Gold Derivatives:

The market view

August 2000

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WORLD GOLD COUNCIL

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FOREWORD

The rapid growth of gold derivatives over the past 15 years has transformed the gold market. It has brought to market participants both new opportunities and new risks. As with all derivative markets, its complexity, the rapid pace of innovation and the chain of transactions typically triggered by one initial operation have made it difficult to measure or assess the market. In addition the gold derivatives market has differed from that of other commodities due to the existence of massive above-ground stocks. This has made the gold market both operate in a different fashion from those relating to other commodities and become considerably more extensive. These differences have also hindered understanding of the market, of the way it operates and of its interaction with the physical market.

A further problem in assessing the derivatives market has been the variable quality of the underlying data on gold holdings and gold movements. While the operations of certain participants are relatively well tracked, information about others can be limited or completely absent.

In the absence of firm data, estimates of the size of the derivatives market and speculative positions have varied widely, promoting confusion and hindering the efficient operations of market participants. In 1999 the World Gold Council was therefore requested by its members to sponsor a major research project into gold derivatives in order to try to get a better assessment of the market's size, scope, operation and effect. This publication, by Dr Jessica Cross and her colleagues of Virtual Metals Research and Consulting Ltd - the first results from the project - is the outcome of a major investigation, lasting nearly one year. During that year Dr Cross and her colleagues have examined in depth the gold derivatives activity of central banks, bullion banks, gold mining companies and hedge funds. A substantial programme of interviews, questionnaires, data analysis and detailed study of gold market transactions was implemented to research and report on the paper gold market and the actions and views of the main participants.

The World Gold Council is grateful to Virtual Metals Research and Consulting for the considerable care and effort that has gone into this report. We are pleased to publish it as the most comprehensive and detailed review of the gold derivatives market so far. As such it should be welcomed by all who are interested in the gold market.

Haruko Fukuda
Chief Executive

About the author

Jessica Cross gained a science degree before joining the Anglo American Corporation in Johannesburg in 1980. There she was trained as a commodity analyst covering the base and precious metals. In 1987, she joined Consolidated Gold Fields in London to work primarily on the authoritative annual gold survey but also to complete platinum research. She co-edited the 1989 gold survey before joining the economics department at The RTZ Corporation plc as their gold analyst.

After completing an honours degree, she went on to obtain a doctorate at the University of Nottingham, evaluating the financial derivative products of gold and their influence on the gold price. As a result, she published her first book: *New Frontiers in Gold - The Derivatives Revolution*, Rosendale Press, London.

In 1994 she launched **Crosswords Research and Consulting**, her own consultancy which today continues to research fund activity in commodity markets but focuses also on anticrime work based in South Africa. In November 1997, Jessica launched a second gold consultancy via the Internet called **Virtual Gold**. In November 1998 the consultancy, under the new name of **Virtual Metals,** evolved further to include silver and the platinum group metals.

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EXECUTIVE SUMMARY

This publication reports on major research into gold derivatives carried out from July 1999 to June 2000. An extensive programme of interviews, questionnaires, data analysis and other research was put in place in order to study and report on the paper gold market and the actions and views of the main participants. Key findings include the following:

- The amount of gold in the lending and swaps market (total liquidity) at the end of December 1999 is estimated at 5,230 tonnes, of which 4,710 tonnes came from central banks and other formal official holdings. The remaining 520 tonnes came from undeclared or quasi official holdings or from private sources. The amount of gold lending and swaps has grown rapidly over the past decade, more than doubling every five years. Immediately after the Washington Agreement total liquidity reached a peak of 5,500 tonnes, up from 4,904 tonnes at end June 1999.

- The lent/swapped gold was used as follows:

Use of gold liquidity

Tonnes

	June 1999	December 1999
Producer hedging (net of deltas)	2,812	3,021
Consignment and other inventory	1,135	1,465
Official sector	310	350
Net short position	647	394
Of which:		
Comex positions	254	7
Implied OTC proprietary/ carry trade	393	387
Total	**4,904**	**5,230**

- The mining industry is thus the greatest user of lent gold. Short speculative positions exist but appear to be of lesser size. The growth of derivatives has played its part in price discovery but cannot be isolated as the dominant factor.

- On average, the official sector lends 14% of its declared gold holdings. However the proportion varies substantially from country to country. If the USA, Japan, IMF and major European countries that do not lend are excluded the proportion rises to 25%.

- In general countries not signing or associated with the Washington Agreement

have lent a significantly higher proportion of their holdings than countries within or associated with the Agreement. This implies that there is only a limited quantity of additional official gold for lending available to the market until September 2004. Unless Japan enters the lending market the maximum additional liquidity likely to be available from declared official holdings is 1,000 tonnes. This compares with some 6,000-9,000 tonnes prior to the announcement.

- Hedging has enabled producers to realise higher than spot prices in recent years. However the mining industry is facing a number of derivative-related challenges:

  - the total costs of marginal producers in North America and Australia are not being fully covered by average realised hedge prices. South African producers are faring better but their position may not be sustainable in the longer term;

  - the Washington Agreement has precipitated a review of hedging practices by both mining companies and bullion banks. Well publicised difficulties with two hedge books have prompted a swing away from the more complex products. However since the more complex products have facilitated the achievement of higher realised prices, this could render hedging more expensive;

  - the majority of producers have not been subject to margin calls on their hedging agreements. However the events of September 1999 have caused bullion banks to review the issue with the possibility that additional hedging premiums may be levied on mining companies that are deemed less creditworthy;

  - the sharp decline in exploration expenditure implies that the reserve base is not being replenished. This has implications for existing credit lines and the ability to hedge reserves in the ground;

  - the introduction of the FAS133 accounting system will also influence the choice of hedging products in the future.

- The bullion-banking industry has been subject to extensive restructuring in recent years. This has had a substantial effect on available credit. Banks' trading limits have declined in recent years and are currently collectively likely to total some 2.5-3.5m oz (75 to 110 tonnes) of combined short-term net exposure.

- No evidence was found of any collusive behaviour on the part of market participants to manipulate the price.

A full overview of all the main findings follows. Chapters 1, 2, 3 and 4 look in detail at the lending (and swaps) market, producer hedging, bullion banking and managed funds sector respectively. Chapter 5 describes derivative products. Chapter 6 gives the author's personal view of the advantages and disadvantages of higher lease rates. Appendices present detailed data and other information.

PREAMBLE

It has long been the case that the presence and potential impact of derivatives on the gold market and consequently the price has generated an unprecedented amount of interest. The level of voluntary participation in the preparation of this study on the part of the commercial banks, the mining companies and the official sector bears testimony to the global consensus that it would be in the interests of all to understand better this component of the gold market. It is hoped that this report goes some way to fulfilling that need. But, as Virtual Metals noted in the initial proposal for this study, any detailed research into the derivative phenomenon would probably generate as many questions as it provided answers. This has indeed been the case and consequently, it is acknowledged that further work is warranted.

The derivative market in gold is a particularly dynamic one which requires frequent analysis. Trading patterns and products considered the norm five, or even three, years ago have now been succeeded by new mechanisms and hedging philosophies. This swift evolution is evidence that the derivatives are a natural and thriving concomitant of a free market in gold. Perhaps for this reason alone their presence should be accepted rather than eschewed.

The participants of greatest influence remain without question the central banks, primarily through their lending and the mining companies via their efforts to eliminate price risk and raise revenue. It is inevitable, therefore, that the discussion that follows concentrates on these sectors. This by no means reduced our research efforts with respect to the roles (actual and potential) played by the commercial banks and the hedge funds. We have considered them in detail. To the commercial banks we have ascribed the roles of facilitators, providers of credit, counterparties, product creators and risk takers. With the funds, we have associated trend following, leverage, carry trade, aggressive short positions and, in some cases, considerable opportunistic risk taking.

The research approach in completing this work combined all available public domain statistics, individual and confidential interviews where market participants gave freely of their collective experience and knowledge (a full description of the research methodologies is given in Appendix 5). The study, therefore, is not simply a statistical review, dry and impersonal in its reading. It makes every effort to account for the more subjective opinions and views held by day-to-day market participants and this inevitably leads to controversy. For years we have joked that one can ask a New York cab driver about the price of copper or aluminium and all you will get is a blank stare (if you are lucky). Ask him about the gold price, however, and not only will he give you the latest two-way price but offer his own theory as to cause and effect.

Although we stopped short of interviewing the New York cab industry, this report is not the work of one consultant but effectively the collective consensus of the international gold market. To thank individually all those who so willingly gave of their time and expertise is an impossible task but in avoiding doing so, my gratitude is by no means diminished. I have long appreciated that the only way to thank the market appropriately is to deliver a balanced, comprehensive, readable, enlightening and thought-provoking study, which will be of intellectual benefit to all. That remains the ultimate objective of this project. However, a number of individuals need special mention. Firstly, I am deeply indebted to Kelvin Williams and Chris Thompson for recognising the need for this work in the first place and ensuring that the project came to fruition. I then single out Ted Reeve of Scotia Mocatta, Canada and Geoff Breen, of Ord Minnett, Australia for their input on hedging in their particular parts of the world as well as Mark Fellows of Brook Hunt & Associates for access to cost data. And finally, I thank most sincerely Neil Newitt for assisting with the interviews and travel and Tony Warwick-Ching for holding the Virtual Metals fort while I moved across full time to this study.

Jessica Cross, Virtual Metals Research & Consulting UK
June 2000
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OVERVIEW

This research neither endorses nor denounces the use of derivatives in general. The brief was very specific: shed light without judging or favouring a particular line of reasoning. However, during the interviews with scores of gold market participants a number of compelling and cogent arguments both for and against price protection and the use of derivatives emerged. To omit them would certainly detract from the potentially very lively debate which hopefully will follow the publication of this report. They have therefore been included in the discussion in the most objective way possible without, however, allowing their presence to dominate the presentation of the research findings.

Before presenting a summary of the results, it is necessary for a moment to stand back and place the whole derivative question into perspective. Primarily, one has to consider why the sector has generated such debate among gold market participants, sometimes even to the point of irrationality and acrimony. Contrast this with other commodities and financial markets, where derivatives are widely accepted and generally observed to be beneficial to the markets of the underlying instruments. Within these markets, the active presence of the derivatives is simply not an issue, let alone an all-consuming preoccupation, which commands a vast amount of intellectual time and energy in its debate.

The short answer to this question is: circumstances unique to gold. Unlike any other commodity (with the possible exception of silver), gold is subject to massive above-ground stocks; but more importantly perhaps much of this is in a physical form which could readily come to market should circumstances dictate. The irony is that the physical and chemical characteristics that originally gave gold its unique and revered place in Man's history (especially its indestructibility) have now come back to haunt the modern day bullion market.

More specifically, the unusual characteristics of the gold market have caused derivatives to develop in a way that favours the short side of the market. Certain of these features have exacerbated the unfavourable price conditions of recent years. The actions of market participants, including producers, central banks, the commercial banks and the hedge funds need to be considered in the light of these circumstances.

Firstly, these market conditions have arisen over the last two decades in the virtual absence of the sophisticated investor, specifically the institutional portfolio manager in Europe and North America, who might have had an interest in maintaining a long, probably derivative-based, gold position. In this regard, gold equities as a percent of an investment portfolio are simply no substitute for physical metal or derivatives instruments based on the physical.

Secondly, over the same two decades, the official sector, the major holder of a good deal of the above-ground stocks, has been gradually implementing modern day portfolio management theory in which gold's role as a predominantly non-interest bearing asset has been brought into question.

Thus, in attempting to secure a return on its reserves, the official sector, in addition to becoming a net seller, has been mobilising its holdings. This has provided the lending market with ample liquidity over the years, which in turn has kept gold lending rates comparatively low and ensured that the market remained in contango. This contango has served to encourage producer hedging while the low lending rates encouraged the hedge funds and others to borrow inexpensive gold with the intention of raising highly cost-effective dollars. Thus market circumstances alone, rather than any orchestrated or deliberately collusive behaviour, have given rise to a derivative market highly geared to the short side. It is our belief that if there had been a dynamic and sophisticated investment component to the gold market, which provided a natural counterbalance to the normal hedging activities of the gold producers and any others taking short positions, then the gold market today would look completely different. In fact, if that were the case, it is most likely that the need to commission this study would never have arisen in the first place.

The negative effects of these structural features have not been offset by comparable growth in physical offtake and thus the gold price has responded accordingly. The net impact on the price has generated controversy about the actions of the market participants including the practice of producer hedging. The situation is only exacerbated by a great deal of ambiguity and hence confusion surrounding those official derivative statistics that are made available. In many instances, these figures represent grossed-up derivative positions based on substantially lower underlying exposures. To misconstrue these figures and consequently deduce erroneous conclusions is then commonplace but serves only to cloud further the issue.

It is perhaps ironic that this debate is still continuing at a time when the market itself is generating circumstances which could well herald a change in hedging practices. Our research has isolated a number of factors that are likely to influence the future of global hedging. We conclude that, quite apart from opinions, there are fundamental reasons why international hedging practices are likely to change in the short to medium term. In this context we are greatly concerned about the impact on the short-term lending market should the mining companies elect to unwind their hedges at short notice. All these findings are presented later in this chapter.

Before concentrating specifically on gold, I return to my initial comments with respect to placing the derivatives into perspective. It is all too easy to become so engrossed with the intricacies of the gold lending and hedging world that one loses sight of the bigger picture. All other markets indicate that derivatives,

correctly understood and used wisely, exist to assist as much as possible in the removal of price risk. To be totally pragmatic, they would cease to exist if they did not serve a useful commercial function. Specific to gold, isolated and very limited problems aside, there is overwhelming evidence indicating the successful track record of by far the majority of prudent gold hedging programmes over more than two decades. This is particularly true if you are of the school which believes that hedging was not the only reason for the last decade's decline in the gold price. It is also particularly true if you consider a mining company and its hedge book in isolation, divorced from the rest of the industry and serving the interests of its shareholders alone. These arguments are less compelling if hedging is considered in the context of the market in general.

With respect to the impact of derivatives on the longer-term price of the underlying commodity, there is considerable academic research which points to the conclusion that in the long run their influence is negated. Many argue that the hedges over full tenure must come to delivery and thus roll off the collective hedge book. The conclusion drawn, therefore, suggests that in the long run, hedging does not impact on the price.

Specific to gold, I maintain that this may indeed be true of the individual products and their long term isolated behaviour. However, as will be discussed in this report, we did find evidence to suggest that the existence of hedge books has been influencing long-term *decision-making* on the part of a number of mining companies associated with sufficient tonnages of beneficial production for the results to be deemed statistically significant. This suggests an indirect long-term impact of hedging over and above the mere presence of the products. We conclude therefore that the presence of hedging has more than likely delayed mine closures, probably delayed mergers and the restructuring of the industry and in some cases, encouraged or even subsidised exploration and the expansion of reserve bases. If this is indeed the case, then we must accept that hedging, through mining company philosophy has left and will continue to leave its mark on the long-term gold market. But one can argue that any trading activity or presence in the market must impact on the cumulative industry in some way or another. How the readers interpret these findings depends on whether they accept the contention that hedging has not been the only factor influencing the gold price.

Thus the debate is likely to continue. It seems more than just probable that mine management will make every effort to minimise as much as possible risk of all description as it relates to their business. The price of gold is but one element of risk faced by the producer. In any market, but especially one that remains in contango, mine management is hard pressed not to embark on a hedge programme of some description. However, the future ability to hedge with the ease that characterised the past decade now remains to be seen. This then has very significant implications for the lending market and future demand for liquidity.

This report raises for debate various derivative issues but a major objective of the study is to place the derivative question into perspective. This can only be achieved by shedding light on an under-researched and widely misunderstood area of the market. The remainder of this section presents our major conclusions and then summarises the findings of 12 months' worth of research. It also puts forward some recommendations for further consideration not only by the mining company sponsors of this report but by the gold market in general. The remaining chapters consider each sector of the derivative market in considerably more detail. Where appropriate, statistics are given in the associated appendices. Chapter 6 plays devil's advocate and raises for further debate what we have identified as potentially fruitful avenues of further research.

The major conclusions

The derivative market[1] in gold by end-1999 was represented by a total of some 5,230 tonnes of metal. By far the greatest contributor to the supply of lent gold remains the official sector and the greatest consumer of lent gold is the mining industry.

Our estimates of the amount of lending outstanding and its uses as of the end of June and the end of December 1999 are tabulated as follows:

Estimated supply/demand of lent gold during 1999

Tonnes

	June	Dec
Supply		
Official sector	4,344	4,710
Private lending	560	520
Total	**4,904**	**5,230**
Demand		
Hedging net of option deltas	2,812	3,021
Refining consignments	365	475
Jewellery (high & low carat)	220	310
Inventory/investment	550	680
Comex - momentum trading	254	7
Other	310	350
Total	**4,511**	**4,843**
Implied short positions ie carry trade/proprietary trade	**393**	**387**

A number of points need to be made about these estimates:

- The supply of lent gold represents our estimates of *total liquidity* from all sources, including swaps and lending from the private sector. The total pool of gold liquidity is discussed later in substantial detail;

- The hedging figures are not the total nominal book but include estimates of the net deltas against the appropriate options. Net producer hedging accounts for a little under 60% of all gold liquidity and the fate of this hedge book is central to the future of the gold market. We return to this issue later;

[1] See the box on *Gold Derivatives: Basic Principles* for a simplified explanation of how the gold derivative market essentially functions.

- The estimates of gold on refining consignment take into account installed capacities and estimates of current capacity utilisation; the latter of course can vary considerably depending on seasonal variations and market conditions. The increase in pipeline financing of refining material reflected in the table was largely due to the increased throughput triggered by the September price rally. Substantial tonnages of leased physical gold (not in good delivery form) were returned to the refiners immediately after the sharp increase in lease rates in September. This was particularly evident from centres such as Dubai;

- The estimates of financed gold in the jewellery manufacturing process have taken into account the very different production lead times for high-carat low markup and low-carat high markup jewellery;

- The estimates of inventory include consignment stock held by jewellers, consignment stock held by other industrial end users of gold and investment gold traditionally held in the high-carat low markup consuming markets. The increase in inventories shown in the table is largely a seasonal reflection of the stock held by jewellers over the Christmas period;

- The Comex/Nymex figures are published. The sharp decline in the net short position held by the momentum traders is entirely in keeping with their trading behaviour and the price movements during the second half of the year;

- The 'Other' category includes demand for lent gold associated occasionally with the official sector itself, specifically with respect to options, swaps, short-term forward sales and upgrading;

- The residual is the implied net short position held by the major hedge funds and any other proprietary trading. The figures for the two end periods actually mask the dramatic changes that occurred in this sector during the fourth quarter of 1999. There was strong evidence of substantial short covering during the September price rally in which a good deal of this short position was indeed unwound. The fact that the rally stalled at the $330/oz level and did not break much higher levels is probably the most reliable empirical evidence suggesting that the short position held by the hedge funds was nothing like the levels claimed by some in the market[2]. The subsequent collapse in the lease rates has encouraged the re-establishment of at least a proportion of these short positions; a process which can be expected to continue, should the lease rates remain low and should the interest rate differential between the lease rates and the US dollar rates widen even further;

[2] Furthermore, the liquidation this year of two large hedge funds known to be active in the gold market without any dramatic impact on the gold price is further evidence of a more conservative short position than otherwise claimed.

- And finally on the historical data, this research could find no evidence of collusive behaviour in the gold market or any evidence of a conspiracy between the major sectors and participants. Historical data covering at least that last decade confirms that the market has more often than not favoured a short position. If third parties believe that they have such evidence they are strongly urged to submit this information to the appropriate judicial authorities as a matter of great urgency.

Such are the historical findings. Of more importance is the role that the derivatives are likely to play in future price discovery.

The second half of last year and opening months of 2000 saw a spate of public announcements by the mining companies with respect to their hedge positions and their future intentions. A number of companies unwound their forward exposures completely and contributed to a tangible decline in the short hedging position. Others restructured, altering the nature of their exposure rather than the volume. Some added to their existing books while others adopted a "wait and see" attitude.

The price response to many of the announcements to the effect that some mining companies would not be adding to their hedge books was positive but in the short term only. This suggests an influence on sentiment alone that, by implication, is unsustainable rather than signalling a structural change in the underlying status quo. Since then, the gold price has once again slipped well below $300/oz, interest rates, particularly in the United States, have risen and the one month gold lease rate dropped to well below 1%.

Sentiment and investor-relations announcements aside, our research suggests a number of fundamental factors that are likely to precipitate a change in the international hedge book. A limited number of these factors are likely to generate a greater appetite for price risk management, while a number of others could well herald a strategic rethink on the part of the producers and could result in a contraction of the hedge book. These are as follows:

- Our analysis of *total costs*[3] versus average realised prices of the 1999 hedge book suggests that the total cost of the marginal producer in North America and Australia is not being fully covered by those regional realised prices. South African mines are faring better with the costs of the marginal producers fully covered by regional realised prices. However, because of the way some of the larger hedge books in that country have recently been restructured, it is not a foregone conclusion that this state of affairs is sustainable. This then begs the

[3] Including exploration and development costs. Not cash or operating costs which we maintain do not reflect the true profitability of the industry. This said, once a mine is operational it is cash costs which need to be considered to determine its ongoing profitability.

question of whether the global gold producers can afford not to hedge, irrespective of sentiment. The implication is that the producers must either reduce their total costs by a substantial amount or maintain their hedging positions at higher realised prices. The extent to which costs can be reduced is an area that requires more detailed analysis. In the absence of a price rally, the maintenance of the hedge book at current realised prices may be very difficult to achieve without increasing hedge exposures;

- Since the September price rally and the problems associated with two hedge books, the vast majority of mining companies are studiously avoiding any use of what might be described as exotic products and are moving back to tried and trusted vanilla instruments. However, the rationale behind the preference for the more complex mechanisms in the first place was that they afforded the miners higher realised prices than their vanilla sisters. Thus in order merely to maintain current realised prices, the producers are going to have to find alternative ways of making use of the vanilla products. One way this could be achieved is to hedge to longer tenure and compound the contango over a longer contract period. This may indeed be possible in many cases but in other instances, this may place pressure on existing credit arrangements, especially if these lines are currently unmargined. In other words, hedging to longer tenure may simply not be a viable alternative for some companies;

- The price rally in September clearly raised the issue of margin and the fact that, over the past five years, by far the majority of mining companies have successfully negotiated out of their hedging agreements most references to margin. This is evidence of how dominant the producers have been in the hedging relationship and how competitive the bullion banks have found the price risk management business. The question of margin and credit in general is now very much on the agenda of the commercial banks, especially after the sharp increase in lease rates and the price movements of late September. The extent to which they will successfully negotiate back into agreements any reference to margin remains to be seen, especially with the mining industry so adamantly against margin call in any form. The most likely outcome is an internal reassessment of individual credit and the levying of an added hedging premium on those mining companies which are deemed to be less creditworthy than others. This implies that hedging for a proportion of the industry will become considerably more expensive;

- The introduction of the new FAS133 (US Financial Accounting Standards Board Statement 133) accounting system is certainly going to influence future hedging decisions, primarily with respect to the choice of product and the degree of expected disclosure which will render the intricacies of a hedge book substantially more visible. Product choice will be influenced by the way in which a derivative is defined for accounting purposes. Those that are deemed to be

hedge products will probably be unaffected in their use, namely the vanilla forwards and put options bought against forecast production. Those defined as non-hedge or speculative products for accounting purposes will pose more of a dilemma for the mining industry. Call options written, for example, will have to be marked to market on at least a quarterly basis and any resultant profit or loss brought into the income statement. For this reason the industry in general may elect to cease writing these options. However, these calls were granted in the first place with the specific intention of paying for downside protection via the puts bought. This implies that the industry will either have to pay upfront for their puts, which will render hedging that much more expensive, or find some other derivative based method of offsetting this cost. The alternatives at the moment appear limited;

- As chapter 2 demonstrates, commodities in general have witnessed a very sharp decline in exploration expenditure, especially over the past three years. Gold has suffered not only from a decline in absolute levels of expenditure but has also lost to base metals its relative share of total exploration budgets. This has a number of implications for future derivative usage. Firstly, there are currently very few projects at feasibility stage which, if they came to fruition, would require derivative-based development financing. Secondly, this implies that growth in gold production is certainly going to peak, if not plateau or even decline throughout the next decade that will naturally limit the growth in hedging needs. And finally, current reserve bases are not being replenished at the same rate as they are being depleted. This must limit the ability of some companies to hedge, particularly if those companies are already experiencing credit line constraints associated with margin concerns. Moreover, the gold price at which the producers revalue their reserves in the ground, particularly if the gold price fails to consolidate over $300/oz, is also likely to favour a downward bias of the global reserve base.

Thus the mining industry is facing a number of derivative-based challenges. How these are individually and collectively addressed remains to be seen. But what we can say about the preceding discussion is that a number of factors are coming together which could suggest that the peak of hedging is over. The causes are in the main market-related rather than exogenous to the industry. The Washington Agreement on Gold in all fairness probably did not precipitate a fundamental change in hedging philosophies but more likely accelerated events and processes already under way. This is not to say that the hedging phenomenon will simply dissipate overnight. We are saying that for the first time in fifteen years of monitoring this industry, we can foresee a change in the fundamentals that have supported and encouraged the enormous growth in hedging.

These findings then beg the question of future growth in gold lending. If one

accepts the thesis that says the period of sharpest growth in hedging is over and we can expect a decline in the growth in volumes hedged, plus a substantially less complex hedge book all round, one can argue that the demand for lent gold is going to decline proportionately. Less demand for lent gold negates any upward pressure in the lease rates[4].

Chapter 1 details our analysis of the potential liquidity to the market particularly from sources other than the Washington signatories. It concludes that there is sufficient potential lending to meet hedging needs without placing undue pressure on lease rates, certainly under current circumstances and assuming that hedging is not going to increase at anything like the rate seen over the last two decades. Lease rates can therefore be expected to stay low rather than tightening and consolidating at levels above historical averages. Only a *global* moratorium on central bank lending which would necessarily imply an extension of the existing Washington Agreement to include the majority of gold holders of magnitude, would indeed place upward pressure on the lease rates. However, the extent to which this might encourage greater private sector lending, not so much from traditional sources which we believe now to be largely depleted, but from new sources, particularly the Indian Subcontinent, must surely be of concern.

[4] I have often been asked: why do the gold lease rates not reflect other money market rates? Supply and demand and a free market in lending, the associated cost of which will tend to find its own equilibrium.

Gold derivatives: basic principles

The text box sets out the basic principles of how the gold forward market works for those readers unfamiliar with it. It also outlines the effect of the forward market on the supply of gold and hence on the price. It looks only at the very basic plain vanilla forward. In practice more complex transactions are used which are described and assessed in chapter 5 of this study.

In its most simplified form, the transaction can be described as follows:

1. Gold is leased by central banks and other holders to commercial/bullion banks and thus earns for the lender a return in line with the gold lease rate. It is this liquidity which then allows for the execution of all further derivative transactions.

2. With respect to producer hedging, the bullion banks contract to buy gold forward from mining companies. To fund the purchase, the bullion banks sell an equivalent amount of gold borrowed from central banks. The proceeds of this sale are invested and earn interest at money market rates. Thus under these conditions, the borrowed gold is sold, which effectively adds to supply in the very short term. In the absence of compensating factors, this can place pressure on the gold price. This is why hedging of this nature is sometimes termed "accelerated supply". In essence it mobilises metal inventories by bringing this metal into the active market. It also allows mining companies to sell metal ahead of their production schedules.

3. When the forward sale comes to delivery, the producer delivers either newly-mined gold or gold purchased in the market to the bullion bank at the contract price. In theory, the bullion bank then repays its borrowed gold to the central bank and the transaction is unwound in its entirety. However, more commonly, the central bank rolls over the loan, thus maintaining the liquidity to fund further derivative transactions.

4. The transaction in respect to speculative short-selling has an identical effect on the gold market to that of mining companies (except possibly that mining transactions typically involve a longer time horizon). In this case the bullion bank, instead of contracting to buy gold forward from a mining company, contracts to buy gold forward from a speculator (eg a hedge fund or a bank's proprietary trading desk). To

fund the transaction it once again sells the gold borrowed from the central bank and invests the proceeds on the money market. When the forward sale comes to delivery the speculator buys gold on the market and delivers it to the bullion bank. The transaction is then in theory unwound upon the bullion bank repaying the gold to the central bank although in practice the central bank's loan is rolled over to fund the next transaction.

5. The above ground stocks of gold are very large and are in general held in a form that could readily come to market. Further, the willingness on the part of the holders of this metal to participate in the market implies that the cost of borrowing gold remains relatively low compared with money market rates. This is one of the major reasons why the gold forward market is nearly always in contango (forward price higher than spot price offering a positive interest rate) and only very rarely lapses into backwardation. This positive carry available to the producer and speculator means that the market is implicitly biased towards producer hedging and speculator selling. The transaction will be profitable for the miner or speculator unless the gold price rises at a faster rate than the contango.

6. Over the last decade new lending has outstripped repayments so that persistent growth in lending has added to supply and hence had a cumulative effect on the gold price. The market has yet to reach a stage of maturity where outstanding gold lending is stable and when the amount of gold sold forward as a result of new lending will broadly match gold delivered into maturing forward contracts.

7. Lent gold is also extensively used to form consignment stocks for jewellers, fabricators or refiners during the manufacturing of physical products. This enables the user to work with gold and create a product but avoid purchasing until they have a buyer for their product. A jeweller, for example, would be able to manufacture an expensive piece of jewellery but avoid buying the gold until he has sold the piece, thus avoiding cash flow problems and eliminating exposure to gold price fluctuations.

The report findings in brief

Chapter 1: the lending market

- The lending market has shown rapid growth over the past decade, more than doubling every five years;

- As of the end of 1999, total liquidity amounted to 5,230 tonnes, down from a record high of 5,500 tonnes during the weeks after the Washington Agreement, announced on 26th September;

- 118 countries (those whose gold reserves were traceable either through public statistics or direct contact with the banks concerned) were analysed;

- When all known official reserves are accounted for, the total percentage lent stands at 14% of gold holdings. Remove from this the USA, Japan and IMF, as well as the European countries that do not lend, and the overall percentage increases to 25%;

- Western European lending on average stands at 15%. The associated holdings, representing 45% of total existing liquidity, demonstrate the importance of the Washington Agreement;

- In terms of central banking lending attitudes, a full spectrum of philosophies and practices evidenced themselves during the research. The formal official sector collectively is substantially less sensitive to lease rate movements than originally might have been expected. Decisions whether to lend at all, and at what level, appear to be taken for reasons often totally divorced from the performance in the lease rates;

- Our interpretation of the Washington Agreement is as follows:

  The total volume of metal intended for sale during the five-year period was decided on at the time of signature; the implication being that no members can now, or within the five-year Agreement change their minds and elect to offer gold to the market;
  Those who have declared their intention to sell gold within the five-year period are not duty bound to execute those transactions and sales could be conceivably less than the 2,000 tonne allowance;
  There has been subsequent confirmation that the Swiss intend to sell their entire planned 1,300 tonnes within the five-year period and thus this sale will not extend beyond the initial Agreement period. Sales began on May 1st 2000;

Those members who are currently active lenders of gold are not duty bound to maintain their levels of lending. Thus the presence of the signatory countries in the lending market could decline in absolute and relative terms. However under the Agreement, signatory lending cannot increase beyond the levels established at the time of signing;

- Immediately post the Washington Agreement the bullion banks attempted to cover their lending exposures, doing so by managing their risk out to the further dated months. As the lease rates at the longer dated end of the curve rose, the covering swiftly spread into the nearby months. Thus the longer dated lease rates were the very first to come under pressure, although the nearby months followed soon afterwards. Demand for liquidity was sufficient to tip the gold market into backwardation;

- By midweek post the announcement, a good deal of producer business was being executed as mining companies restructured their hedges. This, together with additional liquidity beginning to emerge from non-Agreement countries, plus the reversal of a substantial volume of gold on consignment, was sufficient to re-establish the contango. Despite renewed surges in the gold price in the wake of further short covering, especially during the second week after the announcement, this contango was maintained. During this process we believe that the pool of liquidity swiftly grew to an all time high of 5,500 tonnes, thus increasing by almost 10% in the wake of a shock to the leasing market. The core of lending (on the part of the official sector) appeared to have remained virtually immune to the developments in the market. However, the marginal lending from the other sources demonstrates considerable sensitivity to the lease rates. This was particularly true of the consignment industry;

- Liquidity requirements based on the producer hedge book alone (to end June 1999), suggested demand of additional lending in late September early October on the part of the commercial banks of a minimum of 100 tonnes for every $25 increase in the gold price. This relationship was linear and beyond $400/oz (although, of course, not tested), it appeared to fall away;

- The extent to which the Washington Agreement has effectively sterilised a very large proportion of potential new lending is all too apparent. Post the Agreement, we estimate that potential new lending of residual official holdings not already on loan or swapped, stands at between 560 and 1,000 tonnes. This compares with figures of over 6,000 to over 9,000 tonnes prior to the announcement. Excluded in this assessment is the potential for the private sector to become a substantially more active lender of metal;

- The Washington Agreement is also likely to influence the structure and make-up of the pool of gold liquidity. It is possible that the lending market could

become increasingly sensitive to lease rates as the other sources of lending become more dominant. It is also possible that the lending market will become less and less subject to bureaucratic decisions, which by nature are associated with long lead times. Should this be the case, then the gold market in general might be able to expect a lending market that responds more swiftly to lease rate changes than has been the historical case.

Chapter 2: producer hedging

- Seventy-seven companies representing 50% of annual mine output were approached to contribute to a questionnaire covering hedging. The remaining 50% of output is not in general subject to hedging and every effort was made to cover the volume of hedging in its entirety. As of December 1999, the hedge book totalled a nominal 4,038 tonnes or 158% of total 1999 output. This compares with 3,048 tonnes and 3,908 tonnes as of December 1998 and June 1999 respectively;

- Taking delta hedging into account, the *net* impact of the hedge book on the day-to-day market was substantially less than the nominal total. As of June 1999, the net total was 2,812 tonnes. This had increased to 3,021 tonnes by the end of the year (118% of total 1999 output);

- Of the total, North America represented one third of the hedge book. South Africa and Australia accounted for almost a quarter and nearly 30% respectively;

- 1999 saw realised prices that remained higher than spot prices. This was even more apparent when looking at the full tenure of the global book, as these figures show. Compared to average current spot prices, the forwards in US dollar and Australian dollar terms locked in premia of a little under 30%. South African rand hedging fared better at a 48% premium over spot during the first half of the year. This figure had improved to 50% by December. Higher rand denominated hedging appears to be due largely to high local interest rates but also a restructuring of local hedge books, which boosted realised prices in the short term at the expense of later years. The average strike prices of puts bought (again to full tenure) showed a mixed result over average spot prices during the first half of the year: 39% in the case of Australian dollars, 29% for US dollars and 63% for South African rand. During the second half of 1999, the differential had narrowed quite considerably to 28% in Australian dollars, 20% in US dollars and 21% in South African rand. The reason for this change is almost certainly the greater than expected volume of put options which were bought as the gold price fell towards $250/oz during the period of July and early September;

- An analysis of average realised prices versus total costs[5] of production revealed a less healthy state of affairs. This analysis looks at which decile on the cost curve is covered by average hedge prices. Looking initially at the currency denominated hedging, 80% of the total costs accrued by the North American and Australian mining communities were covered by average realised prices during 1999. The South African industry fared better with 95% of total costs being covered (although the higher short-term realised prices may not be sustainable in some cases). Given that we define the ninth decile as defining marginality, we then conclude that the average realised prices were not quite covering the total costs of the marginal producers in North America and Australia. Since, however, many South African and Australian mining companies regularly hedge in both their local currencies and US dollars, a second and more detailed analysis was conducted to give a more equitable comparison of regional hedging. Again, 80% of Australian total costs were covered by the hedge book as were 95% of the South African costs. In North America, the forwards covered 80% of total costs but the strike price at which puts were bought covered only the fifth decile of the cost curve.

  While cash costs are crucial for considering the ongoing profitability of an existing mine, and hence for considering issues such as potential mine closure, total costs are more relevant when assessing the overall profitability of the global industry as opposed to an individual mine. Hence the overall implication of this analysis suggests a higher probability of decline in production levels than suggested by the conventional cash costs analysis. This is likely to hold true if the industry does not get a chance in the near future to lock in attractive hedge prices. The findings also raise the question of whether the industry can indeed afford not to hedge?

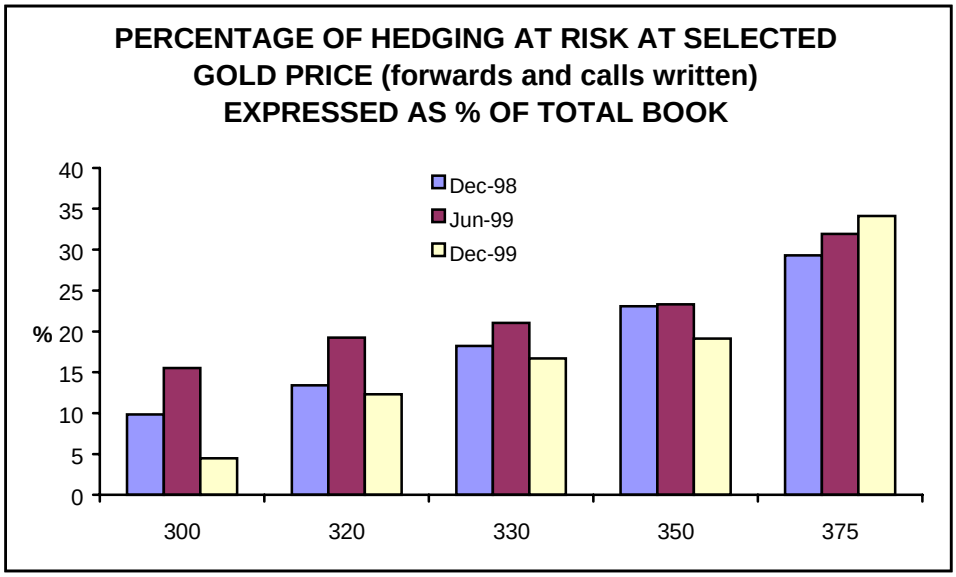
- With respect to the price-related risk of the hedge book, the most vulnerable period of the three studied was the end of June 1999;

- For 1999 delivery, at a spot price of $300/oz, 50% of the hedges under analysis would have been below spot[6]. This increased to between 60% and 63% at gold prices of $320-$350/oz. Over 80% of hedging for 1999 delivery would have been out of the money at a gold price of $375/oz. The gold associated with hedge products scheduled for delivery in 2000 was substantially less at risk. A little over 10% was below spot at $300/oz. This increased to 22% at $330/oz and reached a little under 60% at $375/oz. This nevertheless demonstrates the potential dislocation of the hedge book immediately post the Washington Agreement, if the gold price had indeed stabilised over $320/oz. With the most exposed hedge positions now delivered into 1999, restructured, rolled over or closed out, the situation at the end of December was somewhat differ-

[5] Defined as C1, C2 and C3 as described by Brook Hunt & Associates. Data used with permission.
[6] Products included: all forwards, spot deferred and calls written.

ent. By the end of the year, only 11% was out of the money at $300/oz. This increased to between 30% and 47% at prices ranging from $320-$330/oz. At $375/oz, 84% was currently at risk at $375/oz;

- Since the above analysis looks exclusively at the hedging commitments for the two nearest years, it is necessary to place this into perspective with respect to the total hedge book to full tenure. This is shown below.



- As of the end of December 1999, 4.5% of the total hedge book was at risk at $300/oz. This proved to be considerably lower than the 16% at risk at the end of June. Furthermore, 12%-17% was at risk at between $320-$330/oz (19%-21% end June). A full 20% was at risk at $350/oz and 34% was at risk at $375/oz (23% and 32% respectively by June 1999). This analysis demonstrates the degree to which the miners were able to restructure their hedge books immediately after September 26. The cost of this restructuring is not known;

- Over and above the statistical analysis of the hedge book, over 30 mining companies representing 40% of global production contributed to a second, more in-depth questionnaire which explored hedging philosophies and practices;

- Results from the non-statistical interviews suggested that the need to cover total costs and the ability to remove price risk provided the greatest incentive to hedge;

- The majority of respondents reported favouring options (usually zero-cost collars) to limit the loss of upside potential of higher gold prices, although the actual hedge book is still heavily weighted in forwards;

- While 75% of contributors maintained they had control over the choice of products, a further 23% noted that their counterparties had some input into this decision;

- Life of mine and set policies (in that order) provided the framework for hedging tenure. The price of gold and the lease rates proved to be the most important factors with respect to how a specific hedge was executed;

- Most hedging is now dynamic and reiterative, although still embodied in a framework normally laid out by the board of directors;

- 84% of the contributors felt completely confident that they could adequately monitor the health of their hedge book although many made use of external audit expertise. This level of confidence remained intact post September 26th. 70% felt that they had the in-house expertise to analyse new derivative products on offer;

- 16% of the contributors acknowledged that their hedge book played a role in long-term decision making, especially with respect to possible mine closures and production plans. This percentage increased to 21% when it came to the role of the hedge book in exploration planning. There was a strong correlation between the reliance on the hedge book and geographical region, with Australian mining companies more likely to rely on the hedge book than the South Africans. There was also a strong correlation between the use of the hedge book in long-term decision-making and the structure of the company. The more junior the company, the more likely it was to rely on the hedge book. The conclusions drawn from these results are very significant. Analysis to date covering the impact of hedging on the gold price has been confined to the immediate and then longer-term influence of the products themselves and the way they are offset into the market. Given the fact that hedging is a relatively new phenomenon, very little work had historically been completed assessing the impact that hedging could have had on the longer term structure as a direct result of decision-making based on the existence of the global hedge book. Thus it is possible that hedging could have had a number of influences on the supply of gold to the market which may not be immediately apparent. It certainly has delayed mine closure. But less obviously, it might have influenced the restructuring of the primary industry, delaying mergers and the acquisition of junior companies. Furthermore there is reason to suggest that the existence of hedge books supported (or even subsidised), at least for some while, exploration budgets, the results of which might have materially added to reserve bases;

- Most contributors were satisfied with the service they received from the commercial banks. Others felt that bullion trading was still over-banked despite the restructuring and attrition experienced in recent years and were less happy.

Sovereign risk issues, company restructuring, balance sheet constraints and project specific problems were all issues cited as marring counterparty relationships. Project financing and the associated hedging requirements on the part of the bullion banks has often generated counterparty difficulties;

- Only half a dozen contributors were subject to margin with all their counterparties. A generally margin-free industry, which has evolved over the past five years, is indicative of the degree to which the producers have been the dominant partners in the hedging relationships and shows the extent to which the commercial banks have vied to secure hedging business;

- A little over 50% of contributors acknowledged that their collective hedging activities could have had a negative influence on the gold price (a number of respondents elected not to address this question). This, however did not preclude the decision to hedge nor did the concerns of shareholders. Many companies have gone to great lengths to educate stakeholders and keep them fully briefed with respect to hedging;

- Mining company attitudes towards official sector sales varied across the board. Some expressed their dismay at sales programmes; others were more pragmatic. The industry in general is substantially more comfortable with central bank lending, as opposed to outright sales.

Chapter 3: the commercial banks

- There are currently a little over two dozen commercial banks actively involved in bullion banking;

- The organisation of the bullion banking community is currently very fluid and highly competitive. Over time, very marked regional and sectoral patterns have emerged in which various permutations and combinations of the existing banks dominate;

- Our analysis showed the following:
  - There are no more than eight major participants in derivatives and another five which we would define as second tier (as opposed to market markers);
  - There are around nine major participants in the spot market in London;
  - There are up to ten major participants in the spot market in Europe, including five which are active in the physical market;
  - There are nine major participants in the forward market in Europe;
  - There are four major participants in the Australasian markets;
  - There are ten participants who have a particularly or reasonably strong presence in the fund industry;
  - There are seven participants who have a particularly strong presence in the

official sector;
- There are seven participants who have a particularly strong presence in the mining sector;
- Eight banks have particularly active proprietary trading operations;

- Derivative statistics in the public domain associated with a number of commercial banks should be treated with caution for fear of drawing erroneous conclusions. While enlightening in part, their limitations should be recognised from the outset. In particular, published data do not generally provide a guide to underlying exposure;

- The bullion banks have a number of market-related functions. They are buyers, sellers, stock holders and distributors of metal; a number are market makers involved in the active quotation of two-way prices. They are also providers of credit, act as intermediaries in the lending market, create derivative products and some trade to their own accounts although the levels of proprietary trading are substantially lower than public commentary suggests;

- The bullion banking industry has been subject to considerable restructuring over the past decade. The gold price itself, but more importantly, the sharply lower gold price volatility over the years contributed largely to the changing fortunes experienced by the bullion bankers. Lower volatility combined with markedly lower trading ranges imply tighter bid/offer spreads and less profit margin;

- The derivatives (as opposed to physical trading) have offered a substantially more rewarding profit profile for the bullion banks. Firstly, there has been enormous demand for derivative products especially in the wake of the Australian and North American mining booms of the mid-1980s. Secondly, the variety of products emerging as the OTC market evolved as swiftly as it did, implied initially that many products being marketed were individually priced. The individual pricing provided the banks with considerable latitude with respect to price variation. But, with time, it was inevitable that this component of bullion banking soon became increasingly more competitive and profit margins have consistently been eroded away. Since the Washington Agreement and the very obvious move away from exotic and leverage products and back to vanilla instruments, we expect this erosion of profit margin to continue;

- The restructuring of bullion banking has manifested itself in a number of ways. The withdrawal of a bank from the business is final whereas mergers and acquisitions more often than not result in the duplication of services and skills. The effect this has on credit is probably the most important issue;

- Whichever way the restructuring manifests itself, these developments have had

both positive and negative effects on the gold market but in general we maintain that a contraction of bullion banking is deleterious to the longer-term health of the industry;

- Mergers and buy-outs create fewer but larger entities and have concentrated bullion banking in the presence of a handful of existing banks. This concentration increases those banks' market shares but detracts from healthy competition when it comes to product creation, pricing, marketing and perhaps even customer service. On the more positive side, this increased visibility and profile of the very large banks has given smaller banks and newcomers to the market, a window of opportunity to expand their market share and gain a foothold in a market that would otherwise have remained impenetrable. Niche markets exist in many areas of bullion banking and this will continue to evidence itself provided the presence of the majors does not overwhelm their more junior competitors and leave them no room for operation;

- The availability of credit to the gold industry is another area greatly influenced by the restructuring of bullion banking. The shrinkage in the number of banks active in the gold market implies less in the way of credit lines for all the major users of gold-based products, derivatives or otherwise. Thus credit potential in general has been on the decline. In many producing countries the credit lines, because of sovereign issues, might have been limited to begin with and the restructuring has only exacerbated the problem. Sovereignty more often than not accounts for the lion's share of the existing credit facilities;

- The fact that the mining industry has over the years succeeded in negotiating out of most hedging agreements reference to margin, implies that the hedging and lease rate exposures at risk during the fourth quarter of 1999 remained largely on the books of the banks. The Washington Agreement clearly generated within the banking community a considerable rethink with respect to credit analysis, risk and extension;

- Given the heightened concerns regarding margin and credit we anticipate that the banks will require from the mining community a substantially greater degree of disclosure with respect to a number of parameters associated with price risk management. This could include:
  - More formalised descriptions of the company's hedging philosophy detailing the rationale behind the decision, the overall framework of the programme as it relates to current and planned production and, more importantly, reserves;
  - A more formalised description of the reporting hierarchy and levels of decision-making and hedging responsibilities within the mining company;
  - Greater disclosure of product usage and the overall levels of hedging exposure. This necessarily implies exposure as it relates to other counterparties

together with greater disclosure as to how the resultant hedge exposure is monitored both internally and externally;
- Further details of accounting practices and the company's preparedness for the introduction of the new accounting standards;

- The price at which reserves in the ground are valued by the various mining companies will no doubt come into focus. The longer the gold price remains convincingly below $300/oz, the greater the probability of this becoming an increasingly more important issue for the bullion banks;

- The Washington Agreement has had a profound effect on product creation. Derivative users, especially the mining companies, are already showing a distinct lack of appetite for the more complex products which in turn will reduce the incentive on the part of the commercial banks to generate new and perhaps outlandish mechanisms. This will no doubt have an impact on the profitability of bullion banking;

- The Washington Agreement has also probably encouraged a further and continued restructuring of the industry that will concentrate the business even more in the hands of a few dominant trading entities;

- Over the past decade total trading limits associated with the counterparties have declined. While net trading limits (outright uncovered exposures) in the late 1980s and early 1990s might have collectively totalled 10 million ounces, the state of affairs today is considerably more conservative. Our analysis of the two dozen banks involved yielded an estimate of 2.5 to 3.5 million ounces with any evidence of limits collectively extending towards 5 million ounces considered a possibility only under extreme circumstances. Furthermore, since it would be most unusual for all the banks to be simultaneously either net short or net long, the estimate of collective limits should be seen as a maximum extreme;

- These figures pertaining to outright exposures need to be compared with the gross turnover statistics that are made public. The regulator of national banks in the United States (the Office of the Comptroller of the Currency - OCC) publishes a quarterly report on the derivatives activities of US commercial banks, which has recently attracted some attention. The report for the fourth quarter of 1999 shows that the notional value of the off-balance sheet exposure of the 416 commercial banks regulated by the OCC in gold derivatives stood at $87.6 billion. Of this total $71.9 billion is attributable to just three banks (Chase, Morgan Guaranty and Citibank). At current gold prices, this corresponds to around 9,600 tonnes of gold. Similar, although not entirely comparable, data published by the Bank for International Settlements (BIS) suggested that notional accounts outstanding of gold derivatives at end-December 1999 for major commercial banks in the G10 countries was $243 billion.

- Firstly, the limitations associated with these statistics should be noted:
  - They represent grossed-up total turnover figures associated with substantially smaller net exposures and thus can give a very distorted picture of the actual underlying derivative positions;
  - They cover commercial banks only and thus exclude partnerships and trading entities not registered to take bank deposits;
  - OCC data address commercial banks in the United States alone and thus exclude trading associated with European and Japanese bullion banks. BIS figures cover deposit-taking banks in the G10.

- The concept of grossed-up turnover requires further discussion since if taken at face value these figures could appear concerning. We believe that this outstanding position should not be described as "exposure". A more objective description would be a commercial banking presence in gold-based derivatives. Derivative positions are increasingly traded on the markets and each such trade increases the "gross notional exposure" figure, though it may be undertaken to offset or hedge an initial risk;

- The OCC reports detailing the total trading volumes of the US commercial banks noted that proprietary trading against all derivatives (not just gold) represented 4% of the overall volume. As regards gold, our research revealed that there is a full spectrum of proprietary trading habits among the bullion banks and no generalisations can be made. For some whose policy it is to take only very limited positions to their own account, the figure of 4% is obviously substantially too high. For others, this proved to be too low and representations of anything towards 8-10% or in limited cases, even higher, could be deemed more appropriate. Furthermore there appears to be no correlation between the propensity to trade to own account and size or presence in the market. Banks with substantial market-making facilities and a large exposure to gold may or may not be aggressive proprietary traders. Conversely, those banks with a smaller presence in the market, lower trading limits as well as being niche market specialists might just as commonly be relatively aggressive proprietary traders;

- The level of proprietary trading can also vary considerably depending on the market used. Many of those interviewed suggested that 4% in the spot or cash market might in fact be a little low whereas it might be overstating that true picture with respect to the forward and options markets.

Chapter 4: The funds and money under management

- Hedge fund trading habits have been subject to much speculation over the years and associated all too often with exaggerated claims based on precious little in the way of fact. As a consequence, the money-under-management industry has regularly been cited as the villain of the piece during times of markedly

increased price volatility, often when there is simply a dearth of other acceptable and readily apparent explanations. This situation is compounded by the absence of any reliable public domain data that renders such claims difficult to prove or refute;

- Without an appreciation of the money-under-management industry in its entirety, it makes little sense in trying to isolate and draw conclusions about those individual trading entities that may be actively involved in the gold market;

- The state of health of the overall industry gives a good indication of what might be expected from specific funds. For example, if the industry as a whole is in an aggressively expansionary phase with robust capital inflows responding to a period of strong financial performance, we must acknowledge that those funds with an interest in gold might well be in a position to step up their activities. The converse also holds true;

- Recent developments within the fund industry suggest a marked change in strategic thinking on the part of some of the major trading entities. This is likely to have a far-reaching impact on their attitudes towards precious metals and taking exposure in those markets;

- The fund industry as it influences the gold market can be subdivided into two broad categories, namely the momentum traders and the hedge funds;

- The momentum traders or Commodity Trading Advisors (CTAs) tend to be technically driven entities whose managers have little understanding or interest in the commodities or instruments in which they have exposure. Their trading decisions are taken purely on the basis of price movements and technical trends, which render their exposure to commodities usually short-term in nature. They are, therefore, price followers and tend to be more active during periods of higher price volatility. There are several hundred of these CTAs which have the charter to trade gold. Since they tend to have relatively small capital bases (although there are some very notable exceptions), their *individual* trading behaviour is of little consequence. However, their collective activity in the market, particularly since they are technical trend followers, can certainly have a marked influence on the gold price, specifically in the short term;

- In terms of trading mechanisms, momentum traders are in general confined to Exchange traded products and tend not to have the brief to make use of the OTC market, although there are again some notable exceptions. The fact that the majority make virtually exclusive use of the Exchanges, renders their activities substantially more visible than the hedge funds. Thus their presence can be tracked with reasonable accuracy through the Exchange statistics, which are published regularly;

- Since early 1995, the momentum traders have maintained an almost continuously short position in the gold market. As at the end of June 1999, these trading entities accounted for a short position of 254 tonnes. By December 1999, these shorts stood at a mere 7 tonnes, having been covered in as part of the market's immediate reaction to the Washington Agreement and subsequent price rally during the fourth quarter of the year. During the first three months of 2000, the net short positions had been reduced even further and in fact stood by mid-March at a net long position of some 46 tonnes. By mid-year, this long position has once again reversed itself and the momentum traders were collectively short to the tune of 135 tonnes (to the end of May);

- The hedge funds represent a totally different presence in the gold market. Many of the managers of these funds are primarily fundamentalists in their analytical approach, often having a thorough understanding of the supply and demand components of the markets in which they are exposed. With considerably higher capital bases compared with the CTAs, the ability to borrow against these bases to gain maximum leverage and the charters to make use of the OTC market, they have the potential to make their presence felt. These are the entities primarily involved with what has become known as the "carry trade" whereby the gold leasing rate has given hedge funds the incentive to borrow inexpensive metal, sell it short and raise cost-effective dollars;

- In the total absence of published data, this carry trade has given rise to claims that the short positions held by the hedge funds have been and still are of a magnitude sufficient to create and sustain a substantial squeeze in the gold price. Our research has suggested that while there is indeed an element of carry trade, the total short position that has built up as a result is nothing like the volumes claimed by others;

- We conclude that less than a dozen major hedge funds are actively involved in gold and by end-June 1999, their collective short position (and that of any short position held by the commercial banks through proprietary trading) was perhaps a little under 400 tonnes. Immediately after the Washington Agreement, announced on 26th September 1999, there was clear evidence of short covering, which generated some of the momentum behind the subsequent surge in the gold price. Our information suggests that a good proportion, although perhaps not all, of this short exposure was indeed covered in during the fourth quarter of last year. The mere fact that the gold price failed to maintain its upward momentum at $330/oz and beyond strongly suggests that the short positions were indeed substantially less than others have claimed. By the end of December 1999, this short position stood at a little under 390 tonnes, marginally lower than the end June period. The reason for the probable re-establishment of these short positions is most likely as a direct result of the sharp decline in the lease rates during the final months of last

year. This would have no doubt encouraged renewed carry trade borrowing, particularly in the wake of higher interest rates especially in the United States;

- Early during the second quarter of 2000, the market witnessed the voluntary liquidation of one of the major hedge funds known to be involved with the precious metals and specifically the gold carry trade. The fact that this fund in its devolution did not have a substantial impact on the gold price is added evidence that these enormous short positions simply did not exist;

- Subsequently there was a second press release from another major trading entity to the effect that it would be restructuring its numerous funds to render them less exposed to high risk trading strategies;

- These two public announcements have substantial bearing on the gold carry trade. It reduces by a very large margin the amount of managed money that could be related to the existing carry trade since these funds accounted for a large proportion of the associated capital bases. It might also herald a change in strategic thinking which might become commonplace among the remaining funds which have been known to participate in the gold market. This, however, does not necessarily imply an overnight dissipation of the carry trade phenomenon since other smaller and perhaps less leveraged funds might step into the breach. Our research isolated a minimum of over 100 funds that could potentially participate in the gold market;

- While gold lease rates remain at a substantial discount to money market rates, the carry trade is likely to remain a feature of the gold market. Only when and if the cost of borrowing gold approaches and remains sustainable at or near dollar interest rates, will the incentive to borrow inexpensive gold be negated. The extent to which funds will still make use of the concept of borrowing cost-effective gold needs to be monitored on a regular basis especially in the light of recent developments.

CHAPTER 1 : THE LENDING MARKET

Introduction and objectives

This chapter addresses liquidity (such as gold lending and gold swaps), the lifeblood of the gold derivatives market without which the paper products could not be created, executed or managed. Our assessment of the total pool of gold liquidity might differ a little from that of other market commentators and there is good reason for this. With the official sector remaining the major source of lent gold, much of the research emphasis, quite understandably, has been placed on this sector. Moreover, many of the commercial banks wishing to attract liquidity canvass the formal central banking community to the virtual exclusion of all else. Interviews with these banks for research purposes, therefore, give insights primarily into this dominant area of the market. There are, however, other existing and potential sources of lending and every effort has been made in this study to incorporate statistics on this less visible sector of the market. These sources[1] include non-official gold inventories held by some central banks but not itemised in the mainstream public domain data, holdings by quasi-official organisations, for example, in the Middle and Far East and last but not least, private inventories built up over time and held over generations across the globe. In terms of volumes, these cumulative inventories are a fraction of official sector holdings. However, given that they are in general free of the bureaucracy and formal decision-making associated with the central banking community, their potential to act as the market swing factor should not be underestimated. Thus throughout this analysis, emphasis is placed on liquidity in general as opposed to total central bank lending in its narrower sense.

The objectives of research into this sector are numerous but the most important are as follows:

- Firstly, it is essential to generate a detailed database listing the existing and potential sources of liquidity from which an estimate of the total can be deduced. The total provides the framework for all further analysis of the derivative market and the way it functions, as well as providing the link between the pool of liquidity and the lease rates. Once established, the updating of the database as market conditions change and lending responds, is a relatively simple matter.

- Following on from this, the second objective is to assess future trends in lending and what this could imply for lease rates. This essentially lies at the heart of the whole derivative question and indeed is probably one of the most important factors with respect to future price discovery. The conclusions are particularly

[1] Representing almost 10% of total lending by the end of 1999.

important for the users of derivatives, especially the mining community, and could well have far-reaching implications for hedging philosophies and practices. Achieving this objective is more difficult than it initially appears. Detailed analysis of central banking attitudes towards their gold holdings has revealed a full spectrum of philosophies. These have ranged from absolute non-participation in the gold market on any level, to board-agreed percentages of lending to specific tenure, through to active management of reserves which might include not only lending but also call option writing. Thus no generalisations can be made and we would consider it totally inappropriate to try. Even the briefest of research into this sector shows very early that one must accept that central banks are as individual as the decision-makers that run them and as unique as the countries which they serve. Perhaps the only common factor among the official sector members is that each is, to a greater or lesser degree, a holder of gold.

- The third objective is to use the analysis of market liquidity as a benchmark from which a "supply/demand" balance of lent metal can be constructed. Having established where the gold comes from and in what volume, one then needs to ascertain where it goes. By doing this, one can then cross-check estimates of trading positions held on the part of commercial banks to their own accounts and the hedge funds.

- A fourth objective is to analyse the Washington Agreement on Gold (WAG), announced on September 26th 1999, which has clearly already had far-reaching implications for the lending market and the way in which lenders perceive their own presence as a source of liquidity. How this is going to influence the structure of the lending market is vital in identifying future lease rate trends.

- Finally, we raise one particular issue for further debate. Following on from any discussion of the lending market which incorporates an analysis of the Washington Agreement, is the question of whether or not higher than average lease rates are firstly, achievable and secondly, sustainable under current market circumstances? This then leads to the question of whether or not higher lease rates would actually contribute initially to a more stable market and consequently to a healthier gold price? And if they do, we begin to address at what cost this could come to the various sectors of the gold market.

All these issues are addressed in this chapter with the exception of the supply/demand balance, which is covered in the summary of this report, and the debating issue which is presented in chapter 6.

The data

The volume of gold lent into the market has shown robust growth over the last decade, more than doubling every five years. This is shown in the following table:

Official sector liquidity 1990-1999

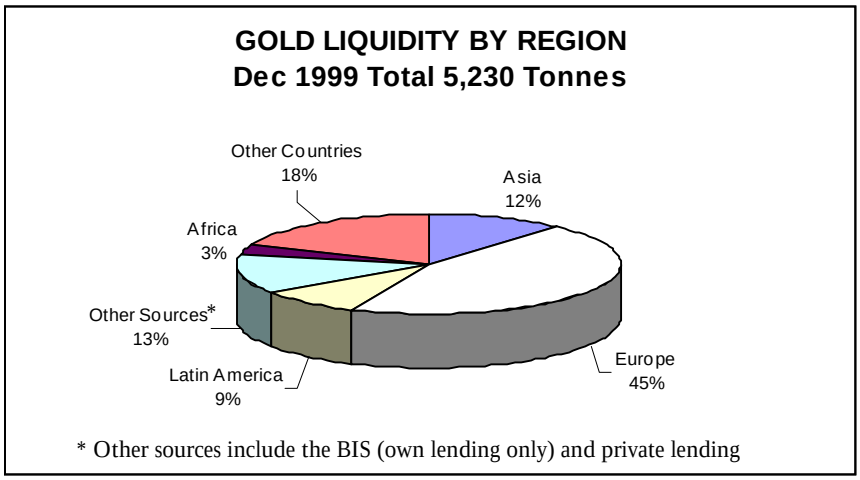
Gold on deposit – tonnes

		% growth
1990	900	
1995	2,100	133
End 1999*	4,709	124

* For direct comparison excludes private sector

Data source: 1990 & 1995: Cross, J.H., The Changing Relationship Between the Central Banks and the Gold Market in the Late 1990s, paper for the Financial Times Conference, Venice, June, 1996. 1999 data: Virtual Metals Research and Consulting

As the table indicates, for direct comparison with earlier work, the year-end 1999 figures exclude private sector lending. If the analysis includes these figures and other non-country specific liquidity, the total increases to 5,230 tonnes as of the end of December 1999, down from a maximum of 5,500 tonnes during the few weeks immediately after the announcement of the Washington Agreement[2] and up from 4,904 tonnes at end-June 1999. The breakdown by region is shown in the following chart and demonstrates the importance of Europe as a lending bloc.



This growth is a result of two inter-related developments, both of which have been features of the lending market throughout the 1990s.

[2]The period immediately post September 26th was characterised by remarkable fluidity in the lending market, the details of which are discussed later in this chapter.

Firstly, within the framework of modern day portfolio management theory, there exists a new generation of central bankers who consider that maintaining a non-interest bearing asset in a portfolio is simply no longer appropriate. Secondly, the widespread use of derivatives has generated a growing need for lent gold and the concept of participating in the leasing market has been actively marketed to the official sector by the commercial banks.

In essence, the lending market has been responding to the forces of supply and demand and these developments are clearly reflected in the lease rates. To this extent, one can accept that, prior to September 26th, the lending market was operating with reasonable efficiency, in the narrow economic sense of the word, despite the obvious inelasticity of a number of sources of supply. Post the Washington Agreement, the situation has changed and this is an added reason for discussing the announcement in detail.

Apart from increases in the overall level of lending, there have also been some important changes in the structure of the market. When completing his research in 1996, James Cross noted that 69 countries were active lenders and had on loan an average of 27% of their holdings. The research approach in this study is somewhat different and yet arrives at a result broadly in line with this earlier work. We have assessed 118 countries (those whose gold reserves we can track either through public statistics or by means of direct contact with the banks concerned) and included them all in the analysis regardless of whether they lend or not[3]. This obviously has a dramatic effect on the average percentages lent by region, especially when it comes to the inclusion of the non-lenders, for example the USA, Japan and the IMF. When all official reserves are accounted for, the total percentage lent stands at 14% of gold holdings. Remove from this calculation the three non-lenders already mentioned, as well as the European countries that do not lend, and the overall percentage increases to 25%. Further details of the percentage committed to the lending market are given in appendix 1.

This total figure actually masks some extremely interesting regional differences, which immediately give insights into the potential new lending or, indeed lack thereof, especially post the Washington Agreement. Our analysis showed that the Latin American countries on average have the greatest percentage of reserves on loan (or on swap), in excess of 50%. Australia and Africa averaged a little over 25% and 35% respectively. The “other countries”, which included the USA, averaged 10%; a figure that obviously increased dramatically (to a little under 50%) when the USA was excluded from the analysis. Interestingly, within this broad category, the Eastern European bloc revealed a high level of lending in percentage terms, although of course from a relatively low base in volume terms. Finally with

[3] The rationale behind this is that it can then easily accommodate updating changes in both lending and holding policies, such as the recent developments in Kuwait, Jordan and Malaysia respectively.

Western European lending on average at 15% and representing 45% of total existing liquidity, the importance of the Washington Agreement again becomes fully apparent.

As already alluded to, in terms of lending attitudes, a full spectrum of philosophies and practices evidenced themselves during the research. A result that was perhaps rather surprising was confirmation that the formal official sector collectively is substantially less sensitive to lease rate movements than originally might have been expected. Decisions whether to lend at all, and at what level, appear to be taken for reasons often totally divorced from the performance in the lease rates. Having said this, there are indeed lenders who do react swiftly to developments in the lending market, some of which are contributors of considerable existing, as well as potential, volume. But in terms of numbers, they are relatively few and far between. Substantially more widespread is an artificial and largely arbitrary limit placed on lending in terms of volume (as opposed to percentage), which then operates under normal lease rate conditions. This decision is taken at board level and then implemented, irrespective of developments in the lending market, except in most unusual circumstances. A number of countries - for example, Korea, Switzerland and the Netherlands - have reported their lending limits in just this manner. In the absence of measurable price elasticity, the implication is a less market-orientated structure and one substantially more subject to bureaucratic decision-making.

The extent to which this situation could change, post the Washington Agreement, is of great relevance to future lease rate behaviour. Thus the question must be asked: will the Washington Agreement precipitate a re-assessment of lending policies currently in place by non-Agreement countries? If so, will the Agreement render lending policies by non-signatories more or even less lease rate sensitive? Of all the findings to come out of this study, this is one area recommended for further and continued research and monitoring.

With respect to tenure and the period out to which the official sector is comfortable lending, the research also revealed some rather surprising results.

A widespread observation made by the commercial banks during interviews was the fact that the official sector was increasingly more willing to lend out for progressively longer periods, primarily via the use of lease rates swaps[4]. This applied not only to existing lenders but also to newcomers to the market who initially lent out mainly into the 1 month but, with time, were increasingly prepared to roll their lending into the 3 and 6 months. Intuitively, this is certainly what might be expected. However, statistically we could find no empirical evidence to

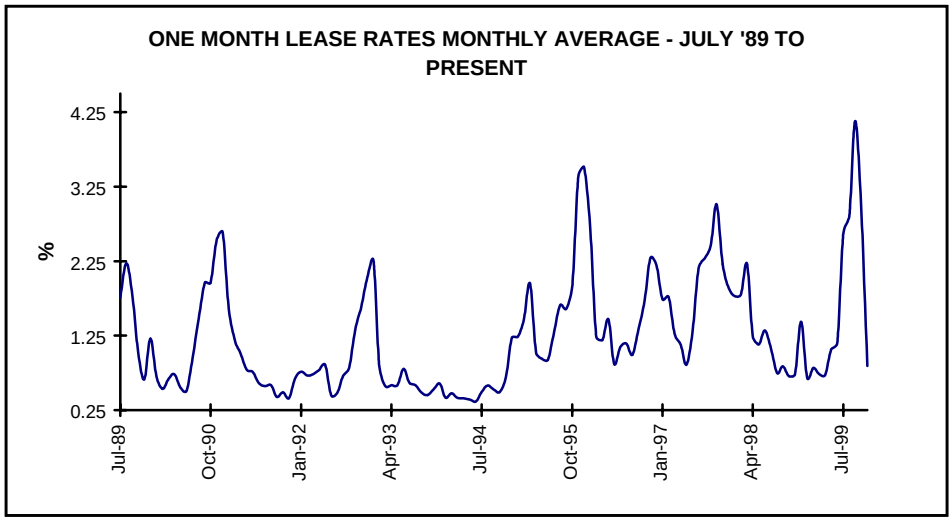
[4] These products are discussed in detail in chapter 5. They should, however, be immediately identified as being very different to some of the more leveraged lease rate products used until recently by the mining industry.

support this. An analysis of daily lease rates going back to July 1989 showed no convergence between the 1 and the 3-6 month cost of borrowing gold. A further analysis of the dollar-based contango also failed to reveal a long-term convergence of the rates[5]. Perhaps with time, this phenomenon may evidence itself in the data. The move towards the official sector lending to longer tenure has important implications for the creators and users of derivatives in that it could alleviate a long standing mismatch between the lending market and the dates out to which producers have elected to hedge. The trend might also have cost implications with respect to the pricing of longer dated derivative products.

The historical lease rate market

The last decade

The ability to track the lending market with any degree of accuracy is a relatively new phenomenon. Historically, there was no formalised reporting of the lease rates and thus a reliable data series was not easy to come by. This situation was remedied in July 1989 when a dozen market makers began contributing to GOFO, the Reuters screen quoting daily gold forward rates. These rates, essentially the convergence of indicative market levels, now give a very good indication of the state of the pool of gold liquidity and the GOFO page is one of the standard sources of reliable gold market information. The accompanying chart shows the history of the 1 month lease rate on a monthly average basis, covering a decade of Reuters reporting.



Data source: Virtual Metals Research & Consulting Databases

Even with its brief history, the GOFO data has provided useful insights into the workings of the gold market. The gold borrowing costs clearly respond to pres-

[5] The only convergence seen was in late 1992 and late 1999 when the leasing market was under severe short term pressure, a result entirely in keeping with what one would expect.

sures within the gold market and this in turn influences the contango earned by selling forward. Furthermore, both the cost of borrowing gold and the contango have important implications for the creators and users of derivatives alike.

Recent history has shown that changes in the cost of borrowing gold originally have come from both the supply and the demand sides of the industry. The influences exerted by the demand side (primarily through producer hedging) are less obvious than the supply side and have come about mainly in the form of ensuring consistent year-on-year growth in the industry. In other words, without the demand for leased gold, the growth in lending would simply never have materialised.

The influence of the supply side is more obvious when assessing specific changes in the lease rates and a number of instances are worth citing.

The sharp increase in the cost of borrowing gold in late 1990 provides the first clear example of how a withdrawal of supply from a central bank can impact on this market.

In May 1990, Drexel Burnham Lambert filed for Chapter 11 status in the United States. At that time, its commodity trading arm had central bank gold on deposit. While the Bank of England ensured that all contracts entered into with the UK subsidiary, which was solvent, were honoured, it still had important implications for the central banks involved with Drexel's operations outside the UK. This situation clearly alarmed the central banking community and many withdrew (most only temporarily) their metal from the pool of liquidity. This contraction of lending by the central banks placed sharp upward pressure on the cost of borrowing gold.

The chart also shows that again at the end of 1992, the cost of borrowing metal responded sharply to another withdrawal of gold from the lending market. This proved to be the Dutch removing liquidity from the market in preparation for their sale of 400 tonnes.

Subsequent and periodic sales from both the Dutch and Belgian central banks throughout the mid- to later-1990s[6] continued to manifest themselves in sporadic increases in the lease rates. The correlation was a particularly strong one, to the extent that the market began to interpret any increases in the lease rates as possible central bank activity. This perceived cause and effect was probably the major source of the rumours which constantly circulated in the market during that period (some of which indeed were later substantiated) and served only to undermine sentiment and erode confidence in the price.

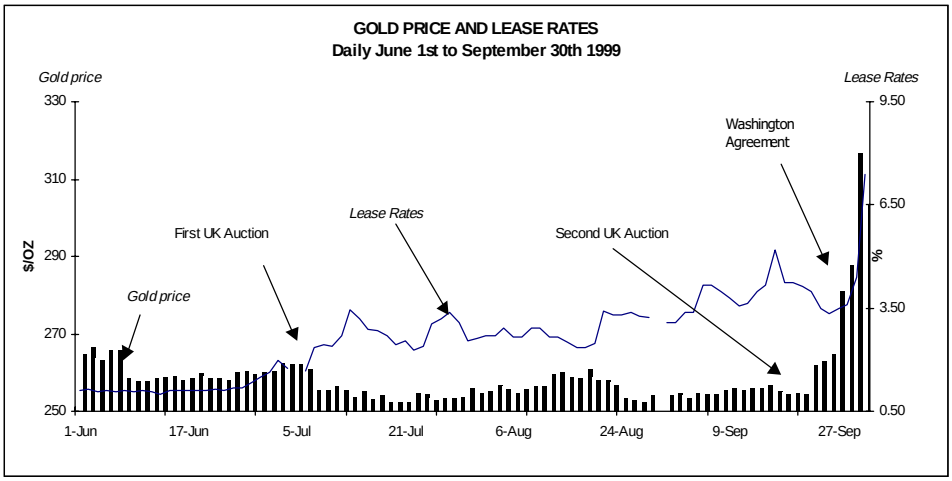
[6] 1992: Belgium 202 tonnes and Dutch 400 tonnes; 1995 Belgium 175 tonnes; 1996 Dutch 300 tonnes and Belgium 203 tonnes.

The very sharp increase in the lease rates in late 1995 was of particular interest in that for the first time, the rally was sufficient to swing the gold price into backwardation (albeit only for a very short time). The other interesting feature was that the backwardation was generated by both the supply and demand sides of the lending market. The completion of the Belgian sale of 175 tonnes, plus the combined execution of two of the largest ever hedge programmes,[7] effectively proved too much for the pool of liquidity to bear. Only very swift intervention on the part of a number of official institutions helped restore the contango and ease the liquidity squeeze.

The period June to December 1999

The period between end June and end December 1999 was probably the most eventful in the history of the gold lending market rendering the collation and finalising of the statistics for this study substantially more difficult than originally envisaged.

July 6th saw the first UK Treasury auction of 25 tonnes. The auction attracted a subscription ratio of 5.2 with bidding from the bullion dealing community and the mining industry alike. Strong interest from the dealing community was early evidence of a market in some need of liquidity and, in fact, the lease rates began to tighten shortly afterwards. This upward trend continued throughout July, although quite why this was the case is not clear. With no confirmation of a specific transaction and hence obvious cause, it may come down to a reason as mundane and basic as a general tightening of overall market conditions. September 21st then saw the second UK auction with an even higher subscription ratio of 8 and lease rates tightened even further. Thus it is a statistical fact that the Washington Agreement was made on September 26th into a market subject to higher and rising, rather than weaker lease rates. Details of the Agreement and the market implications of this announcement are dealt with later in this chapter.



Data source: Virtual Metals Research & Consulting Databases

[7] JCI's Western Areas and Gengold's Beatrix.

November then witnessed the third UK Treasury auction. At 2.1 times over-subscribed, there was considerably less interest shown than in the two previous sales. If the successful bidding on the part of a major gold miner is excluded, then demand for the UK gold was even lower than immediately apparent. The gold price responded accordingly. Without much time to recover it was then subject to the Dutch announcement of the intended sale of 300 tonnes over five years, with the first 100 tonnes in the first year of the Washington Agreement.

The Washington Agreement on Gold – an interpretation

On Sunday 26th September 1999, the members of the European Community (excluding Denmark and Greece), together with Switzerland, announced the following (referred to in this study as the Washington Agreement):

1. In future, the signatories of the Agreement would limit gold sales to those programmes already decided upon and would execute them at a rate of approximately 400 tonnes per annum not exceeding 2,000 tonnes over the next five years. Beyond five years, the agreement would be reviewed.

2. The signatories would limit new lending to the market to the extent that they had already lent gold and no new gold would be placed on deposit.

Those not signing the Agreement included Canada, USA, Japan, Australia, the BIS and the IMF. Subsequent to the announcement, the USA confirmed that it would be neither a buyer or seller. Japan confirmed its non-sale policy and the IMF and BIS confirmed that they would abide by the spirit of the Agreement.

The Agreement was entered into with the express intention of creating and encouraging a more transparent gold market and one that exhibits greater stability. While the immediate reaction of many gold sectors may not have given the impression of a market moving towards greater equilibrium and stability, (in fact quite the contrary!) a detailed analysis of the events and the circumstances is necessary to place the Agreement into the correct context, particularly with respect to the longer term.

Our interpretation of the Agreement is as follows:

- The total volume of metal intended for sale during the five-year period was decided on at the time of signature; the implication being that no members can now, or within the five-year Agreement, change their minds and elect to offer gold to the market;

- Those that have declared their intention to sell gold within the five-year period are not duty bound to execute those transactions and sales could be conceivably less than the 2,000 tonne allowance;

- There has been subsequent confirmation that the Swiss intend to sell their entire planned 1,300 tonnes within the five-year period and thus this sale will not extend beyond the initial Agreement period. Sales began on May 1st, 2000;

- Those members who are currently active lenders of gold are not duty bound to maintain their levels of lending. Thus the presence of the signatory countries in the lending market could decline in both absolute and relative terms. However, under the Agreement, signatory lending cannot increase beyond the levels established at the time of signing;

- In attempting to create a more transparent gold market, we assume that the Agreement was signed with the intention of removing a good deal of the uncertainty that was associated with previous sales, especially those of the Dutch and the Belgians;

- One concept which the Agreement press release did not deal with, was how the signatories intended to create or encourage a more stable market. Was it intended to be exclusively via the announced sales programme, which afforded the market a degree of clarity and removed a good deal of the uncertainty that had plagued the market throughout the 1990s? Or did the signatories anticipate that the lending moratorium might equally play a role by perhaps encouraging higher rather than lower leases? Did the signatories intend to reduce the level of carry trade and general speculative short selling of the market via the lease rates? In other words, can we assume that the implicit intention of the Agreement was to encourage an environment of higher rather than lower lease rates?

Analysis of the Washington Agreement on Gold and the prognosis for the future

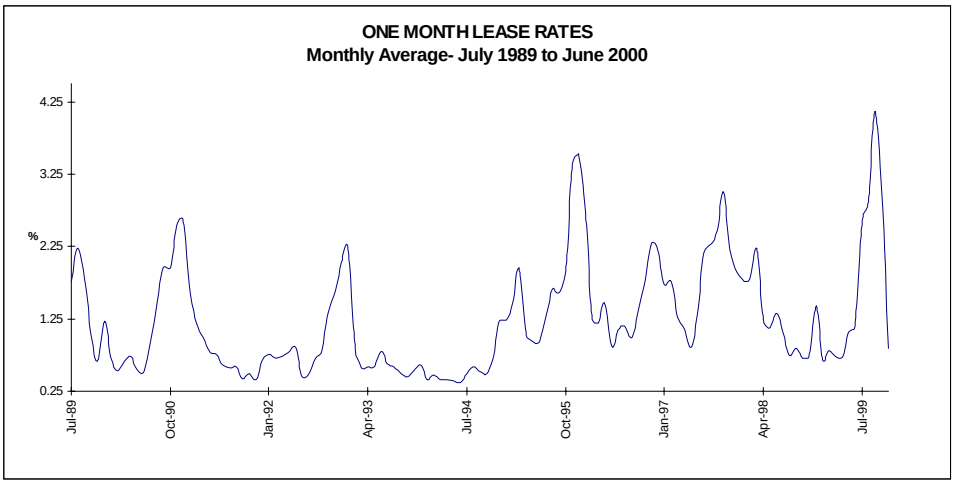
With the benefit of some months of hindsight, it is fair to say that the Washington Agreement has provided the gold market with a series of outcomes, which are intriguingly paradoxical. With respect to the producer's approach to hedging and developments within the commercial banking sector, especially as regards credit issues, the Agreement has effectively altered irrevocably the structure of the market. The consequences of this need to be assessed if we are to understand fully the implications for the derivative industry. However, with respect to developments in the lease rates, the Agreement appears to have only impacted in the very short term. The medium-term outlook seems unchanged with a "business as usual" outcome foreseen as the most likely result.

The immediate impact of the Washington Agreement on Gold

In terms of immediate market reaction (rightly or wrongly), the first statement of the Agreement, namely the limiting of sales to around 400 tonnes per annum, probably received substantially less response and coverage than might have been the case if it had been the only announcement made by the signatories. Overshadowing the sales announcement, by an order of magnitude, was the second part of the announcement, that being the moratorium on new lending. It is the moratorium that is central to any assessment of the lending market.

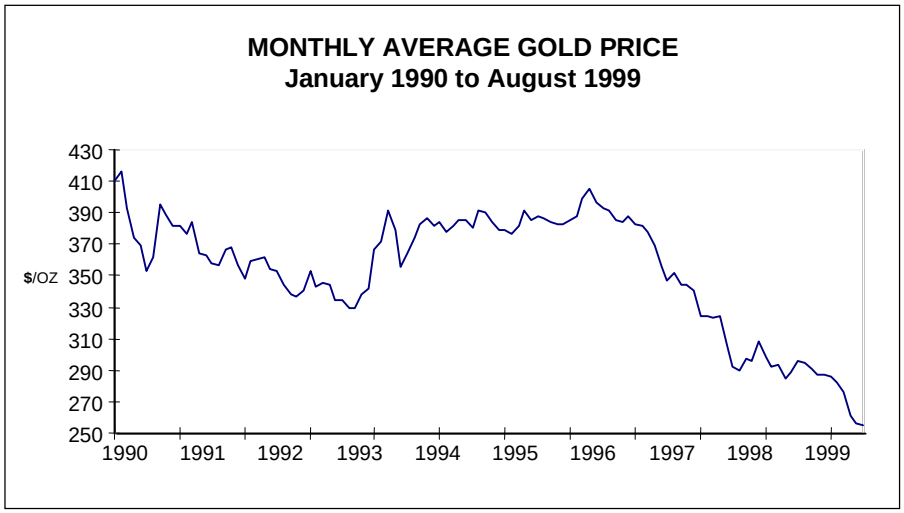
Prior to the announcement, the lending market operated under the basic premise that it would never be starved of liquidity for any period long enough to influence lease rates for more than a matter of days. Therefore, with the exception of the very brief backwardation experienced in 1995, the gold market was expected to remain in contango. Consequently, and virtually without exception, all derivative products that subsequently evolved were structured on this premise.

Past lease rates since the launch of GOFO are shown in the following chart.



Data source: Virtual Metals Research & Consulting Databases

The historical averages, low compared with the majority of money market rates, ensured, on average, a very attractive contango for gold and over the years this encouraged the use of derivative instruments designed to secure price protection on the short side. It also encouraged the carry trade whereby relatively inexpensive gold was borrowed to raise cost-effective dollars.



Data source: Virtual Metals Research & Consulting Databases

While it is very difficult (if not impossible) to isolate the exact cause and effect, the perceived unlimited source of lent gold which in turn kept lease rates low, certainly played its role in capping the gold price. As was pointed out in the Summary of this report, this of course was not the only factor, but we must accept that this was an influence. Thus, this lease rate regime coupled with a prolonged, weak and seemingly ever declining gold price only served to encourage further short positions held primarily by the mining companies and the associated bullion banks but also by the funds. The size of these short positions gradually increased over time but, more importantly, the overall position began showing markedly increased complexity and leverage in terms of the products that were being favoured, particularly those being actively used by the mining companies[8].

Faced with constantly declining prices (approaching total operating costs), the mining industry felt obliged to seek ever more sophisticated ways to enhance the realised prices they could secure and report to shareholders. The data shows that these higher prices were achieved by entering into a combination of option strategies and the use of various types of products associated with the lease rates. The longer the financial climate remained intact, the greater the incentive for the mining community to tie a greater proportion of their planned output, and in some cases, reserves to more complex derivative strategies. The total global hedge book therefore evolved swiftly, based on the premise that lease rates would remain comparatively low and reasonably stable.

[8] An analysis of the various products and their influence on the short-term gold price is set out in chapter 5.

The low lease rates also encouraged what has become known as the carry trade. Seen by a handful of large hedge funds as an inexpensive means of raising dollars, these entities were content to short the gold market particularly in a climate of declining gold prices that was unlikely to place any pressure on their exposures. Declining prices in turn attracted into the market the technical or momentum fund managers who merely served to contribute to the growing short position in gold[9] .

The announcement to the effect that those countries signing the Washington Agreement had placed a moratorium on new lending effectively forced the bullion banks (and the mining companies) to very rapidly reassess their lease rate and option exposure.

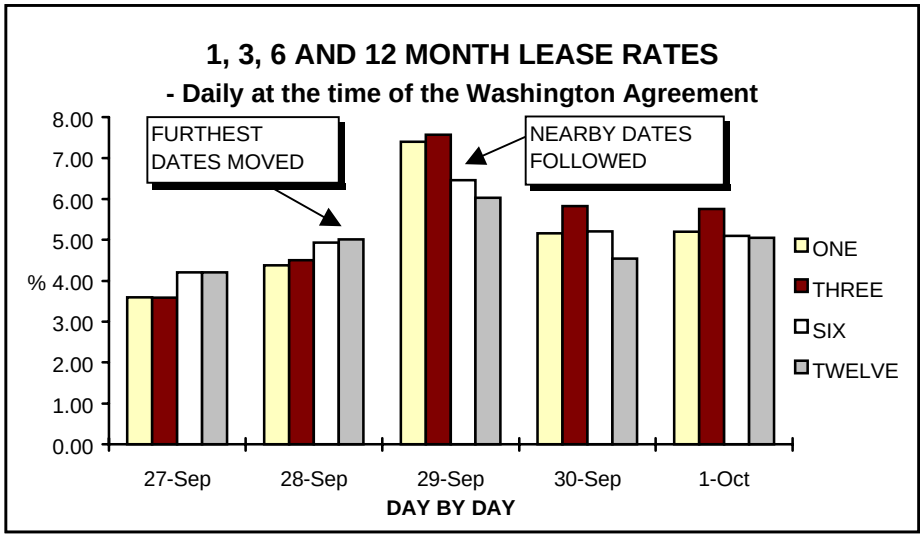
This is primarily because the signatories were *the* major potential source of new liquidity and in their absence, the cumulative market realised that it would be hard-pushed to find new and substantial sources of lending, particularly at very short notice. Thus, in the face of a possible shortage of liquidity to the lending market, the bullion banks rushed to cover their exposures and very quickly a chain reaction of events was set in motion during the first week after the announcement.

From what we can see, it was indeed the bullion banks who initially attempted to cover their lending exposures, doing so by managing their risk out to the further dated months. One of the major reasons for this was the fact the so few mining companies were subject to margin and this is addressed in more detail in chapter 2.

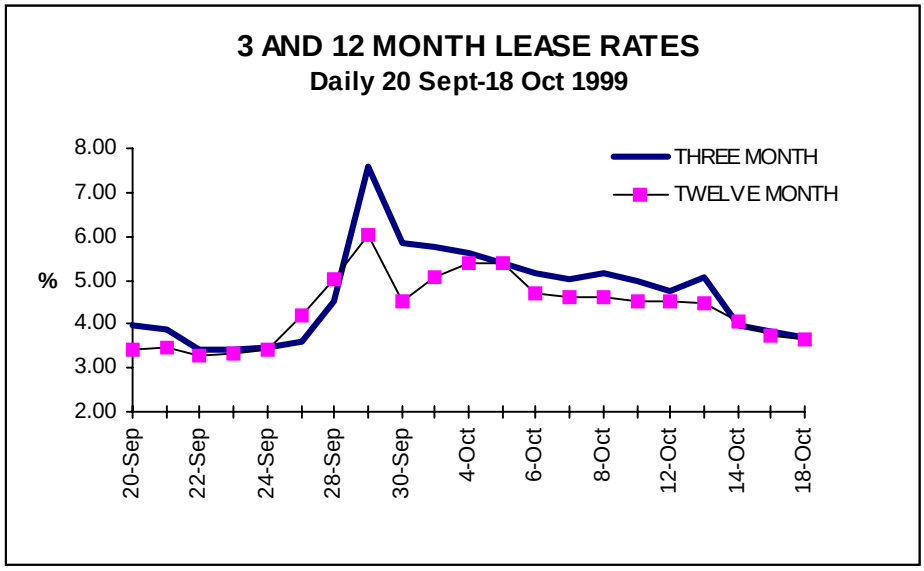
The banks' reaction was a natural one, in the initial belief (and probably hope) that this liquidity squeeze was going to be short in duration. As it happened it was, but without the knowledge of hindsight, the banks clearly had to assume the worst. This triggered a series of events that placed enormous pressure on the cost of borrowing gold. As the lease rates at the longer dated end of the curve rose, the covering swiftly spread into the nearby months. Thus the longer dated lease rates were the very first to come under pressure although the nearby months followed soon afterwards and the demand for liquidity was sufficient to tip the gold market into backwardation.

These series of events are shown quite clearly in the accompanying charts.

[9] This is discussed in more detail in chapter 4.



Data source: Virtual Metals Research & Consulting Databases



Data source: Virtual Metals Research & Consulting Databases

By midweek post the announcement, a good deal of producer business was being executed as mining companies restructured their hedges. The way this was executed in the market appears to have contributed to alleviating the liquidity shortage. This, together with additional liquidity beginning to emerge from non-Agreement countries, plus the commercial banks recalling consignment gold, was sufficient to re-establish the contango. What started as a trickle of liquidity soon become a flood and towards the end of the year the lease rates fell back sharply in response. Despite renewed surges in the gold price in the wake of

further short covering, especially during the second week after the announcement, this contango was maintained. During this process we believe that the pool of liquidity swiftly increased to an all time high of 5,500 tonnes thus increasing by almost 10% in the wake of a shock to the leasing market. The rate at which the additional liquidity (largely consignment-based) ebbed away during the closing months of 1999, was of particular interest. The core of lending (on the part of the official sector) appeared to have remained virtually immune to the developments in the market. It was therefore the marginal lending from the other sources which we referred to in the opening remarks of this chapter that demonstrate considerable sensitivity to the lease rates. This was particularly true of the consignment industry.

Our analysis of the liquidity requirements based on the producer hedge book alone (to end June 1999), suggested demand of additional lending on the part of the commercial banks of a minimum of 100 tonnes for every $25/oz increase in the gold price. This relationship operated during the first week all the way up to the mid $330s and appeared to be linear rather than exponential. Beyond $400/oz (although, of course, not tested), it appeared to fall away. Obviously this can only be an estimate and should be considered as a bare minimum since we did not have statistics covering other components of the OTC derivative market at that time, such as the proprietary trading on the part of the bullion banks and exposures associated with the hedge funds. One also needs to bear in mind that some of these additional exposures may have amplified the liquidity requirements while others may have partly offset them. The other important point is that since a good deal of the lease rate exposure was covered within a matter of days of the announcement, the 100t: $25/oz ratio ceased to apply shortly afterwards. To reassess this continually changing liquidity requirement needs a constant re-evaluation of lease rate exposures.

The weeks and months that followed the Washington Agreement showed a continued and very sharp decline in the lease rates. The closing out of a number of producer hedging positions only served to place further downward pressure on the rates. Pressure was sufficient to keep rates low, particularly at a time when the market might have normally expected some strength with year-end book squaring especially over the millennium period.

There appear to have been other factors, which cumulatively contributed to this slump in the cost of borrowing gold. Unconfirmed reports of a Russian sale of 80 tonnes during November might have been a contributing factor. Certainly, as already alluded to, the reversal of consignment stock especially from the Middle and Far East appears to have been larger than originally thought. This served as a source of immediate liquidity and we have attempted to take this into account in our “supply/demand” of leased gold. But more importantly, it became very clear at an early stage post the Washington Agreement, that the official sector itself was

a willing lender. Kuwait announced its participation to the tune of 79 tonnes. The country, a relative newcomer to the lending market elected to go from a position of very low lending to 100%, a decision that surprised the market.

The longer-term implications of the Washington Agreement and the outlook for the future lending market

The Washington Agreement raises a number of critical questions. Firstly, to what extent will the moratorium on new lending influence or even dictate future lease rate levels? Secondly, has the Agreement in effectively capping new lending to the market, altered the nature of derivative trading and product creation and was this the specific intention of the signatories? If the answer is in the affirmative, then the next question is: what impact does this have on future gold prices in the short, medium and longer term and what does it mean for the derivative sector?[10]

In attempting to address the first question, it is necessary to gain an appreciation of potential new lending to the market. The accompanying chart shows the calculated level of official sector lending that could come to market at various percentages (of available unlent metal). A number of explanatory notes place these figures into perspective.

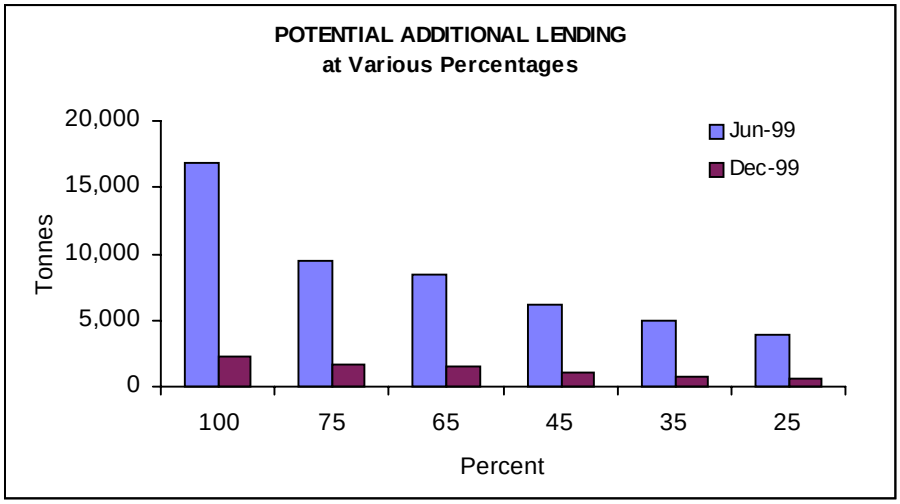
- The figures exclude the United States which maintains a policy of total inactivity in the gold market;

- The figures exclude the IMF as a potential lender on the premise that the organisation would need to alter its charter in order to do so;

- The figures do not take into account the possibility of Japan entering the lending market for the first time. The country holds 754 tonnes and thus, if the authorities elected to ease their policy of strictly no lending, it could prove to be a source of liquidity of some magnitude. At the moment, however, this appears to be unlikely;

- And finally, the figures exclude any estimates of increased lending from the private sector or quasi-official monetary authorities known to hold metal, the totals of which are not reflected in mainstream data.

[10] This last question is addressed in chapter 6.



Data source: Virtual Metals Research & Consulting Databases

The extent to which the Washington Agreement has effectively sterilised a very large proportion of potential new lending is all too apparent. One has to accept that it is most unlikely that a hundred percent of non-signatories' potential holdings would ever come to market and the total volume that could be mobilised in reality is probably less than 50% (of residual holdings not already on loan or swapped). Should this be the case, the total potential liquidity, post the Washington Agreement, now stands at between 560 and 1,000 tonnes. This compares with figures of over 6,000 to over 9,000 tonnes prior to the announcement.

Excluded in this assessment is the potential for the private sector to become a substantially more active lender of metal. An analysis of the total volume of gold held in private hands is an impossible task. However, we do know that over the past two decades, private holdings in the major developed countries have been consistently on the decline. At probably historical lows, the propensity for these holdings to provide a major source of liquidity is most unlikely. A similar assumption can be made regarding the metal held by various private and quasi-official organisations in the Middle East. Once very apparent in the market, having been the recipients of petro-dollars, these organisations are now substantially less active in the gold market. The other major potential source of liquidity then is the gold held by individuals in the Indian Subcontinent. The authorities have long attempted to tap this source of metal for some years now but so far without much success. However, this historical lack of success does not necessarily imply that this state of affairs will continue in future and it is strongly recommended that this potential source of liquidity is looked into in substantially more detail.

Quite apart from the volumes of potential future lending, the Agreement is likely to influence the structure and make-up of the pool of gold liquidity. With the

absolute levels of signatory lending now capped, any growth in the pool of liquidity will imply that their presence will decline in percentage terms. Will this then render the lending market increasingly more subject to lease rate sensitive responses as the other sources of lending become more dominant? Can we also expect that the lending market will become less and less subject to bureaucratic decisions, which by nature are associated with long lead times? If the answer to these questions is in the affirmative, then the gold market in general might be able to expect a lending market that responds more swiftly to lease rate changes than has been the historical case. Of all the recommendations resulting from this study, it is strongly suggested that this should be an area of continued research.

Our estimates of the actual tonnages of potential non-Agreement lending that might come to market and the possibility of this gold being more readily available, suggests probably sufficient future liquidity open to the lending market without placing undue upward pressure on lease rates. In other words, any upward pressure on lease rates as a result of the Washington moratorium on new lending will probably serve only to provide non-signatories with an opportunity to secure a better return on their gold, even if it is only in the short to medium term. Thus any effort on the part of the official sector to create a climate of higher average lease rates will require concerted and global intervention over and above the existing arrangements. This of course begs the question of whether or nor the lending market will in fact need additional liquidity. Chapter 2 dealing with producer hedging assesses current hedging practises and attempts to forecast future growth potential. It suggests a scenario in which the global hedge book is likely to change in profile and structure that might well in turn imply a need for less, rather than more, liquidity.

If the above arguments are correct, it addresses in part the second question, namely will the Agreement alter the nature and level of derivative activity? With little or no long-term impact on the lease rates, the Agreement will not directly influence the way derivative business is conducted. But in a sense, by triggering a price rally and backwardation in late September and early October, the Washington Agreement has already been the indirect cause of a major reassessment of producer hedging practices on the part of both the mining companies and the commercial banks. This is discussed in more detail in chapters 2 and 3 respectively.

CHAPTER 2 : PRODUCER HEDGING

Introduction and objectives

The object of this chapter is to analyse producer hedging which represents by far the greatest consumer of lent gold. Price risk management on the part of the mining community has been a function of the gold market for more than two decades. During this time, the presence of hedging as a day-to-day feature of the gold market has increased enormously in terms of both the volume of gold committed to forward sales programmes and the complexity of the products used to achieve price protection. In terms of the market's response to hedging it is probably fair to say that, perhaps second only to official sector attitudes towards gold in recent years, producer hedging has been the most controversial topic within the bullion industry.

The active hedgers currently maintain that what would be considered sound risk management business practices in other industries have been isolated and cited as *the* major reason for the constant disappointment in the performance of the gold price. The hedging debate, in holding the attention of decision-makers across the industry, has been raised to a level over and above its due. This, they argue, has only served to distract commentary and attention away from what are more relevant long-term market- and business-related issues, such as effective marketing and the understanding of regional physical markets. Those committed hedgers claim that they have been pressurised into a situation where they collectively feel the need to defend their hedging practices. This has consumed a vast amount of managerial resources, time and energy, which could have served the shareholders better by being channelled into more constructive areas of decision-making. Thus, they argue, we have a situation where well-managed companies have felt obliged to make public statements worded in a way that might only serve in future to render them hostages to financial fortune.

Those opposed to hedging welcome this public initiative, maintaining that their institutional shareholders are now questioning more than ever the wisdom of derivative practices which they accept as being instrumental in capping the gold price. They argue that hedging has destroyed the mining industry's collective opportunity to reap the benefits of higher gold prices. While they acknowledge that it cannot be proved in terms of conclusive statistics, they maintain that it is self-defeating to report average realised prices that greatly exceed spot prices if the mechanisms used to establish those hedge prices undermined the spot price in the first place. They argue that the unwinding of the hedge book on a global basis can only be supportive of the gold price and the market in general.

And between these extremes, we find those that are agnostic with respect to hedging, taking the attitude: if everyone else is hedging what choice do we have?

One further area of discussion is the question of how the market would respond to a premature and deliberate unwinding of the existing hedge position. As chapter 2 shows, by far the greatest hedge volume is clustered into the first four years of the global hedge book. This implies that the natural delivery of gold into those positions, even in the absence of a total buyback of the entire book, would imply that the short position would unwind reasonably swiftly (provided of course these positions were neither replaced or rolled over into further years). The deliberate closing out of the book over an even shorter period of time with the intention of creating a price rally concerns us a great deal. We fear that this sort of action could cause a dislocation in the lending market of such magnitude as to be most damaging to the longer term industry. Firstly, if it were ever perceived that the gold producers had taken a collective decision to manipulate the gold price, there would almost certainly be anti-trust implications. Secondly, the almost instantaneous unwinding of a hedge book that has taken more than a decade to evolve would create a vacuum in the lending market into which the lease rates would certainly implode. There is evidence to suggest that in the absence of even the most modest return on gold, the collective official sector might be inclined to become an even more aggressive seller of gold reserves. Furthermore, the lower the lease rates (particularly combined with higher US interest rates), the greater the incentive for the hedge funds to borrow gold, short the market and raise very cost-effective dollars. An escalation of the carry trade would be conducive to neither a stable nor appreciating gold price, certainly in the medium term.

Given all this controversy, the volumes of gold involved with global producer hedging and the fact that the mining companies have shown a propensity to make use of intricate and, in some cases, potentially volatile products, a detailed analysis of the hedging phenomenon is central to the understanding of the derivative market in general. This study embarked on a two-pronged approach in an attempt to gain a fuller understanding of hedging norms and practices.

In the first instance, a database covering statistical details of the international hedge position was constructed. Without the support and input from the international mining industry, the exercise would not have been possible. This research was completed on a six monthly basis covering 77 companies representing 1,275 tonnes, or 50% of total production of virgin metal in 1999[1]. Unlike any other research in this area to date however, this analysis placed emphasis not only on price-related derivative positions, but also lease rate-based exposures.

[1] Part of the methodology was to cross-check results against the data collated by Scotia Mocatta and Ord Minnett. Of the 50% remaining output very little, if any, is subject to hedging.

On completion of this, a second questionnaire was carried out involving the face-to-face interviewing of a little over 30 companies representing 1,025 tonnes or 40% of 1999 output. The questions posed were of a non-statistical nature and explored the mining companies' attitudes, practises and concerns pertinent to hedging and price risk management. The companies participating were selected specifically to give the statistical sample broad exposure to geographical trends, as well as to enable us to distinguish between different attitudes and hedging requirements among mature, emerging and junior companies. The results of this work are laid out and discussed later in the paper.

The findings and recommendations

The global hedge book has grown swiftly over the years and there are now only a handful of mining companies that do not have some form of hedging in place.

Circumstances suggest very strongly that the nature of the global hedge book is about to change and we cite a number of reasons for this. A limited number are working in favour of a firmer commitment to hedging. Substantially more however, are rendering the hedge decision more complex for the mining community to the extent that the miners are being limited in their alternatives and have markedly less latitude to do what many still deem necessary. The difficulty, of course, is taking all the factors into account and giving each its fair weighting in an attempt to forecast the direction and magnitude of the change and how that may influence the future gold price. This by nature remains a very subjective exercise and we can only hope to raise the issues for active debate and recommend strongly that further research is undertaken as events unfold.

Thus the following aspects need to be considered:

- The Washington Agreement, the subsequent sharp increase, equally swift decline in the lease rates[2] and the problems associated with two hedge books have focused the minds of the miners on the real hazards of using highly leveraged and complex derivatives. The results of the non-statistical questionnaire showed an overwhelming trend to a return to vanilla, tried and trusted products. While this is unlikely to affect net volumes hedged, it is probable that the global hedge book will be rendered less complex in its make-up. Both the primary and secondary delta hedging against the book is therefore likely to be less complex;

- In the absence of the more leveraged strategies, the mining industry will need to find more innovative ways of using vanilla products if they are going to

[2] Discussed in detail in chapter 1.

achieve average prices which greatly exceed spot. The rationale for adopting the more complex instruments in the first place was the fact that they generated the additional income that their vanilla sisters did not. This leaves the mining industry with a number of alternatives, many of which are not particularly promising.

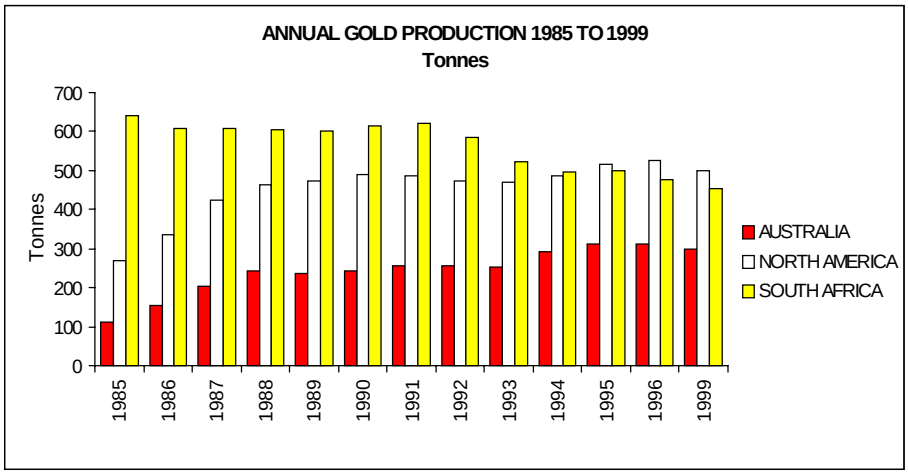
- Firstly, the miners wait for a higher gold price; something which recent history has proved on more than one painful occasion not to be relied on;
- Secondly, the miners turn their attention to higher US interest rates, which in turn will secure a more attractive contango;
- Thirdly, the miners can hope for persistently lower lease rates, which in turn will ensure a greater contango. An understanding of the lending market, and to put into focus how it is going to evolve, is then very important and in fact becomes central to hedging decisions. Currently, lease rates are favouring the hedgers. Their continued weakness at the moment looks likely but nothing in the longer term can be guaranteed;
- The fourth alternative requires proactive management by the miners during which they engineer higher compounded contangos. In the absence of exotic products this has to be achieved by stretching the tenure of the hedge books out as far as possible. The extent to which this could place pressure on existing credit lines remains to be seen and will no doubt vary enormously from company to company. It is, however, not a foregone conclusion that the miners will be able to fully achieve their aims via this fourth option;
- And finally, we could see a greater reliance on downside protection via put options. This is already favoured by many companies and leaves open the question of whether or not the cost of the options will continue to be offset, either in part or totally, via the writing of calls.

• The very sharp decline in exploration expenditure throughout the late 1990s is likely to be felt in the years to come with, firstly, less in the way of new projects which would otherwise require derivative-based project financing and secondly declining, or at least, stagnating production levels. Both will impact on the volumes to be hedged. The last two years have seen massive cuts in exploration and gold has borne the brunt of much of these declines. The accompanying table shows all too clearly two distinct features. Firstly, the sharp decline in commodity exploration expenditure as a whole and more importantly the extent to which gold has declined in importance as an exploration target relative to other commodities.

Exploration expenditure 1997-1999

	All commodities		Gold's	Gold	
	$billion	% Change	Share %	$billion	% Change
1997	4.03		65	2.62	
1998	2.83	-29.8	55	1.56	-40.6
1999	2.17	-23.3	50	1.09	-30.3

Data source: Calculated from Metals Economic Group as reported in the *Financial Times*, 6 January 2000



The accompanying chart shows the production profiles of the major producing countries. The gradual decline in output from South Africa is self-evident. With the South Africans entering the hedging arena so late, there is no correlation between production levels and volumes of hedging. North America is still exhibiting reasonably strong growth although this is being generated from the USA rather than Canada. North America, therefore, can be expected to continue contributing the lion's share of future hedging. Australian output is showing distinct signs of maturity and is expected to plateau at current levels, if not beginning to decline. In the absence of any aggressive exploration, the outlook for future growth is not particularly good. This in turn will influence the level of hedging generated from that part of the world;

- Lower exploration expenditure is not the only reason for an anticipated decline in reserve bases. If the gold price fails to rally or, more importantly, fails to find an equilibrium over $300 per ounce, the mining companies will eventually have to revalue existing reserves at lower prices and thus the ratio of proven, probable and indicated reserves and resources is likely to change. Lower proven reserve bases will limit the ability of some mines to hedge a greater proportion of gold in the ground;

- The Washington Agreement has raised the question of credit limits and margin within the commercial banking world. The non-statistical questionnaire (detailed later in this chapter) showed clearly that the majority of producers are currently margin-free and this state of affairs has been evolving gradually over the past five years. Since the mining industry remains vociferously opposed to margin, it is unlikely that the bullion banks will successfully renegotiate standard margin clauses back into hedging agreements. However, substantially more will be expected in terms of disclosure. The extent to which this might affect hedging decisions is debatable and in any case greater levels of disclosure will be dictated by the new accounting practises. Of more significance is the possibility that the bullion banking industry will levy an increased hedging premium in place of margin which could well alter substantially the cost of hedging, especially for those companies deemed to be greater credit risks. Alternatively margin agreements might be reached whereby it can only be called after a set of pre-agreed financial parameters are broken;

- The introduction of new accounting practices, specifically FAS133, is likely to influence hedging policies and practises in two ways. Firstly, it will enforce a greater level of financial disclosure associated with price risk management. Secondly, it is likely to influence the choice of derivative product, depending on how those products are defined for accounting purposes. Those defined as hedges will probably be favoured in future over those defined as speculative instruments (non-hedges) requiring quarterly accountability in the income statements. This implies greater reliance on forward instruments and put options and perhaps less in the way of call option writing and use of exotics. This in turn will influence the net impact of the hedge book on the price of gold via the delta hedging;

- An analysis of current realised prices against *total* costs shows that in Australia and North America, the costs of the marginal producers are not being fully covered. This begs the question of whether the producers can afford not to hedge, especially in the absence of any sustained improvement in the gold price. There is therefore an argument that says, sentiment and media pressure aside, there is the possibility that some producers may have no choice but to continue hedging;

- The Washington Agreement has very recently raised the question of hedging in the minds of some institutional investors mainly in Europe and North America but less so in Australia. Changes in shareholder perceptions and acceptance of hedging could well emerge as a factor of increasing importance.

All these factors suggest a particularly challenging future for the mining industry with respect to their attitudes towards their hedge books and also with respect to the flexibility they have with which they can remodel their hedging portfolios.

In the next few months, if we indeed see a growing trend towards public announcements to the effect that companies will no longer add to hedge books and *assuming that the existing contracts are not rolled* but delivered into, it implies that the hedge book will contract sharply. However, in doing so, and as demonstrated later in this chapter, a greater proportion of future output is swiftly going to become more exposed to total costs. It is most doubtful that the mining industry will be able to pare costs to the extent that the reduction offsets completely the loss of price protection currently afforded by the hedge prices. This line of reasoning also begs the question of whether or not the gold price would respond positively to a more subdued approach to hedging. If it did, which is likely if the hedge book contracts by a substantial margin, then the higher spot price might counterbalance the reduced reliance on existing realised prices. If, however, the gold price failed to respond to a change in hedging norms, then the mining companies would be even worse off. By delivering into higher realised prices, they would quickly become more exposed to lower spot prices, which in turn, would only serve to expose them more to their total costs.

Media announcements relating to this issue certainly appear to have had an impact on the gold price. But this has been very short in duration and appears to have been associated with improved market sentiment rather than a perceived structural improvement or a meaningful change in the status quo. Therefore, it is not a forgone conclusion that any attempt by the mining companies to influence the gold price via public statements relating to any limits on new hedging, will have a lasting and sustainable impact on the gold price. Only a complete global moratorium on hedging, which would involve the closing out or delivery on existing contracts without the establishment of new ones or the rolling forward of existing ones, as already mentioned would cause the hedge book to devolve swiftly. The volumes associated with the nearby delivery dates are of sufficient magnitude to impact on the total short position in gold. Should this occur, there could well be far reaching implications for both the gold price and the lease rates.

The findings of the statistical questionnaire

The statistical questionnaire addressed hedging data covering 77 companies, representing 60% of annual production in 1999. As of the end of December 1999, the total nominal volume of gold associated with various price risk management products totalled 4,038 tonnes (158% of 1999 physical production). This compares with a nominal total of 3,048 tonnes (120%) and 3,908 tonnes (153%) as of December 1998 and June 1999 respectively. The accompanying table shows how this has changed during the calendar year 1999. The table also details the

various products in use showing the marked preference for forwards and spot deferreds as well as the common practise of buying put options and writing calls.

Nominal total hedging by product

Hedging	End Dec-99 Tonnes	End Jun-99 Tonnes	End Dec-98 Tonnes	End Dec-99 Mn oz	End Jun-99 Mn oz	End Dec-98 Mn oz
Forwards	1,510	1,218	793	48.5	39.2	25.5
Spot deferreds	524	756	652	16.8	24.3	21.0
Floating forwards	107	74	0	3.4	2.4	0.0
Convertible forwards	12	11	0	0.4	0.4	0.0
Variable price forwards	36	7	7	1.2	0.2	0.2
Puts bought	870	899	794	28.0	28.9	25.5
Puts written*	15	12	4	0.5	0.4	0.1
Calls written	832	819	665	26.7	26.3	21.4
Convertible puts bought	133	115	0	4.3	3.7	0.0
Knockout puts bought	14	9	9	0.5	0.3	0.3
Calls bought*	429	167	64	13.8	5.4	2.1
Gold loans*	0	8	6	0.0	0.2	0.2
Kick in calls written	0	0	127	0.0	0.0	4.1
Total	**4,038**	**3,908**	**3,048**	**129.8**	**125.7**	**98.0**
Total offset*	444	187	74	14.3	6.0	2.4
* Products offset						
Nominal hedging as % of 1999 output	158	153	120			

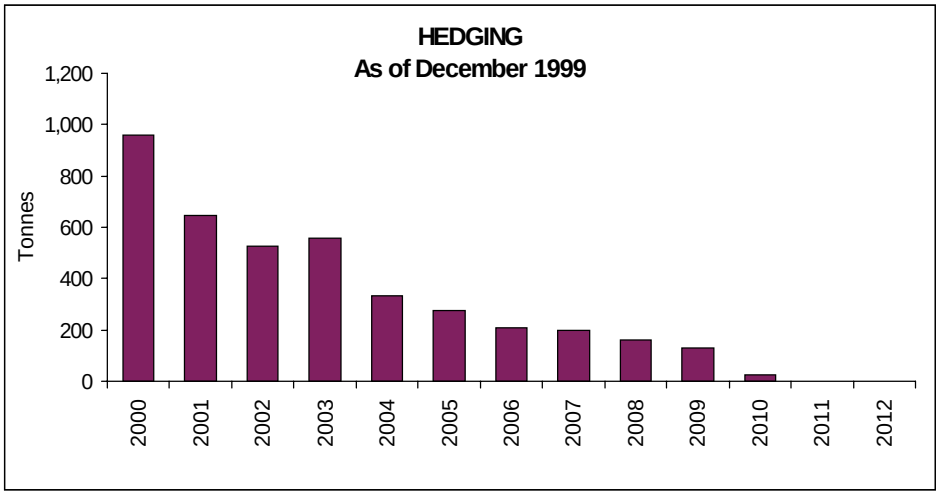
It should be noted that the puts written, calls bought and gold loan repayments have been deducted from the total since they exerted a net positive influence.

These nominal values, as reflected in the table, are actually misleading as they over-emphasise the *net* impact of hedging on the market. To remedy this, it is necessary to calculate the deltas on all options positions; a figure which can then be added to the sum of all the forward positions. The reason for this is because all forward products impact immediately on the market to the full 100% of their underlying value, whereas only a proportion of the options have an influence on the market depending on their tenure and their strike prices relative to the spot price. While the delta can and does vary between option strategies, overall in total and under normal circumstances, it can be expected to be well below 50% of the total underlying option position.

As of end June 1999, we estimate that the delta on all the options was a little over 40% which effectively reduced the total hedging impact during the first half of

the year to 90.4 million ounces or 2,812 tonnes. This equates to 112% of total 1999 primary output. By the end of the year, this total had increased to 97 million ounces or 3,021 tonnes or 120% of 1999 output. Without doubt, the vast majority of this net addition to the hedge book came during the third quarter of the year as prices languished below the $260 per ounce level. We are also of the opinion that the net increase would have been substantially larger had it not been for the Washington Agreement announced on September 26th. The consequent price reversal generated a spate of hedge restructuring and in many cases, actual buybacks with a net reduction in derivative exposures.

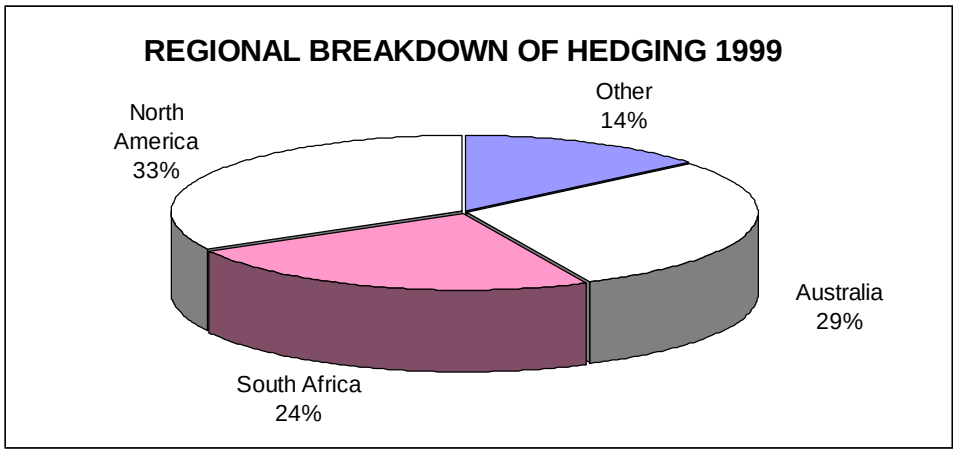
In terms of tenure, although credit lines extend out 15 years, the international hedge book for which we have data does not go out beyond the year 2012. As the accompanying chart shows, the bulk of the hedging is very much clustered into the nearer years. However the mining community placed a good deal of emphasis (at least vocally in our interviews) on the need to be able to execute longer-term strategies. While not much volume in fact has gone through beyond years 5 or 6 of the hedge book, longer credit lines give the producer the agility to roll contracts over should price movements make this desirable.



Data source: Virtual Metals Research & Consulting Databases

This profile is significant. It implies that should the mining industry in general elect not to add to the hedge book over the next eighteen months and merely deliver into existing contracts (as opposed to rolling them), the total outstanding short position associated with price protection would fall away swiftly.

In terms of geographical spreads, the following chart shows that the major producing regions of the world, namely Australia, North America and South Africa, are reasonably equally represented, even though North America accounts for the largest percentage of the hedge book.



Data source: Virtual Metals Research & Consulting Databases

This profile has not always been representative of the industry. During the early to mid-1990s, the hedge book was characterised by the dominance of Australia and the under-representation of South Africa. The consolidation of the Australian industry, plus the fact that the average life of a mine in the open pits in that region is relatively short, have clearly had a marked impact on the level to which the country is hedged. Thus the production from the relatively shallow, low-grade open pits which characterised the Australian industry was actively hedged during the late 1980s and early 1990s. As these pits approach the end of their useful lives, the hedge profile from Australia can be, and indeed has been, adjusted accordingly.

The South African situation is different. From reluctant hedgers (mainly due to historical legislative reasons) and hence their late arrival to the world of hedging, the mining houses have swiftly caught up with respect to price risk management. The late 1990s saw the South Africans in essence pioneer the complex project specific hedge programmes associated with Western Areas and Beatrix.

Despite a declining gold price (specifically in US dollar terms), the global mining industry, on average, is still realising prices that are in excess of spot prices. The accompanying table shows this. It lists specifically the number of features summarised from the detailed statistics, which appear in Appendix 2. It must be noted that this analysis covers the global book to full tenure and this does not necessarily reflect achieved hedge prices in any particular delivery period.

Essentially, the table calculates the average potential realised hedged prices in all three major hedging currencies for three price periods, namely the average gold price for 1999 and the average spot prices at the beginning and the end of each six monthly period under review.

A feature of this table is the fact that South African rand denominated hedging achieved the highest realised prices compared with spot. This is almost certainly a function of local interest rates in that country. But there is possibly another reason why this could have been the case. With the restructuring of the South African mining industry over the past two to three years has come a restructuring of some of the major hedge books. In some cases, a feature of this restructure has been the deliberate tilting and flattening of the contango curve whereby longer tenure contango has been loaded into the nearby years, thus boosting short-term revenues at the expense of profits in the later years. The magnitude of this restructuring was such that it could have had an impact on current realised prices.

Average realised prices of the global hedge book

Pecentage gains over spot prices

	End Dec 1998			End Jun 1999			End Dec 1999		
	A$	US$	ZAR	A$	US$	ZAR	A$	US$	ZAR
Average for the year									
All forwards	26	28	62	30	29	48	32	28	50
All puts bought	26	18	54	39	29	63	31	22	21
Puts written		1	10		-2	11	6	-6	
Calls written	17	24	41	18	27	50	24	26	48
Calls bought	80	18	14	11	29	23	48	19	29

	End Dec 1998			End Jun 1999			End Dec 1999		
	A$	US$	ZAR	A$	US$	ZAR	A$	US$	ZAR
Average at the beginning of the six monthly period									
All forwards	27	29	65	41	38	58	44	37	61
All puts bought	27	18	57	51	37	74	43	30	30
Puts written		1	12		5	19	16	0	
Calls written	18	25	43	30	35	60	35	34	59
Calls bought	81	19	16	21	38	31	61	27	38

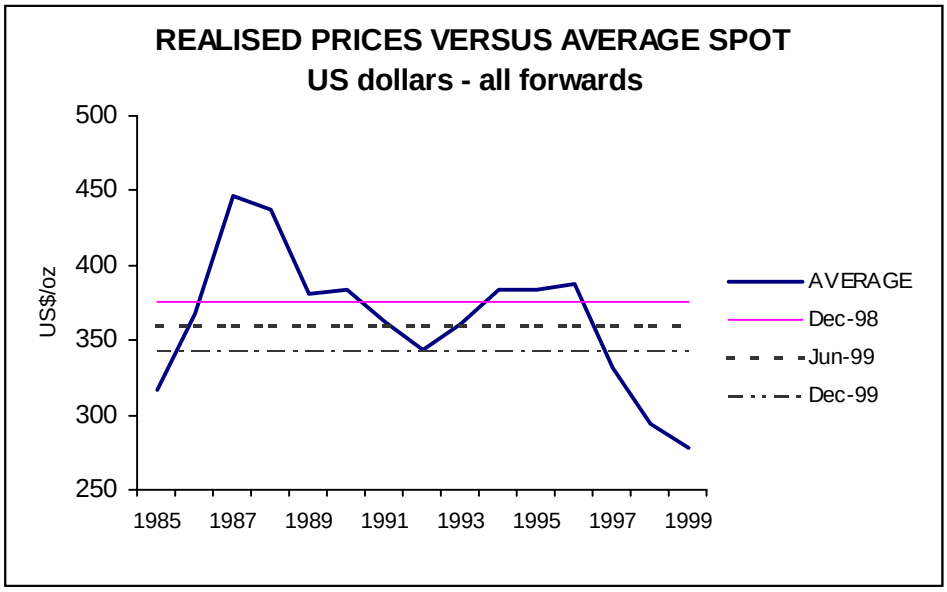
	End Dec1998			End Jun 1999			End Dec 1999		
	A$	US$	ZAR	A$	US$	ZAR	A$	US$	ZAR
Average at the end of the six monthly period									
All forwards	23	29	72	27	27	44	29	26	47
All puts bought	22	19	64	36	27	59	28	20	18
Puts written		2	16		-4	8	4	-8	
Calls written	14	25	49	15	25	46	21	23	145
Calls bought	75	19	21	9	27	20	45	17	26

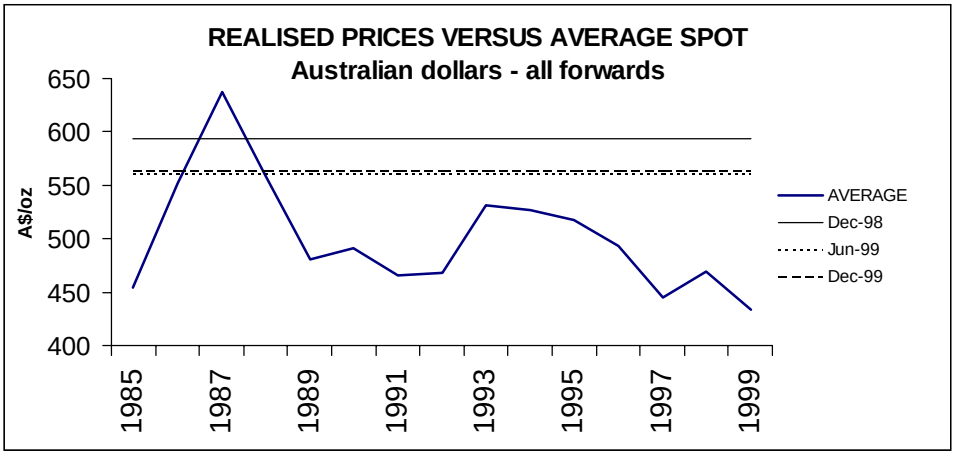
See Appendix 2 for full statistics

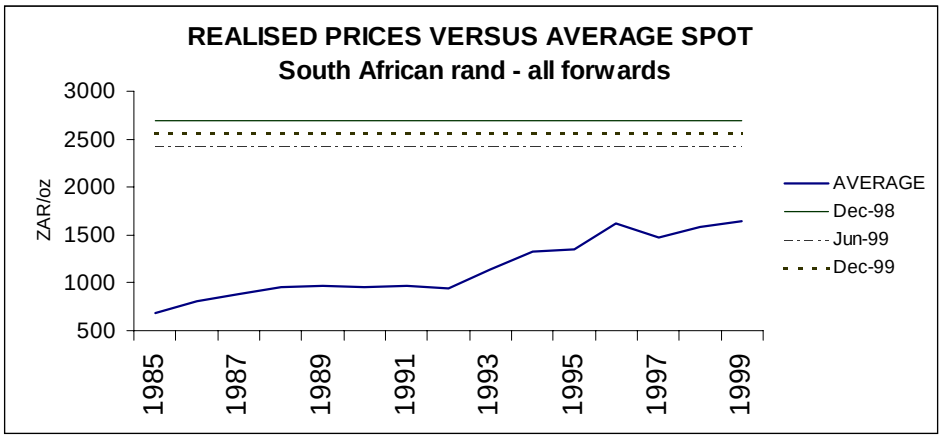
The other interesting feature is that the average strike prices at which the miners have written calls are not quite as far-out-of-the-money as one might expect. This is particularly true of the calls written in Australian dollars during the first half of 1999. The reason for this is a function of the higher premium earned on options with the strike price closer to the money, particularly if the mining community anticipated further declines in the gold price. In other words, these strike prices are a very clear indication of how the mining industry perceived future prices just prior to the Washington Agreement. It is interesting to see that the premium over spot at which these calls were written during the second half of the year widened in the wake of the Washington Agreement – again a good measure of producer sentiment.

The fact that the put options have been written on average at a discount, or near discount to spot, is exactly what would be expected.

Another interesting analysis of realised prices looked at how current hedged prices have compared with the historical performance of the gold price in the three major hedging currencies. The following three charts show these comparisons for all the forward products in US dollars, Australian dollars and South African rand respectively. They demonstrate that in terms of Australian dollars and South African rand, the realised prices over the last year have been consistently above spot and by a wide margin. This is not the case in US dollars, with the exception of the last three years.







A similar analysis was completed for the average prices at which put options have been bought to protect the downside. A virtually identical profile was seen for each of the three major hedging currencies.

The next section of this chapter demonstrates that the ability to cover costs was cited during most mining company interviews as the prime and most important reason for hedging. Thus an analysis of the cost structure of the industry was necessary to ascertain the extent to which this is being achieved. The analysis that follows studiously avoids any examination of cash costs or operating costs since we believe that these do not reflect the true profitability of the industry. We have concentrated only on total costs[3] and calculated the percentage points or deciles

[3] The data was derived by Brook Hunt & Associates and is used with permission. Total costs are defined as Brook Hunt's C1, C2 and C3 costs.

at which the costs lie. These were then compared to the weighted average US dollar realised price by major product. The results are shown in the accompanying table but a number of observations need to be made about the data. Readers should keep in mind that this analysis looks at which decile on the cost curve is covered by the various average hedge prices.

Analysis of realised prices versus total operating costs

C3 Costs

	US$/oz		
Decile	North America	South Africa	Australia
10	220	219	214
20	237	231	239
30	290	241	259
40	308	267	273
50	308	284	297
60	316	290	326
70	334	305	334
75	342	309	344
80	348	314	351
90	397	338	409
95	440	349	449
100	604	385	852

Realised prices of the hedge book as of 1999 as a percent of total costs

Currency denominated hedging expressed in US dollars

End June 1999	Weighted Average Price	Decile points covered		
		North America	South Africa	Australia
All forwards	363	80	95	80
All puts bought	377	80	95	80

End December 1999	Weighted Average Price	Decile points covered		
		North America	South Africa	Australia
All forwards	365	80	95	80
All puts bought	351	80	95	80

Regional analysis irrespective of hedge currency

End December 1999
Average realised prices

In US dollar terms	North America	South Africa	Australia
All forwards	372	399	365
All puts bought	310	349	364

Total costs on the costs curve covered

	North America	South Africa	Australia
All forwards	80	100	80
All puts	50	90	80

Data Sources: Brook Hunt & Associates, Virtual Metals analysis

Firstly, the results may come as a surprise to those accepting the conventional wisdom, which states that the South African industry incurs the highest costs. This might, in some cases, be true of cash costs but it is certainly not true of total costs. South African mines compete favourably in terms of total costs since the industry is relatively debt free and thus incurs little in the way of the interest charges accrued in Australia and North America.

Secondly the table shows that if the average realised prices for each product are considered as a benchmark for the reporting periods, then 80% of the total costs accrued by the Australian and North American industries are covered. The only exception to this are Australian dollar denominated calls bought within the second half of 1999. The overall picture for South Africa is healthier with 95% of total costs covered by realised rand denominated prices.

However, given the fact that many mining companies in South Africa and Australia hedge in both their local currencies and US dollars, a more detailed regional analysis was completed taking this into account. The same table shows the results. The total cost coverage with respect to all forward products proved to be broadly similar to the currency denominated analysis. The major variation in the results came with respect to the puts bought by the North Americans. The average strike price at which these puts were written only covered 50% of North American total costs.

In any cost analysis, we would consider the ninth decile (90%) as being the cut-off which defines marginality. Thus we conclude that the average realised price for global hedging is not quite covering the total costs of the marginal producers. The implications are of considerable importance when making any assumptions about

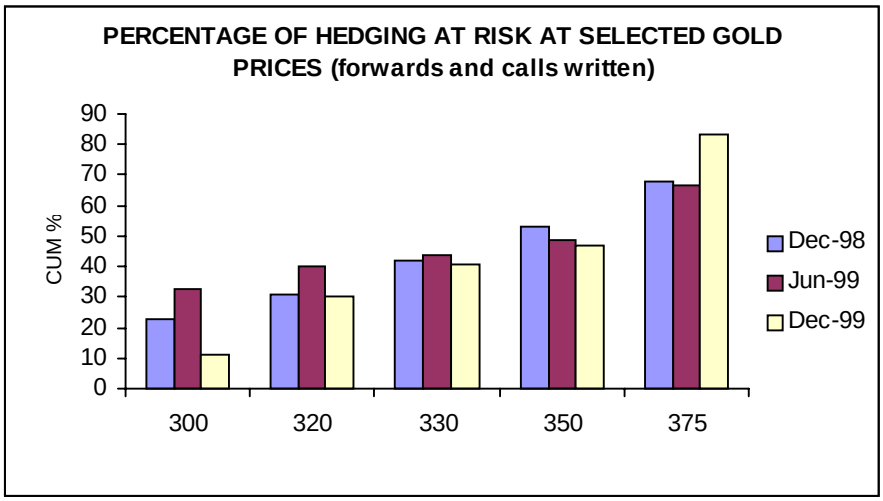
the future of the global hedge book. It is true that cash costs are the key determinant in assessing the profitability of an existing mine. But total costs are important over the whole life of a mine, including exploration and development. If this state of affairs continues, it must imply a higher probability of natural attrition in production levels in the years to come than the conventional cash cost analysis would reveal (unless of course, the mining industry can continue to reduce its costs). The analysis however also raises the question: can the mining industry at current prices afford not to hedge? In the next few months, if we indeed see a growing trend towards public announcements to the effect that companies will no longer add to hedge books, and assuming that the existing contracts are not rolled but delivered into, it implies that the hedge book will contract sharply. However, in doing so, a greater proportion of future output is swiftly going to become more exposed to total costs. It is most doubtful that the mining industry will be able to reduce costs to the extent that the reduction offsets completely the loss of price protection currently afforded by the realised hedge prices. This line of reasoning also begs the question of whether or not the gold price would respond positively to a more subdued approach to hedging. If it did, then the higher spot price might counterbalance the reduced reliance on existing realised prices. If, however, the gold price failed to respond to a change in hedging norms, then the mining companies would be even worse off. By delivering into higher realised prices, they would quickly become more exposed to lower spot prices, which in turn, would only serve to expose them more to their total costs.

In terms of product usage, the industry still exhibits a marked preference for vanilla forwards, the buying of put options and the writing of calls. The summary table shown in the introduction to this chapter shows that there has been limited usage of forward variants and exotic options, although in volume terms they are by far in the minority and, in fact, are confined to a very limited number of companies. We have separated them out in all the analyses since, especially in the case of exotic options, their deltas can be several times the total volume of the underlying and therefore their behaviour under volatile market conditions can be unpredictable[4] .

One of the most revealing areas of the analysis was an assessment of the various price levels at which the hedge book was at risk of being out of the money. Two time horizons were assessed and then compared, namely the hedge book as of the end of June 1999 and the same book at it stood at the end of December 1999. These two snapshot views provided a particularly useful comparison in that they highlighted the hedging reaction to the Washington Agreement of September 26th. The price exposure for the forwards, spot deferreds and call options written

[4] A description of these products can be found in chapter 5

were assessed for the total of the first two delivery years in each period.[5] These were compared to gold price levels in US dollars, Australian dollars and South African rand. The results are listed in detail in Appendix 2 but a summary of the results is shown graphically in the accompanying chart.

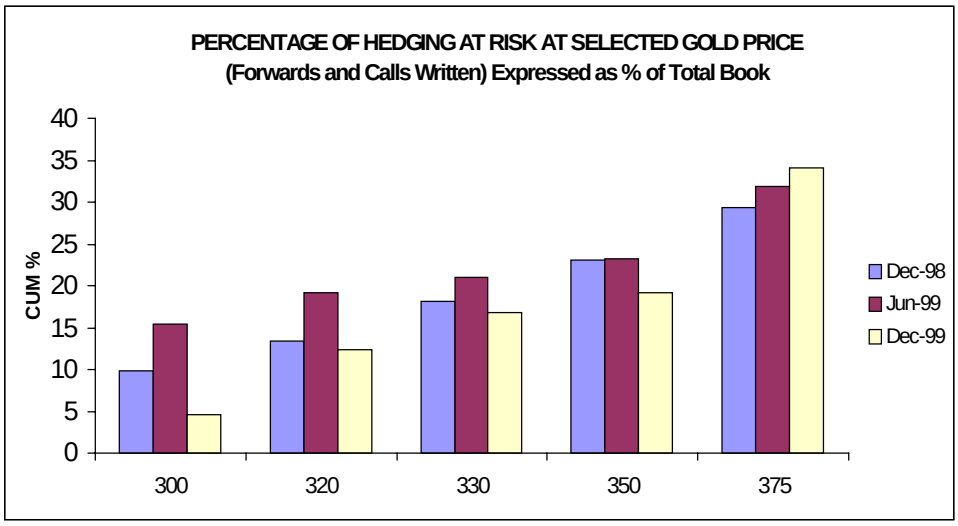


During the period ending June 1999, the hedging for delivery in that year was most at risk, especially at prices between $320-$330/oz. At $300/oz, almost a third would have been below spot. This increases to between 40% and nearly 50% at gold prices of $320-$330/oz. Over 67% of hedging would have been out of the money at a gold price of $375/oz. This analysis gives a very clear picture of the potential dislocation of the hedge book immediately post the Washington Agreement, if the gold price had indeed stabilised over $320/oz. In the wake of the Washington Agreement, many mining companies restructured their hedge books and a good deal of this nearby hedging was either closed-out, delivered into or rolled over. Thus the hedging at risk as of the end of December shows a different profile as the chart indicates. Only 11% would be out of the money at a price of $300/oz. This increased to between 30% and 47% at prices ranging from $320-$330/oz. 84% was at risk at $375/oz.

Since the above analysis looks exclusively at the hedging commitments for the two nearest years, it is necessary to place this into context with respect to the total hedge book to full tenure. The accompanying chart does this. While the profile for hedging at risk for the three reporting periods is very similar, the percentages at risk are very different. As of the end of December 1999, 4.5% of the total hedge book was at risk at $300\oz. This proved to be considerably lower than the

[5] Only the first two deliverable periods were assessed as they represented the greatest percentage of the hedge book

16% at risk at the end of June. Furthermore, 12%-17% was at risk at between $320-$330/oz. (19%-21% end June). A full 20% was at risk at $350/oz and 34% was at risk at $375/oz (23% and 32% respectively by June 1999).



Findings of the non-statistical questionnaire

A breakdown of the statistical sample covered during the second questionnaire is collated in the following table and shows that 31 mining companies representing almost 33 million ounces of production (almost 1,025 tonnes) contributed. This equates to 40% of total global production during calendar 1999.

Regional breakdown of the non-statistical questionnaire

	Number of participants	Percent of total	Gold production mn oz	Percent of total
South Africa	5	16.1	13.35	40.6
North America	14	45.2	13.21	40.1
Australia	12	38.7	6.36	19.3
Total	**31**	**100**	**32.92** (1,024 tonnes)	**100**

The initial point of departure with respect to hedging philosophies is the motive for hedging. The miners were asked to give each motive a weighting from 1 to 3, 1 being most important and 3 being not at all relevant. The results were then weighted according to output and are tabulated as follows in descending order of perceived importance:

1. Cover total costs
2. Remove price risk as a matter of policy
3. Enhance revenue
4. Cash flow concerns
5. Achieve a pre-determined price
6. Project finance reasons
7. Tax reasons
8. Shareholder requirements

With the prime motives being to cover total operating costs and to remove price risk as a matter of policy respectively, the motives for hedging appear to be fundamental to on-going corporate strategic thinking, rather than being project specific or associated with the imposition of tax. The extent to which the miners are achieving their objective with respect to costs is discussed in the previous section.

Quotable Quotes

Responses to the question: What dictates the choice of products used?

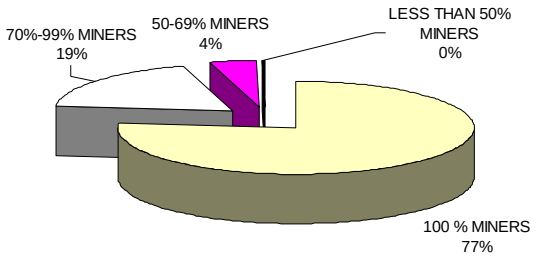
"We are happy to pay for insurance. Sometimes we give up some contango to do it."

"Shareholders want upside participation."

The miners were then asked what influenced the choice of products they used when hedging. The overwhelming majority indicated that the use of options was preferred on the premise that they provided downside protection while minimising the loss of upside participation. Most were still comfortable with entering into collars whereby the call option premium paid in full or in part for the puts. Most also indicated that post September 26th, there was a policy to avoid exotic products and return to tried and trusted vanilla instruments.

Taking this concept further, the miners were then asked to what extent they had control over the choice of products and to what extent this choice was influenced by the counterparties. As the accompanying chart shows, over 75% of the sample has complete control over the choice of their hedging products. 19% believed that they had between 70%-99% control and a further 4% had 50%-69% control.

EXTENT TO WHICH MINERS CONTROL HEDGING DECISIONS AS OPPOSED TO COUNTERPARTIES



Interestingly, there was no correlation between the control and the size of the operation. Companies producing 40,000 ounces a year were just as much in control of these decisions as the major producers. There was also no regional trend in the responses with the exception of South Africa, where all the respondents have 100% of control.

The next point of reference related to the factors that dictate the tenure to which producers elect to hedge. In this case, the overwhelming concern by a wide margin was the life of the mine, although set hedging policies clearly emerged as an important issue. In terms of importance the factors were ranked as follows:

Life of mine	0.60 (scaling factor on a weighted basis)
Set policy	0.46
Credit issues	0.16
Market conditions	0.14
Price	0.13
Project financing	0.08
Reserves	0.06
Cash flow	0.02
Bank debt	0.01
Bank requirements	0.00

More specific to the structuring of a hedge programme, we then attempted to isolate which market parameters most influenced how and why a particular hedge was executed. In declining order of importance these factors are:

Gold price and lease rates (equally important)
Contango
Interest rates
Price and option volatility (equally important)
Credit limits
Local currencies

Once the hedge is in place we found that the overwhelming trend is to now view the structure as dynamic and to re-iteratively adjust the exposure according to changing market conditions. Many mining companies still view their hedging as very opportunistic, while others structure a specific hedge for a specific project. With respect to the overall decision to hedge, the boards of the mining companies still tend to agree to an overall framework, although within these structures the treasury departments now seem to have more latitude to make opportunistic adjustments than was the case five years ago. Within the industry, there is a marked diversity as to how the hedging limitations are set. We saw many instances where limits were placed on the volume hedged relative to planned and actual output, while others based the limits on reserves. Others had limitations measured in tenure or product usage and, in some instances, hedging was limited to a specific project which required price protection or, indeed, required hedging to secure financing.

Quotable Quotes

In response to question about hedge management:

"We used to set and forget but dynamic hedging will soon be the norm."

Since the interviews were completed after the Washington Agreement, it was useful to gauge the level of confidence within the mining industry with respect to being able to monitor the health of their hedging programmes and their reactions to sharp adjustments in the underlying parameters. Just under 84% of the sample expressed a great deal of comfort with their ability to constantly assess their exposures and manage them effectively, although the vast majority make extensive use of external expertise to audit, cross- and counter-check the analysis.

Many expressed the opinion that one of the major reasons which gave them this level of comfort was the fact that they studiously avoided using any product which they did not fully understand. Of those who felt less confident of their internal treasury's ability to stress-test their hedge book, many were relative newcomers to hedging and this positive correlation came as no surprise. This led onto specific questions relating to product confidence. We asked the miners if they felt that they understood the products that they are, firstly, using and, secondly, being offered. There was virtually unanimous agreement that they fully understood the products currently existing in their portfolios. As expected there was less consensus when it came to products that they are being offered. A little under 70% felt they had the analytical capabilities to assess new products. The remaining 30% were wary of exotic products, some in the extreme and avoided their use.

This study then needed to assess the degree to which the mining industry depends on hedging and if hedging influences long-term business decisions. The companies were asked whether or not the existence of their hedge book influenced their decision-making with respect to mine closures, production plans and explorations plans. The results were as follows:

The influence of the hedge book on long-term decisions

	By tonnage		By number of respondents	
	yes	**no**	**yes**	**no**
Closure of a mine	15.5%	84.5%	16	15
Production plans	15.9%	84.1%	14	11
Exploration plans	20.7%	79.3%	11	20

We interpreted the fact that a minimum of 15% by tonnage responded in the affirmative, representing 5 million ounces of production, as being significant enough to warrant further investigation. This revealed some other very interesting observations. Firstly, there was a positive correlation between the size of the company and its response. For this reason we have reported the results in the above table both in terms of volume and by number of respondents. The major, mature companies almost without exception place no reliance on the hedge book when taking longer-term decisions regarding mine closure, production and exploration plans. The smaller, more junior companies displayed a fundamental difference in that the hedge book plays a more central role in decision-making of this nature. But secondly, there was also a strong regional divergence in the responses. We do not believe that we would be breaking a confidence in reporting that the South African houses, without exception, reported that they place absolutely no weight on the hedge book for long-term decision-making of any sort. This was not true of Australia and to a lesser extent, North America. A closer assessment reveals that this, in fact, has nothing to do with national idiosyncrasies, but rather mining techniques. Clearly when confronted with deep, capital-intensive hard rock mining with very long lead and development times, plus long life of mine expectancy, the hedge book plays a lesser role compared with the shallow open pit operations with relatively restricted reserve bases.

But the conclusions drawn from these results are very significant indeed. Analysis to date covering the impact of hedging on the gold price has been confined to the immediate and then longer-term influence of the products themselves and the way they are offset into the market. Very little work has been completed assessing the impact that hedging could have had on the longer-term structure as an indirect result of decision-making based on the existence of the global hedge book. Thus it is possible that hedging could have had a number of influences on the supply of gold to the market which may not be immediately apparent. It certainly has delayed mine closure. But, less obviously, it might have influenced the restructuring of the primary industry, delaying mergers and the acquisition of junior companies. Furthermore there is reason to suggest that the existence of hedge books supported (or even subsidised), at least for some while, exploration budgets which might well have materially added to reserve bases.

The questionnaire then turned to the structure of the market and how the mining companies perceive the service they are getting from the counterparties. In terms of whether the market offered sufficient depth and liquidity for the miners to execute their hedging, especially the longer dated contracts, the response was very positive indeed. In fact only three companies, representing 1.1% of the sample expressed concerns to the effect that the market was controlled now by a handful of banks and hence was not as liquid as hoped. This applied primarily when attempting to execute hedging in local currency terms and not US dollars. Looking longer-term, the miners were asked if they thought that the Washington Agreement would influence their hedging policies. A third of the sample felt things would continue unchanged while the balance was uncertain. Interestingly, many volunteered comments to the effect that the Washington Agreement had highlighted the need to be substantially more conscious of lease rate behaviour and exposure to the cost of borrowing gold.

Quotable Quotes

Responses to the question: Have counterparty relationships been affected by the restructuring in banking?

"The market is still over-banked although there are less one-stop shops".

"Declining liquidity hinders our ability to trade large tranches".

"We are concerned about the fair weather service we get from some counterparties".

This then led to the question of the industry's relationship with the counterparties and whether or not the on-going restructuring of the bullion banking industry had affected their working relationship. Here the responses were mixed, although 92% of the sample felt that the restructuring had not adversely affected their ability to complete their risk management programmes. This, however, did not necessarily imply that the mining industry in general is happy with the service, marketing approach and the quotes, as the accompanying text box reveals. What did emerge from this line of questioning was the growing concern about credit, in some cases where sovereign risk played a role. When asked if the companies had ever experienced difficulties securing the necessary credit lines, again the sovereign risk issue was cited as being a problem. Nine of the respondents, representing just under 30% of the sample, confirmed that this at some stage had been a problem. Apart from sovereign risk, company restructuring, balance sheets, mining costs and project specific problems were cited as influencing the ability to secure lines. Many

Quotable Quotes

In response to question about attitudes towards counterparties:

"They are very sophisticated and meet our needs well".

"Vultures!"

"They do not have a divine right to our business".

"Only a handful can do the structured deals we want".

"Continued strong relationships have served us very well".

expressed the view that the banks were inflexible and limiting especially when it came to the question of margin.

And it was margin that proved to be the most emotive issue among the industry. With the exception of half a dozen mines, the respondents to our questionnaire are currently free from margin. This is a new phenomenon. Five years ago margin was the norm rather than the exception, albeit an unwelcome one. The extent to which the miners have succeeded in negotiating out of their agreements any reference to margin is an indication of just how much the industry has been the dominant partner in the hedging relationship. It also shows the extent to which the bullion banks have clamoured to secure hedging business. With the majority of the mining companies vehemently against any form of margin to the degree that some would prefer to sever and lose lines of credit rather than accept margin, the bullion banks are now facing a most thorny question and one that could have a material impact on their ability to secure producer business. Those banks which adamantly maintain margin requirements could see their market share decline. On the other hand, not many mining houses can afford the loss of credit lines and walk away from what have probably been long and successful banking relationships. But the extent to which the industry is going to remain unmargined in any form, or not, as the case may be, could have a substantial bearing on the profile and structure of the future hedge book. The absence of margin over time has encouraged the leverage of hedging exposures and, in some cases, beyond the limitations of a company's balance sheet. Any renewal of margin, if at all possible and in whatever form is acceptable to the producers, is likely to necessitate a different approach to risk management. It does, however, appear unlikely that the commercial banks will successfully re-introduce margin into existing agreements, certainly in its most standard least flexible form. It is more likely that they will impose a greater degree of financial disclosure and perhaps the levying of some sort of hedging premium in place of margin. This could have substantial implications for the cost of hedging incurred by the miners and influence their hedging policies.

Quotable Quotes

In response to question about the issue of margin:

"Never have and never will!"
"No, thank you."
"Under no circumstances".
"We accept it but very reluctantly".
"We understand the need but would prefer to avoid it".
"We accept it within reason".

Turning to the final leg of the questionnaire, we asked the mining industry to share their views on a number of market related issues. In the first instance, we asked them whether their actual or potential to influence the gold price adversely through hedging concerned them at all. Eight companies elected not to respond. Three, representing less than 1% of the sample, indicated that their impact was real but of no concern. Thus, a little over 50% of the sample acknowledged that they were firstly aware, and secondly, concerned about their hedging activities.

Quotable Quotes

Responses to the question: Are miners concerned that their hedging affects the gold price?

"We try to stand back in price weaknesss".

"We have to look after ourselves and hedge anyway".

"Miners should only hedge to cover costs".

"Our collective activity does affect the price".

But within this sample, the level of concern varied, as the comments in the accompanying text box shows.

Under these circumstances, the next question was logically: What are your shareholders' attitudes towards hedging? Attitudes here seem just as diverse as those of mine management. Certainly, the shareholders want the ability to participate in any upward movement of the gold price but just prior to the Washington Agreement, an emerging trend was the fact that shareholders are increasingly viewing hedging as part and parcel of a well managed company which has the capability of addressing risk of any sort and not just that of price. This was probably the result of two interrelated factors. Firstly, shareholders are acutely aware of the fact that, for whatever reasons, the gold price has failed in any sustained rally in recent years. Hence hedging has returned to them substantial returns that otherwise might not have been enjoyed. In a sense, this is a circular argument and antagonists of hedging will maintain that it was hedging in the first place that placed downward pressure on the gold price. These arguments are set out in more detail in chapter 2, but maintain that to isolate hedging as *the* villain of the piece addresses a symptom and not the cause. There are other structural reasons endemic to the gold market which have created the price profile of the past two decades. How shareholders' attitudes develop, especially post the Washington Agreement, is one area of study that we suggest requires further monitoring.

Quotable Quotes

Responses to the question: What are shareholders' attitudes toward hedging?

"Our shareholders accept that our policy is one of ensuring downside protection and not one of revenue enhancing".

"Our shareholders want an ideal combination of low costs and prudent hedging".

Secondly, management is very conscious of the views and wants of their shareholders. Many reported that they are spending a good deal of time and energy educating their shareholders and keeping them fully briefed with respect to price risk management. In general, there is a very marked trend towards fuller reporting of hedge programmes with the corresponding explanatory notes. In the cases where shareholders are not particularly comfortable with hedging policies, many reported that they took these views on board but it did not preclude or prevent the management going ahead with hedging in any case.

One area that generated a fair amount of comment was the question: what do the mining companies feel about the level of hedging expected by the bullion banks in the context of project financing? In a number of instances this issue was of no

relevance. Of those who had been subject to this, a number felt comfortable with the requirements, provided they were accounted for in the initial financial discussions. Others felt more strongly, implying that what the banks required was too onerous relative to the mines' in-house hedging policies. Others felt they were restrictive and, in general, attempted to avoid involvement. One company admitted to walking away from a financial package because of the hedging requirements imposed by the commercial bank involved.

Quotable Quotes

Responses to the question of new accounting requirements:

"It's overkill and excessive".
"The authorities are removing the incentives to mine".
"It's driving us crazy".
"Disclosure is very necessary but this is too onerous".
"It fails to recognise risk management".
"FAS133 is poorly prepared and in general unreasonable".

On a global basis, the industry was in general extremely critical and concerned about proposed changes to the accounting system as the accompanying text box indicates. It is premature to assess how the introduction of the new accounting requirements will eventually impact on the collective decision to hedge and this is one area of the study which will require further assessment as the accounting practices are introduced. As discussed in the summary chapter, we conclude that a good deal of the potential impact on hedging decisions will depend on exactly how the various products are defined for accounting purposes and whether they will be treated as hedge products.

Quotable Quotes

Responses to the question: What is your opinion of central bank sales?

"No problem if they are orderly".
"They are entitled but they need to understand the impact on the market".
"We can live with the sales - they are free to do what they want".
"They are their own worst enemy".
"We are dismayed by the sales programmes".
"Sales into price weakness are myopic".

And the final question we put to the miners was probably the most obvious, that being: what are their attitudes towards central bank selling and lending of gold? In general, the industry's attitude towards sales was a little less negative than one might have expected although a number of companies were vehemently against the sales programmes both historic and planned. Others were more accepting and the accompanying text box displays a full spectrum of opinions. As expected, the companies' attitudes towards lending were, in general, more accommodating. Many perceived lending as a very acceptable alternative to sales and a necessary precursor to the mining industry being able to execute their hedging programmes. A number expressed the view that for gold to remain a viable reserve asset, considerable liquidity was necessary, which of course predicated lending. Others believed that the level of lending should be limited. Only one company acknowledged that it would gladly trade the ability to hedge for a contraction in the lending market.

CHAPTER 3 : THE COMMERCIAL BANKS

This chapter looks at the bullion banking industry which, essentially, has served as the conduit for derivatives. The commercial banks have collectively been a supplier of credit, the creator of derivative products, the executor of price risk management strategies and a securer of liquidity. While most banks involved in gold have some relations with each sector of the market, distinct sectoral and regional strengths are readily apparent. These are discussed in as much detail as the confidential sector will allow. Furthermore, the commercial banks involved in gold have been subject to far-reaching structural changes over the past decade. The impact this might have had on the industry is also discussed in detail. Further, the Washington Agreement of September last year brought into stark relief some of the issues now faced by the bullion banks, particularly with respect to credit and margin. At the time of writing, it was still not quite clear how these issues would resolve themselves and it is recommended that further monitoring of this is warranted. And finally, this chapter assesses the turnover statistics covering derivative exposures which are in the public domain and compares those to estimates of the net trading limits associates with the collective bullion dealing community. It also attempts to review the levels of proprietary trading.

The current status of bullion banking

There are currently a little over two dozen commercial banks who are to a greater or lesser degree actively involved in bullion banking. These are listed in alphabetical order in Appendix 3. The five current occupants of the fixing seats compared with those of ten years ago are tabulated as follows:

Current Fixing Members	**Members of a Decade Ago**
NM Rothschild	NM Rothschild
ScotiaMocatta	Mocatta and Goldsmid *1
HSBC*	Samuel Montagu *2
Deutsche Bank*	Sharps Pixley *3
CSFB*	Mase Westpac *4

*1: Mocatta via Standard Chartered and then Bank of Nova Scotia to become ScotiaMocatta.
*2: Samuel Montagu via Midland to HSBC.
*3: Sharps Pixley via Kleinwort Benson to Deutsche Bank.
*4: Johnson Matthey Bankers via Mase Westpac to become Republic National Bank of New York and then HSBC. Seat sold to CSFB.

The organisation of the bullion banking community is currently very fluid, highly competitive and, as a consequence, confidential in the extreme. Over time, very marked regional and sectoral patterns have emerged in which various permutations and combinations of the existing banks dominate. This structure is particularly dynamic. It can and does change with time and circumstance. Most banks have some business with each sector of the market. Many have found market niches and deliberately specialise in servicing a particular sector. A good proportion of the banks have a global, 24-hour presence although most national desks have developed regional expertise and interests.

Our analysis showed the following:

- There are no more than eight major participants in derivatives and perhaps another five which we would define as second tier (as opposed to market markers);
- There are no more than nine major participants in the spot market in London;
- There are fewer than ten major participants in the spot market in Europe (includes the UK), including at least four which are active in the physical market;
- There are nine major participants in the forward market in Europe;
- There are at least four major participants in the Australasian markets;
- There are fewer than ten participants who have a particularly strong presence in the fund industry;
- There are seven participants who have a particularly strong presence in the official sector;
- There are seven participants who have a particularly strong presence in the mining sector;
- Perhaps eight banks have particularly active proprietary trading operations.

Traditionally, the role of the commercial banks in the gold market has remained broadly unchanged, only the sectoral and product emphasis has evolved as the gold market becomes increasingly more sophisticated.

Originally, the emphasis was on the physical market and the banks acted as buyers, sellers, stock holders and distributors of metal. The twice-daily London gold fixing has historically represented the essence of these functions. A natural component of this was, and still is a trading role involving the active quotation of two-way prices.

The second major function is the provision of credit for all bullion banking transactions. This includes trade finance for consumers, lines of credit for investors and project financing and day-to-day hedging facilities for the producers.

The third function applies to the lending market in which the bullion banks have acted as intermediaries and have aggressively attracted liquidity to lubricate the swiftly evolving derivative market.

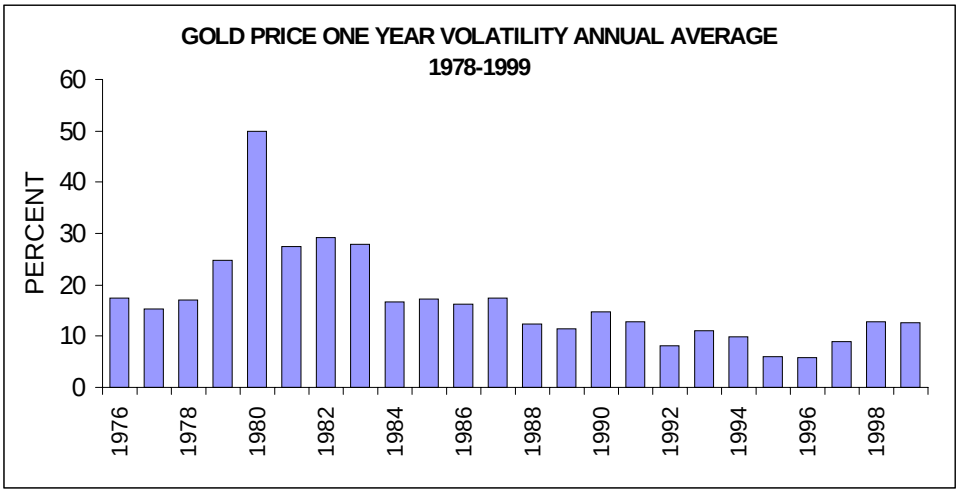
This necessarily provided a fourth function, which was the creation of derivative products and the marketing of gold-base financial packages designed specifically for the end user. Project financing (usually derivative-based) provided much of the stimulus behind bullion banking throughout the 1980s as mine production in Australia and North America expanded very sharply. The subsequent growth in the global hedge book has largely sustained this profitable component of bullion banking.

The fifth function is associated with proprietary trading and risk taking to the banks' own accounts. This has and always will remain an area of bullion banking least discussed. For this very reason, it has been vulnerable to much rumour-mongering; being one of those market sectors, like the short positions held by the hedge funds, in which alleged activities can be neither proved or refuted. While very much in evidence, the volumes of trading associated with this role have probably been overdone by the media and over-estimated by market observers. Our estimates of the volume of proprietary trading are deduced from our supply and demand balance of the lending market, which is presented in the summary chapter of this report.

The cause and effects of the gradual restructuring of bullion banking

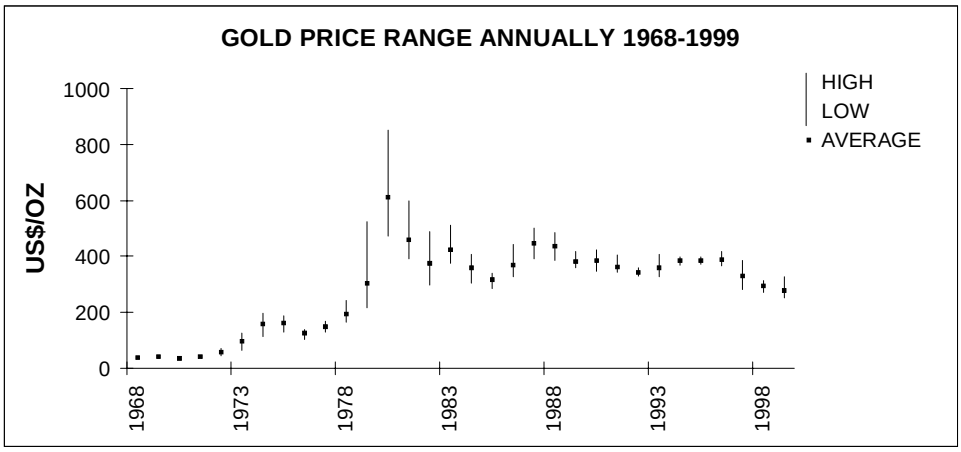
The structure of the London gold fixing as tabulated at the beginning of this chapter has changed over the last ten years, certainly in name if not so much in actual seat ownership. If considered a microcosm of the greater market, it provides a good indication of the extent to which the bullion banking industry has restructured.

This transformation of the industry has come about for several reasons, some internal to the gold market itself and others as a result of changes within banking in general. The gold price itself, but more importantly the sharply lower gold price volatility over the years contributed largely to the changing fortunes experienced by the bullion bankers. One year average volatility since 1976 is shown in the following chart.



Data source: Virtual Metals Research & Consulting Databases

Lower volatility combined with markedly lower trading ranges has implied tighter bid/offer spreads and contracting profit margins. The next chart shows the annual average gold price since 1986 but more tellingly, the price range associated price with the years' highs and lows. Initially, it was the physical market that was adversely affected by the very narrow price ranges and bid/offer spreads. The profit margins were progressively squeezed and this was probably a primary reason why the banks began to place so much marketing and trading emphasis on the derivatives.



Data source: Virtual Metals Research & Consulting Databases

But when faced with a similar price regime, why should the derivatives have offered a substantially more rewarding profit profile? We can suggest two major

reasons. Firstly, there was enormous demand for derivative products especially in the wake of the Australian and North American mining booms of the mid-1980s. Initially the gold loan industry and then more complex derivative-based project financing provided business opportunities for the bullion banks in a way not seen in the physical market. And secondly, the variety of products emerging as the OTC market evolved as swiftly as it did, implied that many products being marketed were individually priced. This provided the banks with considerable latitude with respect to price variation. But with time, it was inevitable that this component of bullion banking soon became increasingly competitive and profit margins have consistently been eroded. Since the Washington Agreement, and the very obvious move away from exotic and leverage products and back to vanilla instruments, we expect this erosion of profit margin to continue.

Over the years the restructuring of bullion banking has manifested itself in a number of ways: total withdrawal from the market on the part of some banks; mergers and acquisitions; and finally the internal contraction and re-design of existing operations.

The withdrawal of a bank from the business is final, whereas mergers and acquisitions inevitably result in the duplication of services and skills. The effect that both these outcomes have on the availability of credit is probably the most important issue and is returned to later in this chapter. However the restructuring manifests itself, it has addressed cost cutting and the question of profitability and these developments have had both positive and negative effects on the gold market. In general, we maintain that a contraction of bullion banking is deleterious to the longer-term health of the industry.

In a number of instances the market has seen internal restructuring. The gold desks have been greatly reduced to the extent that they have been absorbed into other trading desks, typically foreign exchange or fixed income. Very often this has occurred when decisions are taken at board level, far removed from the day-to-day bullion dealing, but more importantly, when that particular board does not have a member who is prepared to champion the cause of gold and act as a mentor to the gold team. Without that active support, the decision to reduce gold's role within the organisation by absorbing it into another area of business is a logical consequence and is then a relatively easy decision. While this may secure quite substantial cost savings, it does have the psychologically negative impact of reducing gold's status and role in the minds of all those within the bank but more importantly in the minds of its clients. The bullion dealers run the risk of losing their identity as well as their status. Thus often a vicious circle is set in motion which simply further reduces gold's role and perceived status in the particular bank and thus an initial decision to reduce the banks exposure to gold then becomes self-fulfilling.

Many interpret the restructuring as a proactive response on the part of the banks in their adjustment to meet the demands of the changing and dynamic market from which a healthier state of affairs will emerge. In many cases there have often been advantageous synergies between merging businesses. Others have resulted in massive economies of scale allowing for the streamlining of what used to be cumbersome cost centres.

On the more negative side, cost cutting exercises have yielded short-term gains but perhaps at the expense of longer-term commitment to the business and the ability to service the clients' needs. Non-income generating areas of activities, especially research, tend to be the first areas to suffer. Ironically with only minimal cost savings the true cost of cutting back on research eventually becomes apparent. It undermines the flow of information to and from the bullion trading desks. The knock-on effect is that the flow of market insights and opinions to the client is markedly reduced.

Restructuring, but primarily cost-cutting exercises, also often result in a dilution of expertise and experience. More often than not, when a cost saving exercise is implemented, it is the more senior experienced staff members that are the first to exit, leaving the younger less experienced staff in place who command lower salaries. This can also unsettle the client and some mining companies did express concern about the long-term commitment on the part of some banks to the gold business. The sudden staff turnover, leaving more junior personnel at the helm, is normally seen as the first indication of a changing attitude towards gold on the part of the banks. On the positive side, these redundancies create opportunities for those banks taking a contrarian attitude and expanding while others are cutting back. Recruitment from a large pool of redundancies gives access to experienced, often highly valued, team players who bring to their new partners a wealth of knowledge, coupled with respect and reputations which stand them in very good stead with the client base.

Reduced staffing in general greatly increases the remaining staff's workload. As responsibilities increase, less attention can be paid to detail and with respect to derivatives, perhaps less time is then being spent on the creation of new and innovative products[1]. When traders are over-stretched they will naturally tend to rely on tried and trusted off-the-shelf products with a proven track record of reliability and stability.

The upshot of all these factors suggests a deterioration in the bank/client relationship, unless of course the individual bank works hard at maintaining client relationships which many do very diligently. Some of the very positive comments made by the mining industry during the course of our interviews are evidence of

[1] Those cynics among us could well argue that this is not a bad thing, particularly in the wake of the Washington Agreement!

this. Because of its size, the gold market remains very much a personal one, based on relationships which have often taken years to establish. Discussions with the mining industry suggest that this is felt most when complex project specific hedging is in place, where the two counterparties have worked closely together for many months in structuring complex strategies specific to a mine or company. A sudden hiatus in that continuity because of a restructuring or merger can often set a bank-client relationship back many months. In some cases, the relationship might be seriously damaged, possibly even irrevocably, and business is lost as a result. Ironically, this tends to further undermine that bank's presence in the industry.

Over the past five years, mergers that create fewer but larger trading entities, have concentrated the presence in the market of a handful of existing banks. This concentration increases those banks' market shares but probably overall detracts from healthy competition when it comes to product creation, pricing, marketing and perhaps even customer service. This concentration of business has the additional disadvantage of attracting attention to the larger banks making it that much more difficult for those banks to operate in the market without attracting undue comment. On the more positive side, this increased visibility and profile of the very large banks has given smaller banks and newcomers to the market, a window of opportunity to expand their market share and gain a foothold in a market that would otherwise have remained impenetrable. Niche markets exist in many areas of bullion banking and this will continue to evidence itself provided the presence of the majors do not overwhelm their more junior competitors and leave them no room for operation.

The availability of credit to the gold industry is another area greatly influenced by the restructuring of bullion banking. The shrinkage in the number of banks active in the gold market implies less in the way of credit lines for all the major users of gold-based products, derivatives or otherwise. Here more so than perhaps anywhere else in the industry, the one plus one not equalling two principle applies. This is particularly true with respect to the numerous banking mergers we have seen as opposed to the withdrawal of banks from the industry. The credit facilities of a newly merged banking entity almost certainly do not equal the sum of the credit facilities previously enjoyed by the two merging organisations. Thus credit potential in general has been on the decline. Furthermore, some expressed the view that the problem may indeed be more widespread than specific gold transactions. In many producing countries, but specifically countries like Ghana and South Africa, the credit lines, because of sovereign issues, might be limited to begin with and the restructuring has only exacerbated the problem. Sovereignty more often than not accounts for the lion's share of the existing credit facilities. Therefore, it is not necessarily only the smaller mining companies that may experience the lower credit ceiling and a limit to what they may be able to establish and maintain in terms of price protection programmes. How the bullion banks will address this question remains to be seen. One must expect them to leave no stone unturned in their efforts to unlock every bit of credit capacity.

The impact of the Washington Agreement On Gold

The Washington Agreement and the resultant price and lease rate response during the fourth quarter of last year had a profound influence on the bullion banking community. The fact that the mining industry has over the years succeeded in negotiating out of most hedging agreements with the commercial banks most references to margin, implies that the hedging and lease rate exposures at risk during the fourth quarter remained largely on the books of the banks. The daily response to the lease rate increase immediately after the September 26th is described in more detail in chapter 1. The whole episode clearly generated within the banking community a considerable rethink with respect to credit analysis, risk and extension.

The full outcome and implications are still to manifest themselves although we can even at this early stage suggest ways in which the banks are likely to respond to increasing credit concerns.

Firstly we anticipate that the banks will require from the mining community a substantially greater degree of disclosure with respect to a number of parameters associated with price risk management. Where hedging agreements have been in place for some time, this information has probably already been supplied either directly, but in most cases probably indirectly, through the gradual establishment of the bank/mining company relationship. Where new agreements are being initiated or existing agreements being extended, the request for information will probably be more formal. This could entail a number of issues including:

- A more formalised description of the company's hedging philosophy detailing the rationale behind the decision, the overall framework of the programme as it relates to current and planned production and more importantly, reserves. With respect to the overall hedging plan, the banks will probably want details regarding the motives for hedging: whether the mining companies perhaps intend hedging a proportion of planned production on a day-to-day basis, or whether the hedging is project specific;

- A more formalised description of the reporting hierarchy and levels of decision making and hedging responsibilities within the mining company. This would include details of lines of reporting from board level though to the treasury departments, with details of how much trading latitude the treasury has without recourse to the board;

- Greater disclosure of product usage and the overall levels of hedging exposure. This necessarily implies exposure as it relates to other counterparties together

with greater disclosure as to how the resultant hedge exposure is monitored both internally and externally. Perhaps a greater degree of comfort with respect to the mining company's ability to stress-test the hedge book might be deemed necessary;

- Further details of accounting practices and the company's preparedness for the introduction of the new accounting standards;

- The price at which reserves in the ground are valued by the various mining companies will no doubt come into focus. This will be particularly true of companies which over the years have tended to hedge reserves in the ground, as opposed to annual planned production. The longer the gold price remains convincingly below $300/oz, the greater the probability of this becoming an increasingly important issue for the bullion banks.

From this, it seems likely that the commercial banks are going to re-rate the mining companies relative to each other and relative to the rest of the bank's credit exposures, if they have not already done so. This implies a greater hedging premium likely to be levied on those mining companies with relatively weaker balance sheets and less advantageous cost and production profiles.

Where margin can be re-introduced into hedging agreements, this will be a priority although, as we point out in chapter 2, the mining industry collectively is vehemently opposed to margin. Overall, we believe that while margin will remain a major issue for the commercial banks, this is one battle that they cannot win and alternative ways to reduce their hedging risk will have to be found.

The Washington Agreement has also no doubt had a profound affect on product creation, especially any instrument that might be deemed overly leveraged or even marginally exotic. Derivative users, especially the mining companies, are already showing a distinct lack of appetite for the more complex products that, in turn, will reduce the incentive on the part of the commercial banks to generate new and perhaps outlandish mechanisms. If the derivative emphasis remains on the use of vanilla products, the overall global derivative book is likely to become substantially less complex in its make up. The marketers of complex products are going to find it difficult to persuade clients to make use of new products and thus will have to focus on the tried and trusted instruments. This is likely to render the derivative side of bullion banking even more competitive than before and is likely to reduce commissions and profit margins even further. Thus it seems likely that one of the effects of the Washington Agreement has been to render bullion banking an even more difficult industry in which to make money. Many will argue that this is not necessarily a bad thing. However, it could generate a further and continued restructuring of the industry that will concentrate the business even more in the hands of a few dominant trading entities. The advantages and

disadvantages of a potential further consolidation of the industry were discussed in detail earlier in this chapter but our overall conclusion is that the pros are outweighed by the cons and this is, in general, not a good sign for the international gold market.

Current trading limits and exposures

Given the confidentiality associated with trading limits, an assessment of the bullion banking community's collective net exposure during any period is a particularly difficult area of research. This is compounded by the fact that any statistics referring to trading and exposures, especially derivatives, that are made public tend to be grossed-up total turnover figures which if misinterpreted can give an extremely distorted view of reality.

While the bullion banks were understandably not forthcoming about their own trading limits, they were prepared to enter into open discussions about the collective total allowing us to reach a consensus. Without doubt, over the past decade total trading limits associated with the counterparties have declined. This has a good deal to do with the restructuring and consolidation of the industry which was discussed in detail earlier in this chapter. But it also became apparent that individual banks have reduced their limits. Thus, while net trading limits in the late 1980s and early 1990s might have collectively totalled 10 million ounces, the state of affairs today is considerably more conservative[2]. Currently, under normal circumstances, our analysis of the two dozen banks involved yielded an estimate of 2.5 to 3.5 million ounces (78-110 tonnes) with any evidence of limits collectively extending towards 5 million ounces considered a possibility only under extreme circumstances. By net limits of 3.5 million ounces we are referring to a collective *net* short or long position (outright uncovered exposure) over a given period of time, perhaps overnight. Furthermore, since it would be most unusual for all the banks to be simultaneously either net short or net long, the estimate of collective limits should be seen as a maximum extreme. Thus, for example, a bank may be running a substantial derivative book consisting of many millions of ounces' worth of producer hedging or options. These exposures would have been squared away - in the case of forwards offset in full and in the case of options offset through delta neutrality. Thus the net exposure (outright risk) would be considerably smaller, perhaps in the order of 150,000-200,000 ounces.

These figures pertaining to outright exposures need to be compared with the gross turnover statistics that are made public. Most recently it has been the OCC figures that have attracted the most attention as well as those statistics published by the Bank For International Settlements.

[2] All these estimates of net exposures assume that the collective market is all trading in one direction (either all short or all long)– something that rarely if ever occurs.

The regulator of national banks in the United States (the Office of the Comptroller of the Currency) publishes a quarterly report on the derivatives activities of US commercial banks. The report for the fourth quarter of 1999 shows that the notional value of the off-balance sheet exposure of the 416 commercial banks regulated by the OCC in gold derivatives stood at $87.6 billion. Of this total $71.9 billion is attributable to just three banks (Chase, Morgan Guaranty and Citibank). At current gold prices, this corresponds to around 9,600 tonnes of gold.

In the light of our estimates of net trading limits, a more detailed analysis of these figures gives some insights into gold derivatives provided the statistics are interpreted correctly, placed into perspective and their limitations acknowledged.

Firstly, the limitations:

- The figures address commercial banks in the United States alone. Thus the derivative trading associated with European and Japanese bullion banks, for example, are not included. The figures published by the BIS, while in strictest statistical terms not quite comparable with the OCC figures, do go some way to remedy this;

- The figures cover commercial banks only and thus exclude partnerships or those trading entities that are not registered to take bank deposits. Some of the larger names therefore are excluded;

- The figures represent grossed-up total turnover statistics associated with substantially smaller net exposures and thus, if misconstrued, can give a very distorted picture of the actual underlying derivative positions.

The concept of grossed-up turnover requires further discussion since if taken at face value an exposure of 9,600 tonnes could appear worrying. (Together with the US$243 billion or some 25,000 tonnes of derivative “exposures” reported by the BIS covering major banks and dealers in the G10 the figures look even more alarming). In this regard we believe that this outstanding position should not be described as “exposure” as it certainly could have negative if not alarmist connotations. A more objective reference would be a commercial banking presence in gold-based derivatives. A worked example demonstrates how these figures could be derived.

Consider for example, in a particular quarter, a mining company that elects to sell 10 tonnes forward. The counterparty (the commercial bank) takes onto its book a long position of 10 tonnes that it immediately offsets by selling forward 10 tonnes to the proposed delivery date. The net position on the book of the commercial bank is zero but the turnover associated with the position is 20 tonnes. This 20 tonnes will be reflected in the OCC numbers. Now perhaps in that quarter the

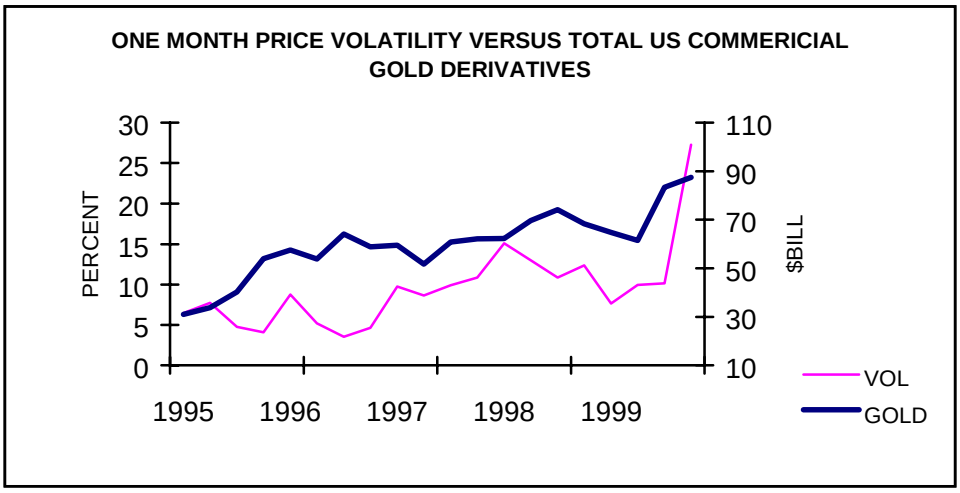
mining company elects to buy back 5 tonnes of its forward sale. The commercial bank will unwind the exposure in both legs of the original transaction. Thus the mining company has sold forward 5 tonnes, the commercial bank's net exposure is still zero but the turnover against the whole strategy in that quarter is now 30 tonnes.

Options result in even more paper trading. When a mining company buys a put option for price protection, the commercial bank in writing the option takes the full value of the underlying onto its books. It then delta hedges a percent of that exposure depending on the strike price relative to the spot price at the time of writing, but usually around 40%. This primary delta is recorded in turnover. Then on a virtually daily basis as the spot price moves relative to the option strike price, the commercial bank continues to buy or sell a small percentage of the exposure in order to render the exposure delta neutral. But all this buying and selling is clocking up turnover - all of which will be reflected in the OCC numbers.

With a global hedge book well in excess of a nominal 4,000 tonnes, a simple grossing up of merely the forwards and options with an initial delta (not even considering secondary delta hedging) brings the total to in excess of at least 7,000 tonnes of turnover. Thus the OCC figure of derivative "exposure" of in the order of 10,000 tonnes should not be cause for concern. In fact, this figure should be considered an absolute minimum. As already noted, excluded from the total are non-deposit taking banks and the figures associated with the non-USA commercial banks.

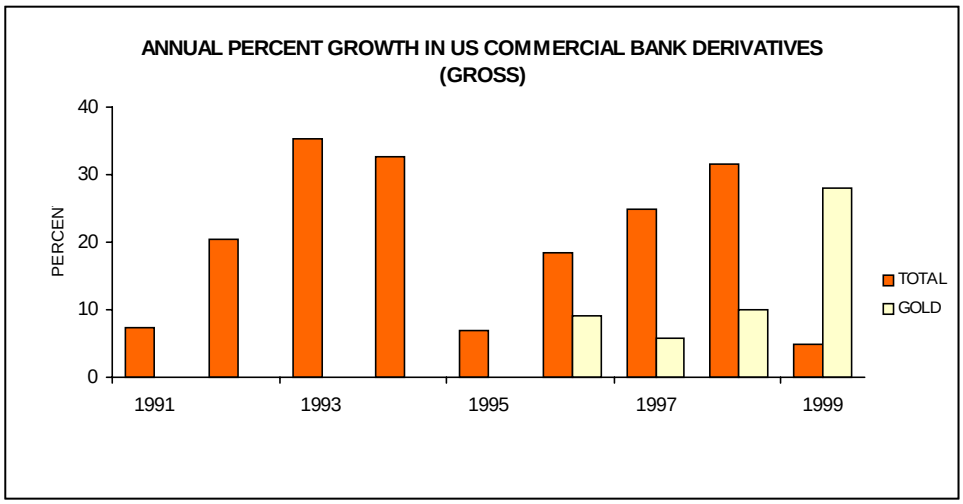
In a sense, these figures are very similar to the enormous trading volumes reported by Comex/Nymex where we know one ounce of gold gets traded over and over again but delivered or settled for only once.

The OCC numbers do, however, demonstrate a close and positive correlation between turnover and price volatility. The accompany chart shows this clearly, using the 1-month volatility, particularly the sharp increase in derivative turnover in the second half of 1999 as a direct result of higher volatility in the wake of the Washington Agreement.



Data sources: OCC Quarterly Reports, Virtual Metals Research & Consulting Databases

The other interesting result of an analysis of the OCC numbers relates to the growth in gold derivative turnover relative to growth in all derivative activity in the USA. The following chart shows this.



Data Sources: OCC Quarterly Reports

It shows that the growth in all derivative turnover has greatly exceeded gold (with the exception of 1999). The implication is that between 1996 and 1998, gold has been accounting for a declining proportion of total derivative turnover. This data therefore does not support the theory of large derivative-based exposures built up by the US commercial banks. The exception was 1999 where derivative turnover in gold increased sharply. Again this is evidence of a response to the surge in price volatility in the wake of the Washington Agreement.

Proprietary trading and trading to own account

If trading limits proved to be an area of confidentiality then obtaining any statistics pertaining to the level of proprietary trading on the part of individual banks proved difficult in the extreme. Compounding the problem of confidentiality is the fact that most derivative books are dynamic and managed very actively on a day-to-day basis. It is therefore difficult to draw any conclusions about a component of the industry that is constantly undergoing change. A snapshot view frozen in time might be possible but only to be rendered inappropriate soon afterwards. However, our research did reveal some trends which shed a little light on the issue.

Firstly, the OCC reports noted that proprietary trading against all derivatives (not just gold) represented 4% of the volume. With respect to how this order of magnitude might apply to gold, detailed discussions with the bullion banking community revealed the following:

- There is a full spectrum of proprietary trading habits among the bullion banks and no generalisations can be made. For some whose policy it is to take only very limited positions to their own account, the figure of 4% is obviously substantially too high. For others, this proved to be too low and representations of anything towards 8-10% or in limited cases, even higher, could be deemed more appropriate. Furthermore there appears to be no correlation between the propensity to trade to own account and size or presence in the market. Banks with substantial market-making facilities and a large exposure to gold may or may not be aggressive proprietary traders. Conversely, those banks with a smaller presence in the market, lower trading limits as well as being niche market specialists might just as commonly be relatively aggressive proprietary traders;

- The level of proprietary trading can also vary considerably depending on the market used. Many of those interviewed suggested that 4% in the spot or cash market might in fact be a little low whereas it might be overstating the true picture with respect to the forward and options markets.

CHAPTER 4 : THE FUNDS AND MONEY UNDER MANAGEMENT

Introduction and objectives

The hedge funds and commodity trading advisors have long been a dynamic component of the gold industry. Their presence, however, does not imply that their activities are well understood or readily apparent, in fact the contrary is true. Hedge fund trading habits, metal exposure and day-to-day influence on the market have been subject to much speculation over the years and associated all too often with wildly exaggerated claims based on precious little in the way of fact. As a consequence, the money-under-management industry has regularly been cited as the villain of the piece during times of markedly increased price volatility, often when there is simply a dearth of other acceptable and readily apparent explanations. This situation is compounded by the absence of any reliable public domain data that renders such claims difficult to prove or refute.

A primary objective of this chapter and its associated appendices is to present a statistical analysis of the data covering the fund industry for the purposes of understanding the nature, structure and health of what has become a major participant in currency and commodities markets. Without an appreciation of the money-under-management industry in its entirety, it makes little sense in trying to isolate and draw conclusions about those individual trading entities which may be actively involved in the gold market. Furthermore, the state of health of the overall industry gives a good indication of what might be expected from specific funds. For example, if the industry as a whole is in an aggressively expansionary phase with robust capital inflows responding to a period of strong financial performance, we must acknowledge that those funds with an interest in gold might well be in a position to step up their activities. The converse also holds true. A climate in which the funds yield below average returns and hence are subject to investor redemptions is unlikely to be conducive to an aggressive and indeed risky foray into the precious metals markets and in fact may be forced liquidators of precious metals exposures. Thus the overall analysis of the industry provides a backdrop and point of initial reference from where all other research into those funds which are or might be involved in gold can be completed. The results of this analysis are summarised in this chapter but detailed in Appendix 4 together with all the statistical tables supporting the analysis.

Once the fund population in general has been placed into context, the second objective of this study can be addressed, that being an attempt to isolate those funds which are or could be active in the gold market. The discussion that follows

details our findings. Very recent developments within the fund industry suggest a marked change in strategic thinking on the part of some of the major trading entities. This is likely to have a far-reaching impact on their attitudes towards precious metals and taking exposure in those markets. These developments are discussed in more detail in this chapter.

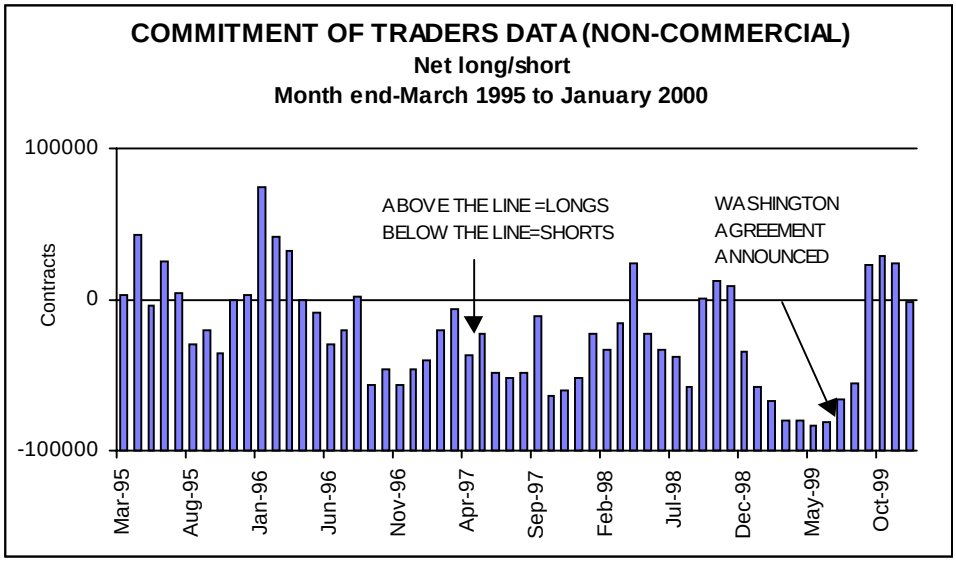
The Research Findings

The fund industry as it influences the gold market can be subdivided into two broad categories, namely the momentum traders and the hedge funds.

The momentum traders, primarily Commodity Trading Advisers (CTAs), tend to be technically driven entities whose managers have little understanding, or indeed interest, in the commodities or instruments in which they have exposure. Their trading decisions are taken purely on the basis of price movements and technical trends, which render their exposure to commodities usually short-term in nature. They are, therefore, very much price followers rather than setters and tend to be more active during periods of higher price volatility.

Within the fund population, there are several hundred of these CTAs which have the charter to trade gold. Experience in dealing with the data has allowed us to identify these funds quite readily. Since they tend to have relatively small capital bases (although there are some very notable exceptions), their *individual* trading behaviour is of little consequence. However, their collective activity in the market, particularly since they are technical trend followers, can certainly have a marked influence on the gold price, specifically in the short term.

In terms of trading mechanisms, momentum traders are in general confined to Exchange traded products and tend not to have the brief to make use of the OTC market, although there are again some notable exceptions. The fact that the majority makes virtually exclusive use of the Exchanges, renders their activities substantially more visible than the hedge funds. Thus their presence can be tracked with reasonable accuracy through the Exchange statistics, which are published regularly.



Data Source: CFTC Website

The accompanying chart shows all too clearly that since early 1995, the momentum traders have maintained an almost continuously short position in the gold market. As at the end of June 1999, these trading entities accounted for a short position of 254 tonnes. By December 1999, these shorts stood at a mere 8 tonnes, having been covered in as part of the market's immediate reaction to the Washington Agreement and subsequent price rally during the fourth quarter of the year.[1] During the first three months of 2000, the net short positions had been reduced even further and in fact stood by mid-March at a net long position of some 46 tonnes. By the end of May, this long position had yet again reversed itself and momentum traders collectively held a short position of 135 tonnes, the highest level recorded during the year.

The hedge funds represent a totally different presence in the gold market. Many of the managers of these funds are primarily fundamentalists in their analytical approach. More often than not they have a thorough understanding of the supply and demand components of the markets in which they are exposed. Their investment decisions tend therefore to be strategic and hence they maintain an interest in a commodity for a substantially longer period than the CTAs. With considerably higher capital bases compared with the CTAs, the ability to borrow against these bases to gain maximum leverage and the charters to make use of the OTC market, they have the potential to make their presence felt and in no uncertain terms. These are the entities primarily involved with what has become known as the "carry trade" whereby the gold leasing rate has given hedge funds the incentive to borrow inexpensive metal, sell it short and raise cost-effective dollars.

[1] These figures have been taken into account in the supply/demand balance appearing in the summary chapter.

In the absence of published data[2], this carry trade has given rise to claims that the short positions held by the hedge funds have been and still are of a magnitude sufficient to create and sustain a substantial squeeze in the gold price[3]. Our research has suggested that while there is indeed an element of carry trade, the total short position that has built up as a result is nothing like the volumes claimed by others.

We conclude that fewer than a dozen major hedge funds are actively involved in gold and by the end June 1999, their collective short position (and that of any short position held by the commercial banks through proprietary trading) was perhaps a little under 400 tonnes[4]. Immediately after the Washington Agreement announced on 26th September 1999, there was clear evidence of short covering, which generated some of the momentum behind the subsequent surge in the gold price. Our information suggests that a good proportion, although perhaps not all, of this short exposure was indeed covered in during the fourth quarter of last year. The mere fact that the gold price failed to maintain its upward momentum at $330/oz and beyond is compelling empirical evidence to suggest that the short positions were indeed substantially less than others have claimed. Further analysis of the lending market suggests that by the end of December 1999, this short position stood at a little under 390 tonnes, marginally lower than the end June period. The reason for the probable re-establishment of these short positions is most likely as a direct result of the sharp decline in the lease rates during the final months of last year. This would have no doubt encouraged renewed carry trade borrowing, particularly in the wake of higher interest rates especially in the United States.

Early during the second quarter of 2000, the market witnessed the voluntary liquidation of Tiger Management, one of the major hedge funds known to be involved with the precious metals and specifically the gold carry trade[5]. The fact that this fund in its devolution did not have a substantial impact on the gold price is added empirical evidence that these enormous short positions simply did not exist. Not long after this announced liquidation, came a second press release from the Soros trading entity to the effect that it would be restructuring its numerous funds to render them less exposed to high risk trading strategies. Again this announcement came without any upward pressure on the gold price. These two public announcements have substantial bearing on the gold carry trade. It reduces by a very large margin the amount of managed money that could be related to the existing carry trade since these funds accounted for a large

[2] Analysis of annual accounts published by the hedge funds yield little in the way of meaningful detail.
[3] Claims of short positions in excess of 3,000 tonnes have been commonplace.
[4] In the absence of any reliable data, we have had to deduce the implied short position by eliminating all other identified destinations of lent gold. This analysis appears in the summary chapter of this report.
[5] Last year prior to the September price rally, *rumoured* short positions associated with this fund alone totalled anything up to 800 tonnes of gold.

proportion of the associated capital bases. It might also herald a change in strategic thinking which might become commonplace among the remaining funds which have been known to participate in the gold market. Historically, these two funds have been trendsetters and where they go others have usually followed. This, however, does not necessarily imply an overnight dissipation of the carry trade phenomenon since other smaller and perhaps less leveraged funds might step into the breach. Our research isolated a minimum of over 100 funds which could potentially participate in the gold market.

While gold lease rates remain at a substantial discount to money market rates, the carry trade is likely to remain a feature of the gold market and one that should not be forgotten when assessing the impact an artificial unwinding of the producer hedge book could have on market conditions. (This is discussed in more detail in chapter 2.) Only when the cost of borrowing gold approaches and remains sustainable at or near dollar interest rates, will the incentive to borrow inexpensive gold be negated[6]. The extent to which funds will still make use of the concept of borrowing cost-effective gold needs to be monitored on a regular basis especially in the light of recent developments.

[6] The prognosis for the lending market and the cost of borrowing gold is discussed in more detail in chapter 1 and the summary chapter. A case for higher lease rates is debated in chapter 6.

CHAPTER 5: THE DERIVATIVE PRODUCTS

Introduction and objectives

This chapter is a stand-alone section of the study which sets out to explain in a little more detail than one usually sees the structure and behaviour of some of the risk management products that have been marketed. It is not our intention to go into lengthy mathematical descriptions of these products. Instead we are more concerned about what these products mean for the global hedge book and the international gold industry in a practical way, particularly under stress conditions like those the market experienced in last September and early October last year.

We have attempted to describe as many products are we could, essentially to give the reader an appreciation of the many permutations and combinations of hedging mechanisms available. The list is by no means complete and should be considered as illustrative rather than exhaustive. For example, we have not gone into details regarding variable volume and price forwards or binary options. Despite this acknowledgement, our analysis of the hedge book that appears in chapter 2 shows that the majority of these products are not in active use and the mining community has distinct preferences for only a handful of tried and trusted products.

It should be noted that the following product descriptions are indicative only. In many instances the underlying parameters are essentially pre-agreed between the user and the creator and thus are flexible in the extreme. For example in many of the more complex forward products, where we have listed lease rates as floating, they could just as commonly be fixed and vice versa. Additionally, where we have listed vanilla options in the more complex strategies, they could be either European or American which complicates both the description and the market impact of the product.

The products have been described in order of increasing complexity and many descriptions build on those preceding products.

Those products that are not described in this chapter are defined in the Glossary.

The products

5.1. The forwards

5.1.1 The fixed forward

Definition: The most basic forward contract that allows the seller to deliver an agreed volume of gold for an agreed price at a future agreed date.

Underlying financial parameters:

Price: Fixed based on spot at execution.
US$ (local) interest rate: Fixed – compounded annually.
Gold lease rate: Fixed – compounded annually.
Contango: Calculated from the above two parameters and fixed.
Maturity: Fixed.

Application and usage: Best selected when interest rates [1] are high and not likely to rise further or could even fall during the life of the contract. Best selected when gold lease rates are low and are unlikely to fall further but could actually rise during the life of the contract. The two situations will yield the optimal level of contango. From the miner's point of view best selected when delivery of metal is guaranteed.

Advantages to the user: Offers guaranteed contango and price protection in the event of declining gold prices. All financial parameters associated with the contract are known. Does not require active management after it is executed unless the miner elects to restructure. Can be unwound before delivery.

Disadvantages to the user: Inflexible delivery dates. The user cannot put into practice any specific views on either the lease rate or interest rates. Can lock in unfavourable contango if the lease rates and/or interest rates move against the hedger. For fixed forwards beyond 12 months, the executing bank quotes for a period beyond which gold borrowing can readily be hedged; a factor which is ultimately reflected in the price. Can incur an opportunity cost should the market price consolidate at levels higher than the contract price (including contango).

Impact on the gold price:

Immediate impact: 100% - the executing bank borrows the equivalent amount of gold and sells it immediately into the market.

[1] Interest rates refer throughout this chapter to dollar or local currency interest rates as opposed to gold lease rates.

Subsequent impact: On delivery, the executing bank unwinds the short position and delivers gold back to the original lender.

Cost to the user: Bank commission and any cost of restructuring. Potential opportunity costs as described above.

5.1.2 The floating gold rate forward

Definition: Standard forward contract in which the gold price and interest rates are pre-agreed and locked-in. The gold lease rate is allowed to float and is calculated at maturity based on its performance during the life of the contract. It is most common for the three-month lease rate to be used.

Underlying financial parameters:

Price: Fixed based on spot at execution.
US$ (local) interest rate: Fixed – compounded annually.
Gold lease rate: Floating – calculated on maturity. Renewal date is flexible but usually done quarterly or bi-annually.
Contango: Calculated from the above two parameters at maturity.
Maturity: Fixed.

Application and usage: Best selected when interest rates are high and not likely to rise further or could even fall during the life of the contract. Best selected when gold lease rates are high and could fall during the life of the contract. The two situations will yield the optimal level of contango. From the miner's point of view best selected when delivery of metal is guaranteed.

Advantages to the user: Offers guaranteed contango and price protection in the event of declining gold prices. More flexible than the fixed forward with respect to the user's views on future lease rates. Does not require active management after it is executed unless the miner elects to restructure. Can be unwound before delivery. Three-month lease rates appear more cost effective than other rates. Allows greater flexibility than the fixed forward in that interest rates can be locked-in but lease rates float. Beyond 12 months, the problem associated with the fixed forward is overcome as the gold lease rates are quoted for periods shorter than the contract life.

Disadvantages to the user: Inflexible delivery dates. The user cannot put into practice any specific views on future interest rates. Can lock-in unfavourable contango if the interest rates move against the hedger. If the lease rates rise during the life of the contract, the cash adjustment is payable by the hedger. Settlement is payable on maturity. Final contango is confirmed only on maturity.

Can incur an opportunity cost should the market price consolidate at levels higher than the contract price (including contango).

Impact on the gold price:

Immediate impact: 100% - the executing bank borrows the equivalent amount of gold and sells it immediately into the market.
Subsequent impact: On delivery, the executing bank unwinds the short position and delivers gold back to the original lender.

Cost to the user: Bank commission and any cost of restructuring. Potential opportunity costs as described above.

5.1.3 The floating forward

Definition: Forward contract in which the gold price is pre-agreed but the interest rates and gold lease rates are allowed to float and are calculated at maturity based on their performance during the life of the contract.

Underlying financial parameters:

Price: Fixed based on spot at execution.
US$ (local) interest rate: Floating – calculated on maturity. Renewal date is flexible but usually done quarterly or bi-annually.
Gold lease rate: Floating – calculated on maturity. Renewal date is flexible but usually done quarterly or bi-annually.
Contango: Calculated from the above two parameters at maturity.
Maturity: Fixed.

Application and usage: Best selected when interest rates are likely to rise further and gold lease rates are likely to fall during the life of the contract. The two situations will yield the optimal level of contango. From the miner's point of view best selected when delivery of metal is guaranteed.

Advantages to the user: Offers guaranteed contango and price protection in the event of declining gold prices. Allows user to put into practice specific views with respect to future lease rates and interest rates. Does not require active management after it is executed unless the miner elects to restructure. Can be unwound before delivery. Allows greater flexibility than preceding forwards in that interest rates and lease rates float. Beyond 12 months, the problem associated with the fixed forward is overcome as the gold lease rates are quoted for periods shorter than the contract life.

Disadvantages to the user: Inflexible delivery dates. Can lock-in unfavourable

contango if the interests rates and/or lease rates move against the hedger. Slightly more after-execution attention is required with respect to interest rate and lease rate renewals. Settlement is payable on maturity. Final contango is confirmed on maturity. Can incur an opportunity cost should the market price consolidate at levels higher than the contract price (including contango).

Impact on the gold price:

Immediate mpact: 100% - the executing bank borrows the equivalent amount of gold and sells it immediately into the market.
Subsequent impact: On delivery, the executing bank unwinds the short position and delivers gold back to the original lender.

Cost to the user: Bank commission and any cost of restructuring. Potential opportunity costs as described above.

5.1.4 The spot deferred

Definition: Forward contract in which the gold price is pre-agreed; interest rates and gold lease rates are allowed to float. The maturity date is deferrable.

Underlying financial parameters:

Price: Fixed based on spot at execution.
US$ (local) interest rate: Floating – calculated on maturity. Renewal date is flexible but usually done quarterly or bi-annually.
Gold lease rate: Floating – calculated on maturity. Renewal date is flexible but usually done quarterly or bi-annually.
Contango: Calculated from the above two parameters at maturity. Varies with each roll over or deferral.
Maturity: Flexible with indefinite deferral subject to a pre-agreed notice period, commonly 45 days. Notice is usually one full interest period.

Application and usage: Best selected when interest rates are likely to rise further and gold lease rates are likely to fall during the life of the contract. Best selected when delivery of metal is not guaranteed.

Advantages to the user: Offers guaranteed contango and price protection in the event of declining gold prices. Can be unwound before delivery. Allows the user to put into practice specific views with respect to future lease rates and interest rates. No fixed delivery date and metal can be delivered on or before maturity or deferred indefinitely. Flexible delivery reduces loss of upside participation into a price rally. If spot prices exceed the contract price (including contango), delivery is deferred.

Disadvantages to the user: Executing bank can eventually request delivery and serve notice. The bank might serve notice if the mine is in default on other contracts, exceeds credit limits or operates at a substantial loss. Slightly more after-execution attention is required with respect to interest rate and lease rate renewals. Settlement is payable on maturity.

Impact on the gold price:

Immediate impact: 100% - the executing bank borrows the equivalent amount of gold and sells it immediately into the market.
Subsequent impact: On delivery, the executing bank unwinds the short position and delivers gold back to the original lender.

Cost to the user: Bank commission plus the cost of any restructuring. The more regular the renewal period, the greater the cost of deferral and the shorter the delivery notice.

5.1.5 The participating forward

Definition: Forward contract with a purchased call option [2] attached.

Underlying financial parameters:

Price: Fixed based on spot at execution.
US$ (local) interest rate: Fixed – compounded annually.
Gold lease rate: Fixed – compounded annually.
Contango: Calculated from the above two parameters and fixed.
Maturity: Fixed.
Option strike price: Pre-agreed – depending on potential forward contango and intended volume of options.
Option maturity: Pre-agreed usually matched to forward maturity.

Application and usage: Best used when the potential loss of upside participation is a major concern. Used mostly during periods of high price volatility. Best selected when interest rates are high and when gold lease rates are low. The two situations will yield the optimal level of contango. From the miner's point of view best selected when delivery of metal is guaranteed.

Advantages to the user: Offers guaranteed price protection in the event of declining gold prices. All financial parameters associated with the contract are known. Does not require active management after it is executed unless the miner elects to restructure. Can be unwound before delivery. Loss of upside participation is

[2] Options are defined later in this chapter.

reduced by the call option which is exercised if the spot price on maturity exceeds option strike price. Most contracts offer the ability to re-write the contract thus locking-in higher prices as the spot rallies which is an advantage over min-max (collars) strategies.

Disadvantages to the user: Inflexible delivery dates. No contango is earned since the contango pays for the call options. Slightly more after-execution attention required if the option is to be exercised. The option is exercisable only if it is in-the-money. If the spot price exceeds the contract price but the options are out-of-the-money the option expires worthless and the contango is lost. On using the rewriting facility, the upside participation is reduced. There is an opportunity cost if the gold lease rates fall and/or the interest rates rise during the life of the contract since the option buying power is reduced.

Impact on the gold price:

Immediate impact:: 100% of the forward leg of the contract - the executing bank borrows the equivalent amount of gold and sells it immediately into the market. The call option writer is initially a buyer of gold depending on the delta.
Subsequent impact: On delivery, the executing bank unwinds the short position and delivers gold back to the original lender. The call option writer becomes a subsequent buyer of gold if the gold price rises and a seller if the gold price falls depending on the delta. The delta hedging against the options cannot be greater than 100% of the underlying volume of gold associated with the options (not necessarily equal to the volume associated with the forwards).

Cost to the user: Bank commission and cost of any restructuring. Price of the options (forgone contango). Cost of the rewrite facilities.

5.1.6 The advance premium forward

Definition: A forward contract in which the contango is partly payable in advance. Also known as the flat rate forward or the stablised contango.

Underlying financial parameters:

Price: Fixed based on spot at execution.
US$ (local) interest rate: Fixed – compounded annually.
Gold lease rate: Variable.
Contango: Calculated from the above two parameters.
Maturity: Fixed.

Application and usage: Best selected when interest rates are high and not likely to rise further or could even fall during the life of the contract. Best selected

when gold lease rates are high and could fall during the life of the contract. The two situations will yield the optimal level of contango. From the miner's point of view best selected when delivery of metal is of no concern. Best used in the early years of a project when the greater contango can coincide with cash flow requirements. Most effective for long-term hedging.

Advantages to the user: Offers guaranteed contango and price protection in the event of declining gold prices. Contango paid upfront has cash flow advantages. Conversion of a standard forward into an advance premium forward allows for early realisation of hedging profits. Does not require active management after it is executed unless the miner elects to restructure. Can be unwound before delivery.

Disadvantages to the user: Inflexible delivery dates. Can lock-in unfavourable contango if the interests rates move against the hedger. Settlement is payable on maturity. Slightly more after-execution attention required because of contango payments. The early payment of the contango is at the expense of yield in the later years of the contract. Can incur an opportunity cost should the market price consolidate at levels higher than the contract price (including contango).

Impact on the gold price:

Immediate impact: 100% - the executing bank borrows the equivalent amount of gold and sells it immediately into the market.
Subsequent impact: On delivery, the executing bank unwinds the short position and delivers gold back to the original lender.

Cost to the user: Bank commission plus the cost of any restructuring. Opportunity costs as described above.

5.1.7 The short-term averaging forward

Definition: A forward contract locking in an average, not the spot price.

Underlying financial parameters:

Price: Average of the am/pm London gold fixes over a pre-selected period.
US$ (local) interest rate: Fixed – compounded annually.
Gold lease rate: Variable.
Contango: Calculated from the above two parameters.
Maturity: Fixed.

Application and usage: Best selected when maximising revenue from short-term production. Best selected when interest rates are high and not likely to rise further or could even fall during the life of the contract. Best selected when gold lease rates are high and could fall during the life of the contract. The two situations will yield the optimal level of contango.

Advantages to the user: Offers guaranteed contango and price protection in the event of declining gold prices. Does not require active management after it is executed unless the miner elects to restructure. Can be unwound before delivery. Reduces the probability of the contract price being the low for the period. With the contango, the achieved price is guaranteed to exceed the average of the London fixes for the duration of the contract. Averaging slightly reduces the opportunity costs incurred with other forward products if the market prices stabilises above the contract price (including contango).

Disadvantages to the user: Inflexible delivery dates. Can lock-in unfavourable contango if the interest rates move against the hedger. Possible opportunity cost incurred in averaging rather than attempting to lock-in the highs.

Impact on the gold price:

Immediate impact: 100% - the executing bank borrows the equivalent amount of gold and sells it immediately into the market.
Subsequent impact: On delivery, the executing bank unwinds the short position and delivers gold back to the original lender.

Cost to the user: Bank commission plus the cost of any restructuring. Opportunity costs as described above.

5.2. The options

5.2.1 The put option

Definition: A contract that gives the buyer the right but not the obligation to sell gold at a pre-agreed price at an agreed date. There is an obligation on the part of the option writer to take delivery of gold at the agreed price on the agreed date should the option be exercised.

Underlying financial parameters:

Strike price: Pre-agreed at the time of execution.
US$ (local) interest rate: Pre-agreed at the time of execution.

Gold lease rate: Pre-agreed at the time of execution.
Maturity: Pre-agreed at the time of execution.
Implied price volatility: Quoted by the option writer.

Application and usage: Widely bought by the mining industry since the put offers price protection on the downside at finite cost without limiting upside participation in any rally in the gold price.

Advantages to the user: Costs of the hedge are limited to the premium paid for the option. Since the product offers price protection on the downside without limiting potential participation in a price rally, it is a mechanism that is clearly more acceptable than forwards to many shareholders and boards.

Disadvantages to the user: Price of options can be high depending on how close to the money they are at the time of writing. Price protection has to be paid for without the earning of any contango as in a forward.

Impact on the gold price:

Immediate impact: Put option buyers will tend not to delta hedge [3] any of the exposure. The writer (the commercial banks) will initially be a seller depending on the delta. Primary delta hedging is normally around 40-45% of the underlying volume.
Subsequent impact: The bank will remain a seller into any price declines but will become a buyer into any price rises depending on the delta. The delta hedging against the options cannot be greater than 100% of the underlying volume of gold.

Cost to the user: Initial premium and any cost associated with restructuring.

5.2.2 The call option

Definition: A contract that gives the buyer the right but not the obligation to buy gold at a pre-agreed price at an agreed date. There is an obligation on the part of the option writer to deliver gold at the agreed price on the agreed date should the option be exercised.

Underlying financial parameters:

Strike price: Pre-agreed at the time of execution.
US$ (local) interest rate: Pre-agreed at the time of execution.
Gold lease rate: Pre-agreed at the time of execution.

[3] See Glossary for a definition of delta hedging.

Maturity: Pre-agreed at the time of execution.
Implied price volatility: Quoted by the commercial bank generating the calls.

Application and usage: Widely written by the mining industry in order to earn a premium. Also written by a number of central banks. The premium either pays for put options bought or enhances average realised prices of the balance of the hedging (in the case of the miners) or renders gold holdings income bearing (in the case of the official sector). The calls are left naked to maximise the premium earned.

Advantages to the user: Offers additional revenue particularly if the hedger is of the opinion that the spot price will not exceed the strike price of the calls. The hedger (especially the central banks) may be willing to deliver against the calls should they be exercised.

Disadvantages to the user: Since these options are sold by the hedger although created by the commercial banks, the potential loss should the price move against the contract is unlimited. Loss of upside participation emerges once the market price exceeds the option strike price.

Impact on the gold price:

Immediate impact: Calls written by the hedger are deliberately left naked and thus the hedger does not delta hedge this position in any way. The executing bank as the call option buyer, is initially a seller depending on the delta.
Subsequent impact: The bank will be a seller into any price rises and will become a buyer into any price falls depending on the delta. The delta hedging against the options cannot be greater than 100% of the underlying volume of gold.

Cost to the user: Initially nothing to the option granter since the calls written generate income. Subsequently, any restructuring may incur a cost depending on the nature of the transaction.

5.2.3 The cap and collar or the min-max

Definition: An option strategy in which the user buys put options and writes call options.

Underlying financial parameters:

Strike prices: Pre-agreed at the time of execution.
US$ (local) interest rate: Pre-agreed at the time of execution.
Gold lease rate: Pre-agreed at the time of execution.

Maturity: Pre-agreed at the time of execution.
Implied price volatility: Quoted by the issuing commercial bank.

Application and usage: Widely used by the mining companies to secure downside protection in the gold price (via put options) but to offset the cost of that protection via the granting of call options. The premium earned by the calls pays either in part or totally for the puts options bought. The calls are left naked to maximise the premium earned.

Advantages to the user: Offers price protection at either no or greatly reduced costs. The miner can stipulate the levels at which the call options are written. The ratio of put options bought to call options written is usually 1:3.

Disadvantages to the user: Since the call options are written by the miner, the potential loss should the price move against the contract is unlimited. Loss of upside participation when the market price exceeds the call option strike price. The further out-of-the-money the call options are written the lower the premium paid and hence the greater volumes that have to written to secure the desired cost saving. The closer into-the-money the calls are written, the greater the premium earned but the greater the possibility of them being exercised.

Impact on the gold price:

Immediate impact: The miner or user does not delta hedge either the put options bought or the calls options written. With respect to the put options written and the call options bought, the executing bank is an initial seller.
Subsequent impact: The bank's subsequent delta hedging will be as follows:
With respect to the calls bought: a seller into a price rise and a buyer into price falls;
With respect to the puts written: a buyer into a price rise and a seller into price falls.
The delta hedging against the options cannot be greater than 100% of the underlying volume of gold.

Cost to the user: Initially, either nothing or minimal since the calls are written with the express intention of funding the puts. Costs incurred in any subsequent restructuring depending on the transaction. Unlimited loss potential via call option writing.

5.2.4 The up and in barrier option (kick/knock-in)

Definition: An option strategy in which the options (either calls or puts) are triggered and come into being if a pre-agreed price level is broken at any stage of the contract life. Up and in put options have little use to the mining industry.

Underlying financial parameters:

Trigger prices (knock-in) boundary: Pre-agreed at the time of execution.
US$ (local) interest rate: Pre-agreed at the time of execution.
Gold lease rate: Pre-agreed at the time of execution.
Maturity: Pre-agreed at the time of execution.
Implied price volatility: Quoted by the issuing commercial bank.

Application and usage:
Most commonly up and in call options are written by the mining industry with trigger prices at intervals above spot at the time of the transaction. The calls then only come into being once the spot price hits the trigger price. The kick-ins are usually bought in conjunction with other option strategies, commonly put options in which case the calls offer some upside participation in a price rally but only until the trigger price.

Advantages to the user:
Affords the mining industry upside participation in the gold price between any put option strike price (existing price protection) and the trigger price of the kick-ins.

Disadvantages to the user:
Upside participation into a price rally is limited only through to the trigger beyond which the calls come into being. The premium earned is less than that earned by writing a vanilla call since the buyer forfeits some time value. Very commonly the trigger is valid only for a certain usually limited period throughout the option life which in turn can limit the window of opportunity during which the options can be brought into existence.

Impact on the gold price:

Immediate impact: The option buyer (in this case the commercial bank) will be an initial delta hedge seller.
Subsequent impact: The option buyer will then remain a delta hedge seller into a rising gold price but a delta hedge buyer into price declines. The level of delta hedging increases very sharply as the spot price approaches the trigger price especially if the contract is close to maturity. Thus the delta hedging against these options can and often does greatly exceed 100% of the underlying volume. Deltas of 150-200% are commonplace. Once the trigger price is breached, all the delta hedge selling that has been done is then suddenly reversed and the option buyer will buy back all the delta hedge selling that has taken place. This can have a marked impact on short-term price movements if the options exist in sufficient volume at specific price levels.

Cost: The proximity of the kick-in boundary to the spot price and the strike price at the time of writing greatly affects the price of the option. The further away the boundary, the less the probability of kick-in therefore the more the cost will resemble a vanilla option. Kick-ins tend to be cheaper than ordinary options since the buyer is potentially giving up time value.

5.2.5 The down and out barrier option (knock out)

Definition: An option strategy (can be either calls or puts) in which the options cease to exist if a pre-agreed price level is broken at any stage of the contract life. A rebate is usually payable if the option is knocked-out, the amount depending on the remaining life of the contract. Down and in options also exist but have little application of the mining industry.

Underlying financial parameters:

Knock-out boundary: Pre-agreed at the time of execution.
US$ (local) interest rate: Pre-agreed at the time of execution.
Gold lease rate: Pre-agreed at the time of execution.
Maturity: Pre-agreed at the time of execution.
Implied price volatility: Quoted by the generating bank.

Application and usage:
Calls are used by the mining industry to generate a premium to pay for put options. Put knock-out boundary is usually substantially higher than put strike and spot prices. Most barrier options are priced more on contango rather than spot price.

Advantages to the user:
Call options that can cease to exist if the spot price falls. Put options which cease to exist with the spot price rises substantially above the boundary or trigger level.

Disadvantages to the user:
Less premium is earned by the writer compared with writing vanilla calls. Very commonly the trigger is valid only for a certain usually limited period throughout the option life which in turns limits the window of opportunity during which the options can be knocked-out.

Impact on the gold price:

Immediate impact:
With respect to calls: if the mining industry has written the calls, the buyer

(the commercial bank) will be an initial seller depending on the delta.
With respect to puts: if the mining industry has bought the puts, then the buyer (the commercial bank) will be an initial seller depending on the delta.
Subsequent impact:
With respect to the calls as written above: the commercial bank will remain a delta hedge seller into a price rise but will turn a delta hedge buyer into a price fall.
With respect to the puts as written above: the commercial bank will become a delta hedge buyer into a price rally but will turn a delta hedge seller into a price decline.
The level of delta hedging increases very sharply as the spot price approaches the trigger price especially if the contract is close to maturity. Thus the delta hedging against these options can and often does greatly exceed 100% of the underlying volume. Deltas of 150-200% are commonplace. Once the trigger price is breached, all the delta hedge selling (buying) that has been done is then suddenly reversed and the option buyer will buy (sell) back all the delta hedge selling (buying) that has taken place. This can have a marked effect on short-term price movements if the options exist in sufficient volume at specific price levels.

Cost: The proximity of the knock-out boundary to the spot price and the strike price at the time of writing greatly affects the price of the option. The further away the boundary, the less the probability of knock-out and therefore the more the cost will resemble a vanilla option. Knock-outs tend to be cheaper than ordinary options since the buyer is potentially giving up time value.

5.2.6 The convertible 'forward'

Definition: This in fact is not a forward at all but an option strategy that involves the mining industry in buying a vanilla put option and selling a kick-in call option. A feature of this strategy is that the options have the same strike price. A variant of this product is the purchase of the vanilla put with the writing of a knock-out call at a trigger level that is substantially below the option strike price.

Underlying financial parameters:

Strike price: Pre-agreed at the time of execution.
US$ (local) interest rate: Pre-agreed at the time of execution.
Gold lease rate: Pre-agreed at the time of execution.
Maturity: Pre-agreed at the time of execution.
Trigger price: Pre-agreed at the time of execution.
Implied price volatility: Quoted by the generating bank.

Application and usage:
A complex structure that mimics a forward transaction but offers added (although perhaps limited) flexibility where loss of upside participation is considered an issue.

Advantages to the user:
Offers the miners the standard price protection via the put option. It generates a premium via the calls options that in turn offer participation into a price rally to the point at which the option kicks in. Put options can be converted into a forward.

Disadvantages to the user:
Upside participation is limited to the trigger point. Window of opportunity is usually limited to a period of the entire option life.

Impact on the gold price:

Immediate impact:
The mining company leaves both the puts bought and the calls written unhedged. The counterparty hedges the strategy as follows:
The puts: an initial seller depending on the delta
The calls: an initial seller depending on the delta
Subsequent impact:
With respect to the puts:
The counterparty buys into a price rise and continues to sell into a price fall. Given that the puts are vanilla the total delta hedging cannot exceed 100% of the underlying volume;
With respect to the calls:
The counterparty remains a seller into price rises but turns a buyer into a decline in the price. The level of delta hedging increases very sharply as the spot price approaches the trigger price especially if the contract is close to maturity. Thus delta hedging of 150-200% of the volume of the underlying is commonplace. Once the trigger price is breached, all the delta hedge selling that has been done is then suddenly reversed and the option buyer will buy back all the delta hedge selling that has taken place. This can have a marked affect on short-term price movements if the options exist in sufficient volume at specific price levels.

Cost to the user: Bank commission plus cost of any restructuring. Cost of the put options. Probably less cost effective than a forward sale.

5.3. The basic lease rate swap

Definition: A basic agreement in which gold is lent at a pre-agreed lease rate for a pre-agreed period (usually 3 months). At the end of the period the average lease rate is compared to the contract rate and the differential is paid by the party in debit. The contract is then usually rolled for a further period.

Underlying financial parameters:

Volume: Pre-agreed at the time of execution.
Gold lease rate: Pre-agreed at the time of execution.
Maturity: Pre-agreed at the time of execution.

Application and usage:
Used increasingly by the official sector for the purposes of lending gold.

Advantages to the user:
Allows roll over of short term lending. Overcomes the tenure mismatch experienced by the bullion banks between their gold on deposit and the length out to which the miners wish to hedge.

Disadvantages to the user: Possible cost incurred if the lease rate moves against the swap during the contract life.

Impact on the gold price:

No direct impact on the gold price *per se*. But has considerable implications for the lending market since the swap allows the official sector to begin taking a longer-term view with respect to their lending policies.

CHAPTER 6 : A DEBATING ISSUE

A hypothetical case for higher lease rates – the implications for the gold market – supportive or not of the long term gold price?

The Washington Agreement, and the market's initial response, raises for debate the concept of higher than average lease rates and what this might imply for the longer-term gold price. This chapter deliberately plays devil's advocate since all too often during interviews conducted in the preparation of this study we came across the attitude: if only the central banks would stop lending. Lease rates would rise and then begin to reflect that of other money markets. This would discourage hedging and the gold price would stabilise at higher levels. In other words, low lease rates are essentially at the root of all gold woes. Well are they?

In beginning to tackle the issue, four questions need investigation. These are as follows:

- Under current and future market circumstances are higher lease rates achievable?
- If they are achievable, are they sustainable?
- If they are sustainable, would they indeed exert a positive influence on the gold price?
- How would the various market sectors be affected by them?

Two factors have created the historical situation whereby a vicious circle has been generated in which many market participants have had a vested interest in maintaining a short position. Firstly, the predominant market participants are by nature long of physical gold and above ground stocks of metal exist in volumes not seen in other commodity markets (with the exception of silver). And secondly, the low historical cost of borrowing gold (relative to borrowing dollars for example) has had a lot to do with maintaining this vested interest of a constant short trading position held against long physical holdings.

Thus it appears logical to argue for higher lease rates that would gradually unwind the shorts and discourage further position taking. With less in the way of carry trade by the hedge funds, short trading on the part of the commercial banks

and more subdued producer hedging, the market would see less in the way of demand for lent gold. Intuitively, this implies that sentiment would begin to improve and attitudes towards gold would gradually change, eventually reversing the vicious circle and establishing a virtuous circle of a more confident and stable outlook for the industry. But at what cost would this come to various market participants and would higher lease rates simply generate new problems as it solved existing ones?

These are very complex questions to which there is no clear-cut answer. The best this study can offer at this stage is a strong recommendation for continued and further research into developments relating to these issues and highlight the questions for active debate. But perhaps a constructive starting point is a tentative look at how each market sector might be affected and might respond to a tighter lending market.

Of primary importance is the **official sector** since it remains the single largest holder of metal. As already alluded to, higher lease rates could well generate a reassessment of existing lending policies among the non-signatories of the Washington Agreement within the official community. Potentially more attractive yields may result in either newcomers to the lending market or existing lenders increasing any limits that may have applied under a lower lease rate regime. Those lenders who do not impose specific limits and remain sensitive to lease rate movements will obviously tend to increase their lending activity as lease rates remain comparatively high. Thus in the absence of a global moratorium on lending, higher lease rates are merely likely to provide lending opportunities to those who might otherwise remain non-lenders or lenders of minimal amounts. Chapter 1 details our analysis of the potential level of new lending that could come to market should lease rates encourage it.

For the purposes of debate, one can take the whole question of lending to an extreme. Assume for one moment a total global moratorium on lending through which no further official sector gold could go out on loan. How would this affect official sector holdings? At the moment, the ability to lend out gold and hence render interest-bearing what otherwise would have to remain a sterile asset, is but one of the options open to the central banks. In the total absence of this alternative, what are the other avenues open to the official sector, especially given the reluctance of some members to continue holding a non-interest bearing asset? They are the following:

- At the one extreme: sell gold to reduce the level of sterile assets. Clearly some have opted for this over the years but many others have not;

- At the other extreme: do nothing. Maintain the gold reserves and accept that they will remain non-interest bearing. However, this does not address the problem;

- And somewhere in-between: sell volatility to earn a premium – in other words, write call options against gold reserves, a proportion of which will be delta hedged into the market or;

- Issue warrants against reserves which again implies option granting of sort, a proportion of which will be delta hedged into the market.

Each of these alternatives obviously has very different implications for the short-, medium- and longer-term gold price and this highlights the need to address the question of whether or not reduced lending, in solving some issues, will merely create new or added problems for the gold market.

The final question that needs to be raised with respect to the official sector is: to what extent would lease rates influence the official sector's collective thinking *vis-à-vis* holding gold? As alluded to elsewhere in this report, we believe that a number of central banks maintain their holdings because they can lend them out and earn a return, albeit a small one, under current market circumstances. We expressed the concern that if lease rates collapsed even further, then the rationale for lending gold would be negated and this might cause the official sector to reconsider their reasons for maintaining those reserves. In this context, the converse should then be asked. If the lease rates were to be sustained at higher rates, would this encourage the official sector to hold more loyally onto their existing holdings?

The **primary industry** will also be directly affected by a tighter lending market and the developments post September 26th have already indicated that the mining community has embarked on a total re-look at hedging norms and practices. The fundamental question of whether to hedge or not is already being re-visited at board level. The extent to which shareholders enter the debate would depend on individual companies and the make-up of their share registers. The outcome of such debates might indeed herald the exit of some mining companies from the hedging world. The extent to which this might occur is extremely difficult, if not impossible, to assess since the decision will come from board level where personal experiences, views and opinions come very much into play.

If a large percentage of previously hedged producers withdraw from the derivative market in any volume, this of course, would reiteratively reduce the need for borrowed gold and alleviate some of the lease rate pressures in the lending market. The same will be true if mining companies elect to unwind their hedge positions, even if it is only in the short term. However, given that the gold would probably maintain its contango (although greatly reduced if lease rates strengthen) and given the success of hedging over the years and the substantial returns hedging has afforded companies, we believe that the majority would probably elect to continue with risk management programmes in some form or another. Having said this, we would expect producers who did to exhibit a more cautious

approach to hedging and while price risk management would remain an integral part of corporate philosophy, its role might well be reduced or simplified through the greater use of vanilla products. Thus, if the mining industry is hoping that higher lease rates would encourage and support an improvement in the gold price, it will have collectively to accept a trade-off, that being the possible inability to execute sophisticated, large and long-term price risk management programmes. There simply cannot be a "two-tier" market. We cannot have a situation in which the official sector is discouraged to lend but where the producers can still hedge at will. Higher lease rates will imply a less attractive contango for the miners and an illiquid lending market will imply the inability to participate in the derivative market in anything like the volumes and tenures currently accepted as the norm.

With respect to the **commercial banks**, the Washington Agreement revealed in stark relief the exposures held by some of these banks through the lease rates. Clearly some very painful lessons have been learnt and these have come at a price for bullion banking in general[1].

Regardless of the absolute levels of lending, the worst case scenario is that bullion desks could close and the associated bank withdraws from the gold market in general. A contraction of the number of banks actively involved in the gold market would only serve to detract from the general competitiveness of bullion banking and undermine the health of the industry in general. Moreover, the fewer the banks directly involved, the less the lines of credit, the fewer the counterparties through which risk can be offset and the less the overall competitiveness of the business.

As with the mining companies, again irrespective of future lease rate trends, the bullion banks are clearly going to embark on a strategic re-think of their activities and their approach to their bullion activities. Credit issues and the evaluation of existing and future risk will obviously be areas of major concentration. Margin clauses within legal agreements are another area which will no doubt attract much attention and this may result in a reassessment of credit with some of the mining companies. These issues are discussed in more detail in chapter 3.

In assessing the impact of higher lease rates on the **collective money-under-management industry**, it is necessary to distinguish between the technical or momentum traders and those hedge funds that take fundamental and strategic positions in a commodity.

The momentum traders, as evidenced primarily in the Commitment of Traders reports, would no doubt continue to trade on price technicalities as they have for

[1] These are discussed in more detail in chapter 3.

decades. Their presence, or lack thereof, will be dictated not by lease rates but by price volatility.

The approach adopted by the large hedge funds, which are more inclined to take longer term strategic positions in a chosen commodity, would most likely be somewhat different but certainly no easier to anticipate. Historically we acknowledge the incentive to borrow relatively inexpensive gold to raise dollars. Higher average lease rates in the longer term would discourage this carry trade and there might be less incentive for the large hedge funds to short the gold market. Recent developments in this sector suggest a fundamental change in the structure of the hedge fund industry and this could alleviate to some extent the potential for increased carry trade. This is discussed in detail in chapter 4.

Of considerable importance is the potential reaction to higher lease rates on the part of **private holders of gold**. In this regard we are referring mainly to private investors of physical metal in the Indian Subcontinent who to date have had little incentive to mobilise their substantial cumulative holdings. Repeated efforts on the part of the authorities in that area have so far failed to encourage active participation in the national or international gold markets. Can the collective gold industry assume that this state of affairs is likely to continue or could a higher lease rate regime precipitate a change in thinking and philosophy in that region of the world? One recommendation of this study is for further research into this particular questions.

The final industry participants, whose importance should not be under-estimated, are the **fabricators** many of whom are active borrowers of gold to fund pipeline manufacturing. Higher lease rates would have a major impact on the economics of the fabrication business whether it is the manufacture of jewellery or investment products. Those most affected are likely to be the fabricators of high carat low mark-up gold products serving the Middle and Far Eastern consumers as opposed to the fabricators of low carat goods who enjoy a very high retail price mark-up. This could have a serious and detrimental impact on the fabrication business in those very areas which are serving as the mainstay of physical offtake and which need to be supported and encouraged if the market in general is to benefit from a sustainable higher gold price.

GLOSSARY

ACCELERATED SUPPLY: Gold reaching the market through lending and leasing before it is physically produced.

ACTUAL VOLATILITY: Actual measured price volatility from the historical data records. See **volatility** and contrast **implied volatility**.

ADVANCE PREMIUM FORWARD: Forward contract offering a constant contango throughout contract life; similar to flat rate forward and stabilised contango.

AMERICAN STYLE: (Option) that can be exercised at any stage during its life, in other words at or before expiration date. Contrast European style.

ASIAN OPTIONS: A **history-dependent** option where the outcome is not only reliant on whether or not the option is in-the-money at expiry, but also depends on the average price of the **underlying** throughout the option life. They are used mostly in the base metal markets to reduce exposure or incentives to manipulate the underlying price at expiry. Asian options are also used by market participants who are obliged to have frequent exposure to the underlying asset over time. The options are then useful in capping the overall cost of the physical exposure.

ASSET-OR-NOTHING CALLS (PUTS): History-independent exotic options which have no income if the price of the underlying at expiry is below (above) the **strike price.**

AT-THE-MONEY OPTION: An option with a strike price equal to that of the current price of the underlying.

AVERAGE STRIKE OPTIONS: Asian options where the income depends on an average strike price rather than an average underlying asset price.

BACKWARDATION: A market situation where the spot price trades at a premium to the forward price. Opposite of contango.

BARRIER OPTIONS: Unlike standard **European options** where the income depends only on the price of the underlying at expiration, barrier options are **history-dependent.** In other words, their outcome depends on the performance of the price of the **underlying** during the life of the option and whether that price breaches some predetermined barrier or level. See 'in' barrier and 'out' barrier options.

BINARY OPTIONS: Unlike standard options which have a constant income, binary options have variable (usually all or nothing) pay backs depending on whether or not the price of the underlying meets some pre-agreed condition. Binary options can be either history-dependent or history-independent.

BIS: Bank for International Settlements

BONDS: Means of raising debt through the capital markets. See also **Gold-Backed Bonds.**

BOSTON OPTIONS: See **Break forward options.**

BREAK FORWARD OPTION: Similar to the standard **call** option, except that it has no initial cost.

CALL OPTION: Option giving the purchaser the right but not the obligation to buy gold at a predetermined **(strike)** price.

CASH-OR-NOTHING CALLS (PUTS): The simplest, **history-independent binary options** which have no pay out if the price of the underlying is below (above) the strike price at expiry. They yield a constant sum if the price of the **underlying** is above (below) the strike price.

CBOT: The Chicago Board of Trade

CCA: Comex Clearing Association

CFTC: Commodity Futures Trading Commission, the futures and options watch-dog.

CHOOSER OPTIONS: An option bought and paid for immediately but after an agreed time, the buyer can elect whether the option is to be a **put** or **call** with an equal strike price and equal remaining time to expiry. The chosen put or call is a standard **European** option.

COLLARS: Options which have the same pay out as the standard **call** except that the upside is not unlimited. It is subject to a maximum. The option buyer foregoes any further income above this maximum.

COMEX: The Commodity Exchange in New York. Merged with New York Mercantile Exchange **(NYMEX).**

COMPLEX CHOOSERS: Similar to plain chooser options except that either the put/call strike prices or the put/call time to expiry (or both) are not equal.

COMPOUND OPTIONS: These are options on options. The underlying asset is an option rather than a tangible commodity or security. Valuation of the option is complicated by the fact that two expiry dates must be accounted for: the time to expiration of the compound and the time to expiration of the underlying option.

CONTANGO: A market situation where the spot price is lower than the forward quotation; the differential representing the carrying (financing) costs and prevailing interest rates. Opposite of **backwardation.**

CONTRACT: Basic unit of a **derivative product.**

COST CURVE: Graphical representation of the costs of producing a metal for an entire primary industry. Usually cumulative output expressed in percent plotted against unit operating costs.

COUPON: Annual interest rate associated with capital market bond issues.

DELTA: A measure of the instantaneous rate of change in the value of an option for a one-unit change in the price of the underlying commodity or asset.

DELTA HEDGING: The probability of an option being exercised against the holder, with changes in the spot price relative to the option strike price.

DERIVATIVE (INSTRUMENT): A financial instrument or paper product which has a value based on an underlying asset.

DOWN-AND-IN CALLS: A **barrier** option where the **call** is paid for up front but not received until the knock-in barrier is reached. See also up-and-in calls.

DOWN-AND-OUT CALLS: A barrier option where the standard calls are paid for and exist until such time as the price of the underlying falls below a predetermined barrier after which the options cease to exist.

DOWN-AND-IN PUTS: A **barrier** option where the put is paid for up front but not received until the knock-in barrier is reached. See also up-and-in puts.

DOWN-AND-OUT PUTS: A **barrier** option where the standard puts are paid for and exist until such time as the price of the underlying falls below the predetermined barrier, after which the options cease to exist.

EUROPEAN STYLE: An option that can only be exercised on the date of expiry.

EXCHANGE OPTIONS (1): An option offered by an exchange. It is a standard contract subject to the rules and regulations of the governing exchange. The

COMEX option offers the buyer a COMEX futures contract should the option be exercised.

EXCHANGE OPTIONS (2): An exotic option which allows the holder to exchange one underlying asset for another.

EXERCISING AN OPTION: The option purchaser holds the writer (seller) of an option to the agreed contract.

EXOTIC OPTIONS: Generic term for the more sophisticated option strategy which has features over and above the basic contracts.

EXPIRY DATE: The date on which a **derivative product** expires or ceases to exist. **Exchange** products have set expiry dates. OTC expiry dates are agreed between the **principals.**

EXPLOSIVE OPTIONS: See knock-out options

FORWARD STARTS: Options that are paid for upfront but are only received at a pre-agreed future date. The buyer, after the pre-determined date can at no extra cost receive an option with the usual life length but at a strike price that will be at-the-money on expiry. Major application in company share option schemes.

GAMMA: A measure of the instantaneous rate of change in the **delta** of an option based on a one-unit change on the price of the underlying commodity or asset.

GAP OPTIONS: Options that place emphasis on the role played by the strike price of a standard option. The strike price not only determines if the option is **in- or out-of-the-money** at expiry but also the magnitude of the resultant payoff. The gap is the difference between the strike price and the resultant payoff.

GOFO: Reuters screen code for the daily gold lease rates.

GOLD-BACKED BONDS: Debt raised through the capital markets issued with a gold option alternative to enhance the value/attraction of the investment.

GOLD LOAN: A means of raising capital for project financing which involves monetising gold. Feature of the mid to late 1980s.

HEDGING RATIO: The proportion in which the option or the **underlying** asset or commodity needs to be traded to eliminate sensitivity to movements in the price of the **underlying.**

HISTORY-DEPENDENT OPTIONS: Options whose outcome at expiry is

dependent on the price performance of the underlying throughout the life of the option. Sometimes also called **path dependent.** See also **history-independent options.**

HISTORY-INDEPENDENT OPTIONS: Options whose outcome is based entirely on the price of the u**nderlying** at expiration date. The price performance of the underlying during the life of the option is irrelevant. Standard **European and American options** are history independent. Sometimes also called **path independent**. See also **history-dependent options.**

IFS: International Financial Statistics published by the International Monetary Fund.

IMPLIED VOLATILITY: The degree of price volatilty inferred or implied from option market values. This is the only subjective component of option pricing. Contrast **actual volatility.**

'IN' BARRIER OPTIONS: Options which are paid for at the time of the initial transaction but are not received until a specified price level (the barrier or the knock-in boundary) is broken. If the barrier is broken at some stage during the option's life, then the buyer receives a standard **European** option with a **strike** price and time to expiration. If the barrier is not broken, then at expiry, the holder receives a cash rebate.

IN-THE-MONEY OPTION: An option which has a positive **intrinsic value** is said to be in the money. In the case of a call, it is in-the- money when the **strike** price is lower than the current price. A put option is in the money when the **strike** price is higher than the current price.

INTRINSIC VALUE: (of an option) The difference between the strike price and current price of the underlying commodity.

KAPPA: A measure of the responsiveness in the option **premium** to changes in price **volatility** of the **underlying** commodity or asset. Known also as the vega or lambda.

KNOCK-OUT OPTIONS: Exotic option whereby the contract is cancelled if the spot price breaks through an agreed price. See **up-and-out puts** and **down-and-out calls**. The knock-out option is priced differently since it can explode or be cancelled while theoretically it still has **time value.**

LAMBDA: See **kappa**

LIMIT DOWN: Arbitrary price level below which trading on a Futures and

Options Exchange ceases during that trading day. Imposed to prevent very sharp price declines in futures prices and are adjusted from time to time at the discretion of the Exchange. See **Limits.**

LIMITS: Arbitrary price barriers imposed by Futures and Options Exchanges to limit severe price movements during a trading day. There are no limits in the spot market. See **Limit Up** and **Limit Down.**

LIMIT UP: Arbitrary price level above which trading on a Futures and Option Exchange ceases during that trading day. Imposed to prevent very sharp price increases in futures prices and adjusted from time to time at the discretion of the Exchange.

LIQUIDITY: The volume of business or turnover on an exchange or any market forum; can be applied to either the paper market or the physical.

LOAN DRAW DOWN: Mechanism by which gold used for financing is monetised usually with a sale of gold into the spot market or delivery against a forward contract.

LOCO: Physical location of metal. Unless otherwise stated, price quotations imply delivery loco London.

LONG: To be long of a commodity or associated futures or options contract is to have been a buyer or to be a holder of physical metal. Contrast short.

LONG VOLATILITY: To have been a buyer of either a **put** or a **call option.** Contrast short volatility.

LOOKBACK OPTIONS: A **history-dependent** option where the income is reliant not only on whether the option is **in-the-money** at expiry, but also on the maximum or minimum price achieved by the **underlying** during at least some part of the option life.

MARKET MAKER: A counterparty or bullion banker offering both bid and offer prices.

MARK TO MARKET: A regular (usually daily) re-evaluation of open positions or derivative exposures based on the closing price (**midprice**) (between the bid and offer prices) of the **underlying commodity.**

MATURITY DATE: Date on which options mature; when it is either exercised or it expires worthless. Also known as e**xpiration date.**

MARGIN: The cash deposit against a paper contract payable as a guarantee. An initial payment is usually made and thereafter further margin requirements may have to be met depending on the performance of the contract throughout its life.

MID PRICE: The price between the bid (quoted by the buyer) and offer (quoted by the seller) prices.

MULTIPLE OPTION FINANCING: Term used in bullion financing in which the gold loan agreement is flexible, in that the borrower can elect to make capital and interest payments in either gold or currency.

NAKED OPTIONS: Options granted and left unhedged or exposed to potential exercising.

NYMEX: New York Mercantile Exchange. Now merged with **COMEX.**

OPEN OUTCRY: Method of trading any commodity where dealers face each other in a dealing ring or pit and there is direct communication. Contrast: **Screen Trading.**

OUT-OF-THE-MONEY (Option): An option that has no **intrinsic value** is said to be out-of-the-money. A **call** is out-of-the-money when the **strike** price is higher than the current price. A **put** is when the **strike** price is lower than the current price.

OTC: Over-the-counter; term used to describe an option that is written and traded through principals rather than an Exchange.

'OUT' BARRIER OPTIONS: Options which are paid for immediately and exist until, during the option life, a predetermined barrier is broken, after which the options are rendered null and void - they cease to exist. If the barrier is not breached, the holder receives standard **European** options. If the barrier is broken and the options are extinguished, the holder is then paid a rebate.

PRINCIPAL-TO-PRINCIPAL: Bullion transactions executed directly between the client and the bullion banks without being channelled through an exchange. Used primarily by market participants who have actual physical transactions to complete rather than the speculators. Speculative business tends to be channelled via the exchanges.

PREMIUM: The cost which the buyer of an option pays to the writer or seller of the option; normally only a very small fraction of the value of the underlying commodity.

PUT OPTION: Option giving the purchaser the right but not the obligation to sell gold at a particular **strike** price.

RANGE FORWARDS: Options similar to **collars** except that they have zero initial cost.

RHO: A measure of the instantaneous rate of change in the value of an option for a one-unit change in the relevant interest rate.

SCREEN TRADING: Method of trading via computer screens and telephones in which there is no direct contact between dealers. Contrast: **open outcry.**

SETTLEMENT DATE: Usually the full business day after expiry date or after the closing of a contract.

SHORT: To be short of a commodity or associated futures or options contract is to have been a seller. Contrast long.

SHORT VOLATILITY: To have been a grantor or writer of either **put** or **call options.** Contrast **long volatility.**

SPOT DEFERRED: Hybrid forward contract offering floating interest rates and no fixed delivery. More flexible than a conventional forward, but without the cost of an option.

SPOT MARKET: The immediate market where delivery obligations usually occur no more than two days after the transaction.

STABILISED CONTANGO: Forward contract historically offered by the South African Reserve Bank to the marginal SA mines. See **flat-rate forward** or **advance premium forward.**

STRIKE PRICE: The agreed price at which the option can be exercised which will be equal to, higher or lower than the current price of the **underlying.**

SWAP: A spot sale with a simultaneous equal forward purchase of equal tonnage. This is the definition of a gold or bullion swap which may differ from the term used by the foreign exchange markets.

SYNTHETIC GOLD LOAN: A means of raising finance using the gold forward market but does not result in the monetising of physical metal.

THETA: A measure of the instantaneous rate of change in the value of an option for a one-unit change in the time to expiry.

TIME VALUE: Option value associated with the time left to maturity since during its life an option can move in and out of the money.

UNDERLYING: Shortened term for the underlying commodity upon which futures and options are traded (See **Derivative Instrument**).

UP-AND-IN CALLS: A barrier option where the call is paid for at the time of transaction but is not received until the predetermined knock-in barrier is reached. Differs from down-and-in calls in that the price of the underlying is initially below the barrier.

UP-AND-IN PUTS: A barrier option where the put is paid for immediately but is not received until the predetermined knock-in barrier is reached. Differs from down-and-in puts in that the price of the underlying is initially below the barrier.

UP-AND-OUT CALLS: A barrier option where the standard calls are paid for immediately exist until such time as the price of the underlying rises above a predetermined barrier after which the options cease to exist.

UP-AND-OUT PUTS: A barrier option where the standard options are paid for immediately and exist until such time as the price of the underlying rises above the predetermined barrier, after which the options cease to exist.

VEGA: see kappa

VOLATILITY: The rate of change in the price of the underlying commodity. See **actual volatility** and **implied volatility.**

WARRANT: Option attached usually to a bond issue designed to give the holder a highly leveraged exposure to the underlying commodity.

WINDOW OPTIONS: Suite of **history-dependent** exotic options in which preagreed parameters are valid only for an agreed period of time within the option life.

WRITING OPTIONS: Selling someone else the right to buy or sell gold at a particular price.

ZERO COST COLLAR: See **collars.**

10K REPORT: Set of audited annual accounts published and issued to shareholders. Differs from an annual report only in detail.

APPENDIX 1: ANALYSIS OF THE LENDING MARKET

COMMITMENT TO THE LENDING MARKET - OFFICIAL SECTOR BY COUNTRY
Excludes private and other lending

RESERVES LENT AS OF DECEMBER 1999

	Number of countries	Holdings Tonnes	Lending Tonnes	Average lent, %
Zero lending to 10%	29	15,017	354	2
Greater than 10%-25%	4	7,428	1,122	15
Greater than 25%-50%	48	4,999	1,917	38
Greater than 50%	37	1,798	1,157	64
Weighted average lent				16
TOTAL	**118**	**29,242**	**4,549**	
Including BIS,ECB etc		33,404	4,709	14

REGIONAL ANALYSIS OF OFFICIAL SECTOR GOLD LENDING AS OF DECEMBER 1999

	Number of countries	Holdings Tonnes	Lending Tonnes	Average lent, %
Africa	26	502	177	35
Australasia	19	2,495	683	27
Europe East & West	37	16,422	2,897	18
Latin America	22	750	447	60
Middle East	12	865	315	36
North America	2	8,207	31	0
TOTAL	**118**	**29,242**	**4,549**	
Average weighted				16

APPENDIX 2

HEDGING AT RISK AT VARIOUS US DOLLAR, AUSTRALIAN DOLLAR AND S AFRICAN RAND PRICES AS OF END DECEMBER 1998 - FOR DELIVERY IN 1999

PRICE AT RISK	FIXED FORWARDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	SPOT DEFERREDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	CALLS WRITTEN OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	TOTAL AT RISK OUNCES	% TOTAL	CUMULATIVE % TOTAL
TOTAL	**6,093,012**			**TOTAL**	**5,239,575**			**TOTAL**	**5,479,945**			**TOTAL**	**16,812,532**		
US$300	62,546			US$300	14,025			US$300	360,500			US$300	6,467,537		
A$450	0			A$450	0			A$450	0			A$450	0		
R1800	0			R1800	0			R1800	0			R1800	62,546		
TOTAL	**62,546**	**1.0**	**1.0**	**TOTAL**	**14,025**	**0.3**	**0.3**	**TOTAL**	**360,500**	**6.6**	**6.6**	**TOTAL**	**6,530,083**	**38.8**	**38.8**
US$320	203,184			US$320	423,950			US$320	1,352,700			US$320	1,979,834		
A$480	0			A$480	6,487			A$480	0			A$480	6,487		
R1930	324,800			R1930	0			R1930	0			R1930	324,800		
TOTAL	**527,984**	**8.7**	**9.7**	**TOTAL**	**430,437**	**8.2**	**8.5**	**TOTAL**	**1,352,700**	**24.7**	**31.3**	**TOTAL**	**2,311,121**	**13.7**	**52.6**
US$330	2,539,282			US$330	0			US$330	0			US$330	2,539,282		
A$500	0			A$500	0			A$500	150,000			A$500	150,000		
R1990	0			R1990	0			R1990	0			R1990	0		
TOTAL	**2,539,282**	**41.7**	**51.4**	**TOTAL**	**0**	**0.0**	**8.5**	**TOTAL**	**150,000**	**2.7**	**34.0**	**TOTAL**	**2,689,282**	**16.0**	**68.6**
US$350	89,655			US$350	16,000			US$350	2,090,630			US$350	2,196,285		
A$530	30,154			A$530	0			A$530	44,000			A$530	74,154		
R2110	0			R2110				R2110	0			R2110	0		
TOTAL	**119,809**	**2.0**	**53.3**	**TOTAL**	**16,000**	**0.3**	**8.8**	**TOTAL**	**2,134,630**	**39.0**	**73.0**	**TOTAL**	**2,270,439**	**13.5**	**82.1**
US$375	455,508			US$375	0			US$375	73,400			US$375	528,908		
A$565	102,047			A$565	78,193			A$565	45,000			A$565	225,240		
R2260	367,974			R2260				R2260	845,255			R2260	1,213,229		
TOTAL	**925,529**	**15.2**	**68.5**	**TOTAL**	**78,193**	**1.5**	**10.3**	**TOTAL**	**963,655**	**17.6**	**90.5**	**TOTAL**	**1,967,377**	**11.7**	**93.8**
TOTAL	**4,175,150**	**68.5**		**TOTAL**	**538,655**	**10.3**		**TOTAL**	**4,961,485**	**90.5**		**TOTAL**	**15,768,302**	**93.8**	

HEDGING AT RISK AT VARIOUS US DOLLAR, AUSTRALIAN DOLLAR AND S AFRICAN RAND PRICES AS OF END DECEMBER 1998 - FOR DELIVERY IN 2000

PRICE AT RISK	FIXED FORWARDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	SPOT DEFERREDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	CALLS WRITTEN OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	TOTAL AT RISK OUNCES	% TOTAL	CUMULATIVE % TOTAL
TOTAL	**4,074,730**			**TOTAL**	**5,214,842**			**TOTAL**	**3,343,659**			**TOTAL**	**12,633,231**		
US$300	0			US$300	0			US$300	124,884			US$300	124,884		
A$450	0			A$450	0			A$450	0			A$450	0		
R1800	0			R1800	0			R1800	0			R1800	0		
TOTAL	**0**	**0.0**	**0.0**	**TOTAL**	**0**	**0.0**	**0.0**	**TOTAL**	**124,884**	**3.7**	**3.7**	**TOTAL**	**124,884**	**1.0**	**1.0**
US$320	47,000			US$320	69,262			US$320	0			US$320	116,262		
A$480	0			A$480	0			A$480	0			A$480	0		
R1930	0			R1930	0			R1930	20,000			R1930	20,000		
TOTAL	**47,000**	**1.2**	**1.2**	**TOTAL**	**69,262**	**1.3**	**1.3**	**TOTAL**	**20,000**	**0.6**	**4.3**	**TOTAL**	**136,262**	**1.1**	**2.1**
US$330	53,000			US$330	120,000			US$330	223,500			US$330	396,500		
A$500	0			A$500	0			A$500	0			A$500	0		
R1990	146,390			R1990	0			R1990	20,000			R1990	166,390		
TOTAL	**199,390**	**4.9**	**6.0**	**TOTAL**	**120,000**	**2.3**	**3.6**	**TOTAL**	**243,500**	**7.3**	**11.6**	**TOTAL**	**562,890**	**4.5**	**6.5**
US$350	693,263			US$350	17,500			US$350	175,750			US$350	886,513		
A$530	133,000			A$530	0			A$530	40,000			A$530	173,000		
R2110	0			R2110	0			R2110	0			R2110	0		
TOTAL	**826,263**	**20.3**	**26.3**	**TOTAL**	**17,500**	**0.3**	**4.0**	**TOTAL**	**215,750**	**6.5**	**18.1**	**TOTAL**	**1,059,513**	**8.4**	**14.9**
US$375	1,027,934			US$375	0			US$375	1,211,300			US$375	2,239,234		
A$565	0			A$565	0			A$565	0			A$565	0		
R2260	0			R2260	0			R2260	0			R2260	0		
TOTAL	**1,027,934**	**25.2**	**51.6**	**TOTAL**	**0**	**0.0**	**4.0**	**TOTAL**	**1,211,300**	**36.2**	**54.3**	**TOTAL**	**2,239,234**	**17.7**	**32.6**
TOTAL	**2,100,587**	**51.6**		**TOTAL**	**206,762**	**4.0**		**TOTAL**	**1,815,434**	**54.3**		**TOTAL**	**4,122,783**	**32.6**	

HEDGING AT RISK AT VARIOUS US DOLLAR, AUSTRALIAN DOLLAR AND S AFRICAN RAND PRICES AS OF END JUNE 1999 - FOR DELIVERY IN 1999

PRICE AT RISK	FIXED FORWARDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	SPOT DEFERREDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	CALLS WRITTEN OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	TOTAL AT RISK OUNCES	% TOTAL	CUMULATIVE % TOTAL
TOTAL	**16,934,718**			**TOTAL**	**2,777,751**			**TOTAL**	**6,962,102**			**TOTAL**	**26,674,571**		
US$300	8,813,892			US$300	792,700			US$300	1,934,733			US$300	11,541,325		
A$450	369,469			A$450	0			A$450	200,000			A$450	569,469		
R1800	0			R1800	0			R1800	0			R1800	0		
TOTAL	**9,183,361**	**54.2**	**54.2**	**TOTAL**	**792,700**	**28.5**	**28.5**	**TOTAL**	**2,134,733**	**30.7**	**30.7**	**TOTAL**	**12,110,794**	**45.4**	**45.4**
US$320	143,254			US$320	30,500			US$320	1,276,620			US$320	1,450,374		
A$480	213,000			A$480	4,125			A$480	0			A$480	217,125		
R1930	695,168			R1930	0			R1930	0			R1930	695,168		
TOTAL	**1,051,422**	**6.2**	**60.4**	**TOTAL**	**34,625**	**1.2**	**29.8**	**TOTAL**	**1,276,620**	**18.3**	**49.0**	**TOTAL**	**2,362,667**	**8.9**	**54.3**
US$330	23,456			US$330	0			US$330	0			US$330	23,456		
A$500	549,640			A$500	0			A$500	0			A$500	549,640		
R1990	171,101			R1990	0			R1990	0			R1990	171,101		
TOTAL	**744,197**	**4.4**	**64.8**	**TOTAL**	**0**	**0.0**	**29.8**	**TOTAL**	**0**	**0.0**	**49.0**	**TOTAL**	**744,197**	**2.8**	**57.0**
US$350	0			US$350	14,966			US$350	0			US$350	14,966		
A$530	4,838			A$530	0			A$530	503,000			A$530	507,838		
R2110	0			R2110	0			R2110	0			R2110	0		
TOTAL	**4,838**	**0.0**	**64.9**	**TOTAL**	**14,966**	**0.5**	**30.3**	**TOTAL**	**503,000**	**7.2**	**56.2**	**TOTAL**	**522,804**	**2.0**	**59.0**
US$375	1,049,825			US$375	0			US$375	158,000			US$375	1,207,825		
A$565	2,443,250			A$565	0			A$565	567,000			A$565	3,010,250		
R2260	0			R2260	0			R2260				R2260	0		
TOTAL	**3,493,075**	**20.6**	**85.5**	**TOTAL**	**0**	**0.0**	**30.3**	**TOTAL**	**725,000**	**10.4**	**66.6**	**TOTAL**	**4,218,075**	**15.8**	**74.8**
TOTAL	**14,476,893**	**85.5**		**TOTAL**	**842,291**	**30.3**		**TOTAL**	**4,639,353**	**66.6**		**TOTAL**	**19,958,537**	**74.8**	

HEDGING AT RISK AT VARIOUS US DOLLAR, AUSTRALIAN DOLLAR AND S AFRICAN RAND PRICES AS OF END JUNE 1999 - FOR DELIVERY IN 2000

PRICE AT RISK	FIXED FORWARDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	SPOT DEFERREDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	CALLS WRITTEN OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	TOTAL AT RISK OUNCES	% TOTAL	CUMULATIVE % TOTAL
TOTAL	**7,363,065**			**TOTAL**	**5,211,030**			**TOTAL**	**3,696,251**			**TOTAL**	**16,270,346**		
US$300	1,376,403			US$300	60,000			US$300	215,300			US$300	1,651,703		
A$450	0			A$450	0			A$450	166,000			A$450	166,000		
R1800	0			R1800	0			R1800	0			R1800	0		
TOTAL	**1,376,403**	**18.7**	**18.7**	**TOTAL**	**60,000**	**1.2**	**1.2**	**TOTAL**	**381,300**	**10.3**	**10.3**	**TOTAL**	**1,817,703**	**11.2**	**11.2**
US$320	276,440			US$320	206,000			US$320	489,942			US$320	972,382		
A$480	0			A$480	0			A$480	0			A$480	0		
R1930	0			R1930	0			R1930	0			R1930	0		
TOTAL	**276,440**	**3.8**	**22.4**	**TOTAL**	**206,000**	**4.0**	**5.1**	**TOTAL**	**489,942**	**13.3**	**23.6**	**TOTAL**	**972,382**	**6.0**	**17.1**
US$330	0			US$330	0			US$330	223,500			US$330	223,500		
A$500	135,282			A$500	0			A$500	0			A$500	135,282		
R1990	480,000			R1990	0			R1990	0			R1990	480,000		
TOTAL	**615,282**	**8.4**	**30.8**	**TOTAL**	**0**	**0.0**	**5.1**	**TOTAL**	**223,500**	**6.0**	**29.6**	**TOTAL**	**838,782**	**5.2**	**22.3**
US$350	663,255			US$350	70,000			US$350	27,000			US$350	760,255		
A$530	653,550			A$530	0			A$530	0			A$530	653,550		
R2110	100,000			R2110	0			R2110	10,000			R2110	110,000		
TOTAL	**1,416,805**	**19.2**	**50.0**	**TOTAL**	**70,000**	**1.3**	**6.4**	**TOTAL**	**37,000**	**1.0**	**30.6**	**TOTAL**	**1,523,805**	**9.4**	**31.7**
US$375	1,061,514			US$375	0			US$375	1,123,600			US$375	2,185,114		
A$565	482,350			A$565	0			A$565	0			A$565	482,350		
R2260	860,438			R2260	0			R2260	0			R2260	860,438		
TOTAL	**2,404,302**	**32.7**	**82.7**	**TOTAL**	**0**	**0.0**	**6.4**	**TOTAL**	**1,123,600**	**30.4**	**61.0**	**TOTAL**	**3,527,902**	**21.7**	**53.4**
TOTAL	**6,089,232**	**82.7**		**TOTAL**	**336,000**	**6.4**		**TOTAL**	**2,255,342**	**61.0**		**TOTAL**	**8,680,574**	**53.4**	

HEDGING AT RISK AT VARIOUS US DOLLAR, AUSTRALIAN DOLLAR AND S AFRICAN RAND PRICES AS OF END DECEMBER 1999 - FOR DELIVERY IN 2000

PRICE AT RISK	FIXED FORWARDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	SPOT DEFERREDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	CALLS WRITTEN OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	TOTAL AT RISK OUNCES	% TOTAL	CUMULATIVE % TOTAL
TOTAL	**12,506,458**			**TOTAL**	**4,843,900**			**TOTAL**	**5,307,904**			**TOTAL**	**22,658,262**		
US$300	718,190			US$300	265,000			US$300	478,520			US$300	1,461,710		
A$450	508,807			A$450	18,000			A$450	117,797			A$450	644,604		
R1800	21,000			R1800	0			R1800	0			R1800	21,000		
TOTAL	**1,247,997**	**10.0**	**10.0**	**TOTAL**	283,000	**5.8**	**5.8**	**TOTAL**	**596,317**	**11.2**	**11.2**	**TOTAL**	**2,127,314**	**9.4**	**9.4**
US$320	3,788,423			US$320	0			US$320	1,493,994			US$320	5,282,416		
A$480	1,278,628			A$480	10,900			A$480	0			A$480	1,289,528		
R1930	0			R1930	0			R1930	0			R1930	0		
TOTAL	**5,067,050**	**40.5**	**50.5**	**TOTAL**	10900	**0.2**	**6.1**	**TOTAL**	**1,493,994**	**28.1**	**39.4**	**TOTAL**	**6,571,944**	**29.0**	**38.4**
US$330	147,123			US$330	0			US$330	992,000			US$330	1,139,123		
A$500	503,451			A$500	0			A$500	0			A$500	503,451		
R1990	0			R1990	0			R1990	0			R1990	0		
TOTAL	**650,574**	**5.2**	**55.7**	**TOTAL**		**0.0**	**6.1**	**TOTAL**	**992,000**	**18.7**	**58.1**	**TOTAL**	**1,642,574**	**7.2**	**45.6**
US$350	137,760			US$350	0			US$350	102,500			US$350	240,260		
A$530	197,724			A$530	0			A$530	125,000			A$530	322,724		
R2110	12,303			R2110	0			R2110	0			R2110	12,303		
TOTAL	**347,787**	**2.8**	**58.5**	**TOTAL**		**0.0**	**6.1**	**TOTAL**	**227,500**	**4.3**	**62.4**	**TOTAL**	**575,287**	**2.5**	**48.2**
US$375	1,610,981			US$375	3,700,000			US$375	687,500			US$375	5,998,481		
A$565	496,635			A$565	0			A$565	642,000			A$565	1,138,635		
R2260	0			R2260	0			R2260	648,093			R2260	648,093		
TOTAL	**2,107,616**	**16.9**	**75.3**	**TOTAL**	3,700,000	**76.4**	**82.5**	**TOTAL**	**1,977,593**	**37.3**	**99.6**	**TOTAL**	**7,785,209**	**34.4**	**82.5**
TOTAL	**9,421,024**	**75.3**		**TOTAL**	**3,993,900**	**82.5**		**TOTAL**	**5,287,404**	**99.6**		**TOTAL**	**18,702,328**	**82.5**	

HEDGING AT RISK AT VARIOUS US DOLLAR, AUSTRALIAN DOLLAR AND S AFRICAN RAND PRICES AS OF END DECEMBER 1999 - FOR DELIVERY IN 2001

PRICE AT RISK	FIXED FORWARDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	SPOT DEFERREDS OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	CALLS WRITTEN OUNCES	% TOTAL	CUMULATIVE % TOTAL	PRICE AT RISK	TOTAL AT RISK OUNCES	% TOTAL	CUMULATIVE % TOTAL
TOTAL	**8,146,758**			**TOTAL**	**4,362,000**			**TOTAL**	**2,785,062**			**TOTAL**	**15,293,820**		
US$300	829,702			US$320	250,000			US$300	211,520			US$300	1,291,222		
A$450	156,000			A$480				A$450	135,000			A$450	291,000		
R1800	440,000			R1930				R1800	0			R1800	440,000		
TOTAL	**1,425,702**	**17.5**	**17.5**	**TOTAL**	**250,000**	**5.7**	**5.7**	**TOTAL**	**346,520**	**12.4**	**12.4**	**TOTAL**	**2,022,222**	**13.2**	**13.2**
US$320	666,584			US$320	0			US$320	0			US$320	666,584		
A$480	69,000			A$480	0			A$480	0			A$480	69,000		
R1930	22,404			R1930	0			R1930	0			R1930	22,404		
TOTAL	**757,988**	**9.3**	**26.8**	**TOTAL**	**0**	**0.0**	**5.7**	**TOTAL**	**0**	**0.0**	**12.4**	**TOTAL**	**757,988**	**5.0**	**18.2**
US$330	1,809,487			US$330	0			US$330	222,404			US$330	2,031,891		
A$500	297,125			A$500	0			A$500	83,000			A$500	380,125		
R1990	0			R1990	0			R1990	0			R1990	0		
TOTAL	**2,106,612**	**25.9**	**52.7**	**TOTAL**	**0**	**0.0**	**5.7**	**TOTAL**	**305,404**	**11.0**	**23.4**	**TOTAL**	**2,412,016**	**15.8**	**33.9**
US$350	239,787			US$350	0			US$350	110,060			US$350	349,847		
A$530	760,507			A$530	0			A$530	440,000			A$530	1,200,507		
R2110	0			R2110	0			R2110	68,000			R2110	68,000		
TOTAL	**1,000,294**	**12.3**	**64.9**	**TOTAL**	**0**	**0.0**	**5.7**	**TOTAL**	**618,060**	**22.2**	**45.6**	**TOTAL**	**1,618,354**	**10.6**	**44.5**
US$375	1,054,000			US$375	3,700,000			US$375	948,568			US$375	5,702,568		
A$565	480,550			A$565	0			A$565	0			A$565	480,550		
R2260	0			R2260	0			R2260	0			R2260	0		
TOTAL	**1,534,550**	**18.8**	**83.8**	**TOTAL**	**3,700,000**	**84.8**	**90.6**	**TOTAL**	**948,568**	**34.1**	**79.7**	**TOTAL**	**6,183,118**	**40.4**	**85.0**
TOTAL	**6,825,146**	**83.8**		**TOTAL**	**3,950,000**	**90.6**		**TOTAL**	**2,218,552**	**79.7**		**TOTAL**	**12,993,698**	**85.0**	

SUMMARY - NOMINAL TOTAL HEDGING BY PRODUCT

Hedging	End Dec-99 Tonnes	End Jun-99 Tonnes	End Dec-98 Tonnes	End Dec-99 Mn Oz	End Jun-99 Mn Oz	End Dec-98 Mn Oz
Forwards	1,510	1,218	793	48.5	39.2	25.5
Spot deferreds	524	756	652	16.8	24.3	21.0
Floating forwards	107	74	0	3.4	2.4	0.0
Convertible forwards	12	11	0	0.4	0.4	0.0
Variable price forwards	36	7	7	1.2	0.2	0.2
Puts bought	870	899	794	28.0	28.9	25.5
Puts written*	15	12	4	0.5	0.4	0.1
Calls written	832	819	665	26.7	26.3	21.4
Convertible puts bought	133	115	0	4.3	3.7	0.0
Knockout puts bought	14	9	9	0.5	0.3	0.3
Calls bought*	429	167	64	13.8	5.4	2.1
Gold Loans*	0	8	6	0.0	0.2	0.2
Kick in calls written	0	0	127	0.0	0.0	4.1
Total	**4,038**	**3,908**	**3,048**	**129.8**	**125.7**	**98.0**
Total offset*	444	187	74	14.3	6.0	2.4
* Products offset						
Nominal hedging as % of 1999 output	**158**	**153**	**120**			

REALISED PRICES OF THE HEDGE BOOK AS OF END DEC 1998

	Mn Oz	Aust Dollars	Mn Oz	US Dollars	Mn Oz	Rand	Total
Gold price end June 98		**468**		**292**		**1,631**	
Gold price end Dec 98		**484**		**292**		**1,567**	
Gold price average 98		**471**		**294**		**1,662**	
Forwards	11.79	**582**	11.77	**361**	1.95	**2,688**	25.51
Spot deferreds	0.08	**541**	20.87	**385**	0.00		20.96
Floating forwards	0.00		0.00		0.00		0.00
Convertible forwards	0.32	**663**	0.03	**506**	0.00		0.35
Variable price forwards	0.24	**1,161**	0.00		0.00		0.24
Puts bought	12.32	**592**	12.39	**344**	0.84	**2,563**	25.54
Puts written	0.00		0.04	**296**	0.08	**1,824**	0.12
Calls written	2.50	**551**	15.28	**364**	3.59	**2,339**	21.37
Kick in calls written	4.09	**545**	0.00		0.00		4.09
Convertible puts	0.00		0.00		0.00		0.00
Knock out puts	0.00		0.30	**456**	0.00		0.30
Calls bought	0.38	**846**	1.16	**346**	0.52	**1,889**	2.06

PERCENTAGE GAINS ON SPOT PRICE

	Aust Dollars	US Dollars	Rand
Average for 1998			
All forwards	26.3	27.9	61.7
All puts bought	25.9	17.6	54.2
Puts written		0.6	9.7
Calls written	17.0	23.7	40.7
Calls bought	79.7	17.8	13.6
End December 1998			
All forwards	22.8	29.0	71.6
All puts bought	22.4	18.6	63.6
Puts written		1.5	16.4
Calls written	13.8	24.8	49.3
Calls bought	74.8	18.8	20.5
End June 1998			
All forwards	26.9	28.7	64.8
All puts bought	26.5	18.3	57.1
Puts written		1.3	11.8
Calls written	17.6	24.5	43.4
Calls bought	80.6	18.5	15.8

REALISED PRICES OF THE HEDGE BOOK AS OF END JUNE 1999

	Mn Oz	Aust Dollars	Mn oz	US Dollars	Mn Oz	Rand	Total
Gold price end June 99		**398**		**261**		**1,539**	
Gold price end Dec 99		**443**		**284**		**1,687**	
Gold price average 99		**433**		**279**		**1,649**	
Forwards	12.27	**549**	19.01	**321**	3.92	**2,434**	35.19
Spot deferreds	0.02	**543**	24.27	**381**	0.00	**0**	24.29
Floating forwards	0.00	**0**	2.38	**447**	0.00	**0**	2.38
Convertible forwards	0.32	**663**	0.03	**506**	0.00	**0**	0.35
Variable price forwards	0.21	**1,104**	0.00	**0**	0.00	**0**	0.21
Puts bought	14.56	**589**	13.54	**357**	0.64	**2,679**	28.74
Puts written	0.00	**0**	0.30	**273**	0.10	**1,825**	0.40
Calls written	5.11	**509**	17.28	**353**	3.36	**2,469**	25.75
Convertible puts	3.70	**653**	0.00	**0**	0.00	**0**	3.70
Knock out puts	0.00	**0**	0.30	**457**	0.00	**0**	0.30
Calls bought	0.09	**482**	3.61	**360**	0.51	**2,022**	4.20

PERCENTAGE GAINS ON SPOT PRICE

	Aust Dollars	US Dollars	Rand
Average for 1999			
All forwards	29.6	29.1	47.6
All puts bought	39.1	28.8	62.5
Puts written		-1.9	10.7
Calls written	17.6	26.8	49.8
Calls bought	11.3	29.2	22.6
End December 1999			
All forwards	26.6	26.9	44.3
All puts bought	35.9	26.6	58.8
Puts written		-3.6	8.2
Calls written	14.9	24.7	46.4
Calls bought	8.7	27.0	19.9
End June 1999			
All forwards	40.9	37.7	58.2
All puts bought	51.3	37.4	74.1
Puts written		4.6	18.6
Calls written	27.9	35.3	60.4
Calls bought	21.0	37.8	31.4

REALISED PRICES OF THE HEDGE BOOK AS OF END DEC 1999

	Mn Oz	Austr Dollars	Mn Oz	US Dollars	Mn Oz	Rand	Total
Gold price end June 99		**398**		**261**		**1,589**	
Gold price end Dec 99		**443**		**283**		**1,743**	
Gold price average 99		**433**		**279**		**1,704**	
Forwards	17.95	**564**	25.89	**344**	4.70	**2,556**	48.54
Spot deferreds	0.03	**448**	16.80	**364**	0.00		16.83
Floating forwards	0.00		3.45	**432**	0.00		3.45
Convertible forwards	0.32	**663**	0.05	**495**	0.00		0.37
Variable price forwards	0.18	**1,187**	0.98	**334**	0.00		1.16
Puts bought	14.37	**557**	13.10	**340**	0.27	**2,063**	27.74
Puts written	0.05	**460**	0.44	**261**	0.00		0.49
Calls written	6.68	**538**	17.66	**350**	2.40	**2,519**	26.74
Kick in calls written	0.00		0.00		0.00		0.00
Convertible puts	4.28	**627**	0.00		0.00		4.28
Knock out puts	0.44	**400**	0.00		0.00		0.44
Calls bought	2.19	**641**	10.10	**331**	1.50	**2,193**	13.79

PERCENTAGE GAINS ON SPOT PRICE

	Austr Dollars	US Dollars	Rand
Average for 1999			
All forwards	32	28	50
All puts bought	31	22	21
Puts written	6	-6	
Calls written	24	26	48
Calls bought	48	19	29
End December 1999			
All forwards	29	26	47
All puts bought	28	20	18
Puts written	4	-8	
Calls written	21	23	45
Calls bought	45	17	26
End June 1999			
All forwards	44	37	61
All puts bought	43	30	30
Puts written	16	0	
Calls written	35	34	59
Calls bought	61	27	38

APPENDIX 3

The bullion trading community

ABN Amro
AIG International
Barclays Bank
Chase Manhattan
Citibank
Commerzbank
Credit Suisse First Boston
Deutsche Bank
Dresdner Bank
Goldman Sachs/J Aron
HSBC/Republic
JP Morgan
MacQuarie Bank
Mitsubishi
Mitsui
MKS
Morgan Stanley
NM Rothschild
Phibro Bullion
Prudential-Bache
Rabobank
ScotiaMocatta
Société Générale
Standard Bank
Sumitomo
UBS
West LB

APPENDIX 4

Analysis of the Money-under-management data

The analysis that follows is the result of a detailed examination of the Managed Account Reports (MAR), which are published on a six-monthly basis. MAR is one of the primary sources of money-under-management data, presenting detailed statistical information covering a full spectrum of trading entities. A number of points about the data need to be made to place the analysis into its correct statistical perspective:

- The period under review covers the four six-monthly reports between June 1998 and December 1999;

- The MAR data is collated with the express intention of providing users with a directory for the financial comparison of the various funds. Thus, it is used primarily by potential investors. For this reason, there is a strong incentive for the funds to report when their performance is favourable and not to report when they consider their returns to be below average. This skews the data in favour of overall stronger than expected financial performances relative to other investment vehicles;

- The MAR data covers the hedge funds, commodity trading advisors (CTAs) and the funds of funds. This analysis excludes the funds of funds. Since they invest in indices of the CTAs and hedge funds, their exposure and indeed interest in the gold market is indirect and already covered in the analysis of the other funds;

- The data excludes pension funds, mutual funds, CTA pool operators and public funds. Some pension and mutual funds might allocate capital to CTAs and hedge funds and therefore the analysis covers this indirectly;

- One of the major problems associated with any fund analysis is the lack of consistent definitions and fund category types. The terms “funds”, “hedge funds” and “commodity funds”, for example, are used very loosely by the media and in the literature, sometimes even interchangeably without any due regard to specific definitions. In mitigation, this is often no fault of the media in that definitions of the fund business on various levels are ambiguous and vague. This research adopts the definitions as laid out by MAR and Van Hedge (listed in Appendix 4) and while some might be open to debate, every attempt has been made to remain consistent in the use of terminology;

- Reporting to MAR is not consistent over time. The regularity with which a fund manager elects to declare data appears to be down to a personal decision on the part of that manager. Thus a fund may exist and be part of the database although the manager might not have submitted financial data for three, four or even five reporting periods. This does not imply that the fund is dormant or has been dissolved. It therefore remains a part of the overall database but will not appear in the latest statistical analysis except to be recorded as an entity showing no data. Throughout 1999 this lack of reporting proved to be a lead indicator of the health of the industry;

- Of the data sample, without question the sector of greatest interest remains the hedge funds but more specifically the global macro funds (a subsector of the hedge funds), which are the trading entities most likely to have the charters to invest in the commodities;

- The data covers 2,250 funds managing cumulatively $145 billion. In terms of the overall fund population, it is thought that this database is reasonably representative of the industry in general. With the swift ebb and flow of money-under-management and the equally rapid creation and liquidation of funds, it is difficult to obtain a reliable estimate of the total fund population. Media estimates have placed the total fund population at around 4,000 funds covering $3 trillion. Discussions with MAR suggest that the funds not covered by the database will not materially alter any of the conclusions drawn from the analysis and, in terms of chasing the unlisted funds, the law of diminishing returns certainly applies. Any further research will, however, make every effort to continue expanding the database to increase the coverage;

- It should be noted that the $145 billion under management is a minimum figure since of the 2,250 funds existing on the database, 39% did not submit any figures for the second half of 1999. Nevertheless these funds are known to have cumulatively substantial capital under management. This $145 billion is also a minimum in that this is an unleveraged estimate of the total. Given that hedge funds can and do borrow against their capital bases to gain the maximum leverage, the multiplier effect implies that this potential amount of money which could be invested is much greater. To place the potential presence of the funds into the context of the commodity markets, their $145 billion represents seven times the value of total mine production of gold in 1999. It also represents about 45% of the value of total official sector gold holdings.

A defining characteristic of the money-under-management industry is its tendency to be subject to very mixed fortunes over relatively short periods of time and what can only be described as a roller coaster with respect to financial performance and general health. This cycle of feast or famine has manifested itself all too clearly, even in the very short period covered in this study. The mid 1990s

were characterised by very strong capital inflows, healthy financial returns and an overall prosperous outlook. By the end of June 1998, the situation had already begun to change. Within six months, the industry experienced a marked turn around in its fortunes. As the emerging market and related currency crises deepened, the fortunes of the funds reversed and in some cases very sharply indeed. The most obvious example, of course, was the threatened collapse of Long Term Capital Management. Apart from LTCM, many reported to investors loss making results and as a consequence there was evidence of capital redemptions and outflows. By the first half of 1999, there was evidence of a recovery in the industry that gained momentum throughout the remainder of the year.

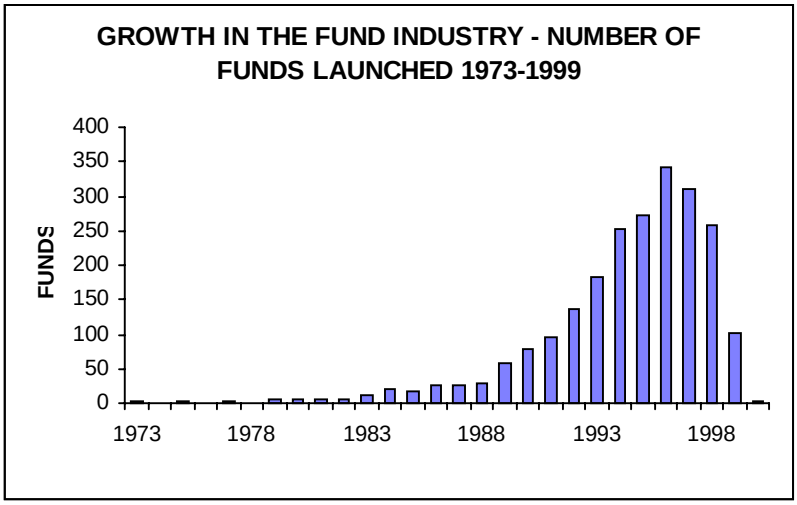
Thus the financial performance during a specific reporting period can and does vary greatly from previous or indeed future periods. For this reason, attempting to draw long-term trends from a single reporting period is not only meaningless but also misleading. Consequently, emphasis in this analysis is placed on the average returns to investors over the entire life of the funds. Interestingly, as this analysis will show, the poor performance of the funds during the second half of 1998 was indeed of sufficient magnitude to begin eroding away the long-term track record of the funds. Fortunately for the industry, the data covering 1999 revealed that the funds managed to recover and largely re-establish their long-term averages.

The overall structure and performance during 1998 and 1999

Of the 2,250 funds managing $145 billion as of the end of December 1999, the hedge funds maintained their dominance, representing 82% of the total capital base. The remainder were the Commodity Trading Advisors (CTAs), greater in number but commanding a substantially smaller capital base.

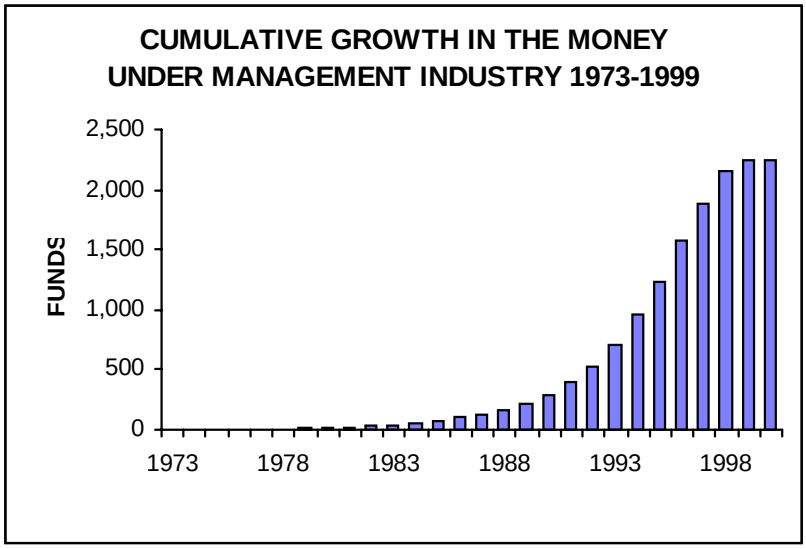
Looking more closely at the hedge funds, the global macros (those funds which are most likely to be involved in the gold market) represented a good proportion of the money under management (16%) although the sector is less important in terms of the number of funds (5%).

In terms of its evolution, the accompanying chart shows the years in which the funds were launched, indicating the swift development of the industry in the last decade. The fund business has indeed been a feature of the 1990s, but especially during the later half of the decade.



Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

And the next chart simply shows the growth cumulatively. The data does indicate a marked slowing-down in the number of new funds launched over the past two years. This is probably a combination of two factors. Firstly, it is likely to be a function of recent and rather uncertain market conditions especially in 1998, which did not favour the inflow of new capital and hence did not encourage the launch of new funds. But it might also be the initial sign of a longer-term trend in which we are seeing the maturation of the industry in general.



Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

Who invests in these funds? Since the answer to this is considered highly confidential, the only way to gain an overall indication is to analyse the minimum account level requirements imposed by the individual funds. This is the basic investment payable on joining the ranks of investors. The following table (in percentage terms) shows the minimum account levels applied to both the CTAs and the hedge funds.

The commodity trading advisers

	Money-Under-Management			**Number of Funds**		
	End Dec	**End Jun**	**End Dec**	**End Dec**	**End Jun**	**End Dec**
Percent	1998	1999	1999	1998	1999	1999
No data	12	12	4	7	5	4
Less than $0.5 mn	13	7	11	34	35	35
$0.5mn but < $1mn	3	2	3	15	14	13
$1mn to <$2.5mn	32	30	30	32	33	33
$2.5 mn to < $5mn	9	11	8	4	4	5
$5mn to < $10 mn	13	18	22	4	7	7
$10 mn to < $20 mn	15	18	21	3	3	3
>$20 mn	3	2	1	0	0	1
Total	**100**	**100**	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

The hedge funds

	Money-Under -Management			Number of Funds		
	End Dec	End Jun	End Dec	End Dec	End Jun	End Dec
Percent	1998	1999	1999	1998	1999	1999
No data	28	34	31	7	7	7
Less than $0.5 mn	15	16	17	46	45	45
$0.5mn but < $1mn	10	10	10	19	20	20
$1mn to <$2.5mn	29	28	33	25	25	26
$2.5 mn to < $5mn	11	0	1	0	0	0
$5mn to < $10 mn	7	9	6	3	3	2
$10 mn to < $20 mn	0	2	1	0	0	0
>$20 mn	0	1	1	0	0	0
Total	**100**	**100**	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

This information indicates that relatively more capital invested with the CTAs is associated with minimum account levels in excess of $10 million than the hedge funds; a result that actually flies in the face of conventional wisdom. The data does not support the general belief that it remains the prerogative of the large hedge funds to expect large minimum account levels. It also suggests that institutional money is destined for both the CTAs and the hedge funds, which again disproves conventional wisdom, which argues that the CTAs serve specifically private investors or the retail end of the industry.

With respect to the actual amount of money under management, the results again belied the media image which seems to be perpetuated: that of many funds commanding huge capital bases. This next table demonstrates the current position.

The size of capital and amount under management

All Funds	**End Dec**	**End Jun**	**End Dec**
Percent	**1998**	**1999**	**1999**
No data	31	39	40
Excess of $1 bn	1	1	1
$500 mn - <$1 bn	1	1	1
$150 mn - <$500 mn	6	6	6
$50 mn - <$500 mn	12	11	12
$10 mn To <$50 mn	24	24	20
$5 mn To <$10 mn	8	6	7
0 - <$5 mn	16	12	12
Total	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

There are not very many truly enormous funds. In fact, there are only 53 with capital bases in excess of $500 million and 24 with bases in excess of $1 billion. This represents 2% and 1% of the sample respectively. Almost a fifth of the funds have between $10 million and $50 million under management. Of the 40% for which there is no data, the sample is thought to be spread reasonably evenly throughout the database.

The sectoral breakdown of capital bases is more revealing as this next table shows. It also shows that the hedge fund sector, and more specifically the global macros, tend to house the larger capital bases and the CTAs tend to maintain smaller

capital bases although there are some exceptions to this. The fact that the global macros have commanded the very high capital bases has been of importance to the precious metals markets in that these were the bases from where the funds would have access to leverage.

Capital bases: number of funds

Percent	Hedge Funds	CTAs	Total	Global Macros
No data	40	42	40	38
Excess of $1 bn	1	1	1	5
$500 mn - <$1 bn	1	1	1	1
$150 mn - <$500 mn	6	6	6	5
$50 mn - <$500 mn	14	9	12	7
$10 mn to <$50 mn	21	16	20	25
$5 mn to <$10 mn	7	6	7	7
0 - <$5 mn	9	19	12	13
Total	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

Putting all this together, this data analysis confirms a market structure in which there are a handful of very large powerful funds servicing professional investors who historically have been the ones most likely to participate aggressively in a commodity market. The recent developments in the form of the liquidation and restructuring of two of the largest global macro funds is thus of great importance to the global gold industry.

Capital flows are a lead indicator of the health of the industry and redemptions appear to be very sensitive to the financial performance. A major feature of the fund industry during the first half of 1998 was the fact that the industry virtually across the board saw substantial reductions in its capital base and the majority of funds were subject to investor redemptions; in most cases on a very large scale. Occasionally, these redemptions were more than offset by the inflow of new capital but in most cases, not. This net capital outflow continued throughout the remainder of 1998 as investors responded to the rather poor financial performance of many of the funds in the wake of the Asian currency crisis. The exception was 2% of the sample which enjoyed strong and renewed investment.

Capital flows within the industry

All funds	End Jun	End Dec	End Jun	End Dec
Percent	**1998**	**1998**	**1999**	**1999**
No data	0	16	23	17
Plus >1000%	0	2	0	0
Plus 500% - 999%	1	0	1	3
Plus 100% - 499%	16	3	11	4
Plus 50% - 99%	19	3	6	14
Plus 0% - 49%	54	40	39	45
Down 0% - 49%	9	32	19	17
Down 50% - 99%	1	4	1	1
Down >100%	0	0	0	0
Total	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

The first half of 1999 saw a marginal improvement with 11% of the money under management associated with capital inflows of between 100-499%. Nevertheless, 20% of the sample still experienced net outflows and this figure should be considered an absolute minimum since another 23% of the sample failed to submit data for the reporting period. This suggests stronger capital outflows than a cursory analysis of the data reveals. It must be expected that fund managers would be reluctant to report a decline in investment that could be interpreted as a loss of confidence in the sector. The results for the second half of 1999 showed a marginal improvement. 18% of money under management saw continued capital outflows whereas 21% enjoyed capital inflows in excess of 50%.

Capital flows in terms of number of funds

All Funds	End Jun	End Dec	End Jun	End Dec
Percent	**1998**	**1998**	**1999**	**1999**
No data	2	49	57	56
Plus >1000%	1	0	0	0
Plus 500% - 999%	3	0	0	0
Plus 100% - 499%	16	3	4	4
Plus 50% - 99%	12	3	4	5
Plus 0% - 49%	38	17	20	19
Down 0% - 49%	23	22	13	14
Down 50% - 99%	5	5	3	2
Down >100%	0	0	0	0
Total	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

In terms of the number of funds affected by changes in capital inflows, again the data suggested a very poor performance during the second half of 1998.

The data for the first half of 1999 showed no improvement whatsoever and the very high level of non-disclosure suggests that the majority of trading entities have been subject to declining capital bases of substantial magnitude. The latest figures to December 1999 reveal very little in the way of any form of improvement. The reason for the reluctance on the part of the funds to report becomes fully apparent when their financial performance is examined in more detail.

This analysis looked at their returns for, firstly, the half yearly reporting periods and then, but more importantly, how these results affected the average financial performance over the life of each fund. The following table shows the six monthly performance of the funds to the end of 1999.

In terms of the amount of money under management, the majority of capital still received a positive return on investments. However, the four reporting periods have shown a marked change in the fortunes of the funds. The first half of 1998 was a rather dismal one with 61% of the capital returning only up to 9% to the investor. By the second half of the 1998, the situation had improved marginally for some funds but deteriorated substantially for others. No less than 27% of the money was associated with loss making returns. The first half of 1999 saw their fortunes improve dramatically with only 1% associated with losses. Almost half the capital (45%) returned to the investor gains of 10%-25% and another 36% yielded 25%-49%. By the second half of 1999, the situation had shown a marked improvement. While there were still losses associated with 11% of the capital, no less than 20% saw returns in excess of 50%; a result not seen before during the four reporting periods.

Financial performance during the six-month reporting period to end-December 1999

All Funds	**End Jun**	**End Dec**	**End Jun**	**End Dec**
Percent	**1998**	**1998**	**1999**	**1999**
No data	0	1	0	0
Returns >100%	0	0	1	5
Returns >50% but <99%	0	1	6	15
Returns >25% but <49%	6	11	36	27
Returns >10% but <24%	25	26	45	23
Returns >0 but <9%	61	35	11	20
Losses >0 but <9%	5	12	1	6
Losses >10% but <24%	2	9	0	5
Losses >25% but <49%	1	5	0	0
Losses >50% but <99%	0	1	0	0
Losses >100%	0	0	0	0
Total	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

Thus a characteristic of the fund industry is this roller-coaster profile when it comes to its financial performance. As the recent data has shown, between any reporting periods, returns can swing dramatically from positive to negative and back again. Furthermore, for individual funds, the magnitude of the swings can be truly enormous, measured often in 100's if not 1000s of percentage points. Thus a specific move in any direction during a particular reporting period need not necessarily imply anything meaningful with respect to long term trends and reading too much into a short term phenomenon will no doubt lead to spurious and misleading conclusions. Consequently the only way to objectively examine the financial health of the industry is to analyse the average financial performance over the life of each fund.

In terms of money under management, this following table shows that by far the vast majority of funds have indeed returned positive results to their investors over the life of the funds. This stands to reason since a fund that consistently reports losses will eventually be liquidated.

Average financial performance over the life of the funds

All Funds	**End Jun**	**End Dec**	**End Jun**	**End Dec**
Percent	**1998**	**1998**	**1999**	**1999**
No data	0	2	1	0
Returns >100%	0	0	0	3
Returns >50% but <99%	3	2	4	4
Returns >25% but <49%	17	9	21	35
Returns >10% but <24%	43	56	56	44
Returns >0 but <9%	36	27	16	12
Losses >0 but <9%	1	3	1	1
Losses >10% but <24%	0	2	0	0
Losses >25% but <49%	0	0	0	0
Losses >50% but <99%	0	0	0	0
Losses >100%	0	0	0	0
Total	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

During the first half of 1998, 60% of capital returned on average 10%-50% to investors and 37% returned up to 9% per annum. The truly impressive returns on which the fund business has built a reputation were actually confined to a very small percentage of the fund industry. Only 3% of capital has enjoyed annual

returns of between 50% and 99%. Interestingly, the very poor six monthly performance during the second half 1998 was actually sufficient to erode away the average and very good track record throughout the life of the funds. Loss making returns were recorded by 5% of the capital and those funds returning 25%-49% on average slipped from 17% during the first half to 9% during the second half of 1998. The state of affairs improved dramatically during the first half of 1999 with 77% of capital returning 10%-49% on average. Furthermore, the capital associated with loss making positions declined to 1%. The second half of 1999 showed a continued consolidation of improved average results. 3% of the capital bases returned to investors on average in excess of 100%.

In keeping with this generally good track record, despite the decline during the second half of 1998, the level of non-disclosure has remained very low.

Furthermore, the data yielded a strong correlation between the extent of the losses and the age of the fund. Those who recorded the greatest losses were the younger funds, launched mainly in the last three years. If they continue to yield negative returns, they can be expected to close in the near future.

The final area of overall analysis of importance is the redemption status of the industry and the degree to which investors can withdraw their capital. A common misconception is that investors have instant access to their capital and can withdraw their funds at very short notice. The implication is that the capital base managed by the funds can react swiftly to systemic shocks, as experienced by the market in 1998 with the threatened collapse of Long Term Capital Management. This is not necessarily the case and in many instances capital can be tied up with the funds for prolonged periods, even after the investor has served notice of intended redemption. This, in general, renders the fund industry less responsive to global market developments which might precipitate a withdrawal of funds from the industry.

The accompanying table shows the redemption requirements imposed by the funds on their investors in terms of both money under management and the number of funds. It shows that 22% of capital and 26% of the funds are associated with what might be considered illiquid notice periods, namely anything from quarterly to annually with further waiting periods of greater than 60 days. Some 33% of the capital and 28% of the funds are associated with quarterly notice periods and less than a 60 day wait. The remainder (around 34% of capital and 37% of the funds) are on what might be considered “call” in that the investors are required to give a maximum of a month’s notice with less than a 60 day wait for their funds.

The degree to which investors can withdraw capital

	Million Dollars Under Management			Number of Funds		
Hedge Funds	**End Dec**	**End Jun**	**End Dec**	**End Dec**	**End Jun**	**End Dec**
Percent	**1998**	**1999**	**1999**	**1998**	**1999**	**1999**
Annually 60 days or more	6	5	6	6	6	6
Annually less than 60 days	4	4	5	5	5	5
Semi-annual more than 60 days	0	1	1	1	2	2
Semi-annual less than 60 days	3	1	5	5	5	5
Quarterly more than 60 days	5	7	5	8	8	8
Quarterly less than 60 days	41	39	33	28	28	28
Monthly more than 60 days	1	3	2	2	3	3
Monthly less than 60 days	23	21	24	28	29	30
Bi-monthly 10 days' wait or less	0	0	0	0	0	0
Weekly greater than 7 days	1	0	1	0	0	0
Weekly less than 7 days	2	2	4	3	3	3
Daily 30 days	1	0	1	0	1	1
Daily less than 30 days	1	1	2	1	1	0
Unknown	10	15	11	14	12	10
Total	**100**	**100**	**100**	**100**	**100**	**100**

Data source: Virtual Metals Research & Consulting analysis of MAR data to end-December 1999

Definitions of Funds and Money-Under-Management

DATA SOURCES: Managed Account Reports (MAR), Van Hedge, Virtual Metals

Aggressive Growth: (Stock-based) Investment in equity in which the fund manager identifies potentially very swift growth in earnings per share. These are usually small or newly capitalised companies in which strong growth potential might be expected.

Distressed: (Stock-based) Investment in equity that is exhibiting financial or structural problems. The fund manager invests at a low-base in the hope that the company can be restructured and turned around. A very high-risk investment.

Emerging Markets: (Country-based) Investment in either equity or debt of emerging markets as defined by the World Bank: that is having a per capita GDP of less than $8,000 per annum. Investment targets are usually in Africa, South America, Eastern Europe and former CIS States and parts of Asia and the Pacific. Tongue-in-cheek definition by the fund managers themselves especially after the Asian currency crisis: an emerging market is something from which you cannot emerge in an emergency!

Financial Services: (Banking, Savings and Loans-based) The fund invests in bank securities, thrifts, savings and loans institutions, building societies and other entities which can be defined as financial institutions.

Funds of Funds: (Fund-based) The fund invests in other funds or indices of other funds. The funds of funds may concentrate on specific sector funds or a combination of strategies adopted by other funds. These funds have been excluded from an analysis in this report since their presence would represent double counting. Their influence on the gold market is in any case only indirect.

Healthcare: (Stock-based) The fund invests in a wide range of equities associated with healthcare for example pharmaceuticals, medical equipment and services, biotechnology and so on.

Income: (Financial-based) Investment in a range of yield bearing financial instruments in which capital appreciation is not of primary importance.

Macro or Global Macro: (Commodity/Stock or Financial-based) Broad spectrum strategy in which the fund manager takes a strategic decision regarding global macro economic trends and commodity cycles and attempts to capitalise on major shifts in country fortunes, commodity developments and interest rate

trends. Decision-making is top down and usually involves a long-term strategy especially with respect to exit. These are the funds most likely to be exposed to precious metals.

Market Neutral: (Various instruments) Investment in a market from both the long and the short side on the premise that that the net impact is neutral or virtually zero. Managers attempt to select the long side from an undervalued position and the short side from an overvalued position.

Market Timing: (Various instruments) Investments which attempt to pre-empt market shifts and trends in order to maximise on financial and economic developments.

Opportunistic: (Various instruments) Investment which attempts to capitalise on developments by using a number of strategies and approaches. Requires a good deal of flexibility.

Short Selling: (Stock-based) Investments that seek out overvalued equities before selling the stock short. Stock is borrowed from brokers and not initially owned by the fund.

HEDGE FUND USE OF LEVERAGE

Data Source: Van Hedge http://www.vanhedge.com/leverage.htm

TYPE OF FUND	No leverage	Low <2:1	High >2:1	Total
Aggressive growth	33	60	7	100
Distressed	59	37	4	100
Emerging Markets	30	62	8	100
Funds of funds	22	58	20	100
Income	37	45	18	100
Macro	12	54	34	100
Market neutral	29	47	24	100
Market timing	30	39	31	100
Opportunistic	23	58	19	100
Short selling	21	74	5	100
Average	**28**	**56**	**16**	**100**

DATA BASE STATUS AND SAMPLE ANALYSIS	Mn US Dollars			Number of Funds		
	End Dec	End Jun	End Dec	End Dec	End Jun	End Dec
HEDGE FUNDS	**1998**	**1999**	**1999**	**1998**	**1999**	1999
Existing and covered during reporting period	80,891	77,795	105,343	637	720	798
Existing but new to database	11,416	18,258	12,375	171	206	159
Existing but not covered during reporting period	0	308	263	415	494	634
Newly launched	0	332	1,510		10	70
TOTAL	92,307	96,693	119,490	1,223	1,430	1,661
HEDGE FUNDS						
Percent						
Existing and covered during reporting period	88	80	88	52	50	48
Existing but new to database	12	19	10	14	14	10
Existing but not covered during reporting period	0	0	0	34	35	38
Newly launched	0	0	1	0	1	4
TOTAL	100	100	100	100	100	100
	End Dec	End Jun	End Dec	End Dec	End Jun	End Dec
CTAs	**1998**	**1999**	**1999**	**1998**	**1999**	**1999**
Existing and covered during reporting period	21,398	20,850	22,693	249	291	288
Existing but new to database	5,043	4,202	2,895	92	55	49
Existing but not covered during reporting period	0	0	14	112	175	233
Newly launched	265	2	309	15	1	20
TOTAL	26,706	25,053	25,911	468	522	590
CTAs						
Percent						
Existing and covered during reporting period	80	83	88	53	56	49
Existing but new to database	19	17	11	20	11	8
Existing but not covered during reporting period	0	0	0	24	34	39
Newly launched	1	0	1	3	0	3
TOTAL	100	100	100	100	100	100

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DATA BASE STATUS AND SAMPLE ANALYSIS …/cont'd

GLOBAL MACROS	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Existing and covered during reporting period	24,867	20,290	24,689	52	45	61
Existing but new to database	5,272	2,314	145	5	19	4
Existing but not covered during reporting period	0	3	40	19	34	39
Newly launched	68	66	28	4	3	3
TOTAL	**30,207**	**22,672**	**24,902**	**80**	**101**	**107**
GLOBAL MACROS						
Percent						
Existing and covered during reporting period	82	89	99	65	45	57
Existing but new to database	17	10	1	6	19	4
Existing but not covered during reporting period	0	0	0	24	34	36
Newly launched	0	0	0	5	3	3
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

ALL FUNDS	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	End Dec 1999
Existing and covered during reporting period	102,289	98,644	128,036	886	1,011	1,086
Existing but new to database	16,459	22,460	15,270	263	261	208
Existing but not covered during reporting period	0	308	277	527	669	867
Newly launched	265	333	1,819	15	11	90
TOTAL	**119,013**	**121,745**	**145,401**	**1,691**	**1,952**	**2,251**
ALL FUNDS						
Percent						
Existing and covered during reporting period	86	81	88	52	52	48
Existing but new to database	14	18	11	16	13	9
Existing but not covered during reporting period	0	0	0	31	34	39
Newly launched	0	0	1	1	1	4
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

SECTORAL ANALYSIS

	Mn Dollars Under Management			Number of Funds		
HEDGE FUNDS	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Stock	NA	38	56	NA	2	2
Event driven	9,975	11,928	12,995	168	180	194
Global	25,654	20,063	21,448	506	441	437
Global emer	468	2,207	2,709	13	45	64
Global est	NA	11,655	20,950		128	204
Global int	2,199	3,826	4,799	44	25	33
Global macro	30,245	22,672	24,902	82	101	107
Long only	323	388	697	23	28	35
Market neutral	21,383	20,227	26,063	296	362	439
Sector	1,415	2,473	3,814	73	89	119
Short sales	611	926	1,029	17	22	23
US opportunity	34	36	29	1	1	1
No data	0	254	0	0	6	3
TOTAL	**92,307**	**96,693**	**119,490**	**1,223**	**1,430**	**1,661**

HEDGE FUNDS Percent	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Stock	0	0	0	NA	0	0
Event driven	11	12	11	14	13	12
Global	28	21	18	41	31	26
Global emer	1	2	2	1	3	4
Global est	0	12	18	0	9	12
Global int	2	4	4	4	2	2
Global macro	33	23	21	7	7	6
Long only	0	0	1	2	2	2
Market neutral	23	21	22	24	25	26
Sector	2	3	3	6	6	7
Short sales	1	1	1	1	2	1
US opportunity	0	0	0	0	0	0
No data	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/…

SECTORAL ANALYSIS …/Cont'd

CTAs	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
Stock index	1	85	96	4	8	12
Stock index	135	148	166	24	24	24
Interest rates	0	0	0	1	1	1
Financial	7,388	7,031	6,923	83	95	107
Eurodollar	0	0	0	1	1	1
Energy	1	0	1	3	3	4
Diversified	14,128	11,730	12,845	247	277	313
Currencies	4,258	5,464	5,218	81	83	90
Agriculture	793	594	310	22	25	26
Niche	1		0	2	5	0
No data	NA	0	351	NA	0	12
TOTAL	**26,705**	**25,052**	**25,911**	**468**	**522**	**590**

CTAs Percent	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
Stock index	0	0	0	1	2	2
Stock index	1	1	1	5	5	4
Interest rates	0	0	0	0	0	0
Financial	28	28	27	18	18	18
Eurodollar	0	0	0	0	0	0
Energy	0	0	0	1	1	1
Diversified	53	47	50	53	53	53
Currencies	16	22	20	17	16	15
Agriculture	3	2	1	5	5	4
Niche	0	0	0	0	1	0
No data	NA	NA	NA	NA	NA	2
TOTAL	**100**	**100**	**99**	**100**	**100**	**100**

ANNUAL GROWTH OF THE INDUSTRY - LAUNCH OF THE FUNDS

	LAUNCH						CUMULATIVE					
	Million Dollars Under Management			Number of Funds			Million Dollars Under Management			Number of Funds		
	End Dec	End Jun	End Dec	End Dec	End Jun	End Dec	End Dec	End Jun	End Dec	End Dec	End Jun	End Dec
HEDGE FUNDS	**1998**	**1999**	**1999**	**1998**	**1999**	**1999**	**1998**	**1999**	**1999**	**1998**	**1999**	**1999**
1973	5,196	3,804	5,827	1	1	1	5,196	3,804	5,827	1	1	1
1974	0	0	0	0	0	0	5,196	3,804	5,827	1	1	1
1975	0	0	0	0	0	0	5,196	3,804	5,827	1	1	1
1976	0	0	0	0	0	0	5,196	3,804	5,827	1	1	1
1977	1,362	1,386	1,508	2	2	2	6,558	5,190	7,334	3	3	3
1978	0	0	0	0	0	0	6,558	5,190	7,334	3	3	3
1979	0	0	0	0	0	0	6,558	5,190	7,334	3	3	3
1980	201	0	339	1	1	1	6,759	5,190	7,673	4	4	4
1981	0	0	0	0	0	0	6,759	5,190	7,673	4	4	4
1982	226	136	113	1	1	1	6,985	5,326	7,786	5	5	5
1983	538	566	112	6	6	6	7,523	5,892	7,899	11	11	11
1984	1,960	2,043	1,837	10	11	11	9,483	7,935	9,735	21	22	22
1985	14,461	4,359	4,536	8	7	7	23,944	12,294	14,271	29	29	29
1986	1,367	3,359	4,230	10	13	16	25,311	15,654	18,501	39	42	45
1987	4,356	4,595	5,631	16	17	18	29,667	20,249	24,132	55	59	63
1988	152	830	805	10	9	10	29,819	21,079	24,938	65	68	73
1989	5,252	5,239	5,142	26	34	34	35,071	26,318	30,079	91	102	107
1990	6,084	10,930	12,701	45	46	51	41,155	37,248	42,780	136	148	158
1991	5,296	4,470	4,487	48	53	55	46,451	41,718	47,267	184	201	213
1992	6,978	7,911	11,200	71	81	85	53,429	49,629	58,467	255	282	298
1993	8,643	8,068	8,674	109	125	132	62,072	57,697	67,141	364	407	430
1994	10,355	11,274	14,657	163	178	185	72,427	68,971	81,798	527	585	615
1995	6,643	7,244	8,061	171	189	203	79,070	76,215	89,859	698	774	818
1996	5,788	7,762	9,121	241	267	286	84,858	83,977	98,980	939	1,041	1,104
1997	6,116	7,821	10,505	211	243	265	90,974	91,798	109,485	1,150	1,284	1,369
1998	1,213	4,298	7,990	69	136	210	92,187	96,096	117,475	1,219	1,420	1,579
1999	0	332	2,016	0	10	82	92,187	96,428	119,490	1,219	1,430	1,661
UNKNOWN	121	265	0	4	0	0	92,308	96,693	119,490	1,223	1,430	1,661

ANNUAL GROWTH OF THE INDUSTRY - LAUNCH OF THE FUNDS …/Cont'd

	LAUNCH						CUMULATIVE					
	Million Dollars Under Management			Number of Funds			Million Dollars Under Management			Number of Funds		
CTAs	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
1973	11	11	11	2	1	1	11	11	11	2	1	1
1974	0	0	0	0	0	0	11	11	11	2	1	1
1975	0	12	3	0	2	2	11	23	14	2	3	3
1976	17	0	0	2	0	0	28	23	14	4	3	3
1977	549	517	436	1	1	1	577	540	450	5	4	4
1978	0	0	0	0	0	0	577	540	450	5	4	4
1979	78	26	17	4	4	5	655	566	467	9	8	9
1980	94	99	85	4	4	4	749	665	552	13	12	13
1981	63	42	7	6	6	6	812	706	559	19	18	19
1982	418	415	363	5	5	5	1,230	1,122	922	24	23	24
1983	1,192	1,352	1,450	6	6	6	2,422	2,473	2,372	30	29	30
1984	2,047	2,096	1,724	8	8	9	4,469	4,569	4,095	38	37	39
1985	445	446	388	9	9	9	4,914	5,015	4,483	47	46	48
1986	348	405	391	10	10	10	5,262	5,420	4,873	57	56	58
1987	399	377	358	10	9	9	5,661	5,796	5,231	67	65	67
1988	1,736	2,184	2,179	18	19	20	7,397	7,981	7,410	85	84	87
1989	1,186	1,486	1,403	22	23	23	8,583	9,467	8,813	107	107	110
1990	1,242	1,347	1,387	24	24	27	9,824	10,814	10,200	131	131	137
1991	1,174	1,346	1,169	38	42	42	10,998	12,160	11,369	169	173	179
1992	3,439	2,812	2,373	40	47	50	14,437	14,971	13,742	209	220	229
1993	3,607	3,224	3,130	44	48	51	18,044	18,195	16,872	253	268	280
1994	3,653	2,625	2,540	55	62	68	21,696	20,820	19,412	308	330	348
1995	2,893	1,589	3,147	61	64	70	24,589	22,409	22,559	369	394	418
1996	470	421	425	51	51	56	25,059	22,831	22,984	420	445	474
1997	1,285	1,511	1,651	30	39	46	26,344	24,342	24,634	450	484	520
1998	362	709	967	18	37	48	26,706	25,051	25,601	468	521	568
1999	0	1	309	0	1	20	26,706	25,052	25,910	468	522	588
UNKNOWN	0	0	0	0	0	2	26,706	25,052	25,910	468	522	590

Cont'd/…

ANNUAL GROWTH OF THE INDUSTRY - LAUNCH OF THE FUNDS …/Cont'd

	LAUNCH						CUMULTATIVE					
	Million Dollars Under Management			Number of Funds			Million Dollars Under Management			Number of Funds		
GLOBAL MACROS	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
1973	5,196	0	5,827	1	1	1	5,196	0	5,827	1	1	1
1974	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1975	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1976	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1977	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1978	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1979	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1980	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1981	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1982	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1983	0	0	0	0	0	0	5,196	0	5,827	1	1	1
1984	318	0	0	2	1	1	5,514	0	5,827	3	2	2
1985	14,000	0	4,000	2	2	2	19,514	0	9,827	5	4	4
1986	882	0	552	3	3	3	20,396	0	10,378	8	7	7
1987	25	0	11	2	2	2	20,421	0	10,389	10	9	9
1988	0	0	0	0	0	0	20,421	0	10,389	10	9	9
1989	9	0	124	2	2	2	20,430	0	10,513	12	11	11
1990	4,044	0	9,000	3	3	3	24,474	0	19,513	15	14	14
1991	3,207	0	2,856	6	8	8	27,681	0	22,369	21	22	22
1992	279	0	47	4	4	4	27,960	0	22,415	25	26	26
1993	1,424	1,841	1,002	10	14	15	29,383	1,841	23,417	35	40	41
1994	124	183	108	7	7	6	29,507	2,023	23,525	42	47	47
1995	271	4,098	255	8	8	9	29,778	6,121	23,780	50	55	56
1996	199	11,707	300	14	16	15	29,977	17,828	24,080	64	71	71
1997	162	4,572	293	11	14	16	30,139	22,400	24,373	75	85	87
1998	68	206	224	5	13	14	30,207	22,606	24,596	80	98	101
1999	0	66	306	0	3	6	30,207	22,672	24,902	80	101	107
UNKNOWN	0	0	0	0	0	0	30,207	22,672	24,902	80	101	107

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ANNUAL GROWTH OF THE INDUSTRY - LAUNCH OF THE FUNDS .../Cont'd

	LAUNCH						CUMULTATIVE					
	Milliion Dollars Under Management			Number of Funds			Million Dollars Under Management			Number of Funds		
ALL FUNDS	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
1973	5,207	3,816	5,837	3	2	2	5,207	3,816	5,837	3	2	2
1974	0	0	0	0	0	0	5,207	3,816	5,837	3	2	2
1975	0	12	3	0	2	2	5,207	3,827	5,841	3	4	4
1976	17	0	0	2	0	0	5,224	3,827	5,841	5	4	4
1977	1,911	1,903	1,944	3	3	3	7,135	5,730	7,784	8	7	7
1978	0	0	0	0	0	0	7,135	5,730	7,784	8	7	7
1979	78	26	17	4	4	5	7,213	5,756	7,801	12	11	12
1980	295	99	424	5	5	5	7,508	5,855	8,225	17	16	17
1981	63	42	7	6	6	6	7,571	5,897	8,232	23	22	23
1982	644	551	476	6	6	6	8,215	6,448	8,708	29	28	29
1983	1,730	1,918	1,562	12	12	12	9,945	8,365	10,270	41	40	41
1984	4,007	4,139	3,560	18	19	20	13,952	12,505	13,831	59	59	61
1985	14,906	4,805	4,923	17	16	16	28,858	17,309	18,754	76	75	77
1986	1,715	3,764	4,621	20	23	26	30,573	21,073	23,374	96	98	103
1987	4,755	4,972	5,989	26	26	27	35,328	26,045	29,363	122	124	130
1988	1,888	3,014	2,984	28	28	30	37,216	29,059	32,348	150	152	160
1989	6,438	6,725	6,545	48	57	57	43,654	35,785	38,892	198	209	217
1990	7,326	12,278	14,088	69	70	78	50,979	48,062	52,980	267	279	295
1991	6,470	5,816	5,656	86	95	97	57,449	53,878	58,636	353	374	392
1992	10,417	10,722	13,573	111	128	135	67,866	64,600	72,209	464	502	527
1993	12,250	11,291	11,804	153	173	183	80,116	75,892	84,013	617	675	710
1994	14,008	13,899	17,197	218	240	253	94,123	89,791	101,210	835	915	963
1995	9,536	8,833	11,208	232	253	273	103,659	98,624	112,418	1,067	1,168	1,236
1996	6,258	8,184	9,545	292	318	342	109,917	106,808	121,963	1,359	1,486	1,578
1997	7,401	9,332	12,156	241	282	311	117,318	116,139	134,119	1,600	1,768	1,889
1998	1,575	5,007	8,956	87	173	258	118,893	121,147	143,075	1,687	1,941	2,147
1999	0	333	2,325	0	11	102	118,893	121,480	145,400	1,687	1,952	2,249
UNKNOWN	121	265	0	4	0	2	119,014	121,745	145,400	1,691	1,952	2,251

MONEY UNDER MANAGEMENT ON A SIX MONTHLY BASIS

HEDGE FUNDS	**End Dec**	**End Jun**	**End Dec**
NUMBER OF FUNDS	**1998**	**1999**	**1999**
Excess of $1 bn	14	14	21
$500 mn - <$1 bn	21	23	22
$150 mn - <$500 mn	80	83	103
$50 mn - <$500 mn	145	173	227
$10 mn - <$50 mn	304	365	354
$5 mn - <$10 mn	92	95	113
0 - <$5 mn	149	150	156
No data	418	527	665
TOTAL	**1,223**	**1,430**	**1,661**

HEDGE FUNDS	**End Dec**	**End Jun**	**End Dec**
PERCENT	**1998**	**1999**	**1999**
Excess of $1 bn	1	1	1
$500 mn - <$1 bn	2	2	1
$150 mn - <$500 mn	7	6	6
$50 mn - <$500 mn	12	12	14
$10 mn - <$50 mn	25	26	21
$5 mn - <$10 mn	8	7	7
0 - <$5 mn	12	10	9
No data	34	37	40
TOTAL	**100**	**100**	**100**

CTAs	**End Dec**	**End Jun**	**End Dec**
NUMBER OF FUNDS	**1998**	**1999**	**1999**
Excess of $1 bn	6	4	3
$500 mn - <$1 bn	5	6	7
$150 mn - <$500 mn	27	29	33
$50 mn - <$500 mn	57	50	53
$10 mn - <$50 mn	86	98	97
$5 mn - <$10 mn	23	28	36
0 - <$5 mn	124	82	115
No data	140	225	246
TOTAL	**468**	**522**	**590**

CTAs	**End Dec**	**End Jun**	**End Dec**
PERCENT	**1998**	**1999**	**1999**
Excess of $1 bn	1	1	1
$500 mn - <$1 bn	1	1	1
$150 mn - <$500 mn	6	6	6
$50 mn - <$500 mn	12	10	9
$10 mn - <$50 mn	18	19	16
$5 mn - <$10 mn	5	5	6
0 - <$5 mn	26	16	19
No data	30	43	42
TOTAL	**100**	**100**	**100**

Cont'd/…

MONEY-UNDER-MANAGEMENT ON A SIX-MONTHLY BASIS …/Cont'd

GLOBAL MACROS NUMBER OF FUNDS	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Excess of $1 bn	6	5	5
$500 mn - <$1 bn	2	1	1
$150 mn - <$500 mn	6	4	5
$50 mn - <$500 mn	7	7	7
$10 mn - <$50 mn	21	27	27
$5 mn - <$10 mn	4	6	7
0 - <$5 mn	15	14	14
No data	19	37	41
TOTAL	**80**	**101**	**107**

GLOBAL MACROS PERCENT	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Excess of $1 bn	8	5	5
$500 mn - <$1 bn	3	1	1
$150 mn - <$500 mn	8	4	5
$50 mn - <$500 mn	9	7	7
$10 mn - <$50 mn	26	27	25
$5 mn - <$10 mn	5	6	7
0 - <$5 mn	19	14	13
No data	24	37	38
TOTAL	**100**	**100**	**100**

ALL FUNDS NUMBER OF FUNDS	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Excess of $1 bn	20	18	24
$500 mn - <$1 bn	26	29	29
$150 mn - <$500 mn	107	112	136
$50 mn - <$500 mn	202	223	280
$10 mn - <$50 mn	390	463	451
$5 mn - <$10 mn	115	123	149
0 - <$5 mn	273	232	271
No data	558	752	911
TOTAL	**1,691**	**1,952**	**2,251**

ALL FUNDS PERCENT	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Excess of $1 bn	1	1	1
$500 mn - <$1 bn	2	1	1
$150 mn - <$500 mn	6	6	6
$50 mn - <$500 mn	12	11	12
$10 mn - <$50 mn	23	24	20
$5 mn - <$10 mn	7	6	7
0 - <$5 mn	16	12	12
No data	33	39	40
TOTAL	**100**	**100**	**100**

CHANGES IN CAPITAL BASES ON A SIX-MONTHLY BASIS

	Million Dollars Under Management				Number of Funds			
HEDGE FUNDS	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	240	11,501	23,504	19,056	16	585	820	917
Plus >1000%	517	55	328	115	10	2	5	2
Plus 500% - 999%	3,109	318	878	3,921	26	6	3	5
Plus 100% - 499%	35,043	2,263	12,823	5,767	160	26	54	76
Plus 50% - 99%	41,721	2,279	5,864	19,510	123	29	53	87
Plus 0% - 49%	120,561	37,032	35,138	57,378	355	195	285	363
Down 0% - 49%	15,124	34,859	17,697	13,124	185	312	175	177
Down 50% - 99%	619	4,000	460	619	32	64	35	34
Down >100%	0	0	0			4	0	0
TOTAL	**216,934**	**92,307**	**96,693**	**119,490**	**907**	**1,223**	**1,430**	**1,661**

HEDGE FUNDS PERCENT	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	0	12	24	16	2	48	57	55
Plus >1000%	0	0	0	0	1	0	0	0
Plus 500% - 999%	1	0	1	3	3	0	0	0
Plus 100% - 499%	16	2	13	5	18	2	4	5
Plus 50% - 99%	19	2	6	16	14	2	4	5
Plus 0% - 49%	56	40	36	48	39	16	20	22
Down 0% - 49%	7	38	18	11	20	26	12	11
Down 50% - 99%	0	4	0	1	4	5	2	2
Down >100%	0	0	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/…

CHANGES IN CAPITAL BASES ON A SIX MONTHLY BASIS ...Cont'd

CTAs	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	320	7,749	4,752	5,609	5	247	284	351
Plus >1000%	102	2,060	0	0	3	4	0	0
Plus 500% - 999%	27	14	3	0	4	1	2	0
Plus 100% - 499%	2,263	1,618	895	203	35	20	19	8
Plus 50% - 99%	2,615	1,427	1,094	972	23	24	21	16
Plus 0% - 49%	8,456	10,414	12,178	7,706	95	97	102	66
Down 0% - 49%	5,921	3,255	5,905	11,071	91	54	78	129
Down 50% - 99%	760	168	226	350	25	21	15	20
Down >100%	0	0	0	0		0	1	0
TOTAL	20,464	26,705	25,053	25,911	281	468	522	590

CTAs PERCENT	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	2	29	19	22	2	53	54	59
Plus >1000%	0	8	0	0	1	1	0	0
Plus 500% - 999%	0	0	0	0	1	0	0	0
Plus 100% - 499%	11	6	4	1	12	4	4	1
Plus 50% - 99%	13	5	4	4	8	5	4	3
Plus 0% - 49%	41	39	49	30	34	21	20	11
Down 0% - 49%	29	12	24	43	32	12	15	22
Down 50% - 99%	4	1	1	1	9	4	3	3
Down >100%	0	0	0	0	0	0	0	0
TOTAL	100	100	100	100	100	100	100	100

Cont'd/…

CHANGES IN CAPITAL BASES ON A SIX-MONTHLY BASIS …/Cont'd

GLOBAL MACROS	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data		5,340	2,444	256		28	55	51
Plus >1000%		0	0	0		0	0	0
Plus 500% - 999%		0	0	0		0	0	0
Plus 100% - 499%		0	9,169	63		0	8	5
Plus 50% - 99%		316	0	6,003		2	0	5
Plus 0% - 49%		15,214	5,960	17,581		16	18	21
Down 0% - 49%		7,226	5,045	908		27	16	17
Down 50% - 99%		2,111	55	91		7	4	8
Down >100%		0	0	0		0	0	0
TOTAL	**0**	**30,207**	**22,672**	**24,902**	**0**	**80**	**101**	**107**

GLOBAL MACROS PERCENT	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data		18	11	1		35	54	48
Plus >1000%		0	0	0		0	0	0
Plus 500% - 999%		0	0	0		0	0	0
Plus 100% - 499%		0	40	0		0	8	5
Plus 50% - 99%		1	0	24		3	0	5
Plus 0% - 49%		50	26	71		20	18	20
Down 0% - 49%		24	22	4		34	16	16
Down 50% - 99%		7	0	0		9	4	7
Down >100%		0	0	0		0	0	0
TOTAL		**100**	**100**	**100**		**100**	**100**	**100**

Cont'd/…

CHANGES IN CAPITAL BASES ON A SIX MONTHLY BASIS …/Cont'd

ALL FUNDS	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	560	19,250	28,256	24,666	21	832	1,104	1,268
Plus >1000%	619	2,115	328	115	13	6	5	2
Plus 500% - 999%	3,136	332	881	3,921	30	7	5	5
Plus 100% - 499%	37,306	3,881	13,718	5,970	195	46	73	84
Plus 50% - 99%	44,336	3,706	6,959	20,481	146	53	74	103
Plus 0% - 49%	129,017	47,446	47,315	65,084	450	292	387	429
Down 0% - 49%	21,045	38,114	23,602	24,195	276	366	253	306
Down 50% - 99%	1,379	4,168	686	970	57	85	50	54
Down>100%	0	0	0	0	0	4	1	0
TOTAL	**237,398**	**119,012**	**121,745**	**145,401**	**1,188**	**1,691**	**1,952**	**2,251**

ALL FUNDS PERCENT	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	0	16	23	17	2	49	57	56
Plus >1000%	0	2	0	0	1	0	0	0
Plus 500% - 999%	1	0	1	3	3	0	0	0
Plus 100% - 499%	16	3	11	4	16	3	4	4
Plus 50% - 99%	19	3	6	14	12	3	4	5
Plus 0% - 49%	54	40	39	45	38	17	20	19
Down 0% - 49%	9	32	19	17	23	22	13	14
Down 50% - 99%	1	4	1	1	5	5	3	2
Down>100%	0	0	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

MINIMUM ACCOUNT LEVELS FOR ENTRY

	Million Dollars Under Management			Number of Funds		
HEDGE FUNDS	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	25,588	32,893	36,737	85	102	113
Less than $0.5 mn	14,260	15,271	20,767	563	649	747
$0.5 mn but < $1 mn	9,114	10,068	11,952	237	279	330
$1mn - <$2.5 mn	26,879	27,072	39,388	303	358	425
$2.5 mn - < $5 mn	10,009	8	825	3	3	5
$5 mn - < $10 mn	6,458	8,668	7,623	32	36	38
$10 mn - < $20 mn	0	1,559	1,068	0	1	1
>$20 mn	0	1,153	1,132	0	2	2
TOTAL	**92,307**	**96,693**	**119,490**	**1,223**	**1,430**	**1,661**

HEDGE FUNDS PERCENT	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	28	34	31	7	7	7
Less than $0.5 mn	15	16	17	46	45	45
$0.5 mn but < $1 mn	10	10	10	19	20	20
$1mn - <$2.5 mn	29	28	33	25	25	26
$2.5 mn - < $5 mn	11	0	1	0	0	0
$5 mn - < $10 mn	7	9	6	3	3	2
$10 mn - < $20 mn	0	2	1	0	0	0
>$20 mn	0	1	1	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

CTAs	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	3,269	3,083	1,044	33	26	23
Less than $0.5 mn	3,357	1,679	2,820	161	182	204
$0.5 mn but < $1 mn	920	594	877	68	73	78
$1mn - <$2.5 mn	8,523	7,503	7,712	149	170	193
$2.5 mn - < $5 mn	2,487	2,745	2,090	18	19	27
$5 mn - < $10 mn	3,450	4,461	5,739	21	34	43
$10 mn - < $20 mn	4,018	4,534	5,369	16	16	18
>$20 mn	682	454	260	2	2	4
TOTAL	**26,706**	**25,053**	**25,911**	**468**	**522**	**590**

CTAs PERCENT	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	12	12	4	7	5	4
Less than $0.5 mn	13	7	11	34	35	35
$0.5 mn but < $1 mn	3	2	3	15	14	13
$1mn - <$2.5 mn	32	30	30	32	33	33
$2.5 mn - < $5 mn	9	11	8	4	4	5
$5 mn - < $10 mn	13	18	22	4	7	7
$10 mn - < $20 mn	15	18	21	3	3	3
>$20 mn	3	2	1	0	0	1
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/…

MINIMUM ACCOUNT LEVELS FOR ENTRY …Cont'd

GLOBAL MACROS	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
No data	16,066	19,072	21,130	14	16	16
Less than $0.5 mn	1,313	1,268	1,373	30	43	47
$0.5 mn but < $1 mn	316	313	211	12	13	13
$1mn - <$2.5 mn	2,511	2,020	2,189	23	28	30
$2.5 mn - < $5 mn	0	0	0	0	1	1
$5 mn - < $10 mn	10,000	0	0	1	0	0
$10 mn - < $20 mn	0	0	0	0	0	0
>$20 mn	0	0	0	0	0	0
TOTAL	**30,207**	**22,672**	**24,902**	**80**	**101**	**107**

GLOBAL MACROS PERCENT	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
No data	53	84	85	18	16	15
Less than $0.5 mn	4	6	6	38	43	44
$0.5 mn but < $1 mn	1	1	1	15	13	12
$1mn - <$2.5 mn	8	9	9	29	28	28
$2.5 mn - < $5 mn	0	0	0	0	1	1
$5 mn - < $10 mn	33	0	0	1	0	0
$10 mn - < $20 mn	0	0	0	0	0	0
>$20 mn	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

ALL FUNDS	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
No data	28,857	35,976	37,781	118	128	136
Less than $0.5 mn	17,617	16,950	23,587	724	831	951
$0.5 mn but < $1 mn	10,034	10,662	12,829	305	352	408
$1mn - <$2.5 mn	35,402	34,575	47,100	452	528	618
$2.5 mn - < $5 mn	12,496	2,753	2,915	21	22	32
$5 mn - < $10 mn	9,908	13,129	13,361	53	70	81
$10 mn - < $20 mn	4,018	6,093	6,436	16	17	19
>$20 mn	682	1,607	1,392	2	4	6
TOTAL	**119,013**	**121,745**	**145,401**	**1,691**	**1,952**	**2,251**

ALL FUNDS PERCENT	End Dec 1998	End Jun 1999	End Dec 1999	End Dec 1998	End Jun 1999	End Dec 1999
No data	24	30	26	7	7	6
Less than $0.5 mn	15	14	16	43	43	42
$0.5 mn but < $1 mn	8	9	9	18	18	18
$1mn - <$2.5 mn	30	28	32	27	27	27
$2.5 mn - < $5 mn	10	2	2	1	1	1
$5 mn - < $10 mn	8	11	9	3	4	4
$10 mn - < $20 mn	3	5	4	1	1	1
>$20 mn	1	1	1	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

SIX-MONTHLY RETURNS TO INVESTORS

	Million dollars under management				Number of Funds			
HEDGE FUNDS	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	0	23	120	60	0	415	499	631
Returns >100%	52	105	473	6,667	4	5	15	91
Returns >50% but <99%	249	1,066	4,856	21,078	8	30	44	169
Returns >25% but <49%	10,975	9,565	23,483	38,696	43	106	224	217
Returns >10% but <24%	50,997	21,783	52,498	29,349	192	168	396	288
Returns >0 but <9%	138,190	31,113	13,390	15,409	445	212	156	134
Losses >0 but <9%	9,193	12,853	1,454	3,527	104	99	51	76
Losses >10% but <24%	4,843	9,546	289	4,492	63	89	31	36
Losses >25% but <49%	2,237	5,424	54	205	34	67	13	16
Losses >50% but <99%	128	769	76	8	7	29	1	3
Losses >100%	70	60	0	0	7	3	0	0
TOTAL	**216,934**	**92,307**	**96,693**	**119,490**	**907**	**1,223**	**1,430**	**1,661**

HEDGE FUNDS PERCENT	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	0	0	0	0	0	34	35	38
Returns >100%	0	0	0	6	0	0	1	5
Returns >50% but <99%	0	1	5	18	1	2	3	10
Returns >25% but <49%	5	10	24	32	5	9	16	13
Returns >10% but <24%	24	24	54	25	21	14	28	17
Returns >0 buts <9%	64	34	14	13	49	17	11	8
Losses >0 but <9%	4	14	2	3	11	8	4	5
Losses >10% but <24%	2	10	0	4	7	7	2	2
Losses >25% but <49%	1	6	0	0	4	5	1	1
Losses >50% but <99%	0	1	0	0	1	2	0	0
Losses >100%	0	0	0	0	1	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/...

SIX-MONTHLY RETURNS TO INVESTORS …/Cont'd

CTAs	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	1	1,137	0	9	1	114	175	234
Returns >100%	1	52	420	3	1	4	1	2
Returns >50% but <99%	332	512	2,124	93	6	13	8	10
Returns >25% but <49%	2,299	3,333	20,489	489	34	49	52	19
Returns >10% but <24%	8,411	9,146	2,020	3,553	90	98	168	56
Returns >0 but <9%	6,170	10,159	0	13,379	98	91	94	91
Losses >0 but <9%	2,979	1,464	0	5,019	40	48	19	97
Losses >10% but <24%	271	864	0	3,096	11	36	4	67
Losses >25% but <49%	0	23	0	269	0	10	1	12
Losses >50% but <99%	0	18	0	0	0	5	0	2
Losses >100%	0	0	0	0				0
TOTAL	**20,464**	**26,706**	**25,053**	**25,910**	**281**	**468**	**522**	**590**

CTAs PERCENT	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	0	4	0	0	0	24	34	40
Returns >100%	0	0	2	0	0	1	0	0
Returns >50% but <99%	2	2	8	0	2	3	2	2
Returns >25% but <49%	11	12	82	2	12	10	10	3
Returns >10% but <24%	41	34	8	14	32	21	32	9
Returns >0 buts <9%	30	38	0	52	35	19	18	15
Losses >0 but <9%	15	5	0	19	14	10	4	16
Losses >10% but <24%	1	3	0	12	4	8	1	11
Losses >25% but <49%	0	0	0	1	0	2	0	2
Losses >50% but <99%	0	0	0	0	0	1	0	0
Losses >100%	0	0	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/…

SIX-MONTHLY RETURNS TO INVESTORS …/Cont'd

GLOBAL MACROS	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No Data		5,340	0	0		28	33	38
Returns >100%		0	116	156		0	1	1
Returns >50% but <99%		0	0	181		0	0	4
Returns >25% but <49%		324	153	15,556		5	6	13
Returns >10% but <24%		4,783	3,304	3,734		13	17	19
Returns >0 but <9%		10,985	10,159	398		12	24	17
Losses >0 but <9%		6,375	4,946	821		13	13	6
Losses >10% but <24%		2,356	3,880	4,046		5	6	7
Losses >25% but <49%		44	114	9		4	1	2
Losses >50% but <99%		0	0	0		0	0	0
Losses >100%		0	0	0		0	0	0
TOTAL		**30,207**	**22,672**	**24,902**		**80**	**101**	**107**

GLOBAL MACROS PERCENT	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No Data		18	0	0		35	33	36
Returns >100%		0	1	1		0	1	1
Returns >50% but <99%		0	0	1		0	0	4
Returns >25% but <49%		1	1	62		6	6	12
Returns >10% but <24%		16	15	15		16	17	18
Returns >0 but <9%		36	45	2		15	24	16
Losses >0 but <9%		21	22	3		16	13	6
Losses >10% but <24%		8	17	16		6	6	7
Losses >25% but <49%		0	1	0		5	1	2
Losses >50% but <99%		0	0	0		0	0	0
Losses >100%		0	0	0		0	0	0
TOTAL		**100**	**100**	**100**		**100**	**100**	**100**

Cont'd/…

SIX-MONTHLY RETURNS TO INVESTORS …/Cont'd

ALL FUNDS	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	1	1,160	120	69	1	529	674	865
Returns >100%	53	157	893	6,670	5	9	16	93
Returns >50% but <99%	581	1,578	6,980	21,171	14	43	52	179
Returns >25% but <49%	13,274	12,898	43,972	39,185	77	155	276	236
Returns >10% but <24%	59,408	30,929	54,517	32,902	282	266	564	344
Returns >0 but <9%	144,360	41,272	13,390	28,788	543	303	250	225
Losses >0 but <9%	12,172	14,317	1,454	8,546	144	147	70	173
Losses >10% but <24%	5,114	10,410	289	7,588	74	125	35	103
Losses >25% but <49%	2,237	5,447	54	474	34	77	14	28
Losses >50% but <99%	128	787	76	8	7	34	1	5
Losses >100%	70	60	0	0	7	3	0	0
TOTAL	**237,398**	**119,013**	**121,745**	**145,400**	**1,188**	**1,691**	**1,952**	**2,251**

ALL FUNDS PERCENT	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	0	1	0	0	0	31	35	38
Returns >100%	0	0	1	5	0	1	1	4
Returns >50% but <99%	0	1	6	15	1	3	3	8
Returns >25% but <49%	6	11	36	27	6	9	14	10
Returns >10% but <24%	25	26	45	23	24	16	29	15
Returns >0 but <9%	61	35	11	20	46	18	13	10
Losses >0 but <9%	5	12	1	6	12	9	4	8
Losses >10% but <24%	2	9	0	5	6	7	2	5
Losses >25% but <49%	1	5	0	0	3	5	1	1
Losses >50% but <99%	0	1	0	0	1	2	0	0
Losses >100%	0	0	0	0	1	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

AVERAGE RATE OF RETURN TO INVESTOR OVER THE LIFE OF THE FUNDS

	Million dollars under management				Number of Funds			
HEDGE FUNDS	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	0	766	120	102	0	418	499	634
Returns >100%	372	62	473	4,114	7	6	15	34
Returns >50% but <99%	3,716	1,968	4,856	5,968	33	33	44	94
Returns >25% but <49%	28,854	7,452	23,483	48,186	177	120	224	261
Returns >10% but <24%	96,131	57,471	52,498	47,606	441	338	396	394
Returns >0 but <9%	85,561	21,612	13,390	11,698	162	201	156	152
Losses >0 but <9%	1,897	1,588	1,454	1,356	50	53	51	51
Losses >10% but <24%	122	1,022	289	429	18	28	31	30
Losses >25% but <49%	254	275	54	31	16	18	13	10
Losses >50% but <99%	28	84	76	1	3	7	1	1
Losses >100%		6	0	0		1		
TOTAL	**216,935**	**92,307**	**96,693**	**119,490**	**907**	**1,223**	**1,430**	**1,661**

HEDGE FUNDS PERCENT	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Jun 1998**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
No data	0	1	0	0	0	34	35	38
Returns >100%	0	0	0	3	1	0	1	2
Returns >50% but <99%	2	2	5	5	4	3	3	6
Returns >25% but <49%	13	8	24	40	20	10	16	16
Returns >10% but <24%	44	62	54	40	49	28	28	24
Returns >0 but <9%	39	23	14	10	18	16	11	9
Losses >0 but <9%	1	2	2	1	6	4	4	3
Losses >10% but <24%	0	1	0	0	2	2	2	2
Losses >25% but <49%	0	0	0	0	2	1	1	1
Losses >50% but <99%	0	0	0	0	0	1	0	0
Losses >100%	0	0	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/...

AVERAGE RATE OF RETURN TO INVESTOR OVER THE LIFE OF THE FUNDS …/Cont'd

CTAs	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	13	1,137	936	9	1	114	175	233
Returns >100%	183	52	1	1	5	4	1	1
Returns >50% but <99%	2,351	512	369	47	36	13	8	8
Returns >25% but <49%	11,003	3,333	2,376	2,628	117	49	52	40
Returns >10% but <24%	6,437	9,146	15,450	16,571	98	98	168	157
Returns >0 but <9%	448	10,159	5,617	5,968	22	91	94	112
Losses >0 but <9%	29	1,464	293	657	2	48	20	31
Losses >10% but <24%	0	864	11	19	0	36	3	6
Losses >25% but <49%	0	23	0	10	0	10	1	1
Losses >50% but <99%	0	18	0	0	0	5	0	1
Losses >100%	0	0	0	0				
TOTAL	**20,464**	**26,706**	**25,053**	**25,910**	**281**	**468**	**522**	**590**

CTAs **PERCENT**	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	0	4	4	0	0	24	34	39
Returns >100%	1	0	0	0	2	1	0	0
Returns >50% but <99%	11	2	1	0	13	3	2	1
Returns >25% but <49%	54	12	9	10	42	10	10	7
Returns >10% but <24%	31	34	62	64	35	21	32	27
Returns >0 but <9%	2	38	22	23	8	19	18	19
Losses >0 but <9%	0	5	1	3	1	10	4	5
Losses >10% but <24%	0	3	0	0	0	8	1	1
Losses >25% but <49%	0	0	0	0	0	2	0	0
Losses >50% but <99%	0	0	0	0	0	1	0	0
Losses >100%	0	0	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/…

AVERAGE RATE OF RETURN TO INVESTOR OVER THE LIFE OF THE FUNDS …/Cont'd

GLOBAL MACROS	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data		5,340	0	0		28	33	38
Returns >100%		0	46	1,632		0	1	1
Returns >50% but <99%		41	1,660	156		2	5	1
Returns >25% but <49%		1,352	397	9,773		4	9	15
Returns >10% but <24%		19,943	19,272	12,408		18	29	24
Returns >0 but <9%		3,333	1,181	891		21	17	23
Losses >0 but <9%		193	63	31		6	3	2
Losses >10% but <24%		5	53	11		1	4	3
Losses >25% but <49%		0	0	0		0	0	0
Losses >50% but <99%		0	0	0		0	0	0
Losses >100%		0	0	0		0	0	0
TOTAL	**0**	**30,207**	**22,672**	**24,902**		**80**	**101**	**107**

GLOBAL MACROS PERCENT	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data		18	0	0		35	33	36
Returns >100%		0	0	7		0	1	1
Returns >50% but <99%		0	7	1		3	5	1
Returns >25% but <49%		4	2	39		5	9	14
Returns >10% but <24%		66	85	50		23	29	22
Returns >0 but <9%		11	5	4		26	17	21
Losses >0 but <9%		1	0	0		8	3	2
Losses >10% but <24%		0	0	0		1	4	3
Losses >25% but <49%		0	0	0		0	0	0
Losses >50% but <99%		0	0	0		0	0	0
Losses >100%		0	0	0		0	0	0
TOTAL		**100**	**100**	**100**		**100**	**100**	**100**

Cont'd/…

AVERAGE RATE OF RETURN TO INVESTOR OVER THE LIFE OF THE FUNDS …/Cont'd

ALL FUNDS	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	13	1,903	1,056	111	1	532	674	867
Returns >100%	555	114	474	4,115	12	10	16	35
Returns >50% but <99%	6,067	2,480	5,225	6,015	69	46	52	102
Returns >25% but <49%	39,857	10,785	25,859	50,814	294	169	276	301
Returns >10% but <24%	102,568	66,617	67,948	64,177	539	436	564	551
Returns >0 but <9%	86,009	31,771	19,007	17,666	184	292	250	264
Losses >0 but <9%	1,926	3,052	1,747	2,013	52	101	71	82
Losses >10% but <24%	122	1,886	300	448	18	64	34	36
Losses >25% but <49%	254	298	54	41	16	28	14	11
Losses >50% but <99%	28	102	76	1	3	12	1	2
Losses >100%	0	6	0	0	0	1	0	0
TOTAL	**237,399**	**119,013**	**121,746**	**145,400**	**1,188**	**1,691**	**1,952**	**2,251**

ALL FUNDS PERCENT	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999	End Jun 1998	End Dec 1998	End Jun 1999	End Dec 1999
No data	0	2	1	0	0	31	35	39
Returns >100%	0	0	0	3	1	1	1	2
Returns >50% but <99%	3	2	4	4	6	3	3	5
Returns >25% but <49%	17	9	21	35	25	10	14	13
Returns >10% but <24%	43	56	56	44	45	26	29	24
Returns >0 but <9%	36	27	16	12	15	17	13	12
Losses >0 but <9%	1	3	1	1	4	6	4	4
Losses >10% but <24%	0	2	0	0	2	4	2	2
Losses >25% but <49%	0	0	0	0	1	2	1	0
Losses >50% but <99%	0	0	0	0	0	1	0	0
Losses >100%	0	0	0	0	0	0	0	0
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

REDEMPTION STATUS	Mn Dollars			Number of Funds		
HEDGE FUNDS	**End Dec**	**End Jun**	**End Dec**	**End Dec**	**End Jun**	**End Dec**
	1998	**1999**	**1999**	**1998**	**1999**	**1999**
Annually 60 days or greater	5,695	5,127	6,790	75	81	98
Annually less than 60 days	3,625	3,740	5,634	61	68	78
Semi-annually greater than 60 days	157	907	1,549	16	22	28
Semi-annually less than 60 days	3,125	1,390	6,561	56	67	83
Quarterly greater than 60 days	4,514	7,104	5,936	93	112	131
Quarterly less than 60 days	38,211	37,303	39,410	337	396	468
Monthly greater than 60 days	1,315	2,496	2,840	22	38	44
Monthly less than 60 days	21,502	20,040	28,826	337	413	494
Bi-monthly 10 days' wait or less	50	416	33	3	2	2
Weekly greater than 7 days	579	108	719	4	6	6
Weekly less than 7 days	1,866	2,105	4,205	35	40	42
Daily 30 days	1,303	87	1,292	4	9	13
Daily less than 30 days	1,164	1,092	1,976	12	9	8
Unknown	9,202	14,778	13,720	168	167	166
Total	**92,307**	**96,693**	**119,490**	**1,223**	**1,430**	**1661**

HEDGE FUNDS	**End Dec**	**End Jun**	**End Dec**	**End Dec**	**End Jun**	**End Dec**
Percent	**1998**	**1999**	**1999**	**1998**	**1999**	**1999**
Annually 60 days or greater	6	5	6	6	6	6
Annually less than 60 days	4	4	5	5	5	5
Semi-annually greater than 60 days	0	1	1	1	2	2
Semi-annually less than 60 days	3	1	5	5	5	5
Quarterly greater than 60 days	5	7	5	8	8	8
Quarterly less than 60 days	41	39	33	28	28	28
Monthly greater than 60 days	1	3	2	2	3	3
Monthly less than 60 days	23	21	24	28	29	30
Bi-monthly 10 days' wait or less	0	0	0	0	0	0
Weekly greater than 7 days	1	0	1	0	0	0
Weekly less than 7 days	2	2	4	3	3	3
Daily 30 days	1	0	1	0	1	1
Daily less than 30 days	1	1	2	1	1	0
Unknown	10	15	11	14	12	10
Total	**100**	**100**	**100**	**100**	**100**	**100**

Cont'd/...

REDEMPTION STATUS …/Cont'd

GLOBAL MACROS	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**	**End Dec 1998**	**End Jun 1999**	**End Dec 1999**
Annually 60 days or greater	139	146	50	3	4	5
Annually less than 60 days	0	0	30	0	0	2
Semi-annually greater than 60 days	0	0	0	0	0	0
Semi-annually less than 60 days	32	24	45	3	3	4
Quarterly greater than 60 days	41	116	156	2	2	2
Quarterly less than 60 days	21,782	9,657	12,048	20	28	28
Monthly greater than 60 days	4	32	38	1	3	3
Monthly less than 60 days	3,954	3,655	3,417	35	44	45
Bi-monthly 10 wait or less	50	0	33	1	0	1
Weekly greater than 7 day	0	0	87	0	1	3
Weekly less than 7 day	1	42	0	1	2	0
Daily 30 days	0	0	0	0	0	0
Daily less than 30 days	199	0	0	1	1	1
Unknown	4,005	9,000	9,000	13	13	13
Total	**30,207**	**22,672**	**24,902**	**80**	**101**	**107**

GLOBAL MACROS	**End Dec**	**End Jun**	**End Dec**	**End Dec**	**End Jun**	**End Dec**
PERCENT	**1998**	**1999**	**1999**	**1998**	**1999**	**1999**
Annually 60 days or greater	0	1	0	4	4	5
Annually less than 60 days	0	0	0	0	0	2
Semi-annually greater than 60 days	0	0	0	0	0	0
Semi-annually less than 60 days	0	0	0	4	3	4
Quarterly greater than 60 days	0	1	1	3	2	2
Quarterly less than 60 days	72	43	48	25	28	26
Monthly greater than 60 days	0	0	0	1	3	3
Monthly less than 60 days	13	16	14	44	44	42
Bi-monthly 10 days' wait or less	0	0	0	1	0	1
Weekly greater than 7 day	0	0	0	0	1	3
Weekly less than 7 day	0	0	0	1	2	0
Daily 30 days	0	0	0	0	0	0
Daily less than 30 days	1	0	0	1	1	1
Unknown	13	40	36	16	13	12
Total	**100**	**100**	**100**	**100**	**100**	**100**

APPENDIX 5

Research methodology

1. **The lending market**

Research approach:
statistical and reiteratively interview-based

Data sources on official sector gold reserves and private lending:
IMF: International Financial Statistics annually 1968 to present
Virtual Metals data bases covering quasi-official gold holdings, unpublished country reserves and estimates of above-ground stocks and private inventories

Establishment of reserve/holdings data base then……
Interviews conducted with commercial banks acting as lending counterparties from where lending by country was assessed then…
Interviews conducted with official sector representatives involving presentation of initial lending estimates then…
Interviews conducted with market participants specialising in the international consignment business and physical/industrial/investment sector of the industry and assessment of their market shares then…
Fine tuning of lending assessment.

2. **Producer Hedging**

Research approach:
price risk management analysis, statistical questionnaires and one-on-one personal interviews

Data sources:
Individual mining company co-operation, annual reports and 10K reports
Brook Hunt and Associates cost data

Assessment of the hedge book:
Specific request for full hedging details to tenure and not simply average realised prices. Specific request for lease rate exposure to tenure. Full delta hedge analysis of each and every option strategy annually to tenure.
Non-hedge analysis:
weighted average according to beneficial production.
Costs analysis:
full mine-by-mine costs analysis of existing data.

3. **The commercial banks**

Research approach:
statistical and reiteratively interview-based

Data sources:
US Office of the Comptroller of the Currency (OCC) data
Bank for International Settlements (BIS) data
Virtual Metals data bases

Initial establishment of commercial banking population then….
Individual questionnaires and one-on-one interviews then….
Initial assessment of market structure then ……..
Analysis of the OCC and BIS turnover figures then …….
Further discussions with market participants then….
Fine tuning of assessments.

4. **The hedge funds**

Research approach:
statistical and reiteratively interview-based

Data sources:
Managed Account Reports (MAR)Bi-annual fund directories (CTAs and Hedge Funds)
Commitment of Traders fortnightly reports
Virtual Metals data bases

Initial establishment of data base and data input then….
Analysis of the 2,500-fund population including the isolation of global macros funds
Interviews of market participants acting as counterparties then…
Refinement of analysis.

APPENDIX 6

The Washington Agreement on Gold

THE SIGNATORIES

Oesterreichische Nationalbank
Banque Nationale de Belgique
Suomen Pankki
Banca d'Italia
Banque Centrale du Luxembourg
De Nederlandsche Bank
Banque de France
Deutsche Bundesbank
Central Bank of Ireland
Banco do Portugal
Banco de España
Sveriges Riksbank
Schweizerische Nationalbank
Bank of England
European Central Bank

THE PRESS RELEASE

Press Communiqué - 26 September 1999
Statement on Gold

In the interest of clarifying their intentions with respect to their gold holdings, the above institutions make the following statement:

1 Gold will remain an important element of global monetary reserves.

2 The above institutions will not enter the market as sellers, with the exception of already decided sales.

3 The gold sales already decided will be achieved through a concerted programme of sales over the next five years. Annual sales will not exceed approximately 400 tonnes and total sales over this period will not exceed 2,000 tonnes.

4 The signatories to this agreement have agreed not to expand their gold leasings and their use of gold futures and options over this period.

5 This agreement will be reviewed after five years.

WGC CENTRE FOR PUBLIC POLICY STUDIES

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Switzerland's Gold, April 1999

A Glittering Future? Gold mining's importance to sub-Saharan Africa and Heavily Indebted Poor Countries, June 1999

Proceedings of the Paris Conference "Gold and the International Monetary System in a New Era", May 2000

20 Questions About Switzerland's Gold, June 2000

Gold Derivatives: The Market View by Jessica Cross, September 2000

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