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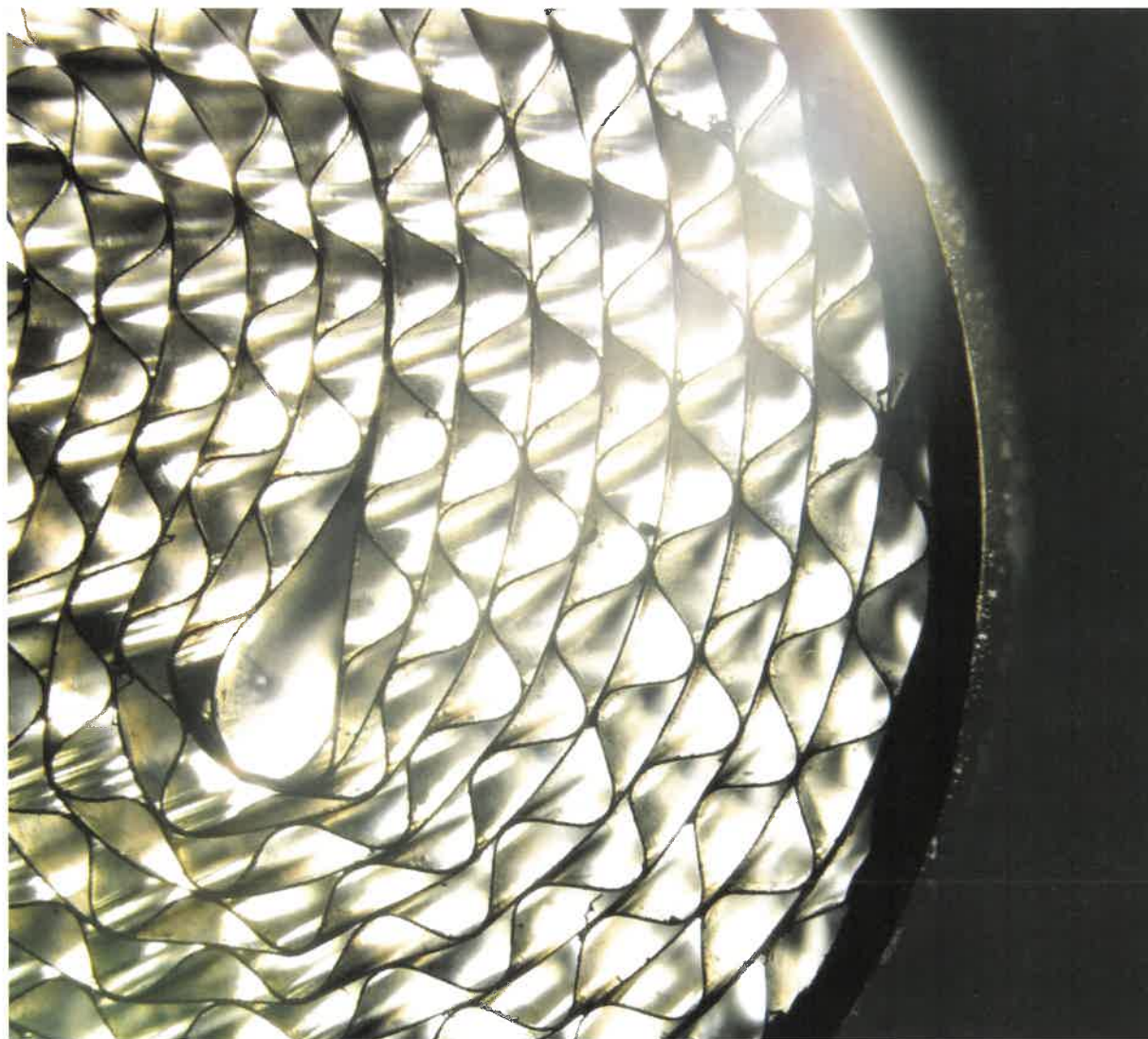
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For the road, and the roller coaster – With prices that have fluctuated between \$200 and \$7,000 per ounce since 1990, rhodium's market value stands in sharp contrast with the normally dirty-grey, dusty metal used in the glassmaking, flat-panel television and automotive industries. Pictured is a platinum/rhodium catalytic converter of the type used in smaller engines – motorcycles, lawn mowers and chainsaws – where rhodium's role is to turn toxic nitrogen oxides into harmless nitrogen. For more on this diamond in the rough, see page 3.

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200 Dollars per Gram

The Metal that Makes Truffles Seem a Bargain

By Wolfgang Wrzesniok-Rossbach, Head of Sales & Marketing, Heraeus Metallhandelsgesellschaft m.b.H.

Imagine that tonight during dinner, you take your family or your friends on a little adventure.

For that you won't have to travel very far – just look underneath

your dinner table. And imagine that there's a big silvery-white

cube sitting there, filling up the space. What you might see there is

all the rhodium that is produced in one year, a little less than two

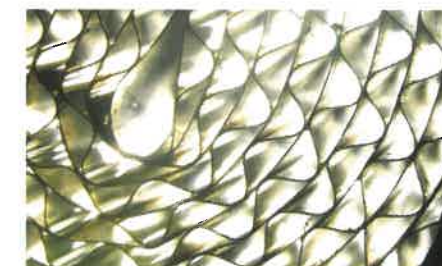
cubic meters (or not even 70 ft³). You don't have to worry, by the

way, that the metal might melt away from its hiding place under

your table. Rhodium has a melting point of 1,966°C (3,571°F)

and it boils at 3,727°C (6,741°F) – a little higher than the water

usually used for the after-dinner espresso.



In catalytic converters like that pictured, rhodium turns the polluting nitrogen oxides responsible for acid rain into inert nitrogen. Tighter emission laws, together with increased industrial use, have helped drive the metal's price back up to its 1990 all-time high near \$7,000 an ounce.

Size and heat resistance are one thing; value is another. And here you can really amaze your fellow diners, because the 'little' cube would have a market value of \$4.6 billion. Of all eight precious metals, rhodium is by far the most expensive – almost ten times as costly as gold and worth five times the price of platinum, the second most expensive precious metal.

That hasn't always been the case in the 203 years since the metal was officially discovered by the English scientist William Hyde Wollaston, using for his findings platinum ore that he presumably obtained from South America. The origin of the name comes from the Greek word 'rhodon', meaning 'rose'.

Rare – and Never Alone

There are no completely reliable long-term production figures for rhodium available, but approximately 425 tonnes of it have probably been unearthed in the last 200 years: 300 in South Africa, 100 in Russia and the remainder in several other countries, mainly in the Americas and in Zimbabwe.

As in the case of its sister metals, ruthenium and iridium, there are no primary deposits of rhodium in existence. The metal is always contained as a by-product in platinum-bearing ores and can be found also in certain nickel deposits. Global supply has risen 50 percent in the last ten years, mainly as a result of a doubling in South African production. Today the four major South African platinum metals producers account for 85 percent of the global production of nearly 26 tonnes (around 825,000 ounces), while Russia has a market share of around 12 percent. Russian supply has shrunk on average during recent years, mainly due to reduced stock sales, but this development has been more than counterbalanced by the above-mentioned production increase in the South African Bushveld.

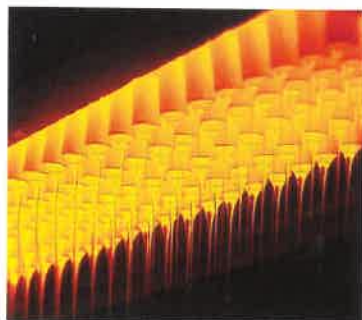
Whether that will be enough to counter the so far ever-increasing industrial demand remains to be seen. However, what is already apparent is the importance of the metal for South African mineral exports. At current market prices rhodium exports are valued at about \$4.1 billion. That is two-thirds of the total value of the South African gold exports, but who – apart from a small group of insiders – has ever heard of a chemical element called rhodium that is set to challenge the importance of the yellow metal as a major export earner for the Rainbow Nation?

Thanks to South Africa's mineral richness, the world is not going to run out of stocks of rhodium – nor any of the other platinum

Different types of catalytic converters are used for cleaning harmful exhaust pollutants. As well as automobiles, their use has now spread to motorcycles, lawn mowers – and even chainsaws.



group metals – for the foreseeable future. There are estimated reserves of 3,000 tonnes of rhodium still in the ground, waiting to be unearthed. Unlike in the very early years, when the ore deposits were easily accessible, it now takes a little more effort to get the metal out of the ground. With underground mines between only a few hundred metres and a maximum of 2,200 metres deep, the challenges for South Africa's platinum producers are in fact comparable to the ones that its gold industry is facing, which currently plans expansion that will lead to depths of more than 4,000 metres.



Bushings for the production of glass fibre that contain rhodium. The metal is needed to increase the durability of the platinum-based equipment.

An Indispensable Element

The efforts the South African mining industry are undertaking are probably worth it, as some industries are waiting desperately for an increase in supply to bring prices down, or at least to enable them to not have to live from hand to mouth as far as metal availability is concerned.

The major user of the white metal has remained unchanged for the past 30 years: it has been the automobile industry, ever since the metal was introduced into catalytic converters of cars because of its ability to turn nitrogen oxides – responsible for the acid rain so widely discussed during the 1980s – into harmless nitrogen.

With its share of nearly 870,000 ounces, more rhodium is used by the automobile industry than it is actually newly mined. The resulting gap between fresh supply and that high demand is filled by an increasing recycling quota that accounts for every fifth ounce of rhodium that is employed in car catalysts. Ten years ago, the share of metal coming from the recycling of scrapped catalytic converters was only half of today's percentage rate, and – as the amount of metal used then was considerable lower – only a fourth of the absolute number of ounces.

Of course there have been as many attempts to reduce the rhodium loadings in car catalysts

as there were different engine models. But so far any successes in that field have always been neutralised in the medium term by another change in legislation, which required yet again a higher metal loading in order to fulfil the tightened limits. That is exactly what happened in Europe after the introduction of EURO 4 emission standards in 2005 (and comparable regulations in other countries). But now for the first time it looks as though the next level in emission standards, EURO 5, might not bring consumption back up to the old levels. EURO 5 will become mandatory for all new car models in September 2009, and for all new cars in January 2011.

Falling consumption in the automobile industry would be good news for the two other main industrial end-users of rhodium, namely the chemical and glass industries. The latter uses rhodium, alloyed with platinum, for the production of high-quality glass. The build-up of new production facilities for flat-panel display glass in Asia has kept annual demand from that sector between 1.5 and two tonnes for the last three years, and a few more expansion projects have already been announced. Nonetheless, the demand for platinum and rhodium from that sector might have seen its peak in 2006, and is likely to fall back again during the coming years to the long-term average of one tonne per year.

Deep-level mining of pgms on South Africa's Bushveld Igneous Complex presents many challenges. The relative density of the host rock is greater than that generally associated with gold mines on the Witwatersrand complex, so rock pressures and associated seismicity increase with depth at a higher rate. Ambient mining temperatures also increase much faster. Photo courtesy Northam Platinum Limited; all other photos courtesy Heraeus

Apart from flat-screen glass production, rhodium (in combination with platinum) is also used to manufacture fibreglass. Here the metal is used in bushings, nozzles and spinnerets. Unlike in the car industry and



Gauze made of a platinum/rhodium alloy, used to produce nitric acid for the fertiliser industry.

some parts of the chemical industry, rhodium is not continually consumed in the glass sector. Instead it is kept in a closed loop – when a second set of metal is needed for the manufacturing of new equipment prior to the recycling time of the old one, it is usually borrowed rather than purchased.

Nearly 1.5 tonnes of rhodium per year end up in the chemical industry. Here the metal is used in catalysts for the production of oxo alcohols and acetic acid. Producers of fertiliser are also frequent users of rhodium, where it is used, again in combination with platinum, for gauzes, which act as a catalyst for the formation of nitric acid through ammonia oxidation.

One of the earliest uses of rhodium – the electroplating of white gold and platinum jewellery in order to give these metals a reflective white surface – today has a largely negligible influence on the demand side.

Trading the Untradable

At first glance rhodium trading does not appear overly complicated. There are no exchange traded futures, no ETFs, no options (let alone any exotic ones), no interest rate derivatives and no fixings. The full product range consists of spot trades and forwards (usually out to 12 months, with very few examples of trades beyond that threshold). And then there are leases, usually used by the glass and chemical industries. Bridge loans are found frequently in both sectors, when a manufacturer temporarily needs more metal to be able to exchange parts of the production equipment. At times, leases are also used to finance the entire metal inventory.

In the past, some companies have done sale and leasebacks of their precious metal inventory. But what works for platinum and palladium is a different animal in the case of rhodium. Interest rates of currently over 30 percent on the offer side (and 20 on the bid side) and a basis price for the lease-fee calculations well above \$6,000 an ounce are

without doubt hurting, and clearly call into question any decision to lease metal instead of buying it.

Spreads are not only wide when it comes to leases – the same is also true for spot trades. On top of that, the market can be very illiquid, and more than once it has seemed impossible to find any sellers when the price is rising, or to find buyers at acceptable prices when the value of rhodium starts diving.

Hedging activity in this market by using forwards is rather limited. From time to time there are trades entered into by car manufacturers. There has been also some forward selling by producers, at least in past years.

Trades are settled usually on weight accounts at one of the leading precious metal fabricators. Whenever possible, physical transport is avoided, but if that takes place, the metal is usually delivered in the form of either powder or sponge, not in solid form.

The Unfiltered Truth: Prices Fluctuate between \$200 and \$7,000 per Ounce

The normally dirty grey, dusty appearance of industrial-quality rhodium powder stands in sharp contrast to the extreme value of the metal. Long gone are the decades when the price of rhodium was more or less stable at \$200 an ounce. After an initial price peak in the late 1970s and a long stable period with prices around \$1,200 in the 1980s, the metal's value gained dramatically in 1990, rising to nearly \$7,000 an ounce on the back of an announcement of problems at Rustenburg Platinum's precious metals refinery.

On top of a situation of already tight availability, reports reached the market that the US Department of Defense was planning to acquire the metal for the national stockpile, a fact that contributed further to the rise. In the middle of 1991 prices started to come off again, when additional Russian deliveries reached the market and Nissan announced that it had developed a rhodium-free catalytic converter. By the end of that year the price had come off to \$1,850 again. And that was not the end of the decline: a few years later, at the beginning of 1997, the metal even reached \$200 per ounce again, the lowest level since the early 1970s. Continuing sales of Russian material, investors bailing out of speculative long positions and an absence of industrial buyers, which were partly using up inventory that had been built up during the 1990 rally, all contributed to the downturn.

Ten years after the metal reached its all-time high, the market jumped back above \$2,500 an ounce. This time strong demand from Asia,

a lack of physical availability and speculative buying on the back of the palladium price explosion caused the spike, which was followed over the next few years by yet another steep decline, bringing the value down again to just below \$500. Since January 2004, a combination of tighter emission laws, additional demand by the glass and the chemical industries and – last but not least – speculative buying interest caused another tremendous price spike that brought the metal's value almost back to the 1990 all-time high.

And on a short-term basis there is no relief in sight: because of the high prices, the car industry is still reluctant to enter into any new hedge positions, hence causing a lack of liquidity supply on the lease market and, as a result, higher interest rates. These then force borrowers to buy the metal instead of continuing to lease it in order to limit the interest-rate risks they are facing.

In the long run, current market conditions will not last. Lower demand for some applications, rising supply from primary as well as secondary sources and profit taking by investors might all come to the rescue of the beleaguered end-users. The mining industry – at the moment profiting massively from the high prices – might not be too sad about a limited decline of the price either. After all, it would put their clients at ease and slow down the massive determination to substitute as much of the expensive metal as possible.

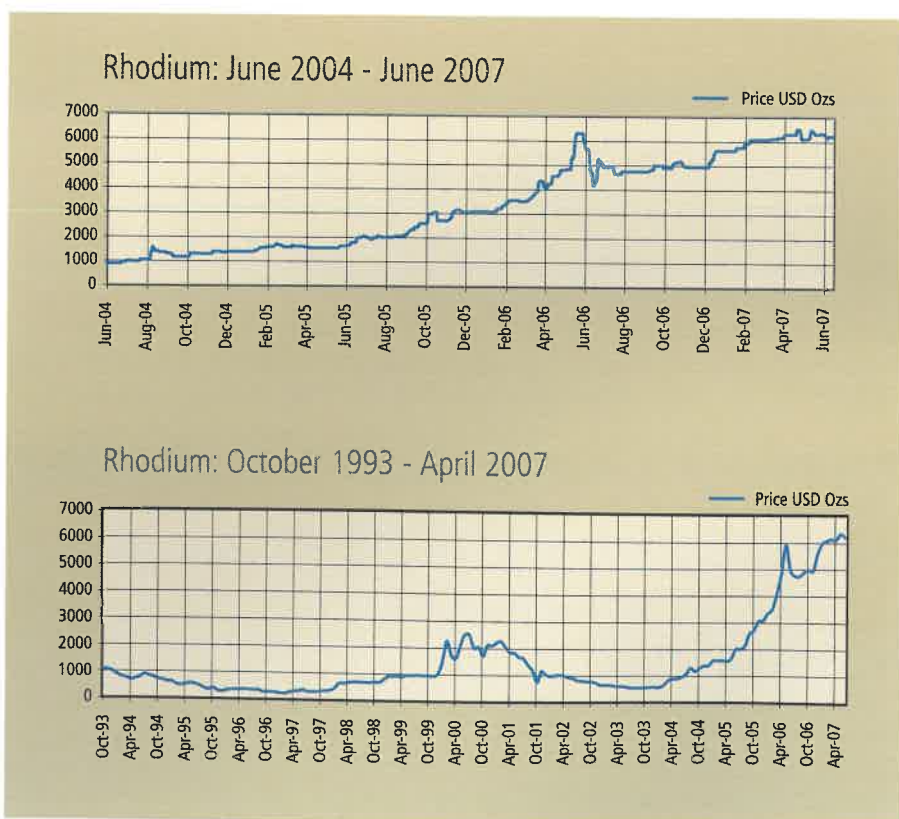
All things considered, the rhodium market has all the ingredients for an exciting future. And until we all drive home from dinner (remember to have a look underneath your table first) in either diesel- or fuel-cell-powered cars – both of which require no rhodium – prices of \$200 per ounce will remain a distant end-user's dream. ■



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Central Banks – Villains or Heroes?

By Matthew Keen, Director, Global Commodities, Deutsche Bank

In the wake of the Bank of Spain's larger-than-anticipated liquidation of gold reserves in the first half of 2007, it seems that the entire central bank community is once again being branded as villains.

It makes for amusing reading, given that the banks were viewed as heroes not all that long ago. Of course, going back a bit further, during the 1990s it was common to see criticism levelled at the official sector. It was a natural reaction: there had been a sustained period of price weakness. Somebody had to take the blame.

The late 1990s was definitely a finger-wagging era, with very few heroes in sight. Central bankers watched their assets continually erode in value, as did the miners. Even the jewellers, who generally thrive on cheap gold prices, were worried that gold would lose its allure in many parts of the world because of the constant erosion in value.

Speculators – able to run substantial and profitable short gold positions – were sitting quietly under the radar during this period, but central banks found themselves in the front line – an easy target because they rarely reacted to the accusations being levelled at them.

Bunfight at the O.K. Corral

A lunch that will live long in my memory took place in Barcelona at the time of the FT Gold Conference ten years ago. On my left we had the Gold Producer, whilst on my right we had the Central Banker.

What followed was both hugely entertaining and a little ridiculous. The central banker had to endure a volley of abuse from the producer, who was complaining that the central bank community was doing untold damage to the gold market on two counts. On the one hand they were selling large quantities of gold in a less-than-coordinated fashion, creating confusion and uncertainty. On the other hand, they were providing liquidity, which allowed the hedge funds to attack the market from the short side.

Either way, the conclusion was that the fact that prices were at 18-year lows and still sliding was clearly all down to the central banks and their irresponsible attitude! I allowed the onslaught to continue for some time, fairly secure in the knowledge that nobody was going to get hurt. However, despite wanting to remain neutral (being the host), I eventually had to stand up for the central banker, who was clearly well trained in not rising to the bait.

Had the producer been a non-hedger, his argument would have been reasonably valid, but this producer most certainly should have acknowledged the fact that his company was one of the bulge-bracket hedgers of the day. While they weren't responsible for either of the two 'super-hedges' that saw millions of ounces enter the market in the late 1990s, they undoubtedly were one of the top five hedgers of their day. As a direct beneficiary of the healthy contango that existed, I felt that the producer's barrage was just a little unfair.

Sentiment was against the central banks during the late 1990s primarily because prices were under immeasurable pressure. To their

credit, the official sector avoided getting embroiled in all the rhetoric, which included plenty of accusations, in addition to the conspiracy theories that started doing the rounds at that time. Much more sensibly, a group of 15

European central bankers, who collectively held more than 400 million ounces of gold, sat down to formulate the ECB Gold Agreement in September 1999. This agreement, closely followed by a pact between the major gold hedgers to reduce their activity, marked a turnaround in gold's fortunes. Result: the swingometer quickly flew back into the hero section for the much-maligned central bankers.

But was the criticism fair in the first place? Should the central banks have accepted the blame for the general state of the gold market as it moved into its twentieth year of a bear run? If one looks at the amount sold from the official sector during those years – a mere 2,300 tonnes from 1980 to 1999 – the logical conclusion is that the blame must lie elsewhere. The global hedge book represented a much larger number than 20 years' worth of official-sector sales, and a good proportion of that had entered the market in the previous three years. In light of that, the initiative from the European central banks to restrict sales in a bid to create improved transparency should register high on the hero end of the swingometer.

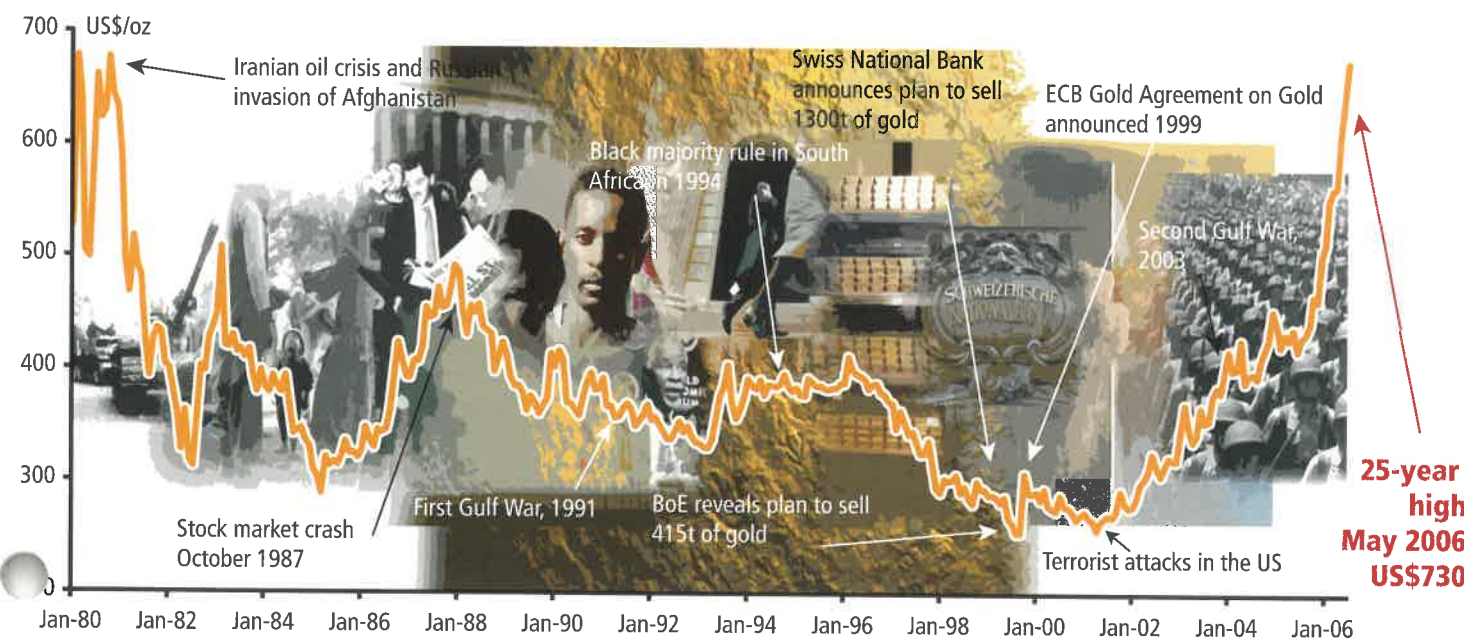
A Century of Ebb and Flow in Central Bank Gold

One hundred years ago central banks are thought to have owned something in the region of seven to eight thousand tonnes of gold. Interestingly, as the table shows, the top gold-holding countries then looked very similar to today. Switzerland was the noticeable absentee, presumably blissfully unaware of the lead role it would be playing as history unwound in the years ahead.

The other big gold holders prior to the Great War were Russia, coming in second with 1,233 tonnes, and Argentina in fourth place with 440 tonnes, two names that – although they are not in the top five – are frequently mentioned in the market today. So two possible conclusions can be drawn: first, gold is quite addictive, and second, with very few exceptions, it must have served a useful purpose for the countries that have stayed with it for a century or more.

The UK has always helped to ensure that gold played a leading role in the huge expansion of the global monetary system since the 19th century. Despite this, the Old Lady of Threadneedle Street has never had a particularly large holding – it peaked around

Longest Bull Run in History



Data based on monthly averages

Source: Datastream, Deutsche Bank Global Markets Research

2,500 tonnes in the late 1950s and, as we all know, currently the UK sits well outside the top ten with a little over 300 tonnes. The United States adopted the gold standard in 1934 and a conversion coefficient (otherwise known as 'price') was set at US\$35.00 per ounce. This price was deemed workable through the Bretton Woods agreement of 1944, and still held good into the 1960s when the gold pool was established. During this period of expansion, the gold price effectively became overvalued, which prompted holders of gold around the world to sell their holdings to the United States. As a consequence, the US increased its holdings to a peak of 20,000 tonnes following the end of World War II, which accounted for more than half the global official holdings at the time.

Despite the fact that the absolute link between national money supplies and gold holdings was broken, gold still played a very important part within the international monetary system, and it was only after a period of growth and inflation through the mid- to late-1960s that a fixed official gold price became untenable. In 1968 a two-tier system was set up, allowing other countries to participate at the official rate and, with the dollar too high (or gold price too low, depending upon your viewpoint), huge quantities of gold were bought and removed from the system to go 'East' in the late 1960s as the 'arbitrage' was exploited.

The gold standard was effectively abandoned in 1971 with President Nixon 'closing the gold window'. Since then, very little has changed in the way the market has operated. The US dollar has become the 'standard' and gold's role has subtly changed to that of a reserve asset, which means it now needs to stack up on its own merits as a worthy asset to hold.

Gold's Role in the Official Sector Today

Gold's role as a worthy reserve asset has been challenged several times in the last decade. Eddie George used the argument that gold was one of the UK Treasury's worst performing assets in the late 1990s; hence the decision was made to sell more than half of the UK's holdings. I was somewhat surprised to see Spain use that same argument as justification for their sale, given the spectacular increase in prices in the last decade.

We heard from several esteemed central bankers at the LBMA conference in Johannesburg 18 months ago that gold is now held for three reasons – namely yield, yield and yield. Although that hasn't always been the case, it does seem that the inability to earn any meaningful interest on a gold holding is a problem, particularly for the European central banks. The truth of the matter is

that for the last couple of decades yield has only been present in bear markets. It quickly disappears when prices move higher. Perhaps this means that with the current high prices and low

yields, central banks will continue to unload this non-yielding asset at a similar rate to that seen recently.

So despite the great initiative from the central banks in 1999 that turned them into heroes, as we come towards the end of the second ECB Gold Agreement five-year period, it is possible that they will find themselves becoming the villains of the piece again – and the Europeans will be most embattled. Last year was the first in seven when the maximum sale quota was not taken up by the members of the ECB Gold Agreement, which suggests that we have now reached some sort of equilibrium. Gold is not about to become a high-yielding asset any time soon – and let's not forget it is a little more complex to hold than a currency. In value terms, within a portfolio, if a central bank has sold 30 percent of its holding in the last few years, it has merely maintained the status quo. Therefore, in much the same way as the Swiss National Bank has justified its further sale of 250 tonnes between now and September 2009, I think it likely that good quantities will continue to be sold by the Europeans in the years ahead. While that could very well be offset in part by net purchases elsewhere, the pressure on the official sector will intensify again once the price turns the corner – in exactly the same way fingers pointed in the late 1990s.

In summary, it is simply not logical to view central banks as anything other than the heroes of the gold market. After all, if gold had not been adopted as a reserve asset all those years ago, it is difficult to imagine the market looking anything like it does today. But despite

Top Central Bank Holdings of Gold

	Rank in 1907	Rank in 2007	1907 Holdings (tonnes)	2007 Holdings (tonnes)
USA	1st	1st	2,293	8,133.46
Germany	5th	2nd	439	3,422.51
France	3rd	3rd	1,030	2,757.58
Italy	7th	4th	355	2,451.84
Switzerland	-	5th	-	1,290.09

At the LBMA conference in Johannesburg, central bankers told us that gold is now held for three reasons – namely yield,

yield and yield.

World Gold Holdings



Data courtesy: IMF and WGC

all the apparent good, this is a fickle market, and the official sector should prepare itself for rough seas ahead.

There has been some debate as to whether there should be a third extension of the ECB Gold Agreement when the current one expires. The safest option for the central banks would definitely be to keep the status quo. The fact remains that central banks have been able to offload an unprecedented 4,000 tonnes in the last ten years – that is an incredibly large amount, and what makes this a spectacular achievement is the fact that this huge tonnage

has gone largely unnoticed. When the producers slip back on to the supply side of the equation – which they will – the central bankers will not be able to keep their heads below the parapet any longer and, consequently, will find themselves in the firing line again. ■

This article was written by Matthew Keen at Deutsche Bank AG (DB). Some parts may have appeared previously in Deutsche Bank Research. The opinions or recommendations expressed in this article are those of the author, and are not representative of Deutsche Bank AG as a whole. DB does not accept liability for any direct, consequential or other loss arising from reliance on this article.



Matthew Keen has been with Deutsche Bank since 2005, tasked with developing the central bank franchise for all global commodity-related business. He joined Dresdner in 2001 to consolidate their global

commodity business from London, and left after that job was complete to join Koch Metals to develop a pgm inventory management business.

Matthew began his career in 1982 with Johnson Matthey Bankers. Following pgm roles at Engelhard Metals, in 1991 he moved to JPMorgan to establish their pgm desk. During his ten years there, his responsibilities broadened to include running all of the bank's precious metal forward books.

Gold Sold Under ECBGA-2

Country	Holdings June 2007* Metric tonnes	ECBGA-2 Year 1	ECBGA-2 Year 2	ECBGA-2/1 Oct06-Dec06	ECBGA-2/2 Jan07-Mar07	ECBGA-2/3 Apr07-Jun07	ECBGA-2/4 Jul07-Sep07	Projected total ECBGA-2 yr3
Germany(BUBA)	3,422.50	5	4	0	0	2	?	2+ ?
France	2,688.90	115	132	38	31	32	?	101+ ?
Italy	2,451.80	0	0	0	0	0	?	0+ ?
Switzerland(SNB)	1,290.10	130	0	0	0	0	?	0+ ?
Germany(ECB)	641.70	47	57	23	0	37	?	60+ ?
Netherlands	640.90	55	68	14	0	0	?	14+ ?
Spain	376.90	30	68	20	40	68	?	128+ ?
Portugal	382.60	55	45	0	0	0	?	0+ ?
Austria	288.70	15	14	0	0	7	?	7+ ?
Belgium	227.60	30	0	0	0	0	?	0+ ?
Sweden	156.20	15	10	2	2	4	?	8+ ?
Greece	111.90	0	0	0	0	0	?	0+ ?
Finland	49.10	0	0	0	0	0	?	0+ ?
Ireland	5.50	0	0	0	0	0	?	0+ ?
Luxembourg	2.30	0	0	0	0	0	?	0+ ?
Totals	12,736.70	497	398	97	73	150	121 est	441 est

*Source: World Gold Council



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What Drives Gold and Silver Prices?

By Peter Fertig, QCR Quantitative Commodity Research Ltd



Paul Anthony Samuelson, one of the first Nobel laureates in economics, once stated that God gave economists two eyes: one for supply and one for demand. Thus it should not come as a surprise that a widespread procedure in commodity markets is to look at the factors driving demand and supply separately. One will find statistics and forecasts for the quantity of demand and supply for various metals. Combined with estimates of inventory changes, this balance between the two quantities can then be used to predict future prices. Also, econometric models estimate supply and demand in separate equations.

For many commodities, including most metals, this is undoubtedly a sound approach. However, silver and, in particular, gold are different. While commercial use plays a role, the more important aspect is the function as a store of value, with both metals having served as money in the past. Some investors would even favour re-establishing the gold standard. In addition, aboveground stocks appear to be more important than mining production for price development. Thus, a more suitable approach is to model the price trends of gold and silver by looking at the macroeconomic and financial market variables exercising the strongest impact on each metal. The factors given below are described in the context of how they apply to gold, but due to the close correlation between gold and silver, they apply similarly to silver.

The Gold Price and... The Inflation Rate

Gold has the reputation of being a hedge against inflation – thus rising inflation rates should lead to higher gold prices. However, which inflation rate should markets be most concerned with? US headline CPI inflation? EU harmonised CPI? Or the skyrocketing inflation rate in Zimbabwe? As gold is priced in US dollars, logically, the US inflation rate should play a major role. Furthermore, economic theory argues that exchange rates adjust to reflect differences in inflation rates.

Looking at the correlation between the non-seasonally adjusted US urban CPI inflation rate and gold prices since 1973, the result might be surprising. At -0.1, the correlation is not only rather low but also has the wrong sign. Gold falls on rising US headline inflation rates. Now one might argue that, rather than the rate of inflation, it is inflation expectations that drive the gold price. We cannot measure inflation expectations over this time span, since inflation-linked US bonds were only introduced in the late 1990s. Therefore, let's assume that gold buyers had perfect foresight, and compare the price of gold with the year-on-year inflation rate one year into the future. Unfortunately,

this result would be even more disappointing: the correlation coefficient declines to -0.28. Thus, the US inflation rate is not a useful variable for modelling the price development of gold.

However, there is no reason to doubt common wisdom. While the gold price is not correlated with the US inflation rate, the percentage change of gold over one year is highly correlated with current inflation rate (correlation coefficient: 0.50) and even better correlated with future inflation rate (correlation coefficient: 0.64). This just demonstrates that one should be very careful in choosing statements and variables to model. It is not the acceleration of inflation rates that leads to higher gold prices, but inflation per se.

This raises the question of whether one should model the percentage change in the gold price by the US headline CPI inflation rate. In this context, we are faced with another problem: correlations may change over time. When the time period considered is divided into almost equal halves, the correlation between the year-on-year percentage change of the gold price and the inflation rate collapses to zero (both time series were uncorrelated over the last 17 years). Therefore, this approach would also be a vain endeavour.

...And the US Dollar

Another argument often used in market reports is that gold is a hedge against a weaker US dollar. Using weekly data from 1990 to

June 2007, there is indeed a high correlation between the price of gold and the exchange rate of the US dollar against individual major currencies such as the euro, sterling or Swiss franc, with correlation coefficients ranging between 0.62 and 0.65 in absolute terms. However, the JPY is an exception, as USD/JPY is only loosely correlated with gold, at -0.13. The US Dollar Index (DXY), an average of the US dollar against major currencies, is correlated at -0.63, and would be a suitable candidate in a model for gold prices.

When I graduated in economics, this was regarded as a sufficient condition for being included in an econometric regression model. However, following the work of Prof. Granger on spurious correlations, we know that the presence of a trend in two time series can lead to distortions – and that the correlation coefficient might overestimate the link between these time series. Regressing the weekly gold price and US dollar exchange rates as well as the dollar index against time shows that a linear trend is indeed present. The t-statistics show that the coefficients of time in these linear regressions are, at the 95-percent confidence level, significantly different from zero. In this case, there are two possible procedures: using de-trended values or including time in the model.

Including time beside one exchange rate as an independent variable in a regression equation again shows an interesting result. For the Japanese yen, the coefficient is not significantly different from zero at the 95-percent confidence level. For all other exchange rates and the US dollar index, the coefficients are all significantly different from zero. The best results are obtained by either including the DXY or the EUR/USD exchange rate beside time in a model.

...And Oil, Stocks, the S&P

However, other factors also influence the gold price – crude oil is often quoted as one. Since oil prices are often regarded as a harbinger of future inflation, rising oil prices should lead to rising inflation rates. The fact that this is not necessarily the case has puzzled many economists and central bankers over the past few years.

Nevertheless, the correlation between the gold price and the price of nearby WTI is even stronger than that between gold and the DXY. Using weekly data, the correlation coefficient since January 1990 is 0.77. Thus, the price of crude oil should also be included in a model for predicting the gold price. However, to avoid the problem of multicollinearity (high correlation between independent variables, which could lead to the problem that an estimate is not possible) one would have to examine whether crude oil and the exchange rate variable are highly correlated. Only GBP has a higher correlation with crude oil prices (correlation coefficient: 0.56), which probably dates back to the time when the UK produced larger amounts of crude oil in the North Sea. The euro and the US dollar index have lower correlation coefficients of 0.2 and 0.25; thus both, together with crude oil, could be included in a model.

Over the last couple of years, institutional investors have discovered commodities as an asset class. Data on the increase in capital flowing into commodity funds is either not available or is only estimated. However, for commodities traded on US futures exchanges, the CFTC publishes the Commitment of Traders Report. Unfortunately, it was initially released each Friday, then biweekly and, finally, monthly. Thus, instead of using weekly data, we have to base an analysis of the relationship between gold and the net positioning of large speculative accounts on monthly data. On Bloomberg, data is available going back to 1993. The correlation between gold and the net long positions of non-commercial is 0.7. However, the correlation between the net long positions of large specs in gold are even more highly correlated with crude oil, which implies that either crude oil or net long positions could be an independent variable in a regression equation for gold. The choice should be crude oil, as it is also available as daily data and over a longer horizon.

The favoured argument for investing in commodities is their low correlation with stocks. And indeed, the correlation between gold prices and the S&P 500 index is a mere 0.11. However, does this imply that the stock market cannot be used to model the development of gold prices? First, remember the developments of late February/early March this year, when falling stock prices also dragged gold lower. When the S&P 500 index is included in a regression model, the coefficient of the S&P 500 index is significantly different from zero at the 95-percent confidence level.

Of course, gold sales by the signatories of the CBGA also play a role. However, including the data on ECB gold and gold receivables yields different results. In a model of monthly data, other variables remain significant. But for weekly data, due to the problem of multicollinearity, the oil price is no longer significant.

Correlations between Gold and its Fundamental Drivers

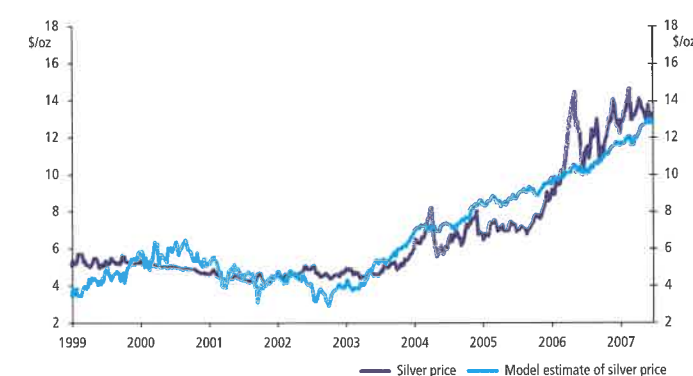
	Gold	Silver
Trend	0.38	0.63
US Dollar Index	-0.63	-0.35
WTI oil price	0.77	0.81
S&P 500 Index	0.12	0.51
Regression since 1990	0.92	0.87
Regression since 1999	0.97	0.95

Thus, beside time, the US dollar index, crude oil, and the S&P 500 index are the major factors driving prices of gold and silver in my weekly model. These factors have not lost their importance over time. The correlation coefficient for the regression estimate and the price of gold was 0.92 for the period from 1990 to June 2007 – and even higher, at 0.97, for the sub-period from 1999 to the present. In the case of silver, the correlation coefficient is only slightly lower, at 0.87 and 0.95 respectively. The coefficients of the independent variables are significant at the 95-percent level.

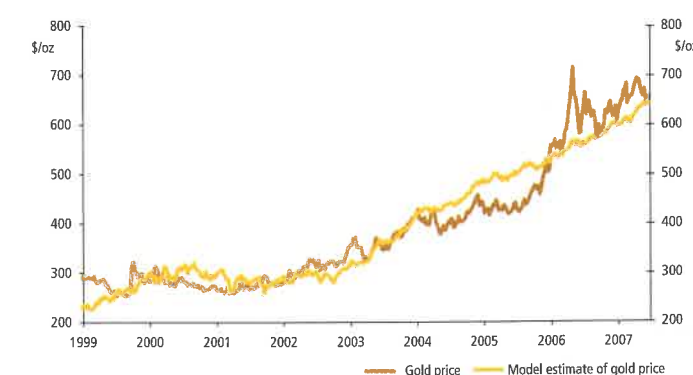
...And Unknown Unknowns

The charts show the prices of gold and silver, together with the corresponding fair values estimated by my model. Despite the high correlation coefficients, the deviations of actual prices from fair value are sometimes rather large, and it took considerable time for

Price of Silver vs Estimated Fair Value



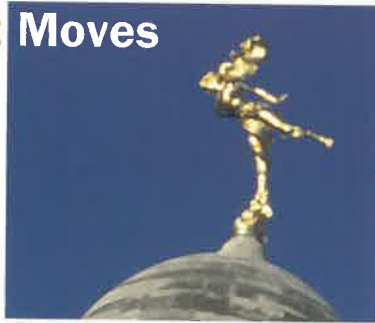
Price of Gold vs Estimated Fair Value



convergence. No model could include all the factors that might drive prices away from fair value. For example, the launch of ETFs in gold and, even more so, in silver pushed prices sharply higher. Thus, while quantitative methods are very helpful, I do not recommend basing trading decisions purely on divergence from fair value, but to always check whether other factors are playing a strong role.

Furthermore, whilst the fundamental factors dominating price direction in gold and silver remain robust over time, markets often put varying emphasis on individual ones. This is quite obvious from moving correlation coefficients with short look-back windows. Thus, more advanced quantitative techniques – such as co-integration and error correction models – may be more appropriate for algorithmic trading of gold and silver. ■

Market Moves



John Coley to JSW Metals

John Coley has taken up a position as Director of JSW Metals Ltd, where he is responsible for formulating and implementing precious metal trading policy. His place of work is his home in West Dorset, with regular visits to the City.

John traded precious metals at Sharps Pixley/Deutsche Bank for 27 years, and then moved on to Mitsui. Latterly, he was a director of Brinks Global Services, where he worked for eight years. John has served on the LBMA Management Committee and chaired both the Membership and Public Affairs Committees.

Mike Connolly to HSBC

Effective 30 July, Mike Connolly returns to HSBC as chief spot trader-New York. In March of 2006 he left HSBC to work at Bank of America, having previously spent nine years with HSBC/Republic.

Kelvin Kum to INTL

Kelvin Kum joined International Assets Holding Corporation in June to head its precious metals business in Asia.

Kelvin previously spent over 20 years with Credit Suisse, helping to first build and then run a large and successful precious metals sales and trading business. This followed six years at the Board of Commissioners of the Monetary Authority of Singapore. From 1993 to 2006 he also served as Honorary Treasurer and Executive Member of the Singapore Bullion Market Association.

Raymond Key to Deutsche Bank

Effective in August, Raymond Key will be joining Deutsche Bank as Global Head of Metals Trading. He will be based in London.

For the past five-plus years, Raymond has been at Morgan Stanley, most recently as global head of precious metals. Prior to that he worked for Credit Suisse, Deutsche and Bankers' Trust.

Jeremy Kyd to ScotiaMocatta

Jeremy Kyd has joined ScotiaMocatta London as their spot silver trader, taking on the responsibility of chairing the daily Silver Fix. Jeremy was most recently with Sueden UK, and before that he was with Baird and Co. He brings to ScotiaMocatta extensive trading experience from previous roles as a market maker with other global financial services firms, including HSBC and ANZ.

'MC' Loh Mun Chun to Commerzbank

Loh Mun Chun – known to the market as MC – has joined Commerzbank as a trader, responsible for integrating the desk in Singapore in order to expand the precious metals business in Asian markets and, on a global level, strengthen the trading team. He will report to Adrien Biondi, the bank's Head of Precious Metals.

MC comes to the bank from Phillip Futures Ltd, a specialist bullion commission house. Over the past eight years, he had responsibility for leading their bullion operations on the Asian markets. Prior to this, he worked as proprietary trader for Bank of Nova Scotia.



Peter Fertig

For more than 20 years, Peter Fertig worked in the research department at Dresdner Bank, spending much of his career as a fixed-income strategist

covering the major government bond markets. His experience across asset classes led to a transfer to commodity strategy.

Today he works as a consultant to Dresdner Kleinwort, and recently founded QCR Quantitative Commodity Research Ltd.

Rory McVeigh to Commerzbank

Effective from May, Rory McVeigh has joined Commerzbank International S.A. as pgm trader. He is based in Luxembourg. Rory was previously at the specialist pgm brokers Comdaq Metals Ltd. for three years. For the four years prior to that, he was at Mitsubishi Corporation in London, where he was also running the pgm book. He brings to the desk his experience of physical pgms and the Asian market.

Peter Smith

Back to ScotiaMocatta

After a sojourn at Bear Stearns, Peter 'Biffa' Smith has rejoined ScotiaMocatta to continue trading spot gold out of London.

Peter's career in precious metals started in 1985, and has included Chase, Barclays and Credit Suisse – as well as his three-month stint at Bear Stearns. Peter, who spent eight years at ScotiaMocatta, is a former member of the LBMA Public Affairs Committee.

James Vorley to Deutsche

With effect from 22 May, James Vorley has joined Deutsche Bank AG London. He will be responsible for running precious metals spot trading out of London.

Prior to joining DB, James was Director at ScotiaMocatta, where he traded spot precious metals.

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The Open Casting of Silver Bars

By David Stokes, Chartered Chemist, MRSC

The decision by the London Bullion Market Association to insist that, from 1 January 2008, only open-cast silver bars will be accepted as London Good Delivery is welcomed on health and safety grounds. The proposed change was mentioned in a paper given by LBMA Chief Executive Stewart Murray at The Fifth China International Silver Conference, held in Panyu, Guangzhou, in September 2006.

By comparison with open casting, the casting of silver bars in closed (or gated) moulds results in a sprue that needs to be removed, normally by the use of a guillotine. However, this can produce a relief at the end of the bar, which invariably has sharp edges. This method of casting can also produce some porosity and cavities, which, if the ingot is water quenched, could allow water to be present within the bar. If one of these ingots is remelted, this trapped water could cause a very dangerous steam/molten metal explosion.

The LBMA requires that a silver bar be of good appearance. Faults that should be avoided on the top include irregularities such as



Silver bars cast in a closed mould will have a sprue on one end. This is part of the gating system that feeds molten silver into the mould cavity. The sprue is normally guillotined off, producing a relief at the end of the bar, which can have sharp edges, making the bars dangerous to handle.

surface cavities, layering and excessive shrinkage. The sides and bottom surface should be smooth and free from cavities, excessive layering and bubbles. The bar should also have rounded edges, be easy to handle and be capable of being stacked safely.

The move to open casting for all silver bars might be a challenge to some refineries that at present use closed-mould casting. A general discussion on the open casting of silver is outlined below.

Open Casting of Silver

The starting point for most refineries is the silver cathode from their electrolytic silver refinery (ESR). This ideally should be bright in appearance and granular, which will make it easier to wash and dry. The analysis of the output would, in most cases, be nominally 9999 silver, with trace levels of other elements.

Certain impurities that might be present in the anode feed – typically bismuth, antimony and tellurium – can create a mushy-type of output, which would be difficult to wash free of electrolyte and, during melting, might absorb higher levels of oxygen. If there are real problems with the levels of some of these impurities, then double refining (through the ESR) could be an option, although there would be time and cost implications with this approach.

The LBMA does not set maximum acceptable levels for impurities in the final bar, but seeks to ensure that they are within appropriate limits.

It has been known for a long time that molten silver will absorb oxygen from the air and will “spit” on solidification (Reference 1), causing top-surface appearance problems. If oxygen is an issue, a reducing flux cover could help. Although forced chilling of the ingot surface can reduce oxygen evolution and shrinkage, the bar produced can be porous. Therefore this process needs to be carefully designed, engineered and operated.

Shrinkage can also be reduced by placing a cover over the mould and the molten ingot, which is removed after the bar has solidified.

Layering (stratification down the sides of the bar) gives the impression that the silver has been allowed to partially cool, then further molten silver has been added to the ingot. This effect can be reduced by pouring into the warmed mould in one smooth, timely operation. The mould must be level – wedge-shaped bars are difficult to stack and pack safely.

Ideally, the mould and molten silver should not be moved until the silver has solidified. However certain casting machines and carousels are capable of moving the mould and molten metal without causing a ripple appearance on the top surface.

Other factors that can influence the overall appearance (including layering, shrinkage and oxygen evolution) of the cast ingot occur during the melting and open casting. They are:

- Temperature of the melt
- Type of furnace used and power rating (most common are induction furnaces)
- Length of time at which the silver is held at the pouring temperature
- Method of pouring – either through a launder, or via a carrying crucible
- Type of flux used
- Type of cast iron alloy used to make the mould (Reference 2)
- Temperature of the mould. The mould(s) should be heated with a gas flame for circa 30 minutes; if the mould is too cold, the molten silver could erupt out of it
- Type of mould dressing and the consistency of its application. This can influence the appearance of the bottom and sides of the bar. Different types of mould dressings should be tried to try to optimise the local melting and pouring conditions
- Skill of the operators.

Most refineries are skilled at melting and casting, and the change to open casting simply presents a different set of factors and parameters to address.

It is worth stating that once the bars are cast and cooled, it is crucial that they be packed securely on a sturdy wooden pallet, suitably strapped, so that they do not move when transported: health and safety concerns about the packing and shipment of bars are equally important.

In terms of the open casting of gold bars – either as small bars or Good Delivery bars – the casting presents fewer problems, although some deleterious elements can cause appearance problems. There is, however, no oxygen issue.

Conclusions

The move to the open casting of silver bars brings several health and safety benefits.

Some refineries will need to modify their method of melting and casting, but this should not present too many problems if the issues mentioned above are considered. They should not, however, forget the importance of good secure packaging. ■

Reference 1 – The Solubility and Rate of Solution of Oxygen in Silver, by E.W.R. Steacie and F.M.G. Johnson. McGill University, Montreal. Proceedings of the Royal Society of London, Series A.

Reference 2 – ISO 16112 Compacted (vermicular) graphite cast irons – Classification. BS EN 1564:1997 Austempered ductile cast irons.



David Stokes, a Chartered Chemist and a Member of the Royal Society of Chemistry, has over 30 years of experience in the refining and processing of gold and silver. He is now an independent consultant.

During a three-decade career at Johnson Matthey, he was Operations Manager for the refining of gold and silver and then, with the addition of the Platinum Group Metals Refinery, he was named Refineries Manager.

Good Delivery Rules Changes

Responding to Market Needs and Changes in Market Practice

By Douglas Beadle – LBMA Consultant

From time to time it becomes necessary for the LBMA to review its Good Delivery Rules so as to reflect changes in market practice and technological changes affecting the production of bars, and to address problems that have arisen in relation to the appearance and / or handling of Good Delivery bars. The LBMA has recently conducted such a review, and the revised June 2007 edition of the Good Delivery Rules is now available on the LBMA website.

The LBMA is keen to promote the delivery of physical gold and silver into the London market, and it therefore tries to maintain as much flexibility as possible. Therefore, whilst some rule changes are mandatory, other proposed changes are merely recommendations for the guidance of Good Delivery refiners in order to try and minimise possible problems for them arising from the need to change production procedures or comply with local regulations. The revised Rules will become effective from 1 January 2008 for refiners already on the Good Delivery List, but the LBMA will, whenever possible, seek to implement the changes immediately as far as new Good Delivery applicants are concerned. The main changes are summarised below.

Weight Range of Silver Bars

The mandatory weight range for silver bars remains unchanged at 750 to 1100 troy ounces, but the LBMA has recommended that the weight range should be narrowed to between 900 and 1050 troy ounces. Bars falling within the narrower range will help make handling and stacking easier.



Prohibition on the Use of Closed or Gated Moulds

From 1 January 2008, it will be *mandatory* for all Good Delivery bars to be produced using open moulds – and the use of closed or gated moulds will no longer be acceptable. Over the last two years a lot of problems have been experienced with silver bars produced using closed or gated moulds. Insufficient care has been taken in removing the residual casting sprue, leaving very sharp edges, and in some cases this method of casting has resulted in large cavities that, if water is used to cool the bar, can result in water being trapped in the bar, which can cause an explosion when the bars are subsequently melted. In both cases, the increased emphasis on compliance with health and safety requirements has meant that it was no longer practical to continue allowing the use of such moulds for the production of Good Delivery bars.

Casting

To bring some standardisation to the shape of both gold and silver bars, and make handling and stacking easier, the LBMA is *recommending* that the undercut (the degree of slope) on the sides and ends of Good Delivery bars should be within 7 and 15 percent on the length (the longer elevation) and between 15 and 30 percent on the width (the shorter elevation). The undercut is calculated as the top-edge dimension less the

bottom-edge dimension, with that figure being divided by the top-edge dimension and the result being expressed as a percentage. The LBMA has conducted a comparison of bars produced by Good Delivery refiners, and the vast majority of brands already fall with the recommended ranges.

Bar Marks

Marks on both gold and silver bars may be applied using either conventional stamping methods or dot matrix (pneumatic punching), provided that – if the latter method is used – it must be no less legible and durable than conventional stamping.

Gold bars *must* be stamped on the larger (top) surface. Silver bars may either be stamped on the larger top surface or the end of the bar, but if end stamping is used, then only the dot matrix method is acceptable. The bottom stamping of bars will be prohibited for all new Good Delivery applicants immediately and for all existing Good Delivery refiners with effect from 1 January 2008. Bars stored in the London vaults are traditionally stacked with the larger surface uppermost. Therefore the prohibition on bottom stamping will remove the need to flip the bars over in order to read the marks. This will significantly reduce the amount of handling required in processing deliveries of bars.

Bar numbers *must not* comprise more than ten digits or characters, as many computerised

systems producing weight lists cannot cope with longer numbers.

The bar marks must include the year of manufacture as a four-digit number – unless incorporated as the first four digits in the bar number. If bar numbers are to be re-used by a Good Delivery refiner each year, then the LBMA strongly *recommends* that the first four digits represent the year of production (although a separate four-digit year stamp may be used in addition).

Packing

The LBMA has also made various *recommendations* for the packing of gold and silver bars. These are set out in Annex G to the Good Delivery Rules. Basically, bars should be packed not more than one tonne to a pallet on sturdy timber pallets such that laden pallets can be stacked six high. Plastic pallets are not deemed to be suitable. Bars should be securely strapped so that they do not readily move on the pallet.

As always, before making changes to the Good Delivery Rules the LBMA have consulted with refiners and the London vaults, and taken their views on proposed changes into account in order to minimise the impact on Good Delivery refiners. ■

The revised June 2007 edition of the Good Delivery Rules is available at: http://www.lbma.org.uk/GD_Rules_200706.pdf.

On Supply and Demand

By GFMS Limited

Following silver's stellar performance last year, it has been interesting to see the continued robustness in its price, in spite of recent weakness in the gold market. GFMS have produced the World Silver Survey on behalf of The Silver Institute since 1995. This article not only reviews the key findings of the latest annual report as they relate to last year, it also offers some commentary on the outlook for 2007 – in terms of the likely direction in the price and how the principal supply/demand components are expected to emerge compared with their standing in 2006.

The Supply Side

World silver mine supply rose by a modest 13 tonnes to reach 20,095 tonnes in 2006. Growth in Peru, China, Chile and Mexico was nearly offset by a sharp drop in Australia, in large part due to downscaling (albeit on a short-term basis) at Cannington. In addition, Canadian mine supply fell notably, principally because of weaker production at the Eskay Creek gold mine.

Turning to net government sales, last year this sector registered the most significant gain on the supply side, with a rise of 18 percent, to 2,415 tonnes. Although Chinese sales were notably weaker, this was comfortably offset by higher sales from Russia, together with the continued disposal of significant quantities of Indian government stocks.

Given the trend towards sharply higher silver prices, it was surprising to see scrap supply rise by a little less than one percent in 2006. In fact, jewellery recycling did grow last year, not least in terms of supplies originating from price-sensitive markets. Industrial scrap was also higher, although this owed more to the growing impact of environmental legislation. However, these gains were almost entirely offset by a drop in photographic scrap supplies.

The Demand Side

On the demand side, in spite of a 58-percent rise in average prices, total fabrication fell by less than one percent. One of the principal reasons for this was the six-percent rise in industrial demand, to a record 13,375 tonnes, which benefited from strong growth in world GDP.

The year 2006 represented the fifth in succession in which industrial demand had posted a year-on-year increase, an outcome that also confirmed the largely price-insensitive nature of the sector, at least in the short term.

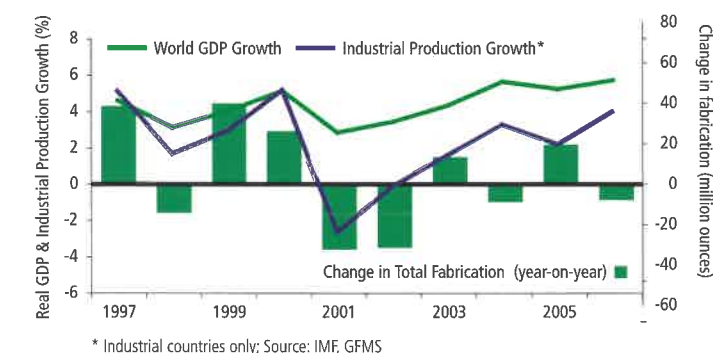
In contrast, higher prices were the chief cause of the five-percent drop in world jewellery fabrication, with the most significant fall recorded in India's price-sensitive market. The declines were, however, far from universal, with continued robustness in western jewellery consumption driving fabrication growth in, for example, China. Higher silver prices also contributed to the 11-percent fall in silverware offtake last year, particularly in price-sensitive countries, although structural taste shifts in western markets added to the sector's difficulties.

Photography posted the largest decline last year – at 505 tonnes, it represented a 10-percent reduction. Ongoing market share losses to digital products in the consumer area were chiefly to blame, while the use of silver in the paper and medical segments was broadly unchanged. Coin offtake also fell last year, albeit by a token nine tonnes, as lower European minting offset higher demand in North America.

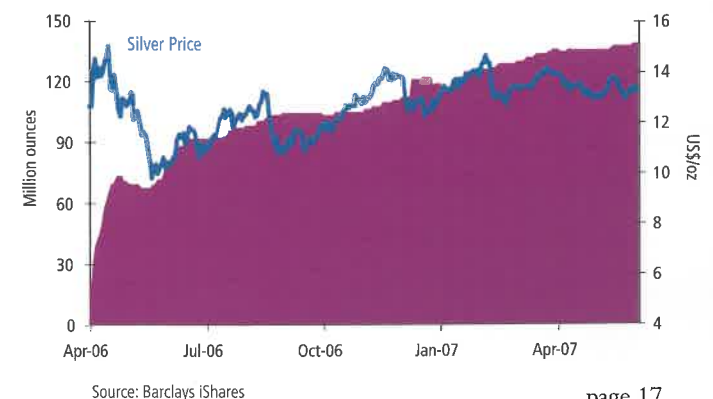
Last year, producing hedging appeared on the demand side for the first time since 2003. In spite of higher silver prices and the generous contango, producers cut their hedge books by 211 tonnes, although this partly reflected the sector's use of silver purchase agreements, instead of the forward market, as a means to fix prices.

Although investment in general was the principal driver behind the sharp rise in silver prices, GFMS's implied net investment figure actually fell by 17 percent year-on-year. This was due to a pronounced decline in

Fabrication Demand and World Economic Indicators



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78 Platinum Pt 195.09	46 Palladium Pd 106.4

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World Silver Supply & Demand

Tonnes	2005	2006
Supply		
Mine Production	20,082	20,095
Net Government Sales	2,051	2,415
Old Silver Scrap	5,797	5,848
Producer Hedging	859	-
Total Supply	28,788	28,358
Demand		
Fabrication		
Industrial Applications	12,622	13,375
Photography	5,040	4,535
Jewellery	5,406	5,156
Silverware	2,072	1,838
Coins & Medals	1,245	1,237
Total Fabrication	26,386	26,142
Producer Hedging	-	211
Implied Net Investment	2,402	2,006
Total Demand	28,788	28,358

Silver Price (London US\$/oz)	7.312	11.549
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Totals may not add
due to independent rounding

speculative long positions in futures, which comfortably offset a net inflow of 3,768 tonnes into the silver ETF.

Outlook for 2007

Looking at this year, mine supply is forecast to increase by over 600 tonnes, or around three percent – well above last year's rise, but more in keeping with 2004 and 2005 – on the back of growth in South America and Mexico, together with a recovery in Australia. In contrast, scrap supply is likely to soften unless the growth in prices is similar to that seen in 2006. Government sales are also forecast to moderate as the Indian programme of disposals has drawn to a close. Finally, on the supply side, it is possible that producer hedging may return to net supply this year although, at the time of writing, there is little to suggest that there has been a concerted effort by producers to take advantage of higher prices.

Turning to demand, GFMS expect total fabrication to be little changed year-on-year. While industrial fabrication is forecast to continue growing, the rate of increase is expected to decline materially, partly due to a far weaker second half performance this year. In addition, photography is expected to post another year-on-year fall, although the rate of decline is unlikely to be as great as in 2006. Turning to jewellery, much will depend on whether India stages a major recovery. Although bullion imports into the country reappeared during late 2006, available data suggest that they remained subdued at the start of 2007.

As noted above, the rise in physical investment demand was arguably the most important factor behind the move towards higher silver prices in 2006. This year, investment demand has remained an important factor behind silver's robust performance.

Firmer gold prices over much of 2007 have also played a key role. Whereas 2006 saw silver, at times, drive gold higher (particularly in the run-up to the launch of the silver ETF), this year the roles have been reversed, in the process re-establishing gold's traditional leading role in the two metals' relationship. That said, demand for the silver ETF has continued to grow in 2007, with net inflows since the beginning of the year (at the time of writing) approaching 550 tonnes, taking total holdings past the 4,300-tonne mark.

Looking ahead to the rest of the year, the risk remains that, should global economic growth – and therefore commodity prices – materially weaken, silver could then face a sell-off by investors. On the other hand, GFMS expect gold prices to move higher later this year, which is likely also to provide fresh support for silver, in the process driving prices higher, probably towards the \$15 level, if not a little beyond. ■

GFMS is a precious metals consultancy specialising in research into the global gold, silver, platinum and palladium markets. The company is based in London and has representation in Australia, India, China, Germany and Russia. The research team comprises eleven full-time analysts and two consultants.

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The data on which this article is based has been obtained by The Silver Institute and GFMS Limited from sources which are generally believed to be reliable. However, this does not guarantee complete accuracy in the information presented here. It is in the nature of the precious metals markets that estimates for a number of components must be made on the basis of incomplete information. A number of figures may have been revised from last year's World Silver Survey in the light of new information. The opinions expressed here represent those of the authors of this article at the time of writing.

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London Gold Fixing Chairmanship

Deutsche Bank AG has taken over the chairmanship of the London gold fixing for twelve months from 1 May, replacing Barclays Capital, which has chaired the fixing for the past year.

The chairmanship of the fixing has rotated annually between its five members

(ScotiaMocatta, HSBC, Barclays Capital, Deutsche Bank and Société Générale) since May 2004.

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LBMA News

By Stewart Murray, Chief Executive, LBMA

MEMBERSHIP

Members

The London branch of Mitsui & Co Precious Metals Inc was reclassified by the Management Committee as a Spot Market Maker, with effect from 14 June 2007. This represents the first company to apply to become a market maker on the basis of the new arrangements announced in 2006. Under these, Ordinary Members can request reclassification as a Market Maker in spot, forward or options, or any combination of these products.

Announcing the reclassification of Mitsui at the AGM, the LBMA Chairman expressed the hope that other Ordinary Members would consider applying to become Market Makers in spot, forwards or options.

In May 2007, Natexis Commodity Markets Ltd changed its name to Natixis Commodity Markets Ltd following a merger involving its parent company.

GOOD DELIVERY LIST

Gold

Moscow Special Alloys Processing Plant of Russia was admitted to the Gold List on 11 May 2007.

A number of refiners on the Good Delivery List have made changes in their brand marks, which have been approved by the Physical Committee recently:

Johnson Matthey

Salt Lake City (the addition of a four-digit year stamp)

Falconbridge Ltd

(new brand mark 'Montreal-East Canada', for both gold and silver)

Mitsui Mining & Smelting Co Ltd, Takehara Plant

(new bar dimensions, no longer weight stamped and with bar and lot number now combined. Year of production now appears as a separate four-digit number).

Details of the above are shown on the Good Delivery List, in the Good Delivery section of the LBMA website.

ANNUAL GENERAL MEETING

The LBMA's 19th AGM was held on 13 June at the Armourers' Hall. The new Management Committee was elected, consisting of:

Philip Aubertin, *UBS Ltd*
Stephen Branton-Speak, *Goldman Sachs Intl.*
Jeremy Charles, *HSBC Bank USA, NA*
Kevin Crisp, *Mitsubishi Corp (UK)*
David Gornall, *Natixis Commodity Markets*
Gerhard Schubert, *Fortis Bank SA/NV, UK Branch*
Simon Weeks, *Bank of Nova Scotia*
Martyn Whitehead, *Barclays Capital.*

The new Committee then met and elected Jeremy Charles as Chairman and Martyn Whitehead as Vice Chairman, both for a second year. An abridged version of Jeremy's speech can be found in the Publications section of the LBMA website.

COMMITTEES

Management

The Management Committee met in April and June. In addition to reviewing and discussing the recommendations from the various subcommittees, the Management Committee agreed that the Executive should pursue the possibility of taking out a new lease on a somewhat larger office on the expiration of the current lease on the third floor at Basinghall Street in November. The main concern is to have a larger boardroom so as to be able to welcome the frequent groups of visitors from various countries who wish to find out about how the bullion market in London works. For example (see photo), on 2 July, a 14-person delegation

from China was given a presentation by the Chief Executive on VAT in the London Bullion Market.

The Committee also approved in principle a recommendation from the Physical Committee stemming from the Assaying and Refining Seminar in March to support a project to produce and market solid-sample reference materials for use in assay laboratories around the world. The project will involve a steering committee of six Good Delivery refiners (Great Wall Gold and Silver Refinery, Metalor Technologies SA, Royal Canadian Mint, Rand Refinery Ltd, Tanaka Kikinzoku Kogyo K.K. and Umicore Precious Metals Refining) which will be chaired by Dr Mike Hinds of the Royal Canadian Mint.

Physical

The Physical Committee continues to have a very full agenda due to the work involved in processing applications for Good Delivery listing and in monitoring those companies already on the List. Good progress has been made with the project to put the documentation on Good Delivery bars on an electronic basis for the benefit of the nine custodians recognised in the London market.

However, the most important part of the committee's work in recent months has been the preparation of a major revision of the Good Delivery Rules (the first since April 2004) which was posted on the website on 29 June 2007. All Good Delivery refiners have been informed about the pending changes, some as recommendations and others as mandatory specifications. Most of these will take effect on 1 January

2008 for refiners already on the list, but will apply immediately in the case of new applications. (For more information, see the article by Douglas Beadle on page 15.)

Public Affairs

The PAC continues to monitor the progress towards the LBMA conference in Mumbai (18-20 November 2007). The conference brochure and registration form will be circulated to all Members, Associates and recipients of the *Alchemist* by the middle of July.

Turning to 2008, the joint conference that the LBMA is organising with the LPPM will take place in Kyoto during the period 28-30 September 2008.

Membership

The Membership Committee has had a particularly busy first half this year owing to major revamp of the rules on the sponsorship and vetting of applications for Membership and Associateship. The new system will in general require sponsorship by two Full Members, neither of which need be a Market Maker. The third sponsor must be a Member in the case of applications for membership, but may be an Associate in the case of Associate applications. The new rules on sponsorship are intended to facilitate applications from some companies (e.g. those that did not have a bullion-based relationship with a Market Maker), but without representing any dilution of the LBMA's stringent criteria for accepting applications. As the Chairman of the Membership Committee reported at the AGM, the Committee's role is to ensure that only fully qualified companies can be accepted into the Association (see the editorial by Paul Merrick on page 22). ■



Nigel Munt: From \$110 to \$850 in 33 Years

On 28 June, Nigel Munt retired from Bache Commodities Ltd. He may not have seen it all, but few today have seen more. Nigel served on the LBMA's Management Committee for four years. We at the LBMA join all his colleagues in the market in wishing him well.

It was 21 January 1980, and Nigel Munt was on the phone, hearing history happen.

On the day the gold price soared to its all-time high – before tumbling \$125 in one afternoon – a customer asked what it would cost to buy \$100,000 worth of gold. 'I was sorely tempted to say that it would be \$120,000,' he remembers saying. 'Amidst all the

mayhem, it gave the whole dealing room something to laugh about.'

During his 33 years in the market – during which he's worked for Sharps Pixley, JP Morgan, Deutsche Bank and, since 1995, for Bache – Nigel saw

the gold price trade between \$110 and \$850.

His career began in 1974, in the accounts department at Sharps Pixley. In his first involvement with precious metals, he was assigned to collate figures for bullion and foreign

exchange – and in so doing, correct traders' errors – before reporting the information to the Bank of England. Having seen firsthand that traders were less than perfect gave him confidence: he decided to join the dealing room himself.

While millions of dollars changing hands is an everyday occurrence in a dealing room, his biggest thrill was seeing gold in all its dimensions: from the trace amounts in the ore of a deep underground mine in South Africa...to the molten metal poured at a refinery...to the intricate jewellery fashioned by an artisan in Arezzo.

Nigel with his wife and some of his colleagues from Sharps Pixley



DIARY OF EVENTS

July

24 – 27

African Junior Mining Congress
Investment Forum 2007
Johannesburg
T: +27 (0) 11 463 2802
F: +27 (0) 11 463 6000
enquiry.za@terrapinn.com
www.terrapinn.com

August

6 – 8

Diggers & Dealers Mining Forum
Kalgoorlie, Australia
T: +61 8 9481 6440
F: +61 8 9481 6446
admin@diggersnddealers.com.au
diggersnddealers.com.au

24 – 25

4th India International Gold Convention
Mumbai
T: +91 80 252 76152/53
F: +91 80 252 76154
mktg@fbspl.com
www.goldconvention.in

28

5th Annual Global Mining and Metals Investment Forum 2007
Hong Kong
30
Singapore
T: +27 (0) 21 689 7881
F: +27 (0) 21 686 4361
davidb@omegainvest.co.za
www.omegainvest.co.za

30 – 31

Precious Metals 07
Brisbane, Australia
T: +44 (0) 7768 234 121
F: +44 (0) 1326 318 352
bwills@min-eng.com
www.min-eng.com

September

10 – 11

Hard Assets Investment Conference
Las Vegas
T: +1 314 824 5516
F: +1 314 824 5603
www.iiconf.com

11

44th Minesite Mining Forum
London
T: +44 (0) 20 7395 1935
F: +44 (0) 20 7395 1931
www.minesite.com

13

GFMS Precious & Base Metals Seminar
Gold Survey 2007 – Update 1
London
T: +44 (0) 20 7478 1777
F: +44 (0) 20 7478 1779
info@gfms.co.uk
www.gfms.co.uk

23 – 26

Denver Gold Forum
Denver, Colorado
T: +1 303 825 3368
info@denvergold.org
www.denvergold.org

October

3 – 6

2007 Precious Metals Symposium
Tucson, Arizona
T: +1 303 763 3132
F: +1 303 973 9550
meetings@smenet.org
www.smenet.org

16

45th Minesite Mining Forum
London
Details as above

16 – 18

The 6th China International Silver Conference
Chengdu
T: +86 21 587 90176
F: +86 21 587 93403
www.china-silver2007.com/en

23 – 24

Chinese Global Mining Investment Conference 2007
Beijing
T: +27 (0) 21 689 7881
F: +27 (0) 21 686 4361
kamreyac@omegainvest.co.za
www.omegainvest.co.za

29 – 30

Mining the Americas
Miami
T: +1 314 824 5516
F: +1 314 824 5603
www.iiconf.com

One, Two, Three and You're In – Or Not?

Editorial Comment by Paul R. Merrick, Chairman, LBMA Membership Committee

Over the past year LBMA membership has become a very hot ticket, a 'must have' accessory for any company wanting to be seen as a serious player in the London bullion market. This has become very apparent to those of us who sit on the Membership Committee.



In 2005 and 2006 there was a net increase in the total membership of only three and two respectively, and it appeared that the majority of companies trading in the bullion market had already joined the Association as members.

However, this year in particular we have seen an unprecedented growth in membership applications, requiring the Committee to meet much more frequently over the past 12 months.

The LBMA currently has ten Market Making Members, 55 Ordinary Members and 46 Associates – a total of 111 companies. This is an increase of seven since this time last year, and clearly reflects the buoyancy of the market, the success of the London bullion contract and the strong brand image of the LBMA generally.

The increase in applications for full membership has highlighted some of the issues that the Membership Committee has to consider carefully before we pass our recommendations to the Management Committee (which makes the final decision on all applications). The Committee has to do much more than simply ensure that we have received three letters of sponsorship from existing members. Contrary to what many may believe, securing the requisite number of sponsors is the start – not the end – of the application process.

More Than Counting to Three

The most important role of the Membership Committee is to ensure that the highest standards of probity are maintained within the membership. For this reason, the Committee needs to be satisfied that it understands an applicant's business adequately and that it

knows enough about the organisation and/or its principals to be confident that it would be a fit and proper member of the Association. Financial soundness, the existence of recent KYC reviews by members and a perceived commitment to the London bullion market are all factors that the Committee looks at

when considering an application.

The LBMA's Articles require that all members be 'actively engaged' in the London bullion market, and the Membership Committee has to be satisfied that this condition is met. We therefore look at an applicant's record of engagement with the market: its length, scope and scale.

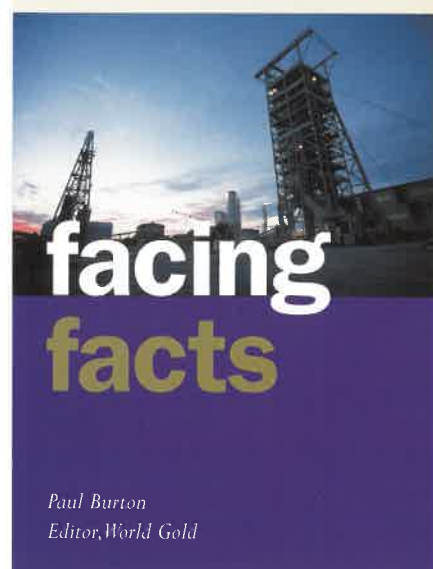
For us to fulfil our role adequately, the job of the Committee must, I believe, involve more than being able to count to three.

But should not the three letters of sponsorship ensure that all the above criteria are met? Not necessarily. While members may have to refuse to sponsor applicants they believe are unsuitable for membership, a sponsorship letter does not necessarily guarantee an applicant's suitability. A sponsor's responsibility is to confirm both the existence of a bullion-based

relationship with the applicant and an assessment that the applicant would be a fit and proper member of the LBMA. The Membership Committee must then make its own judgment, based on all the available information provided by the applicant and its sponsors. It could decide not to recommend full membership if, for example, it judged that the applicant did not have adequate bullion experience or that its scale of activities was too limited – in short, if it was not really 'actively engaged' in the London bullion market.

This is why the Membership Committee's role in the application process is so crucial: it is able to provide a neutral and dispassionate appraisal of an applicant's overall suitability for membership, without having concerns about possible damage to a professional relationship. This might mean going back to the sponsors for further details, and for this reason the range of information received from sponsors is extremely important.

For us to fulfil our role adequately, the job of the Committee must, I believe, involve more than being able to count to three. ■



The Gold Industry: Thriving or Surviving?

Paul Burton
Editor, World Gold

This column identifies a number of fundamental trends that define the gold mining industry at present and attempts to decipher what these trends mean for those wishing to invest in the market.

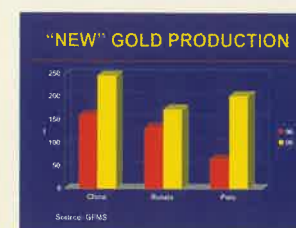
Trend 1: The Pattern of Global Gold Production has Shifted Away from Traditional Producers

Ten years ago the gold industry was dominated by the big four producing countries – South Africa, the US, Australia and Canada. But since that time there has been a shift in the pattern of gold production, and these four have lost much of their influence. Ten years ago collectively they accounted for 54% of the world's production, but in 2006 the percentage was down to 36%.

Although it is still the largest producer, South Africa has lost 41% of its production in ten years; the US has lost 23%; Australia has lost 16% and Canada 37%.

Trend 2: 'New' Gold Countries are Becoming Prominent

Growing to challenge the dominance of the four traditional gold producers, we have seen the likes of China and Peru.

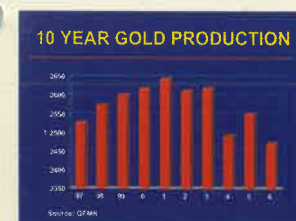


China's production rose to almost 250 t in 2006, a growth of 46% in ten years, making it the third-largest producing nation in the world. Peru, thanks in the main to the development of the giant Yanacocha mine, has seen its output increase by 212% to almost 200 t.

China's progress is impressive considering that the domestic industry is characterised by a multitude of small, undercapitalised mining operations. Western money and technology has only recently been invested in the country, and we can expect further increases in output as the new mines of Eldorado Gold, Sino Gold and Jinshan Gold Mines come on stream and reach full production over the course of this year. Together they will add roughly 12 t of new gold each year.

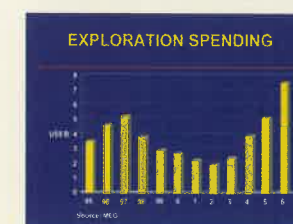
Trend 3: Gold Production has Peaked

According to GFMS, gold production peaked in 2001 and has been in general decline since then.



The decline was due to a combination of interrelated factors and events, which include the decline in the gold price, the decimation of the junior sector following the Bre-X scandal and the consequent cut back in exploration, which has meant that there is a paucity of new projects of note and thus few new mines ready to come on stream.

Trend 4: Exploration Spending at Record Level, but...



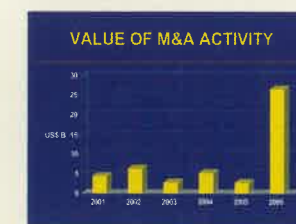
On the face of it, the pickup in exploration budgets since 2002 suggests a pretty healthy situation for the gold industry. However, the headline figures disguise some rather negative sub-trends.

For instance, the figures have not been adjusted for inflation, so in real terms are probably not that impressive when compared to the previous peak in 1997. Another distorting factor is the fact that ten years on, exploration costs a lot more than it did in 1997. In other words, the budgets might be higher, but that fact does not necessarily equate to greater activity.

Another concerning (compelling) observation that compiler Metal Economics Group makes is that gold as a percentage of total spending is falling and is now down to 45%. And what is being spent on gold is now aimed at late-stage projects because of the need to get reserves into production. Grassroots exploration budgets are actually falling.

Finally, the consolidation that the industry has witnessed over the last few years has had a detrimental impact on exploration spending. Two prime examples of this in recent years are the takeover of Normandy Mining by Newmont Mining and Barrick Gold's takeover of Homestake Mining. Before Newmont bought Normandy, the two companies' aggregate exploration budgets totalled US\$111 million. Post-merger, the figure for the newly enlarged company was US\$73 million. Similarly, Barrick and Homestake together had a budget of US\$149 million. When Barrick consumed Homestake the new company's exploration budget shrank to US\$104 million.

Trend 5: Increasing Consolidation



This chart is worth a thousand words, as it clearly shows how merger and acquisition activity shot up in 2006, driven principally by Barrick's takeover of Placer Dome.

Now the top ten producers account for 44% of world production as opposed to 25% ten years ago. The top five alone now produce a third of the world's gold.

Trend 6: Inflationary Cost Pressures



Once again a chart tells the story adequately of how unit cash costs have escalated over the last five years as the price of consumables (chemicals, timber, steel, concrete, tyres), power and wages have all shot up.

In 2006, weighted average cash costs for the industry rose by 19%, and that includes those companies with significant by-product copper and silver credits which saw their costs fall to negative values.

Luckily the gold price increase of 24% in 2006 more than kept pace with the cost inflation.

Conclusions

I have identified six fundamental trends that I believe investors should be cognisant of when making decisions on where to put their money.

From the discussion of these primary trends I have drawn three broad conclusions that can direct investors in their efforts to

recognise undervalued companies and assets.

Conclusion One

Lack of exploration means pressure on production, which means that companies with good projects will get bought. Already the market is placing high value on these ounces.

Conclusion Two

There is great potential for companies in 'new' regions, and in particular I believe there is value to be found in some of the companies operating in China. Readers are referred to our recent *Special Report on China* for more details.



Conclusion Three

Producers need to cut costs so there is a premium for high-grade deposits, and we can expect to see a continuation of the trend to multi-metal projects, where by-product credits help lower gold cash costs. ■



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share our view on risk

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