	18.3	20%	26.5	18.9	13.6	40%	31.4	21.0	16.0	40%
Lonmin Plc	LML.L	Buy	GBP	3.37	4.11	84.0	73.1	24.6	85%	77.5	57.9	25.5	74%	nm	66.6	19.8	na
Nordgold	NORDNq.L	Neutral	USD	4.20	4.62	6.7	10.2	7.9	-7%	6.7	10.6	7.7	-6%	10.2	6.1	5.0	42%
Petra Diamonds	PDL.L	Buy	GBP	1.14	1.45	18.4	8.6	7.4	58%	12.9	8.0	7.5	31%	19.0	13.8	10.3	36%
Petropavlovsk PLC	POG.L	Buy	GBP	3.56	5.01	7.3	5.5	4.3	29%	7.3	4.9	3.6	42%	7.9	5.1	4.5	33%
Polymetal	POLYP.L	Neutral	GBP	10.81	11.31	12.6	8.6	8.7	20%	13.1	8.5	7.7	30%	12.1	8.9	8.1	22%
Randgold Resources	RRS.L	Neutral	GBP	60.60	68.30	19.6	15.2	12.1	27%	19.6	15.4	12.0	28%	19.1	15.0	11.5	29%
<b>South Africa</b>																	
African Rainbow	ARIJ.J	Neutral	ZAR	203	200	15.8	14.4	11.8	16%	15.8	11.9	10.2	24%	12.8	11.7	10.3	12%
Assore	ASRJ.J	Sell	ZAR	438	270	14.9	15.8	15.2	-1%	14.9	12.2	10.1	22%	13.3	13.7	13.4	-1%
Exxaro	EXXJ.J	Neutral	ZAR	174	190	10.3	10.4	10.4	0%	10.5	9.0	8.6	11%	10.9	9.8	8.3	15%
Kumba Iron Ore Ltd	KIOJ.J	Sell	ZAR	597	360	15.8	13.1	14.5	4%	15.8	10.0	9.0	33%	15.4	12.7	13.3	8%

Source: Citi Research

Figure 24. EV/EBITDA multiples

EV/EBITDA	RIC	Rating	Listing	Price	Target	Citi Base Case				Spot Fx/Prices				IBES Consensus			
Calendar Years			Ccy	28/01/13		2012E	2013E	2014E	12E-14E CAGR	2012E	2013E	2014E	12E-14E CAGR	2012E	2013E	2014E	12E-14E CAGR
<b>Diversified</b>																	
Anglo American PLC	AAL.L	Neutral	GBP	18.83	20.00	6.9	4.8	4.4	26%	7.0	4.9	4.6	23%	6.1	5.0	4.7	15%
BHP Billiton PLC	BLT.L	Buy	GBP	21.49	22.00	7.2	7.3	6.2	8%	8.0	6.5	5.8	17%	7.0	6.8	6.1	6%
ENRC	ENRC.L	Sell	GBP	3.31	1.70	6.0	6.5	6.0	0%	6.0	5.9	5.3	6%	6.0	5.6	4.5	16%
Norilsk	NKELYq.L	Buy	USD	19.94	23.00	7.4	6.1	5.5	17%	7.4	7.1	7.5	0%	7.0	6.6	6.3	6%
Rio Tinto PLC	RIO.L	Buy	GBP	35.50	40.00	6.7	5.1	4.4	24%	6.8	4.5	4.0	29%	7.1	5.9	5.5	14%
Vedanta Resources	VED.L	Neutral	GBP	11.53	12.00	5.8	5.3	5.1	6%	5.8	5.0	5.1	6%	5.8	5.0	4.7	11%
<b>Weighted Average</b>						<b>7.6</b>	<b>6.7</b>	<b>5.8</b>	<b>15%</b>	<b>7.9</b>	<b>6.1</b>	<b>5.6</b>	<b>20%</b>	<b>7.5</b>	<b>6.5</b>	<b>5.9</b>	<b>12%</b>
<b>Bulks</b>																	
African Minerals	AMlq.L	Buy	GBP	3.01	4.40	nm	2.4	1.5	na	nm	1.4	1.0	na	nm	3.1	1.6	na
Ferrexpo PLC	FXPO.L	Buy	GBP	2.60	3.20	6.9	5.9	4.2	29%	6.9	3.4	2.7	61%	6.2	5.3	5.2	9%
London Mining	LOND.L	Buy	GBP	1.69	2.00	nm	4.9	1.9	na	nm	2.5	1.2	na	nm	3.7	2.5	na
New World Resources	NWRR.L	Neutral	GBP	2.90		5.8	10.3	4.0	20%	5.8	14.0	17.7	-43%	5.7	6.6	4.4	14%
Zanaga	ZIOC.L	Neutral	GBP	0.26		nm	nm	nm	na	nm	nm	nm	na	nm	nm	nm	na
<b>Base Metals</b>																	
Antofagasta PLC	ANTO.L	Sell	GBP	11.39	9.90	5.3	5.5	6.1	-7%	5.3	5.5	5.7	-3%	5.2	5.2	5.5	-2%
Boliden	BOL.ST	Sell	SEK	116.80	109.00	5.6	5.9	5.6	1%	5.6	5.7	5.0	6%	5.5	5.3	4.7	8%
First Quantum Minerals	FQM.L	Sell	GBP	13.08	11.00	8.4	6.5	5.1	28%	8.6	6.5	5.4	27%	8.2	5.6	4.4	37%
Kazakhmys Plc	KAZ.L	Neutral	GBP	7.54	8.40	6.3	6.0	5.8	4%	6.3	5.9	5.3	9%	6.7	6.2	6.7	0%
Nyrstar	NYR.BR	Buy	EUR	4.47	5.90	6.6	3.7	3.2	43%	6.6	4.9	4.0	30%	6.3	4.3	3.3	38%
Talivaara	TALV.L	Neutral	GBP	0.94		107.0	10.6	3.9	424%	107.0	37.7	9.9	228%	120.0	9.0	4.5	417%
<b>Aluminium</b>																	
Norsk Hydro	NHY.OL	Sell	NOK	26.36	26.00	12.9	7.7	6.6	40%	12.9	9.1	8.9	20%	12.2	8.9	6.8	33%
UC Rusal	0486.HK	Neutral	HKD	4.69	5.18	23.3	11.5	9.7	55%	23.5	23.8	21.9	3%	20.7	14.1	10.8	38%
<b>Precious Metals</b>																	
African Barrick Gold	ABGL.L	Sell	GBP	3.57	3.35	5.0	3.3	3.4	21%	5.0	3.4	3.3	23%	5.0	3.4	3.3	22%
Aquarius Platinum Plc	AQP.L	Buy	GBP	0.63	0.92	32.6	7.0	7.4	110%	32.2	7.5	15.3	45%	11.4	6.8	4.7	57%
Centamin Egypt	CEY.L	Neutral	GBP	0.57		3.4	2.4	2.1	27%	3.4	2.5	2.1	28%	3.3	2.2	2.2	24%
Fresnillo Plc	FRES.L	Neutral	GBP	16.77	19.56	11.8	10.2	11.0	4%	11.8	10.1	9.7	10%	13.2	11.1	9.8	16%
Gem Diamonds	GEMD.L	Buy	GBP	1.64	1.95	2.6	2.4	2.4	5%	2.6	2.4	2.4	5%	2.8	2.9	2.7	3%
Hochschild Mining	HOCM.L	Neutral	GBP	4.27	5.16	5.0	4.4	4.4	7%	5.0	4.3	3.6	18%	5.4	4.5	3.7	21%
Lonmin Plc	LML.L	Buy	GBP	3.37	4.11	18.2	18.4	18.1	0%	17.4	16.5	11.5	23%	17.7	16.6	9.5	37%
Nordgold	NORDNq.L	Neutral	USD	4.20	4.62	2.7	2.9	2.6	2%	2.7	3.0	2.6	2%	3.2	2.5	2.2	20%
Petra Diamonds	PDL.L	Buy	GBP	1.14	1.45	6.5	4.0	3.3	39%	5.9	3.8	3.4	33%	8.3	5.8	4.5	37%
Petropavlovsk PLC	POG.L	Buy	GBP	3.56	5.01	3.8	3.7	3.5	4%	3.8	3.5	3.1	10%	4.1	3.6	3.3	12%
Polymetal	POLYP.L	Neutral	GBP	10.81	11.31	7.5	6.0	6.4	8%	7.6	6.0	5.7	16%	7.8	6.3	5.7	17%
Randgold Resources	RRS.L	Neutral	GBP	60.60	68.30	11.6	8.8	6.8	30%	11.6	8.9	6.8	31%	11.6	8.8	6.6	33%
<b>South Africa</b>																	
African Rainbow	ARIJ.J	Neutral	ZAR	203.00	200.00	7.6	6.6	5.7	16%	7.6	5.8	5.0	23%	6.5	5.9	5.3	11%
Assore	ASRJ.J	Sell	ZAR	438.00	270.00	10.9	11.8	11.5	-3%	10.9	9.6	8.1	16%	na	10.4	10.4	na
Exxaro	EXXJ.J	Neutral	ZAR	173.60	190.00	15.4	21.3	16.8	-4%	15.0	22.1	23.0	-19%	16.9	18.7	12.9	15%
Kumba Iron Ore Ltd	KIOJ.J	Sell	ZAR	596.50	360.00	7.9	6.9	7.6	2%	7.9	5.4	4.9	27%	7.7	6.7	7.1	4%

Source: Citi Research

Figure 25. Calculated NPV analysis

NPV	Ccy	RIC	Rating	Price 28/01/13	Target	Premium (Discount)								
						NPV per share		Spot vs. Base	Share Price LST CCY	Price / NPV USD	Price / NPV Base	Spot	Base	Spot
						Base	Spot							
Diversified														
Anglo American PLC	GBP	AAL.L	Neutral	18.83	20.00	20.66	21.15	2%	18.83	29.75	91%	89%	-9%	-11%
BHP Billiton PLC	GBP	BLT.L	Buy	21.49	22.00	21.20	22.10	4%	21.49	33.95	101%	97%	1%	-3%
ENRC	GBP	ENRC.L	Sell	3.31	1.70	0.70	1.07	52%	3.31	5.24	470%	309%	370%	209%
Norilsk	USD	NKELYq.L	Buy	19.94	23.00	11.06	7.75	-30%	19.94	19.94	180%	257%	80%	157%
Rio Tinto PLC	GBP	RIO.L	Buy	35.50	40.00	45.94	44.65	-3%	35.50	56.09	77%	80%	-23%	-20%
Vedanta Resources	GBP	VED.L	Neutral	11.53	12.00	16.60	19.10	15%	11.53	18.22	69%	60%	-31%	-40%
Bulks														
African Minerals	GBP	AMiQ.L	Buy	3.01	4.40	4.96	8.81	78%	3.01	4.75	61%	34%	-39%	-66%
Ferrexpo PLC	GBP	FXPO.L	Buy	2.60	3.20	4.06	7.14	76%	2.60	4.10	64%	36%	-36%	-64%
London Mining	GBP	LOND.L	Buy	1.69	2.00	2.78	5.58	101%	1.69	2.67	61%	30%	-39%	-70%
New World Resources	GBP	NWRR.L	Neutral	2.90		3.77	1.40	-63%	2.90	4.58	77%	207%	-23%	107%
Zanaga	GBP	ZIOC.L	Neutral	0.26		0.72	0.97	35%	0.26	0.41	36%	27%	-64%	-73%
Base Metals														
Antofagasta PLC	GBP	ANTO.L	Sell	11.39	9.90	9.02	9.53	6%	11.39	18.00	126%	119%	26%	19%
Boliden	SEK	BOL.ST	Sell	116.80	109.00	133.65	143.86	8%	116.80	18.39	87%	81%	-13%	-19%
First Quantum Mineral	GBP	FQM.L	Sell	13.08	11.00	14.23	13.91	-2%	13.08	20.67	92%	94%	-8%	-6%
Kazakhmys Plc	GBP	KAZ.L	Neutral	7.54	8.40	8.54	9.84	15%	7.54	11.91	88%	77%	-12%	-23%
Nyrstar	EUR	NYR.BR	Buy	4.47	5.90	6.40	5.30	-17%	4.47	6.06	70%	84%	-30%	-16%
Talvivaara	GBP	TALV.L	Neutral	0.94		3.22	2.71	-16%	0.94	1.48	29%	34%	-71%	-66%
Aluminium														
Norsk Hydro	NOK	NHY.OL	Sell	26.36	26.00	41.60	40.00	-4%	26.36	4.81	63%	66%	-37%	-34%
UC Rusal	USD	0486.HK	Neutral	4.69	5.18	5.21	1.70	-67%	4.69	0.60	90%	275%	-10%	175%
Precious Metals														
African Barrick Gold	GBP	ABGL.L	Sell	3.57	3.35	2.46	2.72	11%	3.57	5.64	145%	131%	45%	31%
Aquarius Platinum Plc	GBP	AQP.L	Buy	0.63	0.92	0.92	0.81	-12%	0.63	1.00	69%	78%	-31%	-22%
Centamin Egypt	GBP	CEY.L	Neutral	0.57		1.02	1.06	3%	0.57	0.90	56%	54%	-44%	-46%
Fresnillo Plc	GBP	FRES.L	Neutral	16.77	19.56	9.78	10.56	8%	16.77	26.50	171%	159%	71%	59%
Gem Diamonds	GBP	GEMD.L	Buy	1.64	1.95	2.17	2.14	-2%	1.64	2.59	75%	77%	-25%	-23%
Hochschild Mining	GBP	HOCM.L	Neutral	4.27	5.16	3.69	4.09	11%	4.27	6.74	115%	104%	15%	4%
Lonmin Plc	GBP	LMI.L	Buy	3.37	4.11	3.92	3.41	-13%	3.37	5.33	86%	99%	-14%	-1%
Nordgold	USD	NORDNg.L	Neutral	4.20	4.62	3.56	4.00	12%	4.20	4.20	118%	105%	18%	5%
Petra Diamonds	USD	PDL.L	Buy	1.14	1.45	1.45	1.45	0%	1.14	1.80	78%	78%	-22%	-22%
Petropavlovsk PLC	GBP	POG.L	Buy	3.56	5.01	4.20	4.70	12%	3.56	5.62	85%	76%	-15%	-24%
Polymetal	GBP	POLYP.L	Neutral	10.81	11.31	8.70	9.69	11%	10.81	17.08	124%	112%	24%	12%
Randgold Resources	GBP	RRS.L	Neutral	60.60	68.30	45.53	46.69	3%	60.60	95.76	133%	130%	33%	30%
South Africa														
African Rainbow	ZAR	ARIJ.J	Neutral	203	200	180	194	8%	203	16.55	113%	105%	13%	5%
Assore	ZAR	ASRJ.J	Sell	438	270	139	139	0%	438	35.71	315%	315%	215%	215%
Exxaro	ZAR	EXXJ.J	Neutral	174	190	358	358	0%	174	14.15	48%	48%	-52%	-52%
Kumba Iron Ore Ltd	ZAR	KIOJ.J	Sell	597	360	344	475	38%	597	65.99	173%	126%	73%	26%

Source: Citi Research

Figure 26. Gearing ratios

Gearing (ND/Equity)		2012E			2013E		
Calendar Years		Base	Spot	Spot vs. Base	Base	Spot	Spot vs. Base
<b>Diversified</b>							
Anglo American PLC	AAL.L	18%	18%	1%	19%	19%	2%
BHP Billiton PLC	BLT.L	34%	34%	0%	27%	27%	0%
ENRC	ENRC.L	44%	44%	0%	49%	49%	-1%
Norilsk	NKELYq.L	37%	38%	3%	27%	33%	21%
Rio Tinto PLC	RIO.L	28%	29%	1%	23%	20%	-12%
Vedanta Resources	VED.L	48%	48%	-1%	40%	37%	-8%
<b>Bulks</b>							
African Minerals	AMIQ.L	-20%	-20%	0%	-8%	-22%	-168%
Ferrexpo PLC	FXPO.L	22%	22%	0%	19%	6%	-65%
London Mining	LOND.L	58%	58%	0%	83%	40%	-52%
New World Resources	NWRR.L	85%	89%	5%	69%	121%	75%
Zanaga	ZIOC.L	-19%	-19%	0%	-19%	-19%	0%
<b>Base Metals</b>							
Antofagasta PLC	ANTO.L	19%	19%	0%	17%	17%	0%
Boliden	BOL.ST	24%	24%	0%	24%	24%	-1%
First Quantum Minerals	FQM.L	0%	0%	0%	6%	7%	5%
Kazakhmys Plc	KAZ.L	12%	12%	0%	19%	19%	-2%
Nyrstar	NYR.BR	57%	57%	0%	48%	54%	14%
Talvivaara	TALV.L	138%	138%	0%	193%	221%	14%
<b>Aluminium</b>							
Norsk Hydro	NHY.OL	29%	29%	0%	25%	26%	2%
UC Rusal	0486.HK	100%	106%	6%	81%	111%	37%
<b>Precious Metals</b>							
African Barrick Gold	ABGL.L	-17%	-17%	0%	-21%	-21%	1%
Aquarius Platinum Plc	AQP.L	15%	15%	2%	11%	12%	9%
Centamin Egypt	CEY.L	-17%	-17%	0%	-29%	-29%	1%
Fresnillo Plc	FRES.L	-32%	-32%	0%	-41%	-41%	0%
Gem Diamonds	GEMD.L	-22%	-22%	0%	-5%	-5%	-6%
Hochschild Mining	HOCM.L	-31%	-31%	0%	-23%	-23%	-1%
Lonmin Plc	LMI.L	8%	8%	-1%	-11%	-11%	-1%
Nordgold	NORDNq.L	8%	8%	0%	1%	1%	14%
Petra Diamonds	PDL.L	7%	6%	-8%	4%	3%	-17%
Petropavlovsk PLC	POG.L	55%	55%	0%	38%	39%	1%
Polymetal	POLYP.L	34%	34%	0%	-3%	-4%	-2%
Randgold Resources	RRS.L	-16%	-16%	0%	-19%	-19%	1%
<b>South Africa</b>							
African Rainbow	ARIJ.J	0%	0%	0%	-1%	-2%	-78%
Assore	ASRJ.J	-18%	-18%	0%	-24%	-26%	-7%
Exxaro	EXXJ.J	13%	13%	3%	15%	13%	-14%
Kumba Iron Ore Ltd	KIOJ.J	8%	8%	0%	4%	-5%	-245%

Source: Citi Research



## Appendix A-1

### Analyst Certification

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

### IMPORTANT DISCLOSURES

Citi is providing fairness opinion to Sesa Goa Limited on in the proposed merger of Sterlite Industries and other Vedanta Resources PLC group companies. Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Vedanta Resources PLC

An employee of Citigroup Global Markets or its affiliates is a non - executive director of Anglo American Plc.

Citigroup Global Markets Limited acted as Joint Bookrunner and Joint Broker in relation to the recent Rights Issue by Lonmin Plc.

Within the past 12 months, Citigroup Global Markets Inc. or its affiliates has acted as manager or co-manager of an offering of securities of Kumba Iron Ore Ltd, First Quantum Minerals Ltd, Fresnillo Plc, Rio Tinto PLC, African Barrick Gold Plc, Anglo American PLC, Lonmin PLC, Antofagasta.

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from Kumba Iron Ore Ltd, Vedanta Resources Plc, First Quantum Minerals Ltd, Rio Tinto PLC, African Barrick Gold Plc, Norilsk Nickel, Kazakhmys Plc, Norsk Hydro ASA, BHP Billiton PLC, New World Resources, Anglo American PLC, Lonmin PLC.

Citigroup Global Markets Inc. or its affiliates expects to receive or intends to seek, within the next three months, compensation for investment banking services from Vedanta Resources Plc, Norilsk Nickel, BHP Billiton PLC, Ferrexpo PLC.

Citigroup Global Markets Inc. or an affiliate received compensation for products and services other than investment banking services from Kumba Iron Ore Ltd, Vedanta Resources Plc, Nordgold, Hochschild Mining Plc, First Quantum Minerals Ltd, Eurasian Natural Resources Corporation PLC (ENRC), Fresnillo Plc, Rio Tinto PLC, African Rainbow Minerals, African Barrick Gold Plc, Norilsk Nickel, Kazakhmys Plc, Norsk Hydro ASA, BHP Billiton PLC, Gem Diamonds, New World Resources, United Company Rusal, Zanaga Iron Ore Company, Anglo American PLC, Randgold Resources Ltd, Lonmin PLC, Antofagasta, Ferrexpo PLC, Exxaro Resources Limited in the past 12 months.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as investment banking client(s): Kumba Iron Ore Ltd, Vedanta Resources Plc, First Quantum Minerals Ltd, Rio Tinto PLC, African Barrick Gold Plc, Norilsk Nickel, Kazakhmys Plc, Norsk Hydro ASA, BHP Billiton PLC, New World Resources, Anglo American PLC, Lonmin PLC, Ferrexpo PLC.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, securities-related: Kumba Iron Ore Ltd, Vedanta Resources Plc, Nordgold, Hochschild Mining Plc, First Quantum Minerals Ltd, Fresnillo Plc, Rio Tinto PLC, Nyrstar NV, African Barrick Gold Plc, Norilsk Nickel, Kazakhmys Plc, Norsk Hydro ASA, BHP Billiton PLC, New World Resources, United Company Rusal, Zanaga Iron Ore Company, Anglo American PLC, Randgold Resources Ltd, Lonmin PLC, Antofagasta, Exxaro Resources Limited.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, non-securities-related: Kumba Iron Ore Ltd, Vedanta Resources Plc, Nordgold, Hochschild Mining Plc, First Quantum Minerals Ltd, Eurasian Natural Resources Corporation PLC (ENRC), Fresnillo Plc, Rio Tinto PLC, African Rainbow Minerals, African Barrick Gold Plc, Norilsk Nickel, Kazakhmys Plc, Norsk Hydro ASA, BHP Billiton PLC, Gem Diamonds, New World Resources, United Company Rusal, Anglo American PLC, Randgold Resources Ltd, Lonmin PLC, Antofagasta, Ferrexpo PLC, Exxaro Resources Limited.

Analysts' compensation is determined based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates ("the Firm"). Like all Firm employees, analysts receive compensation that is impacted by overall firm profitability which includes investment banking revenues.

The Firm is a market maker in the publicly traded equity securities of Kumba Iron Ore Ltd, First Quantum Minerals Ltd, Norilsk Nickel, Norsk Hydro ASA, Anglo American PLC, Randgold Resources Ltd, Antofagasta, Exxaro Resources Limited.

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures,

are contained on the Firm's disclosure website at [https://www.citivelocity.com/cvr/epublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/epublic/citi_research_disclosures). Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Historical disclosures (for up to the past three years) will be provided upon request.

### Citi Research Equity Ratings Distribution

Data current as of 31 Dec 2012	12 Month Rating			Relative Rating		
	Buy	Hold	Sell	Buy	Hold	Sell
Citi Research Global Fundamental Coverage	49%	38%	12%	7%	86%	7%
% of companies in each rating category that are investment banking clients	53%	49%	45%	60%	49%	55%

### Guide to Citi Research Fundamental Research Investment Ratings:

Citi Research stock recommendations include an investment rating and an optional risk rating to highlight high risk stocks.

**Risk rating** takes into account both price volatility and fundamental criteria. Stocks will either have no risk rating or a High risk rating assigned.

**Investment Ratings:** Citi Research investment ratings are Buy, Neutral and Sell. Our ratings are a function of analyst expectations of expected total return ("ETR") and risk. ETR is the sum of the forecast price appreciation (or depreciation) plus the dividend yield for a stock within the next 12 months. The Investment rating definitions are: Buy (1) ETR of 15% or more or 25% or more for High risk stocks; and Sell (3) for negative ETR. Any covered stock not assigned a Buy or a Sell is a Neutral (2). For stocks rated Neutral (2), if an analyst believes that there are insufficient valuation drivers and/or investment catalysts to derive a positive or negative investment view, they may elect with the approval of Citi Research management not to assign a target price and, thus, not derive an ETR. Analysts may place covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and / or trading in the company's securities (e.g. trading suspension). As soon as practically possible, the analyst will publish a note re-establishing a rating and investment thesis. To satisfy regulatory requirements, we correspond Under Review and Neutral to Hold in our ratings distribution table for our 12-month fundamental rating system. However, we reiterate that we do not consider Under Review to be a recommendation.

**Relative three-month ratings:** Citi Research may also assign a three-month relative call (or rating) to a stock to highlight expected out-performance (most preferred) or under-performance (least preferred) versus the geographic and industry sector over a 3 month period. The relative call may highlight a specific near-term catalyst or event impacting the company or the market that is anticipated to have a short-term price impact on the equity securities of the company. Absent any specific catalyst the analyst(s) will indicate the most and least preferred stocks in the universe of stocks under consideration, explaining the basis for this short-term view. This three-month view may be different from and does not affect a stock's fundamental equity rating, which reflects a longer-term total absolute return expectation. For purposes of NASD/NYSE ratings-distribution-disclosure rules, most preferred calls correspond to a buy recommendation and least preferred calls correspond to a sell recommendation. Any stock not assigned to a most preferred or least preferred call is considered non-relative-rated (NRR). For purposes of NASD/NYSE ratings-distribution-disclosure rules we correspond NRR to Hold in our ratings distribution table for our 3-month relative rating system. However, we reiterate that we do not consider NRR to be a recommendation.

Prior to October 8, 2011, the firm's stock recommendation system included a risk rating and an investment rating. **Risk ratings**, which took into account both price volatility and fundamental criteria, were: Low (L), Medium (M), High (H), and Speculative (S). **Investment Ratings** of Buy, Hold and Sell were a function of the Citi Research expectation of total return (forecast price appreciation and dividend yield within the next 12 months) and risk rating. Additionally, analysts could have placed covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and/or trading in the company's securities (e.g. trading suspension). Stocks placed "Under Review" were monitored daily by management and as practically possible, the analyst published a note re-establishing a rating and investment thesis. For securities in developed markets (US, UK, Europe, Japan, and Australia/New Zealand), investment ratings were: Buy (1) (expected total return of 10% or more for Low-Risk stocks, 15% or more for Medium-Risk stocks, 20% or more for High-Risk stocks, and 35% or more for Speculative stocks); Hold (2) (0%-10% for Low-Risk stocks, 0%-15% for Medium-Risk stocks, 0%-20% for High-Risk stocks, and 0%-35% for Speculative stocks); and Sell (3) (negative total return). For securities in emerging markets (Asia Pacific, Emerging Europe/Middle East/Africa, and Latin America), investment ratings were: Buy (1) (expected total return of 15% or more for Low-Risk stocks, 20% or more for Medium-Risk stocks, 30% or more for High-Risk stocks, and 40% or more for Speculative stocks); Hold (2) (5%-15% for Low-Risk stocks, 10%-20% for Medium-Risk stocks, 15%-30% for High-Risk stocks, and 20%-40% for Speculative stocks); and Sell (3) (5% or less for Low-Risk stocks, 10% or less for Medium-Risk stocks, 15% or less for High-Risk stocks, and 20% or less for Speculative stocks).

Investment ratings are determined by the ranges described above at the time of initiation of coverage, a change in investment and/or risk rating, or a change in target price (subject to limited management discretion). At other times, the expected total returns may fall outside of these ranges because of market price movements and/or other short-term volatility or trading patterns. Such interim deviations from specified ranges will be permitted but will become subject to review by Research Management. Your decision to buy or sell a security should be based upon your personal investment objectives and should be made only after evaluating the stock's expected performance and risk.

### NON-US RESEARCH ANALYST DISCLOSURES

Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the NYSE Rule 472 and NASD Rule 2711 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. The legal entities employing the authors of this report are listed below:

Citigroup Global Markets Ltd

Heath R Jansen; Jatinder Goel, CFA; Jon H Bergtheil; Thomas O'Hara; Michael E Flitton

Citigroup Global Markets (Pty) Ltd

Johann Pretorius

ZAO Citibank

Daniel Yakub

## OTHER DISCLOSURES

Citigroup Global Markets Inc. and/or its affiliates has a significant financial interest in relation to First Quantum Minerals Ltd, Norilsk Nickel, Kazakhmys Plc, Norsk Hydro ASA, BHP Billiton PLC, Anglo American PLC, Lonmin PLC, Exaro Resources Limited. (For an explanation of the determination of significant financial interest, please refer to the policy for managing conflicts of interest which can be found at [www.citiVelocity.com](http://www.citiVelocity.com).)

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Citigroup Global Markets Inc. or its affiliates acts as a corporate broker to Kazakhmys Plc, BHP Billiton PLC, Zanaga Iron Ore Company, Lonmin PLC.

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of Citi Research to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

**Important Disclosures for Morgan Stanley Smith Barney LLC Customers:** Morgan Stanley & Co. LLC (Morgan Stanley) research reports may be available about the companies that are the subject of this Citi Research research report. Ask your Financial Advisor or use [smithbarney.com](http://smithbarney.com) to view any available Morgan Stanley research reports in addition to Citi Research research reports.

Important disclosure regarding the relationship between the companies that are the subject of this Citi Research research report and Morgan Stanley Smith Barney LLC and its affiliates are available at the Morgan Stanley Smith Barney disclosure website at [www.morganstanleysmithbarney.com/researchdisclosures](http://www.morganstanleysmithbarney.com/researchdisclosures).

For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to [www.morganstanley.com/researchdisclosures](http://www.morganstanley.com/researchdisclosures) and [https://www.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures). This Citi Research research report has been reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval was conducted by the same person who reviewed this research report on behalf of Citi Research. This could create a conflict of interest.

**The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by.** The Product is made available in **Australia** through Citi Global Markets Australia Pty Ltd. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being

made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is made available in **France** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 1-5 Rue Paul Cézanne, 8ème, Paris, France. The Product is distributed in **Germany** by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. Bakhtawar, Nariman Point, Mumbai 400-021. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A., Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Italy** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. Via dei Mercanti, 12, Milan, 20121, Italy. The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. <http://dis.kofia.or.kr/fs/dis2/fundMgr/DISFundMgrAnalystPop.jsp?companyCd2=A03030&pageDiv=02>. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Company No. 460819-D) ("CGMM") to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to 'wholesale clients' only as defined by s5C(1) of the Financial Advisers Act 2008 ('FAA') through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. ("CGMSPL"), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold/Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South



African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in **Spain** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gasset, 4th Floor, Madrid, 28006, Spain. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan and/or through Citibank Securities (Taiwan) Company Limited ("CSTL"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the respective license scope of each entity and the applicable laws and regulations in the Republic of China. CGMTS and CSTL are both regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS and CSTL]. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Büyükdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E.**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. This material may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in **United States** by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is regulated by Financial Services Authority.

Pursuant to Comissão de Valores Mobiliários Rule 483, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Many European regulators require that a firm must establish, implement and make available a policy for managing conflicts of interest arising as a result of publication or distribution of investment research. The policy applicable to Citi Research's Products can be found at [https://www.citivelocity.com/cvr/epublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/epublic/citi_research_disclosures).

Compensation of equity research analysts is determined by equity research management and Citigroup's senior management and is not linked to specific transactions or recommendations.

The Product may have been distributed simultaneously, in multiple formats, to the Firm's worldwide institutional and retail customers. The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product.

With the exception of our product that is made available only to Qualified Institutional Buyers (QIBs) and other product that is made available through other distribution channels only to certain categories of clients to satisfy legal or regulatory requirements, Citi Research concurrently disseminates its research via proprietary and non-proprietary electronic distribution platforms. Periodically, individual Citi Research analysts may also opt to circulate research posted on such platforms to one or more clients by email. Such email distribution is discretionary and is done only after the research has been disseminated via the aforementioned distribution channels. Citi Research simultaneously distributes product that is limited to QIBs only through email distribution.

The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with Citi and legal and regulatory constraints.

Citi Research product may source data from dataCentral. dataCentral is a Citi Research proprietary database, which includes Citi estimates, data from company reports and feeds from Reuters and Datastream.

© 2013 Citigroup Global Markets Inc. Citi Research is a division of Citigroup Global Markets Inc. Citi and Citi with Arc Design are trademarks and service marks of Citigroup Inc. and its affiliates and are used and registered throughout the world. All rights reserved. Any unauthorized use, duplication, redistribution or disclosure of this report (the "Product"), including, but not limited to, redistribution of the Product by electronic mail, posting of the Product on a website or page, and/or providing to a third party a link to the Product, is prohibited by law and will result in prosecution. The information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient to any third party. Where included in this report, MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, disseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to,



computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are services marks of MSCI and its affiliates. The Firm accepts no liability whatsoever for the actions of third parties. The Product may provide the addresses of, or contain hyperlinks to, websites. Except to the extent to which the Product refers to website material of the Firm, the Firm has not reviewed the linked site. Equally, except to the extent to which the Product refers to website material of the Firm, the Firm takes no responsibility for, and makes no representations or warranties whatsoever as to, the data and information contained therein. Such address or hyperlink (including addresses or hyperlinks to website material of the Firm) is provided solely for your convenience and information and the content of the linked site does not in anyway form part of this document. Accessing such website or following such link through the Product or the website of the Firm shall be at your own risk and the Firm shall have no liability arising out of, or in connection with, any such referenced website.

---

ADDITIONAL INFORMATION IS AVAILABLE UPON REQUEST

---