Gold Report - 1

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1. Introduction

Gold is a unique asset based on few basic characteristics. First, it is primarily a monetary asset, and partly a commodity. As much as two thirds of gold's total accumulated holdings relate to "store of value" considerations. Holdings in this category include the central bank reserves, private investments, and high-caratage jewelry bought primarily in developing countries as a vehicle for savings. Thus, gold is primarily a monetary asset. Less than one third of gold's total accumulated holdings can be considered a commodity, the jewelry bought in Western markets for adornment, and gold used in industry.

The distinction between gold and commodities is important. Gold has maintained its value in after-inflation terms over the long run, while commodities have declined.

Some analysts like to think of gold as a "currency without a country'. It is an internationally recognized asset that is not dependent upon any government's promise to pay. This is an important feature when comparing gold to conventional diversifiers like T-bills or bonds, which unlike gold, do have counter-party risk.

2. What makes Gold Special?

- **Timeless and Very Timely Investment**: For thousands of years, gold has been prized for its rarity, its beauty, and above all, for its unique characteristics as a store of value. Nations may rise and fall, currencies come and go, but gold endures. In today's uncertain climate, many investors turn to gold because it is an important and secure asset that can be tapped at any time, under virtually any circumstances. But there is another side to gold that is equally important, and that is its day-to-day performance as a stabilizing influence for investment portfolios. These advantages are currently attracting considerable attention from financial professionals and sophisticated investors worldwide.

- **Gold is an effective diversifier:** Diversification helps protect your portfolio against fluctuations in the value of any one-asset class. Gold is an ideal diversifier, because the economic forces that determine the price of gold are different from, and in many cases opposed to, the forces that influence most financial assets.

- **Gold is the ideal gift:** In many cultures, gold serves as a family treasure or a wealth transfer vehicle that is passed on from generation to generation. Gold bullion coins make excellent gifts for birthdays, graduations, weddings, holidays and other occasions. They are appreciated as much for their intrinsic value as for their mystical appeal and beauty. And because gold is available in a wide range of sizes and denominations, you don't need to be wealthy to give the gift of gold.

- **Gold is highly liquid:** Gold can be readily bought or sold 24 hours a day, in large denominations and at narrow spreads. This cannot be said of most other investments, including stocks of the world's largest corporations. Gold is also more liquid than many

alternative assets such as venture capital, real estate, and timberland. Gold proved to be the most effective means of raising cash during the 1987 stock market crash, and again during the 1997/98 Asian debt crisis. So holding a portion of your portfolio in gold can be invaluable in moments when cash is essential, whether for margin calls or other needs.

- **Gold responds when you need it most:** Recent independent studies have revealed that traditional diversifiers often fall during times of market stress or instability. On these occasions, most asset classes (including traditional diversifiers such as bonds and alternative assets) all move together in the same direction. There is no "cushioning" effect of a diversified portfolio — leaving investors disappointed. However, a small allocation of gold has been proven to significantly improve the consistency of portfolio performance, during both stable and unstable financial periods. Greater consistency of performance leads to a desirable outcome — an investor whose expectations are met.

3. What makes Gold different from other commodities?

The flow demand of commodities is driven primarily by exogenous variables that are subject to the business cycle, such as GDP or absorption. Consequently, one would expect that a sudden unanticipated increase in the demand for a given commodity that is not met by an immediate increase in supply should, all else being equal, drive the price of the commodity upwards. However, it is our contention that, in the case of gold, buffer stocks can be supplied with perfect elasticity. If this argument holds true, no such upward price pressure will be observed in the gold market in the presence of a positive demand shock.

The existence of a sophisticated liquid market in gold has, over the past 15 years, provided a mechanism for gold held by central banks and other major institutions to come back to the market. Although the demand for gold as an industrial input or as a final product (jewellery) differs across regions, it is argued that the core driver of the real price of gold is stock equilibrium rather than flow equilibrium. This is not to say that exogenous shifts in flow demand will have no influence at all on the price of gold, but rather that the large supply of inventory is likely to dampen any resultant spikes in price. The extent of this dampening effect depends on the gestation lag within which liquid inventories can be converted in industrial inputs. In the gold industry such time lags are typically very short.

Gold has three crucial attributes that, combined, set it apart from other commodities: firstly, assayed gold is homogeneous; secondly, gold is indestructible and fungible; and thirdly, the inventory of aboveground stocks is astronomically large relative to changes in flow demand. One consequence of these attributes is a dramatic reduction in gestation lags, given low search costs and the well-developed leasing market. One would expect that the time required to convert bullion into producer inventory is short, relative to other commodities which may be less liquid and less homogenous than gold and may require longer time scales to extract and be converted into usable producer inventory, making them more vulnerable to cyclical price volatility. Of course, because of the variability of demand, the price responsiveness of each commodity will depend in part on precautionary inventory holdings.

There is low to negative correlation between returns on gold and those on stock markets, whereas it is well known that stock and bond market returns are highly correlated with GDP. This is because, generally speaking, GDP is a leading indicator of productivity: during a boom, dividends can be expected to rise. On the other hand, the increased demand for credit, counter-cyclical monetary policy and higher expected inflation that characterize booms typically depress bond prices.

The fundamental differences between gold and other financial assets and commodities give rise to the following "hard line" hypothesis: the impact of cyclical demand using as proxies GDP, inflation, nominal and real interest rates, and the term structure of interest rates on returns on gold, is negligible, in contrast to the impact of cyclical demand on other commodities and financial assets.

Using the gold price and US macroeconomic and financial market quarterly data from January 1975 to December 2001, the following conclusions may be drawn:

- There is no statistically significant correlation between returns on gold and changes in macroeconomic variables, such as GDP, inflation and interest rates; whereas returns on other financial assets, such as the Dow Jones Industrial Average, Standard & Poor's 500 index and 10-year government bonds, are highly correlated with changes in macroeconomic variables.
- Macroeconomic variables have a much stronger impact on other commodities (such as aluminum, oil and zinc) than they do on gold.
- Returns on gold are less correlated with equity and bond indices than are returns on other commodities.

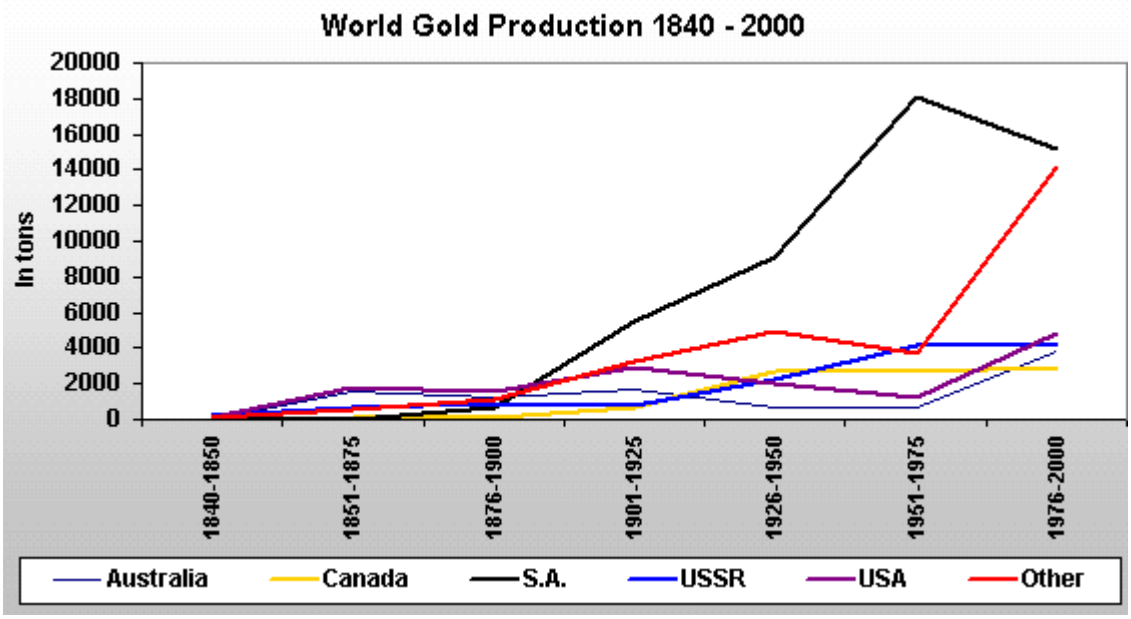
Assets that are not correlated with mainstream financial assets are valuable when it comes to managing portfolio risk. This research establishes a theoretical underpinning for the absence of a relationship that has been demonstrated empirically for a number of years; namely, that between returns on gold and those on other financial assets.

4. International Scenario

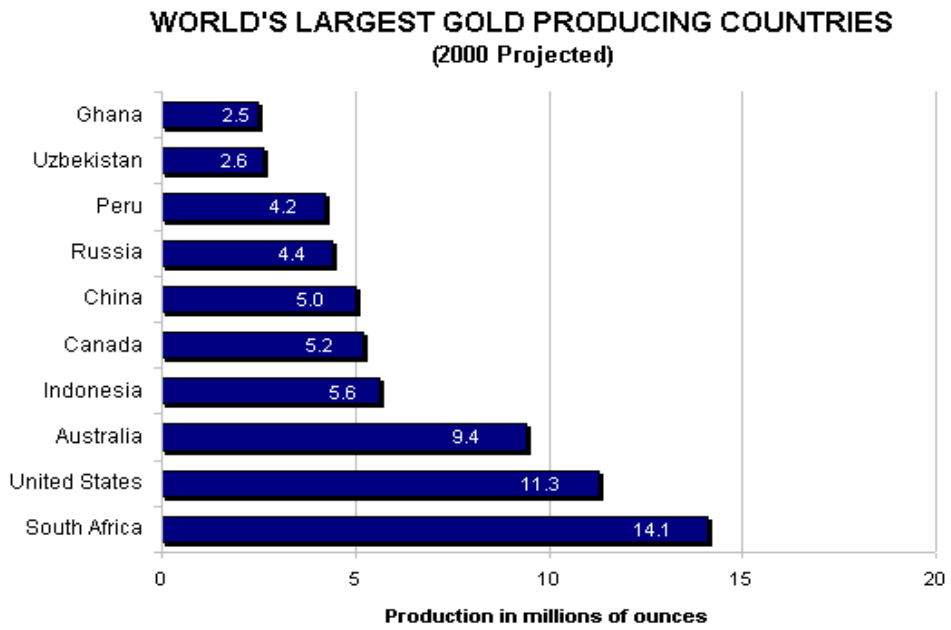
World Supply

According to Gold Field Mineral Services, world gold output in 2001 was 2,604 tons, moderately higher than 2,584 ton in 2000. By comparison, it was only 1,311 tons, including estimated communist output, in 1980. Effectively it has doubled. Western world output, excluding the old communist block, increased even faster, from 959 tons in 1980 to 2,112 tons in 2001. Total production throughout history topped 142,500 metric tons by the end of 2001.

Graph 1: World Gold Production 1840 – 2000



Graph 2: World's Largest Gold Producing Countries



Source: The Gold Institute, World Gold Mine Production 1999 – 2003, winter 2000.

South Africa is the world's largest gold producer, with 393.7 tons in 2001, according to the Chamber of Mines. From 1884 through 2001 it has produced nearly 49,000 tons, which is around 35% of all gold ever mined. No challenger is in sight – or likely to be in the foreseeable future.

The United States is the second-largest gold-producing nation in the world. Most of this gold is produced in western states such as Nevada, which produces more gold than any other state.

Australia is the world's third largest producer of gold with output of 285.0 tons in 2001 a decline of 4% from 296.4 tons in 2000. Western Australia alone provides almost 70% of the production.

Gold Fields Mineral Services Ltd estimate the above-ground stocks of gold to have been some 145,200 tons at the end of 2001, a figure that dwarfs annual new mined supply of around 2,600 tons. Much of this is held in a form that can readily come back to the market under the right conditions. This is obviously true for investment forms of gold but it is also true for much jewellery in Asia and the Middle East. In these regions jewellery traditionally fulfills a dual role, both as a means of adornment and as a means of savings. Notably, it is particularly important for women in Muslim and Hindu cultures where traditionally a woman's jewellery was often in practice her only financial asset. Such jewellery is of high caratage (21 or 22 carats), and is traded by weight and sold at the current gold price plus a moderate mark-up to allow for dealing and making costs. It is also fairly common for jewellery to be bought or part-bought by the trading in of another piece of equivalent weight; the traded-in piece will either be resold by the jeweller or melted down to create a new piece.

In Asia and the Middle East both gold investments and gold jewellery are considered as financial or semi-financial assets. It is not known how much of the total stocks of gold lie in these regions but in recent years they have accounted for approximately 60% of total demand; while the long-held cultural affinity to gold would suggest that the majority of stocks in private hands lie in this area. Consumers are very aware of price movements and very sensitive to them. Gold will be sold in times of financial need but holders will frequently take profits and sell gold back to the market if the price rises. Thus the supply of scrap gold will normally automatically rise if the gold price rises. Even gold used for industrial purposes such as electrical contacts in electronic equipment is frequently recovered as scrap and a rise in the gold price will increase the incentive for such recovery.

World Demand

Table 1: Gold Demand in Key Markets Worldwide

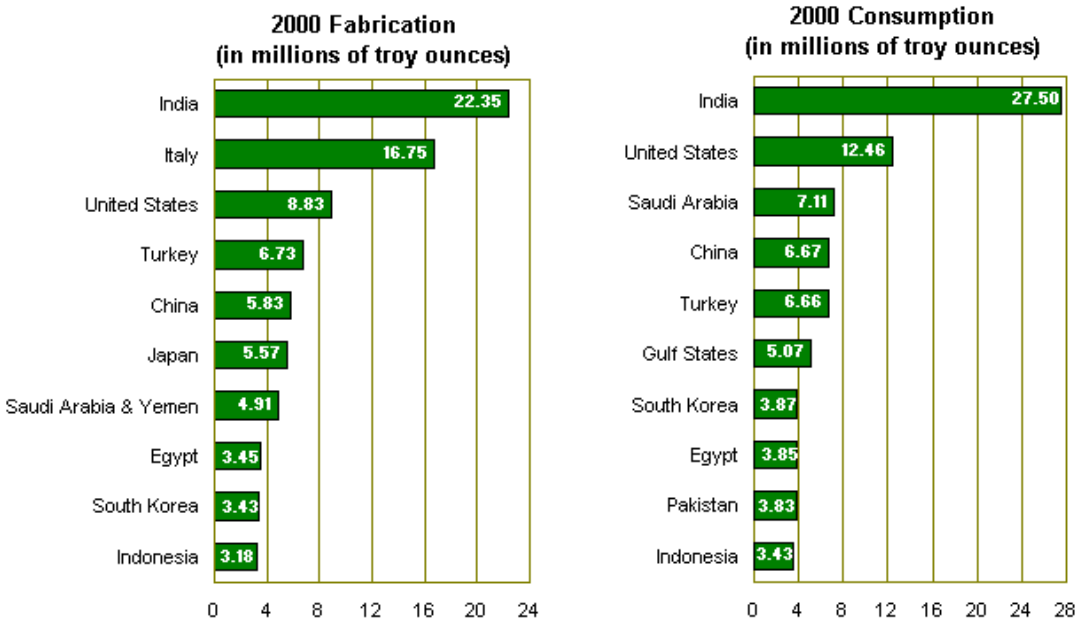
In tons

	1996	1997	1998	1999	2000
India	506.98	736.84	814.91	838.86	855.34
USA	331.56	362.04	428.29	459.71	387.55
China	374.48	406.83	314.45	343.38	329.38
SE Asia	329.69	204.04	51.63	265.62	267.18
Saudi	184.75	199.06	208.39	199.37	221.14
Turkey	153.03	201.86	172.00	139.03	207.15

World Gold Fabrication and Consumption

Fabrication statistics measure the amount of gold used in various countries to manufacture end products. Consumption figures measure where these gold products were consumed.

Graph 3: World Gold Fabrication and Consumption



World Markets

Today's gold market is a round-the-world, round-the-clock business, played out largely on dealers' trading screens. The core of the business, however, remains in the key markets of London, as the great clearing house, New York as the home of futures trading, Zurich as a physical turntable, Istanbul, Dubai, Singapore and Hong Kong as doorways to important consuming regions and Tokyo where the Commodity Exchange (TOCOM) sets the mood of Japan. Even Paris still has a small market, a reminder of the days when the French were great hoarders, while Mumbai has increasing importance under India's liberalised gold regime that permits official imports through local markets.

Graph 4: Historical Gold Price

Table 2: Performance of the International Exchanges in Gold Futures

Exchange	Contract Size	Volume (Contracts)		
		2000	**1999**	**1998**
COMEX	100 ounces	6643464	9575788	8990094
CBOT	1 Kilo	7173	10247	13363
TOCOM	1 Kg	7841692	16011962	9373909

5. Domestic Scenario

India is the world's largest consumer of gold. According to Gold Field Minerals Service, in 2001 it absorbed around 700 tons from the world market, compared to just 320 tons in 1994; that is without taking into account the recycling of scrap from the immense stock of close to 10,000 tons built up on the sub-continent in the last few hundred years, or gold imported for jewellery manufacture and re-export.

Background

An historical perspective is useful in understanding why India has been for so long, and still is, a great market for gold – and also for silver. India, the saying goes, has always been 'a sink for precious metals'. Both metals are closely woven into the social fabric, especially in the rural areas where they are the basic form of saving.

Ever since Roman times the 'east' has been a source of silk and spices, and later diamonds, tea and cotton, sought by Mediterranean and European merchants. The first gold ducats struck by the mint in Venice in 1285, which became a staple form of international payment for over three hundred years, went to the Levant and on to India.

The gold and silver from the Americas, after Columbus discoveries, mostly just passed through Spain on its way to the east. In the 17th century the Dutch and English East India companies sent gold and silver to India and Java to pay for goods. The English East India Company shipped 20 tons, almost three years' world output then, to India between 1660 and 1690. Mocatta, the oldest member of the London gold market, first sent gold to India in 1676 to pay for diamonds, the beginning of a long relationship between London and Bombay (now Mumbai) merchants. During the American Civil War in the 1860s India imported almost 420 tons in payment for cotton exports because of disrupted American cotton crops.

Only once has India been a significant dishoarder, when 1,244 tons was shipped out in the 1930s due to distress selling from famine and the new high price for gold (up from $20.67 to $35).

In recent times India has remained faithful to gold. While demand has increased substantially since the early 1980s due to general economic growth, annual consumption is dictated both by the monsoon, with its effect on the harvest, and the marriage season. In an auspicious year there are upwards of ten million marriages, at which between 20 and 200 grams may be worn by the bride. The status of a family in its community is still often judged by the gold exchanged as the bride's dowry.

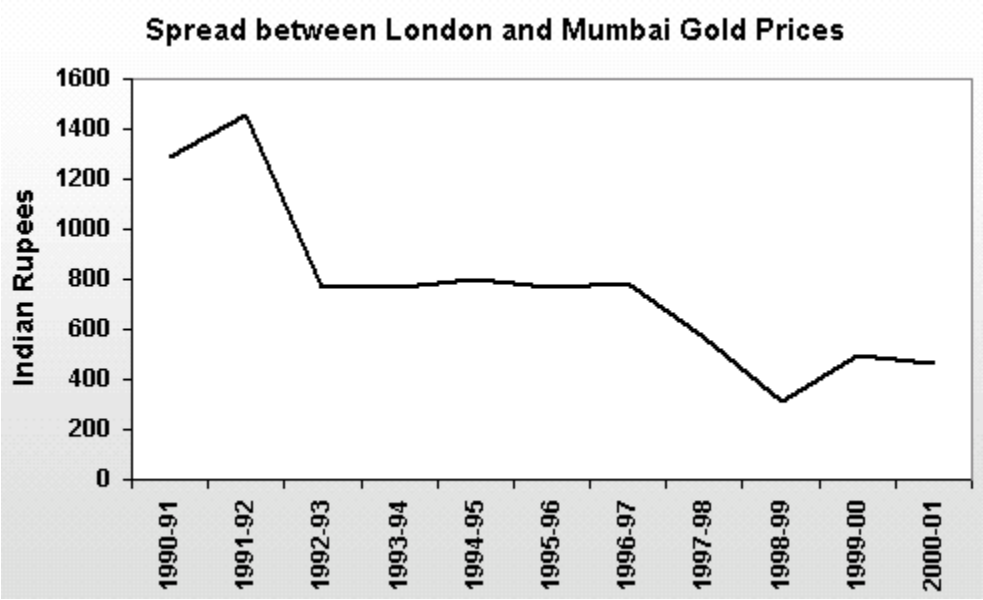
The official import of gold into India, however, was banned from 1947. The Gold Control Act of 1962 also forbade private holding of gold bars. With local production of less than two tons from two small mines, Bharat and Hutti, together with recycling, the main demand was met by smuggling from the regional markets of Dubai, Singapore, and Hong Kong, usually as ten tola bars, uniquely preferred in India. The smuggling was a highly professional business, involving up

to 200 tons, encouraged by a premium of 30 per cent over the London price. Over 3,000 tons has entered India unofficially since 1947.

Until 1990, the Gold Control Act forbade the private holding of gold bars in India. There was physical investment in smuggled ten tola bars, but it was limited and often amounted to keeping a few bars ready to be made into jewellery for a family wedding. Gold investment essentially was in 22 carat jewellery.

In the 1990s, however, deregulation of the market has finally taken place, ushering in the modern market of today. Since 1990, investment in small bars, both imported ten tolas and locally-made small bars, which have proliferated from local refineries, has increased substantially. GFMS estimate that investment has exceeded 100 tons in some years, although it is hard to segregate true investment from stocks held by the 16,000 or more gold dealers spread across India. Certainly gold has been used to conceal wealth, especially during the mid-1990s, when the local rupee price increased steadily. It was also augmented in 1998 when over 40 tons of gold from bonds originally issued by the Reserve Bank of India were restituted to the public.

Graph 5: Spread between London and Mumbai Gold Prices



India and Global Gold Economy

Estimates vary, but it is believed that at least 13,000 tons of gold rest in India – or approximately nine per cent of the world's cumulative mine production. This should be viewed against our share in land area at 2.4 per cent, in population at 16.4 per cent and in GDP at 1.2 per cent.

Mining and production of gold in India is negligible, now placed around 2 tons as against a total world production of about 2,272 tons in 1995.

During 1990-95, India's share in global gold demand is placed at about 402 tons (16.4 per cent) a year, including imports into India. This should be viewed against its share of 0.6 per cent in world trade. On the other hand, India exported about 23 tons in 1995 accounting for a negligible part of world trade.

The world gold trading is concentrated in the U.K., Switzerland, Dubai, Hong Kong, etc. and India does not figure among them.

Facilities for refining, assaying, making them into standard bars in India, as compared to the rest of the world, are insignificant, both qualitatively and quantitatively.

Of the total gold reserves estimated to be on the books of the Central Banks (subject to some Banks not declaring them) of 28,225.4 tons, the holdings of Reserve Bank of India are only a modest 397.5 tons. Government of India has in its possession some amount of gold mainly out of confiscation of smuggled gold remaining after transferring it to the Reserve Bank of India from time to time. RBI is neither a speaking purchaser nor a seller of gold reserves, unlike many other countries including some developing economies, especially in Asia. A part of gold was used by RBI (in parallel with gold with Government) for raising foreign currency resources during the balance of payments crisis in the early 'nineties. These overseas gold holdings are being used as part of reserve management to yield a return.

Use of gold as a financial product is virtually non-existent in India except to a limited extent of issuing 'Gold Bonds' by Government of India from time to time coupled with occasional tax amnesty. Commercial banks, however, accept gold as security, but no advances are permitted for purchase of gold by their customers for non-productive use.

Gold as Investment Vehicle

Gold is valued in India as a savings and investment vehicle and is the second preferred investment behind bank deposits. India is the world's largest consumer of gold in jewellery (much of which is purchased as investment).

The hoarding tendency is well ingrained in Indian society, not least because inheritance laws in the middle of the twentieth century lent a great desirability to anonymity. Indian people are renowned for saving for the future and the financial savings ratio is strong, with a ratio of financial assets-to-GDP of 93%.

Gold's circulates within the system and roughly 30% of gold jewellery fabrication is from recycled pieces. India is typically also the largest purchaser of coins and bars for investment (>80tpa), although last year it had to concede first place to Japan in the wake of the heavy buying in the first quarter due to fears for the stability of the Japanese banking system.

In 1998-2001 inclusive, annual Indian demand for gold in jewellery exceeded 600 tons; in 2002, however, due to rising and volatile prices and a poor monsoon season, this dropped back to 490 tons, and coin and bar demand dropped to 67 tons. Indian jewellery offtake is sensitive to price increases and even more so to volatility, although this decline in tonnage since 1998 is also due in part to increasing competition from white and brown goods and alternative investment vehicles,

but is also a reflection of the increase in price. The Indian bride's "Streedhan", the wealth she takes with her when she marries and which remains hers, is still gold, however (thus giving gold an important role in the "empowerment" of women in India).

Local expenditure, in terms of the value of the gold content purchased, peaked at Rs 302 billion (Rs 311 per capita) in 1998, when total Indian demand was almost 775 tons, and since then has dropped to Rs 279 Bn in 2002 (Rs 284 per capita), a decline of almost 9%. This peak in 1998 came in the wake of the main liberalisation step, which was the freeing of imports in November 1997.

Typically, India accounts for 20% of global gold offtake in any one year. Its GDP (as measured by the World Bank) in 2001 was 1.5% of the world's total, ranking twelfth – although if this is measured on Purchasing Power Parity, then India ranks fourth with 6.4% of the world total. While changes in total demand per capita, in terms both of tonnage and expenditure show how Indian jewellery demand in 2002 compared with the rest of the world in terms of offtake per capita and against GDP. Offtake per capita is still very low, reflecting the widespread distribution of the rural population and the social infrastructure of the country (the rural population accounts for approximately 70% of national gold demand), but offtake in terms of GDP is high. At just over one gramme of demand per thousand dollars of GDP, India stands third in the world, behind only the UAE (just over two grammes) and Bahrain (almost 1.5g) – although these two are both enhanced by tourist purchases.

It was not always thus. As recently as 1991, Indian gold demand was a little over 230 tons, or only 8% of world offtake. The deregulation of the market during the 1990s brought about a dramatic change. Jewellery demand increased from 208 tons in 1991 to peak at 658 tons in 1998, while demand for investment bars grew from ten tons in 1991 to 116 tons in 1998, and registered 85 tons in 2002. These figures reflect average growth rates of 16% and 30% per annum respectively between 1991 and 1998. While both have eased since 1998, there is still a fascination in India for gold and there is significant scope for the development of further demand in the country.

In the cities, however, gold is having to compete with the stock market, investment in internet industries, and a wide range of consumer goods. In the rural areas 22 carat jewellery remains the basic investment.

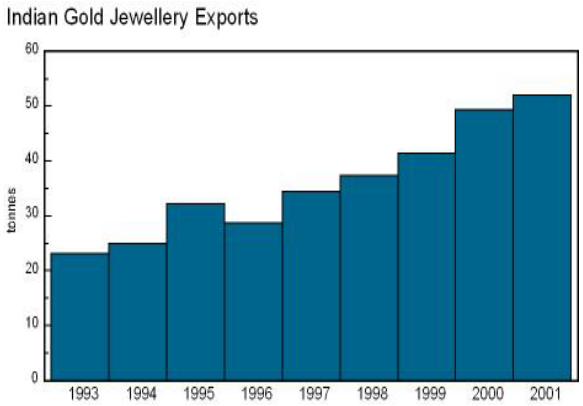
The World Gold Council, which was involved in the deregulation of the market in the 1990s, continues to work closely with Indian gold market stakeholders to foster increased demand, partly through the development of new gold instruments that can be bought through banks, as an additional set of distribution channels, although the rural community does still tend to prefer to use jewelers.

Jewellery

India is the world's foremost gold jewellery fabricator and consumer with fabricator and consumption annually of over 600 tons according to GFMS. Measures of consumption and fabrication are made more difficult because Indian jewellery often involves the re-making by goldsmiths of old family ornaments into lighter or fashionable designs and the amount of gold

thus recycled is impossible to gauge. Estimates for this recycled jewellery vary between 80 tons and 300 tons a year. GFMS estimates are that official gold bullion imports in 2001 were 654 tons.

Graph 6: Indian Gold Jewellery Exports



Source: Gold Fields Mineral Services

Exports have increased dramatically since 1996, and in 2001 stood at over 60 tons. The US accounted for about one third of total official exports. Manufacturers located in Special Export Zones can import gold tax-free through various registered banks under an Export Replenishment scheme.

Recent Developments in India

World Gold Council (WGC) has estimated that the annual Indian demand for the precious metal in recent years has been in excess of 800 tons. Most of it appears to be meant for jewellery fabrication, and the rest, estimated at 10 to 15 percent, is possibly meant to meet demand on account of investment and industrial processes. A major step in the development of gold markets in India was the authorization in July 1997 by the RBI to commercial banks to import gold for sale or loan to jewellers and exporters. Initially, 7 banks were selected for this purpose on the basis of certain specified criteria like minimum capital adequacy, profitability, risk management expertise, previous experience in this area, etc. The number of banks later went upto 18. On a review, since five banks had not evinced adequate interest in this business in terms of activity, the RBI did not find it appropriate to renew their licences for this purpose. At present, 13 banks are active in the import of gold. The quantum of gold imported through these banks has been in the range of 500 tons per year.

Import of gold by banks authorised by the RBI has succeeded to a large extent in curbing illegal operations in gold and in foreign exchange markets. It has also resulted in reducing the disparity between international and domestic prices of gold from 57 per cent during 1986 to 1991 to 8.5 per cent in 2001.

The import duty on gold, which was Rs.220 per ten grams upto January 1999, was increased to Rs.400 per ten grams, and with effect from April 2001 has been reduced to Rs.250 per ten

grams. The estimates of duty realised from gold imports indicate an annual amount varying from about Rs. 1,000 to Rs. 2,000 crore per annum since 1997.

Even though the country consumes more than 800 tons of the metal every year, the system of assaying and hallmarking has not gained the desired importance. The low quality of gold jewellery being sold in the country and the resultant losses being incurred by the consumers are being recognized now. Recent surveys conducted by the Bureau of Indian Standards (BIS) jointly with Central Consumer Protection Council in 5 major cities reveal that more than 80 per cent of the jewellery being sold in the market was of lower purity than claimed and charged for. In some cases, the gold articles sold were 38.6 per cent short in purity in monetary terms. The low purity results in a loss of around 16 per cent to gold jewellery.

In the recent past, RBI has been actively pursuing the issue of upgrading the quality of trade and products through a system of assaying and hallmarking with Government of India and BIS. The major objectives of introducing a proper assaying and hallmarking system in the country are enabling consumer protection, developing export competitiveness of the gold jewellery industry, introducing gold based financial products, which will help in mopping up the vast dormant gold resources with the domestic sector and developing India into a leading gold market centre in the world.

The Government of India announced the Gold Deposit Scheme in 1999 and RBI issued guidelines to the banks intending to launch the scheme in October 1999. Five banks have launched their schemes under the guidelines and the quantum of gold mobilised so far has been about 7 tonnes. Unfortunately, the scheme has not evoked the expected response. A number of reasons can be cited for the low response, prominent among them being depositors' losing the making charges spent on jewellery (as the banks would convert them into primary form before accepting as deposits), the low caratage of jewellery, low rate of return on deposit (as seen by the depositors) and the absence of any amnesty.

6. Role Played by International Authorities

The authorities of different countries, have on the other hand, played significant roles in furthering the development of gold markets. Here one could see three patterns:

Producer nations like South Africa, Australia and Brazil have shown keen interest in the development of spot and forward market in their respective countries mainly with the intention of providing financial products to the producers. Also, since a liquid forward market in gold (for enabling the producers to sell their product forward) presupposes the existence of a leasing market, these authorities have promoted this market also.

Financial centers like the U.K., the USA, Switzerland, Hong Kong and Singapore have actively promoted gold related products to be traded at these Centers. While in the UK and the USA, the market is designed to be used by residents and non-residents alike the focus in Singapore is on providing service to off-shore entities in Singapore and non-residents. There are direct benefits to the countries concerned in the form of value-addition in the products, employment etc.

In Turkey, the gold market has recently been liberalised. Turkey has quite a few parallels with India in respect of gold i.e. no significant domestic output; and large private sector holding. In Turkey, the private sector holding is estimated at 5,000 tones, while in India the same is placed at 7,500-10,000 tons. Further, like India, Turkey seems to have high income elasticity of demand for gold. In early 1995, Turkey liberalised its gold control regime by throwing open imports. The Istanbul Gold Exchange was set up in July 1995 to help bring into the economic mainstream the huge quantity of gold held by the private sector. Gold-based paper is sought to be introduced there as also the setting up of a gold refinery with international accreditation for providing refining services to the gold producing countries in Central Asia.

While in India the concerned authorities are still yet to play an active role in developing gold market domestically on sound lines and linking such markets with the financial sector. After liberalization of gold imports, now the right step forward would be to develop a forward market of gold in the country and thus integrate the same with the mainstream financial sector.

7. A Success Story

Istanbul Gold Exchange

"Istanbul Gold Exchange became an important step in canalizing the gold to financial system, developing gold based investment vehicles and international integration of gold sector in Turkey."

As a prominent gold importer, Turkey owes its physical gold demand (reaching to 200 tons (6.430.148 ounces) per year) to the popularity of gold in the eyes' of the Turkish people. Gold has preserved its importance throughout the ages, first as a means of exchange and more recently as a commodity for investment and saving. Despite the recent proliferation and developments in the Turkish financial markets, gold retains its traditional role for the Turkish society. Turkey is within the top five countries with the highest demand for gold in the world. Since there is no domestic production of gold yet the demand is met through imports.

The restructuring model for gold aimed converting the existing idle gold savings into an active resource for the Turkish economy and canalising them into investments. Developing a gold-based financial system, establishing Istanbul Gold Exchange, developing gold-banking, supporting jewellery sector and finally establishing Gold Refinery are the main steps of this model.

On July 26, 1995 the Istanbul Gold Exchange was opened with the objectives of liberalizing the Turkish gold sector and integrating it with the international markets, rationalizing the gold imports and introduce gold-based financial instruments. The opening of the spot gold market provided the gold sector a regulated and reliable market and the gold sector's acceptance of the spot gold market is shown in the trading volumes of the precious metals market gold market.

By launching of the Istanbul Gold Exchange local gold prices have closed to world gold prices, imported gold bars have met the purity and the standard accepted worldwide, gold trading has been taken into record and the system have gained a transparent structure.

On August 15, 1997, the Istanbul Gold Exchange Gold Futures and Options Market was launched to meet the demand for future products of gold in Turkey, which is the first derivatives market in Turkey.

New amendments about silver and platinum have been made on the Decree No. 32 concerning the Protection of the Value of Turkish Currency. These latest amendments published on the Official Gazette dated on December 31, 1998 made the silver and platinum trading possible in Istanbul Gold Exchange as well as gold.

Lastly Precious Metals Lending Market was started its operations in Istanbul Gold Exchange on March 24, 2000 for the purpose of bringing supply and demand into an organized market, lowering the production costs of the jewellery sector and securitization of gold.

The success of derivatives instrument of Gold in Turkey (a predominant Gold consuming country like India) is best illustrated in the following table.

Table 3: Futures and Options Market Volume in Turkey

Years	Total Number of Contracts	Total Number of Transactions	Total Value
1997 (US$)*	445	61	13,511,486.15
1998 (US$)	30	3	833,442.7
1999 (US$)	47	10	1,197,131.3
2000 (US$)	97	12	1,211,714.34
2000 (TL)	70	5	774,198,331,982
2001 (US$)**	50	4	971,071.66
Total from beginning (US$/ons)	669	90	17,701,580.40
Total form beginning (TL/gr)	70	5	774,198,331,982
TOTAL	739	95	

* Aug. – Dec 1999

** Jan – Feb. 2001

Treatment of Foreign Currency in Turkey

In-flow and out-flow of foreign currency to Turkey is permitted. Persons settled in Turkey are permitted to carry foreign currency as well as buy foreign currency from banks, private finance companies, authorized institutions and precious metal brokerage companies. It is also permitted to invest the foreign currency nationally or abroad via banks and private finance companies or to open foreign savings accounts or to use as effective without any restrictions.

Persons settled abroad are permitted to buy foreign exchange from banks, private finance companies, authorized institutions and precious metal brokerage companies.

Once all obligations to the Central Bank concerning foreign currencies are met by the aforementioned establishments, they may then proceed in activities within the currency and effective market embodied and regulated by the Central Bank.

Banks, private finance companies, authorized institutions and precious metal brokerage companies are unconstrained to use their existent currencies provided that the means of use are in accordance to fore ordained principles of the Central Bank and the Decree No.32.

The Central Bank and banks may open foreign currency and gold deposit accounts on behalf of persons settled within Turkey or abroad. There are no constraints on savings. The interest applied to these accounts may mutually be agreed upon by the account holder and the respective banks. Banks may use their own resources to transfer principal amounts, interests as well as return of gold. The fluctuations in the rate of exchange which may arise due to these accounts are the responsibility of the concerned parties.

Gold Banking in Turkey

The Turkish lira is convertible and transactions between foreign exchange, gold and Turkish Lira are free, as are remittances in and out of Turkey.

Banks have been authorized to open gold storage accounts and gold credits since March 21, 1993. In 1995, it was stabilised that the basis for gold storage accounts and also provoked arrangements to be made for the use of credit within the country by obtaining gold credits from abroad.

There are specialists in bank branches who are authorized in gold transactions. Their first duty is controlling and testing for fineness of the gold, which physically delivered to the bank or customer. Also they calculate the value of gold which is recorded in the registration book.

Turkish regulations have permitted following gold banking activities; gold storage accounts, gold credits, consumer credit by mortgaged gold and gold gift cheques.

Only gold storage accounts are used as an investment instrument in banks, for now. However, "Gold Backed Securities" may be issued soon, when its legal structure is completed.

Regulations regarding the restructuring model for gold aims to convert the existing idle gold savings into an active resource for the Turkish economy and to channel them into investments via gold banking activities.

8. International Gold Market Review 1997 - 2002

The apparently inexorable decline in the gold price during 1997 was the clearest sign of an oversupplied market. A substantial increase in supply was absorbed only thanks to the price falling to a level which produced the required price-elastic reaction in the form of increased jewelry offtake and bar hoarding investment.

A statistical description of the year includes many records, both for the absolute levels of many of the principal market components and also for year-on-year rates of change. The average US dollar gold price of $331.29 was an 18-year low in nominal terms and a 26-year low in real, inflation-adjusted terms. The fall in the average price compared with the 1996 level, at 14.6%, was the sharpest decline since 1984. By the middle of December, the price had reached the year's low of $283.00, just below the 1985 low of $284.25, though the depths to which the market had sunk by then can be appreciated when converting the latter figure into constant 1997 dollars, namely $424.

In attempting to understand the combination of market fundamentals and sentiment which resulted in this dramatic weakening of the price, two questions stand out. Firstly, how and where was the large volume of incremental supply generated and secondly, why did the price have to fall so much to produce the required response from the demand side?

On the supply side apart from old gold scrap, every component showed an increase last year, ranging from a perhaps surprising 4.6% rise in mine production, to the order-of-magnitude jump in supply from forward sales. Between these extremes, there were very large increases in supplies from official sector sales, option hedging and implied disinvestment.

That mine production increased so substantially, especially after a similar increase the previous year and in a two-year period of weakening prices, requires its own explanation. In brief, the rise in output was the result of the start-up of substantial new capacity which had been in the pipeline during the previous two to three years. The increase in mine production over the past two years may not have helped investor sentiment towards gold but neither was it a key factor in explaining the price weakness.

Nor could it be claimed that the recycling of scrap was responsible. Although the market crises in East Asia resulted in a massive dishoarding of old jewelry, as local gold prices exploded in the second half, this effect was more than offset, at least in terms of the 1997 statistics, by a price-related decline in scrap supply elsewhere. Nevertheless, towards the end of year, the perception of a surge of old scrap from the region did not help sentiment. This was reinforced by the publicity given to the highly successful semi-official campaign in South Korea to mobilize scrap during the first quarter of 1998.

The average London PM fix in 1997, at $331.29, was the lowest since 1985's $317.26, while the year-on-year fall of 14.6% was the sharpest drop since 1984. The price fell steadily but not dramatically during the first three quarters of the year, but the rate of decline then accelerated, taking the price down in almost a straight line to a series of new 12-year lows and ultimately to an 18-year low of $283 on 12th December.

The price was driven down primarily by a potent combination of central bank selling and market fears about the level of future official sales, though the strengthening of the US dollar exacerbated the fall in the dollar gold price.

Western investors showed little inclination to return to the gold market but speculators continued to exert a large and negative influence by selling gold short. Producer hedging was also a major factor, particularly in the fourth quarter.

In 1999 and 2000 price started to improve on the back of strong physical regional demand and speculative short-covering. The former stabilised the price in mid-1999 just above $250/ounce and then took it slowly higher; the latter developed because of stable gold prices and falling money market interest rates. The fact that this was happening in a period of relative political and financial calm, when there was no perceived need for substantial risk management, did bring gold to the attention of some money managers and other investors in the "professional" arena. If there was no perceived need for the professional to be hedging against risk, then why was the gold price rising? Consequently, when global economic political and financial conditions did start to deteriorate, gold had already to some extent made its case for fresh attention. A solid fundamental backdrop was already in place.

Investment in the latter part of 2002 and at the start of 2003 has been driven by geo-political concerns but the underlying background is more complex, and reflects currency concerns, along with the desire to hedge against risks in the equity and bond markets and, notably in the case of Argentina and Japan, risks in the banking sector. Corporate governance problems also played a strong part during the first part of 2002, as a deepening mistrust of corporate reports and accounts augmented some investors' desire to hedge against equity exposure. Gold thus reasserted itself as an alternative asset class, enabling the professional investor to diversify his risk. With concerns also swirling in the markets about the destiny of the dollar, the euro and the yen, gold and the Swiss franc came into play as reserve currencies.

As a consequence, the professional investor is once again looking at gold as a hedge against risk - something that many individuals in developing nations have never ceased to do. These individual investors in the Middle East, Indian sub-continent and the Far East have remained loyal to gold as a safe haven, or an "ultimate investment" as a portable anonymous form of money and it is this sustained activity which has formed the foundation of the change in sentiment in the rest of the world. The "retail" investor in the so-called first world is also aware of gold's resurgence and there has been a noticeable rekindling of interest in coins and bars from this quarter as well interest in gold in other forms from other investment pools.

Offsetting this fresh demand to some extent is the fact that the slowing global economy had a negative effect on purchases of gold in the jewellery sector, and the poor Indian monsoon meant that Indian offtake, the world's largest, was particularly badly hampered. This is one of the answers to the question "why didn't the price rise further, given all the other uncertainties in the world?" One of the important features of gold is that more often than not, a reason for one man to buy it is the same reason for another man to sell it. It is this that helps to make it an attractive alternative asset class as it has characteristics all of its own and a negative, if any, correlation with many of the other major asset classes. In this case the slowing economy hindered jewellery

purchases, but prompted purchases from investors concerned that stock market valuations were too high given the deteriorating outlook for earnings.

It is worth pointing out also that if the price had rocketed, the integrity of the demand side would have been severely undermined and such a rally would have proved unsustainable, as well as generating considerable resale of secondary metal and damaging new demand for the longer term.

Intermittent periods of volatility in gold's price last year generated the usual reaction from the regional buying centres - i.e. in times of volatility they moved to the sidelines. What was significant, however, was that there was little resistance on the part of these purchasers to return to the market at higher price levels once conditions had stabilised and the support lent from the physical market has thus been at steadily rising prices.

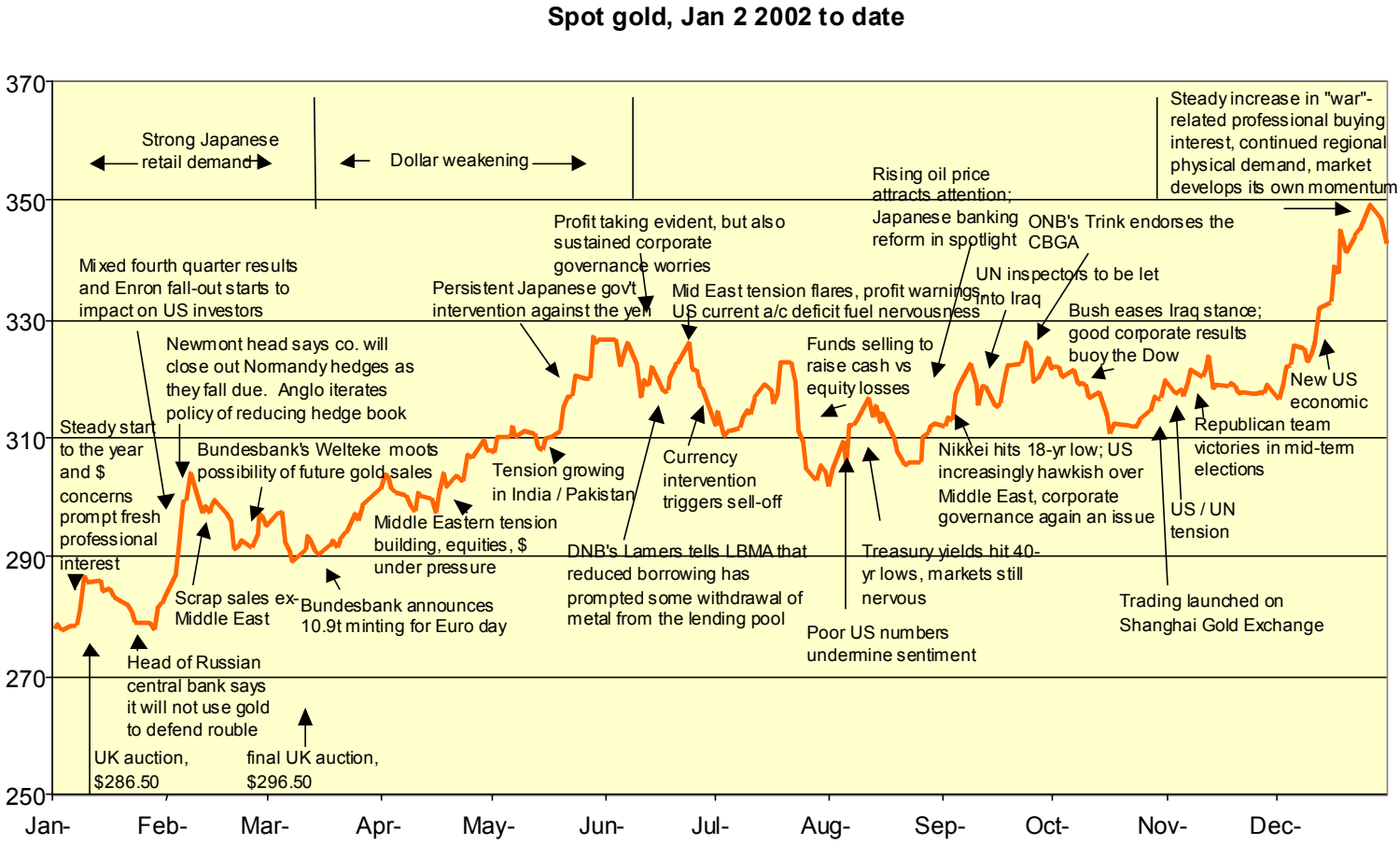
The market has therefore benefited from a solid underlying fundamental base, combined with a cocktail of influences that have led to steady investment activity from hitherto absent friends. The recent moves, in the last few weeks of 2002 and early 2003, have been predominantly concerned with increasing tension in parts of the Middle East and north Korea and the recent rapid upward moves have choked off physical demand in the near term. As we go to press the price is looking to consolidate between $345/ounce and $355/ounce.

There is clear evidence of speculators in the market as well as investors looking for value and for risk management and this is currently generating a degree of caution in the expectation of profit taking. The panoply of uncertainties in the external environment, however, is underpinning the tone in the market as gold is once again sought out as an insurance policy. There may be those in the market who will either wish or need in future to cash in their insurance; others will wish to hold on in case of further rainy days.

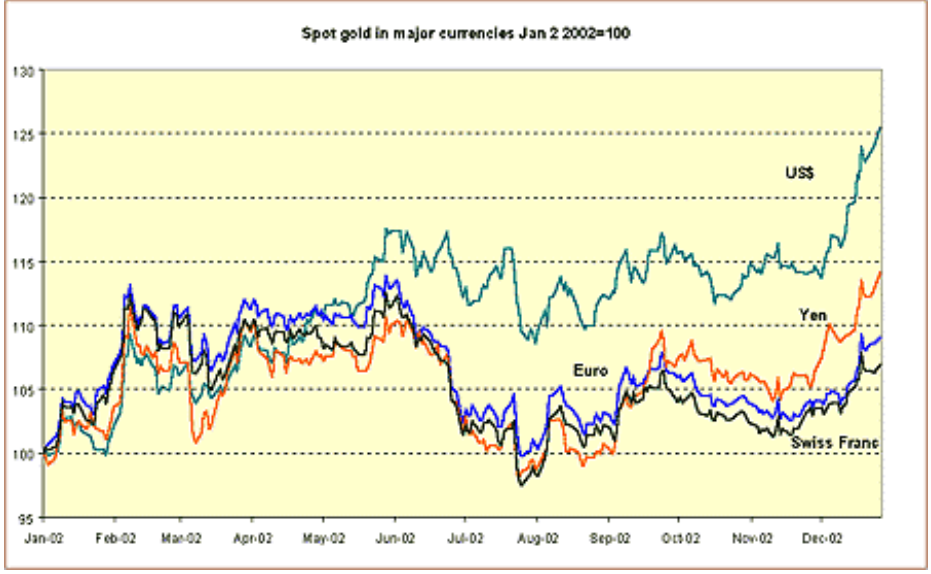
Gold has been seen as a currency and as an investment for thousands of years. During 2002, while other, younger, sectors showed signs of fear, gold offered the sheltering arm of a reliable elder brother.

9. Gold's Relative Performance in 2002

Graph 7: Gold Spot Price Movement in 2002



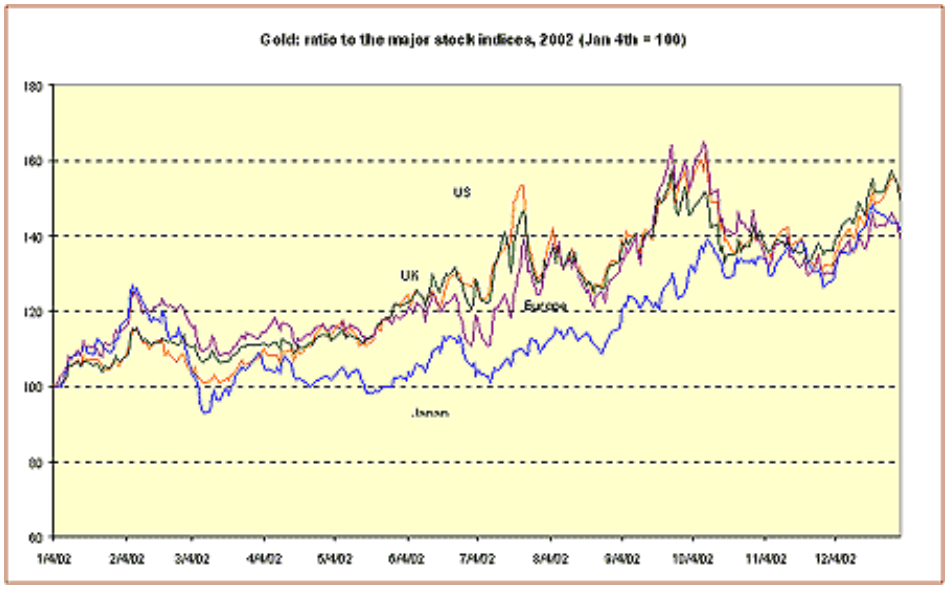
The large-scale chart that accompanies this piece is annotated with events that were relevant to the market and which may have contributed to price movements or trends. These smaller charts show gold's performance in different currencies and against the major stock markets.



Graph 8: Spot Gold in Major Currencies in 2002

Over the course of the year, gold outperformed the dollar by 25%, the yen by 14%, sterling by 13%, the euro by 9% and the Swiss franc, the other major recipient of "safe haven" funds (notably from the Middle East), by 7%.

Graph 9: Gold Ratio to the Major Stock Indices in 2002



The search for alternative assets is reflected in the relative performance against the major equity markets. The chart above shows gold in US terms divided by the Dow, in sterling divided by the FTSE, in Euro divided by the FT Europe index and in yen divided by the Nikkei. Over the year gold outperformed the FTSE by 52%, the Dow by 47%, the Nikkei by 44% and the European index by

10. Gold Futures in India

Why Gold Futures in India?

The Indian gold market has always been linked to international gold market in view of large requirements of imported gold. Given the inevitable integration between the global and local gold markets, there is considerable merit in following the global practice of integration of gold markets with financial markets and introducing forward trading.

Suitability of Gold Futures

Uncontrolled and uncertain supply

Besides new mining supply, the available supply of gold in the market is made up of three major 'above-ground sources'. In recent years, the growth in gold supply has come from these 'above-ground' sources.

a. reclaimed scrap, or gold reclaimed from jewelry and other industries such as electronics and dentistry;
b. official, or central-bank, sales
c. gold loans made to the market from official gold reserves for borrowing and lending purposes.

Following the growing pattern of liberalisation of the gold trade since the early 1990's the local markets and exchanges of countries like India and Turkey can flourish legitimately. Consequently the pattern of gold flows from mine to end-user, whether in jewellery, industry or investment, is more direct. This pattern has also been influenced by growing gold production, particularly in Australia and the United States, which are now major sources of supply for Asian markets. World gold output rose from only 1,311 tons in 1980 to 2,604 tons in 2001, i.e almost double.

In 1993 the Indian government permitted non-resident Indians to bring 5kg of gold into the country twice yearly on the payment of import tax of Rs. 250 per 10 grammes (at current rates this equates to US$14.56/ounce or 4.2%). The allowance was raised to 10 kg per trip in January 1997.

1997 Open General Licence (OGL) was introduced in India, paving the way for substantial direct imports by local banks from the international market for sale or loan to jewelers and exporters, thus partly eliminating the regional supplies from Dubai, Singapore and Hong Kong. At present, 13 banks are active in the import of gold. The quantum of gold imported through these banks has been in the range of 500 tons per year.

Gold consumers are very aware of its price movements and very sensitive to them. Gold is sold in times of financial need but holders frequently take profits and sell gold back to the market if the price rises. Thus the supply of scrap gold normally automatically rise if the gold price rises. Even gold used for industrial purposes such as electrical contacts in electronic equipment is frequently recovered as scrap and a rise in the gold price increases the incentive for such recovery.

Fluctuating and uncertain demand

The deregulation of the Indian gold market during the 1990s brought about a dramatic change. Jewellery demand increased from 208 tons in 1991 to peak at 658 tons in 1998, while demand for investment bars grew from 10 tons in 1991 to 116 tons in 1998, and registered 85 tons in 2002.

India in 2001 it absorbed around 700 tons from the world market compared to just 320 tons in 1994; that is without taking into account the recycling of scrap.

In India the rural population accounts for approximately 70% of national gold demand. Thus India's annual gold consumption is dictated both by the monsoon, with its effect on the harvest, and the marriage season. Between 1998-2001 annual Indian demand for gold in jewellery exceeded 600 tons, however in 2002, due to rising and volatile prices and a poor monsoon season, this dropped back to 490 tons, and coin and bar demand dropped to 67 tons. Indian jewellery off-take is sensitive to price increases and even more so to volatility, although this decline in tonnage since 1998 is also due in part to increasing competition from white and brown goods and alternative investment vehicles, but is also a reflection of the increase in price.

In the cities, however, gold is having to compete with the stock market, investment in internet industries, and a wide range of consumer goods. In the rural areas 22 carat jewellery remains the basic investment.

Indian gold jewellery exports have increased dramatically since 1996, and in 2001 stood at over 60 tons.

The major factors influencing demand for gold in India are,

a. generation of large market surplus in rural areas as a result of all round increase in agricultural production
b. unaccounted income/wealth generated mainly in the service sector
c. domestic gold prices relative to those of ordinary shares and international gold prices

Wide and unforeseen price variation

Economic forces that determine the price of gold are different from, and in many cases opposed to, the forces that influence most financial assets.

Econometric studies indicate that the price of gold is determined by two sets of factors: 'supply' and 'macro-economic factors'.

Supply and the gold price are inversely related. In the case of 'macro-economic factors', the U.S. dollar tends to be inversely related to gold, while inflation and gold tend to move in tandem with each other. Also, high low-interest rates are generally a positive factor for gold. Overall, the impact of all of these determinants on the gold price is judged to be neutral-to-positive at this time. Also there is low to negative correlation between returns on gold and those on stock markets

Variation in Indian and International Gold Ready Prices

Table 4: Occurrence in percentage terms

Month on month variation in percentage terms	0 – 2	2 - 5	5 & above
Mumbai Gold Price between 1992 – 93 to 2000 – 01	72	24	3
Perth Mint Gold Price between 1991 – 92 to 2002 – 03	64	36	3

Table 5: Maximum Price Variation in Percentage Terms

Mumbai (Rupees)	Percentage
Monthly	13.7
Perth Mint (USD)	
Daily	6.5
Weekly	13.1
Monthly	19.1

Mumbai – 1992/93 – 2000/01
Perth Mint – 1991/92 – 2002/03

Homogenous nature with well-defined grades

Assayed gold is homogeneous and it is indestructible and fungible. Refer Annexure.

Likely Benefits from Gold Futures

Development of gold futures would help in efficient price discovery and emergence of healthy and transparent practices in the market. The basic framework for such an exchange already exists with 13 banks active in import of precious metals. Five of them have launched the Gold Deposit Scheme also. They can also enter into forward contracts in a limited way. To begin with the banks can start trading among themselves and then with MMTC, STC and also with big traders according to the demand/supply dynamics.

The demand driven gold market of India may well become the dictator of gold prices over a period of a few years displacing the supplier driven international market.

Futures trading will facilitate to bring down hoarding demand and help in bringing the idle gold into the market/official pool (mobilize domestic gold) or permit their use as a financial asset in the banking sector.

Futures in gold apart from offering jewellery manufacturers and exporters the chance of hedging their inventories would provide many other investors or speculators with a cheap and highly efficient way of getting into gold.

Studies show in India the consumers on an average would be paying Rs. 8,000 crores extra each year by virtue of the questionable quality of gold sold to them. In particular, the rural and middle class and women are especially vulnerable to the low quality of gold. (Refer Annexure) Development of futures market would make a positive contribution to the protection of consumer and improvement of the industry by setting the benchmark quality for trading.

Annexure - 1

Properties of Gold

Out of the earth comes a remarkable metal with an unparalleled combination of chemical and physical properties that make this metal invaluable to a wide range of everyday applications essential to our modern life. Thousands of common, everyday appliances require gold to ensure perfect performance over a long period of time. This indestructible metal is completely recyclable and virtually immune to the effects of air, water, and oxygen. Gold will not tarnish, rust, or corrode. This unique combination of properties makes gold a vital component in many medical, industrial, and electrical applications. These properties include:

Gold is a rare metallic element with a melting point of 1064 degrees centigrade and a boiling point of 2808 degrees centigrade. Its chemical symbol, Au, is short for the Latin word for gold, 'Aurum', which literally means 'Glowing Dawn'. It has several properties that have made it very useful to mankind over the years, notably its excellent conductive properties and its inability to react with water or oxygen.

Resistance to Corrosion: Gold is the most non-reactive of all metals. It is benign in all natural and industrial environments. Gold never reacts with oxygen (one of the most active elements), which means it will not rust or tarnish. The gold death-mask in the tomb of Tutankhamun looked as brilliant when it was unearthed in 1922 as when it was entombed in 1352 BC.

Electrical Conductivity: Gold is among the most electrically conductive of all metals. Since electricity is essentially the flow of charged particles in a current, metals that are conductive allow this current to flow unimpeded. Gold is able to convey even a tiny electrical current in temperatures varying from -55° to +200° centigrade. This makes gold a vital component for electrical connectors in computers and telecommunications equipment.

Ductility and Malleability: Gold is the most ductile of all metals, allowing it to be drawn out into tiny wires or threads without breaking. As a result, a single ounce of gold can be drawn into a wire five miles long. Gold's malleability is also unparalleled. It can be shaped or extended into extraordinarily thin sheets. For example, one ounce of gold can be hammered into a 100 square-foot sheet.

Infrared (Heat) Reflectivity: Gold is the most reflective and least absorptive material of infrared (or heat) energy. High purity gold reflects up to 99% of infrared rays. This makes gold ideal for heat and radiation reflection, as in life-saving face shields for astronauts and firefighters.

Thermal Conductivity: Gold is also an excellent conductor of thermal energy or heat. Since many electronic processes create heat, gold is necessary to transfer heat away from delicate instruments. For example, a 35% gold alloy is used in the main engine nozzle of the Space Shuttle, where temperatures can reach 3300° centigrade. Gold alloy is the most tenacious and long-performing material available for protection at these temperatures.

Annexure - 2

Uses of Gold

1. Electronics and Telecommunications

(a) ***Computers/Semiconductors*:** Millions of computers are manufactured worldwide each year and gold plays an active role in their many components. The most important use of gold is as a fine wire that connects circuits to the semiconductors, or the "brains" of the computer. This "bonding wire" is specially refined (up to "five nines" or 99.999-percent pure gold) and has an average diameter of one hundredth of a millimeter - smaller than the diameter of a human hair. Gold is also used as a paste with which a circuit is printed on a ceramic base to produce a printed circuit board. In other areas, each key on the computer keyboard strikes gold circuits that relay the data to the microprocessor. Computer games also use printed circuit boards that have gold circuitry to connect the logic units in the game package. Computer peripherals, where there is frequent plugging and unplugging, use gold-coated contacts to assure consistently clean, corrosion-free contacts and reliable signals. Gold is essential in computer circuitry because of its electrical conductivity and because it does not degrade over time.

(b) ***Powerchairs*:** Computerized wheelchairs, called powerchairs, allow disabled patients further control over their movements and a renewed sense of independence. At the heart of the computerized controls is a tiny, but powerful, Motorola microprocessor connected to the wheelchair's controls by gold wire and gold-coated connector pads. Gold is used in this application because of its high electrical conductivity and its resistance to corrosion. The powerchair, which is exposed to many climates and temperatures, could not operate properly without its gold corrosion-resistant components.

(c) ***Spacecraft*:** To protect the onboard computers in the Galileo space probe from short circuiting as a result of heavy bombardment, NASA developed a Heavy Ion Counter (HIC). The HIC contains silicon wafers with gold electrodes that detect the heavy ions as they penetrate the wafers. Use of the HIC allows NASA engineers to monitor the functioning of onboard computers and make adjustments when necessary.

The Pathfinder "robotic geologist" that took close-up color pictures of rocks and soil on Mars and analyzed the planet's chemical makeup, relied on sophisticated electronics to direct its landing and movement. In addition, intricate gold circuitry enabled sophisticated computer technology to transmit the Pathfinder's information back to Earth.

(d) ***Telephones*:** Behind the protective cover of every telephone mouthpiece is a miniature transmitter that contains gold in one of its central components, the diaphragm. A gold-plated dome in the diaphragm works with the other mouthpiece components to transcribe voice vibrations into an electrical current. Gold is used in this application because of its permanence, particularly in public phones that are exposed to outdoor weather conditions.

(e) ***Telephone Wall Jacks*****:** Because gold conveys a superior signal, and does not corrode or tarnish, it is used to coat billions of contacts for phone jacks and connecting cords throughout our nationwide telephone system. The phone wall jacks are goldcoated to assure the customer of the convenience of moving the phone from one wall jack to another while maintaining clear static-free conversation.

(f) ***TVs and VCRs*****:** The microcircuitry in televisions is composed of fine lines of gold circuits connected by hair-thin gold wires to the micro-electronic circuit chips that process broadcast signals into a TV picture. Cables connecting television sets to videocassette recorders are goldcoated to assure clear relay of the television signal.

2. Lasers and Optics

(a) ***Astronomy:*** The world's largest telescope, located at the Keck Observatory, uses gold in its internal workings. Located atop the 13,796-foot-high Mauna Kea volcano in Hawaii, the observatory is composed of twin telescopes, Keck I and Keck II, and each is equipped with a 2l-inch secondary mirror that is coated with 99.9-percent pure gold. Keck I, in operation since 1993, has opened the door to astronomers with its light-gathering ability to see and measure very faint light sources -- mainly from the infrared spectrum -- on the outer edge on the universe. Keck II began astronomical observations in 1996. The telescopes are so powerful that they could detect a single burning candle on the surface of the moon.

Gold is used to coat the telescope's secondary mirrors because of its high reflectivity of infrared light. Developed by Epner Technology, the gold coating process is known as "Laser Gold" (so named because of its frequent use in the pump cavities of lasers). Laser Gold has been accepted as a Standard Reference Material (SRM) by the National Institute for Standards and Technology.

Astronomers using the twin Keck telescopes, with their gold-coated mirrors, announced in October 2000 that they have produced the most detailed, precise images of Neptune and Uranus ever captured. Scientists are currently poring over the images, learning facts about the plants' surfaces and atmospheres that were previously unknown.

(b) ***Copy Machines***: Copy machines use very high temperatures to affix the copy image onto the paper. These machines use gold-coated mirrors to reflect the heat efficiently, and produce copies for millions of businesses every day.

(c) ***Photo CDs*****:** Eastman Kodak Company has developed a Photo CD System that uses gold as the reflective surface. Photofinishers can transfer, in a digitized format, 35mm negatives or slides to compact discs holding up to 100 images on a disc. Once on disc, images can be viewed on television or computer screens. An interesting example of how this system can be used is demonstrated in a project for the National Park Service in which all items left at the Vietnam Veterans Memorial are photographed, catalogued, and compiled onto gold-coated photo CDs.

(d) ***Satellites***: Military and commercial communications satellites circling the Earth use gold in many important ways. Circuitry and chemically clean gold wires provide permanently static-free signals in rebroadcasting signals back to Earth.

Electronic circuitry boxes are gold coated to protect the electronic devices from cosmic ray degradation and solar bursts.

Gold-coated Mylar sheets are wrapped around the main body of satellites to reflect away the intense solar heat that would otherwise degrade the satellites' performance.

Gold is essential in satellites because of its reflectivity, conductivity, and resistance to corrosion.

(e) ***Security Systems***: Security systems require long-term unattended reliability. The infrared reflective properties of gold are used in infrared viewing equipment for home and office security systems. These nighttime security cameras can view areas at night without the need for visible light.

Medicine and Health

Gold is valuable to modern medicine because it is non-toxic and biologically benign, one of the most efficient conductors of electricity, and its density enables it to be seen under electron microscopes. And although gold is virtually indestructible, it is a soft metal, easy to work with, shape, flatten or draw out into microscopic strands

(a) **Dentistry**

Most gold used in dentistry is in the form of alloys, which are mixtures of gold and other metals, such as platinum, palladium, silver, copper and zinc. Gold is non-toxic and biologically inert, which makes gold ideal for use in dental procedures. It is easy for the dentist to manipulate, but strong, stiff, durable and tough -- it never wears or tarnishes. It is also very resistant to chemical attack and does not corrode.

(b) **Eye Surgery**

Accidents, disease or surgery may cause a condition called Lagophthalmos, which is the inability to close the eyelids fully. In order to keep the eyelids moist, doctors previously resorted to sewing the eyelid half shut, but a new gold eyelid implant is now the current form of treatment. These gold "eyelid load implants" are surgically inserted into the upper lid and allows the eye to blink normally. The muscle that opens the eyelid works to hold the eyelid open; then, when the muscle relaxes, gravity exerted on the gold causes the eyelid to drop. Gold is the best choice for this device as it does not corrode and will not react with tears.

(c) **Lasers:** One of the most promising new areas of medical treatment is in the use of ion lasers, the interior surfaces of which are coated with gold to control the focus of the beam. In one development, gold vapor lasers create a high intensity red light with the required

wavelength to seek out and selectively destroy cancerous cells without harming healthy neighboring cells. A new lightweight laser, designed by the military and using gold plated contacts, enables medics to seal battlefield wounds in the field, thereby reducing blood loss and improving survival chances for the seriously wounded. In hospitals, this new design will allow lasers to be brought to critically injured emergency patients without moving them, saving minutes and lives.

Surgeons use gold instruments to clear clogged coronary arteries. Injection of microscopic gold pellets helps retard prostate cancer in men. Some forms of cancer are treated with colloidal gold. Lasers with gold-coated parts literally give new life to patients with once-inoperable heart conditions and tumors.

These gold-reliant lasers are revolutionizing medicine - from pinpoint destruction of cancerous cells to rapid emergency surgical procedures, to delicate surgery on eyes and brain tissue that was previously not possible. Most recently, gold-coated lasers are being used to rejuvenate skin tissue damaged by burns and injuries, while leaving the surrounding healthy tissue unaffected. Because of its inert and benign nature, gold can be used inside the human body without fear of corrosion or harmful physical reactions in most cases.

(d) **Rheumatoid Arthritis Treatment:** Rheumatoid arthritis is an autoimmune disease that afflicts approximately millions of Americans, mostly women. Gold has been used in the treatment of rheumatoid arthritis since the 1920s, and has been a standard treatment since the 1960s. Gold treatment includes different forms of gold salts, an effective medicine for controlling some types of arthritis. For many, but not all patients, it helps relieve joint pain and stiffness, reduces swelling and bone damage, and lessens the chance of joint deformity and disability. Gold can be taken either by injection or in pill form. While the reasons for the effectiveness of gold are not completely understood, according to the Arthritis Foundation, it appears that gold affects the process that causes joint pain and swelling.

(e) **Thermometer:** Gold is a key component of modern thermometers that can read human body temperature in two seconds, just by holding the thermometer against the outer ear. The readings are accurate because the eardrum shares the same blood vessel system as the hypothalamus, the organ that controls the core body temperature. The thermometers contain a gold coated tube -- known as a "waveguide" -- that directs heat from the ear to the temperature sensing element in the device. Waveguides have been essential components of electronic systems such as radar and microwave telecommunications. Since gold is the most heat-reflective metal, none of the heat radiated from the ear will be lost warming up the tube of the thermometer. A result, gold is the metal of choice in the FirstTemp Genius® for providing a non-invasive method of monitoring body temperature -- especially invaluable when monitoring babies or unconscious patients.

(f) **Research:** Laboratory coupling of tiny gold particles with DNA has produced new microscopic structures that are opening a range of research, treatment and diagnostic possibilities in fields such as biochemistry, genetics and medicine.

Soon doctors will be able to test patients for infections, cancer, AIDS, and other diseases and get immediate results by using genetic probes affixed with clusters of gold molecules that adhere to targeted DNA material.

Scientists at the Massachusetts Institute of Technology (MIT) developed a microchip, the size of a human thumbnail, with more than 1000 separate tiny compartments that can hold medications in solid, liquid, or gel form, and dispenses them from under the patient's skin. The silicon chip is covered with thin gold foil. Medicine is released when a tiny electrical charge is applied between the gold cover and a gold electrode, opening the desired compartment.

Industry and Aviation

(a) **Airbags:** Gold is used in automobile airbag deployment systems, where a sensor device is placed inside the car near the front bumper. This sensor contains gold-plated electrical contacts that, when activated, send the signal for the airbag to deploy. Because of its dependable electrical conductivity and its resistance to corrosion and tarnish, gold is the only metal that meets the quality requirements for this life-saving feature.

(b) **Aircraft Engines:** Gold plays a vital role in the engines of military and civilian aircraft. Gold is a major constituent of a brazing alloy used in the manufacture of two assemblies -- stators and tubes. These two assemblies are integral to maintaining airflow and air compression necessary for combustion engine operation. Gold also plays a key role in aircraft electronics and guidance systems.

(c) **Aircraft Windows:** Many domestic and military aircraft use gold-coated acrylic windows in the cockpit. In cold weather, these windows, carrying an electric current, help eliminate frost that might diminish the vision of the pilots. These thin coatings of gold also help avert fogging as the plane ascends through moisture-laden clouds.

During warmer weather, gold's reflectivity helps maintain cool cockpit temperatures on hot runways. In flight at high, cold altitudes, gold's thermal conductivity helps retain the heat of the cabin, keeping the crew warm.

(d) **Engine Systems:** Gold-plated connectors in the sensors for ignition and exhaust monitoring ensure long-term efficiency of automobile engine operation. Gold is integral in maintaining car efficiency. Gold plated connectors and contacts that operate in a car's engine require materials that can withstand the high-temperature and corrosive environment.

(e) **Fire Bunker Gear:** When a disaster occurs, such as an airplane crash or hazardous chemical fire, firefighters must wear protective "bunker gear" so they can get close enough to the fire to control it. In close proximity to intense heat, firefighters need to protect their eyes while maintaining the ability to see the fire scene clearly. Bunker gear head coverings have protective face heat shields that are coated with a thin layer of gold. Gold has been used for several years in this safety-related application because of its heat and

infrared reflectivity.

(f) **Food- Freshness Sensors:** Gold-coated sensors provide the food industry with a system for measuring carbon dioxide gas, which is necessary to prevent spoilage of fruits and vegetables. Gold sensors are also important in maintaining carbon dioxide levels required to extend the shelf life of packaged and stored foods. The sensors containing gold are unaffected by high humidity, an environment that is needed for growing mushrooms, for example. Gold is inert, so it will not react with other elements

(g) **Gold Catalysis:** One of the exciting new applications for gold in industry is as a catalyst. New developments in catalysis may allow gold to replace or augment traditional catalysts, resulting in a wide range of potential industrial applications, including catalytic converters for automobiles. Gold has always been thought to be relatively inactive as a catalyst, compared to others such as platinum and palladium. This seems to be changing.

Recent innovations and research have shown that when properly prepared, gold can actually be preferable to other, more conventional catalytic materials. For instance, platinum and palladium require very high temperatures for catalysis to occur. But under proper conditions gold catalysis can occur at ambient temperatures, making catalysis more effective across the thermal spectrum. Gold catalysts can help keep our air cleaner.

Gold catalysts are also being researched for fuel cells, powerful devices that could generate electricity for automotive and industrial motors without creating pollution.

(h) **Protection of Air Force One:** Air Force One, the airplane used by the President of the United States, is equipped with gold-plated reflectors. These reflectors confuse an incoming missile's heat-seeking signal, making it difficult for missile's guidance systems to focus on their target.

Gold Jewellery

From the first discoveries of gold in ancient times, its beauty and the ease with which it could be worked inspired craftsmen to create it into ornaments, not just for adornment, but as symbols of wealth and power. The skills of the goldsmith from ancient Egypt to Benvenuto Cellini or Carl Faberge still amaze us. As Pihder wrote nearly 2,500 years ago, "Gold is the child of Zeus, neither moth nor rust devoureth it". Today, gold jewellery is more a mass- market product, although in many countries still treasured as a basic form of saving. Jewellery fabrication is the crucial cornerstone of the gold market, annually consuming all gold that is newly mined.

Pure gold is used in those parts of the world where jewellery is purchased as much for investment as it is for adornment, but it tends to be vulnerable to scratching. Elsewhere, it is usually mixed, or alloyed, with other metals. Not only do they harden it, but influence the colour; white shades are achieved by alloying gold with silver, nickel or palladium; red alloys contain mainly copper. A harder alloy is made by adding nickel or a tiny percentage of titanium.

The earliest known gold jewellery dates from the Sumer civilisation, which inhabited what is now southern Iraq around 3000 BC. Articles displaying various techniques such as repousse, chain-making, alloying and casting have been found in ancient Egyptian tombs, with the best known examples coming from the treasures of King Tutankhamun who died in 1352 BC. The Minoans on Crete produced the first known cable chain, still very popular today, and the Etruscans in Italy had developed granulation, whereby items are decorated with tiny granules of gold, by the 7th century BC.

Italy has remained at the forefront of the gold jewellery industry. The Italian Renaissance coincided with the discoveries of the New World sources of gold, and wealthy Italian patrons encouraged goldsmiths as they did painters and sculptors. The Spanish acquisition of South American gold, however, was achieved at the expense of the ancient heritage of Pre-Columbian goldsmiths. These craftsmen were producing exquisite items as early as 1200 BC and their art reached its zenith during the Chimu civilisation from the 12th to the I5th centuries AD, halted only by the mass looting and slaughter by the "conquistadors".

Historically, gold was a rare metal, afforded only by the wealthy. But the gold rushes to California and Australia in the mid- 19th century ushered in a new dimension of gold supply. They coincided, too, with the development of machinery for making chain and other articles and of a much wider consumer market. In the 20th century gold jewellery has come within the pocket of most people.

The way ahead was pointed by Italy, which has become jewellery manufacturer to the world, using over 400 tonnes of gold annually, more than two- thirds of it for export. Factories often housing several hundred ma- chines that "knit" gold wire into chain flourish in the towns of Aires, Bassoon del Grape and Vicenza. Important new centres emerged in the early 1990s, notably in Hong Kong, Singapore, Malaysia and Thailand, catering particularly for the rapidly growing market for chukka am (pure gold) jewellery in China, which requires several hundred tonnes a year. In Japan jewellery fabrication for the domestic market has become a major industry, using around 100 tonnes a year.

Attitudes to jewellery still vary. In the industrial countries gold jewellery is primarily a fashion item. But in the Middle East and much of Asia gold ornaments are seen equally as investment; 22 carat articles are bought on a low mark-up of only 10-20 per cent over the gold price of the day, and may be traded in at a profit if the price rises or, more often, for new articles.

The importance of jewellery to the gold mining industry cannot be under-estimated. Between 1970 and 1992 around 65 per cent of all gold available to the market was used in jewellery, and from the late 1980's into the 1990's, it absorbed much of the rise in production. Since 1991 over 2,000 tonnes of gold has been used annually. The continuing success of the mining industry is inextricably linked with the fortunes of the jewellery trade.

Annexure - 3

Indian Standard

Gold and Gold Alloys, Jewellery/ Artefacts-Fineness and Marking-Specification as per Bureau of Indian Standards
(Third Revision)

Scope
This standard specifies eight grades of gold, used in the manufacture of jewellery/artifacts of gold, based on their gold content.

This standard also specifies the guidelines for marking of purity and other details on tested jewellery/artifacts.

References
The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	Title
1418 : 1999	Assaying of gold in gold bullion, gold alloys and gold jewellery/artifacts – Cupellation (fire assay) method (second revision)
2790 : 1999	Guidelines for manufacture of 23, 22, 21, 18, 14 and 9 carat gold alloys (first revision)
3095 : 1999	Gold solders for use in manufacture of jewellery – Specification (second revision)

Terminology
For the purpose of this standard, the following definitions shall apply:

- **Assaying:** The method of accurate determination of the gold content of the sample expressed in parts per thousand (%).
- **Carat:** One-twenty fourth part by mass of the metallic element gold.
- **Fineness:** The ratio between the mass of gold content and the total mass expressed in parts per thousand (%).
- **Find Gold:** It is gold having fineness 999 parts per thousand (5) and above without any negative tolerance.
- **Gold:** The metallic element gold, free from any other element.

- **Standard Gold:** Gold having fineness 995 parts per thousand (%) and above without any negative tolerance.

Grades

Gold and gold alloys shall be classified in accordance with the following grades depending upon their fineness.

Table 9: Grades of Gold

Notes:

1 The above classification is applicable for gold jewellery/artifacts also.

2 For jewellery/artifacts of 23 carat, the gold solder of 22 grade may be used. The purity of the grade of gold alloy may be suitably adjusted to make the melting purity to the declared fineness.

Requirements

The fine or standard gold used for the manufacture of jewellery shall have the fineness as agreed to between the purchased and the manufacturer subject to a minimum of fineness as given in 4.1 without any negative tolerance.

Solders used for the manufacture of gold jewellery/artifacts shall be of the same fineness (or caratage) as that of the jewellery/article and shall conform to the requirements as specified in IS 3095. However in case of 23 carat jewellery/artifacts where it is not possible to use solder of the same caratage, solders of immediate next lower caratage may be used provided the overall purity of the jewellery as declared conforms to the respective grade of fineness. For 9, 14, 18, 21 and 22 carat jewellery/artifacts solders shall be of the same caratage as the jewellery article. Solder compositions other than specified in IS 3095 may also be used provided their gold content is same as the respective grade as specified for the standard solder and they are free from cadmium. Solders of a fineness less than the standard fineness of article shall not be used for strengthening, weighing or filing.

***Sampling*:** Unless otherwise specified for the jewellery/article of the same design and quality, the sample should be taken from 10 percent of the articles/ornaments selected ar random. In all other cases, the sample should be taken from each article/jewellery. Any other sampling plan may also be followed subject to agreement between the contracting parties or as specified by the inspection agency as the case may be.

*A**ssaying*:** The sample taken as prescribed in 5.3 shall be assayed in accordance with IS 1418. The actual weight of samples etc. shall, however, be as prescribed in respective test method detailed in IS 1418.

***Tolerances*:** No negative telerance shall be allowed on the gold content of gold article/jewellery sampled and tested as per 3.3.

Marking

The gold, gold alloys, jewellery/artifacts shall be stamped with the Standard Mark in this case known as the "Hallmark" by BIS recognized assaying and hallmarking centers only which comprises of the following:

- Assay center's symbol;
- The purity mark along with purity/fineness grade (indicating caratage shall not be mandatory); and
- Year of marking denoted by a letter symbol (as defined by BIS):Hallmarking – The use of Hallmark is governed by the provisions of the Bureau of Indian Standard Act, 1986 and Rules and Regulations made their under. The details of conditions under which the licence for the use of the Standard Mark may be granted to jewelers/jewellery manufacturers may be obtained from Bureau of Indian Standards.NOTE-Jewellers/Sponsorer's logo on each article shall be marked before offering the lot to BIS recognized Assaying and Hallmarking Centre for Hallmarking.
- Only linear designs shall be permitted.
- Marking shall be legible and durable.
- Marking to be done on all parts which can be easily removed or replaced. In case of bangles and light items marking shall be done at one place only.

Gold jewellery/artifacts on which marking should not be applied are as follows :

a. Any gold jewellery/artifacts which has not been assayed by BIS recognized Assaying and Hallmarking Centres.
b. Any gold article/ornament which fails to comply with specified fineness/caratege.
c. Any gold article/ornament which is not solid or which is made with a hollow center and then filled with base metal, cement, lac or other foreign substance thereby giving the article a false or added weight or strength unless the weight of gold is indicated on the article along with the jeweller's/sponsorer's logo.
d. Gold article/ornament on which it is physically impossible to stamp the marks.

Bureau of Indian Standards

BIS is a statutory institution established under the Bureau of Indian Standards Act, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Carat

This stems back to ancient times in the Mediterranean/Middle East, when a carat became used as a measure of the purity of gold alloys. The purity of gold is now measured also in terms of fineness, i.e., parts per thousand. Thus 18 carats is 18/24th of 1000 parts = 750 fineness.

A Carat (Karat in USA and Germany) was originally a unit of mass (weight) based on the Carob seed or bean used by ancient merchants in the Middle East. The Carob seed is from the Carob or locust bean tree. The carat is still used as such for the weight of gem stones (1 carat is about 200 mg). For gold, it has come to be used for measuring the purity of gold where pure gold is defined as 24 carats.

How and when this change occurred is not clear. It does involve the Romans who also used the name Siliqua Graeca (Keration in Greek, Qirat in Arabic, now Carat in modern times) for the bean of the Carob tree. The Romans also used the name Siliqua for a small silver coin which was one-twentyfourth of the golden solidus of Constantine. This latter had a mass of about 4.54 grammes, so the Siliqua was approximately equivalent in value to the mass of 1 Keration or Siliqua Graeca of gold, i.e the value of 1/24th of a Solidus is about 1 Keration of gold, i.e 1 carat.

If we take national gold reserves, then most gold is owned by the USA followed by Germany and the IMF. If we include jewellery ownership, then India is the largest repository of gold in terms of total gold within the national boundaries. In terms of personal ownership, it is not known who owns the most, but is possibly a member of a ruling royal family in the East.

Pure gold is designated 24 carat, which compares with the "fineness" by which bar gold is defined, as detailed below:

Table 10: Fineness of Gold

Caratage	Fineness	% Gold
24	1000.0	100.00
22	916.7	91.67
18	750.0	75.00
14	583.3	58.3
10	416.7	41.67
9	375.0	37.5

The most widely used alloys for jewellery in Europe are 18 and 14 carat, although 9 carat is popular in Britain. Portugal has a unique designation of 19.2 carats. In the United States 14 carat predominates, with some 10 carat. In the Middle East, India and South East Asia, jewellery is traditionally 22 carat (sometimes even 23 carat). In China, Hong Kong and some other parts of Asia, "chuk kam" or pure gold jewellery of 990 fineness (almost 24 carat) is popular.

In many countries the law requires that every item of gold jewellery is clearly stamped with its caratage. This is often controlled through hallmarking, a system which originated in London at Goldsmiths' Hall in the 14th century. Today it is compulsory in such countries as Britain, France, the Netherlands, Morocco, Egypt, and Bahrain. Where there is no compulsory marking manufacturers themselves usually stamp the jewellery both with their own individual identifying mark and the caratage or fineness.

Hallmarking

Bureau of Indian Standards (BIS), national standards body in India, formulated a scheme of hall marking in 1998, as a Voluntary Certification Scheme, with a combination of quality certification and BIS Laboratory recognition schemes. The BIS-recognised laboratories would affix/stamp/hall mark jewellery manufactured by BIS certified jewellers. BIS launched the scheme of hallmarking in April 2000 under the BIS Act, 1986. Under the Scheme, 12 firms of jewellers (MMTC Ltd., New Delhi; Bharat Assayers, Chennai; Calicut Assay and Hallmarking Centre Pvt Ltd., Chennai; Chemmanur Gold Refinery (P) Ltd., Cochin; VIMTA Labs, Hyderabad; Emerald Testing (India) Pvt. Ltd., Coimbatore; Geekay Exim (India) Ltd., Mumbai; Gujarat Gold Centre, Ahmedabad; J. J. Hallmarking Centre, Kolkata; Jalan and Co., New Delhi; Jewel Metallochem Laboratory, Mumbai; MICRO Assaying & Hallmarking Centre, New Delhi) have been certified as assaying and hallmarking centres so far. Consumer awareness campaign highlighting the advantages of going in for hallmarking jewellery is being conducted by BIS.

The major objectives of introducing a proper assaying and hallmarking system in the country are enabling consumer protection, developing export competitiveness of the gold jewellery industry, introducing gold based financial products, which will help in mopping up the vast dormant gold resources with the domestic sector and developing India into a leading gold market centre in the world. The objectives behind instituting a credible system of Assaying and Hallmarking can be enumerated as under:

- To protect consumer against victimization of irregular gold quality.
- To develop export competitiveness of gold jewellery industry and thus provide strong impetus for gold jewellery exports
- To develop gold based financial products which will help in mopping up of the vast dormant gold resources lying with the household sector.
- To develop India as a leading gold market centre in the world commensurate with its status as the topmost consumer

Weighing

Gold is made into a large number of different bars of different weights. The most well known are the large 'London Good Delivery Bars' which are traded internationally. These weigh about 400 Troy Ounces, i.e. 12.5 kg/ 27 lbs. Each. Others are denominated in kilogrammes, grammes, troy ounces, etc. In grammes, bars range from 1 g up to 10 kg. In troy oz, from 1/10 tr.oz. up to 400 tr.oz.. Other bars include tola bars and Tael bars. Gold is traditionally weighed in Troy Ounces (31.1035 grammes). With the density of gold at 19.32 g/cm3, a troy ounce of gold would have a volume of 1.64 cm3. A tonne of gold would therefore have a volume of 51, 760 cm3, which would be equivalent to a cube of side 37.27cm (approx. 1' 3").

Annexure - 5

History of Gold

4000 BC	Gold is first known to be used in parts of Central and Eastern Europe.
3000	The Egyptians master the arts of beating gold into leaf and alloying gold with other metals to achieve variations in hardness and color. They also develop the ability to cast gold, using the lost-wax technique still used in today's jewelry industry. The Sumer civilization of southern Iraq uses gold to creat a wide range of jewelry, often using sophisticated and varied styles still worn today.
2500	Gold jewelry is buried in the Tomb of Djer, the king of the First Egyptian Dynasty, at Abydos, Egypt.
1500	The immense, gold-bearing regions of Nubia make Egypt a wealthy nation, as gold becomes the recognized standard medium of exchange for international trade. The Shekel, a coin originally weighing 11.3 grams of gold, is used as a standard unit of measure throughout the Middle East. The coin contained a naturally occurring alloy called electrum, which was approximately two-thirds gold and one-third silver.
1352	The young Egyptian King Tutankhamun is interred in a pyramid tomb laden with gold, his remains laid in an extravagant gold anthropoid sarcophagus.
1350	The Babylonians begin to use fire assay to test the purity of gold.
1091	Squares of gold are legalized in China as a form of money.
560	The first coins made purely from gold are minted in Lydia, a kingdom of Asia Minor.
58	Julius Caesar seizes enough gold in Gaul (France) to repay Rome's debts.
50	The Romans issue a gold coin called the Aureus.
600-699 AD	The Byzantine Empire resumes gold mining in central Europe and France, an area undeveloped since the fall of the Roman Empire. Artisans of the period produce intricate gold artifacts and icons.
1100	Venice secures its position as the world's leading gold bullion market due to its location astride the trade routes to the east.
1284	Venice introduces the gold Ducat, which soon becomes the most popular coin in the world, and remains so for more than five centuries. Great Britain issues its first major gold coin, the Florin, which is followed by the Noble, the Angel, the Crown, and the Guinea.
1511	King Ferdinand of Spain sends explorers to the Western Hemisphere with the command to "get gold."
1717	Isaac Newton, Master of the London Mint, sets price of gold that lasts for 200 years.
1787	First US gold coin is struck by Ephraim Brasher, a goldsmith.
1792	The Coinage Act places the young United Sates on a bimetallic silver/gold standard, defining the U.S. Dollar as equivalent to 24.75 grains of fine gold, and 371.25 grains of fine silver

	the U.S. Dollar as equivalent to 24.75 grains of fine gold, and 371.25 grains of fine silver.
1803	North Carolina site of first US gold rush. The state supplies all the domestic gold coined for currency by the US Mint in Philadelphia until 1828.
1848	The California gold rush begins when James Marshall finds specks of gold in the water at John Sutter's sawmill near the junction of the American and Sacramento Rivers.
1850	Edward Hammong Hargraves, returning from California, predicts he will find gold in Australia within one week. He discovers gold in New South Wales within one week of landing.
1859	The Comstock Lode of gold and silver is discovered in Nevada. As a result, Nevada is made a state five years later.
1886	George Harrison, while digging stones to build a house, discovers gold in South Africa.
1887	Glasgow doctors, Robert and William Forrest, and chemist John S. MacArthur patent the process for extracting gold from ore using cyanide.
1896	Two prospectors discover gold while fishing in the Klondike River in northern Canada, richer finds were rumored farther south in Alaska's Yukon, spawning the Alaska Gold Rush in 1898 -- the last gold rush of the century.
1900	US adopts the gold standard for its currency.
1903	The Engelhard Corporation introduces an organic medium to print gold on surfaces. First used for decoration, the medium becomes the foundation for microcircuit printing technology.
1922	King Tutankhamun's tomb (1352 BC) opened to reveal a 2,448 lb. gold coffin and hundreds of gold and gold-leafed objects (including the mask pictured at the beginning of this section).
1927	A Medical study in France proves gold to be valuable in treatment of Rheumatoid arthritis.
1933	President Franklin D. Roosevelt bans the export of gold, halts the convertibility of dollar bills into gold, orders US citizens to hand in all the gold they possess and establishes a daily price for gold.
1934	Roosevelt fixes price of gold at $35 per ounce.
1935	Western Electric Alloy #1 (69% gold, 25% silver and 6% platinum) finds universal use in all switching contacts for AT&T telecommunications equipment.
1944	The Bretton Woods agreement sets an international gold exchange standard and creates two new international organizations, the International Monetary Fund (IMF) and the World Band. The new standard sets par values for currencies in terms of gold and obligates member countries to convert foreign offical holdings of their currencies into gold at these par values.
1947	The first transistor, the building block for electronics, is assembled at AT&T Bell Laboratories. The device uses gold contacts pressed into a germanium surface.
1960	The laser is invented using gold-coated mirrors to maximize infrared reflection.
1961	Modern-day mining begins in Nevada's Carlin Trend, ultimately making Nevada the nation's largest gold-mining state.
1968	Intel introduces a microchip with 1,024 transistors connected by gold circuits

1969	Gold coated visors protect the astronauts' eyes from searing sunlight on the moon (Apollo 11 moon landing).
1970	The charged coupled device is invented, using gold to collect electrons generated by light, eventually used in hundreds of military and civilian devices, including video cameras.
1971	The colloidal gold marker system is introduced by Amersham Corporation of Illinois. Tiny spheres of gold are used in health research laboratories worldwide to mark or tag specific proteins to reveal their function in the human body for the treatment of disease.
1973	The U.S. Dollar is removed from gold standard, and gold prices are allowed to float free. By June, the market for gold in London reaches more than $120 per ounce.
1974	On December 31, US government ends its ban on individual ownership of gold.
1976	The Gold Institute is established in Washington, D.C., to promote the common interests of the gold industry by providing statistical data and other relevant information to its members, the media, government, and the public.
1980	Gold reaches intra-day historic high price of $870 on January 21 in New York.
1986	Gold-coated compact discs are introduced.
1987	Airbags are introduced for cars, using gold contacts for reliability.
1996	The Mars Global Surveyor is launched with an on-board gold-coated parabolic telescope-mirror that will generate a detailed map of the entire Martian surface over a two-year period.
1997	Congress passes Taxpayers Relief Act, allowing US Individual Retirement Account holders to buy gold bullion coins and bars for their accounts as long as they are of a fineness equal to, or exceeding, 99.5 percent gold.
1999	The Euro, a pan-European currency, is introduced, backed by a new European Central Bank holding 15 percent of its reserves in gold.
2000	Astronomers at the Keck Observatory in Hawaii use the giant gold-coated mirrors of the observatory's twin telescopes to produce the most detailed images of Neptune and Uranus ever captured.

Annexure - 6

Table 11: World Gold Production Pre 1840

Time	Annual Average Production	Location
Sumer Civilization 3000 BC	0.03 Moz.	Asia Minor/Africa
Egyptians 2000 BC	0.10 – 0.13 Moz.	Africa/Saudi Arabia/Asia Minor/China
Roman Empire	0.19 – 0.29 Moz.	Africa/Asia Minor/Spain/Portugal
500 – 1100	0.06 – 0.10 Moz.	Africa/Germany/Austria/China
1100 – 1500	0.10 – 0.16 Moz.	Africa (mainly Gold Coast)/China
1500 – 1600	0.16 – 0.32 Moz.	Africa (Gold Coast)/China/South America**
1600 – 1700	0.32 – 0.39 Moz.	Africa (Gold Coast)/China/South America
1700 – 1800	0.48 – 0.80 Moz.	Africa (Gold Coast)/Brazil and other South American countries/Russia
1800 – 1840	0.80 – 1.61 Moz.	Africa (Gold Coast)/Brazil and other South American countries/Russia

*The figures in this chart are rough annual estimates. It should be noted that for some years, little production may have taken place. Overall, it is believed that pre-1840 production totaled about 600 million ounces.

**Production in South America started much earlier, but remained there until plundered by Spain.

Gold probably was first found on the ground and used by prehistoric man as a tool. Highly sophisticated gold art objects and jewelry discovered by archaeologists in the Sumerian Royal Tombs at Ur, in what is now Southern Iraq, date back to around 3000 BC. Similarly, goldsmiths of the Chavin civilization in Peru were making ornaments by hammering and embossing gold by 1200 BC. Refer to Annexure-II for the details on history of Gold.

Annexure – 7

Gold Mines

Gold mining is very capital intensive, particularly in the deep mines of South Africa where mining is carried out at depths of 3000 meters and proposals to mine even deeper at 4,500 meters are being pursued. Typical mining costs are US $238/troy ounce gold average but these can vary widely depending on mining type and ore quality. Richer ores mined at the surface (open cast mining) is considerably cheaper to mine than underground mining at depth. Such mining requires expensive sinking of shafts deep into the ground.

The gold-containing ore has to be dug from the surface or blasted from the rock face underground. This is then hauled to the surface and milled to release the gold. The gold is then separated from the rock (gangue) by techniques such as flotation, smelted to a gold-rich doré and cast into bars. These are then refined to gold bars by the Miller chlorination process to a purity of 99.5%. If higher purity is needed or platinum group metal contaminants are present, this gold is further refined by the Wohlwill electrlytic process to 99.9% purity. Mine tailings containing low amounts of gold may be treated with cyanide to dissolve the gold and this is then extracted by the carbon in pulp technique before smelting and refining.

The gold mining industry today is a global business in every sense, conducted in over 60 countries, of which 16 have significant output of over 31.1 tons (1 million oz), and which is dominated increasingly by international mining groups. Yet just 20 years ago, it was a business dominated by the output of South Africa and the Soviet Union and undertaken mainly by local mining companies (albeit large ones in South Africa). This transformation is as radical as any in the history of the industry.

The challenge facing the gold industry today is the drifting gold price, which can only be partly offset by new technology and better productivity. Weighted average cash costs in the Western World as reported by GFMS, including the main producing countries, South Africa, the United States, Australia and Canada in 2001 were US$176, and total production costs were $228 per ounce. Not all mines are so expensive. Barrick Gold's Pierina in Peru had cash costs of just $40 per ounce and Newmont Mining's Yanacocha, also in Peru, was at $115. But these are the exception.

Gold exploration budgets have fallen sharply since 1997. In that year miners spent US$2.99 billion on gold exploration; in 2001 the total was just less than US$850 million, a significant decline of over 70%. Moreover, the total share of exploration for gold in all mining exploration worldwide has fallen from 65% to 38% in the same period, according to Canada's Metals Economics Group. Not only is exploration down, but some new projects are on hold. Metals Economics Group's chairman, Michael Chender, told the Financial Times World Gold conference in March 2001 that ten major gold projects, which between them would yield 82.5 tonnes (2.65

million oz) annually, had been put "on the shelf". These include Barrick's Pascua Lama in Chile and Placer Dome's Las Cristinas in Venezuela.

Table 12: Top World Gold Mines in 2000
(in thousands of troy ounces)

Mine	Country	Owner	Production
Grasberg	Indonesia	Freeport-McMoRan C&G (86%)	2,363
Yanacocha	Peru	Newmont Mining (54%)	1,803
Muruntau	Uzbekistan	Navoi Mining	1,800*
Betze Post	US	Barrick Gold	1,647
Driefontein	South Africa	Gold Fields	1,394
Twin Creeks	US	Newmont Mining	1,367
Carlin	US	Newmont Mining	1,357
Kloof	South Africa	Gold Fields	1,322
Cortez	US	Placer Dome (60%), Rio Tinto (40%)	1,010
Great Noligwa	South Africa	AngloGold	971
Porgera	Papua New Guinea	Placer Dome (50%)	910
Randfontein	South Africa	Harmony	855
Pierina	Peru	Barrick Gold	822
Meikle	US	Barrick Gold	805
KCGM	Australia	Homestake (50%), Normandy (50%)	787
Kumtor	Kyrgyzstan	Cameco (33%)	670
Obuasi	Ghana	Ashanti Goldfields	641
Round Mountain	US	Echo Bay (50%) HM (50%)	640
Sadiola	Mali	AngloGold (38%), IAMGOLD (38%)	610
Lihir	Papua New Guinea	Lihir Gold	606

Annexure - 8

Country Profiles

South Africa

Mining

South Africa is unique. Its gold-bearing reefs are mined down to 4,000 metres (over 13,000 feet) and have not yet bottomed out. The capital required for such deep mining meant that from the start large mining houses capable of raising finance were an essential. So the great names of Anglo American, Gold Fields of South Africa, Rand Mines, Johannesburg Consolidated Investments, General Mining, and Union Corporation soon grew up as mining finance houses.

Yet within the last decade the whole character of this home-grown South African industry has changed with 'unbundling' and restructuring of these houses and the closure of famous mines.

The deep mines of South Africa almost belong to another era. Development of new shafts is slow and costly compared to open pit operations that can be quickly brought on-stream in Australia, Peru or the United States. The South African mining houses have ventured abroad, not just elsewhere in Africa, but to Australia, Latin America, and Peru. Equally, Canada's Placer Dome is in a South African joint venture with Western Areas.

The South African gold mining industry may still be the world's biggest, but it is very different not just from 1970 when it produced 1,000 tons or 79% of non-communist output, but even from 1990. The change in a decade has been radical.

The challenge for the South African mining industry in 1990 was to restructure itself, not just to take account of what was happening in gold mining around the world where output was soaring, but to adapt to a fast-changing political landscape at home, while a declining gold price was only partly offset by the depreciation of the rand.

In 2001 South Africa was still the largest producer, with 393.7 tons, but that is down from 605 tons in 1990 and over 1,000 tons in 1970.

Gold's role in the South African economy is much less. Until 1983, gold accounted for over 50% of foreign exchange earnings; today it is under 20%. The mines used to employ over 500,000 people, today it is scarcely 300,000. In 1990, there were 34 major gold mines, today there are less than 20 significant mines.

The great mining houses, which used to control many enterprises besides gold, have largely been 'unbundled', often spinning off their gold operations into new companies and familiar names have vanished.

Anglo American has put its gold companies into AngloGold, within which the South African mines have been concentrated as Vaal River, Free State and West Wits.

The original Gold Fields of South Africa's mines are part of a new group, also called Gold Fields, set up in 1998 in a merger with the gold mines of Gencor (itself formed by a merger in 1980 of General Mining and Union Corporation). Gold Fields includes Driefontein, Kloof, Beatrix and St Helena.

Johannesburg Consolidated Investments has been 'unbundled', with JCI Gold, created in 1998, only having a serious stake in Western Areas.

AngloVaal's gold operations are translated into Avgold, set up in 1998, whose only real gold asset is the new Target mine, where output commenced recently.

Rand Mines has become Randgold Resources, which has only two projects in Mali; Syama, whose operations are currently suspended, and a 40% stake in the new Morila mine. Its former Harmony mine is now independent and has rapidly been acquiring a new stable of mines in South Africa, Australia and Canada.

The grade, which was once an enviable 13g/t is at best 8-9g/t at Vaal River or Driefontein, but often 5-7g/t in Free State (excellent for open pits, but not for deep mines).

Average cash costs for South African mines in 2001 were US$196 per ounce, against $189 in the US and $175 in Australia (based on GFMS estimates of weighted average total cash costs for mines in these countries).

While restructuring at home, the South African houses have also ventured abroad. AngloGold is in Argentina, Brazil, Mali, Namibia, Tanzania and the United States. Gold Fields is at Tarkwa in Ghana as well as in Australia and Randgold is in Mali, while Harmony owns operations in Australia and in Canada.

For the first time, however, overseas companies have also bought into South Africa; Canada's Placer Dome has acquired 50% of Western Areas, an interesting vote of confidence in the future of the South African industry.

Australia

Mining

Gold was first discovered in Australia on the Macquarie river near Bathurst, New South Wales in 1851 by Edward Hammond Hargraves. The same year further discoveries were made at Ballarat and Bendigo in Victoria. By 1856 output was 95 tonnes (3.05 million oz). See gold rushes or Library - Gold Rushes.

New discoveries were made by Paddy Hannan at Kalgoorlie in Western Australia in 1893. Along Kalgoorlie's famous Golden Mile over 1,500 tons have been extracted since 1893. By 1903 Australia's output was 119 tons, a record not broken until 1988, for gold mining slowly declined.

By 1980 output was only 17 tons. Not a single mine on Kalgoorlie's Golden Mile was open, yet by 1990 it had soared to 244 tons.

The renaissance came not just through a higher gold price triggering fresh exploration that found new deposits, but by the pioneering of a whole new infrastructure of mining finance, complete with gold loans, hedging and the adaptation of new technology to create mobile milling and carbon-in-pulp recovery plants that could be transferred easily from one open pit to another.

Low-grade open pits, which could be brought quickly into production and often turned a profit within a year, were the heart of the boom that ultimately took Australian production to a new record of 313 tons in 1997. It set the pattern for a fundamental new alliance between miner and bullion banker, which was swiftly copied in North America, Africa, Indonesia and Latin America.

Declining gold prices in the 1990s, although mitigated by weakness in the Australian dollar, have led to sharp cuts in exploration and consolidation among mining companies. The cash costs of major Australian companies at the end of 2000 were US$191 per ounce, and total costs at US$245.

Tax was not levied on gold mining until 1991, but is now at a corporate rate of 36%. Consolidation in the global gold mining industry gathered a lot of momentum in 2001, with several mergers and acquisitions initiated and concluded during the year and into the first months of 2002. Newmont secured control of Australia's largest producer, Normandy, while the country's number two producer, diversified miner WMC Ltd, implemented its decision to divest of its gold assets with the sale of two mines to Gold Fields Ltd from South Africa. As for the local miners, Delta Gold and Goldfields merged at the end of 2001 to create AurionGold, meanwhile, Sons of Gwaila strengthened their production profile thanks to the acquisition of PacMin Mining's Tarmoola and Carosue Dam mines.

United States

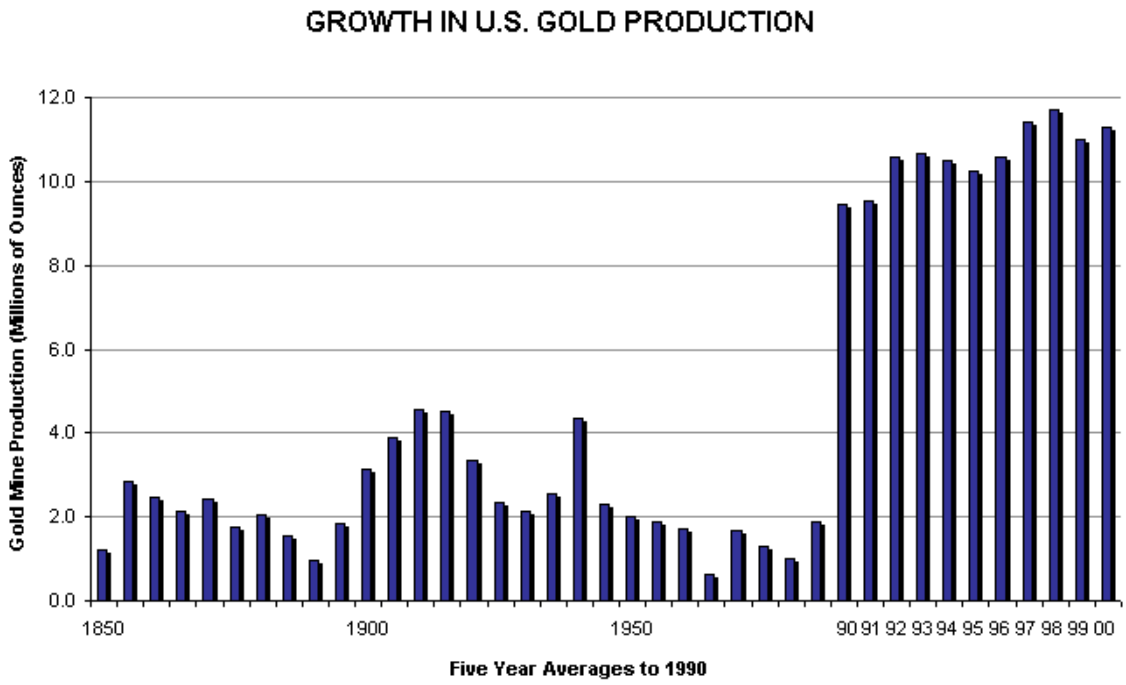
Table 13: US 2000 Gold Production by State:

	Gold Produced (1,000 ozs)	$ Value ($1,000's)
Alaska	546	148,976
California	447	121,882
Colorado	248	67,667
Idaho	72	19,645
Montana	212	57,926
Nevada	8,446	2,304,409
S.Dakota	171	46,630
Utah	700	190,995
Washington	94	25,675
Total	**10,936**	**2,983,806**

Growth Trend in Production: For many years, 75% or more of the gold needed by U.S. manufacturers was imported from other countries. From 1980 forward, however, U.S. gold production climbed steadily -- from one million to more than 11 million ounces annually -- due to important advances in exploration, mining and processing technologies. Today, the U.S. produces more gold than any nation except South Africa, and can meet all of its domestic gold needs while still making 23% of U.S. production available for export. In 1999, this resulted in a positive $2.7 billion contribution to the nation's balance of trade.

Impact on Overall Economy: Gold plays a key role in a wide range of rapidly developing technologies that are important to the nation's economic health. Billions of gold-coated electrical connectors are used throughout the computer, telecommunications and home appliance industries. Weather and communications satellites depend on gold-plated shields and reflective apparatus for protection from solar heat and electrical interference while in space. Advanced laser technology used in a variety of industrial and medical applications employs interior gold coatings to concentrate its powerful light energy. The automobile industry depends on gold-coated contacts for sensors that activate automobile air bag systems. And modern medicine relies on gold in a wide variety of procedures ranging from the monitoring of heart functions to the chemistry related to diagnosis and treatment of cancer, viral and bacterial diseases and allergies. All of these uses of gold are critical to the global economy.

Graph 10: Growth in US Gold Production



(Data in metric tons 1 of gold content, unless otherwise noted)

Domestic Production and Use: Gold was produced at about 52 major lode mines, a dozen or more large placer mines (nearly all in Alaska), and numerous smaller placer mines (mostly in Alaska and in the Western States). In addition, a small amount of domestic gold was recovered as a byproduct of processing base metals, chiefly copper.

Thirty mines yielded more than 99% of the gold produced in the United States. In 2002, the value of mine production was more than $2.9 billion. Commercial-grade refined gold came from about two dozen producers. A few dozen companies, out of several thousand companies and artisans, dominated the fabrication of gold into commercial products. U.S. jewelry manufacturing was heavily concentrated in the New York, NY, and Providence, RI; areas with lesser concentrations include California, Florida, and Texas. Estimated uses were: jewelry and arts, 85%; dental, 10%; and electrical and electronics, 5%.

Market Introduction

As a gold market, New York has only really come into its own since 31 December 1974 when Americans were once again permitted to buy and sell gold freely for the first time since 1933. In the intervening years the gold business had been strictly licensed through a handful of banks, such as Republic National Bank of New York and Rhode Island Hospital Trust National Bank, which supplied gold to authorised jewellery and industrial fabricators.

But once those restrictions were lifted, the New York market developed in its own unique way through futures (and later options) trading. The concept of futures had developed in Chicago in the 1830s essentially for agricultural projects. The application to gold came only in the 1970s, initially at the Winnipeg Commodity Exchange in Canada, but then on COMEX (Commodity Exchange Inc.) in New York and at the Chicago Board of Trade and the Chicago Mercantile Exchange from 1975. They brought a completely new dimension to gold trading, but ultimately it was COMEX which set the pace, so that today it is COMEX (now a division of NYMEX) that is the heart of America's gold market. As one writer put it, "The world of gold stays awake for COMEX".

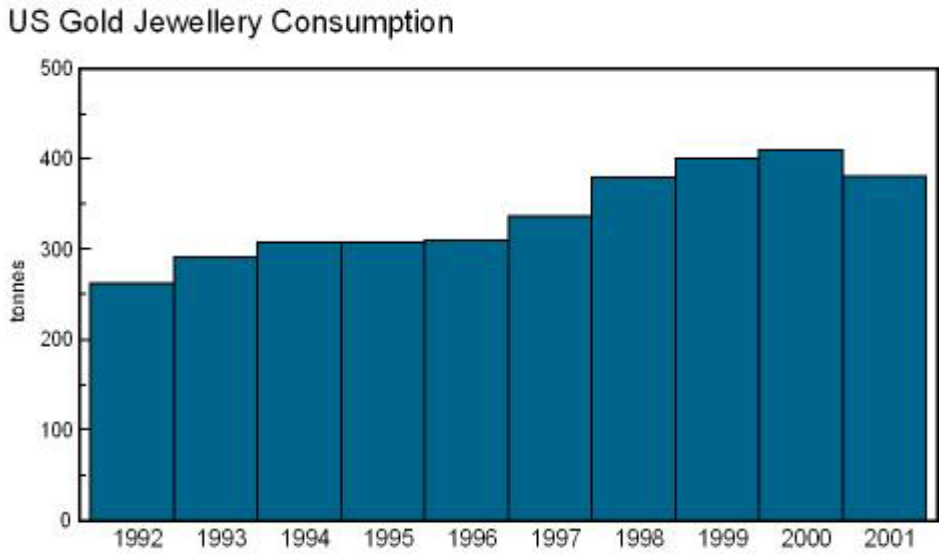
In parallel with COMEX as the great terminal market, however, an increasing amount of gold trading is done outside the exchange by market-makers in spot, forward and over-the-counter options. This is often known as 'the upstairs market'. But its volumes are not recorded. So COMEX remains supreme in terms of a formal market with its transactions closely recorded and observed by analysts.

Jewellery Briefing

According to figures published by GFMS, the United States in 2001 ranked fourth in the world, after India, Italy and China in gold jewellery fabrication, using 158 tonnes (5.1 million oz) of fine gold. Production had grown by 50% since the recession-induced low point recorded in 1991. In 2001, however, the industry suffered a major setback. Production slumped due to a high level of trade stocks being carried over from the previous year. This owed much to, and was exacerbated by, a recession-induced weaker trend in US jewellery consumption that had set in from the fourth quarter of 2000 onwards. Finally, and especially with the strong dollar over much of 2001, competition from imports was ferocious. As regards the last of these challenges, up until 2000 US manufacturers' loss of market share to imports had partly been cushioned by not only rapid growth in US jewellery consumption but also due to American companies relocating part of their production abroad. In 2001, however, both imports and domestically produced articles registered sales declines at the trade level. The picture was a little brighter at the retail level due to a major rundown of inventories.

- The manufacturing industry was originally centred in New England, in Massachusetts and Rhode Island, but has since diversified to other parts of the country, such as Florida and, especially, Los Angeles. The industry numbers approximately 4,000 production units of which 80% have less than 25 employees. Consolidation within the industry brought the number of manufacturers down by 20% during the 1990s. It is common for US manufacturers to focus on specific production lines.
- The bulk of production is in 14 carat with growing volumes of both 10 carat and 18 carat jewellery. Exports account for up to a quarter of production; major destinations are Mexico, Canada, Hong Kong and the UK.
- The US home market at the trade level absorbed 381 tonnes (12.2 million oz) of jewellery in 2001. This represented a 7% decline from the previous year's record high. As explained above, this setback came after a decade of uninterrupted growth - consumption in 1991 according to GFMS was by comparison only 238 tonnes (7.7 million oz). Over the period, the share of the domestic market taken by imported jewellery has grown from just over half to more than two-thirds. The main supplier countries are Italy, India, Turkey, China and Thailand. Recent growth from East Asia has been notable, especially from mainland China and Hong Kong. Both India and Turkey have until recently enjoyed duty exemption thanks to the Generalised System of Preferences while Italy has been subject to the handicap of a 6.2% import duty.

Graph 11: US Gold Jewellery Consumption



Source: Gold Fields Mineral Services

- According to GFMS the value of plain gold jewellery retail sales was over $16 billion in 2001 in an overall jewellery market of more than $40 billion. Even though 2001 was a difficult year, over the past decade the size of the US jewellery market has risen by close to two-thirds. This growth has been attributable not only to an increase in consumers' purchasing power but also to highly efficient discount jewellery chains and non-store retail outlets. From a low base, on-line jewellery sales are rising sharply and are predicted to exceed one billion dollars by the year 2003.

- Although 14 carat remains the norm in the US market, 18 carat jewellery has gained some ground as American consumers become more international and sophisticated in their tastes for fine jewellery. Ten carat has also been rising as it provides lower price points in the market for heavier articles.

Recycling: 85 metric tons of new and old scrap, equal to 50% of reported consumption, was recycled in 2002.

Import Sources (1998-2001): Canada, 46%; Brazil, 14%; Peru, 8%; Australia, 7%; and other, 25%.

Tariff: Most imports of unwrought gold, including bullion and doré, enter duty free.

Depletion Allowance: 15% (Domestic), 14% (Foreign).

Government Stockpile: The U.S. Department of the Treasury maintains stocks of gold (see salient statistics above) and the U.S. Department of Defense administers a Government-wide secondary precious metals recovery program.

Events, Trends, and Issues: Domestic gold mine production in 2002 was estimated at about 10% less than the level of 2001, but high enough to maintain the United States' position as the world's second largest gold-producing nation, after South Africa. Domestic output continued to be dominated by Nevada, where combined production accounted for more than 75% of the U.S. total. Between July 2001 and August 2002, four gold mines were closed in the United States. During this 12-month period, the average output per mine remained about the same, companies merged, and the size of gold mining operations increased. Companies were beginning to have difficulties in successfully replacing annual production with new reserves. Estimates by an industry association indicate that worldwide gold exploration expenditures decreased for the fifth consecutive year, with 1997 marking the peak of exploration spending for the 1990s. The expenditures of U.S. gold producers continued to fall, but at a lesser rate than in 2001 owing to the recovering gold price.

France (Paris)

Market Introduction

The Paris gold market is essentially a domestic one, although since 1987 the freedom to trade physical gold outside France's frontiers has existed. However, an individual fiscally domiciled in France is liable to an eight per cent resale tax on bullion.

Turnover is much less than in the 1950s and 1960s when the French were regarded as the greatest hoarders of gold in Europe and the French price could influence the international market. Indeed, by contrast, the French market since the mid-1980s has been characterised by sustained dishoarding of physical metal by French investors.

A daily price fixing takes place at 12.15 pm in the basement of the Paris Bourse (Stock Exchange). This session fixes prices for 12½ kg good delivery bars, French kilobars and the most

common gold coins, such as the 20 franc Napoleon, the US Double Eagle, the Mexican Centenario, and the Krugerrand.

Fixing members are the CPR Or, Crédit du Nord, and Cookson - CLAL. CPR Or negotiates about 70% of the French gold in the bullion market.

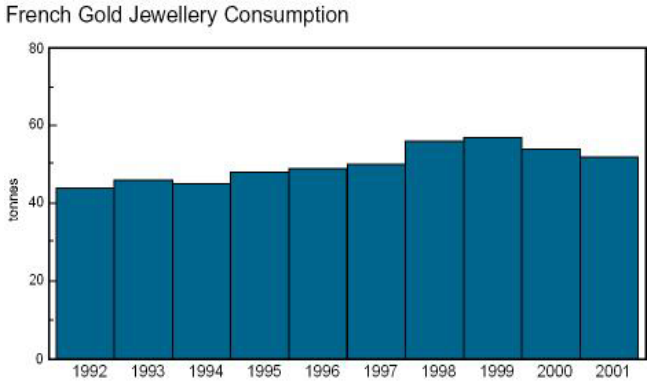
Bidding at the fixing is by open outcry, with a broker who is selling calling *'Je l'ai'*, while buyers call *'Je le prends'*.

Jewellery Briefing

France is one of Europe's mid-ranking producers of gold jewellery, processing just under 27 tons of fine gold in 2001 to create around 9 million items.

- Jewellery is produced in the area of St Amand-Montrond and in the Rhône-Alpes, Franche-Comté, Alsace and Paris regions.
- There are just under 4,000 production units but the vast majority are workshops. Less than 10% of the units employ more than ten people and a bare 5% process more than 30 kg fine gold per month.
- About one quarter of gold jewellery production is exported, main markets being US and the Far East.
- The French home market is the fourth largest in Europe accounting for 52 tons fine gold.
- All items weighing more than 3 grams sold on the French market must be assayed by the Bureau de la Garantie and carry the official hallmark. Eighteen carat is the traditional home market title and accounts for 99% of items sold. Nine carat and 14 carat have been admitted since 1994 but have made extremely little impact.
- Jewellery is sold through 9,000 outlets and the value of retail sales is in the region of €2.5 bn.
- Domestic market growth over the last decade is largely attributable to the growing distribution of gold jewellery through hypermarkets at lower mark-ups than those practised in traditional retail outlets. However, independent retailers are still prized for their exclusive models and unique service.

Graph 12: French Gold Jewellery Consumption



Source: Gold Fields Mineral Services

Germany

Market Information

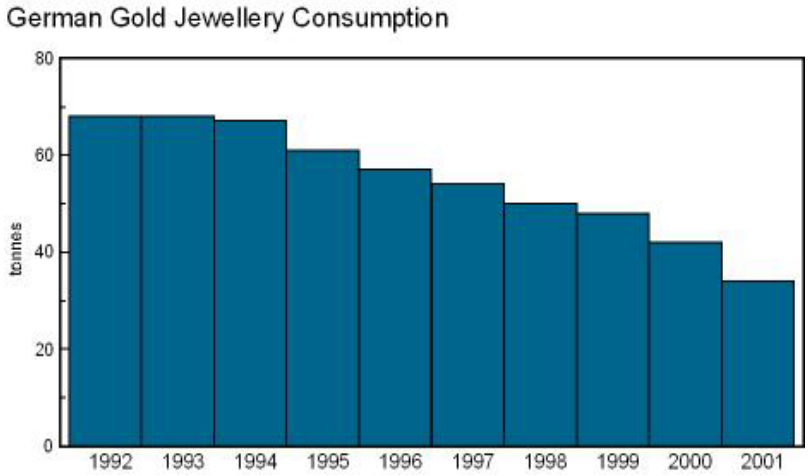
Imported jewellery, mainly from Italy and then Asia now accounts for more than half of all domestic sales. d business today is as the home of the European Central Bank (ECB), arbiter of central bank gold policy for the eurozone countries, rather than as a forum of gold trading. Until the 1990s, however, Frankfurt was a key centre, with both Deutsche Bank and Dresdner Bank active participants in international trading, while also servicing an active demand for gold coins, mainly Krugerrands, in Germany or 'offshore' in Luxembourg. Germany's third largest bank, Commerzbank, has always centred its gold operations out of Luxembourg. However, once Deutsche Bank bought the London broker Sharps Pixley in 1993 and secured its seat at the fixing, their gold operations have been centred in London, although Deutsche Bank in Frankfurt handles local physical business. The other German banks also focus most of their trading in London, including West LB from Cologne, which has established a global presence as a bullion bank.

Jewellery Briefing

Germany ranks sixth in Europe, after Italy, UK and Ireland, Switzerland, Spain and France, in volume of gold used in jewellery fabrication. According to GFMS, just over 26 tonnes (0.85 million oz) went into production in 2001.

- Pforzheim is the major manufacturing area with some production also carried out in Idar Oberstein and Schwäbisch Gmünd. Overall, more than 4,000 production units are engaged in making gold jewellery but fewer than 15% are classified as industrial concerns. Fewer than 150 units employ more than twenty workers and production has come down strongly since peaking in 1991 due in part to high costs and import substitution.
- There are five semi-fabricators that supply the industry with alloys and semi-finished products. Production is mainly carried out in 8, 14 and 18 carat for the home market and 14 and 18 carat for export destinations.
- A large but declining part of the finished production is distributed by the 200 or so wholesalers who handle mainly the low to middle price jewellery segments.
- Exports of jewellery declined in 2001 but still account for over half of total production. The main countries served are neighbouring Switzerland, Austria and Netherlands but exports to the US and UK have grown in recent years.
- There is no official hallmarking system in Germany, manufacturers do their own marking.

Graph 13: German Gold Jewellery Consumption



Source: Gold Fields Mineral Services

In volume, roughly one third of the jewellery on the German market is in 8 carat. Over the past decade the share of 8 carat in the home market has fallen at the expense of 14 and 18 carat jewellery. Imports of gold jewellery have fallen since their peak in 1994 but they have taken a growing share of the domestic market, now accounting for well over half, as overall consumption has fallen faster still.

Hong Kong

Market Introduction

The former British colony, which was returned to China in 1997, has long been a major regional gold market and jewellery manufacturing centre. Gold trading dates from the foundation of the Gold and Silver Exchange Company in 1910, which changed its name in 1918 to the Chinese Gold & Silver Exchange Society. The society was effectively the world's first gold trading exchange.

From 1947-74 strict sterling area foreign exchange controls limited gold trading in Hong Kong to 945 fine industrial metal, causing bullion imports to be diverted to the neighbouring Portuguese colony of Macau, whence they arrived back in Hong Kong unofficially.

With liberalisation in 1974, Hong Kong quickly became a significant centre in round-the-world, round-the-clock gold trading. Huge volumes on the exchange attracted international bullion houses to establish a parallel market in loco London gold during Hong Kong's trading hours. They took advantage of the arbitrage between a Hong Kong price quoted in Hong Kong dollars per tael

(1 tael = 1.2 oz/37.43 gr) and the London price in US dollars per ounce. The international bullion banks do not trade on the exchange itself, but operate more as wholesalers, dealing in lots of 2,000-4,000 ounces at a time. This alliance between local Chinese traders and the bullion banks made Hong Kong the pacesetter of the early morning gold price.

Hong Kong is also a physical re-export centre for both tael bars and kilobars, particularly into mainland China, and also to India, Thailand, Taiwan and Vietnam, although nowadays these countries rely increasingly on direct imports. Hong Kong imports (or re-exports to the international market) now reflect flows into, and sometimes from, China, depending on the prevailing Chinese price.

Hong Kong imports reached a record 460 tons (14.8 million oz) in 1988, but were more normally 200-300 tons (6.4-9.6 million oz) during the 1990s. However, official figures fell to scarcely 120 tons (3.9 million oz) in 1999, and by 2001 had dropped to below 100 tons (around 3 million oz).

Hong Kong used to be a major jewellery manufacturing centre, using between 80-100 tons (2.6-3.2 million oz) in the 1990s. According to GFMS data, though, manufacturing of jewellery has been in decline since 1997, both on the back of lower local demand and the shift of fabrication facilities to the mainland, in particular Shenzhen.

Jewellery Briefing

GFMS estimate that jewellery production in Hong Kong used around 43 tons (1.38 million oz) fine gold in 2001.

- Although there is still an active fabrication base in Hong Kong, this has been shrinking over the past decade, and GFMS notes that it is possible that a substantial proportion of the fabrication attributed to Hong Kong is actually been undertaken on the mainland. Much of the production that has remained in Hong Kong itself is of high end jewellery, in particular diamond set pieces, and most of the factories using labour-intensive processes have moved to mainland China to take advantage of cheaper labour.
- Regular exports from Hong Kong, which have grown strongly over the past decade, include re-exports of gold jewellery made in China. Approximately one quarter of Hong Kong's own production is earmarked for these exports. The US is by far the main destination taking almost one half of the total. Other leading markets for Hong Kong jewellery are Japan, Switzerland, Germany and the UK. During the Asian crisis, many manufacturers turned to new markets particularly in the US and Europe.
- Gold and platinum on sale in Hong Kong must carry a mark of fineness as prescribed by the Government Customs & Excise Department. All titles are admitted from 8 carat to 24 carat. However, in practice, around 70% of demand on the local market is for 24 carat chuk kam, pure gold investment jewellery which is now also produced in modern designs.

Graph 14: Hong Kong Gold Jewellery Consumption

Source: Gold Fields Mineral Services

- Harsh domestic economic conditions in recent years have seen Hong Kong's consumption of jewellery decline sharply. In 2001 GFMS estimate that only 27 tons of jewellery was consumed, compared with over 60 tons in 1997.
- Established Hong Kong retailers are facing keen competition from manufacturers that have integrated vertically and opened chain stores in recent years selling trendy and low-priced items for mass customers.

Japan

Market Introduction

Japan has evolved as a major market for gold for fabrication and investment since trading was liberalised in 1974. But the gold business in Japan has much earlier origins. Gold mines in Japan in the 17th century exported through the Dutch East India Company to East Asian countries. Tokuriki Honten, still an important refiner and fabricator, traces its history back to 1727. Tanaka Kikinzoku Kogyo, the leading precious metal refiner and trader, was established in 1885.

Actual mine production is limited. The only significant mine is Sumitomo Metal Mining's Hishikari on Kyushu island, opened in 1985, with output between seven and eight tons annually. The Japanese market is supplied, therefore, both by imports of bullion and by-product gold from imported concentrates.

Total gold demand in Japan ranges between 200 and 275 tons, embracing jewellery fabrication, electronic and industrial uses, dental applications and physical bar investment . Japan is the world's foremost user in electronics, using over 100 tons in 2000 according to GFMS (although this fell sharply, to around 70 tons, in 2001 on the back of the slowdown in global demand). Japan's use of dental gold in 2001 was around 21 tons according to GFMS. Physical bar hoarding is also much higher than in other industrial countries, and is an anonymous way of

holding wealth outside of the banking sector. GFMS estimate that it averaged just under 60 tons over the past decade and exceeding 100 tons in 1999. The first few months of 2002 saw a surge in Japanese hoarding demand due to fears about the health of the banking system.

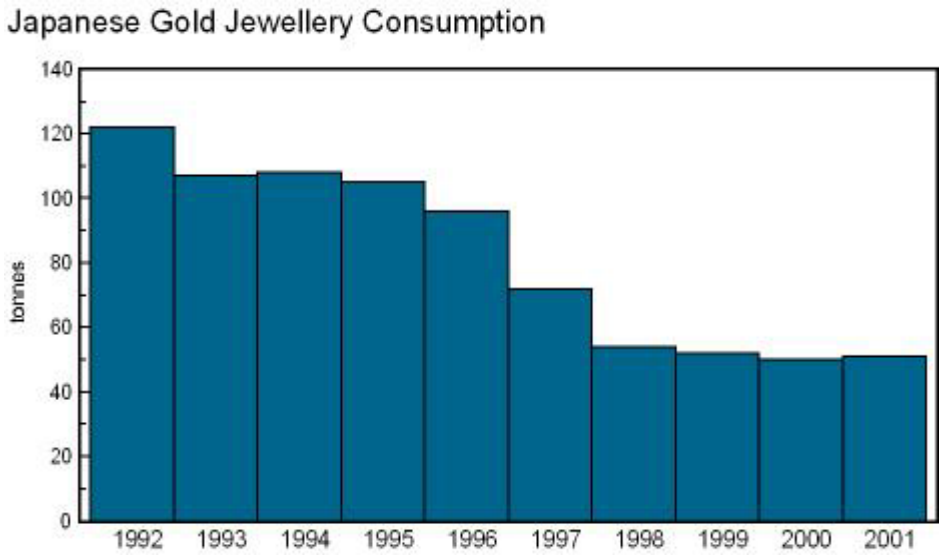
It is also the custom in Japan for companies to give gifts of 24 carat ornaments such as teapots, saki cups, vases and chopsticks. The gold tea ceremony room at the Moa Art Museum in Shizuoka Province used 50 kilos (1,607 oz) for teapots and cups, plus gold leaf for its walls.

Jewellery Briefing

According to GFMS, Japan's gold jewellery production rose marginally in 2001, to just above 37 tons. This amounted to just over one third of the volumes registered at the beginning of the decade. Japan's economic vicissitudes and the popularity of platinum are both to blame for the decline.

- The jewellery industry is highly fragmented, consisting mostly of medium-to-small family-run businesses and just a handful of clear market leaders, including some large chain makers. Eighteen carat, high quality jewellery is very much the norm. Production is largely for the home market and exports have remained relatively small. Japanese manufacturers are increasing output of lower-end items to boost sales by targeting the mass market.
- The home market is now just over 50 tons compared to 120 tons in 1990. The jewellery is sold through around 15,000 retail outlets of which only a small proportion are really active and innovative and include the big branded stores and the department stores.
- Traditionally, most of the jewellery was from home fabrication but with the strengthening of the yen, imports increased sharply reaching over 20% of sales in 1994. Today, about 30% of the jewellery comes from abroad, mainly from Italy, France, US and Hong Kong. There is a 6% import duty.

Graph 15: Japan Gold Jewellery Consumption



Source: Gold Fields Mineral Services

Luxembourg

Luxembourg became an important market for European investors during the 1980s after the imposition of value added tax on gold coins in Germany, the abolition of anonymous gold buying in France and a short-lived tax on gold delivered in Switzerland. Luxembourg offered anonymity and no tax. Some 90 companies started trading gold there, but the abolition of value added tax on bars and coins in Germany from 1993, and declining investor interest in gold, led to a rapid decline in business.

However, Commerzbank International SA, the Luxembourg affiliate of Germany's Commerzbank, has expanded its global gold activities. Its gold trading is centred in Luxembourg, while sales offices for gold have been established in New York, Mumbai (Bombay) and Hong Kong. The bank also has a 35% holding in the Argor-Heraeus refinery in Switzerland, and is a member of the London Bullion Market Association (LBMA).

Singapore

Singapore's gold market opened on 1 April 1969, as part of the strategy to make the city-state an important financial centre. The market has always been encouraged and watched over by The Monetary Authority of Singapore, the central bank, which itself has considerable gold holdings, built up mainly in the 1970s and which currently stand at 127 tons.

Singapore is the main distribution centre for physical gold to such south-east Asian countries as Indonesia, Malaysia, Thailand and Vietnam, along with considerable quantities to the Indian sub-continent. Imports, mainly in kilobars, but also ten tola bars for India, were 300-400 tons annually during most of the 1990s. They fell dramatically with the Asian financial crisis of 1997/98 to 167 tons in 1998 before recovering to 290 tons in 1999 but have since eased to 124 tons in 2001.

The level of bullion flows through Singapore are heavily influenced by demand from jewellery manufacturers located in Indonesia and, to a lesser extent, in Thailand and Malaysia, as well as the size of direct shipments now occurring between 'supplier' countries such as Australia, Indonesia and Switzerland direct to those destination markets, bypassing Singapore as a physical distribution point but still involving Singaporean based banks.

Within Singapore there is a goods and services (GST) tax of 3% on gold sales, but even before this tax was introduced, most local manufacturers had moved their operations to Malaysia or China where labour costs are lower. Singapore itself is a centre for jewellery wholesalers shipping finished goods direct to its Asian neighbours or Dubai. The Singapore Assay Office hallmarks locally made ornaments, although this is not compulsory.

Singapore is a physical market and, although bullion banks such as Credit Suisse First Boston, Standard Bank London and Rothschild are active, along with local banks such as United Overseas Bank (UOB), it has not become a major trading centre.

The Singapore International Monetary Exchange (SIMEX) was established in 1983, offering a 100-ounce futures contract quoted in US dollars, but volumes were always small and there has been no trading since March 1996.

Switzerland

Market Introduction

Switzerland has been at the heart of the gold business since World War II, as a centre for physical gold wholesaling, for gold investment in private banks and for refining. Swiss Bank Corporation was a buyer at the third London gold fixing after its inauguration in 1919. The Bank for International Settlements (BIS), the central bankers' central bank, was established in Basel in 1930.

Although today, the country's central bank, the Swiss National Bank, holds the sixth largest official stock and has a long history as a strong ally of gold, much has changed in the 1990s. The main Swiss banks have moved much of their gold trading from Zurich to London, the private banks no longer recommend gold as 10% of any portfolio and even the Swiss National Bank is selling its gold since May 2000.

To understand the current Swiss gold scene, it is important to realise the way it was for many years. (See also: Switzerland Market in 2001)

In the late 1940s, while the gold market in London was still closed after the war, the Zurich triumvirate of Crédit Suisse, Swiss Bank Corporation and Union Bank of Switzerland gained hold of the growing physical market to Italian jewellery makers, the Middle East and India. They were often the main buyers in London when the market re-opened in 1954.

In 1968, while the London market was briefly closed when the official price of $35 an ounce broke free, the three Swiss banks did a deal with South Africa, then coming to the peak of its output, to take most of its gold. The former Soviet Union also chose the Zurich banks for most of its sales in the 1970s and 1980s.

So the Swiss had cornered the suppliers of the two great producers; over 1,000 tons of metal came through Switzerland each year.

By 1990, however, the era of high inflation and gold investment was over. More important, gold production in South Africa and the old Soviet Union was declining, while major new output came from Australia, the United States, Latin America and south-east Asia and did not flow naturally to Switzerland. While the boom in derivatives trading, paper gold, centred more on London and New York. Finally, in 1997, the Swiss president announced the setting up of a special fund to aid victims of the Holocaust, for which capital would be raised by the sale of 600 tons from the Swiss National Bank. Going into the new millennium, the Swiss gold market was a shadow of its former self, even though it retained an important role in the physical bullion trade.

Jewellery & Watches Briefing

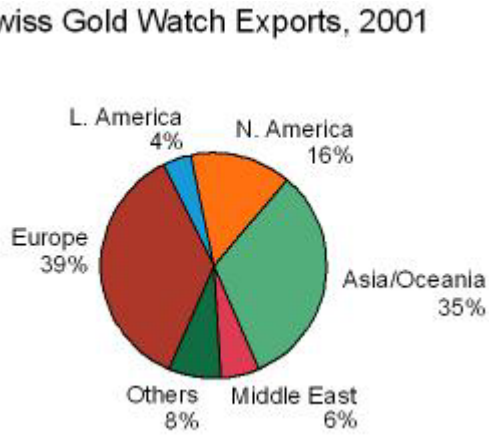
The Swiss watch industry has been using gold for more than two centuries with manufacture situated in and around three main centres, La Chaux-de-Fonds, Bienne and Geneva.

- Today, Switzerland is the world's major manufacturer of gold watches. The level of production is strongly influenced by the industry's pronounced inventory-cycle. This has resulted in

annual output ranging from less than 400,000 to more than 650,000 units in the past decade. Over 575,000 units were manufactured and hallmarked in 2001, requiring close to 35 tons of gold.

- All Swiss precious metal watch cases must be hallmarked by the Contrôle des Métaux Précieux.
- The vast majority is made in 18 carat gold.
- More than half of the cases are fitted with a gold bracelet. The hallmarking of bracelets is not obligatory.
- 80% of the gold cases used in the manufacture of watches are made in Switzerland with the remaining 20% imported mainly from neighbouring Italy where they are commissioned by the Swiss watch companies. Some bracelets are also imported from Italy.
- Major gold watchmakers include Rolex, Cartier and Piaget (the latter both part of the Richemont Group).
- More than 90% of the gold watches made in Switzerland are destined for worldwide export. Although in terms of units they accounted for only 5% of overall Swiss watch exports in 2001, watches made of precious metals (which are mostly gold) represented no less than 48% of all Swiss watch exports by value that year. Deliveries abroad of gold watches rose by 15% in value terms in 2001, with major destinations being the US, Italy, Japan,and Hong Kong. US demand fell at a double-digit rate in 2001. Exports to Asia increased, including to Japan and Hong Kong. It was also a positive story across much of Europe, with growth in shipments to most countries, particularly, and for the second year in succession, the UK. The major exception to the good performance in European markets was Italy. Exports to the Middle East were also higher in 2001, in contrast to the weakness of general carat jewellery demand across the region.
- Counterfeit wristwatches made predominantly in S.E. Asia and southern Europe are estimated to account for about 10% of global value.

Graph 16: Swiss Gold Watch Exports, 2001



Source: Gold Fields Mineral Services

Turkey

Market Introduction

Turkey has been an important regional gold market for many years; during the 1990s domestic jewellery fabrication averaged 125 tons. In addition, Turkey has been a key source of bullion for several neighbours countries.

Turkish bullion imports, which normally exceed 100 tons on an annual basis, came to 107 tons in 1999 but then rose significantly in 2000 to 205 tons. However, the following year bullion imports fell sharply. According to GFMS, this was partly due to the sharp devaluation of the Turkish currency and the associated economic and banking crises which affected the country.

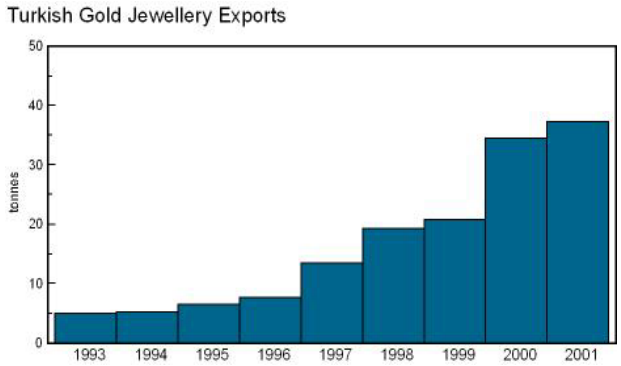
On a separate note, Turkey's position in the international market was enhanced by the full liberalisation of the local gold market in 1998 and the opening of the Istanbul Gold Exchange on 26 July 1995.

Jewellery Briefing

Turkey is the world's sixth largest gold jewellery fabricator. According to GFMS, jewellery production in 2001 was nearly 133 tons.

- The manufacturing industry comprises more than 6,000 workshops and a growing number of big factories equipped with modern technology. The largest firm employs more than 1,000 workers.
- Manufacture is centred in and around Istanbul with the majority of workshops in the area of the covered Bazaar, while some industrial-scale manufacturers have moved out to the west of the city.
- Turkish manufacturers produce the whole range of caratages, from 8 carat for Germany, to 22 carat for their home market.
- Exports have grown strongly since the liberalisation of currency and precious metals markets in 1993. They now account for more than 35% of production and go out to more than forty markets. The US is by far the leading recipient country, and accounts for more than a third of exports.

Graph 17: Turkish Gold Jewellery Exports



Source: Gold Fields Mineral Services

- Consumption on the Turkish home market was 83 tonnes (2.67 million oz) in 2001. The market is broadly characterised by two contrasting features: sales to the local population which traditionally takes 22 carat 'investment' jewellery and sales to tourists who take 14 carat. However, for some years now, there has been a marked shift amongst the local population, in particular in the cities, away from 22 carat to more fancy, higher mark-up 14 carat articles. Even in the rural areas, the traditional bastion of the 22 carat investment bangle, the consumer is moving to 18 or even 14 carat.
- There are more than 30,000 retail outlets, a large number of which are seasonal catering to foreign tourists who actually form the customer base for all jewellery shops along the western and southern coastline and for more than 50% of the jewellery shops in Istanbul. Studies show that on average one in four tourists tends to buy jewellery.
- There is no obligatory, official hallmarking system in Turkey. With the exception of the 22 carat gold bangles, jewellery production is self-controlled so that some jewellers mark their products with their individual patent serial number. Some export production is assayed by the State mint or bears the Turkish Standard 7000.

United Arab Emirates (Dubai)

Dubai, the trading centre and port at the southern end of the Arabian Gulf has been a major regional gold and silver market since the early 1960s. Over the last 35 years it has imported annually an average of over 155 tons, serving its Gulf neighbors and, primarily, India and Pakistan. The trade has been mainly in ten tola bars for India, but kilobars are also important for re-export to such countries as Saudi Arabia and in local jewellery manufacture. The steady rise in imports in the 1990's reflected the growing demand in India, which Dubai initially continued to supply once official imports were permitted in 1992. But a new system of general import licences for India from 1997, with banks in India importing direct from the international market, has reduced Dubai's trade and the record import of almost 650 tons in 1997 is unlikely to be repeated. Since 1998, customs statistics have no longer been published. However, it is estimated that in the following year, 1999, imports reached a little under 40% of their 1997 peak, and then in 2000 and 2001 a little over 40% of this peak.

Table 14: Dubai Imports (Official Customs Data)

Date	Tons	Million oz
1990	161	5.0
1991	166	5.1
1992	284	9.0
1993	228	7.3
1994	257	8.2
1995	314	10.1
1996	345	11.1
1997	646	20.0
1998	347	11.1

The physical gold business goes through bullion banks such as Standard Bank and local traders and exchange houses.

Jewellery Briefing

Dubai has evolved as a significant jewellery manufacturer as well as wholesaling substantial quantities of jewellery from Italy, Malaysia, Indonesia and South Korea. Italy alone exports around 25 tons of gold as jewellery to Dubai annually. Saudi Arabian manufacturers have also established outlets in Dubai. Factories in Dubai and the neighbouring emirate of Sharjah produce around 49 tons of gold jewellery annually.

- The essence of jewellery marketing in Dubai is high volume and low mark-up. With no sales tax, it is one of the cheapest places to buy jewellery. Indeed, Dubai calls itself 'City of Gold'. The 400 gold shops in its souks and shopping malls have 9.3 tons on display in 18, 21, 22 and 24 carat gold, often with jewellery, coins and small bars.
- The amount of gold jewellery consumed locally in the UAE stands at around 41 tons (1.3 m oz). Retail sales, however, are far higher because of the very large number of purchases made by tourists. A major surge in consumption occurs every March with the Dubai Shopping Festival which actively promotes gold. During the March 2001 festival, it is estimated that over 9 tons of gold jewellery was sold.
- The Dubai Gold & Silver Jewellery Group, an association of local manufacturers, wholesalers and retailers, is active in promotion.
- As a gold market, New York has only really come into its own since 31 December 1974 when Americans were once again permitted to buy and sell gold freely for the first time since 1933. In the intervening years the gold business had been strictly licensed through a handful of banks, such as Republic National Bank of New York and Rhode Island Hospital Trust National Bank, which supplied gold to authorised jewellery and industrial fabricators.
- But once those restrictions were lifted, the New York market developed in its own unique way through futures (and later options) trading. The concept of futures had developed in Chicago in the 1830s essentially for agricultural projects. The application to gold came only in the 1970s, initially at the Winnipeg Commodity Exchange in Canada, but then on COMEX (Commodity Exchange Inc.) in New York and at the Chicago Board of Trade and the Chicago Mercantile Exchange from 1975. They brought a completely new dimension to gold trading, but ultimately it was COMEX which set the pace, so that today it is COMEX (now a division of NYMEX) that is the heart of America's gold market. As one writer put it, "The world of gold stays awake for COMEX".
- In parallel with COMEX as the great terminal market, however, an increasing amount of gold trading is done outside the exchange by market-makers in spot, forward and over-the-counter options. This is often known as 'the upstairs market'. But its volumes are not recorded. So COMEX remains supreme in terms of a formal market with its transactions closely recorded and observed by analysts.

Annexure – 9

International Gold Exchanges

The major exchanges for gold forward trading are the COMEX division of the New York Mercantile Exchange, Chicago Board of Trade, Hong Kong Gold and Silver Exchange, Bolsa de Mercadorias et Futuros in Sao Paulo and the Tokyo Commodities Exchange.

At the Chicago Board of Trade, Futures contract is of 33.2 fine troy ounces of gold, no less than 0.995 fine contained in no more than one bar. Variations in the quantity of the delivery unit is not allowed in excess of 10% of 33.2 fine troy ounces. All gold is required to be certified as to fineness and weight by an Exchange approved refiner or assayer.

The trading Unit of gold is 100 troy ounces at New York Mercantile Exchange. (±5%) of refined gold, assaying not less than .995 fineness, cast either in one bar or in three one-kilogram bars, and bearing a serial number and identifying stamp of a refiner approved and listed by the Exchange.

Annexure – 10

Istanbul Gold Exchange

Renewing the Infrastructure of the Gold Sector

The structure altering decisions taken in parallel to the application of the free market transmission policies applied to all areas of the economy on January 24, 1980 has played a significant role in the development of the gold sector. Reforms set forth in 1983 and 1984 allowed the unhindered importation of gold provided that it would be in compliance to the foreordained regulations. These reforms also authorized Central Bank of the Republic of Turkey (Central Bank) to determine the exchange rates of gold and foreign currency to the Turkish Lira.

Pursuant to the said reforms, Central Bank established the gold market indexed to the Turkish Lira in 1984. In this market, the gold imported by Central Bank was sold to persons within the country in return for Turkish currency. Central Bank in 1989, then established the gold market indexed to foreign currency, where the gold imported by Central Bank was sold to persons within the country in return for foreign currency and effective. Capital movement was unleashed in accordance with Decree No. 32 of the preservation of the value of Turkish currency scheme which was prepared in 1989. As a result, the designation of necessary arrangements for gold, being an inseparable counterpart of the financial system has become unavoidable.

With the modifications made to Decree No. 32 of the preservation of the value of Turkish currency in 1993, ascertainment of prices as well as the import and export of gold was set free. Decisions taken in favour of the liberalisation of gold created an effortless phase in import and export. These developments on the subject of gold caused a favourable decrement in domestic prices against international prices, and therefore deflating the outlay costs. With an enhanced competitiveness in the sector abroad, a growing trend was encountered where the gold could be processed to supply the domestic demand and also allowed for re-exportation.

During this period of re-structuralism, the model outlined for gold consisted the idea of canalising the gold to investments by liquidating gold savings to the financial system. In addition to this, a development of an organised system for gold, establishment of the Gold Exchange, restoration of gold banking, support for the jewellery sector and ultimately the establishment of a gold refinery has been targeted.

Modifications made to Decree No. 32 of the preservation of the value of Turkish currency in 1993, in regard to gold storage accounts and gold credits, banks were authorized to open gold storage accounts. The same Decree modified again in 1995, stabilised the basis for gold storage accounts and also provoked arrangements to be made for the use of credit within the country by obtaining gold credits from abroad.

Establishment and Legal Structure of the Istanbul Gold Exchange

Clause 40/A titled " Foreign Exchange and Precious Metals Exchange " of the Capital Market Law numbered 3794, dated 1992, states that, "related ministries are authorized: to establish the currency and precious metals exchanges, to determine their working principles, to verify the

fundamentals related to the intermediaries who are active in these exchanges and to make arrangements for the auditing and control of these exchanges and intermediaries." The legal framework constituted for the establishment of the precious metals exchange, stated with this clause had inaugurated the foundation for the first legislative procedures for Istanbul Gold Exchange.

The Capital Markets Board prepared progressively following regulations in accordance with clause 40/A of the Capital Market Law, a "General Administration of the establishment and business principles of the precious metals exchange" in order to provide the precious metals to be purchased and sold easily and confidentially under the free competition conditions and also to confirm and announce the related prices in 1993. Establishment of the general administration, public organisations which have a corporate body are authorized to buy/sell precious metals predetermined by the Under-Secretariat of Treasury in the market to be created within the exchange, and by conforming to the clear, regular and free competition conditions which have been predetermined for the precious metals as well as carry out other duties mentioned in the regulation such as stabilisation of prices and making announcements." based on this regulation in 1993, Under-Secretariat of Treasury prepared "Basis for the issuance of membership certificates to precious metals exchange institutions, and activity conditions of the precious metals exchange brokerage companies".

Following this, the Capital Markets Board had approved, in 1994, the proposition of "Administration of Istanbul Gold Exchange" set forth by the enterprising committee which was on duty preceding the first Board of Directors of Istanbul Gold Exchange.

Istanbul Gold Exchange officially began its operation on July 26, 1995.

Istanbul Gold Exchange termed operations and administration of the Futures and Options market was enforced in 1996.

With the modification, made in 1999, the Decree of the preservation of the value of Turkish currency regards that silver is to be introduced as a precious metal, and also that regulations such as brokerage companies having to forward the unprocessed metals to Istanbul Gold Exchange. The purchasing and selling transactions of precious metals would be carried out by Istanbul Gold Exchange, and also that regulations concerning tradable precious metals in the Exchange and related markets would be prepared by the exchange itself.

Silver and platinum have been traded since July 09, 1999 in Istanbul Gold Exchange.

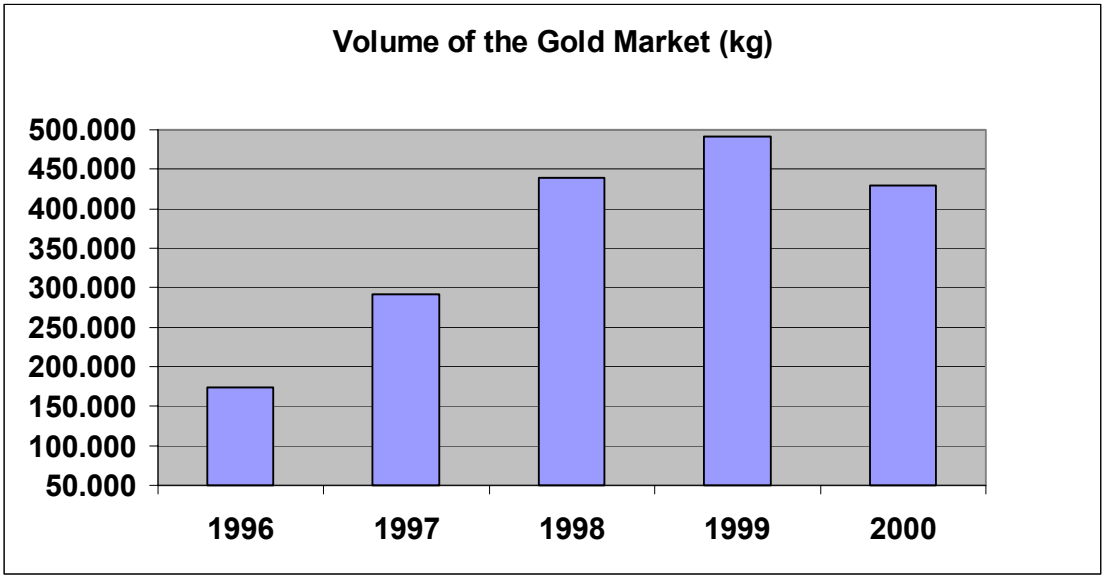
Volume of Istanbul Gold Exchange

Trading statistics of Istanbul Gold Exchange are as follows;

Graph 15: Gold Volume (tons)

	1996	1997	1998	1999	2000
TL./gr. transactions	103	178	266	278	300
USD/oz transactions	71	113	174	214	129
Weighted Avarage Price (USD/oz)	388.34	333.48	293.76	277.71	278.85

Graph 18: Volume of the Gold Market



Annexure - 11

Indian Gold Jewellery Market

- Plain 22 carat jewellery is the core of consumption especially in the rural areas, where gold is so important in judging a family's status at a marriage. A basic marriage set for a bride is two earrings, one nosepin, one ring, one necklace and two bangles, all in 22 carat gold and weighing up to 200 grams (6.2 oz).
- Studded (i.e. gem-set) 18 carat jewellery is increasingly popular in the cities and is estimated to have used 31 tonnes (1 million oz) in 2001.
- Medallions, charms and small gift items account for up to half of what is loosely called jewellery. These items are popular as gifts at weddings and other family events.

- Gold thread, known as Jari used in high quality saris worn at weddings and special occasions requires somewhere in the region of 20 tonnes (0.6 m oz) annually.

- The market is highly fragmented with an estimated 100,000 workshops supplying over 300,000 retailers, mostly family-owned, single shop operations. The industry is beginning to be modernised with large factories, installing the latest equipment, in centres such as Mumbai, Ahmedabad and Bangalore.

- Hallmarking does not exist in India and under-caratage is commonplace. The Bureau of Indian Standards has introduced a voluntary scheme which, although not yet widely used, is becoming more popular. The minimum legal caratage is 9 carat.

- The number of retail jewellery outlets has increased greatly since the abolition of gold control, as has the number of Indians possessing gold jewellery.

Annexure - 12

Features of India's Gold Economy

India has been known to possess large stocks of gold and studies show that they are mostly accumulations from centuries of trading rather than result of production of her mines. What is of contemporary interest, however, relate to the demand, supply and price-movements and their link with policy. Some broad generalizations on these aspects would be appropriate to review the policy and identify the issues.

First, on the demand side, while there are no authentic estimates, the available indications are that about 80 per cent is for jewellery fabrication (mainly of over 22 carat purity) for domestic demand, 15 per cent is for investor-demand (which is relatively elastic to gold-prices, real estate prices, financial markets, tax-policies, etc.) and barely 5 per cent is for industrial uses. The demand for gold jewellery is rooted in the societal preference for a variety of reasons viz. Religious, ritualistic a preferred form of wealth for women and as a hedge against inflation. It will be difficult to prioritize them but it may be reasonable to conclude that it is a combined effect, and to treat any major part as exclusively a store of value or hedging instrument would be unrealistic. Nor would it be realistic to assume that it is only the affluent who create demand for gold. There is reason to believe that a part of investment demand for gold assets is out of black money. The annual consumption of gold which was estimated at 65 tons in 1982 has increased to 505 tons in 1995. Although it is likely that with prosperity and enlightenment, there may be deceleration in demand, particularly in urban areas, it would be made good by growing demand on account of prosperity in rural areas. In the near future, therefore, the annual demand will continue to be high at around 400 to 500 tons.

Second, as the domestic production of gold is very limited, around 2 tons per year, and supply from fabricated old gold scraps estimated at around 62 tons per year being not adequate, the rising demand has to be sourced from outside the country. In the face of a virtual ban on official import of gold for domestic consumption till 1990, the rising demand was met by illegal imports. During the period 1968 - 1995, smuggled gold into India varied in the wide range of 10 – 217 tons per year with the sole exception of 1980 when 9 metric tons were reported to have been smuggled out of the country to take advantage of the soaring gold prices in the international market. However, the situation changed drastically during the 'nineties since the proportion of smuggled gold in our total supplies has gone down substantially. While currently there are some efforts to promote gold mining domestically, especially involving private sector, there are no indications that domestic supply would increase in any perceptible manner.

Third, the strong domestic demand for gold and the restrictive policy stance are reflected in the higher price of gold in the domestic market compared to that in the international market at the available exchange rate. During the 19-year period from 1977-78 to 1995-96, the average spread between Mumbai and London market prices (Mumbai price less London price in rupee terms) of gold has been positive except for a brief period during 1980-81 when the international gold price zoomed briefly, following the oil crisis, the persistent weakening of the US dollar resulting in flight of dollar resources into gold and accelerating world-wide inflationary trends. The average spread was as high as 41.3 per cent during 1977-79 which rose to 46.6 per cent during 1981-85 and further to 56.6 per cent during 1986-91. In the post-liberalisation period, with changes in the

exchange rate regime and some relaxations on the import regime of gold, the average spread between domestic and international prices has come down from 53.1 per cent in 1991 to 20.6 per cent in 1993, 20.1 per cent in 1994, 19.9 per cent in 1995 and further to 17.5 per cent in 1996 (up to October). In the absence of open import, the domestic gold prices relative to international prices appear to have been governed by two factors: (i) the spread between the official and market exchange rate of the rupee and (ii) the customs duty, transportation cost, storage cost, risk premia, etc.

Fourth, the value of gold imports through official channels increased from $ 1.25 billion in 1992 to $ 3.4 billion in 1995 while that of smuggled gold was in the range of $ 1.2 to $ 1.7 billion. Viewed from any angle, gold import has emerged, in terms of importance in our foreign trade, only second to that of oil.

Fifth, as the policy-debates would show, the management of demand and supply of gold has important policy implications for fiscal policy and exchange rate management, and in the recent times, use of gold as a financial instrument, especially mobilisation of domestic gold has attracted attention.

Indian Gold Policy

The evolution of the gold control policy since independence was centered around some major objectives, viz., weaning away people from gold, regulating the supply of gold, reducing the domestic demand and prices and curbing smuggling. In the wake of the Chinese war, it was felt in some circles that it would be feasible to make a frontal attack on demand for gold in India. Accordingly, the Gold Control Order 1962 was issued, banning the making and selling of jewellery above 14 carats, making it compulsory for gold smiths to be licensed and submit accounts of all gold received and utilised by them etc., The measures met with lot of resistance and criticism. This coupled with administrative complexities resulted in the failure of the Gold Control order.

Bullion imports and exports were also banned but restrictions on import of gold into the country resulted in the flourishing of smuggling and unofficial transactions in foreign exchange. Official imports to discourage smuggling was first mooted in 1977 but viewed against the forex reserves available then, it was thought as an impossible proposition. The Government decided to sell confiscated gold in small quantities through the RBI. However, it did not have any major impact on smuggling.

Various schemes for mobilisation of idle gold holdings have been implemented by the Government and RBI in the past, but with little success. The 15-year Gold Bonds at 6 1/2 per cent (November 1962) could mobilise only 16.70 tonnes. A second attempt to garner gold was made through the 7 per cent Gold Bond 1980 Scheme (March 1965) which could mobilise only 6.1 tonnes. The third series designated as National Defence Gold Bonds 1980 (1965) garnered 13.7 tonnes and the Gold Bond Scheme 1993 garnered 41 tonnes of gold. Even after two years of launching the scheme under the recent Gold Deposit Scheme (1997) the mobilization is around seven tonnes only. Thus, attempts to mobilise gold under various schemes have not evoked the desired response.

Currently, gold import is permitted through three official channels viz., special import licences, non-resident Indians and authorized banks and institutions. Import of gold through Special Import Licence (SIL) has been negligible after gold import through banks was permitted. It is but natural that NRI route had become less attractive after the banks have been permitted to import gold.

The liberalized gold policy has certainly brought to the official sector what originally was an unofficial sector. Without doubt, it has eliminated illegal transactions and profiteers out of such illegal transactions with attendant socio-economic impact of such large scale and high value market involving cross-border operations. At the level of managing external sector and forex markets, the elimination of large unofficial market in forex has improved the policy effectiveness. It may also be noted that the Indian consumer of gold has been spared of huge transaction costs amounting to thousands of crores of rupees on account of the existence of the unofficial sector in the past. Further, duty realization is significant at a time when realization through customs duty on other commodities is coming down. However, there are some who argue that ban on gold imports should be re-imposed, while a few others argue that the duty be hiked on the assumption that such measures would curb the total import bill on account of gold. Past experience does not seem to favour this negative view. In this regard, there is another view which holds that both gold import and export should be totally freed, but this argument ignores the fact that gold has some characteristics of a currency.

The regulatory steps

The Gold (Control) Act, implemented in 1968 and abolished in 1990, had forbidden the holding of gold in bar form. The repeal of the Act was part of the economic reform process that took place in the wake of the balance of payments crisis of 1990 and 1991. In 1993 the Foreign Exchange Regulation Act was repealed, which had little tangible impact (the Act had treated gold and silver as foreign exchange for foreign exchange control purposes, and allowed the government to restrict dealings therein prior to, or at the point of, import), but reflected a more pragmatic attitude towards gold and silver.

Also in 1993 the government permitted non-resident Indians to bring 5kg of gold into the country twice yearly on the payment of import tax of Rs. 250 per 10 grammes (at current rates this equates to US$14.56/ounce or 4.2%). The allowance was raised to 10 kg per trip in January 1997.

Meanwhile in 1997 the Committee on Capital Account Convertibility recommended that the market should be liberalised, but also that a well-regulated and transparent market should be developed. The first step in this process was to allow import and export of gold under Open General Licence and the banks involved had to fulfil certain specific criteria. There are currently approximately twenty such banks operating in the market, both executing international trade in gold and selling and leasing the metal for domestic Indian use. These include local banks ICICI Bank and HDFC bank, both of which are enthusiastic about the developments in the market and are looking to drive developments forward, see below.

1990 Abolition of the long-standing Gold Control Act, which had forbidden the holding of 'primary' or bar gold except by authorised dealers and goldsmiths and sought to limit jewellery holdings of families.

Imports were then permitted in three stages.

1992 Non-Resident Indians (NRIs) on a visit to India were each allowed to bring in up to 5 kilos (160.7 oz) on payment of a small duty of six per cent. This allocation was raised to 10 kilos in 1997.

1994 Gold dealers could bid for a Special Import Licence (SIL) which was issued for a variety of luxury imports.

1997 Open General Licence (OGL) was introduced, paving the way for substantial direct imports by local banks from the international market, thus partly eliminating the regional supplies from Dubai, Singapore and Hong Kong.

The OGL system has also largely eclipsed imports by NRIs and SILs. Additionally, significant temporary imports are permitted under an Export Replenishment scheme for jewellery manufacturers working for export in designated special zones.

Table 16: Breakdown of Official Imports

	Tons	Million Ounces
NRI & SIL	3	0.1
OGL	599	19.25
Export Replenish	52	1.67
Total Official	654	21.03

Source: 2001 GFMS data

In 2001 unofficial imports fell because of a reduction in import duties, pushing down the local premium and making smuggling less profitable. Ten tola bars are still the preferred form of gold in India, accounting for 95% of imports.

In the 2003 budget the Finance Minister reduced the customs duty on 'serially numbered bars, or…. gold coins' from Rs. 250 per 10 grammes to Rs. 100 per 10g. At today's rates (gold at $345/ounce), this is the equivalent of a cut from US$16.5/ounce or 4.6%, to $6.6/ounce or 1.9%. The move, which was accompanied by a reduction in customs duties on diamonds, notably on some rough and half-cut stones, is designed to enhance India's already important role in the world's jewellery industry. It does not include ten tola bars, which have for years been the favoured bar for hoarding in India (this is partly historical because their design made them particularly suitable for carriage by smugglers). To qualify for the lower tax, the bars should have their weights expressed in metric form. Although ten tola, or 'TT' bars are popular elsewhere, including Saudi Arabia, many have now been melted down in favour of metric bars.

The second phase, the development of gold-related financial instruments, is rapidly coming to life. The one blot is perhaps the poor performance of the Gold Deposit scheme, which was launched in October 1999. Under the scheme the State Bank of India takes local gold deposits and issues interest-bearing gold term deposits in return (and allow local banks to lease the metal to

jewellers). This has however gathered little momentum as members of the public continue to show a preference for holding their gold in physical form rather than a paper representation. Roughly eight tonnes have so far been mobilised; the bank had been looking for 100t in the first twelve months of the scheme. Gold in any physical form can be tendered and is subject initially to a non-invasive assay (no effect on the piece in question). At that stage, if the tenderer does not agree with the assay results or wishes to withdraw for any reason then he may do so. If the deposit is made, then the metal is melted and subjected to full assay, which would reduce the metal to scrap form.

The lock in period has also deterred would be investors. The terms available offer interest rates over a range of lock-in periods from three to seven years, although there was also an initial lock-in period of one year, after which premature encashment would be permitted. The slow uptake of the scheme has meant that leasing to jewellers remains comparatively limited. The State Bank of India (SBI) cut the rates payable on these deposits in April, from 3-4% to 1.5% because of the low interest rates prevailing in the international gold market, which further suggests that uptake is likely to remain sluggish.

Risk and Return on Gold Investments

The return from investments in gold may be compared with the return on investment in Government bonds in the Indian markets. Illustratively, if gold had been purchased at end-February 1996 and sold at end-February 2002 at the prevailing rates in the local bullion market, the average annualised return would work out to be negative. On the contrary, investment in a liquid risk-free Government security on the same date would have fetched a comfortable positive return, and in case capital gains through marked to market is also taken into account, the annualised average return could be as high as 15 per cent.

Annexure - 13

Recent Research in Gold Markets

A DRG study (Gold Mobilisation Instrument as an External Adjustment) prepared in the RBI in 1992, tested five factors for their influence on demand for gold. These five factors are

1. generation of large market surplus in rural areas as a result of all round increase in agricultural production,
2. unaccounted income/wealth generated mainly in the service sector,
3. comparative rate of return available on alternative financial assets like bank deposits, units of UTI, small saving schemes etc.,
4. price variation in gold and
5. price of other commodities.

The study led to the conclusion that the first two factors i.e. rural surplus and unaccounted income in the service sector have far more influence on gold demand than the other factors.

In another analysis made by Shri Vaidyanathan in 1999, (Economic and Political Weekly, February 20, 1999) the factors determining the demand for gold were studied. The parameters taken into account were GDP, ratio of household financial savings to national product, domestic price of gold, GDP deflator, index of ordinary share prices and the difference between domestic and foreign price of gold as percentage of international prices. The study established that gold imports tend to be higher when domestic gold prices rise relative to those of ordinary shares and international gold prices; but, the effect of these two variables was pronounced during 1991-96 as compared to 1970-90.

Dr. Saumitra Chaudhuri (Financial Express, November 26, 2001) made an analysis of the possible choices for a saver between interest bearing financial instruments and gold. He advocates that in Indian conditions, a return of less than 6 per cent for a saving instrument would induce the saver to invest in gold.

Mr. N.A. Mazumdar, in many of his articles, has been holding the view that a capital starved country like India cannot afford to utilize foreign exchange on a commodity like gold. He holds the opinion that the consequences of the gold liberalization policy could be alarming, especially in view of the fact that such imports of gold are unrelated to India's exports of jewellery.

Annexure - 14

Statistics

Table 17: World Gold Production 1840 - 2000

In Tons

	1840-1850	1851-1875	1876-1900	1901-1925	1926-1950	1951-1975	1976-2000
Australia	0	1608	1235	1695	712	697	3798
Canada	0	68	149	659	2647	2731	2914
S.A.	0	0	644	5549	9091	18102	15206
USSR	233	703	905	765	2277	4196	4283
USA	162	1816	1586	2921	2078	1257	4843
Other	162	594	1151	3263	4973	3667	14189
World Total	557	4790	5670	14852	21779	30649	45235

Table 18: Gold Fabrication in Industrial and Developing Countries by Market Sector

Including the use of scrap

Table 18a: Industrial Countries

(in millions of troy ounces)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Jewelry	28.45	29.83	28.72	28.66	29.02	28.71	30.67	32	31.18	31.14
Electronics	4.46	4.09	4.39	4.67	5.09	5.14	5.76	5.3	5.69	6.49
Dentistry	1.63	1.75	1.73	1.77	1.9	1.91	2	1.84	1.86	1.96
Other Industrial	1.85	1.98	1.99	2.07	2.14	2.16	2.13	1.98	1.77	1.75
Medal Sales	0.29	0.19	0.13	0.13	0.09	0.06	0.08	0.06	0.12	0.07
Coin Sales	3.89	2.48	3.14	1.87	2.24	1.52	2.65	3.54	3.71	0.88
Sub Total	40.56	40.32	40.11	39.16	40.48	39.5	43.28	44.71	44.33	42.3

Table 18b: Developing Countries

(in millions of troy ounces)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Jewelry	47.39	58.97	53.4	55.53	60.74	62.96	77.01	69.46	70.07	70.94
Electronics	2.1	1.51	1.35	1.4	1.47	1.57	1.79	1.94	2.24	2.61
Dentistry	0.39	0.35	0.31	0.28	0.27	0.26	0.25	0.22	0.27	0.26
Other Industrial	0.49	0.76	1.21	1.3	1.37	1.44	1.57	1.44	1.46	1.61
Medal Sales	0.57	0.73	0.67	0.73	1.02	0.99	1.28	1.43	1.44	1.87
Coin Sales	0.95	0.46	0.75	0.45	0.54	0.5	0.51	0.54	0.57	0.61
Sub Total	51.9	62.78	57.69	59.69	65.4	67.73	82.4	75.02	76.04	77.91
World Total	92.47	103.1	97.79	98.85	105.89	107.23	125.68	119.73	120.37	120.2

Table 19: Jewellery fabrication demand by region

Excluding the use of scrap. ((in millions of troy ounces)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Europe	20.11	21.07	19.57	19.38	19.62	19.21	21.83	23.59	22.49	22.02
North America	3.82	4.13	4.33	4.55	4.6	4.76	5.01	5.35	5.63	5.76
Latin America	1.65	1.87	1.97	2.49	2.11	2.39	2.8	2.98	2.91	3.05
Middle East	8.54	10.1	8.92	4.76	8.54	10.1	17.28	15.3	12.74	14.86
Indian Sub-Continent	6.04	8.16	6.79	9.68	11.31	12.31	20.21	21.91	21.34	20.78
East Asia	17.81	22.05	18.68	19.11	19.09	18.22	17.16	9.35	14	13.42
Africa	1.22	1.19	0.78	0.81	0.91	0.95	1.05	0.95	0.9	0.91
Australia	0.1	0.1	0.15	0.19	0.16	0.15	0.16	0.16	0.18	0.18
China	4.12	6.21	5.47	6.24	6.08	5.53	6.69	4.82	4.4	4.43
Soviet Union/CIS	1.06	0.75	0.61	0.48	0.47	0.61	0.71	0.68	0.66	0.86
World Total	64.47	75.6	67.27	67.68	72.9	74.25	92.89	85.1	85.24	86.17

Annexure - 15

List of London Bullion Market Association Approved Gold Suppliers

Country	Company	Location of Refinery	Date of first Listing	Most Recent Brand Mark
Australia	AGR Matthey Joint Venture	Newburn, W. Australia	24.1.03	AGR Matthey in an oval round three stacked bars
Belgium	Umicore SA, Business Unit Precious Metals	Hoboken	1930 (est.)	Hoboken 9999 and Hoboken 999.7
Brazil	Banco Ourinvest SA	São Paulo	17.3.95	i in circle and Ourinvest, and i in circle and Ourinvest S.B.M. all in rectangle
	Casa da Moeda do Brasil - CMB	Rio de Janeiro	25.6.84	Casa do Moeda do Brasil - CMB and mark
	OMG Brasil Ltda.	Guarulhos, São Paulo	11.12.92	Degussa Brasil with sun and moon in diamond logo
	Mineração Morro Velho SA	Nova Lima	21.3.86	Morro Velho and MMV in rectangle
Canada	Johnson Matthey Limited	Brampton, Ontario	15.6.61	Johnson Matthey JM and crossed hammers in diamond, and JM Ltd Canada Assay Office in oval
	Noranda Inc CCR Refinery	Montreal East, Quebec	1.1.55	Refined (year) Noranda Inc CCR Montreal East Canada
	Royal Canadian Mint	Ottawa, Ontario	1919 (est.)	Royal Canadian Mint and Monnaie Royale Canadienne in mark
China, Peoples Republic Of	The Great Wall Gold & Silver Refinery of China	Chengdu	1981	Refined by Great Wall Gold & Silver Refinery in oval around *China* and Great Wall logo and assay seal.
	Neimenggu Precious Metal Refinery of China	Huhhot, Inner Mongolia	27.10.99	Horse's head logo circled by Neimenggu Precious Metal Refinery of China in Chinese and Roman script and assay mark of logo in circle with Chinese script
Colombia	Banco de la República	Medellin	22.12.94	Banco de la República Colombia in rectangle with mountains

Germany	W.C. Heraeus GmbH	Hanau, Hessen	15.7.58	Heraeus Hanau in rectangle
	Norddeutsche Affinerie Aktiengesellschaft	Hamburg	Before 1934/ 12.8.53	Norddeutsche Affinerie Hamburg in rectangle and NA
Hong Kong	Johnson Matthey Hong Kong	Kwai Chung	15.8.01	Johnson Matthey Hong Kong in oval round
				REFINERS MELTERS and Johnson Matthey Assay Office in oval round crossed hammers
Indonesia	PT Aneka Tambang (Persero) Tbk	Jakarta	1.1.99	LM logo and Logam Mulia Antam Jakarta in oval
Italy	Chimet SpA	Badia Al Pino, Arezzo	27.7.96	Chimet Trattamento Metalli Preziosi Badia Al Pino AR in oval
	Metalli Preziosi SpA	Paderno Dugnano, Milan	Before 1962	Metalli Preziosi S.p.A. Milano Affinazione in oval round MP in diamond
Japan	Ishifuku Metal Industry Co., Ltd.	Soka, Saitama Pref.	30.6.82	Ishifuku Tokyo Melters & Ishifuku Tokyo Assay Office in circles round Japanese 'Bun' character
	Matsuda Sangyo Co.,Ltd.	Iruma, Saitama Pref.	11.1.00	Matsuda Tokyo Assayer-Melter in oval with M
	Mitsubishi Materials Corporation	Kagawa, Kagawa Pref.	20.5.81	Three diamonds mark and three diamonds mark with Assayer Melter in rectangle
	Mitsui Mining and Smelting Co., Ltd.	Takehara, Hiroshima Pref.	20.5.81	Logo consisting of three horizontal lines inside diamond inside circle
	Nippon Mining &	Saganoseki,	3.5.00	Hollow circle above NSS with

	Metals Co Ltd	Smelter & Refinery		Nippon Mining at right
	Sumitomo Metal Mining Co., Ltd.	Niihama, Ehime Pref.	17.6.81	Sumitomo with logo and Sumitomo Assay Office with logo
	Tanaka Kikinzoku Kogyo KK	Hiratsuka, Kanagawa Pref.	7.9.78	Tanaka Tokyo Melters round logo and Tanaka Tokyo Assay Office round logo
	Tokuriki Honten Co., Ltd.	Shobumachi, Saitama Pref.	21.10.81	Tokuriki Tokyo Melters Assayers in circle round Japanese 'Toku' character
Kazakhstan	Kazzinc Joint Stock Company	Ust-Kamenogorsk	20.6.96	Stylised K and Kazakhstan in Cyrillic script in oval with running stag
Korea, Democratic People's Republic Of	Central Bank of the DPR of Korea	Pyongyang	14.4.76	Central Bank Pyongyang, Refiners, Melters, Central Bank DPR of Korea and assay mark
Korea, Republic Of	Korea Zinc Co Ltd	Onsan	9.8.00	KOREA ZINC CO., LTD. 1974 in circle around KZ
	LG-Nikko Copper Inc	Ulsan	20.5.94	LG-Nikko with LG logo and Assayer Melter with LG logo
Kyrgyz Republic	Kyrgyzaltyn JSC	Karabalta	27.10.99; name & brand changed 1.5.01	KYRGYZ REPUBLIC in oval round ALTYN on crossed globe logo
Mexico	Met-Mex Peñoles, S.A.	Torreon, Coahuila	22.11.91	Met-Mex Peñoles SA DE CV in oval
Netherlands	Engelhard-CLAL/Drijfhout BV	Amsterdam	20.3.54	H Drijfhout & Zoon Amsterdam Melters and assay mark
	Schöne Edelmetaal BV	Amsterdam	Before 1934	Degussa with sun and moon in diamond logo
Philippines	Bangko Sentral ng Pilipinas (Central Bank of the Philippines)	Quezon City	6.9.79	Central Bank of the Philippines Gold Refinery & Mint in oval round crucible pouring mould and similar assay mark

Russia	Joint Stock Company Ekaterinburg Non-Ferrous Metal Processing Plant	Ekaterinburg	11.1.99	Ekaterinburg logo, Cyrillic ED and Russia in Cyrillic script in oval
	Federal State Enterprise Novosibirsk Refinery	Novosibirsk	11.1.99	Novosibirsk logo, Cyrillic NV and Russia in Cyrillic script in oval
	The Open Joint Stock Company "The Gulidov Krasnoyarsk Non-Ferrous Metals Plant" (OJSC "Krastvetmet")	Krasnoyarsk	29.11.99	Krasnoyarsk logo, Cyrillic KR and Russia in Cyrillic script in oval
	Prioksky Plant of Non-Ferrous Metals	Kasimov, Ryazan	29.11.99	Prioksky logo, Cyrillic PM and Russia in Cyrillic script in oval
	State-Owned Enterprise Shyolkovsky Factory of Secondary Precious Metals	Shyolkovo, Moscow	27.10.99	Shyolkovsky logo, Cyrillic SCH and Russia in Cyrillic script in oval
South Africa	Rand Refinery Limited	Germiston, Gauteng	1921 (est.)	Rand Refinery Limited and Rand Refinery Ltd South Africa in circle round head of springbok
Spain	SEMPSA Joyeria Plateria SA	Madrid	-.1.84	Sociedad Española de Metales Preciosos SA in circle round Fundadores Afinadores and star
Sweden	Boliden Mineral AB	Skelleftehamn	-.1.84	Boliden with logo
Switzerland	Argor-Heraeus SA	Mendrisio	28.8.61	Argor-Heraeus SA in cirle round AH and AH Melter Assayer in rectangle
	Cendres & Métaux SA	Biel-Bienne	20.5.81	Cendres et Métaux SA CH Bienne in circle round CM logo and CM Essayeur Fondeur in rectangle
	Métaux Précieux SA Metalor	Marin, Neuchatel	Before 1934	Métaux Précieux SA Metalor in circle round MP logo and MP assay mark

	PAMP SA	Castel S Pietro, Ticino	10.6.87	PAMP SA Switzerland with PAMP logo and Essayeur Fondeur in rectangle with PAMP logo
	Valcambi SA	Balerna, Ticino	20.5.68	Valcambi SA Balerna-Suisse in oval and Essayeur Fondeur with CHI in rectangle
United Kingdom	Johnson Matthey PLC	Royston, Herts	1919	Johnson Matthey London in oval round
				Refiners Melters and Johnson Matthey Assay Office in oval round crossed hammers logo
USA	ASARCO Incorporated	Amarillo, Texas	22.4.76	ASARCO Gold Amarillo Texas in square
	Johnson Matthey Inc	Salt Lake City, Utah	22.5.89	Johnson Matthey with JM and crossed hammers in diamond, and JMI Assay Office in oval round SLC
	Metalor USA Refining Corporation	North Attleboro, Mass	19.7.91	METALOR® and MUS assayer's mark including year
Uzbekistan	Amalyk Mining and Metallurgical Complex (AMMC)	Amalyk, Tashkent	28.10.97	Uzbekistan in Cyrillic and Roman script in circle round globe and AMMC logo with Melter Assayer in rectangle
	Navoi Mining and Metallurgical Combinat	Navoi	17.10.94	Uzbekistan, in Cyrillic and Roman script round globe in circle and NMMC logo with Melter Assayer in rectangle
Zimbabwe	Fidelity Printers and Refiners (Private) Limited	Harare	28.10.89	Fidelity Refiners in rectangle and bird logo in circle

Annexure – 16

Glossary

Assay: To test a metal for purity.

Bullion: Refined gold that is at least 99.5% pure, usually in the form of bars, wafers or ingots.

Bullion Coin: A legal tender coin whose market price depends on its gold content, rather than its rarity or face value.

Fine, Fineness, Fine Gold: The quantity of pure gold contained in 1,000 parts of an alloy. A normal "good delivery bar" of 0.995 fineness contains 995 parts of gold and 5 parts of another metal. Gold is produced in bars up to a purity of 999.9 (often referred to as "four nines").

Gold Standard: A monetary system based on convertibility into gold; paper money backed and interchangeable with gold.

Grain: One of the earliest weight units used for measuring gold. One grain is equivalent to 0.0648 grams.

Hallmark: Mark, or marks, which indicate the producer of a gold bar and its number, fineness, etc.

Karat: Unit of fineness, scaled from one to 24. 24 karat gold (or pure gold) has at least 999 parts pure gold per thousand; 18-karat has 750, parts pure gold and 250 parts alloy, etc.

Kilo Bar: A bar weighing one kilogram – approximately 32.1507 troy ounces.

Legal Tender: The coin or currency which the national monetary authority declares to be universally acceptable as a medium of exchange; acceptable for instance in the discharge of debts.

Liquidity: The quality possessed by a financial instrument of being readily convertible into cash without significant loss of value.

Troy Ounce: A unit of weight, equal to about 1.1 avoirdupois (ordinary) ounces. The word ounce when applied to gold, refers to a troy ounce. 1 troy ounce is equivalent to 31.1034768 grams.

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