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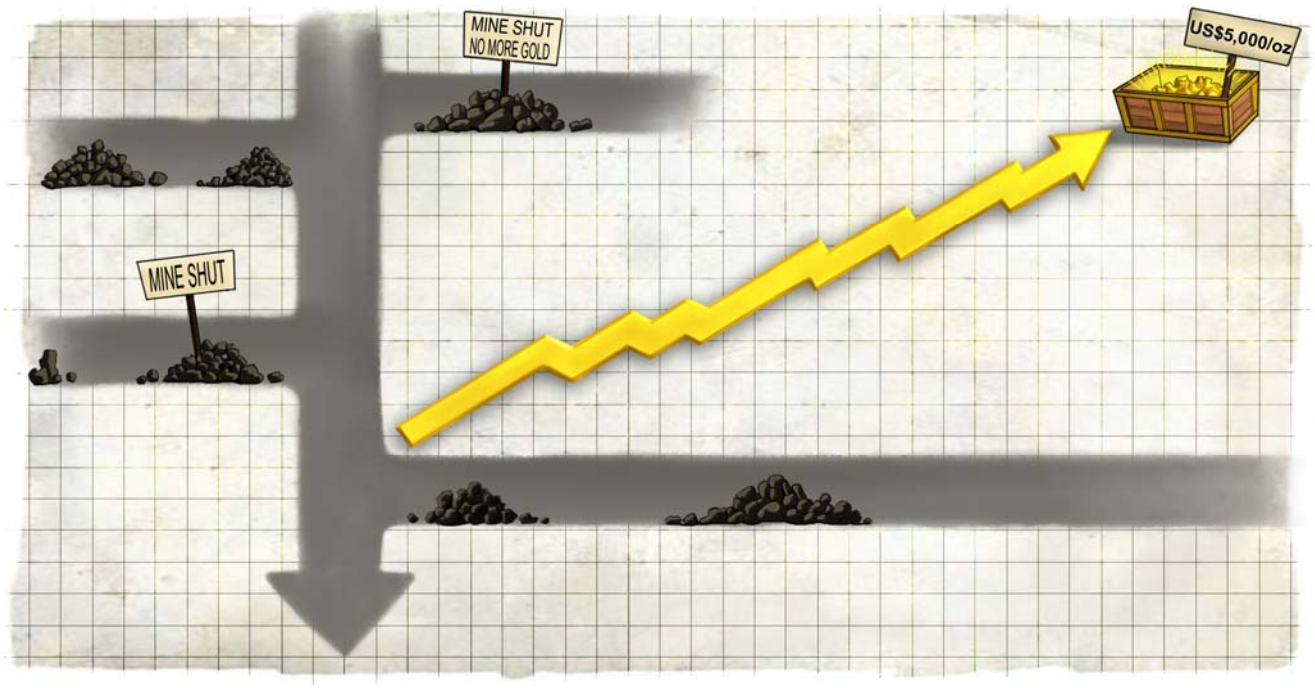
Standard Chartered

| Equity Research | Asia | Metals and Mining | 14 June 2011

In gold we trust

A definitive study of gold mine production from 2011 to 2015



- **Slow production growth:** Most market commentary on gold centres on the direction of US dollar movements or inflation/deflation issues – we go beyond this to examine future mine supply, which we regard as an equally important driver. In our study of 375 global gold mines and projects, we note that after 10 years of a bull market, the gold mining industry has done little to bring on new supply. Our base-case scenario puts gold production growth at only 3.6% CAGR over the next five years.
- **High cost hurdle:** Our IRR analysis of the major gold projects under construction globally reveals that the long-term gold price will need to be US$1,400/oz to justify capital cost. For greenfield projects, the gold price would need to be closer to US$2,000/oz to generate the minimum required return. Escalating costs of building gold mines could result in delays at many projects.
- **Deficit market:** The limited new supply comes at a time when central banks have turned from being net sellers to significant net buyers of gold. The result, in our view, will be a gold market in deficit, even assuming flat growth in demand. With the supply-demand balance so out of kilter, we see the gold price potentially going to US$5,000/oz.
- **Our hunting ground – the juniors:** We believe the gold juniors are the best way to play a rising gold price, as they offer good growth at attractive valuations in terms of EV/resource within our universe of 106 gold companies. We think the gold majors, with their low growth, will continue to underperform the juniors, particularly those depending on expensive acquisitions for growth.
- **Zhaojin Mining our top pick:** Among the gold companies we cover, Zhaojin Mining stands out for its superior production growth and low production cost. More importantly, it has built a track record in low-cost expansion through exploration and acquisition. We also like Zijin Mining for its cheap valuation and Philex Mining, which has the potential to create value by spinning off its petroleum business and restarting its Bulawan mine.

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Important disclosures can be found in the Disclosures Appendix

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Executive summary

Gold production growth = 3.8%

We are bullish on gold. Most market commentary on gold has centred on the direction of US dollar movements or inflation/deflation issues. We go beyond this to examine future mine supply, which we think is just as important a driver. Our comprehensive study of 375 gold projects supply suggests a very limited production growth profile for the next five years. A ten-year bull market in gold has done little to drive gold production. The gold miners are running to stand still. A lack of funding from equity markets and a shortage of large gold mines makes it difficult for the industry to compensate for the depletion caused by aging mines and falling grades**. In our base case, our 375-mine supply model shows net production growth of 3.6% pa. over the next five years.**

US$1400/oz to justify construction of major gold projects

Our IRR analysis shows that for the major gold projects under construction, for which the acquisition cost of gold resources has already been spent, the gold price would need to be US$1,400/oz in order to generate a 20% IRR, which is usually the minimum return requirement. For greenfield projects going forward, the gold price would need to be nearly US$2,000/oz to produce an IRR of 20%. We believe this daunting hurdle will likely further delay gold production.

Central banks change from net seller to net buyer

The limited supply comes at a time when central banks have completely changed their tune on selling down their gold stocks and now appear likely to accelerate their net buying programmes. China is way behind the curve. Currently, only 1.8% of China's foreign exchange reserves is in gold; if the country were to bring this proportion in line with the global average of 11%, it would have to buy 6,000 more tonnes of gold, equivalent to more than 2 years of gold production.

We believe that these factors – limited gold production, buying by central banks and increasing demand from India and China – can potentially drive the gold price to US$5,000/oz, as highlighted in our commodity team's earlier report, *Gold – Super-cycle to extend above US$2,100/oz* (17 April 2011).

We recommend investing in either physical gold or junior gold miner stocks

We believe the best ways to invest in the gold cycle are buying physical gold (a safe asset) or investing in junior gold miners (highest leverage to the gold price) that are 1-2 years away from production. We are cautious about the gold majors. Project plans of the big five gold producers by market cap suggest an average production CAGR of only 4% in the next five years. They need to depend on expensive acquisitions in order to grow further. As a form of affirmation, the share price index we constructed for the gold majors underperformed the gold price by 147ppt over 1995-2011.

Gold mine production – subdued growth in next five years

This report focuses on the gold mine production trend in the next five years and addresses the key issues that drive demand. We studied 345 gold mines as well as 30 copper and base-metal mines with significant gold credits, such as Grasberg in Indonesia. Our key findings are:

- Gold mine production CAGR for the next five years will be 3.6%, going by our base case, or down to 1.2% CAGR, under our bear-case scenario. Even our bull case has gold mine production growth at only 5.6%.
- There are very few large gold mines commencing operations in the next five years. Only seven gold mines (green or brownfield) and one copper/gold mines (the Oyu Tolgoi Mine in Mongolia) are capable of adding a total of more than 500koz gold production over the entire period of 2011-15.
- Our analysis of the major gold projects shows they can generate an IRR of 19% at the long-term gold price of US$1,400/oz, below the gold companies' IRR of at least 20%. For greenfield projects going forward, the gold price needs to be nearly US$2,000/oz to produce a 20% IRR.

- From our analysis, the regions that could contribute the most to gold mine production growth are Asia (29% of total five-year global volume growth), Africa (23%), North America (17% mainly Canada) and South America (12%).
- The average grade (weighted by resource size) of the gold mines in our database is 3.5g/tonne, which reflects the grade of the gold reserves. The resource grade is typically lower than the reserve grade.

We conclude that gold production growth will be limited, which will continue to fuel the gold cycle. We believe demand will be driven by continued growth in per capita GDP in China and India, a weak US dollar and high inflation, which have fuelled doubt in the creditability of paper currency. Ironically, central banks, which collectively had been net buyers of gold until 2010, would also be a powerful force driving gold demand.

Where we should put our money

General investment theme

For investors with conviction in gold price growth, we see two main ways of investing in the gold cycle ahead: buying physical gold (safest) and junior gold miners (highest leverage to gold price). There is also a spectrum of other means in-between, including buying gold ETFs and investing in the gold majors.

In this report, we present a comprehensive global comparison of the trading multiples of 106 listed gold companies, based on PER, EV/reserve, EV/resource and production growth.

We project that gold majors in general will experience slow growth, partly because of their high base. The largest five gold majors by market cap will have a production CAGR of only 4% in the next five years, and this is if we were to fully accept management's guidance. Our other concern is that gold majors are likely to depend on expensive acquisitions to fuel production growth.

Companies that offer fast production growth and yet are trading on low EV/resources include Centamin Egypt, Jaguar Mining, Silverlake Resources, Banro, Noble Minerals, Detour, Cluff Gold, G-Resources, etc. A detailed discussion can be found in the next section, "Investment views and recommendations".

Gold mining companies that we cover

Among the gold mining companies we cover, **our top pick continues to be Zhaojin Mining (1818 HK, Outperform)**, for its superior production growth, pure play on gold and low production cost. We highlight the company's low-cost expansion of its gold resources via exploration and acquisition.

We also like **Zijin Mining (2899 HK, Outperform)** for its cheap valuation (11.5x PER 2011E and 9x PER 2012E vs a 3-year earnings CAGR of 26%) and **Philex Mining (PX PM, Outperform)** for the company's value-unlocking exercise on the oil and gas businesses. **Real Gold (246 HK, In-Line)** looks very cheap too, trading at only 0.5x to its NPV, but the company will have to work hard to redeem itself after a recent negative report from the *South China Morning Post*.

Fig 1: Comparison of gold companies under coverage

Name	Ticker	Rec	Ccy	Price 13-Jun	Mkt cap (US$m)	PT	Upside %	PER (x) 2011E	PER (x) 2012E	EV/EBITDA (x) 2011E	EV/EBITDA (x) 2012E	EV/Reserve (US$/oz)	EV/Resource (US$/oz)
Zhaojin	1818 HK	OP	HKD	16.80	6,291	23.49	40%	26.5	19.1	18.3	13.1	666.6	338.7
Zijin Mining	2899 HK	OP	HKD	3.88	14,631	4.78	23%	11.5	9.2	6.6	5.2	629.3	60.7
Real Gold	246 HK	IL	HKD	8.86	1,034	9.02	2%	6.2	5.2	2.3	1.9	102.6	66.9
Philex	PX PM	OP	PHP	19.10	2,171	23.00	20%	20.3	22.1	12.5	13.4	1,339.8	113.9

Source: Standard Chartered Research estimates

Investment views and recommendations

Ways to invest in gold

There are many ways to invest in the gold cycle. The main ones are:

- Buying physical gold. We see this as the safest way to invest in gold.
- Buying gold ETFs, which are often backed by physical gold, and thus can be viewed as a proxy for gold, but one cannot rule out the counterparty risk.
- Investing in gold companies – majors, mid-tiers and juniors. We think the juniors, if filtered properly, can offer very handsome returns within an escalating gold price environment. Their valuations tend to be depressed during periods when the gold price is not high, but the picture can change substantially when gold prices rise. We believe that mid-tier or junior gold producers with good production potential can also be interesting.

Supply/demand and gold price forecast

Gold market to be in deficit due to limited mine production and central banks' net buying

Our research team takes a bullish view on gold. We believe the gold market will be in deficit over the next five years because mine production will be limited and central banks are already buying gold. In our forecast table below, to be ultra conservative, we have assumed zero growth for gold demand. Even under such assumptions, the gold market will be in deficit until 2015 (see Fig 2 below). See the section "Gold demand: Driven by China/India and central banks globally" for a more detailed discussion on our assumptions.

Fig 2: Global gold supply and demand

Metric tonnes	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011E	2012E	2013E	2014E	2015E
Supply															
Mine production	2,621	2,588	2,592	2,492	2,550	2,475	2,478	2,410	2,590	2,689	2,764	2,875	3,027	3,128	3,204
Net producer hedging	(151)	(412)	(270)	(422)	(86)	(369)	(444)	(352)	(236)	(103)	(40)	0	0	0	0
Total mine supply	**2,470**	**2,176**	**2,322**	**2,070**	**2,464**	**2,106**	**2,034**	**2,058**	**2,353**	**2,586**	**2,724**	**2,875**	**3,027**	**3,128**	**3,204**
Central bank sales/(purchases)	520	547	617	469	674	329	484	232	34	(76)	(500)	(550)	(605)	(666)	(732)
Recycled gold	713	840	943	849	886	1,106	958	1,316	1,695	1,646	1,646	1,646	1,646	1,646	1,646
Total supply	**3,703**	**3,563**	**3,882**	**3,388**	**4,025**	**3,541**	**3,476**	**3,605**	**4,081**	**4,155**	**3,870**	**3,971**	**4,068**	**4,108**	**4,118**
Demand															
Fabrication															
Jewellery	3,001	2,653	2,477	2,614	2,707	2,279	2,404	2,190	1,814	2,017	2,118	2,118	2,118	2,118	2,118
Industrial & dental	474	481	513	411	427	452	462	439	410	466	480	480	480	480	480
Sub-total above fabrication	**3,475**	**3,134**	**2,990**	**3,025**	**3,134**	**2,731**	**2,866**	**2,629**	**2,223**	**2,483**	**2,598**	**2,598**	**2,598**	**2,598**	**2,598**
Bar & coin retail investment	261	264	180	398	411	411	446	636	778	1,149	1,207	1,207	1,207	1,207	1,207
Other retail investment	-	165	712	(60)	(26)	(28)	(14)	220							
ETFs & similar				133	208	260	253	321	617	338	355	355	355	355	355
Total demand	**3,736**	**3,563**	**3,882**	**3,496**	**3,727**	**3,374**	**3,552**	**3,806**	**3,618**	**3,971**	**4,160**	**4,160**	**4,160**	**4,160**	**4,160**
Surplus / (Deficit)	**33**	**-**	**-**	**(108)**	**297**	**167**	**(76)**	**(200)**	**463**	**185**	**(290)**	**(189)**	**(92)**	**(52)**	**(42)**
Gold price (US$/oz)	271	310	363	409	444	604	695	872	972	1,225	1,460	1,650	1,864	2,107	1,900

Source: World Gold Council, Standard Chartered Research estimates

Our commodity research team recently published a report, *Gold – Super-cycle to extend above US$2,100/oz* (17 April 2011). It believes gold could run to US$4,869/oz in nominal terms by 2020 (US$3,681/oz in real terms) in a bull-case scenario.

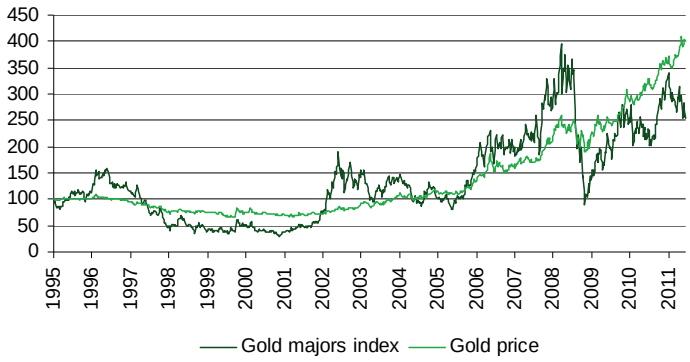
Investing in the gold companies

Gold big caps underperform gold price

Gold majors underperformed gold price

We track 106 gold companies in our database (Appendix 1 has a complete list with comparison details). We find the gold majors have generally lagged the gold price in the past 16 years (see the chart below). The gold major index is calculated as the market cap weighted average share prices of the largest 10 gold companies in terms of market cap.

Fig 3: Gold price vs gold majors index

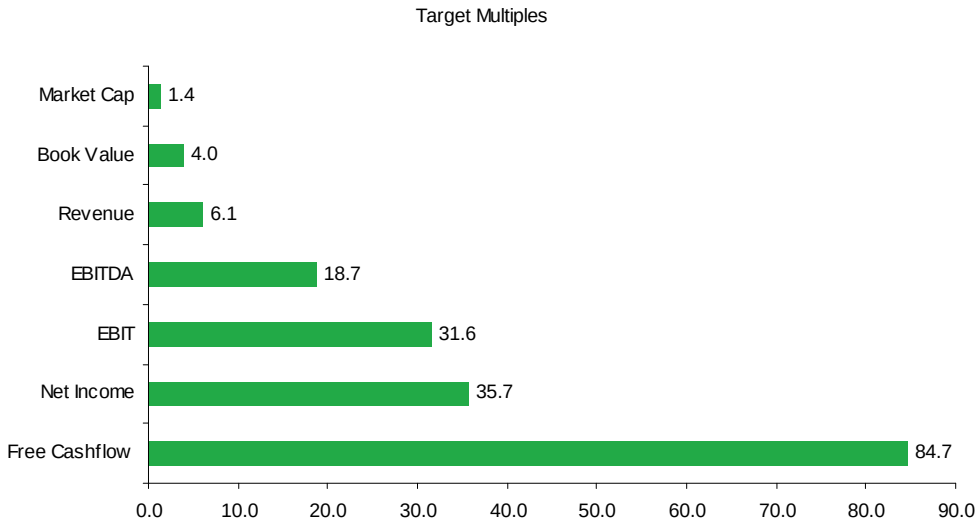


Based on a universe of gold majors comprising Barrick, Newmont, Anglo Gold Ashanti, Goldfields, Newcrest, Goldcorp, Kinross, Freeport-McMoRan, Harmony Gold and Polyus
Source: Companies, Bloomberg, Standard Chartered Research

Gold company acquisitions have been made at a premium since 1995

One possible reason why gold majors have underperformed is that it has been difficult for them to achieve growth from a high base. Thus, they are forced to depend on expensive acquisitions for growth. According to Bloomberg, all gold acquisitions of over US$500m since 1995 were done at an average 40% premium to the market cap of the targets, 3.8x of book, or about 19x of EBITDA. These hefty prices formed a significant burden for the acquirers.

Fig 4: Average multiples of gold acquisitions >US$500m from 1995-2010



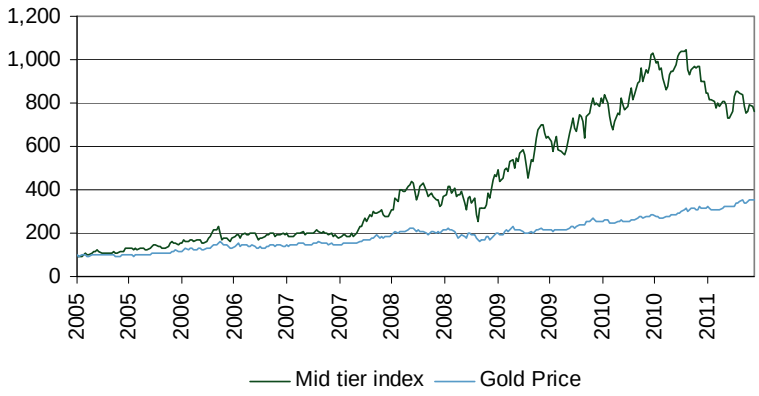
Source: Bloomberg, Standard Chartered Research

Gold juniors/small caps outperformed the gold price

Gold juniors/mid-tiers outperformed

The construction of a junior index is tricky, particularly over a long period, because of changes in the nature of business of some of the companies. We constructed an index in 2005 to track 19 companies offering good growth and with reasonable valuations based on EV/resources. The chart below shows that in the past six years, the juniors/mid-tier stocks have shown clear outperformance to the gold price.

Fig 5: Gold price vs gold junior index

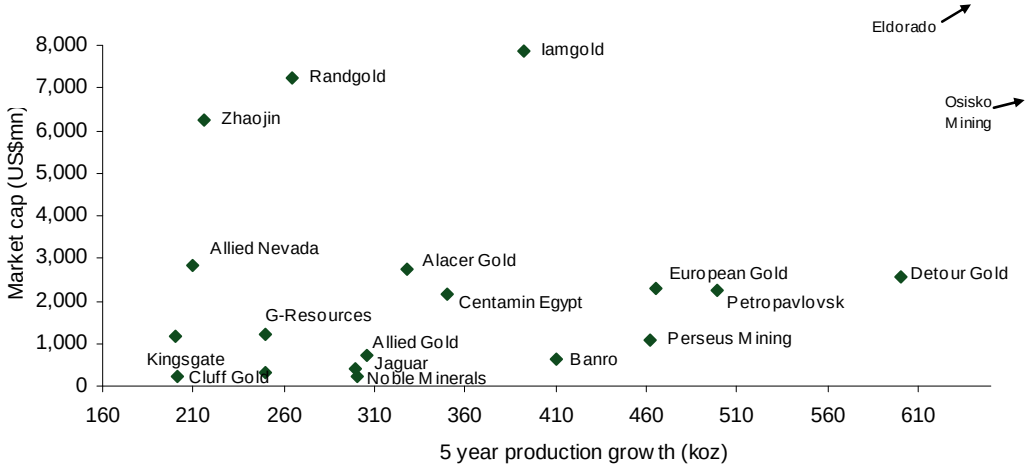


Our gold junior universe comprises Noble Minerals, Jaguar, Randgold, Silverlake, Allied Nevada, Eldorado, Yamana, Detour, Agnico, Petropav, Perseus, Euro Gold, Banro, Iamgold, Centamin Egypt, Alacer, Allied Gd, Zhaojin Mining, Kingsgate
Source: Companies, Bloomberg, Standard Chartered Research

Which juniors or mid-tiers are interesting?

There are many ways to screen gold companies. We mined our database of 106 gold companies to select mid-tier and junior gold companies with five-year total production growth of over 200koz and at reasonable EV/resource values. These companies are either in production or close to it. We chart several of them below, based on market cap versus production volume growth.

Fig 6: Market cap vs growth: Mid-tier and junior gold producers



Source: Companies, Bloomberg, Standard Chartered Research
Note: Eldorado and Osisko are beyond the scale following the direction of the arrows.

The complete list of those companies and their details are listed in Fig.7 below. We do not cover the companies above, but they could be mispriced on the prospective growth they offer. The usual disclaimer here is that investors should assess project and country risks to decide the appropriate valuation levels for these companies.

Fig 7: Mid-tier and gold companies with prospective growth (rank by production volume growth from high to low)

Company	Ticker	Market cap US$m	EV/Reserve US$/oz	EV/Resource US$/oz	P/E 2011	Resources (incl. reserves) (koz)	Production 'koz					total 5yr vol growth (koz)	5-year CAGR	Mine life by reserve yr
							2011E	2012E	2013E	2014E	2015E			
Osisko Mining	OSK CN	5,458	616	342	29	16,140	300	688	712	695	1,004	1,004	35%	9
Eldorado	EGO US	7,746	500	284	22	26,896	750	838	1,000	1,388	1,400	767	17%	11
Yamana	AUY US	8,566	148	101	12	85,172	1,104	1,298	1,651	1,651	1,651	605	10%	11
Detour Gold	DGC CN	2,510	129	93	n.a.	20,515	0	0	200	500	600	600	73%	25
Agnico Eagle	AEM CN	10,414	415	257	24	42,465	1,150	1,300	1,400	1,500	1,500	512	9%	14
Petropavlovsk	POG LN	2,172	86	42	8	62,057	650	888	961	1,047	1,012	506	15%	9
Perseus Mining	PRU AU	1,058	350	134	n.a.	7,300	200	250	478	462	462	462	23%	6
European Gold	EGU CN	2,162	115	100	n.a.	21,000	0	0	206	317	465	465	50%	21
Banro	BAA US	643	121	73	n.a.	7,530	40	140	210	300	410	410	79%	11
Iamgold	IMG CN	7,649	497	251	16	28,741	1,150	1,123	1,359	1,359	1,359	392	7%	12
Centamin Egypt	CEY LN	2,093	214	134	11	14,490	270	300	350	400	500	350	27%	18
Alacer Gold	AQG AU	2,701	863	223	18	12,130	410	510	580	610	598	328	17%	5
Allied Gold	ALD AU	696	216	89	25	8,300	220	220	240	240	370	306	42%	9
Noble Minerals	NMG AU	241	394	119	n.a.	2,000	40	150	225	300	300	300	65%	2
Jaguar Mining	JAG US	386	130	73	15	7,438	200	230	410	457	437	299	26%	10
Randgold	RRS LN	7,083	414	155	20	43,720	748	787	725	705	705	265	10%	23
Silverlake Resources	SLR AU	316	n.a.	116	14	2,536	80	170	260	280	300	250	43%	n.a.
G-Resources	1051 HK	1,229	248	118	n.a.	8,381	62	250	250	250	250	250	42%	12
Zhaojin Mining	1818 HK	6,291	671	341	26	15,941	403	453	499	512	530	203	10%	15
Allied Nevada	ANV US	2,767	252	119	n.a.	20,726	130	270	280	310	310	210	25%	8
Cluff Gold	CLF LN	207	484	52	n.a.	3,612	90	90	90	140	295	201	26%	1.3
Kingsgate	KCN AU	1,170	511	214	19	5,602	150	250	350	350	330	200	20%	7
Average			**351**	**156**	**18**									

Source: Companies, Bloomberg, Standard Chartered Research Estimates

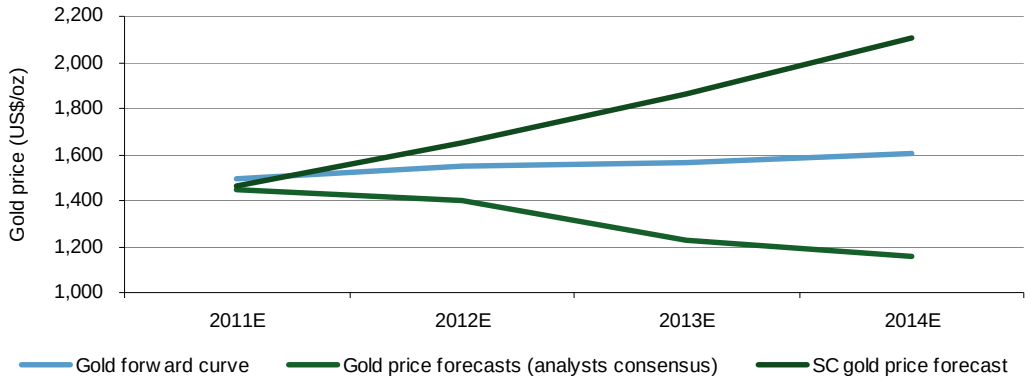
Price/NPV: Why analysts get this wrong

Gold companies have been historically trading at a premium to its NPV because certain factors have led analysts to arrive at conservative NPV estimates:

Analysts' models assume backwardation but the gold forward curve is in contango

- **Gold forward curve in contango while analysts' estimates are in backwardation:** The figure below illustrates that analysts' gold price forecasts are 9% lower in 2012, 21% lower in 2013 and 28% lower in 2014. This has been the case for the last 10 years of the gold bull market as analysts seem to be perturbed by 'how bullish is too bullish?'. Investors, on the other hand, appear to have had more confidence in attributing higher gold prices than analysts' forecasts of gold equities. This has "forced" analysts to use P/NPV multiples with meaningful price targets, which would have been low if their analysis had stopped after discounting cashflows.

Fig 8: Gold price – analysts' forecasts vs forward curve



Source: Bloomberg

- **Superficial short mine life of gold mines.** Like analysts, gold companies also tend to be conservative on the gold price forecasts while modelling and converting resources into reserves. We have witnessed several gold mines producing well beyond the initially identified mine life. We look at Philex Mining as a case study. The company commenced production in 1958 at its Padcal mine in the Philippines. However, Philex has been continuously mining from Padcal for the last 51 years and even increased its gold output. The Sto Thomas II deposit at Padcal is made of porphyry, which is typically large, making it difficult to define the entire ore body. The deposit has a 7-year mine life based on current reserves, which put the final date of production in 2017. In modelling Philex, however, we have been rather dynamic, and we assume the mine life will extend a further 10 years, given our projections of the gold price, the nature of the deposit and the mineral resources contained in it.

- **What is the correct discount rate?** In valuing the gold companies, the appropriate discount rate is also a point of debate. While most analysts are using discount rates on a gold company that are similar to those on other companies, there are investors who believe that the gold value will appreciate over time against cash, and thus a gold company should be discounted at either a low or zero rate. Those investors are willing to pay a price premium to NPV if the NPV were to be based on a normal discount rate.

Gold companies typically get double leverage to rising gold prices: higher earnings and longer mine life. Despite our higher gold price forecasts in the near term, our long-term prices do not differ from the street, and we estimate these at $1,078/oz, 28% lower than today's spot price.

Market is pricing the gold sector at US$1,300-1,400/oz long-term gold price

In our analysis, we compile consensus NPV estimate on the respective companies, and derive the price/NPV ratio based on current share prices. Here is a summary of what we found:

Fig 9: Gold companies' price/NPV multiples under different gold price assumptions

Long-term gold price assumption	Price/NPV (x)	
US$/oz	Average	Range
900	1.9	0.8-2.6
1100	1.7	0.8-2.7
1400	0.9	0.4-1.5

Source: Standard Chartered Research estimates

We found that most analysts are still using US$900-1,100/oz as the long-term gold price. At a long-term gold price of US$1,400/oz, the average price/NPV ratio is 0.9x - i.e. the market is probably discounting the gold sector at a long-term gold price assumption of US$1,300-1,400/oz when there is no premium applied to NPV.

Companies covered

Among the gold mining companies we cover, **Zhaojin Mining (1818.HK, Outperform)** continues to be our top pick, given its superior production growth, pure play on gold, and low production cost. We highlight that the company has been consistently expanding its gold resources and production at low cost.

Fig 10: Comparison of gold companies under coverage

				Price	Mkt cap		Upside	PER (x)		EV/EBITDA (x)		EV/Reserve	EV/Resource
Name	Ticker	Rec	Ccy	13-Jun	(US$m)	PT	%	2011E	2012E	2011E	2012E	(US$/oz)	(US$/oz)
Zhaojin	1818 HK	OP	HKD	16.80	6,291	23.49	40%	26.5	19.1	18.3	13.1	666.6	338.7
Zijin Mining	2899 HK	OP	HKD	3.88	14,631	4.78	23%	11.5	9.2	6.6	5.2	629.3	60.7
Real Gold	246 HK	IL	HKD	8.86	1,034	9.02	2%	6.2	5.2	2.3	1.9	102.6	66.9
Philex	PX PM	OP	PHP	19.10	2,171	23.00	20%	20.3	22.1	12.5	13.4	1,339.8	113.9

Source: Bloomberg, Standard Chartered Research estimates

Zijin Mining (2899.HK, Outperform), after a long de-rating, now looks very cheap at 11.5x R11E and 9x PER12E, compared with the average of 18x PER11E for global gold peers. We think Zijin will return to the growth track in 2012, offering 5% production growth for gold and 27% for copper, in turn driving CAGR for 2010-2012E to 26%.

Philex Mining (PX PH, Outperform)'s share price has risen a notable 35% YTD, but we think there is more to come. The company is now working on unlocking the hidden value of its assets by spinning off its petroleum businesses, to which the market ascribed very little value. The restart of the Bulawan Mine is also likely to add c.12% to the company's value.

Real Gold (246.HK, In-Line) looks like being the weakest of the four companies, having been recently attacked South China Morning Post. Although fundamentally the company is cheap at 0.6x NPV, we think investors will ignore valuations and wait for management to re-establish confidence in the market.

We want to highlight one thing in our valuation model. In our base case, we are using 9-12% discount rates for the DCF price target of the various gold companies, but the time value of gold should appreciate in an environment of continuously weakening paper currencies, so there is a very strong case for using a much lower discount rate. The table bellows illustrates the sensitivity of our price targets to changes in discount rate.

Fig 11 Price target sensitivity to discount rate changes

	Price target changes % to every 1 percentage change in WACC
Zhaojin	8%
Zijin	4%
Real Gold	9%
Philex	12%

Source: Standard Chartered Research

Risks to our recommendation

The key risk to our investment recommendation resides in broad equity risk. If the equity market undergoes a major correction, the gold stocks could be de-rated as well, even though gold prices might be resilient or even benefit from troubled times. There was a major divergence between the performance of the gold price and gold stocks in the last financial crisis.

The second risk is timing. Whilst we have a strong conviction that gold's true value has yet to be revealed, the timing of such a process is uncertain.

Where can I dig out another ounce of gold? A definitive gold mine study.

- We analyse the largest 345 gold mines and 30 copper/base metal gold mines worldwide, including operating mines and those under construction. We estimate gold mine production CAGR for the next five years at 3.6% in our base case, or down to 1.2% in our bear case. Even in our bull case, gold mine production CAGR is only 5.6%.
- There are very few large gold mines set to commence operation in the next five years. Only 7 gold mines (green or brown field) and 1 copper/gold mine (the Oyu Tolgoi Mine in Mongolia) are capable of adding a total of more than 500koz of gold production each over the entire 2011-2015 period.
- Our IRR analysis of the major gold projects shows that they can only generate 19% IRR at a long-term gold price US$1,400/oz, which is below gold companies' required internal return of at least 20%. For greenfield projects going forward, the gold price needs to be nearly US$2,000/oz to produce 20% IRR.
- The regions that could contribute the most to gold mine production growth should be Asia (29% of total five-year global volume growth), Africa (23%), North America (17% mainly Canada), and South America (12%).
- The average grade (weighted by resource size) of the gold mines in our database is 3.5gram/tonne, which reflects the grade of the gold reserves. The resource grade is typically lower than reserve grade.

Methodology

We study 375 mines owned by 106 companies.

In order to gain an understanding of gold production growth, we look at 345 gold mines and 30 copper and base metal mines with significant gold credit around the world. They are owned by 106 gold mining companies.

We compiled a database mine by mine primarily from publicly available information, and tried our best to be as comprehensive as possible on production growth, mine grade, cash costs, and gold resources. We also cross-checked our information with industry experts.

Our database captures 67% of global gold production in line with industry best practice.

The total production of the 375 mines in our database in 2010 was 1,764 tonnes, which represented about 67% of global gold production. We believe our database provides as comprehensive a representation as those of specialist metals/mining consulting companies.

As much of our analysis is built on information sourced from the companies themselves, we are aware that the composite data may possibly err on the side of optimism. Our experience has been that mining companies, particularly those operating greenfield projects, tend to under-deliver their targets. We have thus applied a discount to company guidance to arrive at our base forecasts.

Lastly, in our database, we do not include the explorers or mines that are under pre-feasibility studies and where the production date is expected to be beyond 2015.

Production forecast: three scenarios

Key assumptions

We have walked through every publicly announced mine project of all major gold producers and most junior miners that have public information available.

Gold companies may not achieve what they hope to produce.

In the bull-case analysis, we assume that the production growth guided by the companies could be 100% achieved. In the base case, we apply a 30% discount to the gold companies' production guidance, i.e. assuming they can only achieve 70% of what management aspires to. In the bear case, we assume that they can achieve 40% of targeted production.

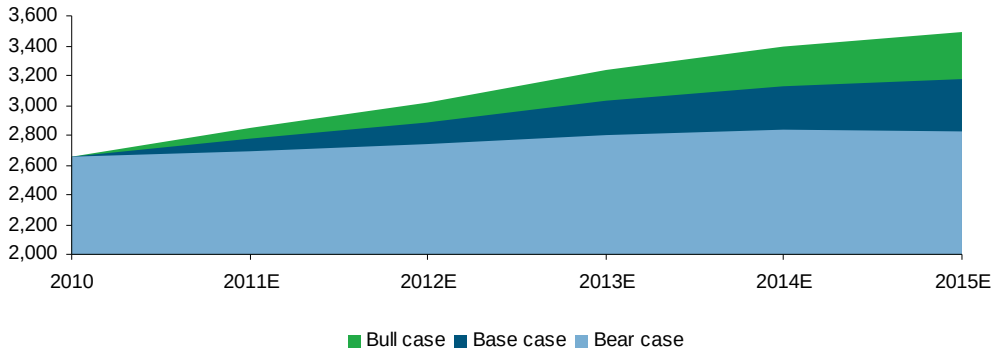
As to the gold production not in our database, this is primarily in the form of by-product gold from other mines. This is particularly the case in China, where nearly half of mine gold production comes as by-products. For the mines not included in the database, we separate the 'others' volume by country and apply the average growth rate over the past five years for each country. The only exception is that we apply 10% and 5% to China and Indonesia, respectively, as we believe these two countries will continue to record solid production growth.

Conclusion

Gold production growth very low in the next 5 years, 5.8% CAGR in the most optimistic case

Gold production could achieve a CAGR of 3.6% from 2010 to 2015 under our base case, 5.6% under the bull case, and 2.2% under the bear case. We think even our base-case estimate of 3.6% could be generous, considering that the compound growth of gold production over the past 20 years was a meagre 0.7%.

Fig 12: World gold production growth under 3 scenarios



Source: Company, USGS, Standard Chartered Research

We show the breakdown of our forecasts below. Under our base-case assumption, we expect the gold market to be in deficit until at least 2015 even assuming flat demand growth. See Fig 2 in the Investment Views and Recommendation section above.

One potential downside risk to our forecast, as shown in Fig 13-15 below, is that we assign 10% p.a. growth to China's "other" gold production not captured in our database, which is largely by-product gold from base metal mines. If production growth for base metals mines is slower than we expect, there is a chance of China's production being below our forecast.

Fig 13: Gold production growth – base case (assuming 70% of the gold mining industry's growth plan can be achieved)

Unit: tonnes	2010	2011E	2012E	2013E	2014E	2015E	Five-year growth
Database Mine							
Gold mine	**1,614**	1,740	1,831	1,924	1,981	2,003	389
Base metal-gold metal mine	**150**	127	131	158	174	177	27
Total production from database mines	**1,764**	**1,867**	**1,962**	**2,082**	**2,155**	**2,180**	**416**
Non-database mine	**895**	909	926	947	971	999	104
Among which:							
US	35	35	34	33	33	32	-3
South Africa	28	26	24	22	21	19	-8
China	217	239	263	289	318	350	133
Indonesia	99	104	109	114	120	126	27
Canada	15	15	14	13	13	12	-3
Australia	44	44	44	44	44	44	0
Russia	74	76	77	79	80	82	8
Peru	64	62	59	57	55	52	-12
Uzbekistan	30	31	31	32	32	33	3
Ghana	22	24	25	26	28	30	8
Others - Bear	265	255	246	236	227	219	-47
World Total	**2,659**	**2,776**	**2,889**	**3,028**	**3,126**	**3,179**	**520**
YoY %	2.9%	4.4%	4.1%	4.8%	3.2%	1.7%	
5-year CAGR							**3.6%**

Source: Public information of gold mining companies, World Gold Council, Standard Chartered Research estimates

If the gold companies deliver production perfectly in accordance with their guidance i.e. we apply no discount to the company's production guidance - then gold production could grow by a total of 870 tonnes in the next five years. Under this bull case, the gold market will still be in deficit in 2011 and 2012, and return to surplus by 2013. We think the probability of this scenario being realised is very low.

Fig 14: Gold production growth – bull case (assuming 100% of the gold mining industry's growth plan can be achieved)

Unit: tonnes	2010	2011E	2012E	2013E	2014E	2015E	Five-year growth
Database Mine							
Gold mine	**1,614**	1,801	1,939	2,085	2,185	2,240	625
Base metal-gold metal mine	**150**	133	139	178	200	205	55
Total production from database mines	**1,764**	**1,934**	**2,078**	**2,263**	**2,385**	**2,444**	**680**
Total non-database mine	**895**	919	946	976	1,009	1,046	151
Among which:							
US	35	35	34	33	33	32	-3
South Africa	28	26	24	22	21	19	-8
China	217	239	263	289	318	350	133
Indonesia	99	104	109	114	120	126	27
Canada	15	15	14	13	13	12	-3
Australia	44	44	44	44	44	44	0
Russia	74	76	77	79	80	82	8
Peru	64	62	59	57	55	52	-12
Uzbekistan	30	31	31	32	32	33	3
Ghana	22	24	25	26	28	30	8
Others	265	265	265	265	265	265	0
World Total	**2,659**	**2,853**	**3,024**	**3,239**	**3,395**	**3,490**	**831**
YoY %	2.9%	7.3%	6.0%	7.1%	4.8%	2.8%	
5-year CAGR							**5.6%**

Source: Public information of gold mining companies, World Gold Council, Standard Chartered Research estimates

If gold companies, however, miss production guidance massively, in which case we assume that gold companies can achieve only 40% of their production targets, global gold production growth will only achieve 170 tonnes in the next five years, or a CAGR of 1.2%. Under this bear-case scenario, we will have a large gold supply/demand deficit of 320-420 tonnes per year in the next five years, which could drive up gold prices significantly.

Fig 15: Gold production growth - bear case (assuming 40% of the gold mining industry's growth plan can be achieved)

Unit: tonnes	2010	2011E	2012E	2013E	2014E	2015E	Five-year growth
Database Mine							
Gold mine	**1,614**	1,679	1,724	1,762	1,777	1,766	152
Base metal-gold metal mine	**150**	121	123	138	147	149	-1
Total production from database mines	**1,764**	**1,799**	**1,846**	**1,901**	**1,925**	**1,915**	**151**
Non-database mine	895	895	897	900	906	913	18
Among which:							
US	35	35	34	33	33	32	-3
South Africa	28	26	24	22	21	19	-8
China	217	228	239	251	264	277	60
Indonesia	99	104	109	114	120	126	27
Canada	15	15	14	13	13	12	-3
Australia	44	44	44	44	44	44	0
Russia	74	76	77	79	80	82	8
Peru	64	62	59	57	55	52	-12
Uzbekistan	30	31	31	32	32	33	3
Ghana	22	24	25	26	28	30	8
Others - Bear	265	252	239	228	216	205	-60
World Total	**2,659**	**2,694**	**2,743**	**2,801**	**2,830**	**2,829**	**170**
YoY %	2.9%	1.3%	1.8%	2.1%	1.1%	-0.1%	
5-year CAGR						**1.2%**	**1.2%**

Source: Public information of gold mining companies, World Gold Council, Standard Chartered Research estimate

Breakdown of production growth by regions

Potential gold production growth in the next five years is mainly from:

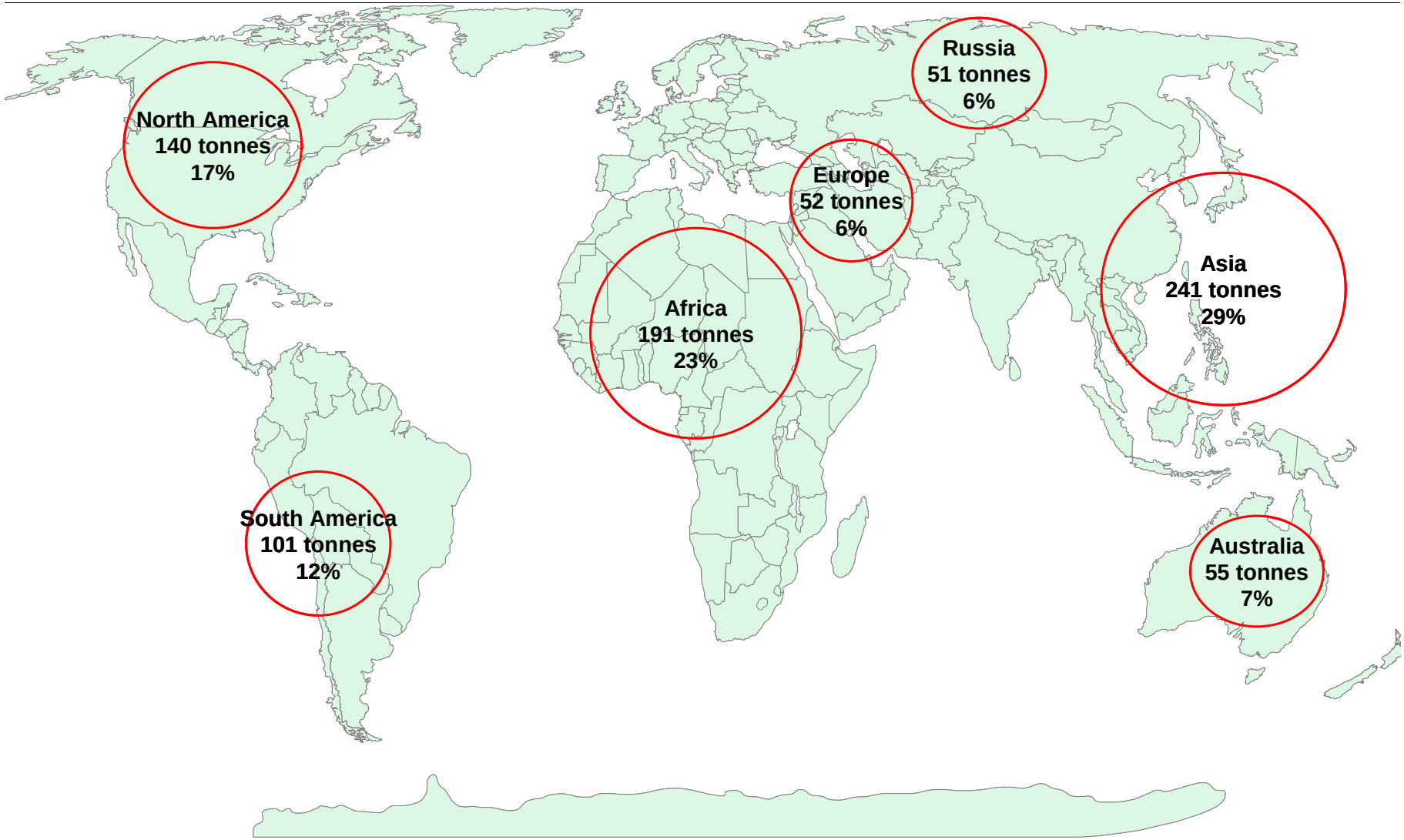
- Asia (29%). Planned growth is mainly from China, Mongolia (Ivanhoe's Oyu Tolgoi mine adding 650koz), and Kazakhstan (Ivanhoe's Bakyrchik copper gold mine adding 388koz). There are no large gold mines in China, but the country has been able to achieve production growth from small primary gold mines and base metal mines, and we assume that the base metal mines can maintain their production growth momentum. The Grasberg copper/gold mine in Indonesia, the single largest mine in the world in terms of gold output in 2010 at 1.8moz, is now working on Phase 6, but underground production is merely planned to compensate for production loss at the open-cut mine, so there should be no meaningful addition of gold production after the expansion is finished;

- Africa (23% of total volume growth): Planned production growth comes from South Africa, Congo, and the Western African countries). Goldfields's South Deep Mine in South Africa has the potential to add 800koz of production by 2015. Anglo Gold Ashanti is working to expand its production by a total of about 180koz in South Africa in the next five years. Production growth in Congo should come from Banro (400koz) and Randgold's Kibali Mine (300koz). Iamgold's Essakane mine in Burkina Faso could potentially add 300koz.

- North America (17%): Osisko's Malartic mine in Canada, starting production this year, is a world-class mine, planned to produce 600koz/pa.

- South America (12%), mainly coming from Argentina (Barrick's Pascua-Lama adding 750koz) and Chile (Kinross's Lobo-Marte adding 350koz). Whilst the contribution from South America looks lower than other regions, we believe this does not represent the true potential of the region. The Cerro Delta is very promising, in our view.

Fig 16: Breakdown by region of gold production growth 2010-2015



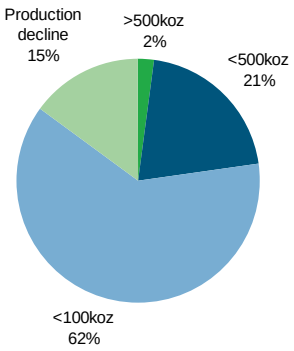
Source: Public information from respective companies, USGS, Standard Chartered Research.
Note: the data above takes the gold mining companies guidance in full, i.e. it'

Profile of mine production growth

Most new mines are small

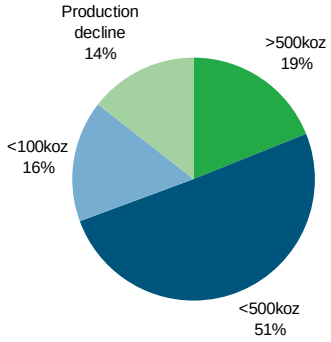
Most of the mines that plan to expand production are small mines. 233 mines, or 62% of the 375 mines we track, plan to grow production by 100koz or less for the total of the next five years. 55 mines look like seeing production decline due to limited gold reserves.

Fig 17: % of total number of gold mines by scale



Source: Standard Chartered Research

Fig 18: Production volume share of gold mines by scale



Source: Standard Chartered Research

Only 7 gold mines and 1 copper-gold mine increasing production by more than 500koz in next 5 years

The largest mines

In our database, only 7 gold mines (Pueblo Viejo, Natalka, Tasiast, South Deep Mine, Pascua-Lama, Mlartic, Detour Lake) and 1 copper gold mine (Oyu Tolgoi) have the potential to grow gold production by a total of more than 500koz in the next five years. The total incremental production these mines represent is about 28% of the total gold production growth in our database. Thus any delay in these projects could affect the global gold production growth quite meaningfully.

Fig 19: Mines with gold production growth of over 500koz for 2011-2015

Mine	Company	Country of mine	Reserve (koz)	MI&I Resource (incl. Reserves) (koz)	Grade (g/tonne)	Production 'koz						Mine life by reserve yr	Mine life by resource yr	Total production growth koz
						2010	2011E	2012E	2013E	2014E	2015E			
Pueblo Viejo	Goldcorp/ Barrick	Dominican Republic	23,658	33,117	2.6	0	104	415	965	965	965	25	34	965
Tasiast	Kinross	Mauritania	7,600	9,688	1.8	57	320	380	500	700	900	8	11	843
South Deep mine	Goldfields	South Africa	29,300	63,600	7.7	265	265	265	265	640	1,065	28	60	800
Pascua-Lama	Barrick	Argentina	18,000	25,300	1.3	0	0	0	375	750	750	24	34	750
Malartic	Osisko Mining	Canada	8,970	9,440	n.a	0	300	688	712	695	630	14	15	630
Detour Lake	Detour Gold	Canada	14,860	20,515	n.a	0	0	0	200	500	600	25	34	600
Natalka	Polyus Gold	Russia	40,841	39,709	1.3	0	0	0	200	580	580	70	68	580
Oyu Tolgoi	Ivanhoe	Mongolia	13,121	46,360	0.37	0	0	0	375	650	650	20	71	650

Source: Companies, Standard Chartered Research

Pre-feasibility study

There are many projects under pre-feasibility studies, among which Xstrata's Tampakan copper-gold mine in Philippines is a large example. This is to be a large-scale, low-cash-cost, open pit mining operation with an average annual production of 375,000 tonnes of copper and 360,000 ounces of gold over an initial 17-year mine life. However, this mine, which could cost more than US$5bn to build, will not start production until 2016.

Gabriel Resources' 80%-owned Rosia Montana project in Romania has a large gold resource of 15,800koz (M.I.&I.), and could also be a prospective large gold mine but it is still at a very early stage of project evaluation.

Long project lead time

The lead time from discovering a new gold mine to production can be quite long, ranging from 2-3 years to over 15 years. According to a study conducted by MinEx, the average lead time for the 214 greenfield projects in 1970-2003 was about 5.4 years in Australia, Canada, and the US, and 8.3 years for other countries. Such a long lead time, in addition to increasing difficulty of locating new gold deposits, explains why the ten-year gold bull market has not done much to increase gold mine production.

Ore grade

In our database, the average grade (resource weighted) is 3.5g/tonne for the gold mines, and 1.6g/tonne for the base metal mines.

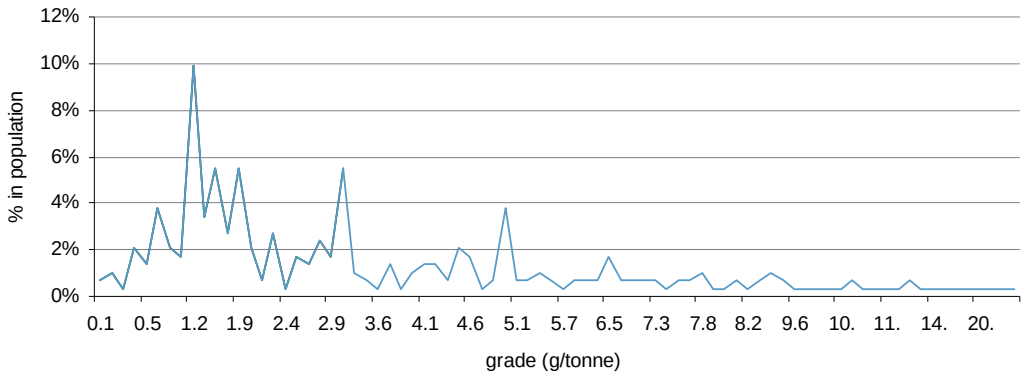
Fig 20 Grade of gold mines

Unit: gram/tonne	Resource-weighted average	Max	Min
Gold mines	3.5	446	0.10
Base metal mines	1.6	13.0	0.03

Source: Standard Chartered Research

In terms of distribution of grade, 75% of the mines in our database have grades of 5g/tonne or lower. Only 6.8% of the gold mines have 10g/tonne or higher grades.

Fig 21: Distribution of ore grades



Source: Standard Chartered Research

These grades are higher than we expected. We thought the grades of the existing mines would have been lower, and in fact, there is study showing that the average grade of large discoveries had been declining significantly (see Fig.37 under the Section of *Gold resource and gold mine discovery*). Part of the reason why the actual findings of grades in our study are higher is that we entered reserve grades in our database, and these tend to be higher than resource grades.

Escalating costs of the new mines

We also found that the new mines are facing higher costs. The chart below summarises the cash-cost profile of the planned new production growth volume from 2011 to 2015. Based on this summary, **more than 50% of the new production volume would be operating at cash costs of US$460/oz, and the top 30% would be operating at US$600/oz or higher.**

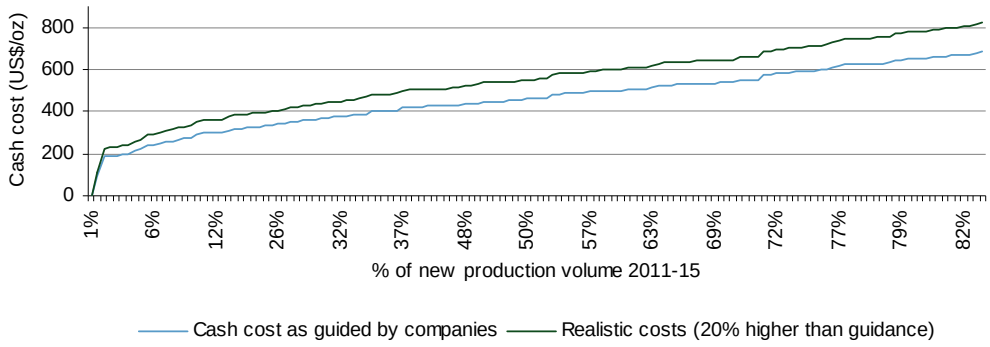
We think companies' guidance could be 20% below the actual costs.

We believe that the cash costs could be understated for two reasons:

- Not all companies report all-in cash costs. In many cases, they only report cash costs at the mine operations level plus administrative costs, and could omit royalties, maintenance capex, etc;

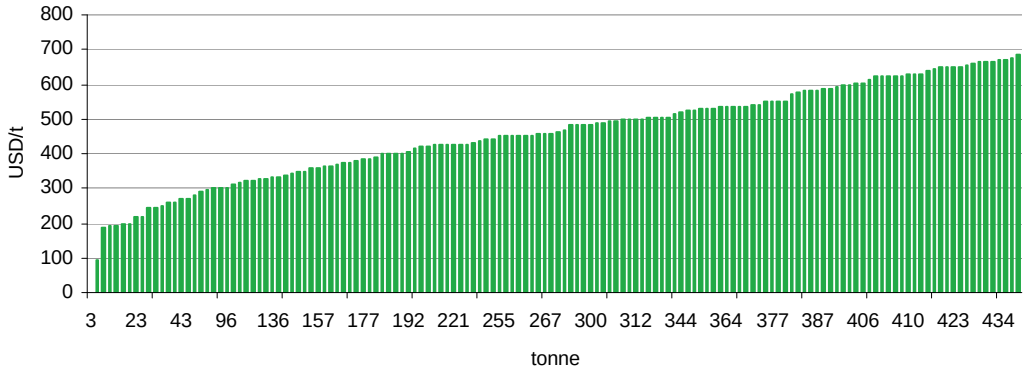
- For the gold mines not yet producing, we rely on the gold companies' guidance or estimates for the cash costs, as they do not know what the actual costs will be before production actually starts. Considering that actual costs usually come in higher than management's expectation when the mines actually start producing, the actual cost curve could be lifted up by 20% to be realistic based on our experience. In which case, the mid point of the cash cost curve could well be US$550/oz. If we consider depreciation and sustainable capex, total cost could be US$800/oz at the mid point. The top 10% of operators could see cash costs at US$960/oz and total costs at US$1,300/oz.

Fig 22: Cash costs curve for incremental production volume (in %)



Source: Public information of gold mining companies, Standard Chartered Research
Note: Cash cost is what we

Fig 23: Cash costs curve for incremental production volume (in tonnage)



Source: Standard Chartered Research

To cross-check our findings against other studies, GFMS found that global all-in-costs, which include capex and indirect costs, were US$717/oz in 2009. It further estimates that the true, fully-loaded, sustainable long-term cost of gold mine production stood between US$925-950/oz in 2009, without allowing for any return to shareholders.

IRR on gold projects: no mines to be built at below US$1,400/oz gold price.

Capital intensity and cash costs

To find the IRR of major gold projects, we need to find the average cash costs, which are about US$500/oz for the seven gold projects, and the capital costs of building the mine, which averages at about US$2,058 per ounce of production as shown below.

Fig 24: Capital intensity of gold projects

	Production Capacity (koz)	Capex - for new capacity (US$m)	Capital intensity (US$/oz)
Goldcorp/ Barrick	965	1,035	1,073
Kinross	1,500	2,700	1,800
Goldfields	535	1,250	2,336
Barrick	750	3,450	4,600
Osisko Mining	732	981	1,340
Detour Gold	649	1,200	1,849
Polyus Gold	580	1,138	1,962
Total/Average	**5,711**	**11,754**	**2,058**

Source: Companies, Standard Chartered Research

IRR analysis

We analysed the IRRs of the current major gold projects. If we use a US$1,400/oz gold price assumption, the IRR that the major gold projects can generate is 19%, below the gold companies' internal benchmark of 20%.

Fig 25: IRR analysis for major gold mine projects

US$/oz	Year 1	Year 2	… …	Year 20
Gold price	1400	1400		1400
cash cost	500	500		500
cash profit per ounce	900	900		900
After tax profit (assuming 50% tax and royalty)	**450**	**450**		**450**
Maintenance Capex	100	100		100
Cash flow after tax and capex	**350**	**350**		**350**
Investment outlay	2,058	0		0
Total cash flow	**(1,708)**	**350**		**350**
IRR	19%			

Source: Standard Chartered Research

US$1,950/oz to generate IRR of 20% for miners if we consider acquisition cost

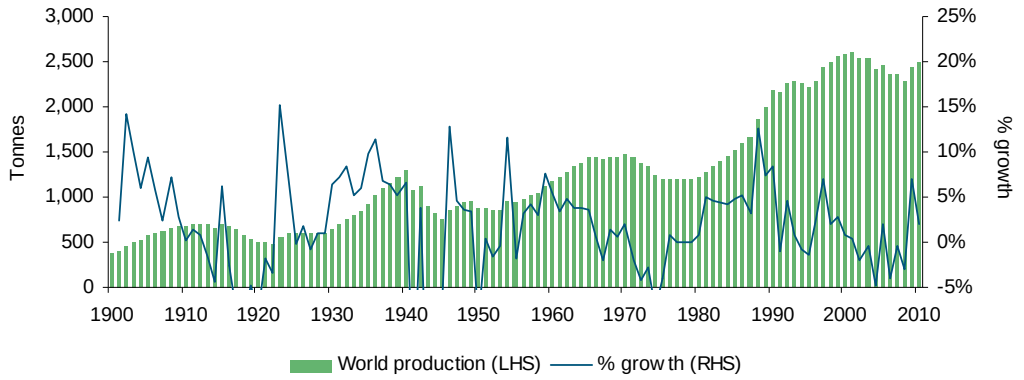
In our analysis above, we only consider the investment outlay to build the mine - i.e. we do not take into account of the acquisition cost of the gold deposits of the mines, which are sunk costs. For greenfield projects in the current environment, however, if acquisition cost of the mine is included (assuming US$100/oz), the required gold price to generate an IRR of over 20% would be US$1,950/oz.

We are mindful that it is difficult to be precise in estimating the IRR, because as gold prices rise, a gold deposit's resource will also increase, and the exact correlation is difficult to predict precisely. Still, our analysis here is sound enough to illustrate the height of the threshold for building a large gold mine. Gold prices lower than the current level should certainly threaten delays to gold projects.

Historical trend of gold production: the magnificent fall of South Africa

Gold production worldwide has been more or less flat in the past 20 years. In fact, the global mine production CAGR for the past 40 years was only 1.3%. Going further back, the production CAGR in 1900-2010 was about 1.7%.

Fig 26: Mine gold production 1900-2010 (units: tonnes)



Source: US Geological Survey, Standard Chartered Research

The chart above clearly shows that the growth momentum of gold production in the past century or so has noticeably slowed down. To further illustrate this, we see that the gold production CAGR in 1900-1990 was 1.9%, while that in 1990-2010 significantly declined to 0.7%.

Fig 27: Gold production growth rate: the past 20 years was very slow

Period	Compound Average Growth Rate %
1900-1990	1.9%
1990-2010	0.7%
1900-2010	**1.7%**

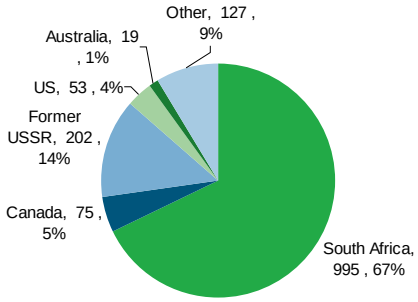
Source: USGS, Standard Chartered Research

South Africa used to produce 1,000 tonnes in 1970, but only 200 tonnes in 2010.

A very important driver of the slow production growth was the dramatic decline of South Africa, which produced about 1,000 tonnes in 1970, but below 200 tonnes last year. Figures 28-31 below illustrate the changes in production of gold producing countries. The dramatic fall of South Africa left a big gap for other countries to fill. The US, the second largest gold producing country in the 1990s, saw its production to decline for the 11th consecutive year in 2010, falling to 230 tonnes from its peak production of 461 tonnes in 1999.

China is now the world's largest gold producing country, but gold mines in China are generally small in scale with low grades and refractory ores, and nearly half of China's gold production comes as by-products from base metal mines, which can be volatile.

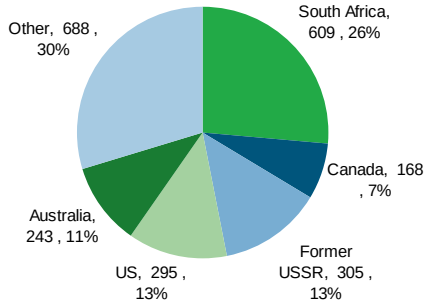
Fig 28: Gold mine production by country – (1970)



Source: Goldsheetlink, Standard Chartered Research

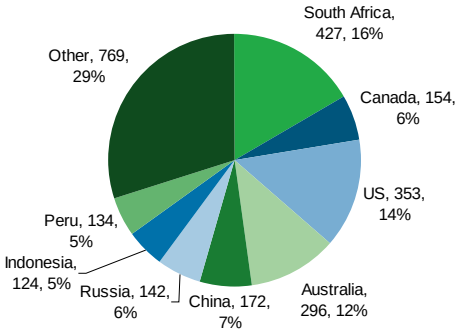
* Note: the absolute figures in the charge are the actual mine production of gold in metric tons, and the % figure is an individual country's % of global production, e.g. South Africa produced 995 tonnes, and accounted for 67% of global production in 1970.

Fig 29: Gold mine production by country (1990)



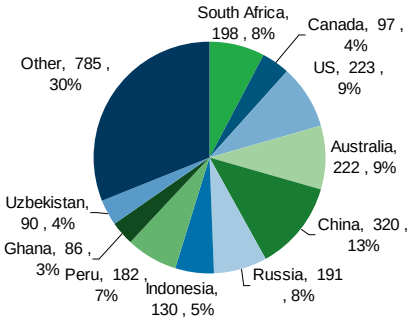
Source: Goldsheetlink, Standard Chartered Research

Fig 30: Gold mine production by country (2000)



Source: Goldsheetlink, Standard Chartered Research

Fig 31: Gold mine production by country (2009)



Source: Goldsheetlink, Standard Chartered Research

Gold resource and gold mine discovery

Gold resources: less than 20 years to go?

Current gold mine reserves only enough to last 19.2 years

According to US Geological Survey's estimate, there were a total of 51k tonnes of gold reserves globally at the end of 2010, or about 19.2 years of production at 2010's production rate. Based on USGS's estimate, large gold producing countries have different life-of-mine reserves. South Africa now has about 32 years of mine life, but this is because its production has dropped substantially, i.e. the production challenge it faces is significant going forward.

Reserves in China have been a point of debate. USGS put them at 1,900 tonnes as of the end of 2010, a level similar to the 1,910 tonnes reported by Statistics Bureau of China in its China Statistics Yearbook 2010. We think this estimate is too conservative. China Gold Association estimated total gold resources to be between 15,000-20,000 tonnes in 2009, of which reserves were 4,634 tonnes (breakdown – rock gold 2,786 tonnes, sand gold 593 tonnes, by-product gold 1,255 tonnes). Regardless of what the true reserves are, the reality is that the gold resources in China are generally difficult to extract. There are few large deposits, and most of the mines have difficult geological and metallurgical conditions.

Fig 32: Gold reserves and mine production

	Mine production			Reserve/production
metric tons	2009	2010E	Reserves	ratio
China	320	345	1,900	5.5
Australia	222	255	7,300	28.6
United States	223	230	3,000	13.0
Russia	191	190	5,000	26.3
South Africa	198	190	6,000	31.6
Peru	182	170	2,000	11.8
Indonesia	130	120	3,000	25.0
Ghana	86	100	1,400	14.0
Brazil	60	65	2,400	36.9
Canada	97	90	990	11.0
Uzbekistan	90	90	1,700	18.9
Mexico	51	60	1,400	23.3
Papua New Guinea	66	60	1,200	20.0
Chile	41	40	3,400	85.0
Other countries	627	654	10,000	15.3
World Total	**2,584**	**2,659**	**51,000**	**19.2**

Source: USGS for reserves and country production, World Gold Council for total gold production, Standard Chartered Research estimates

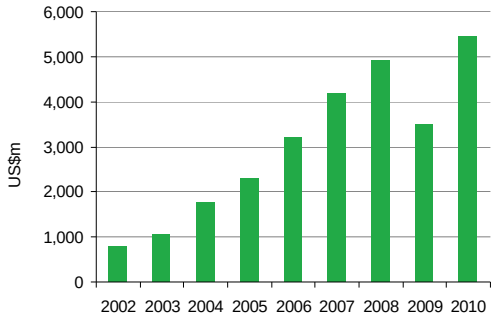
Gold discovery trend in the past two decades

Gold exploration budget grows apace…

Exploration capex

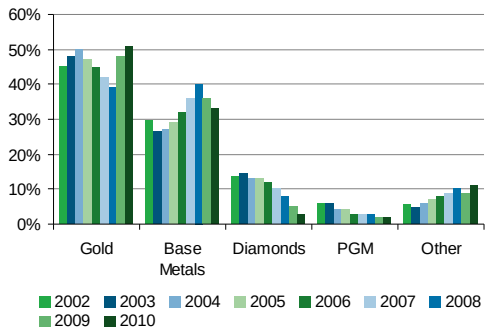
In response to escalating gold prices, exploration budgets for gold have been rising since 2002 (except for 2009). Exploration budget for gold as a percentage of total budget for all mining corporates, however, has remained stable at about 40%-50% in the same period, which shows that as exploration capex increased for most metals, gold remained the focal metal for exploration.

Fig 33: Gold exploration budget (US$m)



Source: Metal Economics Group, Standard Chartered Research

Fig 34: Exploration budget by commodity (as % of annual exploration totals)



Source: Metal Economics Group

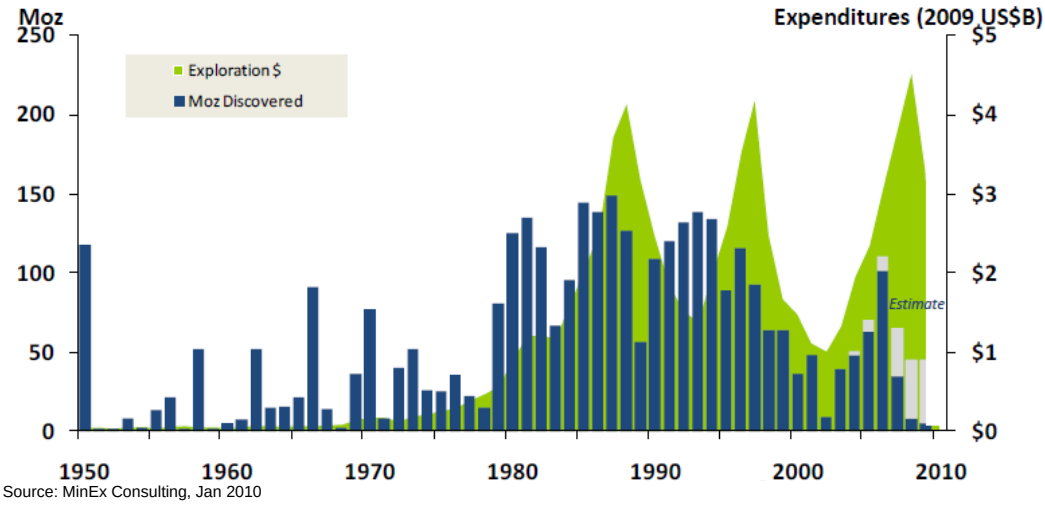
… but few large deposits have been found.

Gold deposits discovered: a lack of giants

Richard Schodde of MinEx Consulting has conducted an interesting study on gold mine exploration. According to his study, during the period from 1985 to 2003, 190 deposits were discovered by the international mining industry, ranging from 895 million to 1 million ounces of gold. Approximately five out of every 10 deposits may have contained about 3 million ounces of gold, while only 14 of the entire 190 deposits contained gold deposits equal to 10 million ounces.

Whilst gold exploration budgets have increased over the past decade, the gold discovery hit rate actually has declined significantly. According to MinEx, the higher exploration expenditures in 2000-2009 corresponded with a lower rate of gold discovery than in 1980-2000.

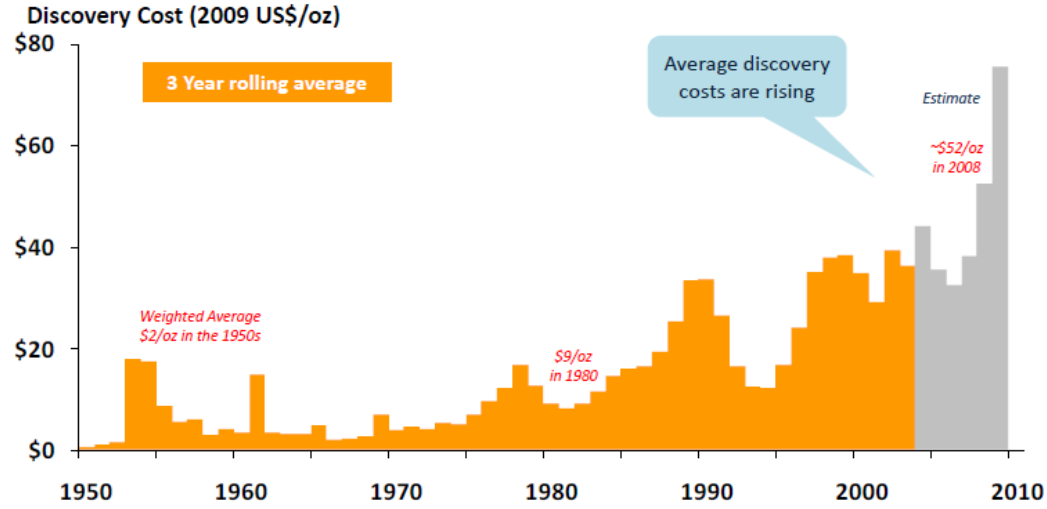
Fig 35: Gold exploration expenditure and ounces of gold found in the Western World



Source: MinEx Consulting, Jan 2010

As a result of declining hit rate and cost inflation, the average discovery cost of primary gold found has seen a rising trend since 1960, which is evidence that good, large gold deposits are increasingly difficult to come by.

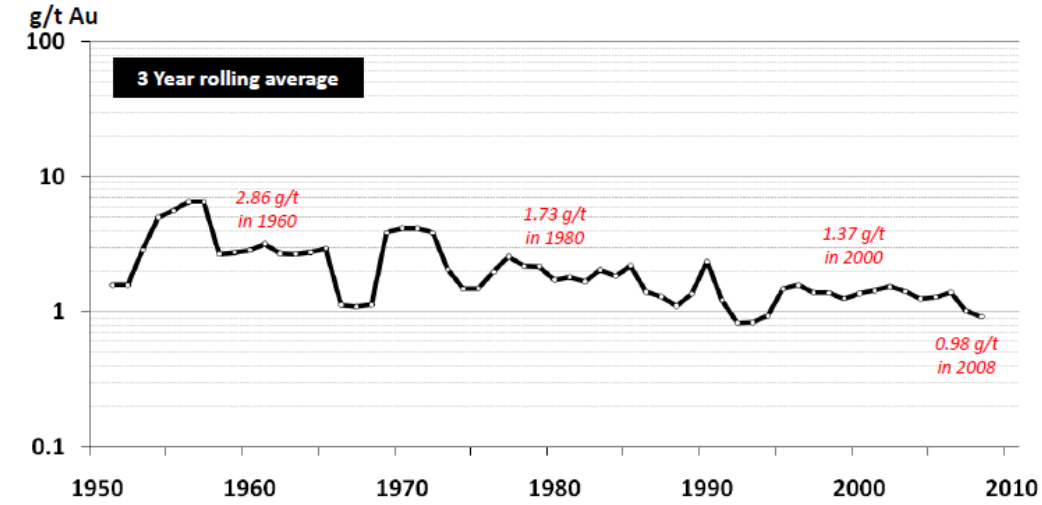
Fig 36: Average discovery cost of primary gold found in the Western World



Source: MinEx Consulting, Jan 2010

It is also worth highlighting that the average ore grades of new deposits discovered have declined noticeably in the past six decades. The most recently discovered large gold deposits (>1m oz) average below 1g/tonne.

Fig 37: Average ore grades for all primary gold discoveries >1m oz in the world



Source: MinEx Consulting, Jan 2010. Note: Part of the reduction in grades in 1970s may be a consequence of new processing technologies (principally CIP), which enabled operators to use lower cut-off grades.

Gold demand: Driven by China/India and central banks globally

- Physical gold demand should continue to be driven by higher average income in China and India. **Our commodity team's forecast based on the relationship between gold price and China/India average income pints to US$4,869/oz in nominal terms (US$3,681/oz in real terms) by 2020.**
- Gold investment demand should stay strong, driven by declining confidence in the major currencies.

Central banks sold 674 tonnes of gold in 2005, now they are buying back…

- The central banks' U-turn in attitude towards gold has completely shifted the balance of the gold market. At the peak, central banks globally sold a total of 674 tonnes of gold in 2005, but in Q1 2011, they bought 129 tonnes of gold, an annualised figure of 517 tonnes.

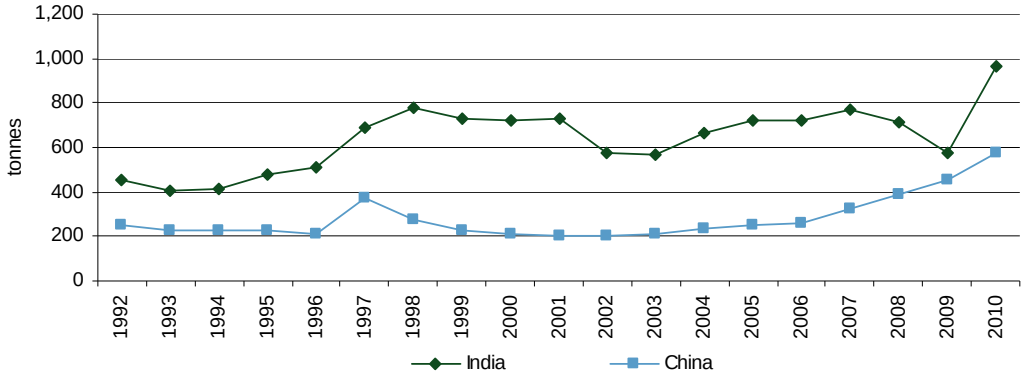
Insatiable demand from India and China

India and China consumed 1,543 tonnes in 2010 - and heading higher…

2010 gold demand

India and China's gold consumption was 963 tonnes and 580 tonnes, respectively. These two countries together accounted for nearly 60% of global gold production from mines. See our commodity team's report Gold Super-Cycle on 17 April 2011, for more details on the correlation between gold price and disposable income in China and India.

Fig 38: Gold consumption in India and China



Source: Standard Chartered Research estimate

Fig 39: Gold consumption by country

(tonnes)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
India	727	576	565	663	722	722	769	713	579	963
China	206	202	207	234	253	260	328	393	458	580
Greater China	270	238	232	271	293	294	365	432	472	607
Middle East	441	371	339	363	388	315	346	346	246	238
Turkey	119	128	212	238	248	225	249	210	107	115
USA	413	409	375	372	377	339	275	267	265	233
Europe ex CIS	102	74	9	(20)	(14)	(12)	10	243	293	267
UK	82	78	73	70	59	53	50	37	32	27
Italy	92	88	82	77	71	65	59	49	41	35
World Total	**3,413**	**3,067**	**2,123**	**2,305**	**3,092**	**2,682**	**2,811**	**3,049**	**2,503**	**3,055**

Source: World Gold Council

Investment demand: driven by doubt over credibility of currencies

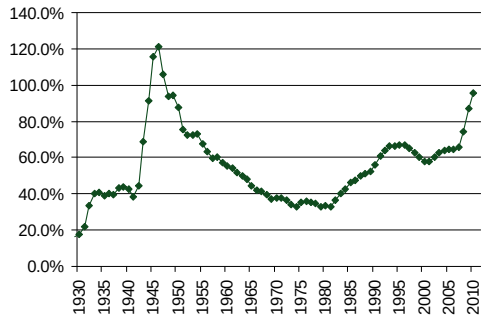
Escalating debt

A key challenge for the US dollar as a reserve currency is the high public debt and the escalating deficit of the US. Currently the US has outstanding debt of about US$15 trillion, without considering unfunded pension and healthcare liabilities

Fig 40 below shows that the US public debt as a percentage of its GDP reached a peacetime all-time high at nearly 100% in 2010 and is set to exceed 100% this year.

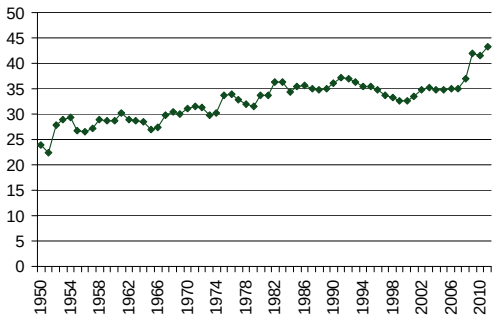
On the other hand, US government spending has continued rising since 1960, and was nearly 40% of GDP last year. With economic growth still lacklustre in the US, we think its government spending can only stay strong, and it will take a long time to turn the US into a thrift country after five decades of spending spree.

Fig 40: US gross public debt as percent of GDP



Source: Bloomberg, Standard Chartered Research

Fig 41: US government spending as percent of GDP



Source: Bloomberg, Standard Chartered Research

180-degree turnaround – central bankers are now buyers of gold

With regard to doubt as to how sustainable the current monetary system is, nothing is more revealing than the complete change of attitudes of the central banks towards gold. The chart below shows the central banks' net sale of gold for the past 15 years. We see a clear reversal trend, with central banks, collectively, becoming net buyers of gold in 2010. In Q1 2011, the trend further accelerated, with net purchase of gold at 129 tonnes, more than the full-year net purchase of 76 tonnes last year.

Fig 42: Central bank gold sale / (purchase)

Source: World Gold Council, Standard Chartered Research

If the central bankers have lost confidence in the security of each other's issued currencies, and placed their trust in gold, it could significantly swing the supply and demand for gold. **From peak net sale of 674 tonnes of gold in 2005 to an annualised net purchase of 516 tonnes for 2011, the shrinkage of gold available to satisfy demand amounts to 1,190 tonnes, which is 44% of last year's gold production from mines.**

Significant room for Asian countries to buy more gold

Even after such a significant change, most Asian countries still hold noticeably low amounts of gold relative to their reserves. As of May 2011, gold represented only 1.6% of China's total reserves, 8.2% of India's, and 3.2% of Japan's. All these percentages are significantly below the worldwide average of 11.1%. We believe there is meaningful room for gold to increase as percentage of reserves for these countries.

Fig 43: Gold reserves of major Asian countries

	Gold reserve (tonnes)	Gold as % of reserves
China	1,054	1.6%
Japan	765	3.2%
India	558	8.2%
Taiwan	424	4.7%
Singapore	127	2.4%
All countries – worldwide	27,240	11.1%

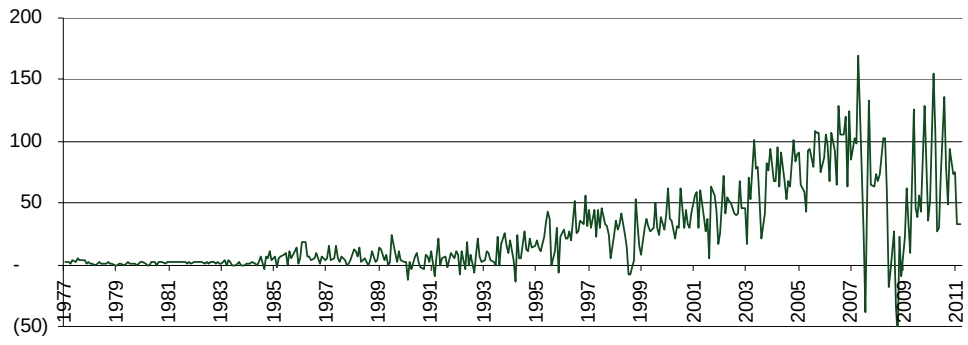
Source: World Gold Council, May 2011

Excessive demand for USD-denominated assets = 'exorbitant privilege' or exorbitant burden?

The term 'exorbitant privilege' has been coined to refer to the privilege that the US enjoys because of the reserve currency status of the US dollar. We argue, however, that such exorbitant privilege also carries an exorbitant burden.

As the US dollar is the only reserve currency in the world, countries globally put their reserves in USD-denominated assets, and unsurprisingly, they collectively have been net buyers of USD assets since 1977 (from which time data has been available on Bloomberg) except for a few months during the last financial crisis. The growth of such demand was strong in the last decade, with monthly net purchase remaining above US$50bn for most of the period. This appetite has given the US the above-mentioned 'exorbitant privilege' of financing its ballooning debt and deficit without substantial immediate threat.

Fig 44: Monthly foreign net purchase of USD assets * (Units: US$bn)



Source: Bloomberg, Standard Chartered Research
* Note: USD-denominated assets include treasury bonds and notes, corporate stocks, government agency bonds, and corporate bonds.

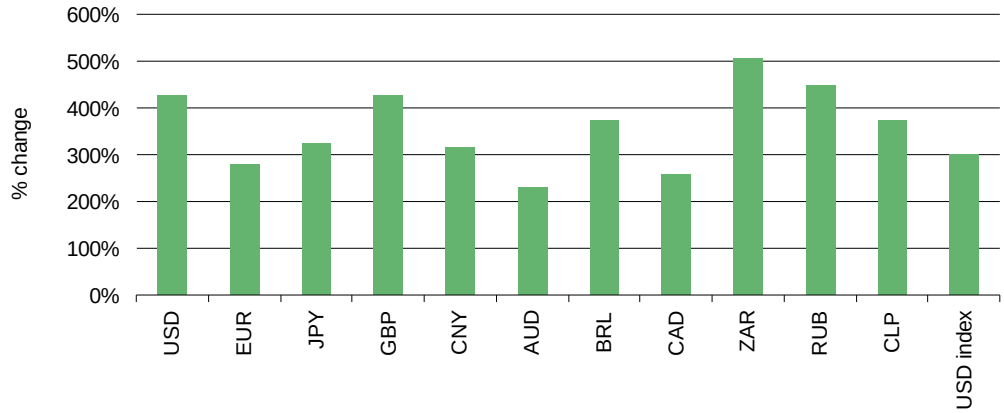
The danger of the one-way uptrend in demand for USD assets, as shown in the chart below, is the accumulation effect. If global demand for USD assets stays strong, the Federal Reserve is virtually obliged to satisfy such demand, resulting in USD flooding into the market, dragging down the value thereof and aggravating global inflation, in turn reducing the demand for USD assets.

We have already seen a dramatic decline in the monthly net purchase of USD assets from US$136bn in August 2010 to US$32bn currently. Time will tell whether this change already marks a permanent turning point in the trend. What is clear to us is the current monetary system is unstable, unbalanced, and unsustainable. A major revamp is necessary.

Gold price has appreciated against all major paper currencies

It is worth highlighting that gold has appreciated in the past 10 years not only against the US dollar, but against all other major currencies. Put in another way, all major currencies have depreciated against gold in value, which shows that if there is a credibility issue, it relates not only to the US dollar.

Fig 45: Movement of gold price in major reserve and commodity currencies (since 2000)



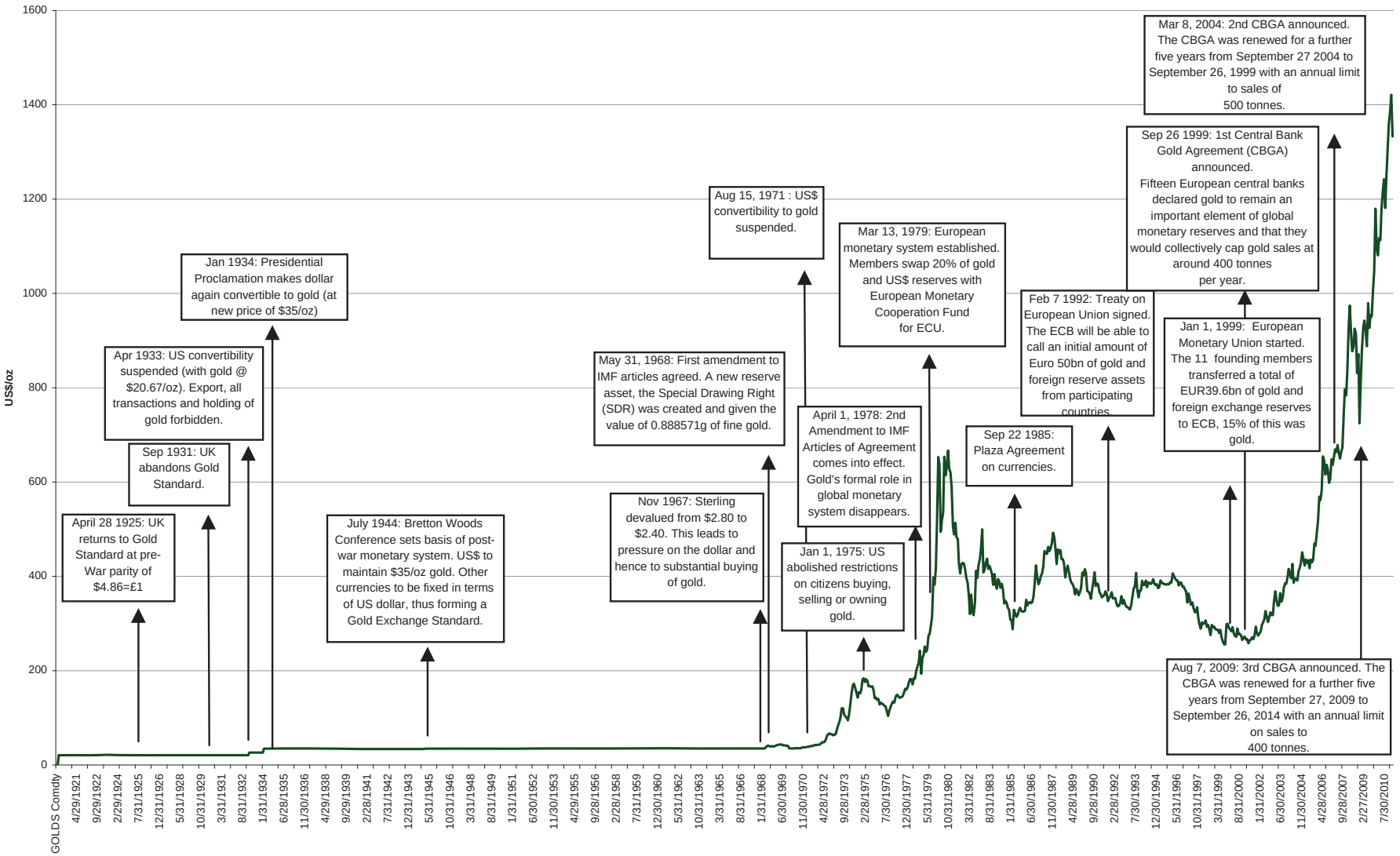
Source: Bloomberg, Standard Chartered Research

Gold: beneficiary of monetary system reform

We see little question that the monetary system needs a major reform. We do not, however, see a complete return to gold as a workable solution, given the inherent deflationary impact of the gold standard on the economy as there is only a limited amount of the metal. We think there would be strong political resistance to a gold standard from the incumbent super powers. Returning to a 100%-gold-backed currency would mean that they would lose their 'exorbitant privilege' of printing money and using their money-printing machines to adjust economic performance.

Popular proposals for monetary reform include, among others, using a basket of currencies or the SDR to replace the US dollar as the reserve currency. Whatever the final solution is, restoring fiscal discipline is key. We think gold is probably the best representation of fiscal discipline, and has played an important role in our monetary history. Appendix 3 presents a detailed chronology of major monetary events related to gold. We highlight the key events in the chart below.

Fig 46: Key gold events



Source: World Gold Council, GFMS, Standard Chartered Research

Gold supply and demand forecast model

We think the gold market is likely to be in deficit in the next five years, given the limited underground supply, dramatic change of the central banks' attitude towards gold, and continued solid demand from fabrication.

Supply/demand forecast: deficit likely extend to 2015 or beyond.
In our gold supply/demand forecast, to be conservative, we maintain gold demand absolutely flat from 2011 onward. On supply side, we input the mine production number from our base case.

The only other variable is 'official sale/(purchase)' made by the central banks. We assume 500 tonnes for 2011 (Q1 2011 actual number would annualise to 517 tonnes) and 10% p.a. growth for 2012-2015. Based on these assumptions, we see the central banks buying a total of 3,053 tonnes of gold in 2011-2015, equivalent to 10% of the current total gold holdings of the central banks globally (including the IMF). To put this in perspective, from 1989 - when the central banks started selling gold through 2009 - the official sales totaled about 8,200 tonnes. If the cycle of central banks selling gold lasted 21 years, we think their purchase of gold, which started in 2010, could also last a long time. The other point to make is that **Currently 1.8% of China's forex reserves are in gold; if China were to bring this percentage in line with the global average of 11%, it would have to buy another 6,000 tonnes of gold, or more than 2 years global mine production.**

Gold market deficit to continue until at least 2015

Under the assumptions above, the gold market will be in deficit at least until 2015. See Fig. 2 in the Investment views and recommendation section.

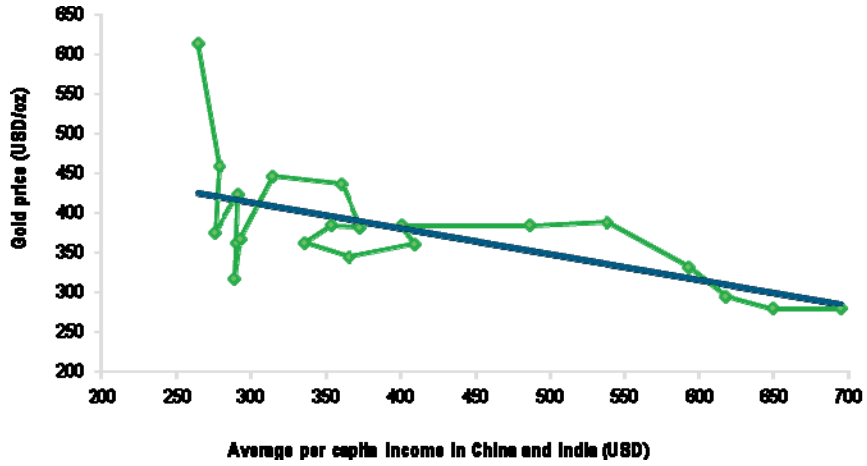
Our commodity team's view of gold

Dan Smith and Michael Haigh from our commodities team published *Gold – Super-cycle to extend above USD 2,100/oz* on 17 April 2011. We summarise some of their interesting findings below. For details, we encourage you to read the full report.

Relationship between gold and disposable income in China and India

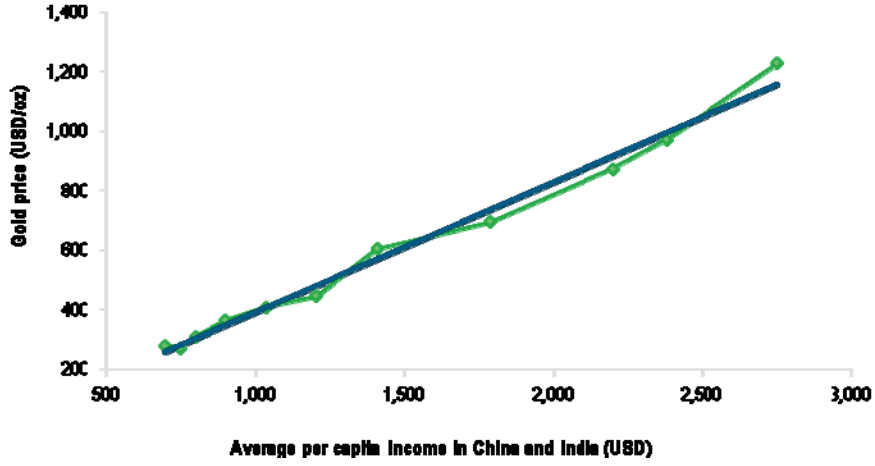
Gold prices have shown a strong correlation with disposable income in China and India. Fig.22 below shows that, prior to 2000, the gold price spiralled down when China and India's GDP per capita was low and their impact on the global economy and gold was modest. However, India liberalised its gold market during the 1990s, and once China deregulated its gold market in 2001, these two countries started to exert a powerful influence on the gold price as we show in Fig.23.

Fig 47: Strong correlation between rising incomes in China and India and gold price; 1980-2000 subdued income growth undermines gold prices



Source: Company, USGS, Standard Chartered Research

Fig 48: Strong correlation between rising incomes in China and India and gold price; 2000-2010 China booms and deregulates its gold market



Source: Company, USGS, Standard Chartered Research

Gold price forecast
Their price forecast is based on the following methodology and time frames:

- 2011-2014 – strong gold demand from Asia on the back of rising income per capita drives up gold price in line with the previous statistical relationship extending back to 2001, but a slow movement from negative US rates to zero moderates the previous relationship;
- 2014-2018 – rising mine supply and positive real US rates reverse the gold rally and encourage short-term speculators to exit; our analysis finds that mine supply reacts to prices with a considerable lag of at least 6 years
- 2018-2020 - the market fully adjusts and prices fall to what we assume to be an equilibrium level, which is average mine production costs plus normal margin (this margin averaged 29% over the most recent 7-year period according to figures from GFMS). We assume that this equilibrium level for prices rises over time in line with our global inflation forecast from our super cycle report.

The report found that there is consistently high correlation between gold price and disposable income in China and India over a 30-year period. In our November report on the super-cycle ('The Super-Cycle Report', 14 November 2010), we predicted that average income per head in China and India would reach 30% of the US level by 2030. **Under this scenario and assuming that the relationship between rising income levels and gold holds (we draw from our prior recursive co-integration analysis that with rising incomes, we should see rising gold prices), gold prices could reach USD 4,869/oz in nominal terms by 2020 (USD 3,681/oz in real terms) in a possible 'super-bull' scenario**.

Company updates

A note on gold price assumption

As discussed earlier, our commodity team built an extensive model to forecast gold prices in its report, *Gold – Super-cycle to extend above USD 2,100/oz* (7 April 2011). The gold prices that we used in our earnings forecasts are as follows:

Fig 49: Gold price assumptions

US$/oz	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Long-term
New assumptions	1,460	1,650	1,864	2,107	1,900	1,600	1,350	1,017	1,046	1,078	1,078
Old assumptions	1400	1200	1200	900	900	900	900	900	900	900	900

Source: Standard Chartered Research estimates

Zhaojin Mining – the champion of low-cost expansion

Zhaojin remains our top pick among the gold companies we cover, given its superior expected production growth and low production cost. **We highlight that the company has been consistently expanding its gold resources and keeping production costs low**.

Zhaojin has excellent track record of low cost acquisition

Track record of resource expansion at low cost

Since its IPO in late 2006, Zhaojin has demonstrated an excellent track record of expanding its gold resources at low cost, both via exploration and acquisition. The table below shows the historical trend of Zhaojin's cost of adding gold resources both via exploration and acquisition. Its unit exploration cost for the past four years averaged US$6/oz and acquisition cost averaged US$103/oz, both significantly below the industry average.

Fig 50: Zhaojin's low-cost resource expansion

	2007	2008	2009	2010
Capex (Rmb m)				
Exploration	61	67	74	155
Acquisition	216	920	667	1,027
Resource addition (koz)				
Exploration discovery	611	1,145	2,092	4,546
Acquisition	446	997	939	1,505
Total added resources	**1,056**	**2,141**	**3,031**	**6,051**
Unit exploration cost (Rmb/oz)	100	58	35	34
Unit exploration cost (US$/oz)	**13**	**8**	**5**	**5**
Unit acquisition cost (Rmb/oz)	484	923	710	683
Unit acquisition cost (US$/oz)	**64**	**133**	**104**	**101**

Source: Company, Standard Chartered Research

- Zhaojin's low-cost gold discovery via exploration is one of the key reasons why we like the firm: its gold resources are understated because it has not thoroughly explored the mines that it owns. Such an 'explore-as-you-go' practice is quite normal in China.
- As a result of the company's prudent expansion, its gold reserves have grown by 88% since its IPO in 2006, and the reserve replacement ratio has been consistently higher than 1x by a large margin. Thus, over the past four years since the company's listing, Zhaojin has expanded its gold reserves by about 88%.

Fig 51: Zhaojin's gold reserves and reserve replacement ratio

k oz	2003	2004	2005	2006	2007	2008	2009	2010
Opening reserves	**3,160**	**3,633**	**4,347**	**4,311**	**4,311**	**4,834**	**5,314**	**7,028**
Minus: Depletion	164	199	206	202	202	249	311	344
Plus: Replenishment	637	913	170	202	321	729	2,025	1,415
Year-end reserves	**3,633**	**4,347**	**4,311**	**4,311**	**4,834**	**5,314**	**7,028**	**8,099**
Reserve replacement ratio	3.9	4.6	0.8	1.0	1.6	2.9	6.5	4.1

Source: Company, Standard Chartered Research

Production growth

The company's gold mine production (excluding buy-and-sell gold, a business where Zhaojin buys gold concentrate and sells the gold processed, instead of just charging a tolling fee) was 344koz in 2010, and management guided 434koz for 2011 (or 510koz if buy-and-sell gold is included). From 2012, management targets growing its mine production by about 15% p.a. for the next few years driven both by organic production growth and acquisition. We think the management would have a good chance of achieving their growth target, given that in the past four years, it has been able to achieve about 14.2% CAGR production growth.

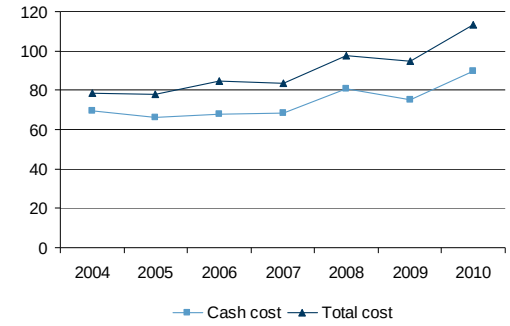
Production cost control

Production costs of Zhaojin's mines are generally low compared with industry average. At Zhaojin's headquarters in Shandong Province, its gold mines recorded an average total cost of about Rmb100/gram (or US$478/oz) in 2010. We think management has done a good job, considering that its mines do not have a particularly high grade (2.55g/tonne for the ores processed in 2010) and not many by-products other than a small amount of silver.

The new mines that Zhaojin acquired outside its headquarters in the past few years recorded a total cost of about Rmb166/gram (or US$794/oz) in 2010. We see scope for this cost to come down because the new mines are mostly still operating at sub-optimal scale.

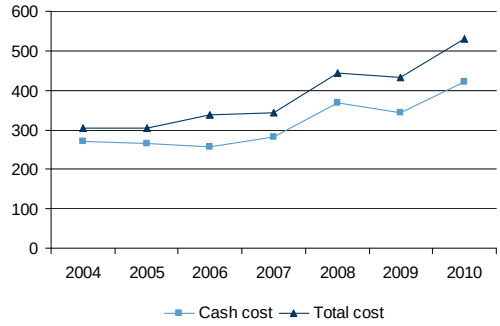
The charts below illustrate Zhaojin's track record of good cost control. Its cash costs in local currency only increased at a 4.2% CAGR in the past six years, which was quite an achievement considering that newly acquired mines with high cash costs accounted for 24% of its total production in 2010, while the percentage was zero in 2004.

Fig 52: Zhaojin's production cost (Rmb/g)



Source: Company, Standard Chartered Research

Fig 53: Zhaojin's production cost (US$/oz)



Source: Company, Standard Chartered Research

Capex and resource expansion plan

The company guided for total capex of Rmb2,270m in 2011, of which Rmb250m will be used on exploration, targeting addition of 95 tonnes of gold resources (focusing on Xiadian, Dayingezhuang, Baiyun, and Qinghe mines). If the company succeeds, the exploration cost per ounce of gold would be US$12.8/oz, again a very low cost.

Besides exploration, the company plans to spend Rmb500m on M&A, targeting acquisition of over 20 tonnes of gold resources.

In the area of capacity expansion, Zhaojin has 53 expansion/construction projects, entailing capex of Rmb1.23bn.

Earnings and price target revisions

We revise down our earnings estimate for 2011E by about 24% as we raise our cost assumption (Rmb121/gram now vs Rmb105/g previously), and we also revise up production from the higher-cost new mines. We also revise up our earnings growth for 2012E and 2013E by about 24% and 58%, respectively, largely because higher gold price assumptions offset the negative impact of changes to our cost and production mix estimates.

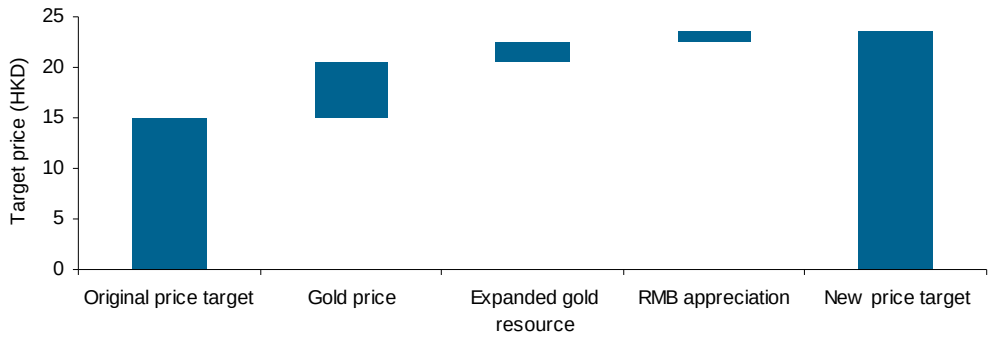
Fig 54: Zhaojin – key assumptions and P&L estimates

	2010	2011E	2012E	2013E
Gold price (US$/oz)	1,222	1,460	1,650	1,864
Exchange rate (Rmb/US$)	6.76	6.47	6.47	6.47
Mine gold production from headquarter mines (k oz)	260	277	286	296
Mine gold production from new mines (k oz)	84	127	167	203
Total mine gold production (k oz)	344	403	453	499
YoY %	14.7%	17.3%	12.3%	10.1%
Gold production cost (Rmb/g)	113.4	121.3	127.9	133.8
YoY %	8.5%	7.0%	5.4%	4.6%
Gold production cost (equiv. US$/oz)	539	603	635	665
Revenue (Rmb m)	4,098	5,039	6,335	7,665
EBIT (Rmb m)	1,617	2,079	2,914	3,862
Net profit (Rmb m)	1,202	1,541	2,104	2,826
YoY %	53.4%	28.2%	36.5%	34.3%
Net profit (Rmb m) – old estimate		2,037	1,697	1,789
New estimate / old estimate %		-24.3%	24.0%	58.0%

Source: Company, Standard Chartered Research estimates

We revise up our price target to HK$23.49 from HK$15 (set on 28 September 2010, adjusted for a bonus share issue). We maintain a discount rate of 9%, and Price/NPV multiple of 2.5x. The key drivers for our higher price target are higher gold prices, expanded gold resources, and Rmb appreciation.

Fig 55: Zhaojin – price target change



Source: Standard Chartered Research estimates

Zhaojin has been trading at a large premium over its Chinese peers since 2009, thanks to its track record of solid expansion. We continue to like Zhaojin, and believe management will continue its low-cost expansion strategy.

Fig 56: Zhaojin's price target (HK$) sensitivity to long-term gold price and P/NPV

	Long-term gold price (US$/oz)								
P/NPV multiple	700	800	900	1,000	1,078	1,200	1,300	1,400	1,500
1.0	8.7	8.9	9.2	9.4	9.6	9.9	10.1	10.3	10.5
1.5	12.9	13.3	13.6	14.0	14.2	14.6	15.0	15.3	15.7
2.0	17.1	17.6	18.0	18.5	18.9	19.4	19.9	20.3	20.8
2.5	21.3	21.9	22.5	23.0	**23.5**	24.2	24.8	25.3	25.9
3.0	25.5	26.2	26.9	27.6	28.1	29.0	29.7	30.3	31.0

Source: Standard Chartered Research estimates

Zijin – resuming production growth in 2012

We believe the worst is over for Zijin's operations

We believe that for Zijin's operations, the worst is over. We hold a positive view on a 12-month horizon. Production growth should resume in 2012, with some projects commencing in late 2011. It might take Zijin some time to repair and restore its reputation, and we think the stock is unlikely to perform well in the near term. However, with a 20% earnings CAGR over 2010-12E and 11.5x 2011E and 9.0x 2012E PER, we see an opportunity for the stock to be re-rated. Global gold mining companies are trading at 18x 2011E PER. We maintain our Outperform rating on Zijin.

Production to grow in 2012

Our production growth forecasts for 2012 are: 5% for gold mining (from 0% in 2011); 27% for copper concentrates/cathodes (from -3% in 2011); and 17% for zinc concentrates (from 1% in 2011). Zijinshan copper operations should restart in late 2011 and two new large projects, Duobaoshan Copper Mine and Tuva Zinc Mine, will commence production in late 2011/early 2012.

Earnings revisions

We revise up Zijin's earnings estimate by 4% to Rmb6.1bn in 2011 and by 43% to Rmb7.7bn in 2012. We raise our gold and copper price assumptions considerably, as well as production costs; which are partly offset by downward revisions in gold, copper and zinc production volumes.

Revise up price assumptions for gold (by 4-18%) and copper (by 16-51%)

- Following our commodity team's price forecasts, we move up our gold price from US$1,400/oz to US$1,460/oz (+4%) for 2011, and from US$1,400/oz to US$1,650/oz (+18%) for 2012. Our copper price assumption is also lifted by 16% to US$4.40/lb in 2011 and by 51% to US$4.54/lb in 2012.
- We cut 2011-12E copper production growth by 18-20% due to the suspension and delay in the expansion of Zijinshan Copper Mine, which was affected by a wastewater leakage accident in July 2010. The mine had a plan for aggressive capacity expansion before the incident. Gold output would also be affected, albeit less substantially; we trim this by 5-7% for the same period.
- We raise 2011-12E gold production cost by 5-6% to reflect cost inflation in labour and materials. We also increase our 2011-12E costs for copper cathodes (accounting for 9% of copper production in 2010) by 40-50% to reflect the constraints at the Zijinshan mine.

Focus on explorations

The company shifted its focus to explorations rather than acquisitions, after the two consecutive incidents in Q3 2010, which dampened its reputation and made its overseas acquisition strategy extremely unfavourable. We agree that companies need to be more cautious in overseas acquisition in this high commodity price environment.

Valuation

Price target cut by 4% to HK$4.78

With the production growth slowly recovers but the reputational risk sustains, we expect Zijin to trade at mid-end of global average in terms of P/NPV (0.8-2.6x based on US$1,100/oz long term gold price assumption). Keep in mind that Zijin is still subject to a sharp decline in gold production over 2016-17 when the gold resource at Zijinshan Mine depletes. We revise down our P/NPV for Zijin from 2.5x to 1.7x, and cut our price target accordingly by 4% to HK$4.78 from HK$5.01 (with bonus share adjustment).

20% earnings CAGR in 2010-13E

Our new earnings forecast implies 20% earnings CAGR in 2010-13E, weaker than the 33% for Zhaojin (our top pick) but stronger than Real Gold's 7%. Zijin trades at 11.3x 2011E PER, which is inexpensive compared to its 2010 average PER of 14.2x and historical average at 17.7x, and 2011E global average of 18x.

Fig 57: Zijin – key assumptions

Sales volume	Units	2009	2010	2011E	2012E	2013E
Gold – mining	tonnes	36.1	29.5	29.3	30.9	30.9
Gold – refining	tonnes	44.6	40.0	33.0	33.0	33.0
Copper concentrate	000 tonnes	68.1	81.3	84.4	101.8	108.1
Copper cathode	000 tonnes	11.5	8.5	2.5	8.8	14.9
Zinc ingot	000 tonnes	100.0	108.8	200.0	200.0	200.0
Iron ore	000 tonnes	1,499.6	1,654.6	1,574.9	1,500.0	1,500.0
Price						
Gold	US$/oz	973	1,222	1,460	1,650	1,864
Copper concentrate	US$/lb	2.02	2.89	3.76	3.88	2.57
Zinc ingot	US$/lb	0.79	1.01	0.90	0.98	0.81
Iron ore	US$/t	57.8	88.6	110.8	116.3	104.7
Cost						
Gold	US$/oz	283.8	317.8	330.3	326.2	327.4
Copper	US$/lb	0.61	0.75	0.76	0.76	0.76
Zinc ingot	US$/lb	0.64	0.97	0.85	0.92	0.74
Iron ore	US$/t	19.8	26.5	31.3	31.3	31.3
P&L summary						
Revenue	Rmb m	20,215	27,769	29,932	34,753	36,939
Operating profit	Rmb m	4,995	7,338	9,596	12,083	12,880
Net profit	Rmb m	3,552	4,813	6,110	7,679	8,259
Net margin	%	17.6%	17.3%	20.4%	22.1%	22.4%

Source: Company, Standard Chartered Research estimates

Fig 58: Zijin – fair value estimate

Mine assets	NPV (RMB m)	NPV (RMB/sh)	P/NPV (x)	HK$/sh
Gold	37,409	1.67	1.7	3.39
Copper	10,737	0.51	1.0	0.61
Zinc	4,478	0.21	1.0	0.25
Iron	4,349	0.19	1.0	0.23
Other	4,000	0.18	1.0	0.22
Subtotal				4.70
Equity stakes	**Market cap (C$m)**	**Marketcap(HK$m)**	**P/NPV (x)**	**HK$/sh**
Continental Minerals	35	274	1.7	0.03
Inter-Citic Minerals	32	248	1.7	0.03
Subtotal				0.06
Other assets	**Book value (RMB m)**	**BVPS(RMB/sh)**	**P/B (x)**	**HK$/sh**
Luoyang gold refinery	105	0.00	2.0	0.01
Bayannoaer zinc smelter	300	0.01	2.0	0.03
Subtotal				0.04
Enterprise value				**4.81**
Net cash (debt)	-395	-0.02	1.0	(0.02)
Total				**4.78**

Source: Standard Chartered Research estimates

Fig 59: Zijin's price target sensitivity to long-term gold price and P/NPV (HK$)

		Long-term gold price (US$/oz)								
		700	800	900	1,000	1,078	1,200	1,300	1,400	1,500
Gold P/NPV (x)	1.1	3.48	3.50	3.53	3.55	3.57	3.59	3.61	3.64	3.66
	1.4	4.07	4.10	4.13	4.15	4.18	4.21	4.24	4.27	4.29
	1.7	4.66	4.69	4.72	4.76	4.78	4.83	4.86	4.89	4.93
	2.0	5.24	5.28	5.32	5.36	5.39	5.44	5.48	5.52	5.56
	2.3	5.83	5.88	5.92	5.97	6.00	6.06	6.11	6.15	6.20

Source: Standard Chartered Research estimates

Fig 60: Zijin setbacks – chronological trail of two major incidents (from Q3 2010)

Date	Mine*	Event	Impact
12-Jul-10	Z	Share trading suspended for one day after waste-water leakage at hydro-metallurgical plant in Zijinshan copper mine on 3 July	Negative for company reputation
19-Jul-10	Z	Disclosure of cause and impact of 3-Jul Zijinshan incident (Zijin planned to produce 100kt copper in 2010, of which Zijinshan would have contributed c.13kt)	Negative for reputation, near-term production and earnings
26-Jul-10	Z	Company announced that gold production would be affected by 1 tonne in 2010 (the original target was 31.1 tonnes); share trading suspended for one day	Negative for reputation, near-term production and earnings
28-Jul-10	Z	Vice-president and former head of Zijinshan Gold & Copper Mine, Chen Jiahong, detained by the police as a suspect in relation to the major pollution issue	Negative for company reputation
2-Aug-10	–	Zijin extended the agreement to acquire Platmin Congo from 30 Jul to 31 Aug. The transaction was eventually cancelled on 6 Sep 2010.	Negative for copper resources and production outlook
9-Aug-10	–	Two gold mines in Longkou, Shandong province, shut down for safety inspection	Slightly negative for gold production growth
21-Sep-10	X	Tailing dam in Xinyi Tin Mine collapsed due to typhoon. (The mine had just started trial production.)	Slightly negative for gold production growth
26-Sep-10	X	Direct economic loss from Xinyi mine incident estimated by the company at Rmb19m	Slightly negative for earnings (<1%)
7-Oct-10	Z	Direct economic loss from Zijinshan mine incident was Rmb31.9m and the administrative fine was Rmb9.6m; share trading suspended for one day	Slightly negative for earnings (<1%)
18-Oct-10	X	Economic loss from Xinyi mine incident confirmed at Rmb19.5m, pending litigation on additional compensation claims against Zijin	Potentially negative for earnings; unknown amount
28-Dec-10	X	Disclosure of cause and impact of Xinyi incident. Company decided to dispose of tin asset to pay for compensation and donated Rmb1.5m to accident recovery. Amount of additional compensations unknown	Potentially negative for earnings; unknown amount
28-Dec-10	Z	Fujian Provincial Department of Environmental Protection imposed administrative punishment on two directors: Rmb706k on Mr. Chen Jinghe (Chairman) and Rmb450k on Zou Laichang (mining chief at Zijinshan Gold & Copper Mine)	Negative for company reputation
18-Jan-11	Z	Two vice-presidents, Mr. Chen Jiahong and Mr. Li Side, resigned to take responsibility for the Zijinshan incident.	Negative for company reputation and operations
30-Jan-11	Z	Company received the criminal judgment against Zijinshan Gold & Copper Mine and five management personnel; company to pay a fine of Rmb30m (deducting the administrative fine of Rmb9.6m = balance Rmb20.4m)	Seriously negative for company reputation and slightly negative for earnings (<1%)
14-Feb-11	X	852 villagers who suffered property losses from Xinyi tailing dam collapse claimed a total of Rmb170.5m in compensation	Negative for earnings (3%)

*Z refers to Zijinshan Gold & Copper Mine; X refers to Xinyi Tin Mine
Source: Company, Standard Chartered Research

Real Gold – accounting issue overhang; weak fundamentals

We downgraded Real Gold to In-Line on 13 May due to delays in capacity expansion and acquisitions, which would mean weak gold production growth (6.8% over 2010-13E CAGR vs. Zijin's 20% and Zhaojin's 33%). Since mid-May, the share price declined from HK$10.00 to HK$8.68, prior to the trading suspension on 27 May.

Two possible outcomes for Real Gold

The *SCMP* incident

Real Gold has remained suspended since 27 May. The incident arose from a news report (by the *South China Morning Post*) reporting the discrepancy between the HKEx filing of Real Gold's 2009 financial figures and the local filing at the State Administration of Industry and Commerce (SAIC) of the PRC. Real Gold has declared its figures were correct and that those obtained by the *SCMP* were inaccurate. There are two possible outcomes for Real Gold, in our view:

- Assuming Real Gold is not able to provide sufficient evidence and convince the market of its innocence, we expect the share price to enter a sustained de-rating period from here and we think it could easily fall by 50% during this time. Recall that Zhongwang's (1333 HK, not rated) share price went from HK$8.70 prior to its share trading suspension to HK$3.30 a year later.
- If Real Gold could prove the consistency between the filing in Hong Kong and that in the PRC, the share price should slowly revive after the initial drop.

Addressing market concerns

During the conference call on 1 June, investors had several suggestions, which we think are valid. They think the company might be able to restore the market's confidence if it addressed these issues properly: 1) hire an independent third-party auditor to review the company's financials in 2009 and 2010, particularly its cash flow; 2) consider buying back its shares, given the low share price and excess cash position (near Rmb3bn at end 2010).

Abnormal weather to have negative impact

Fundamentally, we expect Real Gold's production expansion and acquisition will remain stagnant. The abnormal weather this year (drought in March/April and flooding in May/June), which is similar to last year's, could further delay construction of its mines in the Yunnan and Jiangxi provinces. Apart from these, there is the mining approval issue and tailing dam location issue, which we highlighted in our last report.

Earnings revision and recommendation

We raise our 2011-13 earnings forecasts by 13-66% to Rmb1.1-1.5bn to reflect our higher gold price assumptions. **We lower our price target to HK$9.02 from previously at HK$10.28**. The implied P/NPV for Real Gold is 0.65x, a discount to the global range of 0.8-2.6x, which we think the stock deserves due to the company's poor execution and that the market has in general lost confidence on corporate governance and accounting integrity for privately-owned companies.

Maintain In-Line on strong cash position and low valuation

Real Gold's share price might fall sharply after it resumes trading, although its strong cash position and cheap valuation might lend support to the share price at some point. Real Gold's net cash position of c.Rmb3bn (at end 2010) accounts for 45% of its market cap. In fact, around Rmb2.5bn was raised from the equity market. Real Gold is trading at 6.5x 2011E and 5.5x 2012E PER, based on the share price of HK$8.86 prior to the suspension, vs. the global average of 18x 2011E PER.

Fig 61: Key assumptions for Real Gold

	2009	2010	2011E	2012E	2013E
Output					
Total gold output (k oz)	116.9	136.1	135.7	152.6	165.8
YoY change	149%	16%	0%	12%	9%
Total equivalent gold output (k oz)	177.2	212.1	233.0	242.6	230.3
YoY change	140%	20%	10%	4%	-5%
Price assumptions					
Realised gold price (US$/oz)	839	953	1,168	1,287	1,454
as % of spot price	86.2%	78.0%	80.0%	78.0%	78.0%
Gold price (US$/oz)	973	1,222	1,460	1,650	1,864
Silver price (US$/oz)	14.7	20.0	37.0	38.0	40.0
Copper price (US¢/lb)	240	343	440	454	400
Lead price (US¢/lb)	122	98	120	90	50
Zinc price (US¢/lb)	111	99	109	90	55
Cost assumptions (US$/oz)					
Production cost – gold only	331	343	422	436	449
Production cost – including by-products	208	220	246	274	324
YoY change	25%	6%	12%	11%	18%
P&L summary (Rmb m)					
Revenue	1,011	1,368	1,769	2,069	2,343
Operating profit	700	1,023	1,328	1,559	1,773
Net profit	527	798	1,080	1,280	1,474
Net margin (%)	52.1%	58.3%	61.1%	61.9%	62.9%

Source: Company, Standard Chartered Research estimates

Fig 62: Real Gold's fair value estimate

	Rmb m	HK$/sh
Shirengou-Nantaizi	3,672	4.87
Luotuochang	1,758	2.33
Guangxi	970	1.29
Total	**6,497**	**8.61**
P/NPV	0.5	0.5
Mine asset value	3,248	4.31
Net cash/(debt)	3,556	4.71
Enterprise value	**6,805**	**9.02**

Source: Standard Chartered Research estimates

Fig 63: Real Gold's fair value sensitivity to long-term gold price and P/NPV (HK$)

		Long-term gold price (US$/oz)								
		700	800	900	1,000	1,078	1,200	1,300	1,400	1,500
P/NPV (x)	0.3	7.08	7.14	7.20	7.26	7.30	7.37	7.42	7.47	7.53
	0.5	8.65	8.75	8.85	8.95	**9.02**	9.13	9.22	9.31	9.40
	0.7	10.22	10.37	10.51	10.64	10.74	10.90	11.03	11.15	11.28
	0.9	11.80	11.98	12.16	12.34	12.47	12.67	12.83	12.99	13.15
	1.1	13.37	13.60	13.82	14.03	14.19	14.44	14.64	14.83	15.03

Source: Standard Chartered Research estimates

Philex Mining – unlocking value

Better-than –expected production and robust price underpinned share performance YTD

Philex Mining's share price has increased 35% YTD. The strong share performance was underpinned by better-than-expected production and robust gold and copper prices. We continue to remain bullish on both commodities alongside supply growth concerns. In our report, *Whatever happened to new supply?* (19 Aug 2010), we detailed the impact of GFC on copper supply growth and that it is not positioned to meet even modest demand growth. Since then, we have studied 377 gold mines and projects in the world and in this report we affirm that supply growth will remain muted. Philex Mining has good exposure to gold and copper, two of the commodities on which we are most bullish. The company has a strong balance sheet and intends to consolidate cheap, attractive gold assets within the Philippines. The proposed spin-off of petroleum assets should unlock value as Philex continues to re-rate after First Pacific's 46% acquisition.

Petroleum spin-off to unlock value

We argued in our initiation note that the market ascribes little value to Philex Mining's oil and gas assets (shown in the table below) as the value gets lost within the company's much bigger mining business. On 26 May 2011, the company announced it will spin off the petroleum business under Philex Petroleum Corporation (PPC) by issuing 36% of the latter's shares as dividends to the existing shareholders. Philex Mining will retain the balance 64% of shares of PPC. We think this will be significantly positive, as the spinoff unlocks the value of the petroleum assets, which attracted no value within Philex Mining.

The flagship asset of Philex Petroleum Mining (PPC) is service contract 72 license (formerly GSEC 101), which is 70% owned by Forum Energy Plc, which is in turn 51.9%-owned by PPC. SC 72 is located in the Reed Bank basin in the South China Sea near Palawan. According to early estimates by the company, the Sampaguita field within the SC 72 license area is expected to hold as much as 3.5 trillion cubic feet of natural gas with upside potential to 20 trillion cubic feet based on 8 additional lead identified. The gas was discovered in 1976 and four wells have been drilled to date. Two of the wells tested gas at rates of 3.6mcf/day and 3.2mcf/day.

Fig 64: PMC's key oil and gas interests

Licence (Commodity)	Subsidiary	Country	PMC's interest	Estimated reserves (m boe)	Update
SC72 (Natural Gas)	Forum Energy	Philippines	36.3%	3.5tcf of natural gas with potential upside to 20tcf based on 8 additional leads	Potential stake sale to include an oil major in the project
SC 6 (Oil)	Forum Energy & Philex Petroleum	Philippines	1.7%	6.32m bbl of oil	First oil in 3Q10 at 16,000bopd
SC 6A (Oil)	Forum Energy & Philex Petroleum	Philippines	5.6%	18mn bbl of oil	
SC 53 (Natural Gas)	Pitkin Petroleum	Philippines	14.7%	n.a.	Natural Gas discovery announced in Mar 2010
SC 40 (Oil)	Forum Energy	Philippines	34.7%	93mn bbl of oil and 320bcf of natural gas	
SC 71 (Oil)	Pitkin Petroleum	Philippines	17.9%	n.a.	Block undrilled; initial G&G evaluation
SC 41 (Oil)	Philex Petroleum	Philippines	2.3%	n.a.	JV partner Tap Oil relinquished the licence as the oil prospect did not meet drilling criteria
SC 14 (Oil)	Forum Energy	Philippines	1.0%	49mn bbl of oil	Current production rate of 11,500bbls per day to increase to 15,500bbls of oil per day
Ca Rong Do Block 07/03 (Oil & Gas)	Pitkin Petroleum	Vietnam	8.4%	n.a.	Oil discovery announced in June 2009
Etame Block (Oil)	PetroEnergy Resources	Gabon	0.4%	n.a.	Oil discovery announced in June 2010
Block Z-38 (Oil)	Pitkin Petroleum	Peru	5.3%	The system is expected to contain 1.7bn bbl of oil and 2.5tcf of natural gas	Drilling of exploration wells to begin in 2011

Source: Company, Standard Chartered Research estimates

This licence is comparable to the Malampaya gas field (a JV of Shell, Chevron and PNOC), which is the largest in the Philippines, located 250km from PMC's SC 72, and feeds 18% of total power capacity for the country. This field produces some 44bcf every year and has some 2.5tcf of reserves. The field is connected to power stations onshore by a 520km pipeline, which has an annual capacity of 185bcf gas. As Sampaguita is only 250km from the Malampaya project, it can potentially use the pipeline. We value SC 72 at US$80mn (attributable to PMC) based on in-ground valuation (pre-capex) conservatively assuming that the company can prove up only 1.5tcf of natural gas. However, if we assume 3.5tcf of gas, the asset could be worth as much as US$300-400mn.

Restart of Bulawan mine catches up a higher gold price in 2011

Bulawan restart could potentially add 9% to earnings

PMC was producing gold from the Bulawan mine in the Philippines from 1996 to 2002, when it was placed under care and maintenance due to unfavourable prices. During the seven years of operation, the mine produced 465,766 ounces of gold. When the mine was shut down in 2002, the gold price was around US$300/oz, but since then has rallied to more than US$1,500/oz now. Even if we conservatively assume a cash cost of US$1,000/oz and gold production of 50,000 ounces, we estimate the mine could add 9% to the company's earnings in 2011. The Bulawan deposit has estimated resources of 17.6 million tonnes at 2.25g/t grade, implying 1.28moz of gold metal.

Strong balance sheet lends flexibility

PMC's reported US$84mn of cash as of 31 December 2010 and no significant bank loans. Philex is an established mining operator producing gold and copper from the Padcal mine for more than 50 years. We think the company could leverage its balance sheet and its experience to acquire cheap, attractive assets within Philippines.

Valuation

We arrive at our price target of PHP23, based on an SoTP valuation methodology. We value PMC's producing Padcal mine and the Silangan project based on DCF and the SC72 gas licence based on in-ground valuation, as illustrated in Fig 65. Our key assumptions are:

- Conservative long-term gold price of US$1,100/oz and copper price of US$3/lb.
- Life of the Padcal mine extended by another 10 years to 2027.
- Capex of US$700mn to build Silangan mine with life of mine until 2030.
- P/NPV multiple of 1.5x for Padcal and 1.4x for Silangan to allow for the copper-gold mix.

Fig 65: PMC – SoTP valuation

Operation	Methodology	PHP m	PHP/sh	Multiple	PHP/sh
Padcal	DCF	35,010	7.1	1.5	11
Silangan	DCF	38,116	7.7	1.4	11.1
Philex Petroleum (PPC)	In-ground value	1,635	0.3	n.a.	0.3
Corporate & others	DCF	-318	-0.1	n.a.	-0.1
Net cash		3,574	0.7	n.a.	0.7
Price target					**23.0**
Bulawan mine – restart	EV/EBITDA	13,500	2.7		2.7
Fair value					**25.7**

Source:Standard Chartered Research estimates

We believe the Bulawan mine, if restarted, could add 12% to our fair value, even conservatively assuming US$1,000/oz cash costs and 50,000 ounces of gold production per annum.

DCF sensitivities

The figure below illustrates a scenario where every 10% increase in long-term gold and copper prices adds 9.2% to our price target. Assuming gold prices remain at US$1,500/oz for the long term, we get a fair value of PHP26.1/share for Philex, or 30% increase to the current share price.

Fig 66: DCF sensitivities to long-term gold and copper prices

Copper price (US$/lb) \ Gold price (US$/oz)	900	1,000	1,100	1,200	1,300	1,400	1,500
2.5	19.4	20.1	20.9	21.7	22.4	23.2	24.0
3.0	21.5	22.3	**23.0**	23.8	24.6	25.3	26.1
3.5	23.6	24.4	25.2	25.9	26.7	27.5	28.2
4.0	25.8	26.5	27.3	28.1	28.8	29.6	30.4
4.5	27.9	28.7	29.4	30.2	30.9	31.7	32.5
5.0	30.0	30.8	31.5	32.3	33.1	33.8	34.6

Source: Standard Chartered Research estimates

Fig 67: DCF sensitivities to WACC and P/NPV multiple of Padcal

P/NPV multiple \ WACC	8.5%	9.0%	9.5%	10.1%	10.5%	11.0%	11.5%
1.0	18.0	17.1	16.2	15.3	14.7	13.9	13.3
1.3	23.1	21.9	20.8	19.5	18.8	17.9	17.0
1.5	27.1	25.7	24.4	**23.0**	22.1	21.0	20.0
1.8	31.5	29.9	28.4	26.7	25.6	24.4	23.2
2.0	34.9	33.1	31.4	29.5	28.4	27.0	25.7

Source: Standard Chartered Research estimates

Financials

We use gold and copper price forecasts of our commodities team in our model. We forecast gold price of US$1,460/oz in 2011 and US$1,650/oz in 2012; and copper price forecast of US$4.4/lb and US$4.5lb for 2011 and 2012 respectively. We assume a small decrease in production for 2012 of 7% for copper and 9% for gold due to possible declines in grades, which leads to an 8% decrease in the EPS forecast for 2012.

Fig 68: Philex – key assumptions and summary income statement

		2010	2011E	2012E
Gold price	US$/oz	1,217	1,460	1,650
Copper price	US$/lb	3.6	4.4	4.5
Silver	US$/oz	20	37	38
Gold production	koz	134	139	127
Copper production	kt	16.1	17.0	15.8
Sales	PHPm	13,394	15,158	14,511
EBITDA	PHPm	6	30	33
EBIT	PHPm	6,953	7,284	6,788
EPS	PHP	0.81	0.89	0.82

Source: Company, Standard Chartered Research estimates

Fig 69: 2011E EPS sensitivities to gold and copper prices

Copper price (US$/lb) \ Gold price ($/oz)	1,200	1,300	1,460	1,500	1,600
3.8	0.60	0.67	0.78	0.81	0.87
4.0	0.64	0.71	0.81	0.84	0.91
4.4	0.71	0.78	**0.89**	0.91	0.98
4.8	0.78	0.85	0.96	0.99	1.05
5.0	0.82	0.89	0.99	1.02	1.09
5.4	0.89	0.96	1.07	1.09	1.16

Source: Standard Chartered Research estimates

Fig 70: 2011E PER sensitivities to gold and copper prices

Copper price (US$/lb) \ Gold price ($/oz)	1,200	1,300	1,460	1,500	1,600
3.8	32.1	28.9	24.9	24.0	22.2
4.0	30.3	27.4	23.7	23.0	21.3
4.4	27.2	24.9	**21.8**	21.2	19.7
4.8	24.7	22.7	20.2	19.6	18.4
5.0	23.6	21.8	19.4	18.9	17.7
5.4	21.7	20.2	18.1	17.7	16.6

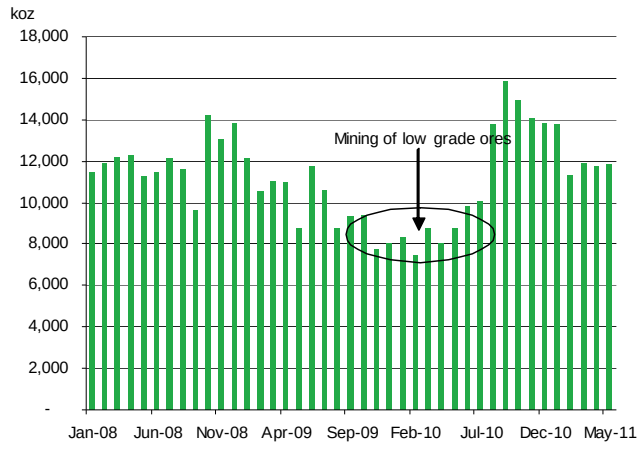
Source: Standard Chartered Research estimates

Gold production 47% higher YoY

Operational update

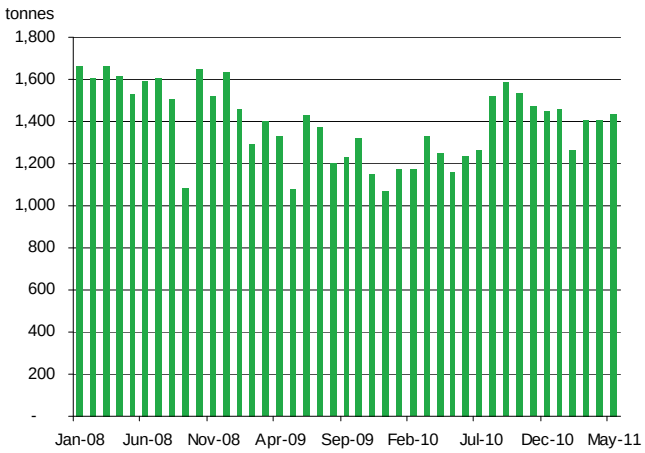
PMC produced 60,630 ounces of gold YTD until May 2011, 47% higher than the 41,290 ounces of gold production during the comparable period last year. Copper production during the Jan-May 2011 period was 6,977 tonnes, 14% higher than the 6,088 tonnes of copper produced during the corresponding period last year. The company's gold and copper production for the first 5 months represent 44% and 41% of our full-year 2011 forecast, respectively.

Fig 71: Philex gold production (monthly)



Source: Company

Fig 72: Philex copper production (monthly)



Source: Company

Zhaojin (1818.HK)

Income statement

Year end: December	2009	2010	2011E	2012E	2013E
Sales (RMBm)	2,797	4,098	5,039	6,335	7,665
Operating profit (RMBm)	967	1,617	2,079	2,914	3,862
EBIT (RMBm)	967	1,617	2,079	2,914	3,862
Net interest (RMBm)	(11)	(92)	8	(18)	23
Recurring profit (RMBm)	1,045	1,652	2,087	2,896	3,886
Pretax profit (RMBm)	1,045	1,652	2,087	2,896	3,886
Tax (%)	25.3	24.8	25.0	25.0	25.0
Net profit (RMBm)	754	1,202	1,541	2,141	2,873
EPS (RMB) – Headline	0.13	0.21	0.53	0.73	0.99
EPS (RMB) – Core	0.13	0.21	0.53	0.73	0.99
DPS (RMB)	0.22	0.12	0.16	0.22	0.30
Sales growth (%)	+30%	+47%	+23%	+26%	+21%
Op. profit growth (%)	+46%	+67%	+29%	+40%	+33%
Net profit growth (%)	+41%	+59%	+28%	+39%	+34%
EPS growth (%)	+41%	+59%	+28%	+39%	+0%
Key assumptions					
Gold price in USD/oz	875.0	978.0	1222.0	1460.0	1650.0
Gold price in RMB/g	195.5	215.2	265.7	303.8	343.4
Mine gold production (k oz)	249.3	300.0	344.0	403.5	453.3
Total unit cost (RMB/g)	97.5	94.8	113.4	121.3	127.9

Balance sheets (RMBm)

Year end: December	2009	2010	2011E	2012E	2013E
Fixed assets	2,763	3,691	5,961	6,426	6,888
Depreciation	234	345	412	452	487
Long-term investments					
Other long-term assets	2,800	3,541	3,541	3,541	3,541
Total non-current asset	**5,564**	**7,232**	**9,502**	**9,966**	**10,429**
Cash	2,214.1	781.9	35.2	1,534.7	3,488.9
Inventory	475.1	779.2	779.2	779.2	779.2
Receivables	10.8	199.2	199.2	199.2	199.2
Other current assets	317.8	422.8	422.8	422.8	422.8
Total current assets	**3,018**	**2,183**	**1,436**	**2,936**	**4,890**
Current borrowings	611	370	370	370	370
Other current liabilities	940	1,115	1,115	1,115	1,115
Long-term debt	58	71	71	71	71
Other long-term liabilities	517	594	565	102	(497)
Total liabilities	**2,126**	**2,150**	**2,121**	**1,658**	**1,059**
Minority interests	400	388	412	444	486
Equity after minority	4,247	4,950	6,029	7,527	9,538
Total equity	**4,647**	**5,338**	**6,441**	**7,971**	**10,024**
Capital employed	4,620	4,242	4,137	7,135	11,100
NAV per share (RMB)	1.70	1.98	2.21	2.73	3.44

Cash flow statements (RMBm)

Year end: December	2009	2010	2011E	2012E	2013E
Cashflow from trading	1,268	2,121	2,499	3,348	4,373
Change in wking capital	16	(680)	0	0	0
Operating cash flow	1,285	1,441	2,499	3,348	4,373
Tax	(332)	(357)	(522)	(724)	(971)
Capex and investments	(963)	(1,966)	(2,270)	(465)	(462)
Interest	(19)	(85)	8	(18)	23
Dividends	(242)	(321)	(462)	(642)	(862)
Change in net debt (inflow = +)	1,526	(1,428)	(747)	1,500	2,101
proceeds from equity placement	0	0	0	0	0
Net debt/(cash) at Y/E	(1,848)	(420)	326	(1,173)	(3,274)

Key ratios

Year end: December	2009	2010	2011E	2012E	2013E
EBITDA margin (%)	42.9%	47.9%	49.4%	0.0%	0.0%
EBIT margin (%)	34.6%	39.5%	41.3%	0.0%	0.0%
Operating margin (%)	34.6%	39.5%	41.3%	0.0%	0.0%
Net margin (%)	27.0%	29.3%	30.6%	0.0%	0.0%
Earnings growth (%)	41.2%	59.4%	28.2%	38.9%	34.2%
Net gearing (%)	cash	-20%	-29%	-5%	cash
ROE (%)	16.1%	22.4%	25.2%	29.7%	31.9%
ROCE (%)	16.9%	27.1%	36.8%	38.0%	31.5%
Interest cost (%)	5.5%	5.5%	5.5%	5.5%	5.5%
Headline PER (x)	54.2	34.0	26.5	19.1	14.2
Core PER (x)	54.2	34.0	26.5	19.1	14.2
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Payout ratio - headline (x)	85.0%	30.0%	30.0%	30.0%	30.0%
Payout ratio - core (x)	85.0%	30.0%	30.0%	30.0%	30.0%
Effective tax rate (%)	25.3	24.8	25.0	25.0	25.0

Source: Company, Standard Chartered Research estimates

Zijin Mining (2899.HK)

Income statement (RMBm)

Year end: Dec	2009	2010	2011E	2012E	2013E
Sales	**20,215**	**27,769**	**29,932**	**34,753**	**36,939**
COGS	**(13,642)**	**(18,240)**	**(17,912)**	**(19,825)**	**(21,024)**
Gross profit	**6,573**	**9,529**	**12,020**	**14,928**	**15,916**
SG&A	(1,095)	(1,550)	(1,680)	(1,935)	(2,051)
Other income/expense	(483)	(640)	(744)	(910)	(985)
EBIT	**4,995**	**7,338**	**9,596**	**12,083**	**12,880**
Net interest	(45)	(158)	(13)	(4)	121
Share of associates	96	137	137	137	137
Pretax profit	**5,045**	**7,318**	**9,721**	**12,216**	**13,138**
Income tax	(968)	(1,576)	(2,430)	(3,054)	(3,285)
Minority interest	(525)	(929)	(1,180)	(1,483)	(1,595)
Net profit - Headline	3,552	4,813	6,110	7,679	8,259
Net profit	**3,552**	**4,813**	**6,110**	**7,679**	**8,259**
EPS (RMB)	**0.24**	**0.33**	**0.28**	**0.35**	**0.38**
DPS (RMB)	0.10	0.13	0.11	0.14	0.15
Payout ratio (core) (%)	34%	40%	40%	40%	40%
Gold mining output (tonnes)	36.1	29.5	29.3	30.9	30.9
Copper output ('000 tonnes)	79.6	89.8	87.0	110.5	123.0
Gold price (US$/oz)	973	1,222	1,460	1,650	1,864
Copper cathode price (US$/lb)	2.37	3.22	4.18	4.31	3.80
Gold cost (US$/oz)	284	318	330	326	327
Copper cathode cost (US$/lb)	0.99	1.95	1.65	1.50	1.50

Balance sheet (RMBm)

Year end: Dec	2009	2010	2011E	2012E	2013E
Fixed assets	10,051	12,557	15,358	16,922	18,273
Other non-current assets	10,634	14,784	17,140	18,808	20,263
Total non-current asset	**20,685**	**27,341**	**32,499**	**35,729**	**38,535**
Cash	3,594	4,383	3,970	6,535	9,040
Inventory	2,590	3,483	3,762	4,163	4,415
Prepayments	849	1,543	1,671	1,925	2,040
Accounts and bills receivables	418	669	725	835	885
Other current assets	1,509	983	738	791	816
Total current assets	**8,961**	**11,061**	**10,866**	**14,250**	**17,195**
Total assets	**29,646**	**38,401**	**43,364**	**49,980**	**55,731**
Short term borrowings	3,458	5,280	3,458	3,458	3,458
Accounts and bills payable	957	1,025	1,006	1,114	1,181
Accrued liabilities and other pay	2,085	2,648	2,601	2,878	3,052
Other current liabilities	668	684	1,576	2,430	3,054
Long-term debt	407	2,303	907	907	907
Other long-term liabilities	416	377	377	377	377
Total liabilities	**7,992**	**12,316**	**9,924**	**11,164**	**12,029**
Shareholder's funds	**18,170**	**21,832**	**28,063**	**31,956**	**35,246**
Minority interests	3,443	4,197	5,377	6,860	8,455
NAV per share (RMB)	1.25	1.50	1.29	1.47	1.62
Net debt (cash)	**271**	**3,200**	**395**	**(2,170)**	**(4,674)**

Cash flow statement (RMBm)

Year end: Dec	2009	2010	2011E	2012E	2013E
Profit before tax and minorities	5,108	5,045	7,318	9,721	12,216
Depreciation and amortisation	699	991	1,185	1,523	1,872
Change in working capital	(485)	(1,571)	(556)	(434)	(200)
Increase in A/R	68	(428)	(83)	(164)	(74)
Increase in inventories	(723)	(891)	(279)	(402)	(252)
Increase in A/P	206	43	(18)	107	67
Income tax paid	(1,095)	(1,412)	(1,576)	(2,430)	(3,054)
Cash flow operating	**4,491**	**5,655**	**8,887**	**10,991**	**11,683**
Capex	(2,627)	(3,373)	(4,000)	(3,000)	(3,000)
Additions to other assets	(912)	(1,265)	(1,500)	(1,500)	(1,500)
Additions to subsidiaries	(1,017)	(1,190)	(900)	(900)	(900)
Cash flow investing	**(3,183)**	**(6,026)**	**(5,815)**	**(4,806)**	**(4,681)**
Net change in bank loans	600	3,192	0	0	0
Issuance of share	0	0	0	0	0
Dividends	(1,786)	(1,892)	(2,695)	(3,422)	(4,300)
Cash flow financing	**(1,042)**	**1,185**	**(2,893)**	**(3,620)**	**(4,499)**
Net increase in cash	**266**	**814**	**178**	**2,565**	**2,504**
Cash at beginning of year	2,720	2,999	3,792	3,970	6,535
Cash at end of year	2,999	3,792	3,970	6,535	9,040

Key ratios

Year end: Dec	2009	2010	2011E	2012E	2013E
Sales growth (%)	19.6	37.4	7.8	16.1	6.3
EBITDA growth (%)	0.1	44.4	30.3	25.8	7.5
Op. profit growth (%)	-3.5	46.9	30.8	25.9	6.6
Net profit growth (%)	-2.5	35.5	27.0	25.7	7.5
Gross margin (%)	32.5	34.3	40.2	43.0	43.1
EBITDA margin (%)	28.3	29.7	35.9	38.9	39.3
Operating margin (%)	24.7	26.4	32.1	34.8	34.9
Net margin (%)	17.6	17.3	20.4	22.1	22.4
Net gearing (%)	1.5	14.7	1.4	-6.8	-13.3
Debt to equity ratio (%)	21.3	34.7	15.6	13.7	12.4
ROE (%)	20.7	24.1	24.5	25.6	24.6
ROCE (%)	13.9	14.2	16.1	17.7	17.1
Core PER (x)	13.2	9.8	11.5	9.2	8.5
EV/EBITDA (x)	12.4	8.6	6.6	5.2	4.9
Dividend yield (%)	3.1	4.1	3.5	4.4	4.7
Tax (%)	19.2	21.5	25.0	25.0	25.0

Source: Company, Standard Chartered Research estimates

Real Gold Mining (0246.HK)

Income statement (RMBm)

Year end: Dec	2009	2010	2011E	2012E	2013E
Sales	**1,011**	**1,368**	**1,769**	**2,069**	**2,343**
COGS	(263)	(311)	(388)	(448)	(500)
Gross profit	**749**	**1,057**	**1,381**	**1,621**	**1,843**
SG&A	(48)	(34)	(53)	(62)	(70)
EBIT	**700**	**1,023**	**1,328**	**1,559**	**1,773**
Net interest	2	8	8	8	9
Other income/expense	34	221	175	224	280
Pretax profit	**736**	**1,251**	**1,511**	**1,790**	**2,062**
Income tax	(193)	(299)	(408)	(483)	(557)
Minority interest	(17)	(10)	-23	-27	-31
Net profit - Headline	527	798	1,080	1,280	1,474
Net profit	**527**	**798**	**1,080**	**1,280**	**1,474**
EPS (RMB)	**0.78**	**0.95**	**1.19**	**1.41**	**1.63**
Diluted EPS (RMB)	0.77	0.95	1.19	1.41	1.62
DPS (RMB)	0.00	0.04	0.00	0.00	1.63
Payout ratio (core) (%)	0%	4%	0%	0%	100%
Gold output (koz)	116.9	136.1	135.7	152.5	165.8
Gold eq. output (koz)	177.2	212.1	233.0	242.6	239.5
Average selling price (US$/oz)	839	953	1,168	1,287	1,454
Production cost (US$/oz)	208	220	246	274	311

Balance sheet (RMBm)

Year end: Dec	2009	2010	2011E	2012E	2013E
Fixed assets	378	457	965	1,158	1,240
Other non-current assets	275	1,435	1,425	1,415	1,405
Total non-current asset	**654**	**1,892**	**2,390**	**2,573**	**2,645**
Cash	1,957	2,965	3,556	4,675	6,103
Inventory	6	8	10	11	12
Accounts and bills receivables	33	45	52	60	68
Other current assets	427	0	0	0	0
Total current assets	**2,424**	**3,018**	**3,618**	**4,747**	**6,184**
Total assets	**3,078**	**4,910**	**6,007**	**7,319**	**8,828**
Short term borrowings	0	0	0	0	0
Accounts and bills payable	46	61	50	50	50
Other current liabilities	494	106	150	200	250
Long-term debt	0	0	0	0	0
Other long-term liabilities	17	17	17	17	17
Total liabilities	**557**	**184**	**217**	**267**	**317**
Shareholder's funds	**2,483**	**4,590**	**5,632**	**6,867**	**8,296**
Minority interests	37	135	158	185	216
NAV per share (RMB)	3.23	5.07	6.22	7.59	9.17
Net debt (cash)	**(1,957)**	**(2,965)**	**(3,556)**	**(4,675)**	**(6,103)**

Cash flow statement (RMBm)

Year end: Dec	2009	2010	2011E	2012E	2013E
Profit before tax and minorities	736	1,108	1,511	1,790	2,062
Depreciation and amortisation	33	38	42	47	47
Change in working capital	3	1	-20	-10	-9
Increase in A/R	-6	-12	-7	-9	-8
Increase in inventories	-1	-2	-2	-1	-1
Increase in A/P	9	15	-11	0	0
Income tax paid	-136	-260	-408	-483	-557
Cash flow operating	**650**	**896**	**1,125**	**1,344**	**1,543**
Capex	-178	-641	-535	-225	-115
Others	-427	330	2	0	0
Cash flow investing	**(606)**	**(312)**	**(533)**	**(225)**	**(115)**
Net change in bank loans	0	-427	0	0	0
Issuance of share	1,443	1,045	0	0	0
Payment from third party	427	0	0	0	0
Dividends	0	0	0	0	0
Cash flow financing	**1,871**	**423**	**0**	**0**	**0**
Net increase in cash	**1,915**	**1,007**	**592**	**1,119**	**1,428**
Cash at beginning of year	42	1,957	2,964	3,556	4,675
Cash at end of year	1,957	2,964	3,556	4,675	6,103

Key ratios

Year end: Dec	2009	2010	2011E	2012E	2013E
Sales growth (%)	223.8	35.3	29.3	17.0	13.3
EBITDA growth (%)	312.5	44.7	29.1	17.2	13.3
Op. profit growth (%)	316.4	46.0	29.8	17.4	13.7
Net profit growth (%)	406.9	51.5	35.4	18.5	15.2
Gross margin (%)	74.0	77.3	78.1	78.3	78.6
EBITDA margin (%)	72.5	77.5	77.5	77.6	77.7
Operating margin (%)	69.3	74.7	75.1	75.3	75.6
Net margin (%)	52.1	58.3	61.1	61.9	62.9
Net gearing (%)	-78.8	-64.6	-63.1	-68.1	-73.6
Debt to equity ratio (%)	0.0	0.0	0.0	0.0	0.0
ROE (%)	35.3	22.6	21.1	20.5	19.4
ROCE (%)	101.9	68.7	54.1	55.5	61.6
Core PER (x)	9.4	7.8	6.2	5.2	4.5
Diluted PER (x)	10.1	8.2	6.5	5.5	4.8
EV/EBITDA (x)	5.6	3.9	2.3	1.9	1.7
Dividend yield (%)	0.0	0.0	0.0	0.0	0.2
Tax (%)	26.2	27.0	27.0	27.0	27.0

Source: Company, Standard Chartered Research estimates

Philex (PX PH)

Income statement (PHP m)

Year end: December	2008	2009	2010	2011E	2012E
Sales	9,717	9,055	13,394	15,158	14,511
Operating expenses	(6,031)	(6,690)	(7,329)	(8,923)	(8,776)
EBIT	**3,687**	**2,365**	**6,065**	**6,235**	**5,735**
Depreciation and amortisation	(773)	(853)	(888)	(1,050)	(1,053)
EBITDA	**4,460**	**3,218**	**6,953**	**7,284**	**6,788**
Net interest	100	80	6	30	33
Associates	10	(73)	0	0	0
Other income/expenses	(527)	1,129	(387)	0	0
Pretax profit	**3,270**	**3,502**	**5,684**	**6,265**	**5,768**
Taxation	(470)	(767)	(1,739)	(1,917)	(1,765)
Minority interest	(92)	(95)	(19)	(19)	(19)
Normalised net profit	**2,708**	**2,830**	**3,963**	**4,366**	**4,021**
Extraordinary items	0	0	0	0	0
Reported net profit	**2,893**	**2,830**	**3,963**	**4,366**	**4,021**
Normalised EPS (PHP)	0.78	0.58	0.81	0.89	0.82
Reported EPS (PHP)	0.83	0.58	0.81	0.89	0.82
DPS (PHP)	0.00	0.09	0.21	0.22	0.19

Balance sheet (PHP m)

Year end: December	2008	2009	2010	2011E	2012E
Cash	10,713	2,881	3,782	4,146	1,734
Short term investments	0	0	0	0	0
Accounts receivable	128	517	2,180	2,468	2,362
Inventory	1,263	1,146	1,094	1,238	1,185
Other current assets	441	478	695	695	695
Total current assets	**12,544**	**5,022**	**7,751**	**8,546**	**5,976**
PP&E	4,066	4,669	5,095	7,683	13,269
Intangible assets	259	259	259	259	259
Associates and JVs	260	1,137	833	833	833
Other long term assets	2,269	10,292	11,715	11,715	11,715
Total long term assets	**6,854**	**16,356**	**17,902**	**20,490**	**26,076**
TOTAL ASSETS	**19,398**	**21,378**	**25,653**	**29,036**	**32,052**
Short term debt	4,039	0	150	150	150
Accounts payable	780	867	969	1,096	1,049
Other current liabilities	1,059	287	1,193	1,193	1,193
Total current liabilities	**5,878**	**1,154**	**2,312**	**2,439**	**2,392**
Long term debt	0	0	0	0	0
Deferred tax	1	1,976	2,013	2,013	2,013
Other long term liabilities	992	565	570	570	570
Total long term liabilities	**992**	**2,541**	**2,583**	**2,583**	**2,583**
TOTAL LIABILITIES	**6,870**	**3,695**	**4,895**	**5,022**	**4,976**
Shareholders funds	11,887	16,983	20,522	23,797	26,877
Minority interest	641	700	236	218	199
LIABILITIES+EQUITY	**19,398**	**21,378**	**25,653**	**29,036**	**32,052**
Net cash/ (debt)	6,674	2,881	3,632	3,996	1,584

Cash flow statement (PHP m)

Year end: Dec	2008	2009	2010E	2011E	2012E
EBIT	**3,687**	**2,365**	**6,065**	**6,235**	**5,735**
Depreciation & amortisation	773	853	888	1,050	1,053
Net interest	52	109	11	30	33
Taxes paid	(507)	(357)	(950)	(1,917)	(1,765)
Changes in working capital	1,410	(533)	(1,718)	(304)	111
Other	79	(304)	211	(0)	(0)
Cash flow from operations	**5,493**	**2,133**	**4,507**	**5,094**	**5,167**
Capex	(1,155)	(1,457)	(1,466)	(3,638)	(6,638)
Disposals	496	17	170	0	0
Other	(1,104)	(4,425)	(1,660)	0	0
Cash flow from investing	**(1,763)**	**(5,866)**	**(2,956)**	**(3,638)**	**(6,638)**
Dividends	(44)	(4)	(649)	(1,092)	(941)
Issue of shares	53	111	57	0	0
Change in debt	(268)	(4,751)	(1,378)	0	0
Other	4,547	877	1,528	0	0
Cashflow from financing	**4,288**	**(3,768)**	**(442)**	**(1,092)**	**(941)**
Effect of Exchange Rate	64	(166)	(208)	0	0
Change in cash	**8,083**	**(7,667)**	**901**	**364**	**(2,412)**
Free cash flow	**4,339**	**675**	**3,041**	**1,456**	**(1,471)**

Key ratios

Year end: Dec	2008	2009	2010E	2011E	2012E
EBIT margin (%)	38%	26%	45%	41%	40%
Effective tax rate (%)	16%	10%	17%	31%	31%
Interest cover (x)	(36.8)	(29.5)	(972.7)	(207.8)	(174.4)
Operating cash/EBIT (x)	1.49	0.90	0.74	0.82	0.90
Depreciation/capex (x)	0.67	0.58	0.61	0.29	0.16
ROE (%)	24%	17%	19%	18%	15%
ROCE (%)	27%	12%	26%	23%	19%
Net gearing (%)	-53%	-16%	-17%	-17%	-6%
Inventory days	47.4	46.2	29.8	29.8	29.8
Accounts receivable days	4.8	20.8	59.4	59.4	59.4
Accounts payable days	29.3	34.9	26.4	26.4	26.4
Total asset turnover (x)	0.5	0.4	0.5	0.5	0.5
PBR (x)	5.73	4.94	7.9	5.5	4.6
EV/Sales (x)	2.62	2.81	6.8	6.0	6.3
EV/EBITDA (x)	10.7	16.2	13.1	12.5	13.4
PER (x)	13.3	27.5	23.4	20.3	22.1
Dividend yield (%)	2.0%	0.0%	1.1%	1.2%	1.0%
No of shares, fully diluted (m)	3,492	4,900	4,922	4,922	4,922

Source: Company, Standard Chartered Research estimates

Appendix 1: Comparison table of gold producers

Fig 73: Comp table of gold producers (ranked by alphabetical order)

Company	Ticker	Market cap US$m	EV/Reserve US$/oz	EV/Resource US$/oz	P/E 2011	Resources (incl. reserves) (koz)	Production (koz) 2011E	2012E	2013E	2014E	2015E	Total 5yr vol growth (koz)	5-year CAGR	Mine life by reserve yr
A1 Minerals	AAM AU	7	n.a.	6	n.a.	1,328	30	30	30	30	30	28	64%	n.a.
Agnico Eagle	AEM CN	10,414	415	257	24	42,465	1,150	1,300	1,400	1,500	1,500	512	9%	14
Alacer Gold	AQG AU	2,701	863	223	18	12,130	410	510	580	610	598	328	17%	5
Alamos Gold	AGI CN	1,794	n.a.	n.a.	24	n.a.	160	160	160	160	160	-11	-1%	n.a.
Allied Gold	ALD AU	696	216	89	25	8,300	220	220	240	240	370	306	42%	9
Allied Nevada	ANV US	2,767	252	119	n.a.	20,726	130	270	280	310	310	210	25%	8
Ampella Mining	AMX AU	475	n.a.	192	n.a.	2,240	0	0	0	100	200	200	100%	n.a.
Angel Mining	ANGM LN	25	n.a.	n.a.	n.a.	n.a.	35	35	35	35	35	0	0%	n.a.
Anglo Gold Ashanti	AU US	16,469	230	75	9	220,000	4,415	4,651	4,651	4,651	4,651	131	1%	15
Apex Minerals	AXM AU	41	98	26	n.a.	2,200	59	59	59	59	59	0	0%	10
Archipelago Resources	AR/ LN	589	n.a.	315	n.a.	1,750	120	160	160	160	160	160	7%	n.a.
Banro	BAA US	643	121	73	n.a.	7,530	40	140	210	300	410	410	79%	11
Barrick	ABX US	43,535	249	188	10	253,102	7,845	8,038	8,355	8,669	8,593	823	2%	16
Brigus Gold	BRD US	270	159	102	37	3,034	82	104	104	104	104	37	9%	19
Buenaventura	BVN US	10,287	681	344	10	29,901	1,164	1,180	996	903	857	-239	-5%	13
Catalpa Resources	CAH AU	323	352	160	25	2,200	95	110	126	133	146	74	15%	7
Centamin Egypt	CEY LN	2,093	214	134	11	14,490	270	300	350	400	500	350	27%	18
Centerra	CG CN	3,707	392	195	10	16,475	630	630	630	630	630	-49	-1%	13
CGA Mining	CGX AU	865	280	108	11	7,770	170	200	200	200	200	50	6%	15
Chenzhou Mining	002155 CH	2,676	n.a.	1,659	29	1,608	81	81	81	81	81	0	0%	n.a.
China Gold International	2099 HK	1,659	539	128	16	12,597	147	147	147	147	147	32	5%	20
Cluff Gold	CLF LN	207	484	52	n.a.	3,612	90	90	90	140	295	201	26%	1
Coeur d'Alene	CDE US	2,129	252	139	9	16,308	250	269	269	269	269	112	11%	9
Colossus Minerals	CSI CN	808	n.a.	n.a.	n.a.	n.a.	0	0	0	0	113	113	n.a.	n.a.
Continental Gold	CNL CN	867	n.a.	n.a.	n.a.	n.a.	0	0	0	50	100	100	n.a.	n.a.
Crescent Gold	CRE AU	59	121	26	n.a.	2,075	100	110	120	120	140	40	7%	3
Detour Gold	DGC CN	2,510	129	93	n.a.	20,515	0	0	200	500	600	600	73%	25
Dundee Precious Metal	DPM CN	973	n.a.	n.a.	12	n.a.	129	169	169	169	169	75	12%	n.a.
Eldorado	EGO US	7,746	500	284	22	26,896	750	838	1,000	1,388	1,400	767	17%	11
EnviroGold	EVG AU	95	n.a.	n.a.	n.a.	n.a.	0	90	115	165	165	165	22%	n.a.
European Gold	EGU CN	2,162	115	100	n.a.	21,000	0	0	206	317	465	465	50%	21
Exeter Resources	XRA US	420	n.a.	7	n.a.	47,132	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Extorre	XG CN	1,019	n.a.	970	n.a.	1,002	0	20	30	30	30	30	14%	n.a.
Focus Minerals	FML AU	250	n.a.	120	12	2,071	100	130	130	130	130	53	11%	n.a.
Freeport-McMoRan	FCX US	46,352	106	n.a.	8	n.a	1,350	1,400	1,700	1,800	1,800	-63	-1%	21
Gabriel Resources	GBU CN	2,472	206	162	n.a.	14,600	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a	n.a.
Gold Resources	GORO US	1,275	n.a.	1,996	19	620	90	155	200	200	200	190	82%	n.a.

Source: Companies, Bloomberg, Standard Chartered Research estimates

Fig 73: Comp table of gold producers (ranked by alphabetical order)

Company	Ticker	Market cap US$m	EV/Reserve US$/oz	EV/Resource US$/oz	P/E 2011	Resources (incl. reserves) (koz)	Production (koz) 2011E	2012E	2013E	2014E	2015E	Total 5yr vol growth (koz)	5-year CAGR	Mine life by reserve yr
Goldcorp	GG US	38,035	348	234	20	161,005	2,800	3,184	3,418	3,748	3,748	1,198	8%	13
Golden Star	GSS US	631	135	84	21	7,396	345	345	345	345	255	-100	-6%	18
Goldfields	GFI SJ	10,508	154	46	11	254,593	3,841	3,841	3,841	4,591	4,641	800	4%	16
Great Basin Gold	GBG US	859	1,034	562	21	1,794	220	330	330	330	330	242	30%	3
G-Resources	1051 HK	1,229	248	118	n.a.	8,381	62	250	250	250	250	250	42%	12
Harmony Gold	HAR SJ	5,617	111	28	33	208,745	1,722	1,851	1,980	2,109	2,187	759	9%	22
Hecla Mining	HL US	2,060	241	95	12	18,414	69	69	69	69	69	0	0%	11
High River Gold	HRG CN	963	317	135	n.a.	6,400	345	375	320	310	310	-25	-2%	9
Hochschild	HOC LN	2,605	820	261	11	9,755	144	126	98	63	45	-100	-21%	3
Iamgold	IMG CN	7,649	497	251	16	28,741	1,150	1,123	1,359	1,359	1,359	392	7%	12
Integra Mining	IGR AU	377	1,361	163	33	2,500	90	100	110	120	120	90	32%	3
International Minerals	IMZ CN	952	929	63	22	14,800	14	14	14	54	54	40	30%	n.a.
Jaguar Mining	JAG US	386	130	73	15	7,438	200	230	410	457	437	299	26%	10
Kingsgate	KCN AU	1,170	511	214	19	5,602	150	250	350	350	330	200	20%	7
Kinross	KGC US	17,602	242	151	22	111,235	2,834	2,960	3,083	3,633	4,243	1,909	13%	15
La Mancha Resources	LMA CN	325	348	116	9	2,295	128	128	128	128	126	4	1%	6
Lake Shore Gold	LSG CN	1,228	1,421	385	34	3,000	125	125	130	140	140	97	26%	6
Lappland Goldminers	GOLD SS	40	n.a.	n.a.	n.a.	n.a.	24	24	24	24	24	0	0%	n.a.
Lingbao Gold	3330 HK	567	n.a.	153	11	5,015	145	177	193	193	193	68	9%	n.a.
Medusa Mining	MML AU	1,579	3,030	711	15	2,151	102	125	130	200	400	310	35%	1
Minefinders	MFL CN	994	138	89	13	10,040	67	70	80	90	250	190	33%	11
Mineral Deposits	MDM CN	414	n.a.	n.a.	5	n.a.	172	172	172	172	172	0	0%	n.a.
Minerals and Metals Group	1208 HK	3,880	268	61	6	75,510	175	175	175	175	175	0	0%	3
Mundo Minerals Limited	MUN AU	30	n.a.	n.a.	3	n.a.	25	25	25	43	43	18	11%	n.a.
Navigator Resources	NAV AU	61	128	65	n.a.	946	98	100	100	100	83	28	8%	6
New Dawn Mining	ND CN	54	232	24	n.a.	2,111	23	40	55	100	100	85	46%	2
New Gold	NGD CN	3,690	180	125	21	27,238	390	410	475	475	475	92	4%	18
Newcrest	NCM AU	30,247	290	146	24	209,526	2,915	3,115	3,365	3,465	3,465	697	5%	14
Newmont	NEM US	25,726	231	162	12	172,726	5,280	5,280	5,113	5,544	5,462	70	0%	17
Noble Minerals	NMG AU	241	394	119	n.a.	2,000	40	150	225	300	300	300	65%	2
Norseman Gold	NGX AU	58	141	15	n.a.	3,700	80	80	80	80	80	0	0%	5
North American Palladium	PAL US	606	n.a.	n.a.	n.a.	n.a.	33	61	50	44	41	23	18%	n.a.
Northern Star Resources	NST AU	156	n.a.	n.a.	8	n.a.	75	75	75	75	75	5	1%	n.a.
Norton Gold Fields	NGF AU	105	n.a.	30	n.a.	5,826	140	170	170	170	175	35	5%	n.a.
NovaGold	NG US	2,269	152	41	n.a.	62,771	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a	n.a.
OceanaGold	OGC AU	642	180	68	10	9,470	290	342	343	344	345	76	5%	10
Osisko Mining	OSK CN	5,458	616	342	29	16,140	300	688	712	695	1,004	1,004	35%	9
OZ Minerals	OZLDA AU	4,682	2,053	799	11	4,100	196	196	196	196	196	0	0%	8
Pan American Silver	PAA CN	3,210	4,155	1,066	10	2,648	64	64	64	64	64	0	0%	11

Source: Companies, Bloomberg, Standard Chartered Research estimates

Fig 73: Comp table of gold producers (ranked by alphabetical order)

Company	Ticker	Market cap US$m	EV/Reserve US$/oz	EV/Resource US$/oz	P/E 2011	Resources (incl. reserves) (koz)	Production (koz) 2011E	2012E	2013E	2014E	2015E	Total 5yr vol growth (koz)	5-year CAGR	Mine life by reserve yr
Perseus Mining	PRU AU	1,058	350	134	n.a.	7,300	200	250	478	462	462	462	23%	6
Petaquilla Minerals	PTQ CN	121	234	137	n.a.	911	40	50	50	50	50	25	15%	11
Petropavlovsk	POG LN	2,172	86	42	8	62,057	650	888	961	1,047	1,012	506	15%	9
Philex Mining Corporation	PX PM	2,171	1,340	114	20	18,229	129	120	120	142	209	94	13%	3
Polymetal	PMTL RU	6,949	724	479	15	15,932	1,150	1,230	1,203	1,137	1,058	198	4%	10
Polyus Gold	PLZL RX	13,324	120	119	20	110,215	1,750	1,770	2,520	2,870	2,720	1,334	14%	40
PT Antam (Persero) Tbk	ANTM IJ	2,372	1,749	368	11	5,488	122	122	122	122	122	33	7%	9
Ramelius Resources	RMS AU	362	595	81	6	3,475	90	140	180	230	230	170	31%	2
Randgold	RRS LN	7,083	414	155	20	43,720	748	787	725	705	705	265	10%	23
Range River Gold	RNG AU	n.a.	n.a.	35	n.a.	547	21	21	21	21	21	-19	-12%	n.a.
Real Gold	246 HK	1,034	103	67	6	5,997	136	136	152	166	224	88	10%	17
Royal Gold	RGLD US	3,136	490	n.a.	44	n.a.	90	120	210	210	210	162	34%	23
Rusoro Mining	RML CN	119	50	7	n.a.	17,535	150	150	150	150	150	40	6%	16
San Gold	SGR CN	994	1,213	354	n.a.	2,627	80	120	180	180	180	140	35%	4
Saracen Mineral	SAR AU	309	271	90	7	3,000	120	130	140	150	160	50	8%	6
Semafo	SMF CN	2,069	671	199	20	9,447	280	280	310	330	380	119	8%	7
Shandong Gold	600547 CH	9,946	1,013	n.a.	35	n.a.	685	756	756	756	756	131	4%	14
Shandong Humon Smelting	002237 CH	1,179	1,819	n.a.	23	n.a.	55	55	55	55	55	0	0%	15
Silverlake Resources	SLR AU	316	n.a.	116	14	2,536	80	170	260	280	300	250	43%	n.a.
Sino Prosper	766 HK	248	n.a.	219	49	995	5	19	24	31	31	26	44%	n.a.
St Barbara	SBM AU	636	188	72	10	7,651	262	312	312	312	251	20	2%	12
Tanami Gold	TAM AU	230	n.a.	112	25	2,030	50	50	50	50	50	10	5%	n.a.
Troy Resources	TRY AU	342	580	224	9	1,561	122	130	114	105	120	58	14%	5
Unity Mining	UML AU	54	59	26	33	203	42	42	21	11	5	-37	-34%	17
Westgold	WGR AU	111	170	35	n.a.	2,994	0	0	0	120	178	178	n.a.	3
Yamana	AUY US	8,566	148	101	12	85,172	1,104	1,298	1,651	1,651	1,651	605	10%	11
Zhaojin Mining	1818 HK	6,291	667	339	26	15,941	403	453	499	512	530	203	10%	15
Zhongjin Gold	600489 CH	7,542	479	n.a.	27	n.a	707	804	804	804	804	161	5%	17
Zijin	2899 HK	14,631	629	61	12	150,007	943	993	993	993	993	56	1%	15
Sector Average			**529**	**213**	**18**							**Total: 20,580**		

Source: Companies, Bloomberg, Standard Chartered Research estimates

Appendix 2: Details of gold mines (ranked by alphabetical order)

Fig 74: Details of gold mines

Company	Mine	country of mine	Reserves (koz)	MI&I Resource-(incl. Reserves) (koz)	Grade (g/tonne)	Cash cost ($/oz)	Total cost ($/oz)	Production 'koz						Total 5-yr production growth (koz)
								2010	2011E	2012E	2013E	2014E	2015E	
A1 Minerals	BrightStar	Australia	n.a.	1,328	n.a	n.a	n.a	3	30	30	30	30	30	28
Agnico Eagle	Creston Mascota, near Pinos Altos	Mexico	n.a.	n.a	2.3	439	n.a	0	31	31	31	31	31	31
Agnico Eagle	Goldex	Canada	1,600	3,500	1.8	344	n.a	164	184	195	210	230	230	66
Agnico Eagle	Goldex, expansion	Canada	1,566	n.a	1.6	335	n.a	0	20	20	20	20	20	20
Agnico Eagle	Kittila	Finland	4,880	6,780	4.6	657	n.a	147	150	150	150	150	150	3
Agnico Eagle	Lapa	Canada	677	977	7.4	529	n.a	116	120	145	160	176	176	60
Agnico Eagle	LaRonde	Canada	4,800	6,600	4.3	220	n.a	180	184	184	184	184	184	4
Agnico Eagle	Meadowbank	Canada	3,486	5,586	3.2	693	n.a	266	362	362	362	365	365	99
Agnico Eagle	Pinos Altos	Mexico	3,271	4,971	2.3	425	n.a	151	168	168	168	180	180	29
Alacer Gold	Copler Leachable	Turkey	2,169	6,043	1.5	483	n.a	10	130	180	190	170	160	150
Alacer Gold	Copler Sulfide potential	Turkey	2,400	n.a.	1.5	430	n.a	0	0	0	0	50	200	200
Alacer Gold	Higginsville*	Australia	853	1,572	4.4	676	n.a	160	180	180	180	180	133	-27
Alacer Gold	South Kalgoorlie*	Australia	106	4,515	2.2	993	n.a	100	100	150	210	210	105	5
Alamos Gold	Mulatos	Mexico	n.a.	n.a.	n.a	n.a	327	171	160	160	160	160	160	-11
Allied Gold	Gold Ridge	Solomon Islands	1,280	2,090	1.7	1,000	n.a	0	120	120	120	120	120	120
Allied Gold	Simberi	Papua New Guinea	2,150	6,220	1.4	650	n.a	64	100	100	120	120	250	186
Allied Nevada	Hycroft	USA	2,400	10,100	0.4	400	n.a	100	130	270	280	310	310	210
Ampella Mining	Batie West	Burkina Faso	n.a.	2,200	1.6	n.a	n.a	0	0	0	0	50	100	100
Angel Mining	Nalunaq	Greenland	n.a.	n.a.	n.a	n.a	n.a	35	35	35	35	35	35	0
Anglo Gold Ashanti	AngloGold Ashanti Brasil Mineracao	Brazil	2,180	10,880	6.6	407	n.a	338	338	350	350	350	350	12
Anglo Gold Ashanti	Cerro Vanguardia	Argentina	2,032	4,195	3.2	366	n.a	209	211	216	216	216	216	8
Anglo Gold Ashanti	Cripple Creek & Victor	USA	4,290	13,740	0.8	493	n.a	233	233	250	250	250	250	17
Anglo Gold Ashanti	Geita	Tanzania	4,210	11,450	3.2	777	n.a	357	360	380	380	380	380	23
Anglo Gold Ashanti	Great Noligwa	South Africa	1,600	6,940	n.a	884	n.a	133	133	140	140	140	140	7
Anglo Gold Ashanti	Iduapriem	Ghana	2,400	4,600	1.4	666	n.a	185	185	195	195	195	195	10
Anglo Gold Ashanti	Kopanang	South Africa	3,110	9,490	6.6	613	n.a	305	305	310	310	310	310	5
Anglo Gold Ashanti	Moab Khotsong	South Africa	7,320	18,240	12.5	588	n.a	292	292	300	300	300	300	8
Anglo Gold Ashanti	Mponeng	South Africa	12,720	49,830	9.8	453	n.a	532	560	580	580	580	580	48
Anglo Gold Ashanti	Navachab	Namibia	1,630	3,730	1.3	727	n.a	87	87	87	87	87	87	0
Anglo Gold Ashanti	Obuasi	Ghana	9,650	29,530	7.1	744	n.a	316	316	350	350	350	350	34
Anglo Gold Ashanti	Savuka	South Africa	690	3,840	6.2	1,100	n.a	22	30	50	50	50	50	28

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Fig 74: Details of gold mines

Company	Mine	country of mine	Reserves (koz)	MI&I Resource-(incl. Reserves) (koz)	Grade (g/tonne)	Cash cost ($/oz)	Total cost ($/oz)	Production 'koz						Total 5-yr production growth (koz)
								2010	2011E	2012E	2013E	2014E	2015E	
Anglo Gold Ashanti	Serra Grande	Brazil	785	1,871	3.7	481	n.a	150	154	154	154	154	154	4
Anglo Gold Ashanti	Siguiri	Guinea	3,612	7,753	0.7	643	n.a	322	322	329	329	329	329	7
Anglo Gold Ashanti	Sunrise Dam*	Australia	1,730	3,620	3.1	957	n.a	396	400	430	430	430	215	-181
Anglo Gold Ashanti	Tau Lekoa	South Africa	800	6,200	n.a	921	n.a	64	64	64	64	64	64	0
Anglo Gold Ashanti	TauTona	South Africa	2,730	6,200	9.1	700	n.a	258	268	290	290	290	290	32
Anglo Gold Ashanti	West Wits Surface	South Africa	1,740	4,550	0.5	450	n.a	176	180	200	200	200	200	24
Anglo Gold Ashanti/Iamgold	Sadiola	Mali	5,602	9,171	1.9	650	n.a	288	288	288	288	288	288	0
Apex Minerals	Wiluna	Australia	572	2,200	5.0	n.a	n.a	59	59	59	59	59	59	0
Archipelago Resources	Toka Tindung	Indonesia	1,100	1,750	3.7	425	n.a	0	120	160	160	160	160	160
Atna Resources	Briggs	USA	201	875	0.6	1,000	n.a	0	40	40	40	55	20	20
Avocet	Inata	Burkina Faso	1,202	2,665	2.1	531	n.a	153	183	183	183	183	183	30
Avocet	North Lanut*	Indonesia	229	2,500	1.5	674	n.a	59	59	59	59	51	25	-34
Avocet	Penjom	Malaysia	388	1,281	2.3	944	n.a	51	48	48	48	48	48	-3
Banro	Namoya	Democratic Republic of Congo	n.a.	1,681	2.2	n.a	n.a	0	0	0	60	120	120	120
Banro	Twangiza	Democratic Republic of Congo	4,540	6,000	1.7	n.a	n.a	0	40	140	150	180	290	290
Barrick	Bald Mountain	USA	4,489	5,667	0.6	768	1,038	59	125	214	226	226	226	167
Barrick	Bulyanhulu	Tanzania	8,147	12,747	10.6	584	697	208	299	319	338	338	338	130
Barrick	Buzwagi	Tanzania	3,401	4,093	1.5	667	922	151	151	151	151	151	151	0
Barrick	Cortez	USA	14,495	23,779	1.4	271	489	1,141	1,160	1,160	1,160	1,160	1,160	19
Barrick	Cowal	Australia	2,697	3,578	1.1	461	648	298	298	298	298	298	298	0
Barrick	Golden Sunlight	USA	508	653	1.7	581	n.a	0	28	28	28	28	28	28
Barrick	Goldstrike	USA	12,614	15,802	5.8	530	614	1,239	1,239	1,239	1,239	1,239	1,239	0
Barrick	Hemlo	Canada	1,325	1,504	2.3	742	952	242	242	242	242	242	242	0
Barrick	Kanowna*	Australia	1,233	2,031	4.9	642	822	251	251	251	251	251	229	-22
Barrick	Lagunas Norte	Peru	6,618	7,467	1.2	282	338	800	730	730	730	730	730	-70
Barrick	North Mara	Tanzania	2,949	3,810	2.9	760	930	171	171	171	171	171	171	0
Barrick	Pascua-Lama	Argentina	18,000	25,300	1.3	n.a	n.a	0	0	0	375	750	750	750
Barrick	Pierina*	Peru	648	756	0.4	797	902	191	191	191	191	96	0	-191
Barrick	Plutonic	Australia	771	2,766	6.3	849	989	136	136	136	136	136	136	0
Barrick	Porgera	Papua New Guinea	7,823	10,655	2.8	582	669	546	546	546	546	546	546	0
Barrick	Ruby Hill	USA	702	1,216	2.0	515	627	81	81	81	81	81	81	0

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Fig 74: Details of gold mines

Company	Mine	country of mine	Reserves (koz)	MI&I Resource- (incl. Reserves) (koz)	Grade (g/tonne)	Cash cost ($/oz)	Total cost ($/oz)	Production 'koz						Total 5-yr production growth (koz)
								2010	2011E	2012E	2013E	2014E	2015E	
Barrick	Tulawaka*	Tanzania	133	179	5.8	738	940	49	49	49	36	18	9	-40
Barrick	Turquoise Ridge	USA	5,429	6,423	14.2	526	617	165	251	331	351	351	351	185
Barrick	Veladero	Argentina	11,291	12,430	1.4	312	457	1,121	1,121	1,121	1,121	1,121	1,121	0
Barrick	Yilgarn South (Darlot, Granny Smith, Lawlers)	Australia	1,372	3,976	4.8	862	1,009	314	314	314	314	314	116	-198
Barrick/ Kinross	Round Mountain	USA	2,932	4,810	0.6	787	917	369	380	428	428	428	428	59
Barrick/ Newmont	Kalgoorlie	Australia	8,410	9,134	1.6	533	596	754	754	754	754	754	754	0
Brigus Gold	Black Fox	Canada	906	1,031	4.2	589	n.a	68	82	104	104	104	104	37
Buenaventura	Antapite*	Peru	12	31	6.9	761	n.a	36	34	0	0	0	0	-36
Buenaventura	La Zanja	Peru	676	792	0.8	339	n.a	44	100	100	100	100	100	56
Buenaventura	Orcopampa*	Peru	711	1,308	19.4	349	n.a	320	310	310	155	78	39	-281
Buenaventura	Poracota*	Peru	53	166	9.0	919	n.a	59	59	59	30	15	7	-52
Buenaventura	Tantahuatay	Peru	659	4,859	0.7	400	n.a	0	50	100	100	100	100	100
Catalpa Resources	Edna May	Australia	1,000	1,700	1.0	997	850	41	65	80	100	120	140	99
Centamin Egypt	Sukari	Egypt	9,100	14,490	1.7	527	n.a	150	270	300	350	400	500	350
Centerra	Boroo	Mongolia	392	862	0.9	640	n.a	111	50	50	50	50	50	-61
Centerra	Kumtor	the Kyrgyz Republic	6,300	13,188	2.1	450	n.a	568	580	580	580	580	580	12
CGA Mining	Masbate	Philippines	3,000	7,770	n.a	n.a	568	150	170	200	200	200	200	50
Chenzhou Mining	Chenzhou (all mines)	China	n.a.	1,608	n.a.	n.a	n.a	81	81	81	81	81	81	0
China Gold Group	China Gold Group (all mines)	China	39,900	39,900	n.a.	n.a	n.a	386	386	386	386	386	386	0
China Gold Intl	Changshanhao	China	2,260	4,990	n.a	n.a	n.a	115	115	115	115	115	115	0
Cluff Gold	Angovia*	Cote d'Ivoire	99	554	1.3	837	n.a	22	22	22	22	22	28	6
Cluff Gold	Baomahun	Sierra Leone	n.a	2,450	2.9	n.a	n.a	0	0	0	0	50	200	200
Cluff Gold	Kalsaka*	Burkina Faso	382	850	1.7	672	n.a	95	90	90	90	90	90	-5
Coeur d'Alene	Kensington	USA	1,409	1,887	8.4	n.a	n.a	43	112	112	112	112	112	69
Coeur d'Alene	Martha*	Argentina	1	2	1.2	n.a	n.a	2	2	1	0	0	0	-2
Coeur d'Alene	Palmarejo	Mexico	870	1,061	1.9	n.a	n.a	102	100	120	120	120	120	18
Coeur d'Alene	Rochester	Nevada	247	955	0.2	n.a	n.a	10	35	35	35	35	35	25
Colossus Minerals	Serra Pelada	Brazil	n.a.	n.a.	1.1-638	n.a	n.a	0	0	0	0	0	150	150
Continental Gold	Burtica	Colombia	n.a.	n.a.	446	n.a	n.a	0	0	0	0	50	100	100
Crescent Gold	Laverton	Australia	445	2,075	n.a	n.a	n.a	100	100	110	120	120	140	40
Detour Gold	Detour Lake	Canada	14,860	20,515	1.0	437	n.a	0	0	0	200	500	600	600
Dundee Precious Metal	Chelopech	Bulgaria	2,600	3,770	3.9	379	210	66	100	140	140	140	140	75
Dundee Precious Metal	Deno Gold	Armenia	n.a.	n.a.	n.a	n.a	n.a	29	29	29	29	29	29	0

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								2010	2011E	2012E	2013E	2014E	2015E	
Eldorado	Eastern Dragon	China	786	897	8.4	40-45	n.a	0	24	74	74	74	84	84
Eldorado	Efemcukuru	Turkey	1,506	2,052	n.a	300	n.a	0	70	80	150	300	300	300
Eldorado	Efremcukuru	Turkey	1,506	2,052	9.1	290	n.a	0	75	100	140	150	150	150
Eldorado	Jinfeng	China	3,941	6,102	5.2	425	n.a	222	226	244	244	244	244	22
Eldorado	Kisladag	Turkey	7,794	14,889	0.9	329	n.a	275	280	280	280	280	280	5
Eldorado	Perama Hill	Greece	966	1,915	3.2	278	n.a	0	0	0	110	200	200	200
Eldorado	Tanjianshan	China	789	1,406	3.6	383	n.a	127	128	128	128	128	128	1
Eldorado	White Mountain	China	832	1,251	3.7	486	n.a	65	77	77	77	77	77	11
EnviroGold	Azuay	Ecuador	n.a.	n.a.	11	375	n.a	0	0	25	50	100	100	100
EnviroGold	Las Lagunas	Dominican Republic	n.a.	621	3.8	n.a	n.a	0	0	65	65	65	65	65
European Gold	Deva Gold	Romania	2,400	2,700	2.0	n.a	n.a	0	0	0	85	170	170	170
European Gold	Hellas Gold	Greece	7,500	9,100	8.0	n.a	n.a	0	0	0	121	147	295	295
Extorre	Cerro Moro	Argentina	n.a.	1,002	n.a	n.a	n.a	0	0	20	30	30	30	30
Focus Minerals	The Mount	Australia	n.a.	371	n.a	n.a	n.a	0	13	30	30	30	30	30
Focus Minerals	Tindals	Australia	n.a.	1,000	n.a	n.a	n.a	77	87	100	100	100	100	23
GlobeStar Mining	Cerro de Maimon	Dominican Republic	136	n.a.	n.a	n.a	n.a	16	16	16	16	16	16	0
Gold Resources	El Aguila	Mexico	619	n.a.	6.5	217	n.a	10	90	155	200	200	200	190
Goldcorp	Cochenour	Canada	n.a.	2,700	n.a	350	n.a	0	0	0	0	0	150	150
Goldcorp	El Sauzal*	Mexico	270	270	1.8	301	n.a	155	100	100	100	50	25	-130
Goldcorp	Los Filos	Mexico	5,470	9,290	0.8	423	n.a	300	408	428	438	438	438	138
Goldcorp	Marlin	Guatemala	1,530	1,620	4.8	n.a	n.a	290	290	290	290	290	290	0
Goldcorp	Musselwhite	Canada	2,100	2,950	6.3	625	n.a	260	260	260	260	260	260	0
Goldcorp	Penasquito	Mexico	18,570	18,800	0.4	n.a	n.a	180	300	336	500	500	500	320
Goldcorp	Porcupine	Canada	2,800	3,640	1.5	595	n.a	266	280	280	280	280	280	14
Goldcorp	Red lake	Canada	3,400	5,140	12.6	297	n.a	703	710	725	750	750	750	47
Goldcorp	Wharf*	USA	200	1,361	0.7	645	n.a	73	73	73	73	37	18	-55
Goldcorp/ Barrick	Marigold	USA	2,399	3,560	0.6	756	772	137	135	135	135	135	135	-2
Goldcorp/ Barrick	Pueblo Viejo	Dominican Republic	23,658	33,117	2.6	300	n.a	0	104	415	965	965	965	965
Golden Star	Bogoso/ Prestea	Ghana	3,800	1,770	2.8	n.a	n.a	190	183	183	183	183	183	-7
Golden Star	Wassa/HBB	Ghana	800	1,026	2.3	677	n.a	203	200	200	200	200	100	-103
Goldfields	Agnew	Australia	1,200	4,000	7.8	539	n.a	165	165	165	165	165	165	0
Goldfields	Beatrix	South Africa	5,700	17,100	4.9	740	n.a	392	392	392	392	392	392	0
Goldfields	Cerro Corona mine	Peru	5,300	8,700	1.0	348	n.a	394	394	394	394	394	394	0

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Goldfields	Damang	Ghana	2,100	4,700	1.6	660	n.a	228	228	228	228	228	228	0
Goldfields	Driefontein mine	South Africa	17,200	52,000	7.8	692	n.a	710	710	710	710	710	710	0
Goldfields	Kloof mine	South Africa	9,500	77,900	6.2	768	n.a	567	567	567	567	567	567	0
Goldfields	South Deep mine	South Africa	29,300	63,600	7.7	811	n.a	265	265	265	265	640	1,065	800
Goldfields	St Ives	Australia	2,300	6,900	2.4	710	n.a	421	421	421	421	421	421	0
Goldfields	Tarkwa	Ghana	9,900	15,300	1.3	536	n.a	735	735	735	735	735	735	0
Great Basin Gold	Burnstone	South Africa	4,096	16,269	1.2	506	n.a	0	110	220	220	220	220	220
Great Basin Gold	Hollister	USA	1,042	2,685	33.0	743	n.a	89	110	110	110	110	110	22
G-Resources	Martabe	Indonesia	3,034	6,490	2.6	242	n.a	0	10	100	250	250	250	250
Guyana Goldfields	Aurora	Guyana	n.a.	6,675	3.9	364	n.a	0	0	0	0	125	250	250
GV Gold	Irkutsk	Russia	2,350	2,900	3.0	424	n.a	116	116	180	270	380	430	314
GV Gold	Yakutia	Russia	3,550	5,230	n.a	n.a.	n.a	9	9	20	36	58	70	61
Harmony Gold	Bambanani	South Africa	1,400	7,400	7.8	723	n.a	133	133	133	133	133	133	0
Harmony Gold	Doornkop Kimberly Reef	South Africa	121	15,610	1.9	822	n.a	63	63	63	63	63	63	0
Harmony Gold	Doornkop South Reef	South Africa	316	5,993	4.6	n.a	n.a	46	87	128	169	209	250	204
Harmony Gold	Evander	South Africa	12,800	35,100	1.6	1018	n.a	112	112	112	112	112	112	0
Harmony Gold	Joel	South Africa	500	4,800	4.6	792	n.a	64	64	64	64	64	64	0
Harmony Gold	Kalgold	South Africa	833	3,700	0.9	748	n.a	49	49	49	49	49	49	0
Harmony Gold	Kusasalethu	South Africa	7,514	11,600	6.5	857	n.a	175	175	175	175	175	175	0
Harmony Gold	Kusasalethu New Mine	South Africa	7,514	11,566	6.5	n.a	n.a	96	134	172	210	248	286	190
Harmony Gold	Masimong	South Africa	1,200	19,200	5.4	602	n.a	156	156	156	156	156	156	0
Harmony Gold	Other	South Africa	n.a	n.a	n.a	622	n.a	50	50	50	50	50	50	0
Harmony Gold	Phakisa	South Africa	5,200	23,000	4.0	953	n.a	44	94	145	195	245	245	201
Harmony Gold	Phoenix	South Africa	900	900	0.3	762	n.a	21	21	21	21	21	21	0
Harmony Gold	Target	South Africa	2,800	12,500	4.4	783	n.a	114	114	114	114	114	114	0
Harmony Gold	Tshepong	South Africa	3,900	12,400	4.5	677	n.a	217	217	217	217	217	217	0
Harmony Gold	Virginia*	South Africa	600	12,700	3.2	1036	n.a	170	170	170	170	90	45	-125
Hecla Mining	Greens Creek	USA	757	1,193	0.1	n.a	n.a	69	69	69	69	69	69	0
High River Gold	Berezitovy	Russia	1,017	1,142	2.3	505	n.a	90	120	120	120	120	120	30
High River Gold	Bissa	Russia	630	1,724	1.8	622	n.a	0	0	75	110	100	100	100
High River Gold	Irokinda	Russia	156	216	11.5	433	n.a	60	60	50	0	0	0	-60
High River Gold	Taparko-Bouroum	Russia	720	982	2.8	469	n.a	120	100	90	90	90	90	-30
High River Gold	Zun-Holba	Russia	211	334	10.8	433	n.a	65	65	40	0	0	0	-65
Hochschild	Arcata*	Peru	79	208	1.3	504	n.a	26	26	26	26	13	6	-19
Hochschild	ARES*	Peru	48	160	5.0	n.a.	n.a	33	33	16	8	4	2	-30
Hochschild	Moris	Mexico	45	71	1.5	n.a	n.a	22	22	22	22	22	22	0

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Hochschild	San Jose*	Argentina	183	443	7.3	504	n.a	165	165	83	41	21	10	-155
Hochschild/International Minerals	Pallancata*	Peru	115	220	1.5	504	n.a	36	35	35	35	18	9	-27
Iamgold	Essakane	Burkina Faso	4,015	6,504	1.3	459	n.a	136	422	356	433	433	433	298
Iamgold	Mouska, Doyon division	Canada	73	801	12.5	n.a	n.a	33	27	0	33	33	33	0
Iamgold	Mupane	Botswana	130	315	1.8	n.a	n.a	57	57	43	20	20	20	-37
Iamgold	Rosebel	Suriname	5,892	8,568	1.1	499	n.a	416	389	421	389	389	389	-26
Iamgold	Westwood	Canada	n.a.	3,736	11.1	358	n.a	0	0	0	186	186	186	186
Iamgold/ AngloGold Ashanti	Yatela	Mali	195	445	1.6	n.a	n.a	150	150	100	100	100	100	-50
Integra Mining	Randalls Gold	Australia	300	2,500	3.0	n.a	525	30	90	100	110	120	120	90
International Minerals	Inmaculada	Peru	n.a.	1,300	5.2	94	n.a	0	0	0	0	50	100	100
Jaguar Mining	Caete	Brazil	1,055	2,384	3.1	505	n.a	19	60	70	80	110	100	81
Jaguar Mining	Gurupi	Brazil	2,330	3,135	1.1	n.a	n.a	0	0	0	149	149	149	149
Jaguar Mining	Paciencia	Brazil	405	1,089	3.3	500	n.a	59	70	80	88	88	88	29
Jaguar Mining	Turmalina	Brazil	555	302	3.2	485	n.a	59	70	80	90	110	100	41
Kingsgate	Arqueros	Chile	n.a.	332	0.4	n.a	n.a	0	0	0	50	50	50	50
Kingsgate	Challenger*	Australia	420	950	5.7	814	n.a	0	40	100	100	100	80	80
Kingsgate	Chatree	Thailand	1,930	4,320	1.0	425	n.a	130	110	150	200	200	200	70
Kinross	Chirano	Ghana	2,400	2,591	2.7	605	971	99	249	296	299	299	299	200
Kinross	Crixas	Brazil	1,388	1,454	3.7	486	710	75	80	80	80	80	80	5
Kinross	Fort Knox	USA	3,692	5,386	0.5	550	708	350	360	360	360	360	360	10
Kinross	Fruta del Norte	Ecuador	6,800	7,434	8.1	n.a	n.a	0	0	0	0	0	205	205
Kinross	Kettle River*	USA	759	862	11.3	330	807	199	210	210	210	129	65	-134
Kinross	Kupol*	Russia	2,565	2,574	10.7	319	533	739	760	760	760	380	190	-549
Kinross	La Coipa	Chile	1,107	1,424	1.3	648	918	196	210	210	210	210	210	14
Kinross	Lobo-Marte	Chile	5,552	6,460	1.1	549	n.a	0	0	0	0	175	350	350
Kinross	Maricunga	Chile	6,403	9,348	0.7	746	843	157	170	170	170	170	170	13
Kinross	Paracatu	Brazil	17,472	23,800	0.4	535	669	482	500	500	500	500	500	18
Kinross	Tasiast	Mauritania	7,600	9,688	1.8	755	1,114	57	320	380	500	700	900	843
La Mancha Resources	Frog's Leg	Australia	364	550	6.4	n.a	617	66	68	68	68	68	68	2
La Mancha Resources	Hassai Mine	Sudan	164	710	n.a	n.a	660	27	27	27	27	27	27	0
La Mancha Resources	Ity Mine	Cote d'Ivoire	162	480	n.a	n.a	519	17	17	17	17	17	17	0
La Mancha Resources	White Foil*	Australia	76	555	1.9	n.a	1,082	12	16	16	16	16	14	2
Lake Shore Gold	Timmins mine	Canada	812	1,200	7.5	575	n.a	44	125	125	130	140	140	96
Lappland Goldminers	Pahtavaara	Finland	n.a.	n.a.	n.a	n.a	n.a	24	24	24	24	24	24	0

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Company	Mine	country of mine	Reserves (koz)	MI&I Resource-(incl. Reserves) (koz)	Grade (g/tonne)	Cash cost ($/oz)	Total cost ($/oz)	Production 'koz						Total 5-yr production growth (koz)
								2010	2011E	2012E	2013E	2014E	2015E	
Lingbao Gold	Lingbao (all mines)	China	1,780	5,015	4.3	373	612	125	145	177	193	193	193	68
Medusa Mining	Bananghilig	Philippines	n.a.	650	1.3	n.a	n.a	0	0	0	0	0	100	100
Medusa Mining	Co-O	Philippines	505	1,501	10.8	190	n.a	90	102	125	130	200	200	110
Minefinders	Dolores Mines	Mexico	2,024	2,972	0.6	450	n.a	60	67	70	80	90	100	40
Minefinders	La Bolsa Deposit	Mexico	320	650	0.6	n.a	n.a	0	0	0	0	0	150	150
Mineral Deposits	Sabodala	Senegal	n.a.	n.a.	n.a	495	n.a	172	172	172	172	172	172	0
Minerals and Metals Group	Sepon	Laos	200	3,100	1.4	n.a	n.a	105	105	105	105	105	105	0
Mundo Minerals Limited	Engenho	Brazil	n.a.	732	3.0	n.a	n.a	25	25	25	25	43	43	18
Navigator Resources	Bronzewing*	Australia	481	946	n.a	n.a	n.a	55	98	100	100	100	83	27
Navoi Mining & Metallurgical Comvinat	Daugistau	Uzbekistan	n.a.	n.a.	n.a	n.a	n.a	1,929	1,929	1,929	1,929	1,929	1,929	0
New Dawn Mining	Angelus & Turk + others	Zimbabwe	220	2,111	4.0-6.1	631	n.a	15	23	40	55	100	100	85
New Gold	Cerro San Pedro	Mexico	1,261	2,144	0.6	n.a	n.a	120	120	120	120	120	120	0
New Gold	Mesquite	USA	3,125	5,675	0.6	550	n.a	173	180	180	180	180	180	7
New Gold	Peak Mines	Australia	480	974	4.4	370	n.a	90	90	90	90	90	90	0
Newcrest	Bonikro	Cote D'Ivoire	n.a	2,300	1.2	420	n.a	72	70	70	70	70	70	-2
Newcrest	Cadia Valley (excl. Ridgeway)	Australia	22,900	40,100	0.6	231	329	498	590	590	590	590	590	92
Newcrest	Cracow*	Australia	286	1,000	7.7	542	788	103	100	100	86	43	21	-81
Newcrest	Gosowong	Indonesia	2,788	3,394	15.0	302	394	536	539	539	539	539	539	3
Newcrest	Lihir	Papua New Guinea	28,800	48,500	5.1	420	n.a	850	850	850	1,029	1,029	1,029	179
Newcrest	Mt Rawdon	Australia	n.a	n.a	0.9	700	n.a	83	90	90	90	90	90	7
Newcrest	Ridgeway in Cadia Valley, new	Australia	2,600	3,600	0.8	91	104	0	0	200	300	400	400	400
Newcrest	Telfer	Australia	13,200	19,400	0.8	499	750	689	690	690	690	690	690	1
Newcrest/ Harmony	Hidden Valley	Papua New Guinea	3,200	5,200	1.2	n.a	n.a	122	220	220	220	220	220	98
Newmont	Ahafo	Ghana	9,130	15,884	1.9	451	577	545	570	570	570	570	570	25
Newmont	Boddington	Australia	21,000	29,220	0.6	596	768	728	775	775	1,000	1,000	1,000	272
Newmont	Jundee*	Australia	800	1,255	5.0	420	573	335	335	335	168	84	42	-293
Newmont	La Herradura*	Mexico	5,205	6,690	0.7	390	483	395	432	432	432	432	432	36
Newmont	Nevada	USA	31,200	48,477	1.3	640	814	1,735	1,850	1,850	1,850	1,850	1,850	115
Newmont	Tanami	Australia	2,040	3,851	4.4	668	816	250	250	250	250	250	250	0
Newmont	Waihi*	New Zealand	500	542	3.4	675	891	108	108	108	108	108	68	-40
Newmont/Buenaventura	Yanacocha	Peru	9,385	13,270	1.1	583	805	1,462	1,363	1,363	1,363	1,363	1,363	-99

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Company	Mine	country of mine	Reserves (koz)	MI&I Resource-(incl. Reserves) (koz)	Grade (g/tonne)	Cash cost ($/oz)	Total cost ($/oz)	Production 'koz						Total 5-yr production growth (koz)
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Noble Minerals	Bibiani	Ghana	605	2,000	1.9	n.a	n.a	0	40	150	225	300	300	300
Norseman Gold	Norseman	Australia	400	3,700	n.a	n.a	n.a	80	80	80	80	80	80	0
North American Palladium	Sleeping Giant*	Canada	56	158	8.1	n.a	1,250	18	33	23	12	6	3	-15
North American Palladium	Vezza	Canada	n.a.	410	n.a	n.a	n.a	0	0	38	38	38	38	38
Northern Star Resources	Paulsens Gold mine	Australia	n.a.	226	5.3	534	510	70	75	75	75	75	75	5
Norton Gold Fields	Mount Morgan Mine	Australia	n.a.	326	1.2	n.a	n.a	0	0	30	30	30	35	35
Norton Gold Fields	Paddington	Australia	1,200	5,500	1.9	n.a	n.a	140	140	140	140	140	140	0
OceanaGold	Didipio	Philippines	1,410	2,310	1.5	331	n.a	0	20	71	71	71	71	71
OceanaGold	Macraes & Frasers	New Zealand	1,680	5,210	2.5	n.a	n.a	183	185	185	185	185	185	2
OceanaGold	Reefton	New Zealand	940	1,180	2.1	n.a	n.a	86	85	86	87	88	89	3
Osisko Mining	Hammond Reef	Canada	n.a.	6,700	0.7	382	n.a	0	0	0	0	0	187	187
Osisko Mining	Malartic	Canada	8,970	9,440	1.1	319	n.a	0	300	688	712	695	630	630
Pan American Silver	Manantial Espejo	Argentina	518	662	n.a	n.a	n.a	64	64	64	64	64	64	0
Perseus Mining	CAGP(Ayanfuri)	Ghana	444	8,620	1.6	500	n.a	0	111	278	333	333	333	333
Perseus Mining	Sissingue, Tengrela	Cote d'Ivoire	825	1,500	1.2	500	n.a	0	0	0	178	162	162	162
Petaquilla Minerals	Molejon	Panama	535	911	n.a	n.a	637	25	40	50	50	50	50	25
Petropavlovsk	Albyn	Russia	1,082	1,830	2.0	n.a	n.a	0	40	109	137	191	191	191
Petropavlovsk	Alluvial operations	Russia	n.a	n.a	n.a	n.a	n.a	90	90	90	90	80	80	-10
Petropavlovsk	Malomir	Russia	2,151	4,119	4.9	186	n.a	36	90	240	290	275	260	224
Petropavlovsk	Pioneer	Russia	2,395	2,795	2.3	539	n.a	231	290	305	260	260	260	29
Petropavlovsk	Pokrovskiy	Russia	632	916	3.1	502	n.a	145	135	135	75	75	75	-70
Petropavlovsk	Tokur	Russia	151	1,417	1.2	n.a	n.a	0	5	9	19	26	31	31
Petropavlovsk	Yamal	Russia	n.a	886	0.9	n.a	n.a	0	0	0	90	140	115	115
Philex Mining Corporation	Padcal	Philippines	693	n.a.	0.5	200	n.a	115	129	120	120	120	120	5
Philex Mining Corporation	Silangan	Philippines	n.a.	5,300	0.9	0	n.a	0	0	0	0	22	89	89
Polymetal	Albazino	Russia	2,264	2,930	4.1	n.a	n.a	0	80	200	200	200	200	200
Polymetal	Dukat*	Russia	580	715	1.0	10	n.a	300	320	260	130	65	33	-268
Polymetal	Khakandjinskoye*	Russia	508	637	4.9	512	n.a	180	180	180	148	74	37	-143
Polymetal	Lunnoye*	Russia	156	344	1.3	10	n.a	70	70	70	35	18	9	-61
Polymetal	Mayskoye	Russia	2,420	3,029	9.6	n.a	n.a	0	0	20	160	220	220	220
Polymetal	Omolon	Russia	1,603	3,363	4.3	981	n.a	20	200	200	200	200	200	180
Polymetal	Varvarinskoye	Kazakhstan	1,329	3,088	1.1	629	n.a	110	120	120	150	180	180	70
Polymetal	Voronsovkoye	Russia	1,678	1,826	2.8	458	n.a	180	180	180	180	180	180	0
Polyus Gold	Alluvials	Russia	1,731	2,328	0.5	670	n.a	197	250	250	250	250	200	3
Polyus Gold	Blagodatnoye	Russia	9,859	10,501	2.3	260	n.a	249	400	300	300	300	300	51
Polyus Gold	Kazakh Gold	Kazakhstan	1,102	3,035	5.0	520	n.a	216	314	392	490	490	490	275

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Polyus Gold	Kuranakh	Russia	1,646	6,553	1.6	765	n.a	120	120	120	120	120	120	0
Polyus Gold	Natalka	Russia	40,841	39,709	1.3	320	n.a	0	0	0	200	580	580	580
Polyus Gold	Olimpiada	Russia	13,046	12,747	3.9	n.a	n.a	584	650	650	650	650	650	66
Polyus Gold	Titimukhta	Russia	2,239	2,700	3.3	n.a	n.a	100	150	150	150	150	150	50
Polyus Gold	Verninskoye	Russia	1,657	2,248	3.0	250	n.a	0	30	100	100	200	200	200
Polyus Gold	Zapadnoye	Russia	394	559	2.8	800	n.a	19	19	20	20	20	20	1
PT Antam Tbk	Cibaliung	Indonesia	341	750	10.0	n.a	n.a	9	58	58	58	58	58	48
PT Antam Tbk	Pongkor	Indonesia	815	1,294	7.5	n.a	n.a	80	65	65	65	65	65	-15
Ramelius Resources	Mt Magnet	Australia	474	3,300	1.7	n.a	n.a	0	0	60	100	150	150	150
Ramelius Resources	Wattle Dam	Australia	n.a	131	25.0	400	n.a	60	90	80	80	80	80	20
Randgold	Gounkoto	Mali	2,800	5,530	5.1	420	n.a	0	110	150	220	210	300	300
Randgold	Kibali	Democratic Republic of Congo	10,050	18,450	4.2	388	n.a	0	0	0	0	200	300	300
Randgold	Loulo	Mali	6,520	14,413	4.6	959	n.a	328	404	448	432	408	408	80
Randgold	Tongon	Côte d'Ivoire	2,940	4,580	2.5	459	n.a	67	258	267	245	249	249	182
Randgold/AngloGold Ashanti	Morila	Mali	560	820	1.4	669	n.a	239	210	180	120	120	120	-119
Range River Gold	Mount Morgans	Australia	n.a.	547	2.9	1,500	1,842	40	21	21	21	21	21	-19
Real Gold	Daping	China	54	n.a	4.7	n.a	n.a	0	3	8	8	8	8	8
Real Gold	Guangxi mines	China	n.a	800	2.6	n.a	n.a	0	0	17	30	43	43	43
Real Gold	Luotuochang	China	828	1,122	3.5	270	n.a	28	28	28	28	28	28	0
Real Gold	Shirengou-Nantaizi	China	1,702	2,756	9.0	194	n.a	108	108	108	108	108	108	0
Royal Gold	Andacollo	Chile	1,600	n.a	0.1	n.a	n.a	55	110	110	110	110	110	55
Royal Gold	Mt. Milligan	Canada	6,000	7,498	0.4	n.a	n.a	0	0	0	164	328	328	328
Rusoro Mining	Choco 10 mine & Isidora	Venezuela	2,391	17,535	n.a	n.a	n.a	110	150	150	150	150	150	40
San Gold	Rice Lake	Canada	767	2,627	7.0	650	n.a	40	80	120	180	180	180	140
Saracen Mineral Holdings	Carosue Dam	Australia	885	3,300	n.a	n.a	700	110	120	130	140	150	160	50
Semafo	Kiniero	Guinea	150	949	n.a	624	n.a	30	30	30	30	30	30	0
Semafo	Mana	Burkina Faso	2,160	5,964	2.6	450	n.a	180	180	180	200	220	250	70
Semafo	Samira Hill	Niger	507	2,536	5.6	865	n.a	51	70	70	80	80	100	49
Shandong Gold	Jinzhou	China	386	n.a	5.0	n.a	n.a	50	55	60	60	60	60	10
Shandong Gold	Other mine total	China	9,656	n.a	n.a	n.a	n.a	107	133	164	164	164	164	57
Shandong Gold	Xinhui	China	312	n.a	4.5	n.a	n.a	30	33	36	36	36	36	6
Shandong Gold Group	Baolun	China	2,572	2,572	n.a	n.a	n.a	22	22	22	22	22	22	0
Shandong Gold Group	Chaihu Lanzi	China	n.a	n.a	n.a	n.a	n.a	17	17	17	17	17	17	0

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Shandong Gold Group	Gaoxian Tianyun	China	n.a	n.a	n.a	n.a	n.a	5	5	5	5	5	5	0
Shandong Gold Group	Guilaizhuang	China	n.a	n.a	n.a	n.a	n.a	58	58	58	58	58	58	0
Shandong Gold Group	Jiaojia	China	2,657	2,657	n.a	n.a	n.a	152	152	152	152	152	152	0
Shandong Gold Group	Linglong	China	198	198	n.a	n.a	n.a	91	91	91	91	91	91	0
Shandong Gold Group	Penglai	China	n.a	n.a	n.a	n.a	n.a	20	20	20	20	20	20	0
Shandong Gold Group	Pingdu	China	436	436	n.a	n.a	n.a	57	57	57	57	57	57	0
Shandong Gold Group	Qinan	China	126	126	n.a	n.a	n.a	14	14	14	14	14	14	0
Shandong Gold Group	Sanshandao	China	2,401	2,401	n.a	n.a	n.a	157	157	157	157	157	157	0
Shandong Gold Group	Xincheng	China	2,063	2,063	n.a	n.a	n.a	105	105	105	105	105	105	0
Shandong Humon Smelting	all mines of the company	China	833	n.a	n.a	440	n.a	55	55	55	55	55	55	0
Silverlake Resources	Daisy East	Australia	n.a.	143	38.3	n.a	n.a	0	20	40	60	60	80	80
Silverlake Resources	Daisy Milano	Australia	n.a.	624	25.8	574	n.a	50	60	80	100	100	100	50
Silverlake Resources	Murchison	Australia	n.a.	1,322	3.0	n.a	n.a	0	0	50	100	120	120	120
Sino Prosper State Gold Resources	Aohanqi project	China	n.a.	544	9.0	200	n.a	5	5	14	14	16	16	11
Sino Prosper State Gold Resources	Zhongyi Weiye	China	n.a.	451	4.0	n.a	n.a	0	0	5	10	15	15	15
St Barbara	Leonora	Australia	2,406	5,394	7.9	686	n.a	109	140	190	190	190	190	81
St Barbara	Southern Cross*	Australia	500	2,257	2.9	964	n.a	122	122	122	122	122	61	-61
Tanami Gold	Western Tanami	Australia	n.a.	n.a.	n.a	n.a	n.a	40	50	50	50	50	50	10
Troy Resources	Andorinhas	Brazil	225	369	6.9	549	634	32	40	40	40	40	40	8
Troy Resources	Casposo	Argentina	341	445	8.2	n.a	n.a	0	82	90	44	35	50	50
Troy Resources	Sandstone	Australia	37	748	2.6	758	n.a	30	0	0	30	30	30	0
Unity Mining	Henty*	Australia	91	203	n.a	n.a	n.a	42	42	42	21	11	5	-37
Westgold	Big Bell	Australia	390	748	4.2	465	n.a	0	0	0	0	67	67	67
Xtrata	Tempakan	Philippines	6,120	n.a	n.a	n.a	n.a	0	0	0	0	0	0	0
Yamana	C1 Santa Luz	Brazil	1,184	2,397	1.6	500	n.a	0	0	53	130	170	170	170
Yamana	Chapada	Brazil	3,134	5,657	0.2	327	n.a	136	145	145	145	145	145	9
Yamana	El Penon	Chile	2,003	2,761	7.3	428	n.a	428	438	480	500	500	500	72
Yamana	Ernesto/Pau-a-Pique	Brazil	710	834	3.1	485	n.a	0	0	31	120	170	170	170
Yamana	Fazenda	Brazil	176	648	3.0	628	n.a	70	76	78	82	82	82	12
Yamana	Gualcamayo	Argentina	2,332	3,263	1.1	506	n.a	135	144	188	228	228	228	93
Yamana	Jacobina	Brazil	1,542	3,205	2.5	535	n.a	122	132	136	138	138	138	16
Yamana	Mercedes	Mexico	794	982	5.6	360	n.a	0	0	17	120	190	190	190
Yamana	Minera Florida	Chile	619	991	4.2	416	n.a	106	115	140	166	166	166	60

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Zhaojin	Canzhuang	China	341	712	2.5	789	989	21.1	27.4	28.8	30.2	31.8	33.3	12
Zhaojin	Dayingezhuang	China	3,069	4,132	2.5	261	n.a	60.5	75.0	82.5	90.8	99.8	109.8	49
Zhaojin	Hedong	China	394	559	4.9	300	410	39.4	51.3	51.3	51.3	51.3	51.3	12
Zhaojin	Jinchiling	China	86	143	6.5	347	457	32.0	32.0	32.0	32.0	15.1	0.0	-32
Zhaojin	Jintingling (75% interest)	China	473	756	4.4	373	483	15.9	17.4	19.2	21.1	23.2	25.5	10
Zhaojin	Non-Zhaoyuan Mines	China	1,785	6,207	n.a	591	791	62.8	99.4	138.6	172.9	190.1	209.4	147
Zhaojin	Xiadian	China	1,951	3,432	4.1	270	380	96.1	100.9	100.9	100.9	100.9	100.9	5
Zhongjin Gold Corp.	Zhongjin (all mines)	China	13,504	n.a	n.a	663	n.a	643	707	804	804	804	804	161
Zijin	Dongping	China	n.a	1,055	5.0	401	n.a	65	96	96	96	96	96	31
Zijin	Hunchun	China	1,977	n.a	0.6	324	n.a	78	78	78	78	78	78	0
Zijin	Other	China	n.a	n.a	n.a	n.a	n.a	156	156	156	156	156	156	0
Zijin	Shuiyingdong	China	n.a	1,695	14.0	242	n.a	68	73	73	73	73	73	5
Zijin	ZGC	China	4,516	n.a	1.0	622	n.a	35	48	48	48	48	48	13
Zijin	Zijinshan	China	n.a	3,051	0.6	192	n.a	535	492	542	542	542	542	7
Total gold mines			**1,010,143**	**1,880,927**				**51,906**	**57,907**	**62,347**	**67,036**	**70,257**	**72,007**	**20,101**

* Note: Mines whose reserves will be depleted before 2015. Based on the peak-year production rate, we estimate production will decrease by 50% year-on-year to smooth the production decreasing speed.
The data in this table are based on full company guidance numbers, without applying any discounts
Source: Companies, Standard Chartered Research

Fig 75: Base metal - gold mines

Company	Mine	Country of mine	Reserves (koz)	MI&I Resource-(incl. Reserves) (koz)	Grade (g/tonne)	Cash cost ($/oz)	Total cost (US$/oz)	Production 'koz						Total 5-yr production growth (koz)
								2010	2011E	2012E	2013E	2014E	2015E	
Antofagasta	Esperanza	Chile	n.a	n.a	0.2	n.a	n.a	0	250	230	230	230	230	230
Antofagasta	Los Pelambres	Chile	1,449	5,946	0.0	n.a	n.a	55	55	55	55	55	55	0
BHP Billiton	Olympic Dam	Australia	13,651	98,172	0.7	n.a	n.a	66	66	66	66	66	66	0
BHP Billiton/ Rio Tinto	Escondida	Chile	n.a	n.a	n.a.	n.a	n.a	133	133	133	133	133	133	0
Citigold	Charters Towers	Australia	330	10,370	13.0	350	n.a	16	50	100	100	150	200	184
First Quantum Minerals	Guelb Moghrein	Mauritania	n.a	n.a	n.a.	n.a	n.a	82	82	82	82	82	82	0
First Quantum Minerals	Kansanshi	Zambia	n.a	n.a	n.a.	n.a	n.a	110	110	110	110	110	110	0
Freeport-McMoRan	Big Gossan	Indonesia	1,300	n.a	1.1	n.a	n.a	0	50	65	65	65	65	65
Freeport-McMoRan	Candelaria/Ojos del Salado	Chile	1,700	n.a	n.a	n.a	n.a	100	100	100	100	100	100	0
Freeport-McMoRan	Grasberg	Indonesia	35,500	112,902	0.9	n.a	n.a	1,800	1,250	1,300	1,600	1,700	1,700	-100
Ivanhoe	Bakyrchik	Kazakhstan	n.a.	8,528	8.7	n.a	n.a	0	181	181	200	300	388	388
Ivanhoe	Osborne	Australia	19	134	n.a	268	n.a	0	27	27	27	27	27	27
Ivanhoe	Oyu Tolgoi	Mongolia	13,121	46,360	0.4	n.a	n.a	0	0	0	375	650	650	650
Jiangxi Copper	Dexing	China	n.a	n.a	n.a.	n.a	n.a	193	216	216	216	216	216	23
Kazakhmys	Kazakhmys Copper	Kazakhstan	8,771	10,560	n.a.	n.a	n.a	170	150	150	150	150	150	-20
Luna Gold Corp	Aurizona	Brazil	731	1,304	1.3	516	n.a	0	55	55	55	55	55	55
Minerals and Metals Group	Golden Grove	Australia	100	900	n.a	n.a	n.a	36	36	36	36	36	36	0
Minerals and Metals Group	Rosebery	Australia	300	1,100	1.7	n.a	n.a	35	35	35	35	35	35	0
New Gold	New Afton	Canada	1,052	1,671	n.a	n.a	n.a	0	0	20	85	85	85	85
Newmont	Batu Hijau	Indonesia	7,308	n.a	0.2	322	399	737	258	258	737	737	737	0
OZ Minerals	Prominent Hill	Australia	1,595	4,100	n.a	n.a	n.a	196	196	196	196	196	196	0
PanAust	Ban Houayxai	Laos	891	2,004	n.a.	425	n.a	0	20	100	100	100	100	100
PanAust	Phu Kham	Laos	n.a.	n.a.	n.a.	n.a	n.a	58	53	53	53	53	53	-5
Rio Tinto	Bingham Canyon	US	6,263	6,539	0.2	n.a	n.a	466	326	326	326	326	326	-140
Rio Tinto	Bougainville	Papua New Guinea	n.a	n.a	n.a.	n.a	n.a	0	0	0	0	200	200	200
Vale	Sudbury	Canada	1,444	n.a	0.4	n.a	n.a	42	42	42	42	42	42	0
Xstrata	Ernest Henry	Australia	1,415	1,984	0.5	n.a	n.a	89	89	89	89	89	89	0
Xstrata	Lomas Bayas and Altonorte	Chile	n.a	n.a	n.a	n.a	n.a	45	45	45	45	45	45	0
Xstrata	Tintaya	Peru	340	746	0.2	n.a	n.a	24	24	24	24	24	24	0
Xstrata/Yamana/ Goldcorp	Alumbrera	Argentina	4,080	n.a	0.4	372	n.a	360	370	380	380	380	380	20
Total Base metal/ gold mine			**101,359**	**313,320**			**4,813**	**4,269**	**4,474**	**5,713**	**6,438**	**6,576**	**1,762**	
Grand total			**1,111,502**	**2,194,247**				**56,719**	**62,177**	**66,821**	**72,749**	**76,695**	**78,582**	**21,863**

*Mines whose reserves will be depleted before 2015. Based on the peak-year production rate, we estimate production will decrease by 50% year-on-year to smooth the production decreasing speed.
The data in this table are based on full company guidance numbers, without applying any discounts

Source: Companies, Standard Chartered Research

Appendix 3: Chronology of gold in monetary history

Fig 76: Gold and the international monetary system – a chronology dating from 1717

Year	Date	Event
1717		In the UK, Sir Isaac Newton (Master of the Mint) gave the guinea a statutory valuation of 21 shillings. The mint price of gold was 77sh 10½d per standard ounce. UK Gold Standard commences.
1797		Napoleonic Wars. Bank of England suspends gold payments.
1816		UK Coinage Act (Post-Napoleonic Wars). Sovereign was the standard unit at 1 standard ounce of gold (>11/12 fine) = 77sh 10½d.
1844		Bank of England obliged to buy gold at 77sh 9d.
1870-1900		All major countries, other than China, switch to the gold standard, linking their currencies to gold. Bi-metallism is abandoned.
1913		Federal Reserve Act establishes the US system of reserve banks. At least 40% of the note issue to be backed by gold.
1917	1-Sep	US prohibits gold exports.
1919	1-Apr	UK prohibits gold exports without official permission. UK now off the Gold Standard.
	June	US gold exports permitted again.
	12-Sep	London Gold Fixing established.
1925	28-Apr	UK returns to the Gold Standard at pre-war parity of US$4.86=£1
	May	UK Gold Standard Act. Currency convertible @ 77sh 10½d per standard ounce but only in amounts of 400 oz. Export of gold again permitted.
1931	September	UK abandons Gold Standard.
1933	20-Apr	US convertibility suspended (with gold @ US$20.67/oz). Export, all transactions and holding of gold forbidden.
1934	31-Jan	Presidential Proclamation makes US dollar again convertible to gold (at new price of US$35/oz)
1936	September	Tripartite Agreement. US, UK and France willing to buy and sell gold freely with each other in exchange for own currency.
1939	3-Sep	London gold market closed on outbreak of war.
1944	July	Bretton Woods Conference sets basis of post-war monetary system. US dollar to maintain $35=1 oz gold conversion rate. Other currencies to be fixed (but adjustable) in terms of US dollar, thus forming a Gold Exchange Standard.
1945	27-Dec	IMF Articles of Agreement effective. Par values established for all members based on gold value of US dollar on 1 July 1944 (0.888671g of fine gold).
1954	22-Mar	London gold market re-opens after World War II.
1961	1-Nov	Gold Pool established (members Belgium, France, Germany, Italy, Netherlands, Switzerland, UK and Federal Reserve Bank of New York: France withdrew in June 1967). Members would sell (and later buy) gold in the London market to maintain prices close to par in that market.
1967	18-Nov	Sterling devalued from US$2.80 to US$2.40. This leads to pressure on the dollar and hence to substantial buying of gold.
1968	15-Mar	London market closed at request of US government.
	17-Mar	Gold Pool abolished and 2-tier market created. Central banks transact only among themselves at official price and neither buy nor sell from London or any other market. Private sector, however, free to do what it likes, with floating gold price. London market re-opens on 1 April and now fixing in US$ for first time.
	31-May	First amendment to IMF articles agreed. A new reserve asset, the Special Drawing Right (SDR) was created and given the value of 0.888571g of fine gold, the same value as the US dollar in July 1944.
1971	15-Aug	US$ convertibility to gold suspended.
	18-Dec	Smithsonian Agreement on new exchange rates.
1972	8-May	US$ devalues to US$38/fine oz.
1973	12-Feb	US proposes further devaluation to US$42.22/fine oz.
	2-18 Mar	Major central banks suspend dealing in foreign exchange markets.
	19-Mar	Most major countries adopt floating exchange rate regime.
	18-Oct	US devaluation effective.
	13-Nov	2-tier gold market formally abandoned.

Source: World Gold Council

Fig 76: Gold and the international monetary system: a chronology from 1717 to date (cont'd)

Year	Date	Event
1975	1-Jan	US abolishes restrictions on citizens buying, selling or owning gold (formerly needed Treasury licence).
	January	First US gold auction (2 million oz auctioned; less than half were bid for).
	30-Jun	Second US gold auction (½ million oz).
	31-Aug	Group of 10 major industrial countries and Switzerland agree there would be no attempt to peg price of gold, and that total stock held by the IMF and the monetary authorities of the G10 countries would not be increased. IMF's Interim Committee agrees to disposal of 50m oz (one third) of Fund's gold. 25m oz to be sold and surplus devoted to a Trust Fund, which would extend concessional loans to low-income members and the other 25m oz to be restituted to members at the official price.
1976	2-Jun	First IMF gold auction.
1978	1-Apr	2nd Amendment to IMF Articles of Agreement comes into effect. Gold's formal role in international monetary system disappears.
	23-May	US gold auctions resume.
1979	13-Mar	European Monetary System established. Those participating in its exchange rate arrangements must – and other members can – swap 20% of gold and US$ reserves on rolling quarterly basis with European Monetary Cooperation Fund for ECU.
	November	Final US gold auction. During the two phases (1975; 1978/79), about 530 tonnes (17m oz) were sold.
1980	7-May	Last of 45 IMF gold auctions. 25m oz (= 778 tonnes) were sold at average price of US$240 per ounce (lowest/highest prices were US$109/US$712).
1982	March	US Gold Commission reports to Congress. Official holdings of 264m oz should certainly not be reduced to zero and a minority favoured no reduction at all.
1985	22-Sep	Plaza Agreement on currencies.
1987	21-22 Feb	Louvre Accord on currencies.
1992	7-Feb	Treaty on European Union signed at Maastricht. This includes agreement for qualifying countries to proceed to Economic and Monetary Union (EMU - the single currency) on a default date of January 1999. Provision is made for the mutation of national central banks into the European System of Central Banks (ESCB), headed by the European Central Bank (ECB). The ECB will be able to call an initial amount of ECU 50bn (€50bn) of gold and foreign reserve assets from participating countries. Reserve management of all ECSB banks, including that of gold holdings, will be subject to guidelines issued by the ECB council.
1998	1-2 May	Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain confirmed as participants in EMU, scheduled to start in January 1999.
	7-Jul	The Governing Council of the European Central Bank (ECB) decides that 15% of its initial reserves of €39.5bn, due to be transferred to it on the first day of 1999, will consist of gold. The council also agrees that before the end of the year it will adopt an ECB guideline that will subject all operations in foreign reserve assets remaining with the national central banks, including gold, to approval by the ECB.
	31-Dec	The swaps of 20% of their gold and US$ reserves deposited with the European Monetary Institute (formerly the European Monetary Cooperation Fund) by EU national central banks in return for ECU are unwound.
1999	1-Jan	European Monetary Union starts. The 11 founding members transfer a total of €39.6bn of gold and foreign exchange reserves to the European Central Bank. 15% of this is gold.
	26-Sep	Central Bank Gold Agreement (CBGA) announced. Under this, 15 European central banks declare that gold will remain an important element of global monetary reserves, that they will collectively cap their gold sales at around 400 tonnes per year over the next five years, and that they will not expand their gold leasings and their use of gold futures and options during this period. The 15: European Central Bank, 11 members of European Monetary Union, Sweden, Switzerland and the UK.
2004	8-Mar	2nd CBGA announced. The CBGA was renewed for five years from 26-Sep-99 to 27-Sep-04 with an annual limit to sales of 500 tonnes.
2009	7-Aug	3rd CBGA announced. The CBGA was again renewed for five years from 27-Sep-09 to 26-Sep-14 with an annual limit to sales of 400 tonnes.

Source: World Gold Council

Disclosures appendix

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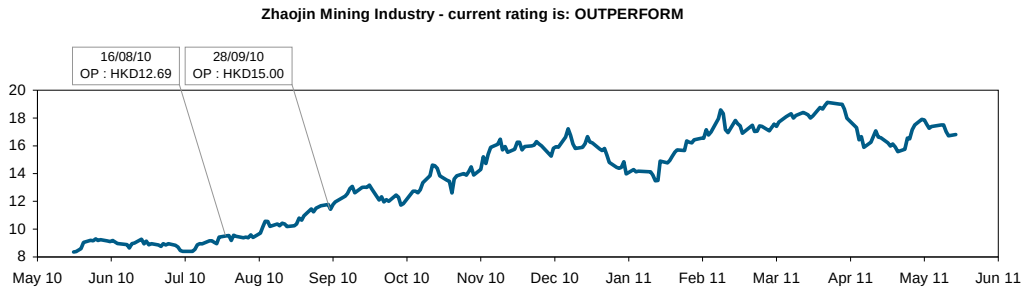

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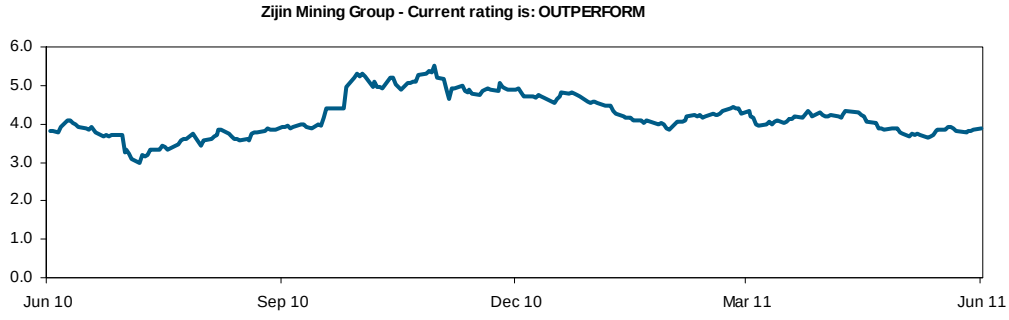

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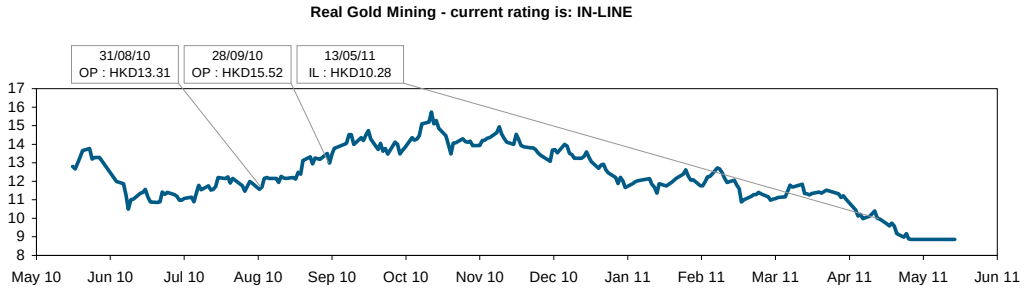

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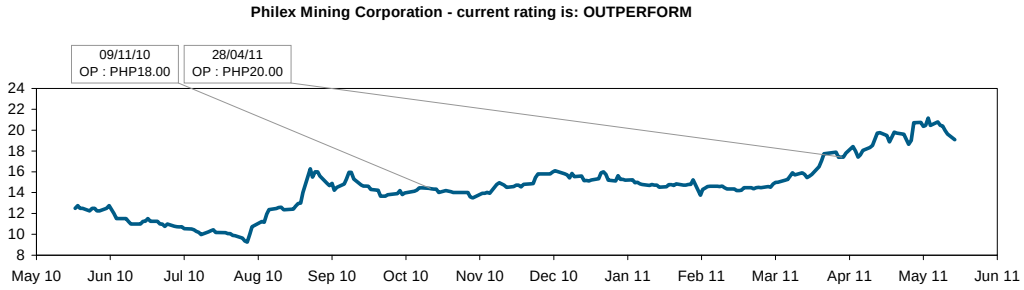

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