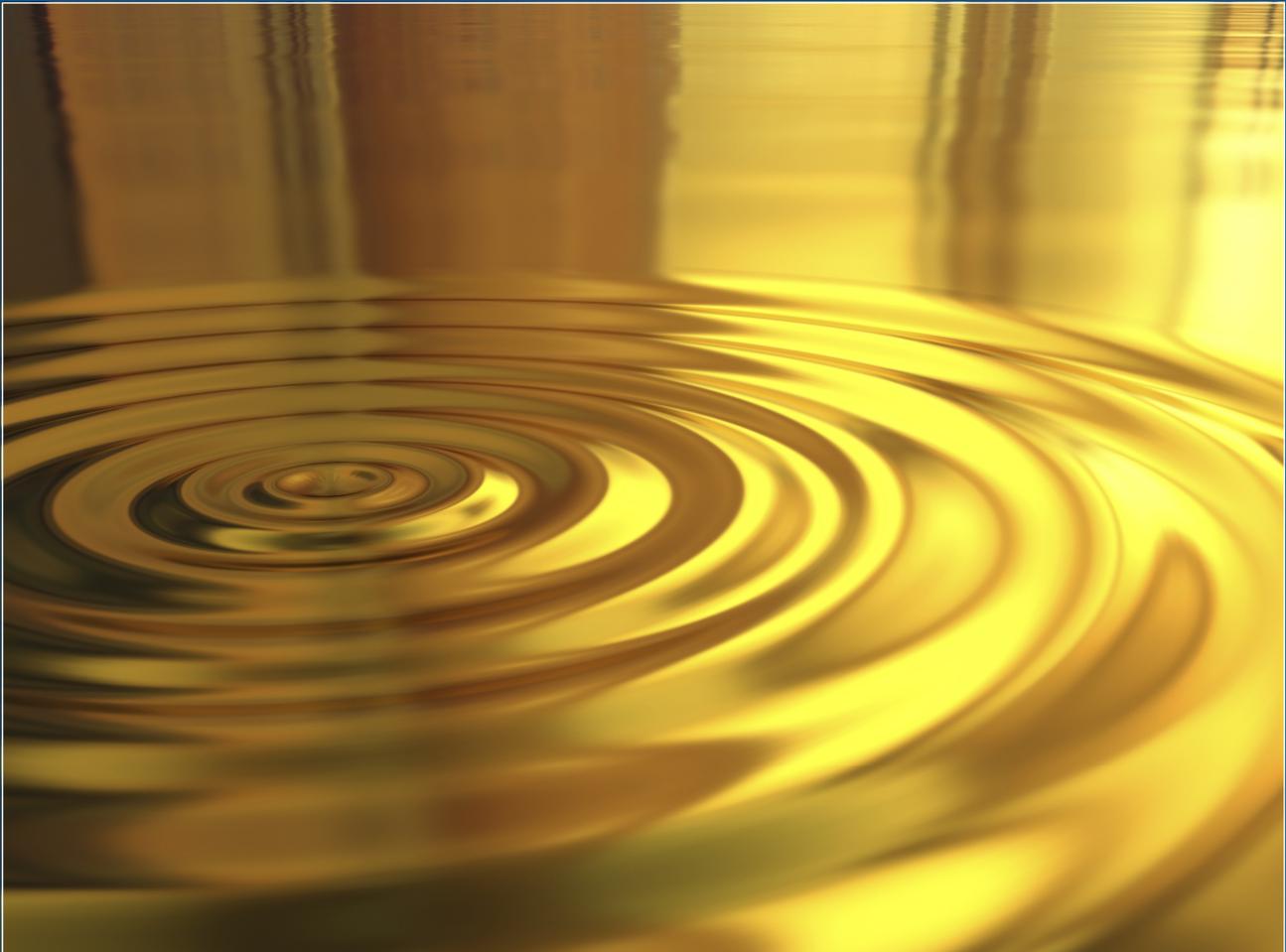


Gold

BDO

Valuation benchmarks are obsolete

Sector report, January 2010



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Gold – Valuation benchmarks are obsolete

“Like gold, US dollars have value only to the extent that they are strictly limited in supply. But the US government has a technology called a printing press that allows it to print as many dollars as it wishes at essentially no cost.”

Ben Bernanke, Federal Reserve Chairman

Updated measured, indicated and inferred valuations

We have re-run our analysis to determine differentiated values for ‘measured’, ‘indicated’ and ‘inferred’ resource ounces to include the Canadian, Australian and South African markets as well as the London one. In doing so, we have been able to determine that the average value of a ‘measured’ resource ounce globally is US\$340/oz, while that of an ‘indicated’ ounce is US\$159/oz and that of an ‘inferred’ ounce is US\$34/oz (excluding Witwatersrand ounces). An average ounce is worth US\$158.56/oz, which contrasts sharply with both its cost of discovery (US\$8.81/oz, as determined by leading international accountancy firm BDO – see inside) and an historic benchmark valuation of US\$35/oz.

Different markets favour different resources

Notwithstanding these new global averages, there are wide variations in the valuations attributed to ounces in different categories by different centres of global mining finance. While Australia ascribes the highest average value to ‘inferred’ and ‘measured’ ounces, Canada does so for ‘indicated’ ounces. London places a below average valuation on ‘inferred’ and ‘indicated’ ounces, but an above average one on ‘measured’ ounces.

Not all companies optimally valued

Any decision by a company on which market to list in should therefore be taken within the context of the categories into which its resources fall. Based purely on the balance of their resources currently, we estimate that up to 57 companies could enhance their valuations (excluding costs) by either migrating from one exchange to another or considering a dual listing.

January 2010

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Market	Companies analysed
London	41
Canada	59
Australia	31
Johannesburg	5
Minus dual-listed	4
Total	132

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Global differential resource analysis

In our report of October 2009, we analysed 41 London-centric companies in order to derive a weighted average differentiated value for ‘measured’, ‘indicated’ and ‘inferred’ resources in the London market. In this report, we have expanded our sample to encompass 132 gold companies covering over two billion ounces of resources (approximately 65,000 tonnes – cf approximately 165,000 tonnes of above ground gold in existence in the world today). This allows us to derive similar differentiated values for resources not only on a global basis, but also in each of four major centres of global mining finance, namely London, Canada, Australia and Johannesburg. In addition and in partnership with BDO, we have conducted an analysis of historic discovery costs of these resource categories, from which we have been able to calculate which centres of mining finance provide the greatest value uplift to investors for their ounces relative to their costs of discovery.

Summary observations and conclusions

During the course of the analysis, it became clear that the existence of Witwatersrand ounces in mining finance centres other than Johannesburg (and particularly in London) was a distorting factor in deriving weighted average values for ‘measured’, ‘indicated’ and ‘inferred’ ounces. These were eventually stripped out of the data with the result that our summary valuation of global resource ounces of gold is as follows:

Exhibit 1: Enterprise values per resource oz summary by category and market (US\$)

Note: * Excluding Witwatersrand ounces; ** Excluding JSE; highest valuations in each category in bold.

	Measured	Indicated	Inferred	Average
London*	403.53	85.94	3.78	120.73
Canadian*	283.68	243.76	62.01	196.90
Australian*	738.55	143.43	91.47	191.75
Simple average	395.46	131.57	48.38	120.26
Weighted average* **	339.90	158.55	33.65	158.56
JSE (maximum)	156.08	53.14	36.27	36.27

Source: Edison Investment Research

As such it can be seen that the global average weighted value of a resource ounce is US\$158.56/oz, with a maximum value of US\$738.55/oz for ‘measured’ ounces in Australia and a minimum value of US\$3.78/oz for ‘inferred’ ounces in London.

By comparison, our estimate of the maximum costs incurred in finding a sample of these ounces is shown in Exhibit 2.

Exhibit 2: Discovery cost per resource oz by category and market, maximum* (US\$)

Note: * Assumes cost of ‘measured’ oz > cost of ‘indicated’ oz > cost of ‘inferred’ oz; ** excludes Wits oz.

	Measured*	Indicated*	Inferred*	Average per total oz
London	46.55	12.53	6.80	8.31
Canadian	34.47	13.70	10.18	12.26
Australian	29.43	5.27	4.50	5.86
JSE (maximum)	4.18	1.26	0.90	0.90
Simple average**	36.82	10.50	7.16	8.81

Source: Edison Investment Research

It is immediately apparent that costs are much lower than the US\$35/oz historically quoted as being the average cost of discovering an ounce of gold. Moreover, there is no great variance in these figures from mining centre to mining centre (within the context of the value achievable upon listing), with the possible exception of the Johannesburg market, where costs are significantly below the average for all three categories of resources. However, as noted before, Witwatersrand ounces have proved to be a consistent anomaly within the analysis. They have both exceptionally low costs of discovery and relatively low valuations wherever they are listed. As such, whereas it has the lowest cost of discovery, the Johannesburg market offers the lowest uplift in value to

investors upon listing with the single exception of ‘inferred’ ounces being listed in the London market. Otherwise:

- Australia offers the greatest uplift in value for ‘measured’ ounces (US\$738.55/oz vs a maximum cost of discovery of US\$29.43/oz).
- Canada offers the greatest uplift in value for ‘indicated’ ounces (US\$243.76/oz vs a maximum cost of discovery of US\$13.70/oz).
- Australia offers the greatest uplift in value for ‘inferred’ ounces (US\$91.47/oz vs a maximum cost of discovery of US\$4.50/oz).

As a result, it is not surprising that in considering an average ounce Australia again offers investors the greatest uplift in value upon listing (US\$191.75/oz vs a cost of discovery of US\$5.86/oz) – albeit only just ahead of Canada (US\$196.90/oz vs a cost of discovery of US\$12.26/oz).

Operational consequences

A number of conclusions arise from these calculations:

- The cheapest ounces in the world for investors to discover are in the Witwatersrand basin.
- The cheapest ounces in the world for investors to buy exist within the Witwatersrand basin and in the ‘inferred’ and ‘indicated’ categories of the London market.
- Of the 132 companies profiled, based on their valuations, six should abandon their exploration activities altogether (subject to a number of provisos), seven should restrict their exploration to upgrading existing ounces rather than exploring for new ones and 39 should focus on expanding their resource inventories rather than upgrading them.
- As many as 57 companies out of the 132 profiled could benefit from either a dual-listing or exchange migration (based solely on the basis of the valuation of their resources).

Sensitivities

Given that this report concerns itself with the value of ounces in the ground and not the economics of mining, the lowest possible cut-off grade has been used to determine resources. Where possible therefore a cut-off grade of 0.5g/t has been used with respect to each company’s resource base or a cut-off grade as close as possible to that figure as reported by the company. Nevertheless, exceptions to this inevitably occur.

In addition there are a number of sampling anomalies. For historic reasons two companies – Wits Gold and Medoro – were considered to be ‘London-centric’. For consistency across the London sample, they have remained within the London sample, despite having primary listings elsewhere (albeit Wits Gold was eventually stripped out on the basis of its portfolio of Witwatersrand ounces). In addition, a number of companies have dual listings and have therefore been included in more than one sample. Specifically, these companies are Kirkland Lake, European Goldfields, Allied Gold and Centamin Egypt, accounting for some 34Moz of gold resources on a combined basis. Their inclusion in two samples simultaneously has the effect of increasing the apparent size of the resource portfolio analysed, but has no material bearing on the individual valuations of resource ounces, either by category or overall.

Investment summary: Deferred gold price peak

The passage of gold through US\$1,000/oz we believe vindicates our note of last year (*Gold – still aping the 1970s*, October 2009). We reiterate our belief that gold is in the second phase of its bull run and that it has the potential to spike higher – especially if, as economists say, the current crisis is ‘the worst since the Second World War’ and therefore by extension worse than the 1970s. In light of the deflationary headwinds facing the US and western economies generally, however, we believe that it will take longer than we had previously anticipated for quantitative easing and loose monetary policy to express themselves in the inflation statistics. Nevertheless, as a result of the delay (to 2013) we estimate the eventual gold price peak will be correspondingly higher, at US\$1,879/oz.

Gold price analysis sensitivities

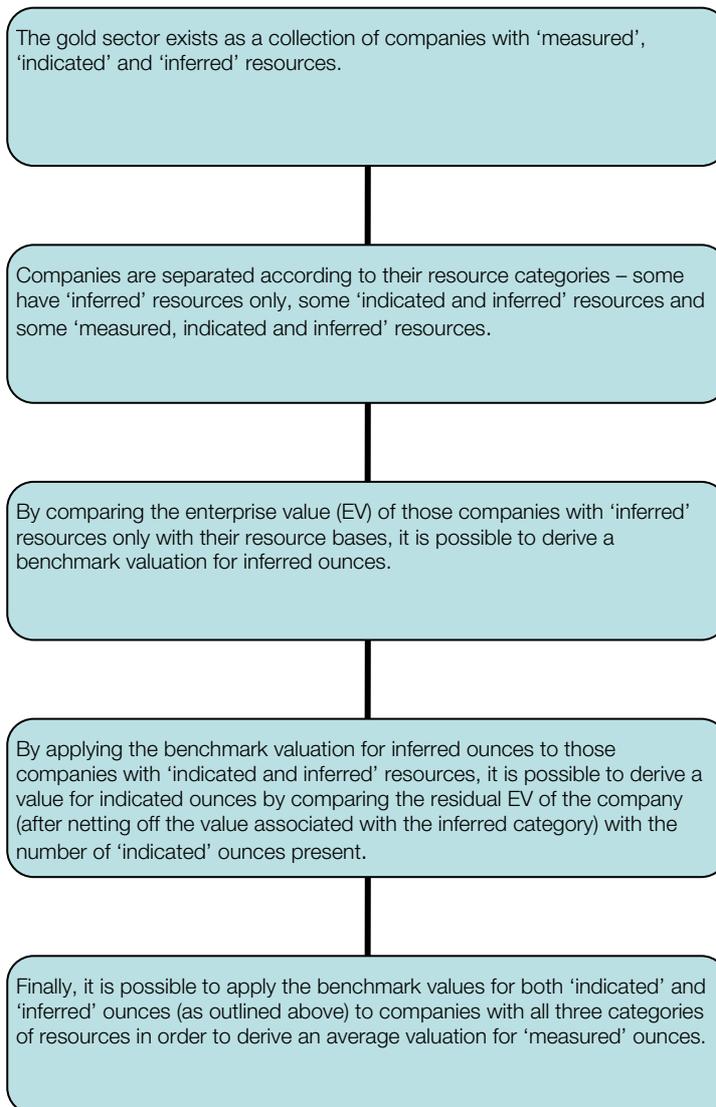
Our analysis of the gold market is dependent upon a number of key macroeconomic variables, including real US interest rates and the oil price. In particular, we assume the continuation of an environment of very low and/or negative real US interest rates and a relatively well-supported oil price. While we believe that gold prices above US\$900/oz would still be justified by a return to more normal economic conditions, a rapid increase in real dollar rates of interest in particular would mean that there is unlikely to be a short-term speculative spike in the price of gold. Similarly, a long-term oil price of US\$75/bbl would support a gold price of at least US\$835/oz. In the event that the oil price falls for a sustained period of time, it is likely to undermine gold both relative to our assumed scenario and its current price.

The method used to value distinct resource categories

A recap of the methodology used to derive separate valuations for each category of resource ounces is given below.

Under JORC-style reporting standards, resources are sub-divided into three categories, according to the level of confidence and knowledge in their geology. In ascending order, these categories are 'inferred', 'indicated' and 'measured'. While historically these have often been considered together and companies valued with respect to the total number of ounces in their resource bases, there is a considerable degree of difference in the geological confidence imputed to each category. The schematic depiction below demonstrates the methodology that we have used in order to determine the differences in the implied valuations of these ounces with respect to their categorisation.

Exhibit 3: Schematic representation of methodology used



Source: Edison Investment Research

As well as offering new benchmarks for the industry, the valuation differentials for each category of resource ounce highlight a number of operational issues for the gold companies profiled, including the identification of those companies that have little scope to add value to shareholders via their exploration activities.

Proportionate interpretation required

As with all empirical analyses, a degree of context is important in interpreting the results. This is perhaps best considered via a hypothetical example. Suppose that a London-listed company has an EV of US\$86m and 1,000,001 resource ounces, of which 1,000,000 are in the indicated category and just one is in the measured category. According to our methodology, the 1,000,000 indicated ounces have a value of US\$85.94m, leaving the remaining ‘measured’ ounce with an implied value of US\$60,000. While logically correct as a method of identifying over-valuation, it could be argued that the extent of this overvaluation has been over-stated in that an alternative interpretation would be that each resource ounce has a value of US\$85.99’. While this is still an over-valuation relative to our ‘indicated’ benchmark of US\$85.94/oz, it appears much less so. Hence it is worth noting that under certain circumstances (ie especially when there is a small proportion of higher category ounces relative to low category ones) the degree of over-valuation of those resource ounces can appear exaggerated.

Discovery cost estimates

In addition to analysing the value of each category of resource ounces, this report also analyses the discovery costs of each ounce for a sample of companies within each group. This analysis was conducted by BDO for each of the four markets. Included in each of the samples are some companies with only ‘inferred’ resources and some with just ‘indicated’ and ‘inferred’ ounces. By calculating the discovery cost of ‘inferred’ ounces first and assuming this cost to be the same for all companies with higher resource categories (ie using the same methodology as above for differentiated resource valuations), it is similarly possible to estimate the industry-wide costs of discovery of ‘indicated’ ounces and then (by adopting the same methodology) ‘measured’ ounces.

The universe of listed gold companies in London

In our consideration of the London market, we have analysed 41 companies, compared to the same number in our report of October 2009. In this respect, the only difference between the two reports is the fact that Moto Goldmines has been excluded after its acquisition by Randgold Resources; and Goldplat has been included. A summary of the results by resource category sub-sector is given in the table below.

Exhibit 4: Gold sector summary valuation according to resource category

Note: Totals may not add up owing to rounding. Prices as at 15 January 2010.

Resource category	No. of co's	%	Market cap (US\$m)	%	Net cash (US\$m)	%	EV (US\$m)	%	Total oz (m)	%	Mkt cap/oz (US\$)	EV/oz (US\$)
Inferred only	3	7	22	0	11	5	10	0	2.7	1	7.96	3.78
Indicated & inferred	7	17	927	5	75	32	852	5	191.2	58	4.85	4.46
Measured, indicated & inferred	31	76	17,642	95	149	63	17,493	95	133.4	41	132.2	131.12
Totals/average	41		18,591		235		18,356		327.3		56.80	56.08

Source: Edison Investment Research, Thomson Datastream, company sources

Compared to our report of October 2009, a number of features are immediately apparent:

- 1) Firstly, while the companies covered in the analysis are essentially the same (with the proviso that Moto has been taken over by Randgold Resources), there has been a noticeable disparity in the aggregate performances of the three sub-sectors. For example, the aggregate market capitalisation of the ‘inferred’ sub-sector is virtually unchanged since October (US\$22m vs US\$23m). However, net cash within the sub-sector has fallen

markedly, from US\$26m to US\$11m. By contrast, the market capitalisation of the sub-sector with ‘measured’ resources has increased by 24%, from US\$14.2m to US\$17.6m, while net cash has almost halved from US\$294m to US\$149m.

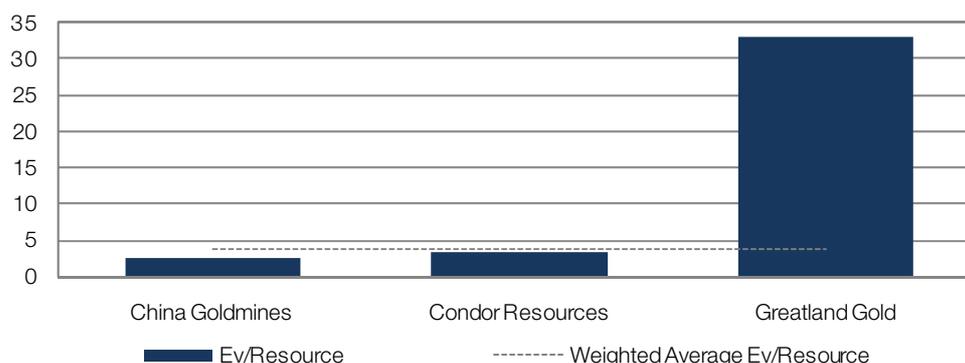
- 2) Aggregate cash resources have fallen from US\$404m to US\$235m.
- 3) The aggregate number of ounces has fallen by 3%, from 337.6Moz to 327.3Moz. This could be attributed to a fall in the ‘indicated’ sub-category in particular (partly on account of the Moto takeover) only partly offset by an increase in the ‘measured’ category.
- 4) The weighted average enterprise value of the sector per total resource ounce has increased 24% from US\$45.33/oz to US\$56.08/oz.

The value of ‘inferred’ ounces

Considering the three companies with ‘inferred’ ounces only, it can be immediately seen that the weighted average value of an ‘inferred’ resource ounce has risen from negative US\$1.31/oz to US\$3.78/oz, which makes more sense intuitively as well as correlating more closely with the result of US\$1.05/oz in April 2009 when we first undertook this exercise. A summary of the per ounce valuations of the three companies with ‘inferred’ ounces is given in Exhibit 5.

Exhibit 5: Implied value per ‘inferred’ resource ounce, London market (US\$)

Note: China Goldmines considered prior to the sale of its asset



Source: Edison Investment Research

An alternative approach for companies with only ‘inferred’ resources is to assume that the market is discounting them expending their cash without adding to their resources. In this instance, a better guide to the valuation of ‘inferred’ ounces could be provided by using market capitalisation, rather than enterprise value. This approach yields a valuation of US\$7.96/oz. However, this is unsatisfactory in that, if such a valuation is accepted for ‘inferred’ ounces, then the average implied valuation of ‘indicated’ ounces (see below) drops below that of ‘inferred’ ounces, which is nonsensical. For this to be avoided, the valuation of ‘inferred’ ounces must be below US\$4.46/oz.

The weighted average valuation of ‘inferred’ ounces is largely determined by China Goldmines and Condor Resources. The valuation implied by Greatland Gold by contrast is much higher than the valuations of both ‘inferred’ and ‘indicated’ ounces (see below), which suggests that the market is discounting future exploration success at the company’s prospects.

Given our observation above that the valuation of ‘inferred’ ounces must be below US\$4.46/oz in order to make sense of the subsequent valuation of ‘indicated’ ounces, whatever approach is taken in interpreting the valuation of ‘inferred’ resource ounces, the outcome is inevitably low (or, as in the past, even negative). For the purposes of our subsequent valuation of ‘indicated’ and ‘measured’ ounces, we have accepted the overall, weighted average valuation implied by the above analysis of US\$3.78/oz.

The value of an ‘indicated’ ounce

A summary of those companies with ‘indicated’ and ‘inferred’ ounces only is given in the table below. It should be noted that approximately 176Moz of the total resource inventory of 191Moz shown is attributable to the two Witwatersrand companies, namely Central Rand Gold and Wits Gold.

Exhibit 6: Sub-sector summary of companies with ‘indicated’ and ‘inferred’ resource ounces only, London market

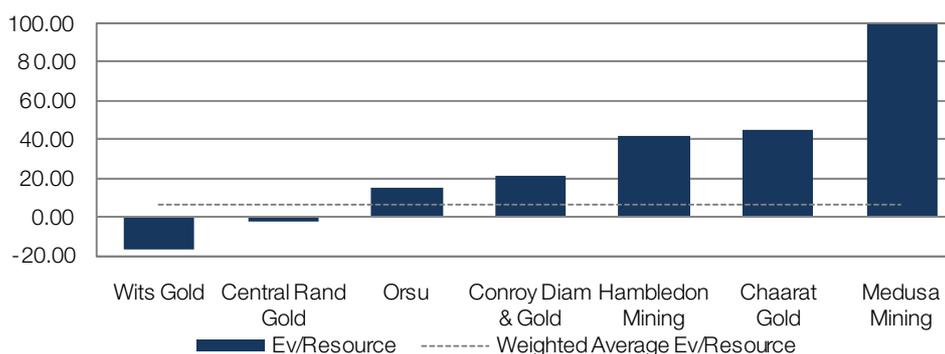
Note: Prices as at 15 January 2010.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Indicated & inferred	7	927	75	852	0.0	43.5	147.9	191.2	4.46

Source: Edison Investment Research, Thomson Datastream, company sources

Having established the value of an ‘inferred’ ounce, it is then possible to derive the average value of an ‘indicated’ ounce by considering those companies with ‘indicated’ and ‘inferred’ ounces only and netting off the implied value of ‘inferred’ ounces (at the average valuation) from their enterprise values. Pursuing this approach for the seven companies with ‘indicated’ and ‘inferred’ ounces only yields an average value for each ‘indicated’ ounce of US\$6.74/oz, compared to a value of US\$30.74/oz in October and one of US\$12.05/oz in April. A graph of the actual implied values for ‘indicated’ resource ounces for each of the companies in this category is given below.

Exhibit 7: Implied value per ‘indicated’ resource ounce, London market (US\$)



Source: Edison Investment Research

Several features are notable in respect of the above analysis. Firstly, the decline in the overall value of ‘indicated’ ounces is partly attributable to the elimination of Moto Goldmines within the sample group. However, probably the most significant factor has been the revaluation of ‘inferred’ ounces described above, which has resulted in a decline in the implied value for ‘indicated’ ounces for each of the individual companies, with the exception of Chaarat Gold. In this respect it is notable that if ‘inferred’ ounces were valued at zero, then the weighted average value of ‘indicated’ ounces would instead be US\$19.60/oz, which may therefore be regarded as a maximum valuation (all other things being equal). As noted before, the implied valuations of all of the companies in this category fall within one standard deviation of the mean, with the exception of Medusa. As such, Medusa is an outlier. However, excluding it from the analysis reduces the weighted average implied valuation of ‘indicated’ ounces to below zero, which is again nonsensical. Alternatively, excluding Medusa from the sample and setting the value of ‘inferred’ ounces to zero suggests a weighted average value of ‘indicated’ resources of US\$8.86/oz. Nevertheless, Medusa stands as an example of the sort of valuation that companies with only ‘indicated’ and ‘inferred’ ounces can achieve if they are able to develop those ounces to the satisfaction of the market and turn them to good account.

One additional factor affecting the valuation of London-centric valuation of 'indicated' ounces is the existence of a substantial body of Witwatersrand ounces in the portfolios of Central Rand Gold and Wits Gold. A summary of the sector differentiating between these two sub-groups is as follows:

Exhibit 8: Sub-sector summary of companies with 'indicated' and 'inferred' resource ounces only, London market

Note: Prices as at 15 January 2010; totals may not add up owing to rounding.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Indicated & inferred	7	927	75	852	0.0	43.5	147.9	191.2	4.46
Ditto excl Wits basin oz	5	680	3	678	0.0	7.5	7.7	15.1	44.97
Wits basin oz only	2	247	73	174	0.0	35.9	140.2	176.1	0.99

Source: Edison Investment Research, Thomson Datastream, company sources

Assuming the same value for 'inferred' ounces of US\$3.78 (as above), yields a weighted average implied value for 'indicated' ounces for non-Witwatersrand gold companies of US\$85.94/oz and for Witwatersrand gold companies of minus US\$9.89/oz (probably implying that the 'inferred' valuation of US\$3.78/oz is too high for Witwatersrand ounces).

As a result, for the purposes of the valuation of 'measured' ounces (below) we have accepted the weighted average implied valuation of non-Witwatersrand 'indicative' ounces of US\$85.94/oz.

The value of a 'measured' ounce

A summary of those companies with 'measured', 'indicated' and 'inferred' ounces is given in the table below. Of note is the fact that the number of aggregate 'indicated' ounces in this sub-sector is approximately the same as that noted in the sub-sector with 'indicated' and 'inferred' ounces only, yet the aggregate market capitalisation of these companies is approximately 20 times as much. If investors accept the value of 'inferred' ounces as negligible, then it stands to reason that the US\$16.7bn uplift in value of the 'measured' sub-sector compared to the 'indicated' sub-sector must be solely attributable to the 31.2 million ounces recorded in the 'measured' category.

Exhibit 9: Sub-sector summary of companies with 'measured', 'indicated' and 'inferred' resource ounces, London

Note: Totals may not add up owing to rounding. Prices as at 15 January 2010.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Measured, indicated & inferred	31	17,642	149	17,493	31.2	56.1	46.2	128.0	133.41

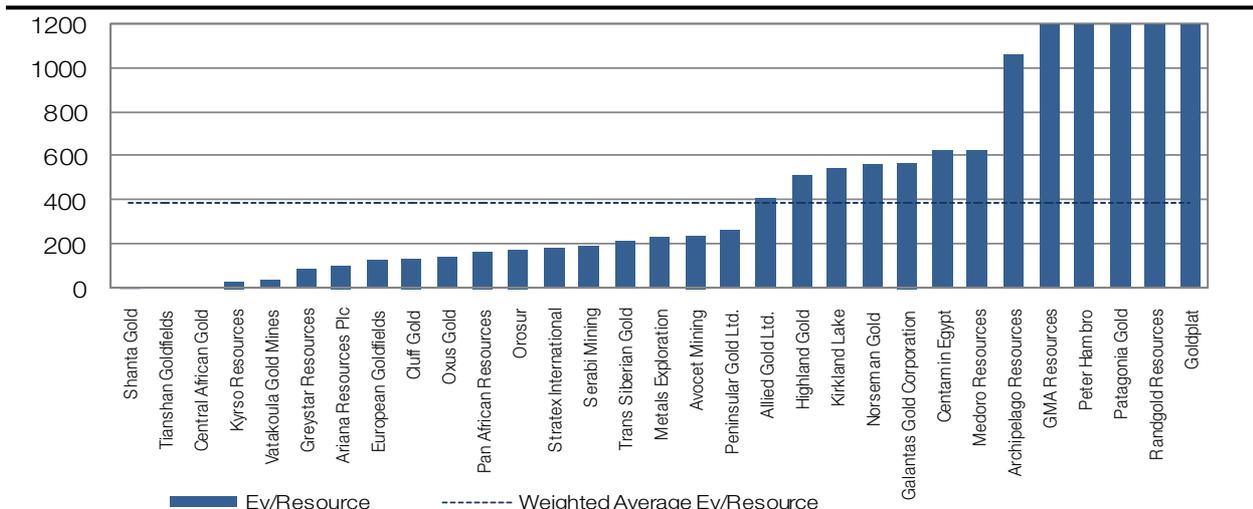
Source: Edison Investment Research, Thomson Datastream, company sources

More specifically, using the approach outlined above, the value of a 'measured' ounce can be determined to be US\$542.88/oz – a 42% uplift compared to the US\$381/oz calculated in October 2009 and a 189% uplift since the US\$188/oz value we calculated in April.

However, accepting a value for 'indicated' ounces of US\$85.94/oz (by excluding Witwatersrand basin ounces) implies a weighted value for measured ounces of US\$403.53/oz. Exhibit 10 illustrates the implied valuations for 'measured' ounces for each individual company on this basis.

Exhibit 10: Implied value per 'measured' resource ounce, London market (US\$)

Note: Tianshan considered prior to the sale of its asset



Source: Edison Investment Research

Clearly it is nonsensical for resource ounces to be valued at more than the price of gold and, in the cases of Patagonia, Randgold Resources, GMA, Peter Hambro and Kirkland Lake (and probably Medoro), the market is self-evidently discounting either the discovery of additional resource ounces or the conversion of a portion of the current resource base from the 'indicated' and 'inferred' categories into the 'measured' category (or some combination of the two) or the profitable development of the resources as they stand.

A number of observers have suggested that they believe the inclusion of Randgold Resources in the above analysis skews the weighted average valuation of 'measured' ounces to the upside. Clearly this true in so far as the implied value of Randgold Resources' measured ounces is above average. Excluding Randgold Resources, the implied value of 'measured' ounces is US\$337.67/oz (with 'indicated' valued at US\$6.74/oz) and US\$102.89/oz (with 'indicated' valued at US\$85.94/oz). On balance, however, we do not believe that there is any more reason to exclude Randgold Resources from the analysis than there is to exclude Barrick, Newcrest or AngloGold Ashanti. As a result, our preferred weighted average valuation for a 'measured' ounce in the London market is US\$403.53/oz.

Discovery costs

A summary for companies in the London market for which BDO has been able to analyse cost data is as follows:

Exhibit 11: Discovery costs for a sample of London gold companies

Note: * See Exhibit 4; totals may not add up owing to rounding.

Resource category	No. of co's	Pct of total*	Discovery costs (US\$m)	Inferred Moz	Indicated Moz	Measured Moz	Total Moz	Pct of total*	Discovery cost per total oz (US\$)
Inferred only	3	100	18.7	2.7	0.0	0.0	2.7	100	6.93
Indicated & inferred	4	57	116.4	143.2	37.5	0.0	180.7	94	0.64
Measured, indicated & inferred	7	23	118.1	7.9	6.9	2.5	17.4	13	6.80
Totals/average	14	34	253.2	153.8	44.4	2.5	327	61	1.26

Source: BDO, Edison Investment Research, Thomson Datastream, company sources

This data may be interpreted in a number of different ways.

At face value, the average cost of discovering an 'inferred' ounce of gold for the three companies with 'inferred' ounces is US\$6.93/oz. However, adopting this number as an industry-wide

benchmark for those companies with ‘indicated’ and ‘inferred’ ounces suggests a negative discovery cost of ‘indicated’ ounces, which is non-sensical. In our view, the rationalisation of this is the inclusion of Witwatersrand ounces in the ‘indicated and inferred’ sample (as detailed previously). Excluding these from the analysis gives the following result:

Exhibit 12: Discovery costs for companies with ‘indicated’ and ‘inferred’ resource ounces

Note: * Assuming US\$6.93/oz cost of discovery for ‘inferred’ oz.

Resource category	No. of co's	Pct of total	Discovery costs (US\$m)	Inferred Moz	Indicated Moz	Total Moz	Pct of total	Implied cost per indicated oz* (US\$)	Discovery cost per total oz (US\$)
Indicated & inferred	4	57	116.4	143.2	37.5	180.7	94	(23.34)	0.64
Ditto excl Wits basin oz	2	29	67.7	3.0	1.6	4.5	2	29.92	14.92
Wits basin oz only	2	29	48.7	140.2	35.9	176.1	92	N/A	0.28

Source: Edison Investment Research, Thomson Datastream, company sources

While a result of US\$29.92/oz is intuitively more acceptable, unfortunately it results in a negative discovery cost for ‘measured’ ounces. In fact, accepting a discovery cost for ‘inferred’ ounces of US\$6.93/oz means that only a cost for ‘indicated’ ounces of below US\$9.15/oz will result in the implied cost for ‘measured’ ounces being positive. Moreover, the implied cost of discovery of ‘measured’ ounces will not exceed that of ‘indicated’ ounces unless the latter drops below US\$7.00/oz.

Alternatively we can make the assertion that the cost of discovery of any ounce is positive and that the cost of discovery of a ‘measured’ ounce is greater than that of an ‘indicated’ ounce which is, in turn, greater than that of an ‘inferred’ ounce within the same ore-body. This being the case, the cost of discovery of an ‘indicated’ ounce must be less than US\$12.53/oz (in the limiting case in which the cost of discovery of an ‘inferred’ ounce is zero) if it is to be exceeded by the cost of discovery of a ‘measured’ ounce. On this basis we can say that the cost of discovery of an ‘inferred’ ounce must, on average, lie within the range up to US\$6.80/oz, while the cost of discovery of an ‘indicated’ ounce must lie between US\$6.80/oz and US\$12.53/oz and the cost of discovery of a ‘measured’ ounce must lie in the range US\$6.80 to US\$46.55/oz (excluding Witwatersrand basin ounces).

Four conclusions are therefore possible:

- 1) At US\$6.93/oz, the cost of discovery of ‘inferred’ ounces is too high.
- 2) The sample size is too small.
- 3) The companies within the sample are unrepresentative.
- 4) It is actually cheaper to discover ‘measured’ ounces than it is to discover ‘indicated’ or ‘inferred’ ounces.

However, we can say with certainty that the weighted average cost of discovery for the 12 non-Witwatersrand, London companies reviewed in this way is US\$8.31 per (total) resource ounce, which is significantly less than the weighted average EV per total resource for the sector of US\$120.26 on a comparable basis.

The universe of listed gold companies in Toronto

In contrast to the 41 London-listed companies, in Canada, we have analysed 59 companies, ranging in size from Barrick to Goldrush Resources (EV=US\$6m). A summary of the results by resource category sub-sector is given in the table below.

Exhibit 13: Canadian market gold sector summary valuation according to resource category

Note: Totals may not add up owing to rounding. Prices as at 15 January 2010.

Resource category	No. of co's	%	Market cap (US\$m)	%	Net cash (US\$m)	%	EV (US\$m)	%	Total oz (m)	%	EV/oz (US\$)
Inferred only	3	5	140.7	0	0.0	0	140.7	0	2.3	0	62.01
Indicated & inferred	6	10	2,543.7	2	120.3	4	2,423.5	2	15.0	2	161.25
Measured, indicated & inferred	50	85	139,553.9	98	(3,156.5)	(104)	142,710.4	98	720.5	98	198.07
Totals/average	59		142,238.3		(3,036.2)		145,274.5		737.8		196.90

Source: Edison Investment Research, Thomson Datastream, company sources

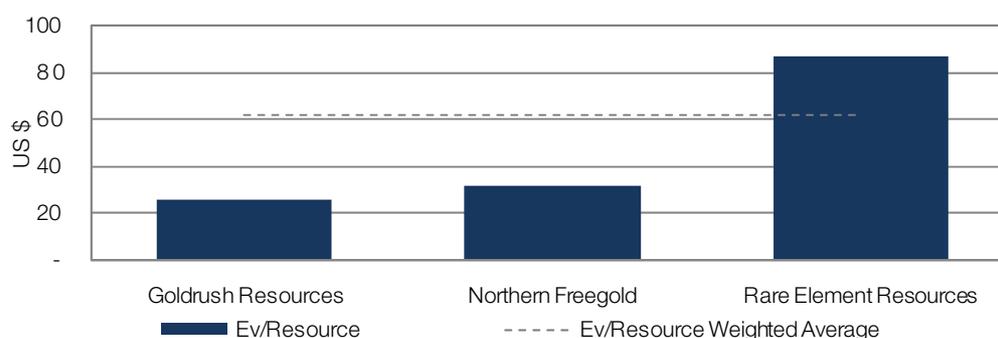
A number of features are immediately apparent from this summary:

- 1) The valuation of total ounces is much higher than in the UK (US\$196.90/oz vs US\$56.08/oz).
- 2) Relatively more value is associated with companies with all three categories of resources. In addition companies with all three resource categories account for a higher proportion of total ounces (perhaps as a result of Witwatersrand basin ounces in the London sample).
- 3) Whereas in the UK market the companies making up each of the three categories have net cash, on aggregate, in Canada companies with 'measured' resources have net debt. In addition, whereas London companies with 'inferred' resources have net cash, in Canada such companies have neither cash nor debt.
- 4) Companies with all three categories of resources make up 98% of total ounces and account for 98% of total enterprise value.

The value of 'inferred' ounces

Considering the three companies with 'inferred' ounces only, the weighted average value of an 'inferred' resource ounce is US\$62.01 (cf US\$3.78/oz in the London market). In addition, the results for the constituent companies within the sample are more tightly grouped around the mean, with the furthest outlier approximately 1.3 standard deviations away from the mean (cf 2.1 for the London market). A summary of the per ounce valuations of the three companies with 'inferred' ounces is given in the graph below.

Exhibit 14: Canadian market implied value per 'inferred' resource ounce (US\$)



Source: Edison Investment Research

As with the London market, however, a maximum value for ‘inferred’ ounces may also be derived with respect to ‘indicated’ ounces. In the case of the Canadian market, this maximum value is US\$161.25/oz (see Exhibit 15).

The value of an ‘indicated’ ounce

A summary of those companies in the Canadian market with ‘indicated’ and ‘inferred’ ounces only is given in the table below.

Exhibit 15: Summary of Canadian-listed companies with ‘indicated’ and ‘inferred’ resource ounces only

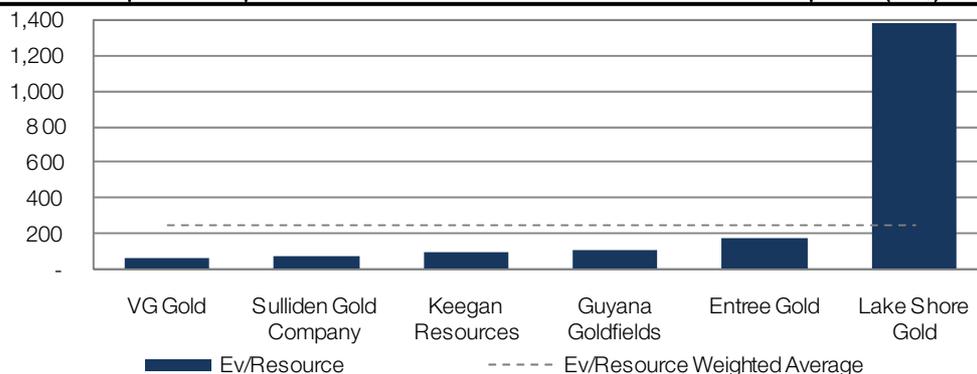
Note: Prices as at 15 January 2010.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Indicated & inferred	6	2,544	120	2,424	0.0	6.8	8.2	15.0	161.25

Source: Edison Investment Research, Thomson Datastream, company sources

As before, it is then possible to derive the average value of an ‘indicated’ ounce by considering those companies with ‘indicated’ and ‘inferred’ ounces only and then netting off the average implied value of ‘inferred’ ounces from their respective enterprise values. Pursuing this approach for the six Canadian companies with ‘indicated’ and ‘inferred’ ounces only yields an average value for each ‘indicated’ ounce of US\$243.76/oz, compared to a value of US\$85.94/oz in the London market. A graph of the actual implied values for ‘indicated’ resource ounces for each of the companies in this category is given below.

Exhibit 16: Implied value per ‘indicated’ resource ounce of Canadian-listed companies (US\$)



Source: Edison Investment Research

Several features are of note. In particular, as with the London market, the implied valuations of all of the companies in this category fall within one standard deviation of the mean, with the exception of one – Lake Shore Gold. As such, Lake Shore Gold is an obvious outlier and excluding it from the analysis reduces the weighted average implied valuation of ‘indicated’ ounces from US\$243.76/oz to US\$105.74/oz. However, while an outlier, there is no reason to suggest that the valuation for Lake Shore Gold is anomalous any more than that of Medusa in London. As a result, we have accepted a weighted average implied valuation of ‘indicative’ ounces of US\$243.76/oz for the purposes of the valuation of ‘measured’ ounces (below).

The value of a ‘measured’ ounce

A summary of those Canadian-listed companies with ‘measured’, ‘indicated’ and ‘inferred’ ounces is as follows.

Exhibit 17: Summary of Canadian-listed companies with ‘measured’, ‘indicated’ and ‘inferred’ resource ounces

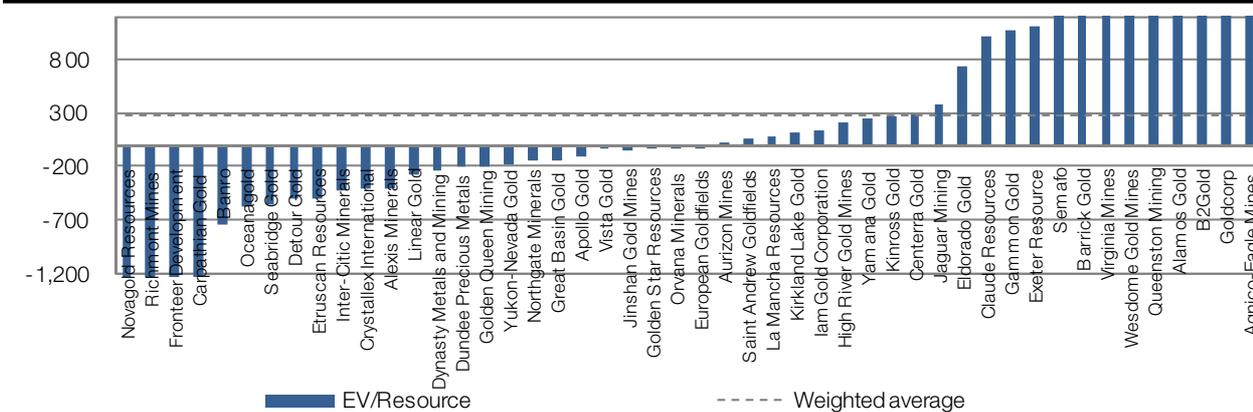
Note: Totals may not add up owing to rounding. Prices as at 15 January 2010.

Resource category	No. of co’s	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Measured, indicated & inferred	50	139,554	(3,157)	142,710	171.6	330.0	218.8	737.8	198.07

Source: Edison Investment Research, Thomson Datastream, Company sources

More specifically, using the approach outlined above, the value of a ‘measured’ ounce can be determined to be US\$283.68/oz – a 30% discount compared to the value implied for companies listed in London of US\$403.53/oz. Alternatively, accepting the valuation of ‘indicated’ resources as US\$105.74 by excluding Lake Shore Gold, implies a weighted average valuation for ‘measured’ resources of US\$549.09/oz – a 36% premium to the London number.

Exhibit 18: Implied value per ‘measured’ resource ounce for Canadian listed companies (US\$)



Source: Edison Investment Research

NB This analysis of the value of ‘measured’ ounces includes Witwatersrand basin ounces (eg within Great Basin Gold). Excluding these raises the average weighted value of ‘measured’ ounces on the Canadian market to US\$312.19/oz. However, given that companies with Witwatersrand ounces are not obviously excessively undervalued compared with their peers and the fact this only represents a small variation compared to the previous result of US\$283.68/oz, we have therefore accepted the latter number as the weighted average value of ‘measured’ ounces in the Canadian market.

As with the London market, it is clearly non-sensical for resource ounces to be valued at more than the price of gold. In the case of the 10 companies with implied ‘measured’ oz valuations for which this is the case, the market is fairly self-evidently discounting either the discovery of additional resource ounces or the conversion of a portion of the current resource base from the ‘indicated’ and ‘inferred’ categories into the ‘measured’ category (or some combination of the two) or the profitable development of the total resource base as it stands.

Similarly, it makes little sense for a ‘measured’ ounce to have a negative valuation. In this respect, it is notable that the range of implied valuations for Canadian ounces is generally much greater than for London companies in the ‘measured’ category. Two factors could explain this:

- 1) The weighted average value of ‘indicated’ ounces is ‘too high’.

- 2) Canadian investors are less forgiving of companies that have disappointed operationally, regardless of the categorisation of their resources.

Discovery costs

A summary for companies in the Canadian market for which BDO has been able to analyse cost data is as follows:

Exhibit 19: Discovery costs for a sample of Canadian gold companies

Note: * See Exhibit 13; ** Does not include Witwatersrand basin ounces; totals may not add up owing to rounding.

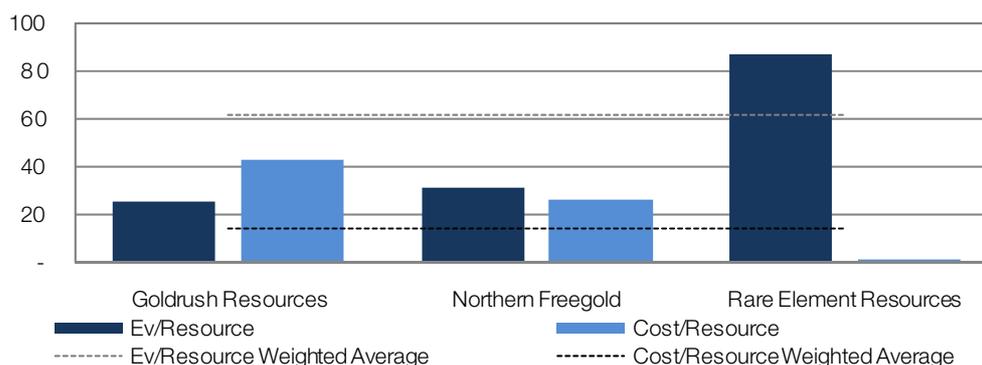
Resource category	No. of co's	Pct of total*	Discovery costs (US\$m)	Inferred Moz	Indicated Moz	Measured Moz	Total Moz	Pct of total*	Discovery cost per total oz (US\$)
Inferred only	3	100	31.8	2.3	0.0	0.0	2.3	100	14.04
Indicated & inferred	6	100	385.0	6.8	8.2	0.0	15.0	100	25.61
Measured, indicated & inferred**	6	12	1,000.6	25.2	44.0	29.0	98.2	14	10.18
Totals/average			1,417.4	34.3	52.2	29.0	115.5		12.26

Source: Edison Investment Research, Thomson Datastream, Company sources

The following chart shows the companies previously considered in their respective resource sub-sectors, with the average cost of discovery for each ounce (by company).

Exhibit 20: Discovery costs per 'inferred' ounce vs implied value attributed per ounce (US\$/oz)

Note: Ranked by extent of uplift between cost and value in US\$/oz terms.



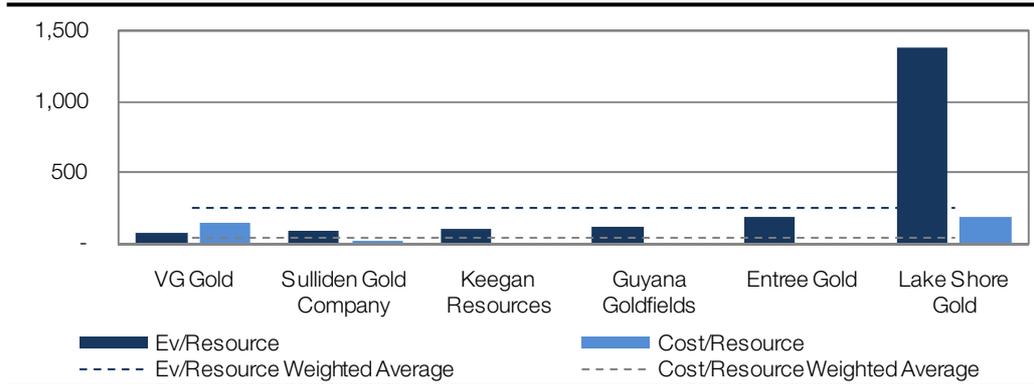
Source: Edison Investment Research

From this it can be seen that the company providing the greatest uplift in value to investors (calculated as EV/oz minus discovery cost per oz) is Rare Element Resources – not only on account of its greater EV per ounce, but also its very low costs of discovery. It is then followed by Northern Freegold and Goldrush Resources. This also suggests that the weighted average cost of a Canadian company discovering an 'inferred' ounce is US\$14.04.

Accepting this average cost of US\$14.04 for a Canadian-listed company to discover an 'inferred' ounce of gold, the following is the same graph for Canadian companies with only 'indicated' and 'inferred' ounces.

Exhibit 21: Discovery costs per ‘indicated’ ounce vs implied value attributed per ounce (US\$/oz)

Note: Ranked by extent of uplift between cost and value in US\$/oz terms.



Source: Edison Investment Research

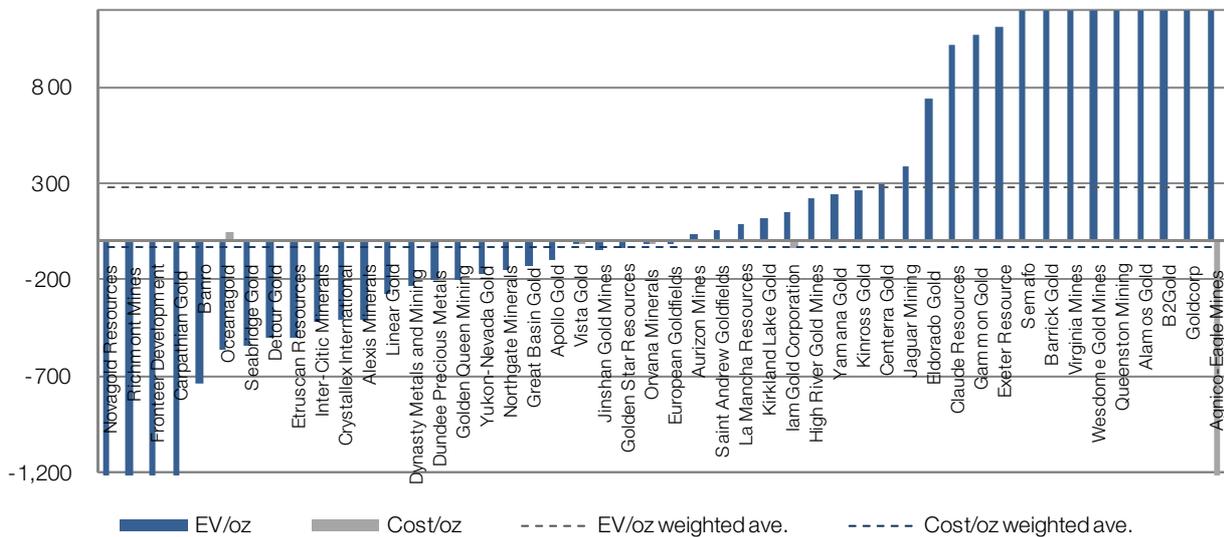
As such, the biggest uplift to investors is afforded by Lake Shore Gold, followed by Entree Gold, Guyana Goldfields, Keegan Resources and Sulliden Gold. For VG Gold, the ‘uplift’ is negative, suggesting that the value accorded by the market for its ‘indicated’ ounces is less than the cost of discovering them – in which case, it should concentrate on drilling up ‘inferred’ ounces instead. Given that the company’s EV per total ounce is US\$62.95 of a discovery cost per total ounce of US\$68.25 however, perhaps even this strategy would be value destroying.

Finally, we are able to observe that (given an average cost of discovery of an ‘inferred’ ounce of US\$14.04), the average cost of discovery of ‘indicated’ ounces is US\$35.24.

Accepting these two benchmarks, the following is the same graph for Canadian companies with all three categories of resources.

Exhibit 22: Discovery costs per ‘measured’ ounce vs implied value attributed per ounce (US\$/oz)

Note: Ranked by extent of uplift between cost and value in US\$/oz terms.



Source: Edison Investment Research

Since the number of companies for which costs have been calculated is not 100% of the sample size (unlike the ‘inferred’ and ‘indicated’ cases, above), in order to assess the extent of value uplift for instances in which cost data were not available, the weighted average cost for ‘measured’ ounces has been used instead.

Immediately apparent is the fact that, accepting weighted average costs of discovery of US\$14.04/oz and US\$35.24/oz for ‘inferred’ and ‘indicated’ ounces respectively, the average

weighted cost of discovery of a 'measured' ounce is negative, which does not make sense. As with the London market, we could assert that the cost of discovery of any ounce is positive and that the cost of discovery of a 'measured' ounce must be greater than that of an 'indicated' ounce which must be greater than that of an 'inferred' ounce within the same ore-body. Adopting this philosophy, the cost of discovery of an 'indicated' ounce must therefore be less than US\$13.70/oz (in the limiting case in which the cost of discovery of an 'inferred' ounce is zero) if it is to be exceeded by the cost of discovery of a 'measured' ounce. Similarly, we can say that the cost of discovery of an 'inferred' ounce must, on average, lie within the range up to US\$10.18/oz. Hence, the cost of discovery of an 'indicated' ounce must therefore lie between US\$10.18/oz and US\$13.70/oz and the cost of discovery of a 'measured' must lie in the range US\$10.18/oz to US\$34.47/oz.

However, these results appear at odds with the previous results for 'inferred' and 'indicated' ounces of US\$14.04 and US\$35.24 respectively. Only two explanations are possible to rationalise this discrepancy:

- 1) Companies with 'inferred' and 'indicated and inferred' ounces only are not typical of companies with all three categories of resources in terms of their costs of discovery. There is no obvious reason to believe this.
- 2) It is actually cheaper to discover 'measured' ounces than it is to discover 'indicated' or 'inferred' ounces.

However, we can say with certainty that the weighted average cost of discovery for the 15 Canadian companies reviewed in this way is US\$12.26 per (total) resource ounce, which is significantly less than the weighted average EV per total resource for the sector of US\$196.90.

The universe of listed gold companies in Australia

In the Australian market, we have analysed 31 companies, ranging in size from Newcrest Mining to Beadell Resources. A summary of the results by resource category sub-sector is given in the table below.

Exhibit 23: Australian market gold sector summary valuation according to resource category

Note: Totals may not add up owing to rounding. Prices as at 15 January 2010.

Resource category	No. of co's	%	Market cap (US\$m)	%	Net cash (US\$m)	%	EV (US\$m)	%	Total oz (m)	%	EV/oz (US\$)
Inferred only	4	13	209.2	1	10.9	4	198.3	1	2.2	1	91.47
Indicated & inferred	12	39	2,799.6	9	152.2	58	2,647.4	8	26.9	16	98.57
Measured, indicated & inferred	15	48	29,717.6	91	98.5	38	29,619.1	91	140.3	83	211.14
Totals/average	31		32,726.3		261.6		32,464.8		169.3		191.75

Source: Edison Investment Research, Thomson Datastream, company sources

A number of features are immediately apparent from this summary:

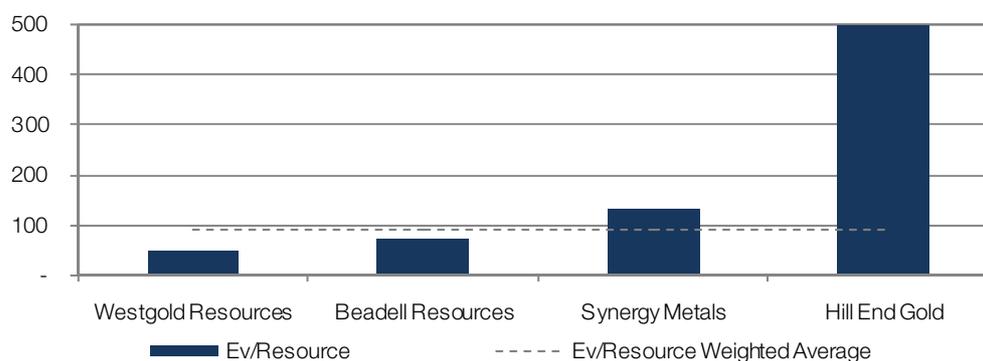
- 1) The aggregate market capitalisations of the 31 companies analysed is almost twice the size of the London sample (US\$18.6bn), but less than one quarter the size of the Canadian sample (US\$142.2bn).
- 2) Like the London market – but unlike Canada – companies in all three sub-sectors have net cash on their balance sheets. Unlike London, companies with 'indicated and inferred' ounces only account for the majority of cash holdings (vs 32% in London).
- 3) The Australian sample accounts for approximately half as many total ounces as the London one (327.3Moz) and less than one quarter the number of total ounces in Canada (737.8Moz).

- 4) The enterprise value per total resource ounce in the Australian sample (US\$191.75/oz) is close to that in Canada (US\$196.90/oz). Both are substantially in excess of the London figure (US\$56.08/oz), albeit the London sample includes a much higher percentage of Witwatersrand basin ounces. If these are excluded, the London figure increases to US\$120.26/oz.

The value of 'inferred' ounces

Considering the four companies with 'inferred' ounces only, the weighted average value of an 'inferred' resource ounce is US\$91.47 (cf values of US\$3.78/oz and US\$62.01/oz in the London and Canadian markets respectively). A summary of the per ounce valuations of the four companies with 'inferred' ounces is given in the graph below.

Exhibit 24: Australian market implied value per 'inferred' resource ounce (US\$)



Source: Edison Investment Research

As with the other markets, a maximum value for 'inferred' ounces may also be derived with respect to 'indicated' ounces. In the case of the Australian market, this maximum value is US\$98.57/oz (see Exhibit 25).

The value of an 'indicated' ounce

A summary of those companies with 'indicated' and 'inferred' ounces only is given in the table below.

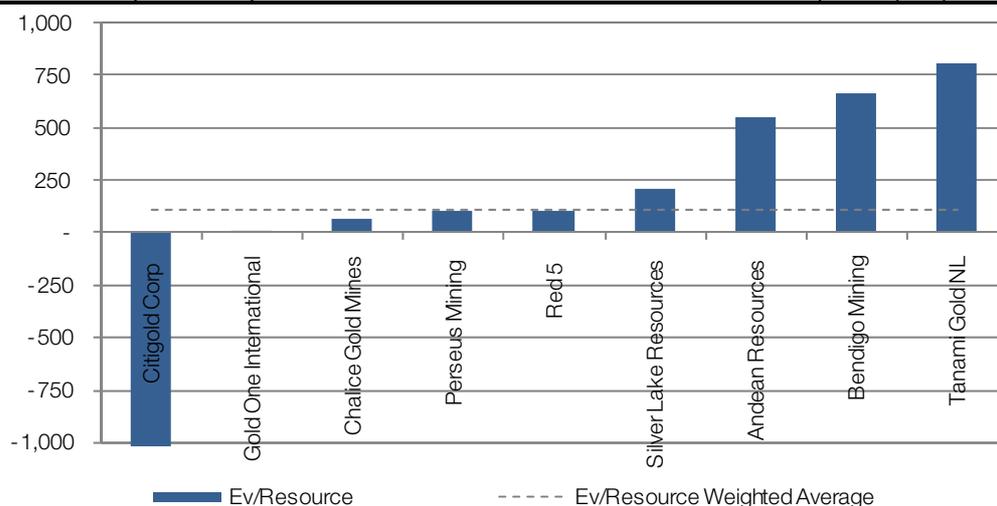
Exhibit 25: Summary of Australian-listed companies with 'indicated' and 'inferred' resource ounces only

Note: Prices as at 15 January 2010.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Indicated & inferred	12	2,800	152	2,647	0.0	10.3	16.5	26.9	98.57

Source: Edison Investment Research, Thomson Datastream, company sources

As before, it is then possible to derive the average value of an 'indicated' ounce by considering those companies with 'indicated' and 'inferred' ounces only and netting off the average implied value of 'inferred' ounces from their respective enterprise values. Pursuing this approach for the 12 Australian companies with 'indicated' and 'inferred' ounces only yields an average value for each 'indicated' ounce of US\$109.96/oz (cf US\$85.94/oz in London and US\$243.76/oz in Canada). A graph of the actual implied values for 'indicated' resource ounces for each of the companies in this category is given below.

Exhibit 26: Implied value per 'indicated' resource ounce of Australian-listed companies (US\$)

Source: Edison Investment Research

Several features are of note relative to the above analysis. In particular, the implied valuations of all of the companies in this category fall within one standard deviation of the mean, with the exception of Citigold Corp. As such, Citigold is a potential outlier. Excluding it from the analysis increases the weighted average implied valuation of 'indicated' ounces from US\$109.96/oz to US\$197.80/oz.

In addition, the Australian sample contained companies (eg Gold One) containing Witwatersrand basin ounces. However, as the table below shows, they account for a much smaller percentage of the whole than the London market.

Exhibit 27: Sub-sector summary of companies with 'indicated' and 'inferred' resource ounces only

Note: Prices as at 15 January 2010; totals may not add up owing to rounding.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Indicated & inferred	12	2,800	152	2,647	0.0	10.3	16.5	26.9	98.57
Ditto excl Wits basin oz	11	2,566	152	2,414	0.0	7.7	14.3	22.0	109.67

Source: Edison Investment Research, Thomson Datastream, company sources

Excluding these Witwatersrand ounces from the analysis yields a weighted average value for 'indicated' ounces in the Australian sample of US\$143.43/oz.

Stripping out both Citigold and Witwatersrand ounces from the analysis yields a weighted average value per 'indicated' ounce in the Australian sample of US\$264.03/oz (cf US\$85.94/oz in London and US\$243.76/oz in Canada).

However, as noted before, we see no specific reason to exclude Citigold from the analysis. Moreover, if we accept a weighted average valuation for indicated ounces in the Australian market of US\$264.03/oz, it implies that the value of a 'measured' ounce (see below) falls below that of an 'indicated' one. As such, our preferred valuation for a weighted average 'indicated' ounce in Australia is US\$143.43/oz.

The value of a ‘measured’ ounce

A summary of those Australian-listed companies with ‘measured’, ‘indicated’ and ‘inferred’ ounces is given in the table below.

Exhibit 28: Summary of Australian-listed companies with ‘measured’, ‘indicated’ and ‘inferred’ resource ounces

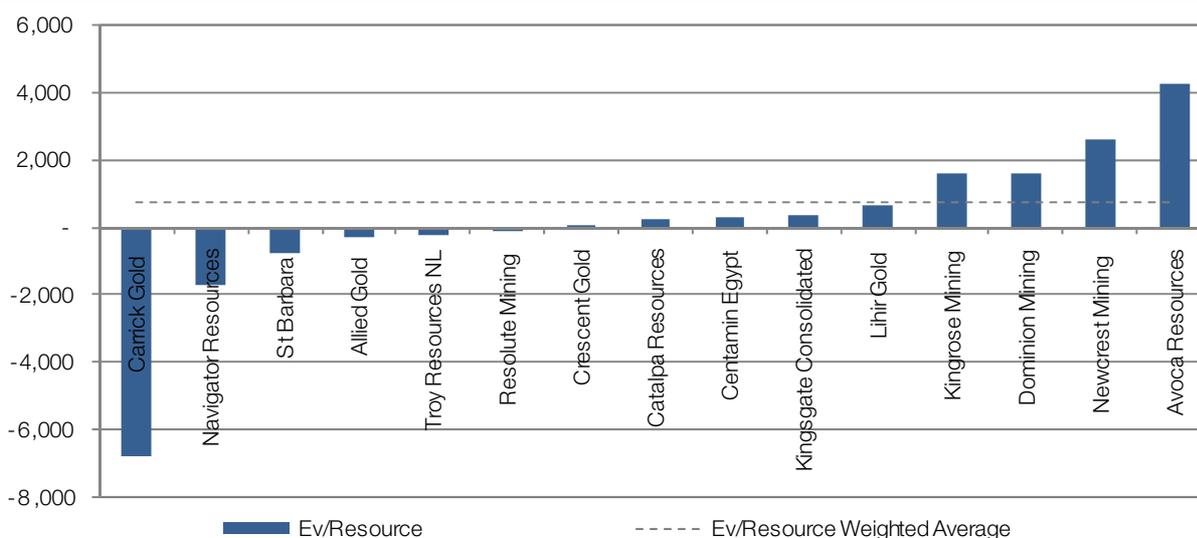
Note: Prices as at 15 January 2010.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Resources (Moz of gold)			Total oz (m)	EV per total oz (US\$)
					Measured	Indicated	Inferred		
Measured, indicated & inferred	15	29,718	99	29,619	19.3	83.2	37.8	140.3	211.14

Source: Edison Investment Research, Thomson Datastream, company sources

More specifically, accepting the value of an indicated ounce as US\$143.43/oz, the value of a ‘measured’ ounce can be determined to be US\$738.55/oz (cf US\$403.53/oz in London and US\$283.68/oz in Canada). In accepting the higher valuation for an indicated ounce of US\$264.03/oz as a result of the exclusion of Citigold (as an outlier) and Witwatersrand basin ounces (on the basis that they self-evidently attract a different valuation – rightly or wrongly) however, yields a weighted average value per ‘measured’ ounce in the Australian market of US\$217.67/oz.

Exhibit 29: Implied value per ‘measured’ resource ounce for Australian listed companies (US\$)



Source: Edison Investment Research

As with the London market, it is clearly nonsensical for resource ounces to be valued at more than the price of gold. In the case of Avoca, Newcrest, Dominion and Kingroose therefore, the market is self-evidently discounting either the discovery of additional resource ounces or the conversion of a portion of the current resource base from the ‘indicated’ and ‘inferred’ categories into the ‘measured’ category (or some combination of the two) or the profitable development of the resources as they stand.

Overall, three companies’ implied valuations of ‘measured’ ounces lie more than one standard deviation away from the mean, being Avoca, Newcrest and Carrick. Excluding these yields an average weighted valuation for ‘measured’ ounces of US\$198.02/oz. Again, however, we see no specific basis on which to exclude these companies, in which case we regard the weighted average valuation of a ‘measured’ ounce within the Australian market of US\$738.55/oz as being acceptable.

Discovery costs

A summary of the Australian companies for which BDO has been able to analyse cost data is as follows:

Exhibit 30: Discovery costs for a sample of Australian gold companies

Note: * See Exhibit 23; ** Does not include Witwatersrand basin ounces; totals may not add up owing to rounding.

Resource category	No. of co's	Pct of total*	Discovery costs (US\$m)	Inferred Moz	Indicated Moz	Measured Moz	Total Moz	Pct of total*	Discovery cost per total oz (US\$)
Inferred only	3	75	32.1	2.0	0.0	0.0	2.0	91	16.01
Indicated & inferred	3	25	128.9	11.2	2.9	0.0	14.2	53	9.09
Measured, indicated & inferred**	5	33	219.6	7.1	34.2	7.5	48.8	35	4.50
Totals/average	11	35	380.6	20.3	37.2	7.5	65.1	38	5.86

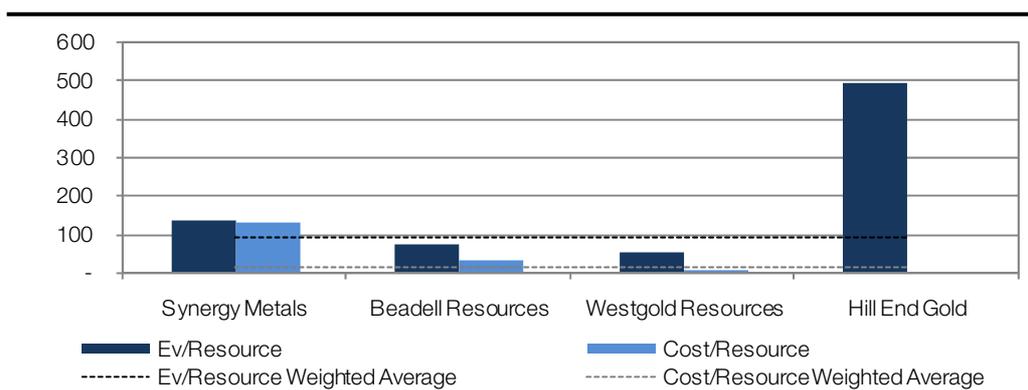
Source: BDO, Edison Investment Research, Thomson Datastream, company sources

Immediately it can be seen that the same anomaly exists as in London and Canada, whereby higher categories of resource ounce appear cheaper to find than lower category ones.

Nevertheless, in the 'inferred' category, it can be seen that the average cost of discovery of an 'inferred' ounce is US\$16.01/oz (cf US\$14.04/oz in Canada and US\$6.93/oz in London).

Exhibit 31: Discovery costs per 'inferred' ounce vs implied value attributed per ounce (US\$/oz)

Note: Ranked by extent of uplift between cost and value in US\$/oz terms.



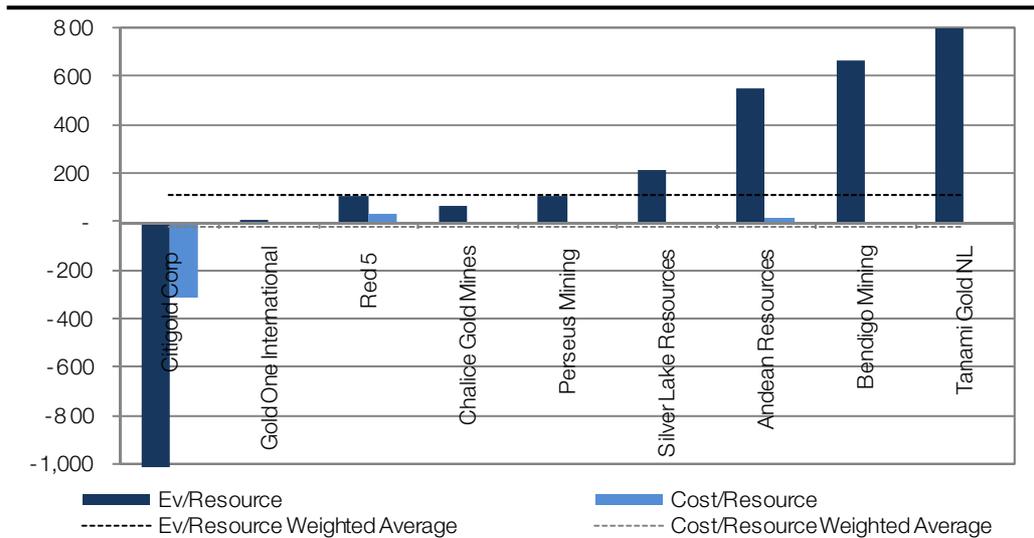
Source: Edison Investment Research

Using either company specific data where it is available or average cost data where it is not (ie Hill End Gold), it can be seen that the company providing the greatest uplift to investors in terms of the difference between the cost of the ounces that it has discovered and the value of the ounces that it is accorded is Hill End Gold. By contrast, the company with the second highest EV per ounce – Synergy Metals – offers the least uplift on account of its relatively high costs of discovery.

Accepting this average cost of US\$16.01 for an Australian-listed company to discover an 'inferred' ounce of gold, the following is the same graph for Australian companies with only 'indicated' and 'inferred' ounces.

Exhibit 32: Discovery costs per ‘indicated’ ounce vs implied value attributed per ounce (US\$/oz)

Note: Ranked by extent of uplift between cost and value in US\$/oz terms.



Source: Edison Investment Research

Since the number of companies for which costs have been calculated is not 100% of the sample size, in order to assess the extent of value uplift for instances in which cost data were not available, the weighted average cost has instead been used. From these figures, we are able to observe that (given an average cost of discovery of an ‘inferred’ ounce of US\$16.01) the average cost of discovery of an ‘indicated’ ounce is negative US\$17.40/oz, which is nonsensical. As such, apart from instances for which there is positive cost data (ie Andean and Red 5) the ranking should be considered as indicative only. In addition, the usual caveat surrounding Witwatersrand ounces applies to Gold One.

Again, however, we can assert that the cost of discovery of any ounce is positive and that the cost of discovery of a ‘measured’ ounce must be greater than that of an ‘indicated’ ounce which, in turn, must be greater than that of an ‘inferred’ ounce within the same ore-body. Adopting this philosophy, the cost of discovery of an ‘indicated’ ounce must therefore be less than US\$5.27/oz (in the limiting case in which the cost of discovery of an ‘inferred’ ounce is zero) if it is to be exceeded by the cost of discovery of a ‘measured’ ounce. Similarly, we can say that the cost of discovery of an ‘inferred’ ounce must, on average, lie within the range up to US\$4.50/oz. Hence, the cost of discovery of an ‘indicated’ ounce must lie between US\$4.50/oz and US\$5.27/oz and the cost of discovery of a ‘measured’ must lie in the range from US\$4.50/oz up to US\$29.43/oz.

This is similar to the results for our Canadian and London samples. However, it again seems at odds with our ‘inferred’ ounce discovery cost estimate of US\$16.01/oz. Only two explanations are possible to rationalise this discrepancy:

- 1) The companies with ‘inferred’ ounces only are not typical of companies with all three categories of resources in terms of their costs of discovery.
- 2) It is actually cheaper to discover ‘indicated’ (and/or ‘measured’) ounces than it is to discover ‘inferred’ ounces.

However, we can say with certainty that the weighted average cost of discovery for the 11 Australian companies reviewed in this way is US\$5.86 per (total) resource ounce, which is significantly less than the weighted average EV per total resource for the sector of US\$191.75 or US\$195.98/oz excluding Witwatersrand basin ounces.

The universe of listed gold companies in Johannesburg

A summary of the gold companies listed on the Johannesburg Stock Exchange is given in Exhibit 33.

Exhibit 33: JSE-listed gold sector summary valuation according to resource category

Note: Totals may not add up owing to rounding. Prices as at 15 January 2010.

Resource category	No. of co's	Market cap (US\$m)	Net cash (US\$m)	EV (US\$m)	Inferred Moz	Indicated Moz	Measured Moz	Total oz (m)	EV/oz (US\$)
Measured, indicated & inferred	5	29,564.6	(1,245.7)	30,810.3	269.6	382.4	197.4	849.4	36.27
Totals/average	5	29,564.6	(1,245.7)	30,810.3	269.6	382.4	197.4	849.4	36.27

Source: Edison Investment Research, Thomson Datastream, company sources

A number of features are apparent:

- JSE-listed companies host the largest resources of all of the four markets profiles (849.4Moz vs 737.8Moz in Canada, 327.3Moz in London and 169.3Moz in Australia).
- Despite this, the aggregate enterprise value of JSE-listed companies is on a par with that of Australia (US\$32.5bn) and significantly less than that of Canada (US\$145.3bn). NB The aggregate EV for the London companies is US\$18.4bn.
- The average EV per total ounce is the lowest of all four markets at US\$36.27/oz (vs US\$196.90/oz in Canada, US\$191.75/oz in Australia and US\$56.08/oz in London) and holds close to the traditional benchmark valuation of total resource ounces of US\$35/oz.

Unlike the London, Canadian and Australian centres of mining finance, Johannesburg hosts five gold companies, of which none have 'inferred' or 'indicated and inferred' ounces only. As such, in valuing ounces listed on the Johannesburg Stock Exchange, it is impossible to use the same differentiated approach as for the London, Canadian and Australian markets.

Two possibilities present themselves as potential solutions to this problem. The first is to find a value for 'inferred', 'indicated' and 'measured' ounces by the use of simultaneous equations. The second is to assert that the value of any ounce is positive and that the value of a 'measured' ounce must be greater than that of an 'indicated' ounce which must be greater than that of an 'inferred' ounce.

In addition to these possibilities, a potential complicating factor is that the majority (but not all) ounces in the cases of DRD Gold, Simmer & Jack, Harmony and Gold Fields are Witwatersrand ounces, whereas the majority of ounces in the case of Anglo American are non-Witwatersrand ounces.

In considering the use of simultaneous equations, there are not enough companies in the sample to allow a distinction to be made between Witwatersrand and non-Witwatersrand ounces, broken down again into the 'measured', 'indicated' and 'inferred' categories. There are enough to find empirical solutions simply for each of the three categories of resource ounces. However, in none of the (up to 32) possibilities tried was it possible to generate a solution in which the value of 'measured' ounces was greater than that of 'indicated' ounces, which was greater than that of 'inferred' ounces and none of the solutions was negative.

As a result, in order to make estimates of the value of different resource category ounces listed on the JSE, we have reverted to the assertion that the value of a 'measured' ounce must be greater than that of an 'indicated' ounce which must be greater than that of an 'inferred' ounce. This being the case, we can make the following estimates:

- The value of an ‘inferred’ ounce must be no higher than US\$36.27/oz.
- The value of an ‘indicated’ ounce must lie in the range US\$36.27/oz up to US\$53.14/oz.
- The value of a ‘measured’ ounce must lie in the range US\$36.27/oz up to US\$156.09/oz.

In the meantime, BDO has been able to analyse cost data for AngloGold Ashanti, Gold Fields and Harmony, as shown in Exhibit 34.

Exhibit 34: JSE-listed gold sector summary valuation according to resource category

Note: Totals may not add up owing to rounding. Prices as at 15 January 2010.

Resource category	No. of co's	Discovery costs (US\$m)	Inferred Moz	Indicated Moz	Measured Moz	Total oz (m)	Discovery cost per total oz (US\$)
Measured, indicated & inferred	3	662.5	212.1	366.8	158.6	737.5	0.90
Totals/average	3	662.5	212.1	366.8	158.6	737.5	0.90

Source: BDO, Edison Investment Research, Thomson Datastream, company sources

Taking a similar approach for costs as for enterprise values, we can then make the following cost estimates:

- The cost of discovering an ‘inferred’ ounce must be no greater than US\$0.90/oz.
- The cost of discovering an ‘indicated’ ounce must be no greater than US\$1.26/oz.
- The cost of discovering a ‘measured’ ounce must be no greater than US\$4.18/oz.

The universe of listed gold companies

Ultimately, a summary of all of the resources of all of the companies included in this report is as follows:

Exhibit 35: Summary of global resources by category

Note: Prices as at 15 January 2010; 34Moz double counted

Resource category	EV (US\$m)	Resources (oz)			
		Measured	Indicated	Inferred	Total
Inferred only	349.11	7.1	N/A	N/A	7.1
Indicated & inferred	5,922.96	171.3	62.0	N/A	233.3
Measured, indicated & inferred	220,603.48	572.2	851.4	419.2	1,842.9
Total	226,875.55	750.7	913.4	419.2	2,083.3

Source: Edison Investment Research, Thomson Datastream, company sources

Perhaps of more significance, Exhibit 36 summarises our findings in terms of the differential values of resource ounces on a universal basis.

Exhibit 36: Enterprise values per resource oz summary by category and market (US\$)

Note: * Excluding Witwatersrand ounces; ** Excluding JSE; highest valuations in each category in bold.

	Inferred	Indicated	Measured	Average
London*	3.78	85.94	403.53	120.73
Canadian*	62.01	243.76	283.68	196.90
Australian*	91.47	143.43	738.55	191.75
JSE (maximum)	36.27	53.14	156.08	36.27
Simple average	48.38	131.57	395.46	120.26
Weighted average* **	33.65	158.55	339.90	158.56

Source: Edison Investment Research

Immediately apparent is the fact that Australian companies are accorded the highest valuations in two categories, namely ‘inferred’ and ‘measured’, while Canadian companies are accorded the highest valuations in the ‘indicated’ category.

By contrast, JSE-listed companies attract the lowest valuations in all categories with the possible exception of ‘inferred’ ounces.

Finally, we can summarise our findings with respect to the discovery costs of each ounce of gold according to the differential method, as follows:

Exhibit 37: Discovery cost per resource oz by category and market (US\$)

Note: * Excluding Witwatersrand ounces.

	Measured	Indicated	Inferred	Total
London	N/M	29.29*	6.93	8.31
Canadian	N/M	35.24	14.04	12.26
Australian	N/M	N/M	16.01	5.86
JSE (maximum)	N/A	N/A	N/A	0.90

Source: Edison Investment Research

Alternatively, our calculated discovery costs based on the assertion that the discovery cost of a 'measured' ounce is greater than that of an 'indicated' ounce which is greater than that of an 'inferred' ounce is thus:

Exhibit 38: Discovery cost per resource oz by category and market, maximum* (US\$)

Note: Assumes cost of 'measured' oz > cost of 'indicated' oz > cost of 'inferred' oz.

	Measured	Indicated	Inferred
London	46.55	12.53	6.80
Canadian	34.47	13.70	10.18
Australian	29.43	5.27	4.50
JSE (maximum)	4.18	1.26	0.90

Source: Edison Investment Research

Comparing the above tables it is apparent that South African companies have the cheapest costs of discovery overall. Moreover, with only a few exceptions, the uplift in value that companies can on average achieve between their costs of exploration and the enterprise value that they may expect to be accorded by the market in which they list (per ounce) is substantial. The one notable exception is that inferred ounces are, on average, given such a poor rating in the London market that listing in that city with only the 'inferred' category of ounces could transpire to be a value destroying exercise. Otherwise, it is apparent that:

- Australia offers the greatest uplift between enterprise value and discovery costs for 'measured' ounces, considered independently.
- Canada offers the greatest uplift between enterprise value and discovery costs for 'indicated' ounces, considered independently.
- Australia offers the greatest uplift between enterprise value and discovery costs for 'inferred' ounces, considered independently.

Operational consequences and implications

As noted previously, the distinction in the valuation of resource ounces has certain consequences with respect to companies' operations regarding their costs of discovery. Firstly, it is not worth a company pursuing a general exploration programme unless the average value of the resources that it is going to find – which we assume to be in proportion to those that it has already found – is worth at least the average cost of discovering them. In addition, it is also not worth a company pursuing a strategy of upgrading its resource ounces from one category to the next unless the valuation differential between those two categories exceeds the cost of the upgrade.

London

For the purposes of this analysis and where there is no specific cost data available, the following assumptions have been made:

- The cost of discovering an inferred ounce is US\$6.80/oz.
- The cost of discovering an 'indicated' ounce is US\$12.53/oz.
- The cost of discovering a 'measured' ounce is US\$46.55/oz.
- The cost of discovering an average ounce is US\$8.31/oz.

From this, it can be seen that, of the 41 companies that we have analysed in this way, it is value adding for 32 of them to conduct full exploration programmes (cf 21 at the time of our note in October). Beyond that, there is one company for which it may be worth upgrading resources into the measured category and a further two for which it may be worth upgrading into the 'indicated' category. There are two companies for which the market apparently favours blue-sky over in-fill drilling (assuming that it is conducted at average cost). Finally, there are four companies for which it is neither worth in-fill drilling nor blue-sky drilling (subject to the provisos noted below). A summary of the exceptions is as follows:

Exhibit 39: Implications of differential resource category valuation on companies' operations

Market apparently favouring blue-sky over in-fill drilling	Companies for which it is potentially worth upgrading into the 'indicated' category only	Companies for which it is potentially worth upgrading into the 'measured' category only	Companies for which it is not worth exploring (subject to provisos, below)
Kryso	Condor Resources	Central Rand Gold	Central African Gold
Vatakoula	China Goldmines		Tianshan Goldfields Shanta Gold

Source: Edison Investment Research

Canada

For the purposes of this analysis and where there is no specific cost data available, the following assumptions have been made:

- The cost of discovering an inferred ounce is US\$10.18/oz.
- The cost of discovering an 'indicated' ounce is US\$13.70/oz.
- The cost of discovering a 'measured' ounce is US\$34.47/oz.
- The cost of discovering an average ounce is US\$12.26/oz.

From this, it can be seen that, of the 56 companies that we have analysed in this way, it is value adding for 26 of them to conduct full exploration programmes. In the meantime, it is neither worth upgrading existing resources nor undertaking blue-sky exploration for three companies. For one company, it is worth upgrading its existing resources but not exploring for new ones, while for another one, it may be worth upgrading resources into a new category. For 28 companies, the market apparently favours blue-sky to in-fill drilling.

A summary of the companies and the groups into which they apparently fall in respect of their exploration activities is shown in Exhibit 40.

Exhibit 40: Implications of resource category valuation differential on companies' operations

Market favouring blue-sky over in-fill drilling	Companies for which it is worth upgrading resources into the 'indicated' category	Companies for which it is potentially worth upgrading into the 'measured' category	Companies for which it is not worth exploring (subject to the provisos)
Yamana Gold	Goldrush Resources	VG Gold	OceanaGold
Iamgold			Crystallex
European Goldfields			Carpathian Gold
NovaGold			
Detour Gold			
Seabridge Gold			
Northgate Minerals			
Golden Star Resources			
Aurizon Mines			
Kirkland Lake Gold			
Great Basin Gold			
Fronteer Development			
Jinshan Gold			
Dundee Precious Metals			
High River Gold			
Banro Corp.			
La Mancha			
St Andrew Goldfields			
Dynasty Metals & Mining			
Crocodile Gold Corp			
Etruscan			
Virginia Mines			
Apollo Gold			
Vista Gold			
Yukon-Nevada Gold			
Orvana Minerals			
Golden Queen Mining			
Inter-Citic Minerals			

Source: Edison Investment Research

Australia

For the purposes of this analysis and where there is no specific cost data available, the following assumptions have been made:

- The cost of discovering an inferred ounce is US\$4.50/oz.
- The cost of discovering an 'indicated' ounce is US\$5.27/oz.
- The cost of discovering a 'measured' ounce is US\$29.43/oz.
- The cost of discovering an average ounce is US\$5.86/oz.

From this, it can be seen that, of the 31 companies that we have analysed in this way, it is value adding for all of them to conduct exploration of some form. For nine of them the market favours blue-sky drilling over in-fill drilling. For two, it may potentially be worth upgrading resources into the 'measured' category.

A summary of these is given in Exhibit 41.

Exhibit 41: Implications of resource category valuation differential on companies' operations

Note: * For these purposes, we have treated Gold One as a typical Australian gold miner; in reality, it operates predominantly in the Witwatersrand basin.

Market favouring blue-sky over in-fill drilling	Companies for which it is potentially worth upgrading into the 'measured' category
St Barbara	Gold One*
Resolute Mining	Citigold
Troy Resources	
Allied Gold	
Crescent Gold	
Carrick Gold	
Hill End Gold	
Navigator Resources	
Chalice Gold Mines	

Source: Edison Investment Research

General

The companies for which it is apparently neither worth upgrading existing resources nor discovering new ones have six logical options to increase value for shareholders (which may also be regarded as provisos upon which the conclusions regarding their putative operational direction have been reached):

- 1) To cease exploration activity and to develop its assets as they stand in order to bring their ounces to account profitably.
- 2) To demonstrate that it is able to add value by discovering new ounces cheaply.
- 3) To demonstrate that it is able to add value by upgrading existing ounces cheaply.
- 4) To sell the company.
- 5) To sell (or part sell) its assets.
- 6) To cease exploration activity and mothball operations.

Assuming that future share price movements reflect the extent to which value is either added or destroyed, the degree to which they are successfully able to achieve any one or all of the above strategies will determine the extent to which their future share prices will either appreciate or depreciate.

Exchange migration

Finally, depending on the mix of a company's resources, the varying differential valuations apparent in each market could result in its being afforded a premium valuation either by migration to another exchange or by considering a dual-listing.

Based on the benchmarks calculated above, the following is a guide to which companies could benefit from such an initiative, based solely on their resources.

Exhibit 42: Companies potentially experiencing re-rating as a result of exchange migration

Note: * In reality TSX→ASX

AIM/LSE→TSX	AIM/LSE→ASX	ASX→AIM/LSE	ASX→TSX	TSX→AIM/LSE	TSX→ASX
Hambledon	Highland Gold	Kingsgate	St Barbara	Detour Gold Corp	NovaGold Resources
Chaarat	European GF		Perseus Mining	Seabridge Gold Inc	Fronteer Dev't Group
Stratex	Greystar Res		Resolute Mining	Northgate Minerals	Guyana Goldfields
Conroy	Avocet		Gold One	Great Basin Gold	Entrée Gold
Central Rand Gold	Cluff Gold		Catalpa Resources	Jinshan GoldMines	Keegan Resources
	Pan African		Citigold Corp	Dundee Precious Metals	
	Oxus		Carrick Gold	High River GoldMines	
	Central African Gold		Westgold Res	Banro Corp	
	Archipelago		Red 5 Limited	La Mancha	
	China Gold Mines		Chalice Gold Mines	St Andrew Goldfields	
	GMA Resources		Navigator Resources	Dynasty Metals & Mining	
	Shanta				
	Greatland Gold				
	Ariana				
	Condor				
	Vatukoula				
	Wits Gold*				
	Metals Exploration				
	Serabi				
	Peninsular				
	Medoro*				
	Trans-Siberian				
	Kryso				
	Galantas				

Source: Edison Investment Research

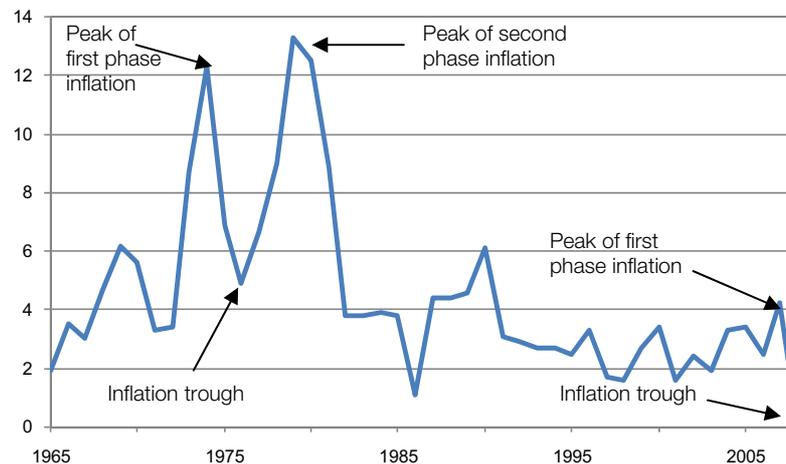
The gold market

The passage of gold through US\$1,000/oz we believe vindicates our note of last year (*Gold – still ailing the 1970s*, October 2009). We reiterate our belief that gold is in the second phase of its bull run and that it has the potential to spike higher in the near term – especially if, as economists say, the current crisis is ‘the worst since the Second World War’ and therefore by extension worse than the 1970s when gold experienced its most famous bull run.

In broad terms, we observe that the crisis of the 1970s proceeded in two distinct phases. In the first, burgeoning inflation (caused by the first oil shock) combined with a global economy dominated by twin US deficits to suck financial markets into a debilitating debt-deflation spiral in 1973-74.

During this period, the Dow Jones Industrials average lost 45% of its value, while the US economy slowed from 7.2% real GDP growth in 1972 to a 2.1% contraction in 1974. The world’s authorities then reacted to the crisis by adopting an excessively stimulative monetary policy to counteract the resulting recession and thereby created a runaway wage-price spiral and a second peak in inflation later in the decade (see Exhibit 43).

Exhibit 43: US consumer price index, percent change year-on-year, 1965-2008



Source: US Department of Labor

We continue to believe in the economic parallels with the 1970s. Nevertheless, it is worth being aware of the fact that gold’s trajectory during the 1970s was not that of a smooth upward trend. A summary of the progression of events in the 1970s and how they may relate in time to the parallel events of the 2000s, as shown in Exhibit 44.

Exhibit 44: 1970s and 2000s timeline with respect to inflation, gold and the Dow Jones Industrials Average

Note: All \$ are US\$; inflation numbers are December to December; gold price numbers are annual averages; DJIA = Dow Jones Industrials Average December close.

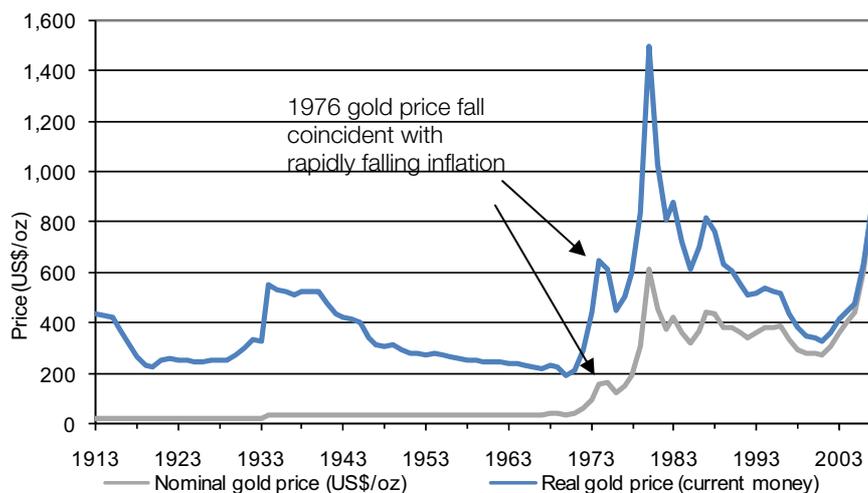
Date	Inflation (%)	Gold (\$/oz)	DJIA	Comment	Date	Inflation (%)	Gold (\$/oz)	DJIA	Comment
1971	3.3	41.17	890		2001	1.6	272.67	10,022	Localised gold price low
1972	3.4	59.00	1,020		2002	2.4	309.66	8,342	
1973	8.7	97.84	851		2003	1.9	364	10,454	
1974	12.3	158.96	616	Peak of first phase inflation; DJIA trough	2004	3.3	409	10,783	
1975	6.9	160.91	852	Gold price peak in phase 1	2005	3.4	445	10,718	
1976	4.9	124.71	1,005	Inflation trough; gold falls; DJIA recovers	2006	2.5	604	12,463	
1977	6.7	147.78	831		2007	4.3	697.5	13,265	Peak of first phase inflation
1978	9.0	193.39	805		2008	0.1	871	8,776	DJIA trough
1979	13.3	304.83	839	Peak of second phase inflation	2009				Inflation trough? DJIA recovers
1980	12.5	614.61	964	Peak of gold price	2010				
					2011				
					2012				Peak of second phase inflation?
					2013				Peak of gold price

Source: US Dept of Labor, South African Chamber of Mines, Edison Investment Research, Thomson Datastream

What is apparent is that, while there is an analogous progression of events between the 1970s and the 2000s, in the latter case, it appears as if the cycle has been extended compared to the former. As such, the coincident trough of the Dow Jones, which occurred in 1974 in the previous cycle, has only just occurred in 2008 in the current one. Since then, the Dow Jones has recovered and inflation has fallen. Again, this experience is analogous to 1976, reflecting as it does the deflationary headwinds that are assailing the economy. However, it is worth noting that this phase of the global economic crisis in 1976 also coincided with a period of weakness in the gold market in 1976, when it fell by almost 25%, as depicted below.

Exhibit 45: The gold price, nominal and real (US\$/oz), 1913-2008

Note: Prices are annual averages.



Source: Edison Investment Research, South African Chamber of Mines, US Department of Labor

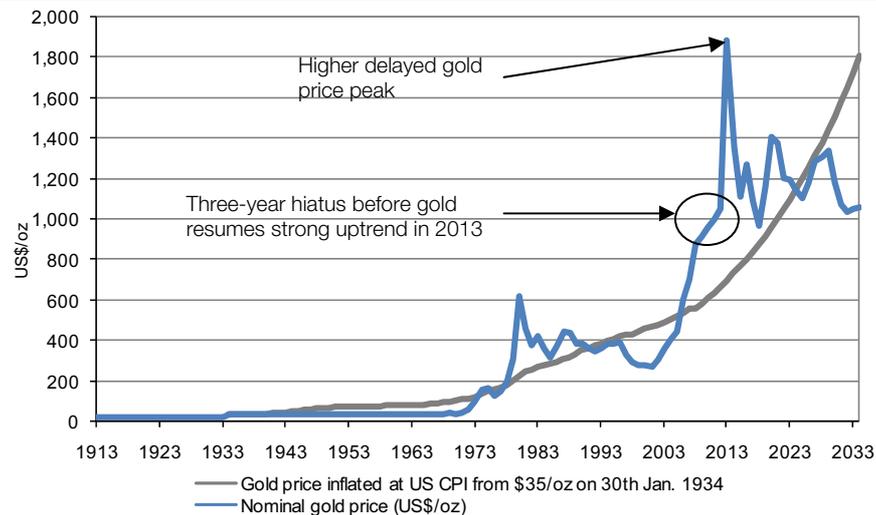
The peak of second phase inflation then occurred three years after its earlier trough (ie in 1979), which correlates closely to Alan Greenspan’s assertion that it takes approximately three and a half years for the effects of quantitative easing to become apparent in inflationary statistics (*Financial*

Times article, 26 June). If 2009 represents the trough in inflation in the current cycle, it is therefore likely that the peak of second phase inflation will be in 2012 and that the gold price will peak one year after that in 2013.

We continue to believe in the medium-term potential of gold to exceed US\$1,500/oz (according to the graph below). However, given the deflationary forces currently being experienced by the world economy we note that there is short-term potential for a hiatus before it resumes its uptrend.

Exhibit 46: Effect of repetition of the 1980-2001 gold price cycle in 2009-2030

Note: Prices are annual averages.



Source: Edison Investment Research, South African Chamber of Mines, US Department of Labor

In particular, we would posit the following milestones for investor perception to switch from a deflationary mindset into an inflationary one (in approximate chronological order):

- 1) Unemployment to improve.
- 2) House prices to stabilise.
- 3) Bank bad debts to fall.
- 4) Bank lending to the real economy to increase.
- 5) Capacity utilisation to increase such that the output gap between the actual and theoretical output of economy closes.

In respect of the last point we would make one final observation. A large part of the reason for monetary over-expansion in the 1970s was the over-estimation of the so-called output gap, which led policymakers to believe that the deflationary headwinds were stronger than they were and encouraged them to continue to pursue expansionist policies for longer than they were appropriate. This gap is notoriously difficult to quantify with accuracy and, with hindsight, it became apparent that the reason for its over-estimation was a consequence of policymakers failing to appreciate the amount of capacity that had been destroyed in the preceding recession.

Of course, it is possible that, this time around, central bankers will behave with perfect judgement with respect to the re-inflation of the global (and particularly the US) economy and withdraw liquidity at such a rate that it causes neither recession, deflation nor inflation. However, history would suggest otherwise, in which case we continue to believe our medium-term thesis of US\$1,879/oz gold and our long-term one of US\$1,177/oz gold.

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