



Annual Hedge Book Review

2003

March 2004



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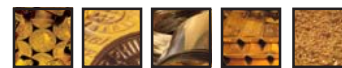
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1. Executive Summary

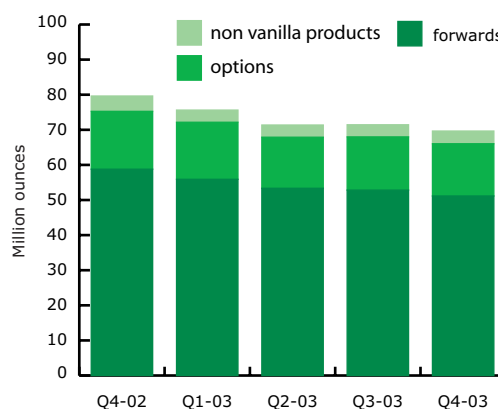
In 2003 the delta-adjusted producer hedge book contracted for its fourth consecutive year, leaving the outstanding position at an estimated 69.65 Moz. The close to 10 Moz decline in the total outstanding producer position fell short of the record 14 Moz drop recorded in 2002.

Producers reduced their hedge cover by a combination of delivering into scheduled positions and buy backs. In addition, hedge books were restructured and simplified. In some cases this was focused on near term contracts as producers scrambled to deliver mine production into the rising spot market. Their hedge contracts, on the other hand, and as evidenced by the deterioration of their marked-to-market valuation, sunk deeper into the red as the year progressed.

The gold price itself saw marked volatility in the first half (providing opportunities, in a rising price environment, for hedge positions to be closed out or restructured on dips in the price).

De-hedging demonstrated clear trends during the year, for instance, in the first half, buy backs were the main feature. Indeed, at the end of June, the global hedge book had already been cut back by some 8.3 Moz, or over 80% of the total decline measured for the year.

Composition of the Delta Adjusted Book



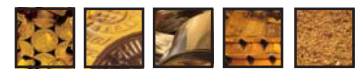
The first half reduction in the hedge book was all the more impressive when measured against the fact that a number of significant new hedges were put in place during the period, notably at Telfer (2.4 Moz), Samira Hill (0.3 Moz) and Amantaytau (0.3 Moz).

In the second half, the September quarter saw a handful of producers restructuring books and whilst buy backs were reported, they were at much reduced levels than the previous quarter. Partially offsetting the decline here, some producers deferred delivery on forward contracts and as a result de-hedging in nominal terms slowed in Q3. Importantly, and unlike previous quarters, the nominal decline was concentrated in the options positions rather than the forward sales.

As the gold price surged towards the end of the third quarter to fix at over US\$388/oz,

Executive Summary

	02.Q4	03.Q1	03.Q2	03.Q3	03.Q4	% Change yoy
Forwards	58.78	55.90	53.34	52.82	51.15	-13%
Options	16.48	16.25	14.55	15.16	14.88	-10%
NonVanilla Products	4.37	3.47	3.48	3.45	3.62	-17%
Total	79.63	75.62	71.37	71.43	69.65	-13%



2. Market Commentary

The gold price averaged \$363.32 in 2003, up 17% on 2002. The first half saw marked volatility and it was during this period (early April) that the low for the year, \$319.90, was posted. The second half saw a fairly relentless rally that took prices to a high of \$416.25, a figure not bettered since February 1990. Volatilities fell slightly in the second half but the annual average was still at its highest level since 1990's 17.6%.

Lease rates fell sharply in 2003, especially in the first half. On this occasion, the difference along the curve was quite limited; the annual average 1-month rate fell 64% year-on-year whereas the 12-month rate dropped 56%.

This seemingly bullish move in the price was largely just in US dollar terms. On the producer side, the rand price fell a hefty 16% year-on-year whilst the Australian dollar price slipped 2%. Prices tended to rise on the consumption side (for example yen, rupee and rupiah prices), reflecting modest appreciation in the relevant currencies. The chief

Gold Prices, 2002-2003			
	2002	2003	change y-o-y Average
US\$/oz	309.68	363.32	17.3%
Rand/kg	104,477	88,006	-15.8%
Euro/kg	10,545	10,327	-2.1%
A\$/oz	569.76	558.32	-2.0%
Yen/g	1,245	1,352	8.6%
Rps/10g	5,131	5,620	9.5%
Rph/g	92,498	100,066	8.2%

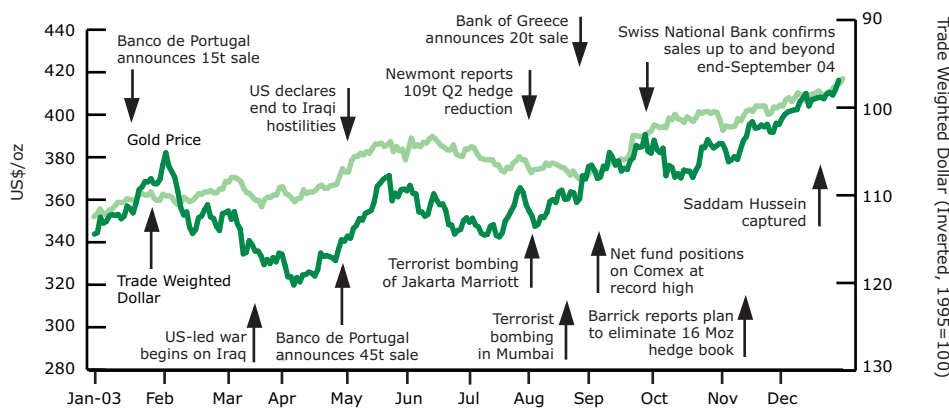
exception was the euro price, which ended 2003 at almost the same level as it had begun the year.

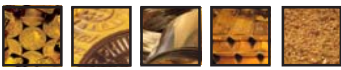
The main driver of the (dollar) price rally, particularly in the second half, was investment. Preliminary estimates for the full year released in GFMS' *Gold Survey Update 2* in January 2004, suggest that World Investment (including implied net investment, bullion coin sales and bar hoarding) reached a level of 28 Moz. The figure accounted for some 21% of global demand last year and represented a net inflow of around US\$10 billion into the metal from investors and speculators, double the value of such fresh demand in 2002.

Attention often focused on the short term,

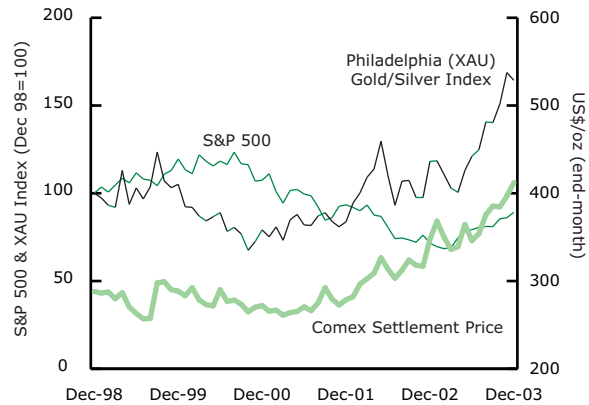
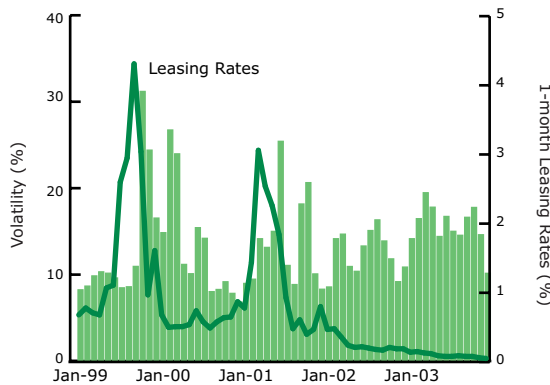
Market Commentary

Gold Price and Trade-Weighted Dollar (inverted), Daily





Daily Gold Price Volatility **Gold and Equity Prices**



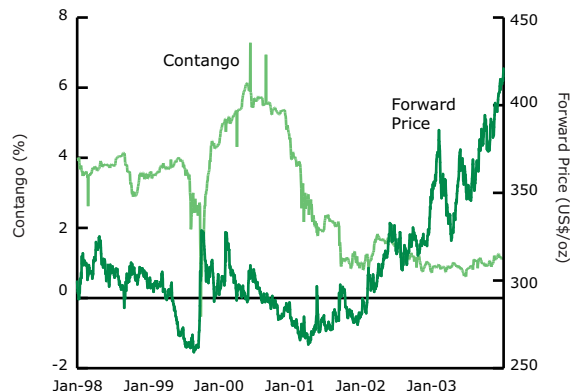
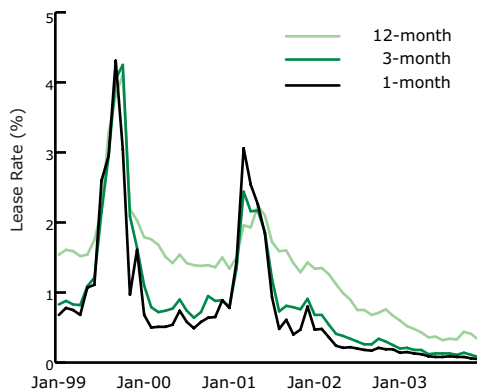
highly speculative players, and not without good reason. The net fund long (using the non-commercial Comex data as a proxy) fell during the first half and the gold price rose just 0.6% intra-period. However, over the second half, their net long rose an equivalent of around 6.4 Moz and the price gained nearly 20%.

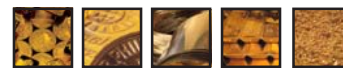
Nevertheless, the spectacular increase in world investment demand could not have occurred without at least some broadening of investor interest. This does indeed seem to have taken place with an increased participation from funds and high net worth private investors.

Another interesting feature of the market last year, and a clear signal that the gold investor base was indeed widening, was the growth in demand from gold investment vehicles other than Comex futures. Exchange-listed warrants and certificates, over-the-counter structured products and new gold-linked securities all attracted much attention in 2003.

Other areas of demand, however, were not so robust. Total fabrication demand in 2003 is estimated to have slipped by 5% year-on-year, a change principally driven by the 7% fall in jewellery demand. Much of the overall drop can be attributed to Italy and East Asia

Leasing Rates (monthly average) **12-Month Contango and Forward Price**





though offtake in the Arab Middle East and the United States also fell noticeably. The decline was attributable to a combination of factors which typically affected all regions but to varying degrees. Higher prices were a major hindrance across Asia, SARS hit East Asia hard, the Iraq war did the same for the Middle East whilst slack consumption and, mainly for Italy, export competition undermined western fabrication.

The global hedge book contracted for the fourth consecutive year, returning close to levels last measured in Q2 1997. Producer de-hedging contributed close to 10 Moz to physical gold demand in 2003, a decline from the previous year of 4 Moz.

On the supply side mine production accounted for 62% of the total, scrap 23%, whilst official sector sales at 14% made up the balance. Concerning primary supply, estimates suggest global mine output posted a narrow 0.3 Moz increase to reach 83.6 Moz. The less than 1% rise year-on-year left global output at its second highest level since records began. A part of the growth can be attributed to higher output in Australia, Peru and China coupled with modest rises in Rus-

Key Market Indicators				
(end period)	2002	2003	Change y-o-y	
Nasdaq Composite	1,336	2,003	50%	
CRB Index	235	255	9%	
XAU Index	77	109	42%	
US 30-yr Bond Yield	4.8%	5.1%	n/a	
Gold Price (US\$/oz)	347.20	416.25	20%	
Contango (3-mth)	1.1%	1.1%	n/a	
US\$ Libor (3-mth)	1.4%	1.2%	n/a	

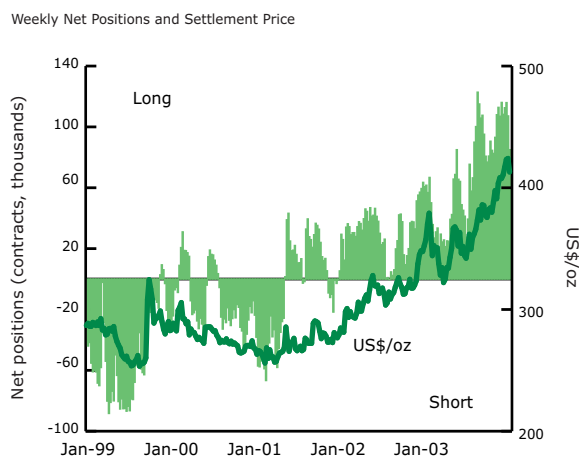
sian and Indonesia. Lower production, on the other hand, was recorded in South Africa, the United States and Canada.

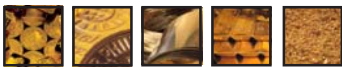
Higher prices drove scrap volumes close to figures last seen at the peak of the Asian economic crisis in 1998. At 30.4 Moz, the total represented a 13% rise on 2002. Indian scrap volumes accounted for 27% of the 3.6 Moz increase year-on-year. There were also higher volumes in East Asia, including Indonesia and Thailand and, to a lesser extent, Malaysia.

Provisional numbers for net official sector sales reported in *Gold Survey Update 2*, were estimated at 19.0 Moz - the highest recorded level since 1992. The year-on-year increase was explained by higher sales from players outside of the Central Bank Gold Agreement (CBGA), which capped sales at around 13 Moz per "CBGA" year (October-to-September). Of particular note were sales from China, whilst there were smaller volumes sold by Canada, Greece, The United Arab Emirates and Macedonia. Mainly as a result of continued low lease rates (largely brought about by the reduction in the producer hedge book), official sector gold lending fell by the order of 5.6-7.2 Moz. Lease rate weakness in 2003 was most marked in the first half.

Market Commentary

Comex/Nymex: Non-commercial Net Positions





3. Composition and Sensitivity of the Global Hedge Book

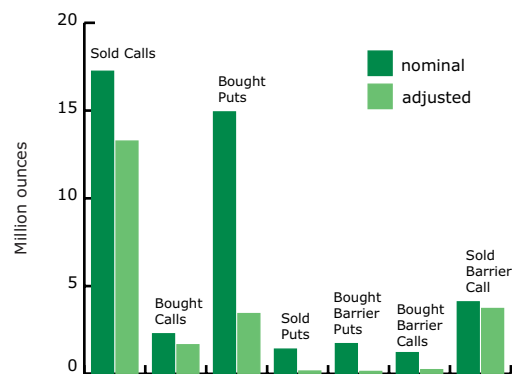
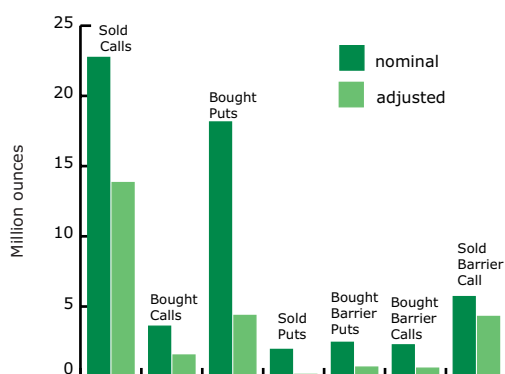
As measured on the 31st December 2003, the hedge book, in nominal terms, consisted of 51.1 Moz of forwards, 28.5 Moz of options and 4.6 Moz of non-vanilla products. Compared to the corresponding period in 2002, the figures represented a decline of close to 8 Moz in forward contracts, a drop of almost 7 Moz in the option position and lastly a more than 1 Moz decrease in the total non-vanilla products category.

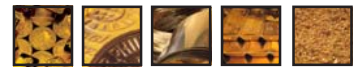
During last year the timing of the decline in each product category was distinct over each of the four quarters. Forwards, for instance, fell off sharply in the first half (over two thirds of the total decline occurred during the first six months of the year), and were little changed in Q3 before returning to higher levels of de-hedging during the three months to December. The options book, meanwhile, saw the sharpest reduction in the second quarter of the year, as nominal positions were scaled back quarter-on-quarter by a substantial 2.5 Moz. Q2 also saw the greatest reduction in the nominal non-vanilla products position, (which essentially consists of barrier options).

On a product specific basis the options book consists of sold calls (48%), bought puts (42%), sold puts (4%) and bought calls (6%). In volume terms, the largest drop was measured in the sold call options, which were reduced by an estimated 5.5 Moz year-on-year. Bought puts decreased by just over 3.2 Moz, whilst bought calls and sold puts declined by 1.3 Moz and 0.5 Moz respectively. The net nominal options book, therefore, was calculated to have declined just short of 7 Moz year-on-year.

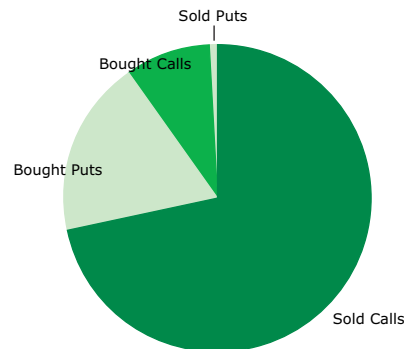
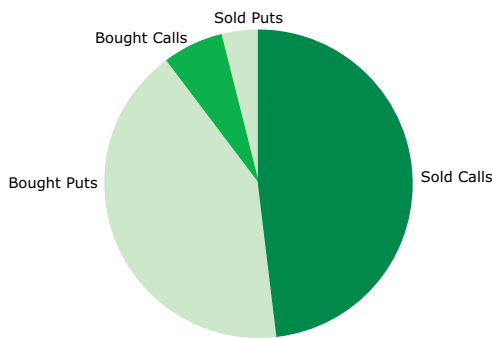
Turning to the non-vanilla products, the book is dominated by sold barrier call options (60%) whilst the balance is composed of bought barrier puts (25%) and bought barrier calls (15%). On a nominal basis, the sold barrier calls measured the biggest year-on-year decline with a drop of an estimated 1.6 Moz. Taking into account further declines in the barrier bought puts and bought calls, the net impact was to leave the non-vanilla products' nominal position some 1.3 Moz lower than in 2002.

Options Hedge Book by Type end-2002 Options Hedge Book by Type end-2003





Nominal Options Book end-2003 **Delta Adjusted Options Book end-2003**



It is important to note that the quarterly or annual changes described above in nominal volumes overstates the physical market impact that these changes actually have. In 2003, for example, the option contracts and non-vanilla products declined in nominal terms by just over 8 Moz. However, on a delta-adjusted basis the year-on-year decline was a combined 2.3 Moz. It is this delta-adjusted position, which is the key parameter of interest in GFMS' analysis. To illustrate the importance of the delta adjustment, the pie charts above show the vanilla options book split by product in both nominal and delta-adjusted terms.

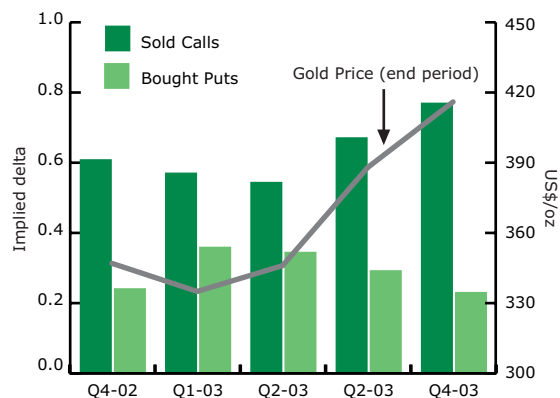
The delta is defined as the rate of change in the value of the derivative for a unit change in the price of the underlying. In the case of a gold forward sale (or purchase), the forward delta is 1. For an option, in contrast, this delta is normally derived from the Black-Scholes option pricing formula (or a variation on this). The GFMS analysis of the gold hedge book uses Brady-Trinity™ software to calculate accurate deltas for contracts which are entered into the system on a trade-by-trade basis.

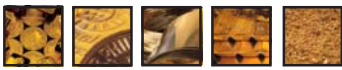
Needless to say, the value of an option, as well as the delta, will change in response to

movements, in particular, the spot gold price, but also market volatility, interest rates and time to expiry. GFMS calculate the delta-adjusted global hedge book at the end of each quarter using market data current at the end of the corresponding period, so any changes in the key parameters outlined above would impact on the value of an option, as well as the delta.

The graph below illustrates this point clearly by charting the end-period gold price and the implied delta against sold calls and bought puts (the two largest constituents of the vanilla options book). The result is clear - as the gold price increases the delta against the sold calls rises whilst that against the purchased put options decreases (*ceteris paribus*). In

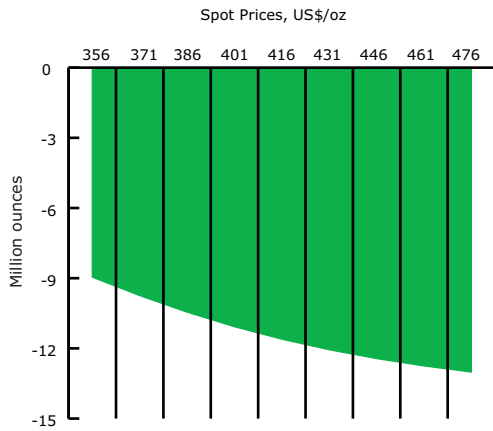
Implied Delta by Contract Type



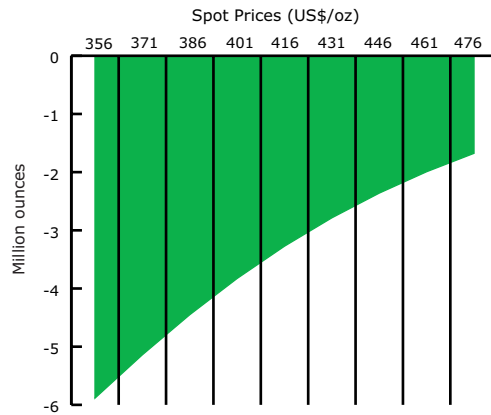


Q4 Options Delta Adjusted Position and the Spot Price

(Net Calls)



(Net Puts)



other words the deltas on these options will move in a diverging manner with the gold price. Considering that the nominal volume of sold calls outnumbers that of purchased puts, the impact of an increase in the gold price would be an increase the delta-adjusted position.

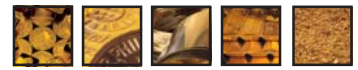
To develop this point further the charts above display the change in the net Q4 options delta-adjusted position (for both calls and puts) and the spot gold price. The graph output has been charted from the producers perspective, so in the case of the net call position, as the spot price increases the delta-adjusted position increases (the miners short position increases). Conversely, the net put position decreases as the spot prices increases (the miners long position decreases).

Whilst sold calls and purchased puts have a positive market impact (taking a position results in the sale by the miner's counterparty (or supply) of physical gold into the market), bought calls and sold puts have a negative impact, in other words they generate physical demand, (see table opposite). From the producers perspective therefore, the net call position is sold calls (- delta) plus bought

calls (+ delta). Similarly, the net put position is bought puts (- delta) plus sold puts (+ delta).

The combined Q4 options delta adjusted position (see chart on page 13), has been charted against changes in the spot price, the responsiveness of which is solely the result of changes in the delta of the options contracts. As mentioned earlier, in nominal volumes, sold calls outnumber purchased puts. As the gold price increases from US\$356 to US\$401, it is the rising delta against the sold calls that is the overriding factor driving the response. As the price rises to \$416/oz, however, the position begins to gradually decline. This is largely a result of the fact that the delta against the sold calls has approached a maximum and the declining delta against the purchased put options becomes the element driving the delta response.

The profile for the non-vanilla options contracts (see chart on page 13) is considerably less regular. As sold barrier calls are the single largest component within the non-vanilla products, it is hardly surprising that from US\$356 to US\$386 the rising delta against these contracts results in an increase in the adjusted position (albeit very sharply). From



there on further increases in spot drives the profile in a very irregular manner. The response is explained by the fact that the non-vanilla options (essentially bought barrier puts and calls and sold barrier calls) are more sensitive to price movements, as price triggers are approached, moved away from or breached.

At the end of the December quarter, the delta adjusted global hedge book was calculated at 69.6 Moz, (representing a close to 10 Moz decrease from the prior year). It consisted of 74% forward sales and gold loans, 21% vanilla options and 5% non-vanilla products. The fact that the book is primarily composed of forward contracts means that the delta hedge book is relatively insensitive to price, volatility and interest rate movements.

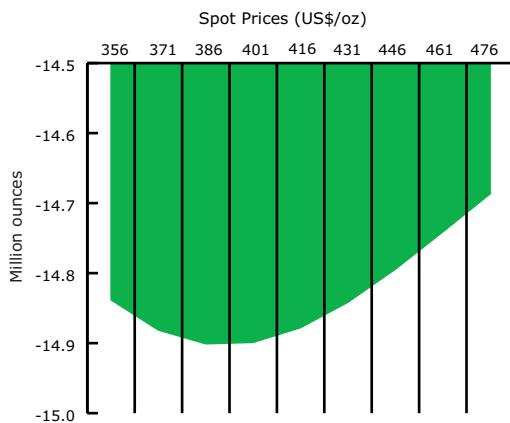
A US\$50/oz decline in the spot price, for example, coupled with a 100 basis point rise in dollar interest rates would only leave the end-Q4 hedge book 1.2 Moz lower, or by just less than 2%, at 68.5 Moz. The effects of a move in Australian dollar interest rates are more pronounced, with the same shift leaving the hedge book down over 2% or by 1.5 Moz from its end-Q4 position at 68.2 Moz.

Product Type and Market Impact		
Instrument	Market Impact	
Sold Calls	+	sale
Bought Calls	-	purchase
Bought Puts	+	sale
Sold Puts	-	purchase
Bought Barrier Puts	+	sale
Bought Barrier Calls	-	purchase
Sold Barrier Call	+	sale

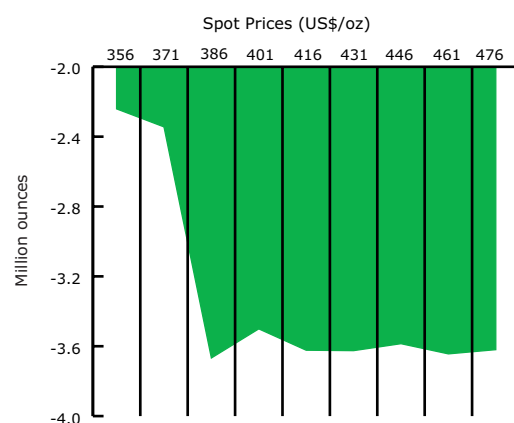
As for volatilities, a \$50/oz increase in the spot price, for instance, in combination with a 10% decline in volatility, leaves the delta-adjusted hedge book some 0.2 Moz lower at 69.4 Moz. For further scenarios the risk matrix (generated within the Brady Trinity™ system) on page 14 illustrates the sensitivity of the Q4 hedge book to the spot price and changes in interest rates and volatilities.

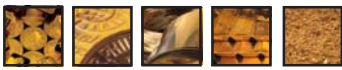
Q4 Options Delta Adjusted Position and the Spot Price

(Vanilla Options)



(Non-vanilla Products)





Sensitivity of Q4 Hedge Book to the Spot Gold Price and USD interest Rates					
Move in Gold Price (\$/oz)					
Move in USD Interest Rates (basis points)	-100	-50	0	50	100
300	67.14	68.89	70.17	69.82	69.51
200	66.90	68.68	70.02	69.73	69.47
100	66.65	68.46	69.84	69.63	69.41
0	66.39	68.22	69.65	69.51	69.33
-100	66.13	67.98	69.44	69.37	69.24
-200	65.88	67.72	69.21	69.20	69.13
-300	65.62	67.47	68.97	69.02	69.00

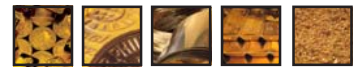
Source: GFMS

Sensitivity of Q4 Hedge Book to the Spot Gold Price and AUD interest Rates					
Move in Gold Price (\$/oz)					
Move in AUD Interest Rates (basis points)	-100	-50	0	50	100
300	65.96	68.08	69.63	69.3	69.14
200	66.10	68.12	69.64	69.36	69.19
100	66.25	68.17	69.64	69.43	69.26
0	66.39	68.22	69.65	69.51	69.33
-100	66.52	68.28	69.66	69.59	69.41
-200	66.65	68.34	69.67	69.67	69.50
-300	66.77	68.40	69.67	69.76	69.59

Source: GFMS

Sensitivity of Q4 Global Hedge Book to the Spot Gold Price and Volatility					
Move in Gold Price (\$/oz)					
Move in Volatility	-100	-50	0	50	100
10%	66.24	68.08	69.49	69.53	69.44
5%	66.30	68.13	69.55	69.52	69.40
0	66.39	68.22	69.65	69.51	69.33
-5%	66.50	68.38	69.84	69.51	69.21
-10%	66.43	68.79	70.35	69.41	68.93

Source: GFMS

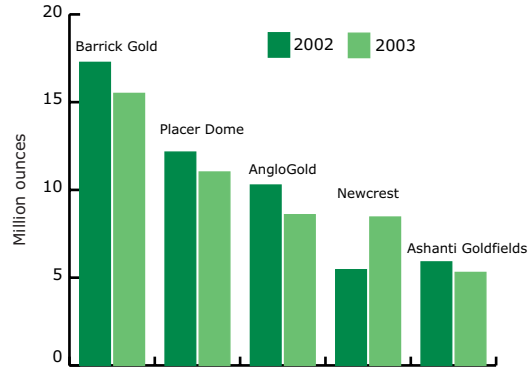


4. Corporate Activity

Producers, in the main, aggressively reduced hedge cover throughout 2003, with an estimated 15.8 Moz scaled back in nominal terms from the global hedge book, representing a delta-adjusted decline just less than 10 Moz. New hedging, in part the result of requirements for the financing of development projects, offset a portion of the decline. Indeed, had it not been for the estimated 4.7 Moz added to the producer book in 2003, the delta-adjusted decline would have been just over 15 million ounces, representing a greater fall than the 14 million ounces cut from the delta book in the prior year.

De-hedging in nominal terms slowed as the year progressed. In 2003 Q1 the nominal hedge book fell by almost 5 Moz quarter-on-quarter, in Q2 by 4.2 Moz, in Q3 by 3.6 Moz and lastly in Q4 by just short of 3 Moz. To some extent this simply reflected the timing of the hedging/de-hedging events throughout the year. However, it was the case in 2003 that the major buybacks and book restructuring were completed during the first

Top 5 Delta-Adjusted Hedge Books



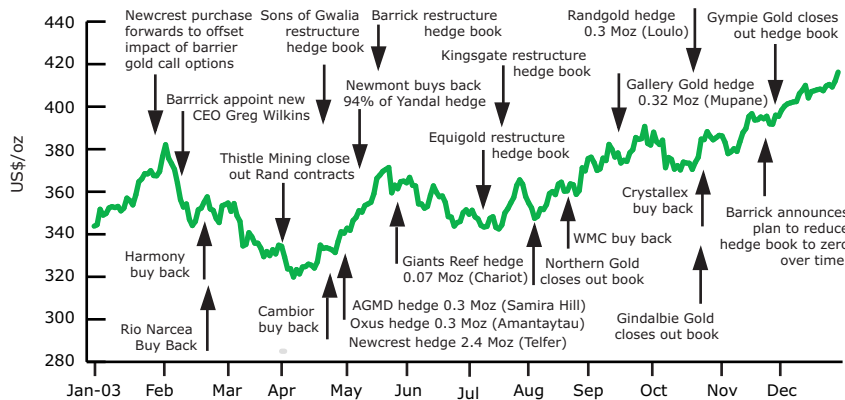
Top 10 de-hedgers (delta-adjusted)

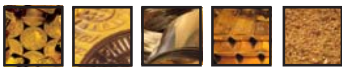
rank	company	% of total decline
1	Newmont	26%
2	AngloGold	18%
3	Barrick Gold	18%
4	Placer Dome	11%
5	Sons of Gwalia	11%
6	Harmony Gold	8%
7	Ashanti Goldfields	6%
8	WMC	6%
9	Cambior	5%
10	Equigold	3%

Corporate Activity

Daily Gold Price and Major Hedging Events 2003

Major Hedging Events and Gold Price





Top 15 Delta Adjusted Hedge Books

Change yoy by product (Moz)

Rank		Company	forwards	options	non vanilla	Total	Total delta	yoy change
2003	2002							
1	1	Barrick Gold	-0.44	-1.33	-	-1.77	15.50	-10%
2	2	Placer Dome	-1.44	0.43	-0.12	-1.13	11.02	-9%
3	3	AngloGold	-1.75	0.06	-	-1.69	8.59	-16%
4	6	Newcrest	2.58	-0.00	0.42	3.00	8.46	55%
5	4	Ashanti Goldfields	0.15	-0.75	-	-0.61	5.30	-10%
6	7	Sons of Gwalia	-1.06	0.08	-0.13	-1.12	2.12	-34%
7	8	Lihir Gold	-0.15	0.01	-	-0.14	2.00	-7%
8	5	Newmont	-2.97	0.42	-0.02	-2.57	1.82	-59%
9	10	Western Areas	-	-0.07	-	-0.07	1.46	-5%
10	15	Xstrata*	0.24	0.07	0.13	0.44	1.37	47%
11	9	Buenaventura	0.17	0.14	-0.62	-0.32	1.37	-19%
12	12	GRD	-0.23	-0.02	-	-0.26	1.02	-20%
13	14	Thistle Mining	0.55	-0.14	-0.56	-0.15	0.87	-15%
14	11	Harmony Gold	-0.55	-0.22	-	-0.76	0.76	-50%
15	13	Cambior	-0.54	0.01	-	-0.52	0.69	-43%

*2002 rank based on MIM Holdings Q4-end hedge position

Corporate Activity

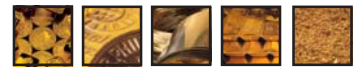
half of the year. In the second half, the gold price rallied strongly. Some contracts were deferred as producers delivered mine production into the higher spot prices, whilst buying back positions became more expensive as the marked-to-market against the open positions soared. This coupled with fresh project hedging contributed to the reduction in the pace of de-hedging.

De-hedging in delta adjusted terms followed a different pattern. As described in more detail in Chapter Three, the value and delta of an option will vary with respect to the gold price (amongst others parameters). As the end period valuation of the gold price fluctuated throughout the year, so too did the delta against the options book. The implied delta against the open option positions (both vanilla and non-vanilla) at the end of December 2002 was calculated at 0.49 (valuation price US\$347). It rose modestly at end-Q1 (US\$335), fell back to its prior level at end-Q2 (US\$346) and then rose again at

end-Q3 (US\$388). Lastly, the implied delta calculated at end-Q4 (US\$416) was 0.56. In other words, a part of the nominal decline in the options book year-on-year was offset by the higher delta. As regards de-hedging, the delta-adjusted book declined by roughly 4 Moz in Q1 quarter-on-quarter, by 4.3 Moz in Q2, actually rose by 63,000 oz in Q3 and lastly dropped by 1.8 Moz in Q4 quarter-on-quarter.

Delta Adjusted Hedge Position by Country

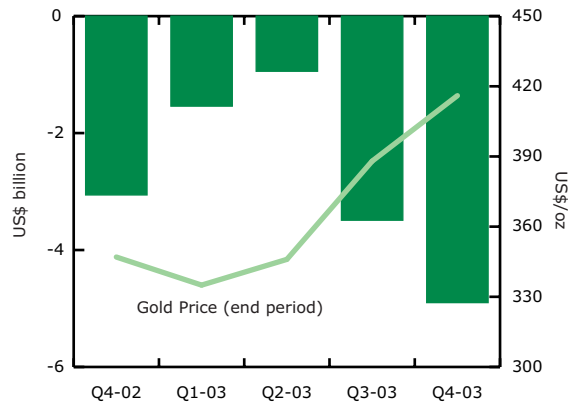
country	end-2002	end-2003	Change yoy
Canada	34.9	31.0	-11%
Australia	14.0	15.9	13%
South Africa	14.2	11.3	-21%
Ghana	6.2	5.6	-10%
United States	4.6	1.9	-59%
Peru	1.7	1.4	-19%
New Zealand	1.3	1.0	-20%
Brazil	0.4	0.4	2%
Mexico	0.6	0.4	-31%



An important part of the total reduction in the hedge book in 2003 was the result of producers buying back positions. Some of the largest transactions were completed by, amongst others, Newmont, Harmony, Sons of Gwalia, WMC and Cambior. The former accounted for a remarkable 26% of the total reduction in the delta-adjusted hedge book. Newmont inherited the Australian based Normandy hedge book following the successful three-way merger with Franco Nevada, which was finalized in February 2002. Since then the group has been aggressively reducing the book.

In the first quarter the company stated that it had delivered or closed out 0.5 Moz and repurchased close to 1 Moz of contracts. During Q2, meanwhile, the majority of the Yandal gold hedge book was bought back. Yandal (which consists of Bronzewing, Jundee and Wiluna) was placed into voluntary administration following the refusal of one of the counterparties to Newmont's tender to purchase the mines' entire hedge position. In later news, Newmont secured ownership of the assets and subsequently completed the sale of Wiluna to a group of management led investors on December 4th 2003, whilst

Marked-to Market Gold Hedge Books

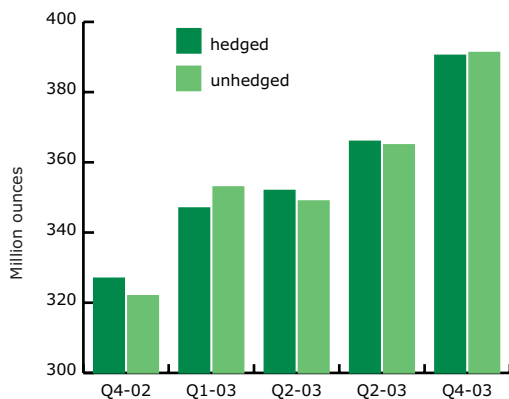


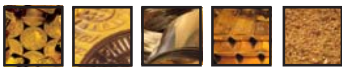
the Bronzewing mine was scheduled to close in March 2004.

The intensive period of merger and acquisition activity in 2002, which resulted in a number of large hedge books falling under the management of non-hedgers, was no doubt one of the key factors behind the high levels of de-hedging witnessed in 2003. Newmont's close out of the Normandy hedge (described above) was one of the biggest transactions of this kind but deals involving Harmony and WMC also contributed to the overall decline.

Harmony for example, picked up Australian based Hill 50's hedge book in June 2002, whilst WMC retained its hedge book in a deal which saw Gold Fields buy the company's gold mining arm (WMC still produces roughly 80,000 ounces per year of by-product gold from its Olympic Dam operation). In both instances the miners have been unwinding positions (in the case of the former to bring the book in line with its no hedge philosophy, whilst for the latter this was to bring the book in line with its hedging limits). In 2003, the drop in their respective adjusted hedge positions accounted for 8% and 6% of the total year-on-year decline.

Realised Prices Hedged-Unhedged





In broad terms, buy backs triggered as the result of mergers and acquisitions accounted for around a third of the total decline in the delta-adjusted global hedge book in 2003.

Book restructuring was also an important part of producer corporate activity during 2003, and there was one recurring theme - to simplify positions. Barrick, for example, simplified its hedge book in the second quarter by converting its "variable price sales and option contracts" (essentially sold calls) into forward sales. This move, coupled with a further 0.6 Moz reduction in Q4, left the overall adjusted position some 1.8 Moz lower year-on-year, representing some 18% of the total decline in the global adjusted hedge book.

Ashanti also made significant changes to its hedge book during the course of the year. The complexity in the original structure of the hedge book had been revealed in the worst possible way during the hedging crisis initiated by the spike in leasing rates and prices following the Central Bank Gold Agreement in September 1999.

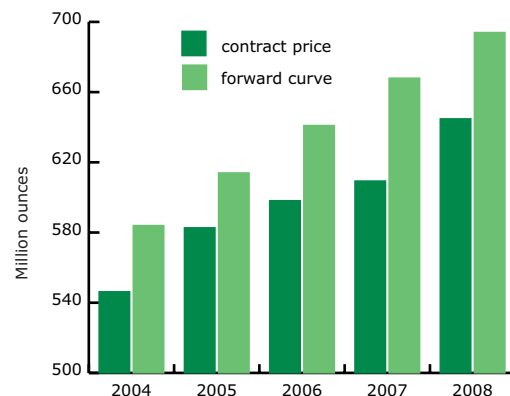
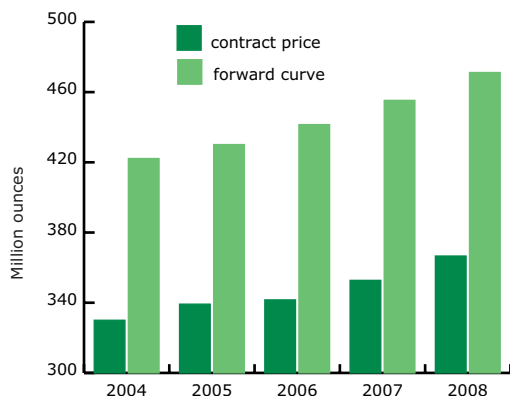
Concerning the details of the restructure, the Ghanaian based miner reduced the absolute volume of bought call option contracts and

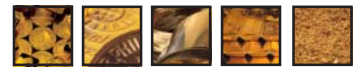
in addition, converted a part of its options contracts into forward sales. During 2003, and as a result of restructure and scheduled contract delivery, Ashanti reduced its delta-adjusted position by 0.6 Moz, representing 6% of the total measured global decline.

The owners of the world's second and third largest delta-adjusted hedge books, namely, Placer Dome and AngloGold, also reported noteworthy reductions in hedge cover. In both instances, the bulk of the reductions were concentrated in forwards. In AngloGold's case, in fact, 97% of the delta-adjusted year-on-year decline in its hedge book was attributable to the reduction in forward sales contracts (largely achieved as the result of scheduled delivery into positions). As for the options position, on a nominal basis, the net call position declined by close to 0.5 Moz. However, the higher valuation price (US\$347 at end-Q4 2002 against US\$416 end Q4 2003) left the adjusted net call position only 90,000 ounces lower than the corresponding period in 2002 (the rising delta against the sold call driving the response of the Q4 net call delta adjusted position).

Despite the integration of East Africa Gold Mine's 0.85 Moz hedge book, which Placer

Average Contract Price US\$ Average Contract Price A\$





Dome acquired in July 2003, the Vancouver based miner reported a noteworthy 1.4 Moz reduction in its forward sale commitments. The decline here, however, was partially offset by an increase in its options book. Net puts increased on a delta-adjusted basis by 0.14 Moz, whilst net calls were some 0.3 Moz higher year-on-year. The increase in the net put position was primarily a result of the addition of a volume of purchased puts.

The ongoing de-hedging and book restructuring designed to simplify hedge positions appeared to have already impacted the make-up of the global hedge book in 2003. The forward's share of the total book increased from 59%, as measured at end-2002, to 61% at end-2003. Vanilla options' share, meanwhile, was scaled back from 35% to 34%, whilst non-vanilla products were cut back from 6% to 5% of the global hedge book (in nominal terms). In addition to the restructuring that impacted on the make up of the global book, fresh hedging (mainly in the form of project specific hedges) tended to be simple forward contracts rather than option strategies, and this further contributed to the growth of the forward contracts overall share.

New hedging, as mentioned earlier, is estimated to have amounted to roughly 4.7 Moz on an adjusted basis. The largest hedge put in place last year was Australian based Newcrest's Mining 2.4 Moz hedge (see table above), which was part of the financing requirements for the 0.8 Moz per year Telfer project. The mine is expected to be commissioned in Q3 of this year and will reach full capacity in 2005.

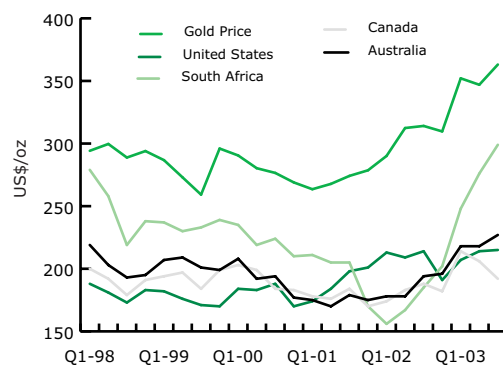
Elsewhere, a number of hedges for gold projects in Africa were put in place. In Niger, 0.3 Moz of forward sales (representing 49%

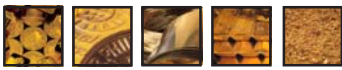
Project Hedging		
Company	Project	Moz
Newcrest	Telfer	2.41
Gallery Gold	Mupane	0.32
AGMD	Samira Hill	0.30
Randgold	Loulo	0.30
Oxus Gold	Amantyttau	0.26

of current reserves) was hedged against the Samira Hill project. African Gamin Mining Development (AGMD) holds an 80% stake in the project (a 50% joint venture between Semafo and Etruscan Resources) with the government of Niger holding the remaining 20%. In turn Morocco's ONA/Managem is the majority owner of Semafo. In neighbouring Mali, Randgold Resources' Loulo project was given the green light for development and attached to this project there was a further 0.3 Moz of hedging completed.

Australian-listed Gallery Gold, meanwhile, announced that it had hedged a portion of expected future output from its Mupane gold project in north-east Botswana. In all, the junior sold forward just over 0.32 Moz of gold. Earlier in 2003, London-based Oxus Gold committed a portion of future production from its Amantaytau operation in Uzbekistan. The mine made its first pour in January 2004 and

Western World Mines' Cash Costs





is expected to produce roughly 0.2 Moz in the current year.

New hedging in the current price environment, (and in spite of the low contango), offered producers the opportunity to lock in prices at levels considerably higher than those fixed during the hedging boom in the late 1990s. This is illustrated by the graphs on page 18 that charts the weighted average forward contract price against the forward price as at end-Q4.

While most of the attention is focused on commodity hedging, currency risk can also be part mitigated by hedging. The logic behind currency hedging is that although gold is sold in US dollars, operations are often located outside of the United States. A certain proportion of costs, therefore, are payable in the domestic currency that the operation is domiciled (labour costs being the most obvious, but could also include purchased materials and supplies).

Producers are thus exposed to fluctuations in the exchange rate between these foreign currencies and the US dollar. Generally, results are positively affected when the US dollar strengthens against these currencies and adversely affected when the US dollar weakens against these foreign currencies. Hence, a number of producers hedge operational currency exposure to lock in an exchange rate or to minimise the impact of adverse exchange rate changes.

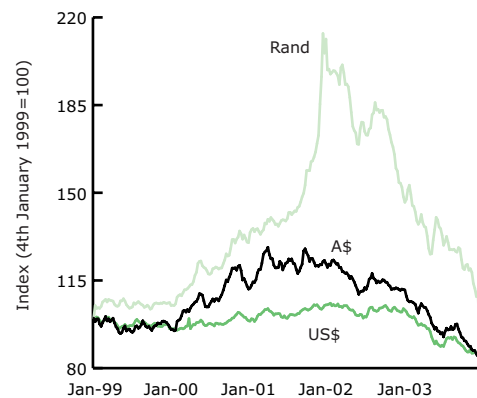
The effect of sharp changes in currency valuations on cash costs was illustrated most noticeably by moves in the rand against the dollar, although changes in the Australian and Canadian dollar were also an issue for many producers during 2003. In South Africa for example, and despite the rise in the dollar

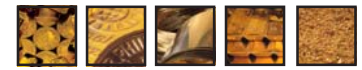
End-Q4 Producer Currency Books			
(delta-adjusted currency books in US\$ billions)			
	Forwards	Options	Total
Barrick	1.83	0.03	1.86
Cameco	0.46	-	0.46
Sons Of Gwalia	0.33	0.08	0.41
Gold Fields	0.23	0.11	0.34
AngloGold	0.06	0.04	0.10

gold price, the sharp increase in US dollar denominated cash costs resulted in an erosion of the cash margin.

It is probably worth mentioning that the population of producers hedging currency exposure is far smaller than that for gold. For example, roughly 28% of planned mine production in 2004 (Western World costed output accounting for approximately 70% of total Western World gold production) is covered by gold hedges. In contrast, only 12% of estimated cash costs (for the same group of producers) is protected by currency hedges. It is however, necessary to add a caveat to the above statement. Specifically, while every attempt has been made to be fully inclusive, the quality of currency hedge reporting is not as high as for commodity hedging. Nevertheless, it is thought

Producer Countries Currencies



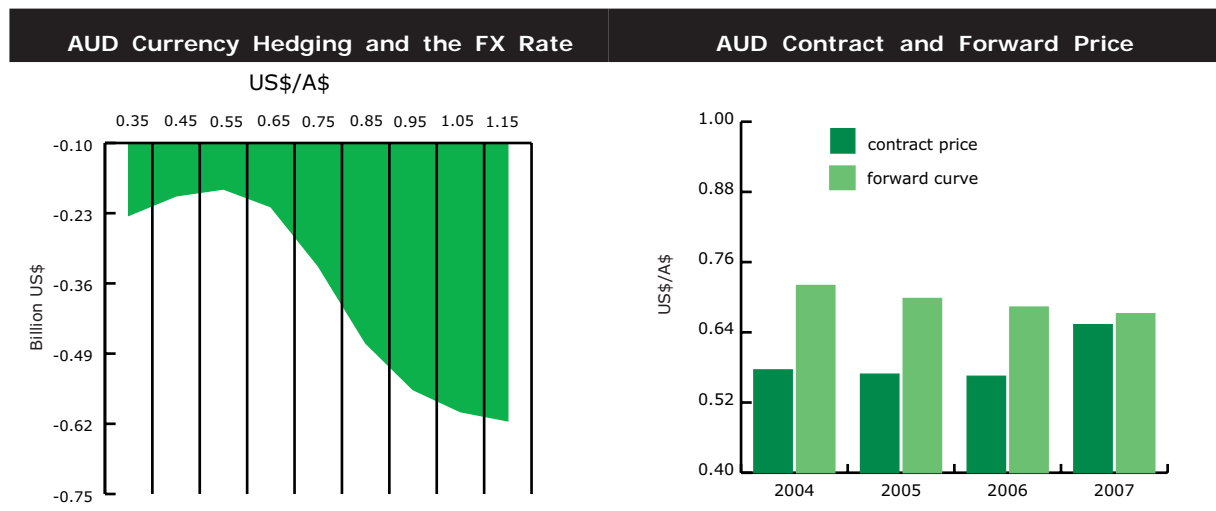


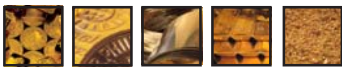
that the currency book estimate captures the majority of hedged positions.

At the end of December 2003 the delta-adjusted currency hedge book was calculated at US\$3.29 billion and was composed of 90% forwards and 10% net option positions. Concerning currencies, the forward book consisted of 55% Australian dollar, 43% Canadian dollar and 2% South African rand denominated contracts. Australian currency hedges, mainly in the form of bought puts, dominated the vanilla options book, accounting for 89% of the total position (in nominal terms), whilst rand contracts made up the balance. Non-vanilla products consisted entirely of Australian denominated barrier options (chiefly sold barrier puts and calls).

Two thirds of the forward sales are concentrated in the near years with the balance due for delivery in 2006 onwards. As regards contract price, the weighted average exchange rate written against the Australian forwards was calculated at US\$/AU\$ 0.59 (compared to the end Q4 rate of 0.75), whilst the average rate for Canadian denominated sales were US\$/CAN\$ 0.69 (end-Q4 0.76).

In nominal terms bought puts outnumbered sold calls by just over two to one. The delta against these vanilla products at end-Q4 was calculated at 0.44 and 0.11 respectively. As discussed at length in Chapter Three changes in the underlying (in this case the exchange rate) will clearly have an impact on the delta-adjusted volume. The Australian vanilla options currency hedge book clearly illustrates this (see graph below). As the local dollar appreciates, the delta adjusted position increases (the rising delta against the purchased puts drives the response, whilst that against the sold calls falls). In other words, the puts move into, or deeper into, the money while the sold call options move out, or further out, of the money.





5. Outlook

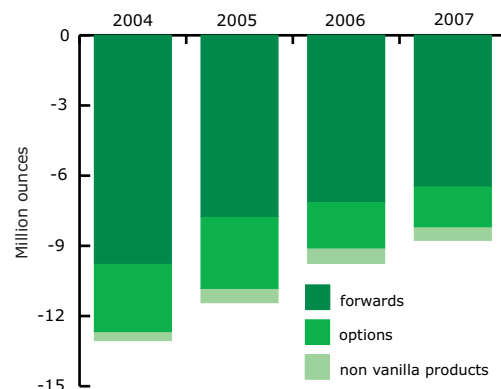
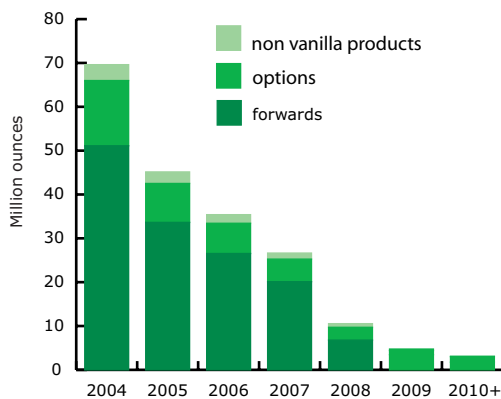
The path that the gold price traces out over the next few quarters could, to some extent, impact the pace that producers reduce their hedge cover. Dips in the price, for example, could encourage producer buy backs, while a surge in the price could, in some cases, see producers applying a “stop loss” policy to hedge positions. On the other hand, price spikes could see some miners add further cover, most likely in the form of protective puts (although the delta-adjusted impact on the hedge book would more than likely be minimal).

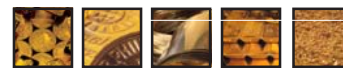
An additional factor that must be considered in estimating the scale of de-hedging over the next couple of years is fresh hedging put in place for new projects. During 2003, project specific hedging offset global de-hedging on a delta-adjusted basis by roughly 3.5 Moz. (Contract deferral and additional hedging by a handful of producers added a further estimated 1.2 Moz to the delta-adjusted book). If prices are sustained above \$350/oz (as the GFMS base case price forecast suggests) there will be considerable scope to bring on stream both stalled and new gold projects

alike. Notwithstanding the high activity on the equity markets, small to medium sized capitalised producers (to avoid high shareholder dilution) will require debt finance. Banks financing these projects will, in turn, look for limited hedge cover as a part of the funding requirements (lenders typically recommend a minimum hedge representing around 25% of the project’s reserve position).

Having said that, due to the lag between exploration and production, the relatively recent improvement in the gold price is unlikely to result in an immediate surge in project start-ups (and hence new hedging). Indeed, estimates suggest that projects already timetabled for development, and that would require some form of hedging, are only expected to add between 1 Moz to 2 Moz per year to mine supply by 2006. As a guide, the hedging put in place against these projects could potentially generate 3 Moz of fresh hedging, or around 2 Moz in 2004 and 1 Moz in 2005. (Assuming an average life of mine of six years, producing 2 Moz per year with a 25% hedge cover against reserves).

Delivery Profile Delta Adjusted end-2003 **Net Impact end-2003**





A further point worth making is that new project hedging levels are likely to be lower than those reported in 2003. After all, a large component of project hedging last year was the position put in place against the Telfer mine. In the near term, the larger mines timetabled for development by amongst others, Newmont, Barrick and Placer Dome, are not likely to be hedged to the same degree as Telfer, if at all! (These majors, after all, have made commitments to reducing hedge cover or to remove it completely).

Industry consolidation was highlighted in Chapter Four as one of the key factors in the high levels of de-hedging witnessed in 2003 and in the current year it could also impact de-hedging levels. Of particular interest is the outcome of the planned merger between AngloGold and Ashanti Goldfields.

Concerning the details of the transaction, the integrated delta-adjusted hedge book of the merged entity, AngloGold Ashanti Limited, as measured at end-Q4, was 13.9 Moz, or 20% of the global adjusted position. AngloGold has already stated its intention to bring the combined hedge cover in line with its own policy of hedging a maximum of 30% of the next five years output. At current production levels this would suggest a target hedge level for the combined entity at around 11 Moz, or some 3.1 Moz lower than the end-Q4 delta adjusted position. The rate at which Anglo unwind this "excess" hedge cover could be an important factor in the scale of de-hedging in 2004.

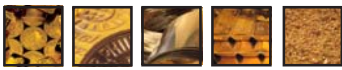
Despite the rising cost of buying back positions further closeouts are anticipated during 2004. Barrick Gold, for example, (which reduced its delta-adjusted book by 1.8 Moz yoy to reach 15.5 Moz at end-Q4) announced in November that hedging was no longer nec-

essary for the company and that it intended to reduce its position to zero over time.

Harmony Gold, meanwhile, announced at the end of January 2004, that it had further restructured the Australian hedge books (inherited with the acquisition of New Hampton and Hill 50). In nominal terms a total of 0.37 Moz (around 0.3 Moz in delta-adjusted terms), being a combination of forward sales and sold call options, were closed out. Later, Peruvian based producer and Newmont's partner at the country's giant Yanacocha mine, Buenaventura, reported that in an effort to de-hedge its gold production, in January 2004 it had purchased 0.12 Moz of committed gold. In addition, the company restructured the book by converting two thirds of its position from derivatives into simple forward sales.

The delivery schedule of the delta-adjusted hedge book as calculated at the end of December 2003 is charted in the figure opposite. This shows that if all forwards and loans are delivered into as dated, and options are either exercised or expire, the adjusted hedge book by 2007 would total roughly 35 Moz, or levels last reported in 1992. Another way of representing the data is to show the potential net impact on the physical market as the global book contracts. The second chart shows the annual impact over the next four years with 13 Moz of de-hedging in 2004, 11.4 Moz in 2005, reducing to 9.7 Moz and 8.8 Moz in the later years.

Taking into account the issues highlighted above a base case figure for de-hedging in 2004 would be between 11 Moz and 13 Moz.



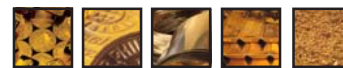
6. Appendix

Top 10 Producer Hedge Books (as reported end-2003)

Company	Forwards	Spot Deferred	Loans	Calls Sold	Bought Puts	Bought Calls	Sold Puts	Sold Barrier Calls	Bought Barrier Calls
Barrick Amount (Moz)	15.50	-	-	-	-	-	-	-	-
Placer Dome* Amount (Moz)	8.46	-	-	1.46	3.61	-	0.54	0.74	-
AngloGold Amount (Moz)	5.81	-	-	4.76	0.66	1.01	0.85	-	-
Newcrest** Amount (Moz)	3.79	0.57	0.58	0.06	3.38	-	-	2.63	-
Ashanti Amount (Moz)	4.44	-	-	1.67	-	0.35	-	-	-
Sons of Gwalia Amount (Moz)	0.88	-	-	0.51	2.11	-	0.02	0.37	0.22
Lihir Gold Amount (Moz)	1.74	-	-	0.27	0.29	-	-	-	-
Newmont Amount (Moz)	-	-	-	2.35	0.53	-	-	-	-
Western Areas Amount (Moz)	-	-	-	2.41	2.18	0.91	-	-	-
Xstrata Amount (Moz)	1.16	-	-	0.05	0.14	-	-	0.09	-

* Contingent call options purchased not included in the summary total 0.2 Moz
 * Forward contracts purchased not included above total 0.2 Moz
 ** Forward contracts purchased not included above total 0.16 Moz

Appendix



Technical Annex

GFMS has carried out a rigorous analysis of 93 mining companies' hedge positions. These companies incorporate the vast majority of those enterprises that carry out some type of hedging activity.

The GFMS analysis utilises the Brady Trinity™ Risk Management and Trading system. Each mining company's individual trades have been input into the Brady Trinity system.

The use of the Brady Trinity system is particularly relevant for the analysis of mining companies' options positions. We have entered each option trade by mid-year of expiry. Moreover, non-vanilla products such as convertible forwards have been broken down into their constituent options. This analysis enables us to accurately obtain key parameters and valuations for each instrument used by each company and subsequently for the global hedge book as a whole. This methodology also allows us to model the delivery profile of the hedge book.

All forward contracts, including spot deferred, floating rate forwards and fixed rate forwards, are input as forward sales. Options contracts, including cap and floor agreements, are entered as their constituent vanilla put and call contracts. Convertible and contingent options are unbundled into their constituent barrier options contracts. Trigger levels for barrier options are taken as the mid-point of published ranges, where available. Convertible forward contracts are modelled as a barrier call option combined with a vanilla put option.

In terms of the GFMS analysis, the key parameter of interest is the **delta**-adjusted position. As explained in the glossary, the delta of an option (or indeed of a forward) is the rate of change in the value of the derivative for a change in the price of the underlying. In the case of a gold forward sale (or purchase), the forward delta is 1, whilst in the case of an option, this delta is derived from the Black-Scholes option pricing formula.

The counterparties to mining companies' hedging activity (typically banks) will dynamically hedge their exposure through delta hedging. For example, suppose a mining company purchases a put option. The writer of the option (a bank) will be long the delta volume. In other words, if the delta of the option is +0.5 and the nominal volume of the trade is 100,000 ounces, the delta volume will be 50,000 ounces (of which the bank will be long). To hedge this exposure, the bank must therefore undertake a transaction that yields an equal and opposite position (i.e. short). This will typically be achieved by the bank borrowing gold (normally from a central bank) and selling this into the spot market. Through this mechanism, mining companies' hedging activities impact directly on the spot gold market.

It should be borne in mind that the value of an option, as well as the delta, will change in response to movements in key parameters, particularly the spot gold price, but also market volatility, interest rates and time to expiry. In response to this, banks will continuously or dynamically adjust their delta hedge position.

Glossary

Option - An option contract gives the holder the right, but not the obligation, to buy or sell gold at a predetermined price on or by an agreed date.

European Option - An option that can only be exercised at the expiry date.

American Option - An option that can be exercised at any time prior to the expiry date.

Put Option - An option contract which gives the buyer the right, but not the obligation, to sell a specified amount of gold (or other asset) at a predetermined price (the strike price) on or before a specified date (expiry date).

Call Option - An option contract which gives the buyer the right but not the obligation to buy a specified amount of gold (or other asset) at a predetermined price on or before the expiry date.

Barrier Option - An option whose outcome depends on the performance of the price of the underlying during the life of the option and whether that price breaches a predetermined barrier.

Forward - A transaction in which two parties agree to the purchase and sale of gold at a future date.

Gold Lease Rate - The cost of borrowing or return from lending gold, the daily level of which reflects the supply and demand for metal in the lending market.

Writer - The writer or grantor is the party who sells the option and receives that premium income.

Long - A position in an asset (e.g. gold) for which the value will rise should the price of that asset rise.

Short - A position in an asset (e.g. gold) for which the value will fall should the price of that asset rise.

Delta - The rate of change of the price of a derivative with the price of the underlying asset.

Gamma - The rate of change of delta with respect to the asset price.

Theta - The rate of change of the price of a derivative with the passage of time.

Vega - The rate of change of the price of a derivative with volatility.

Rho - The rate of change of the price of a derivative with the interest rate.

Greeks - The basket term for the above hedge parameters (delta, theta, vega, gamma, rho).

Underlying - Shortened term for the underlying commodity on which forwards and options are traded (i.e. in this case gold).

Delta Hedging - A hedging scheme that is designed to make the value of a derivatives portfolio insensitive to small changes in the price of the underlying.

Black-Scholes Model - A model for pricing European options. Developed by Fischer Black, Myron Scholes and Robert Merton. See F. Black and M. Scholes "The Pricing of Options and Corporate Liabilities" *Journal of Political Economy* 81, 1973 and R.C. Merton "Theory of Rational Pricing" *Bell Journal of Economics and Management Science* 4, 1973.

Vanilla/Non-Vanilla - Vanilla options are simple put and call options, whilst non-vanilla options are more complex, with pay-offs dependant on a variety of market factors, such as price paths or the price of alternative assets.

Volatility - A measure of the uncertainty or rate of change of an asset price.

About Investec

Investec is an international, specialist banking group that provides a diverse range of financial products and services to a niche client base, primarily in the United Kingdom and South Africa, as well as other countries including Australia, the United States and Israel. Investec has four principal business divisions, namely Treasury and Specialised Finance, Investment Banking, Private Client Activities and Asset Management.

Investec Commodities trades in precious and base metals and provides hedging and structured trades for clients in both the physical and derivatives markets. Based in both the UK and South Africa, they are members of the London Metals Exchange, the London Bullion Market Association and the London Platinum and Palladium Market. They also operate an energy business focussing on structured transactions.

About GFMS

GFMS Ltd the world's foremost precious metals consultancy, specialising in research into the global gold, silver, platinum and palladium markets. GFMS is based in London, UK, but has representation in Australia, India and Russia, and a vast range of contacts and associates across the world.

GFMS Ltd is credited with producing the most authoritative surveys of the gold and silver markets, the annual Gold Survey and World Silver Survey, and produces a range of other publications dealing with all aspects of the precious metals markets. GFMS also provides consultancy services in the form of tailor-made research into selected areas of the precious metals markets. GFMS' research team of eight full-time analysts comprise qualified and experienced economists and a geologist. On the 6th May, the group will release its first Platinum and Palladium Survey.

About Brady Trinity™

Brady is a software solutions provider, delivering systems solutions to an international client base of banks and trading organisations. With teams of professionals in the UK, Italy and South Africa, and equity backing from Surecomp International, the company develops and supports its principal product called Trinity. The company's software development is located at its headquarters on the acclaimed Cambridge Science Park in the UK.



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