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1. Introduction

“When gold speaks, the world is silent.” - An ancient Roman proverb

“When we have gold we are in fear, when we have none we are in danger.” - English proverb

“The gold standard, in one form or another, will prevail long after the present rash of national fiats is forgotten or remembered only in currency museums.” - Hans F. Sennholz

“In the absence of the gold standard, there is no way to protect savings from confiscation through inflation. There is no safe store of value. ...Deficit spending is simply a scheme for the confiscation of wealth. Gold stands in the way of this insidious process. It stands as a protector of property rights.” - Alan Greenspan, 1966

The name “gold” as well as the word “yellow” is derived from the Sanskrit word ‘jval’ which means “to shine” while the chemical symbol for gold, Au, comes from the Latin “aurum”, which means “glowing dawn”.

Gold is one of the most ductile and malleable element on our planet. A single ounce (31.104 grams) of gold can be drawn into wire 35 miles long and gold can be hammered into sheets less than five millionths of an inch thick, making it thin enough to become translucent. Gold crystallizes in a face-centered cubic lattice, melts at 1,064.18°C, and with a specific gravity of 19.3, is among the densest of metals. Next to silver, gold is also the best conductor of heat and electricity and the most reflective of light. These unique properties give gold a very special status among the elements. Gold as well as silver along with platinum is usually referred to noble or precious metals. The reference as a “noble metal” is due to its extreme reluctance to combine chemically with non-metallic elements. While the reference as a “precious metal” is due to its rarity and durability. Gold is a scarce metal as on an average, there is less than 0.004 ppm (parts of million) of gold in the earth’s crust which makes discovery of economically viable mines a rare occurrence as most of the discoveries either has too little gold in the absolute terms or gold is too dispersed or is of low grade.

Gold is usually traded in the marketplace as refined gold bullion of purity that range from 995 to 999 fineness. The internationally traded standard bar of 12.44 kg (400 ounces) typically conforms to the specifications of the London Bullion Market Association (LBMA) for “good delivery bars”. It has a purity of 995 fine minimum, carries a serial number, is of a good appearance & regular shape and bears the stamp of the approved melters. The other principal bars traded on world markets are smaller, may be of higher purity, and range from 995 to 999.9 fineness. The kilo bar is favored in Europe, the Middle East, and Southeast Asia; 5- and 10-tael bars are traded on Chinese markets; and 5- and (mostly) 10-tola bars are traded in India and to some extent in the Middle East. Gold alloys used in jewellery and a few other uses are referred to as “karat gold” and designated by karat number; 22, 18, 14, 10, and 9 or 8 karat gold are commonly used jewellery alloys in the West.

1. “Fineness” refers to the weight proportion of gold in an alloy or in impure gold, expressed in parts per thousand. For example, gold that contains 90 percent gold and 10 percent alloy metal is referred to as “900 fine.”
2. “Karat” like fineness refers to purity, but purity expressed in 24ths, rather than parts of thousands, thus 24-karat gold is 1000 fine, or pure gold and 18-karat gold refers to an alloy of gold and one or more other metals that contains 75 per cent of gold.
3. Appendix
2. Gold Supply

Unlike any other soft commodities or energy products like crude oil or thermal coal, gold is practically indestructible and never really gets consumed. Hence whatever gold being mined is available even today in the form of above ground stocks, estimated at around 168,300 tonnes in 2010 by the World Gold Council.

As seen from the Fig.1, about half of the above ground gold stocks is in the form of Jewellery, around 17% holding is with the official sector, 19% in the form of private investment and 12% in technological application where gold’s unique properties makes it irreplaceable. In 2010, the above ground stocks were 168,300 tonnes as against 165,600 tonnes in 2009 i.e. an increase by 1.6 per cent which was contributed solely by the new mine production.

According to the estimates from the WGC, India owns approximately 18,000 tonnes of above ground stocks of gold in 2010, representing nearly 11% of the global stocks.

It would be worth noting that gold is more than a commodity as unlike other commodities like oil that exhibits supply shocks it is an extremely unlikely event for gold given the geographical diversification of mine production and multiple sources of supply for any given year.

There are three main sources of gold supply: mine production, recycled gold and official sector sales. Historically, mine production constituted anywhere between 60-70 per cent of the total supply, with recycled gold and official sector sales forming the rest (Fig.2).

Note that the mine supply showed in the Fig.2 is the mine production for that year minus the net producers hedging activity.

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1. Net producers hedging: Change in the physical market impact of mining companies through gold loans, forwards and options position.
2.1 Mine Production

The most important source of gold supply is the mine production as it accounts nearly 59% of the total gold supply. Mine production includes gold produced from primary deposits as well as secondary deposits where gold is recovered as a by-product metal from other mining activities.

Gold is a scarce metal as on an average, there is less than 0.004 ppm (parts of million) of gold in the earth’s crust which makes discovery of economically viable mines a rare occurrence as most of the discoveries either has too little gold in the absolute terms or gold is too dispersed or is of low grade. Another key thing to know is that the mining for new gold is not only resource intensive but has a long gestation period taking as long as 10 years. This makes the supply of gold from the mine sector relatively inelastic as they are unable to respond quickly to changes in the price of gold (Fig.3). Over the last few years, the supply levels from the global mine production has relatively stabilized averaging around 2,497 tonnes per year as the new mines developed are mostly serving the purpose of replacing current production rather than expanding global production levels.

The dominant gold producing country for much of the 20th century was South Africa, which in the early 1970s was producing 1,000 tonnes per annum, or over 70 per cent of the world total at that time. This position has been eroded in the past two decades and today mine production is much more geographically diverse. The locus of the world gold mine production seems to be shifting from the big three (i.e. South Africa, United States, and Australia) to the emerging market nations- China, Peru, Russia and Indonesia together accounted for 29 percent of the total world mine supply (Fig.4). This geographical diversification of gold mine production serves as a buffer against supply risks stemming from individual countries, a facet of gold that differentiates from the other precious metals, which have significantly higher production concentration.
Gold production could be divided into following processes:

1. **Ore Exploration**
   The very first step in the gold production is the identification of the prospective gold deposits targets and undertaking an intensive evaluation process to determine whether the discovery is worthwhile to proceed with the developing of the mine.

2. **Creating access to the Ore**
   Access to the ore body is achieved through “underground mining” where a vertical shaft is sunk deep into the ground to transport people and material to underground levels and the ore body is accessed through the horizontal tunnels known as cross-cuts. Another method is the “Open-pit mining” in which the ore lies close to the surface and can be exposed for mining by “stripping” the overlying barren material.

3. **Mining of Ore**
   The mining of the ore is done usually through the drilling and blasting process and the blasted faces are then cleaned and the ore released is transported to the surface.

4. **Transporting the broken material from the mining site to the processing plant.**

5. **Processing**

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**Fig. 4: Top gold producing countries**

(in tonnes)

<table>
<thead>
<tr>
<th>Country</th>
<th>2000</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>17%</td>
<td>8%</td>
</tr>
<tr>
<td>US</td>
<td>14%</td>
<td>10%</td>
</tr>
<tr>
<td>Australia</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>China</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Russia</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Canada</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Peru</td>
<td>5%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: GFMS

Note: country % is w.r.t annual world total
The large rocks delivered from the mining sites are firstly broken down into small particles so that the contained gold minerals are exposed for recovery. This is usually undertaken by a combination of multi-stage crushing and milling circuits and the recovery of gold in the form of dore bars (raw gold) is usually undertaken by the cyanide leaching process or heap leach process.

6. Refining
The dore bars from the processing plants undergoes further refining and purification process where the first stage of purification is the Miller process that uses chlorine gas and achieves purification of 99.5% and the second stage of purification is the Wohlwill process which uses electrolyses and achieves purification of 99.99%.

Once refined, the bullion bars (with a purity of 99.5% or higher) are sold to bullion dealers. These dealers then trade with jewellery or electronics manufacturers or investors. Avoiding large bilateral contracts between miner and fabricator, this dealer-based bullion market lies at the heart of the supply-demand cycle. It facilitates free flow of the precious metal, and underpins the free market for gold.

Fig. 5: Gold production process
2.2 Recycled gold

The second most important source is the ‘old gold scrap’ which accounts nearly one-third of the total gold supply. The recycled gold usually refers to the gold that has been recovered from fabrication products, which is then melted, refined, and cast into bullion bars for subsequent resale into the gold market. The predominant source of old gold scrap supply comes from the recycled jewellery segment. In contrast to the mining supply, recycled gold supply is quite elastic to the changes in the price of the metal. Whenever there is a rise in the gold prices, we see a surge in the old gold scrap supply as the owners of the old and unwanted jewellery have a higher incentive to sell for recycle value. Some are even forced to liquidate their jewellery during periods of economic hardship. With the gold price on a sharp ascent, scrap gold supply more than doubled over the last decade, reaching a high of 1,695 tonnes in 2009. The supply of the recycled gold fluctuates year to year and can respond to the changes in the economic conditions and significant increase in the price volatility, in addition to the higher prices (Fig.6). The supply of scrap gold depends largely on economic circumstances and on the behavior of the gold price. It is a common practice in the Middle East and Asia for customers to trade in one piece of jewellery in exchange for another, and the piece traded in may be melted down rather than simply being resold. But gold can also be sold for cash either if the owner has need of money or if the owner wants to cash in a profit following a rise in the gold price. It follows that scrap supply typically rises in times of economic distress or follows a price rise. As seen from Fig.6, the recycled gold supply in 2009 rose nearly by 29 per cent due to the rise in the gold prices after the global financial crisis but in subsequent year i.e. in 2010 and 2011, the recycled gold supply fell nearly by 3 per cent and 2 per cent respectively, on a year-on-year basis driven by expectation of further rise in the gold prices.

Fig.6: World recycled gold supply
(in tonnes) ($/troy oz)

Source: GFMS, LBMA, Reuters
2.3 Official sector sales

The third important source of gold supply is ‘official sectors sales’ from the central banks across the world and the institutions like International Monetary Fund (IMF) which together holds approximately 17 per cent of the above ground gold (WGC & GFMS- 2010 estimates), and can add a large amount of gold to the supplies in any given year. In addition to buying and selling, central banks also affect the gold market through their lending, swaps and other derivative activities.

The ‘official sector sales’ has been a steady source of supply to the private sector for the last 21 years (1988-2009), supplying an average of just less than 400 tonnes per year, as central banks in advanced economies engaged in a gold sales programme in an effort to rebalance their portfolios. But, in the wake of global financial crisis, the central banks of advanced economies have stopped selling their existing stock of gold while developing nations have brought fresh stocks of gold. This change in the trend from net seller to net buyer is strongly supported by the economic rationale to hold sizeable reserves of gold especially during ‘heightened uncertainty’. It seems unlikely that the current trend is likely to reverse in the near future, given the level of uncertain economic conditions with fragile global economic growth and failure to resolve the Euro-zone sovereign debt crisis, which is running into its third year.

A peek into History

The appearance of official sector gold stocks happened in the late eighteen century, predominately in the context of the Classical Gold Standard when gold coins formed a part of monetary circulation. The history of gold standard dates back to 1717, although accidentally, Britain was the first to follow gold standard rule. But it was the period from 1850-1900, propelled by the discoveries in the United States, Australia and, later, in South Africa that made possible the development of the international gold standard in all major nations with gold coins forming a significant part of the monetary circulation in many countries.

However, the advent of World War I changed everything, gold coins moved from circulation into central banks and the two hundred years of a stable sterling price for gold came to an end, as it was dollar, not the sterling that became the world’s most powerful currency as the centre of economic power shifted from Britain to the United States. This was the beginning of role change for the gold standard as the new League nation in 1922 proposed to economize in the monetary use of gold through the maintenance of reserves in the form of balances in foreign currencies. In practice, this meant that central banks in smaller, poorer nations kept all or part of their reserves in sterling or dollars which remained interchangeable for gold. This inevitably pushed the centre of gravity of gold stocks into the vaults of a handful of major central banks. By the late 1920s, nearly 70 per cent of all official stocks were in the hands of just three countries, Britain, France and United States. But the real power was with the US, where the Treasury and, increasingly, the Federal Reserve Bank held around 45 per cent of gold stocks by 1925. By 1929, central banks held an estimated 92 per cent of all ‘monetary’ gold. The French and Americans between them held virtually 60 per cent of the official gold stocks (Fig.7).

The Bretton Woods Conference of 1944 was another turning point in the gold standard as it established an international fixed exchange rate regime in which currencies were pegged to the US dollar and gold price was fixed at $35 per troy ounce. In November 1961, the London Gold Pool was established by a group of eight central banks including US and seven other European countries to cooperate in maintaining the Bretton Woods System of fixed-rate convertible currencies and defending a gold price of US $35 per troy ounce by intervention in the London gold market. The successful price control in next six years went into troubled water after system become no longer workable as the pegged price of the gold was too low and there was run on the gold, US dollar and British pound which resulted in France to withdraw from the pool. The gold pool collapsed in March 1968, leaving the price to freely float. However, in 1971 when the gold holdings of the United States fell steeply, it led to the suspension of gold convertibility for the dollar resulting in ‘break down of Bretton Woods System’. Subsequently, Smithsonian Agreement (1971) among the Group of 10
major countries was an effort to revise the Bretton Woods system though, it failed. With the adoption of floating exchange rate system by the US, followed by the rest of the developed world, gold lost some of its sheen as a reserve asset.

**Fig. 7: Select central bank & Institutions gold holdings as % of total official sector**

In the early 1990s, when many central banks become convinced that inflation was dead and gone they started reducing their gold reserves in an effort to rebalance their portfolios and to generate greater returns, engaged in gold sales programme which then became a steady source of supply to the private sector. Sales reached a record level where central banks were actually being accused of creating a disorderly market for gold. In this context, major European central banks joined together in September of 1999 to sign the first Central Bank gold Agreement (CBGA1), under which they agreed to limit the annual sales in the ensuing five-year period to 400 tonnes a year for a maximum of 2000 tonnes. The signatories to the agreement were the European Central Bank and 14 other central banks. CBGA2 ran from September 2004 to September 2009, with a ceiling of 2,500 tonnes, but signatory central bank sold only 1,884 tonnes, significantly less than the ceiling they set for themselves. CBGA3 began in September 2009 with an annual ceiling of 400 tonnes, and was designed to accommodate the IMF programme of limited gold sales. In CBGA3, sales have ground to virtual halt, with the European Central banks sold only 8 tonnes in the first 16 month of the agreement. As the focus of Europe shifted to the sovereign debt crisis, it has become more apparent that the appetite for additional gold sales designed to adjust the balance of central bank reserve portfolio has been significantly reduced as European central banks were finding a greater comfort in their large gold holdings as it is the only asset that is actually increasing in value.

Source: IMF, WGC, & GFMS
During the period from 1989 to 2009, the official sector was a net seller of the gold to the private sector, supplying an average of just less than 400 tonnes per year (Fig.8). Recently, in the wake of global financial crisis, central banks in most of the Emerging markets and advanced economies had either brought fresh stocks of gold or stopped selling their existing stock of gold. This was strongly supported by the economic rationale to hold sizeable reserves of gold especially during ‘heightened uncertainty’.

**Fig.8: Official sector net transactions**

(in tonnes)  

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<tr>
<th>Year</th>
<th>Net purchases</th>
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Source: IMF, WGC, & GFMS

**Gold holdings by the central banks**

Gold is seen as an important central bank reserve due to its unique quality of being a perfect hedge against risks and as a barometer of geopolitical uncertainty. Interestingly, gold still remains the most generally acceptable means of international settlement, and hence it is a necessary part of the reserves of central banks and monetary authorities.

On an average (2000-2010), the central banks of the world hold about 10 per cent of their international reserves in the form of gold. But the percentage holdings really varies from country to country, US holds around 68 per cent of their reserves in form of gold, Italy holds around 60 per cent, France around 58 per cent, Germany around 56 per cent, while emerging markets like China and India holds around 2 per cent and 6 per cent respectively (Fig.9). Furthermore, gold constituted 20.1 per cent of the reserves of advanced economies, which hold 80.5 per cent of the world’s gold reserves, and 3.2 per cent of the reserves of emerging and developing economies.
Gold as foreign exchange reserves – Indian context

India’s foreign exchange reserves comprise foreign currency assets (FCAs), gold, special drawing rights (SDRs) and reserve tranche position (RTP) in the International Monetary Fund (IMF). During the period 2000-2010, India’s gold holdings were on an average around 6 per cent of its total reserves. Between 2000 to 2008, the gold contribution to the total reserves has dropped from 8 per cent in Q4 2000 to around 4% in Q4 2008 as the financial liberalization and opening up of the economy saw a surge in the foreign currency assets due to increased capital inflows (Fig.10). Until October 2009, when the Reserve bank of India bought about 200 tonnes of gold from IMF with intent to diversify its foreign exchange reserve surrounding uncertainty over major currencies (viz., the dollar and euro). This resulted in gold contribution to the total reserves moving up to 8 per cent in Q2 2011.

Fig.9: Gold as % of total reserves : select countries
(in percentage)

Source: World Gold Council

Fig.10: India’s total reserves and gold’s share
($ million) (%)

Source: IMF’s International Financial Statistics, WGC
2.4 Gold Supply – Indian Scenario

The Indian gold supply is mainly dominated by the gold imports since the domestic production is just around 0.5 per cent of the annual gold consumption over the past two decades. Same is the case with recycled gold whose supply is around 12 per cent of the annual gold consumption.

As mentioned before recycling activity is sensitive to the general economic conditions and this has been seen in India as well. In addition it is also sensitive to gold price and expectation of price. Thus in 2009, when we witnessed slowdown in economic activity and as gold prices started to rise, supply of the domestic recycled gold rose 29 per cent to 111 tonnes but in the subsequent year i.e. in 2010 and 2011 it fell to 89 tonnes and 59 tonnes respectively, almost imitating the global trend.

Gold imports to India have grown substantially with a CAGR of around 90 per cent over the past decade. In 1995, the gold import to India was around 249 tonnes which has grown by 289 per cent to 969 tonnes in 2011 (Fig.11). During the period 1996-2011, on an average around 85 per cent of the gold consumption has satisfied through imports (Fig.12). In 2011, for example, India imported around 969 tonnes of gold which is 93 per cent of the total supply of 1,037 tonnes in that year.
3. Gold demand

Gold demand comes from three main sources: jewellery, industrial (including medical applications) and investment. The annual demand for gold on an average (2000-2011) was around 3,671 tonnes.

Historically, jewellery demand has constituted anywhere between 50-80 per cent of the total demand with investment and technology forming the rest (Fig.13). Although jewellery demand remains by far the largest component of demand, its share has started to decline in favour of investment demand, since the emergence of global financial crisis and run up in the gold prices.

The demand for gold is widely dispersed around the world. India, China, US, Turkey and Saudi Arabia account for over half of the world demand, with the consumer demand for gold in these countries is around 57 percent, on average for the last decade. The growth in the consumer demand is evident from the Fig.14, as the top six countries in 2011, accounted for 66 per cent of the total consumer demand as against 54 per cent in 1995. The demand for gold in each of these markets is driven by diverse range of factors including cultural and socio-economic influences.
3.1 Jewellery demand

Jewellery demand consistently accounts for the largest share of final demand anywhere between 50-80 percent of total gold demand. In 2010, the jewellery demand was worth around US $80 billion, making it one of the world's largest categories of consumer goods. The jewellery demand is largely affected by the income levels, desirability, price levels, and volatility in price, besides variety of socio-economic and cultural influences. It has been observed that the jewellery demand usually rises during the periods of price stability or gradually rising prices, and then declines in periods of price volatility. This is evident from the reduced volume of jewellery sales, particularly in western markets, during the global financial crisis, when there was a significant negative impact on the consumer spending.

The world's gold jewellery demand is dominated by India, China, US and Middle East. The growth in the jewellery demand is evident from Fig.15, as the top five jewellery consuming countries accounted for 67 per cent of the total jewellery demand in 2011 as against 56 per cent seen in 2005. Each market has its own unique socio-economic and cultural factors that influenced demand but there are some common core attitude towards gold. For instance, the purchase of gold jewellery is associated with special occasions such as weddings, anniversaries, Valentine's Day, and birthdays throughout the world. India remained a dominant market for gold jewellery. While the Chinese jewellery demand is showing rapid growth as its share to the total jewellery demand has gone up to 26% in 2011 as against 9% in 2005 and it is expected that China will soon overtake India in its demand for gold jewellery.

Jewellery demand is seasonal in nature. The fourth quarter is the strongest quarter for jewellery demand due to Diwali, Christmas and other end of the year festivals when jewellery gifts are common (Fig.16). The first quarter is the seasonally lowest as Chinese New Year is the only main occasion when gold is bought.

The second and third quarters are usually seasonally low with relative absence of major gold giving occasion. The start of the second quarter, however, sees wedding season in part of India, while May sees the Akshaya Tirhya festival in India. Tourist demand is at its peak in Turkey in the third quarter.
3.2 Industrial demand

Industrial demand usually constitutes of industrial and dental uses and accounts for around 11% of the total gold demand. The annual industrial demand for gold on an average (2000-2011) is around 426 tonnes.

Gold is irreplaceable in most of the technology applications due to its unique properties of being the most malleable of the metals, with high thermal and electrical conductivity, besides being outstanding resistance to corrosion. This explains why on an average around 64 per cent of the technology demand and 7 per cent of the total gold demand comes from the electronic industry. The share of the electronic industry in the total gold demand has grown from 5 per cent in 2001 to around 8 per cent in 2011, but it has fluctuated according to the global economic growth and growth in the electronics industry.

The bio-medical application especially the dentistry accounts for 15 per cent of technology demand and 2 per cent of the total gold demand due to its bio-compatibility, resistance to bacterial colonization and corrosion as well as due to its malleability which makes it possible to be used successfully inside the human body. Today, various biomedical applications include the use of gold wire in heart transplants, implants for eye or inner ear, gold and gold-plated stents to support weak blood vessels. Japan, U.S and Germany are three leading countries manufacturing dental alloys.

Gold is also used in number of other industrial and decorative purposes such as gold plating and coating and in gold threads. The decorative and other industrials accounts for around 21 per cent of the technology demand and 2 per cent of the total gold demand. Various techniques are used to enable gold to be used in decorative finishes.

Fig.17: World gold industrial demand by category
(in tonnes) ($/troy oz)

Source: GFMS, LBMA
3.3 Investment demand

Investment demand accounted for an average (2000-2011) around 21 per cent of the total demand or around 786 tonnes per annum. Over the years, the share of the investment to the final demand has grown quite significantly, evident from the fact that it contributed around 40 per cent of the total demand in 2011 as against 4 per cent seen in 2000. Investment demand has represented the strongest source of growth in demand with CAGR of around 25 per cent. According to the WGC, the investment demand is made up of physical bar demand, official coins, medals and imitation coins and ETFs & related products. The increase in the investment demand over the past decade is mainly driven by the increase in the demand for physical bar and ETF & related products. As seen from the Fig.17, the demand for physical bar has grown from 2 per cent of the total demand in 2000 to around 28 per cent of total demand in 2011 and in case of ETFs & related products the demand has grown from 4 per cent of the total demand in 2004 to around 17 per cent in 2009 but it has slowed in 2010 and 2011 as it fell to 9 per cent and 4 per cent, respectively.

The increase in the investment demand of the gold in the last few years is mainly driven by the recognition of the importance of the gold in the portfolio diversification, the safe haven attribute of gold in the period of financial distress and economic hardship, and its long history of being a store of value against inflation and dollar depreciation.

Fig.18: World gold investment demand by category
(in tonnes) ($/troy oz)

Source: GFMS, WGC, LBMA
3.4 Gold Demand – Indian Scenario

India is the largest gold market in the world. The annual demand for gold on an average (2000-2011) is around 745 tonnes and accounts for nearly 20 per cent of the world’s gold demand.

Historically, gold jewellery demand has been the largest contributor towards total Indian demand, accounting anywhere between 59-84 per cent with net retail investment and industrial demand forming the rest (Fig.19). Although jewellery demand remains by far the largest component of demand, its share has started to decline in favour of investment demand, since the emergence of global financial crisis and run up in the gold prices.

Fig.19: Indian gold demand by category
(in percentage)

Historically, the Indian gold demand has been impacted by the monsoon rains (Fig.20). This is because a favorable rainfall means good farm production, better return and higher income generation. The good monsoon season converts into higher rural demand for gold as there is limited form of investment avenues present as pointed out by the Basic Statistical returns (BSR-2008) and RBI, only 21 per cent of rural India has access to formal financial services due to the lack of physical and social infrastructure in rural areas.
During the period 2000-2011, the Indian jewellery demand accounted, on an average around 23 per cent of the world’s jewellery demand. The main driver behind the gold jewellery consumption is the wedding related demand as the metal plays a fundamental role in the marriage ceremony.

Gold forms an integral part of the Indian culture where purchase of gold jewellery is considered most liquid and tradable investment for accumulation of wealth. The demand for gold jewellery is also driven by the awareness among the Indian consumer about gold’s unique hedging properties and its role as a store of value.

During the period 2000-2011, the net retail investment demand accounted, on an average around 22 per cent of the total Indian gold demand and 27 per cent of world’s investment demand.

Net retail investment comprises of the individual purchases of coins and bars, gold exchange traded funds, and gold-linked micro finance scheme.

Post global financial crisis in 2009, there has been a growing interest in investment demand as investors seek greater access to more liquid gold investments.
In the coming years, the gold’s investment demand is likely to rise, stimulated by the high savings ratio around 30 per cent of total income, increasing investment opportunities in the form of innovative gold ETFs schemes, new gold retail programme such as the one launched by the Indian Post to sell certified gold coins in the denomination of 0.5 gram, one gram, five gram and eight gram, through strong network of 700 post offices spread across India, and gold-linked microfinance scheme that make good quality of gold accessible to the rural population and to the bottom of pyramid segment of population.

During the period 2000-2011, the industrial and decorative demand accounted, for around 3 per cent of the total Indian gold demand.

The decorative and industrial demand for gold in the country is driven primarily by its use in the weaving of wedding saris i.e. jari, and growth in the electronic manufacturing sector which uses gold-bearing material in electronic micro chips, connectors and contacts. In the recent times, decorative and industrial demand for gold has shown slump as gold prices have risen above the acceptable levels but due to its unique properties it has become irreplaceable. The growth in the mobile industry is also likely to drive its consumption.

According to the WGC, in the longer term, India’s favorable demographic and age profile are likely to ensure buoyant consumption growth, especially given the strong affinity of to the gold in the Indian culture and the improving economic position of many domestic consumers which will play a part in determining demand for gold in the coming years.

**Fig. 23: Indian Industrial and decorative demand**

<table>
<thead>
<tr>
<th>Year</th>
<th>Industrial</th>
<th>Avg gold price (rhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1997</td>
<td>150</td>
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</tr>
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<td>800</td>
</tr>
<tr>
<td>2011</td>
<td>850</td>
<td>850</td>
</tr>
</tbody>
</table>

Source: World gold council

During the period 2000-2011, the industrial and decorative demand accounted, for around 3 per cent of the total Indian gold demand.
4. Gold price movement: An historical perspective

Unlike base metal or other precious metal such as platinum or silver, where the prices are mainly driven by the supply/demand dynamics, same is not the case for the gold as the metal is primarily produced for accumulation and not for consumption. Gold’s value does not arise from its usefulness in industrial or consumable applications. It arises from its use and worldwide acceptance as a store of value. In contrast to other commodities, gold does not perish, tarnish or corrode, nor does gold have quality grades. Gold mined thousands of years ago is no different from gold mined today. Therefore, gold existing in the aboveground gold stock is interchangeable with newly mined gold.

There are number of factors that determine the price of the gold at any given point of time. Gold being considered as a monetary metal it prices are determined by the negative outlook over the fiat currency especially the greenback currency, investors concern over the future inflation outlook, interest rate volatility, and currency-related crises. Moreover its prices are also affected by the geopolitical tension, financial crisis and economic hardship where it plays the role of a safe haven asset. The price of gold reacts to supply and demand changes and can be influenced by consumer spending and overall levels of affluence. The increases or decreases in the prices of other commodities also affect the gold prices.

Fig. 24: Gold price movement
(in $/troy oz)

Source: Kitco, LBMA
4.1 Volatility in gold prices: Comparative analysis

Gold prices are widely perceived to be volatile but as seen from the Fig.25, in the last 30 years (i.e.1982-2011), the volatility has remained stable averaging around 11.4 per cent. However, following the Nixon’s closing of the gold window, abandoning of the two-tier system and gold’s free-float led to surge in the volatility. During the period from 1974-1981, gold’s prices showed high volatility averaging around 22.6 per cent.

The period of late 1970s was that of high inflation that led the volatility in the gold prices to reach a peak of 50.3 per cent in 1980.

While, the period of 1980s, saw implementation of significant policy changes that included a shift in monetary policy towards controlling inflation, cost control measure to reduce large fiscal deficit and measure to improve productivity by reducing the rigidity in the labour market. Thus 1980s represent a structural permanent shift in the macroeconomic policy and interest rate environment, and also in the inflation environment. The volatility in the gold prices abated significantly, averaging around 15.2 per cent.

The period of 1990s was marked with low inflation and with relatively benign political uncertainty. Gold entered a period of range trading showing a continued downward trend and volatility in the gold prices averaged at around 8.8 per cent.

The initial part of the 21st century marked a period of ongoing uncertainty. The internet and tech bubble burst and geopolitical uncertainty was extreme. But then economic growth rates (developed and developing economies) improved which fuelled commodity boom that included gold. We saw surge in inflation with stimulatory monetary policy, easy credit condition and ample liquidity as strong growth in emerging economies pushed up commodity prices.
During the last 30 years i.e. the period from 1982 to 2011, gold has consistently been less volatile than oil, silver and S&P GSCI commodity index (Fig.26). It has also, on an average, been less volatile than equity index (Dow Jones industrial average) and 10-year bond (Fig.27).

During the period 1974-2011, the volatility in the gold prices, on an average, is around 13.8 per cent, as against 23.9 per cent in case of silver, 11.8 per cent in case of Dow Jones, 13.6 per cent in case of S&P GSCI commodity index, 14.9 per cent in case of 10-year bond, and 22.0 per cent in case of crude oil.

The CBoE VIX index is a measure of the volatility for the S&P 500 and a general barometer of the investors’ risk appetite. A low VIX indicates investor confidence and vice-versa. A comparison of the gold prices to the VIX index, especially during the credit crisis in 2008, shows that despite a marked change in the attitude towards risk with index falling to a low of 15 from the peaks of 80, the gold prices continued to rise, revealing gold’s character of a safe haven asset.
4.2 Relative price analysis: Gold with global assets

The relative price analysis i.e. the ratio of two asset prices is used in evaluating its relationship over time. If a ratio is continually widening, one can infer that one asset has increased or decreased significantly in value relative to other asset. Likewise, if ratio remains stable, one can infer that the two assets are trending in same manner.

From the Fig.29, we can see that the ratio of the gold price to each of the global asset price has varied considerably over the time. During the period from Jan1996 to Dec 2011, the ratio of gold price to the silver has shown wide fluctuation and has averaged around 58.7. In case of crude oil, the ratio has comfortably stayed within the low-high range of 6.6-32.6 and has averaged around 15.5. The ratio of gold to the MSCI world has shown wide fluctuation during 1980-82 and has remained relatively stable with an average of 1.1 points. Same is the case with the ratio of gold to the equity index, Dow Jones Industrial average, which has seen fluctuations in 1980 and has remained relatively stable with an average of 0.2 points. The recent appreciation in the gold price relative to the global assets remains consistent with the long-run average.

Fig.29: Ratio of gold to other global assets

Source: LBMA, Reuters
5. Gold: Long-term strategic asset

Gold is considered as a long-term strategic asset due to its unique hedging properties. Gold is renowned as a hedge against inflation mainly due to its ability to hold its real value and also perceived as a good hedge in the event of depreciation in the value of the greenback currency i.e. the US dollar against other currencies. The yellow metal also works as a hedge against both equity weakness and tension in the bond market, although the relationship with the equities is much stronger compared to the bond market. The metal has acted as a safe haven in the event of difficult times such as geopolitical tension, financial crisis and economic hardship. It has also attracted investors during the times of increased uncertainty and risk as the metal is a universally accepted currency carrying no counterparty risk besides the fact that the gold market is highly liquid and truly global.

Gold is an ideal addition to achieve a diversified portfolio as the analysis of correlation between gold and other global asset class suggests that there is no significant relationship between them (Fig.30).

Fig.30: Correlation of gold with other global assets using monthly returns 3-10 years ending Dec 2011

Source: LBMA, Reuters
5.1 Gold as a store of value

It is clearly evident from the Fig.31 that real gold price i.e. the nominal gold price minus the inflation can show wide fluctuations but it is also true that the real gold price today is more or less at the same level as 30 years ago. Moreover, gold is not just a commodity; it is essentially a special form of money and the price of the money is its purchasing power, meaning its exchange value against all goods, services and other currencies. So when price of gold is expressed in terms of other currencies we find that gold price has remained more or less constant (Fig.32).

The reason why gold has not lost its value as store of wealth in the times of turmoil is because of its unique qualities that tend to dampen its response to the certain shocks. Firstly gold carries no credit risk as it is really no one’s liability, as there is no risk that the company will go out of business as in case of equity or the risk that the redemption payment will not be made, as in case of bonds. Secondly, the market for gold is deep and highly liquid as trading is undertaken round the clock by wide range of participants from the jewellery sector to financial institutions to consumers to manufacturers of industrial products in a wide range of products that extends to bars and coins, jewellery, futures and options, exchange-traded funds, certificates and structured products. Moreover, gold is virtually indestructible, nearly all of the gold that has ever been mined still exists and mainly in the form of jewellery, which means that a sudden excess demand for the gold can be satisfied with an ease. Also supply shocks coming from mine production is out of question as no single mine produces more than 10% of the total supply and the mines are geographically dispersed across several continents and many countries.

Fig.31: Gold has retained its value (in $/troy oz)

Source: LBMA, US BLS & Reuters

Fig.32: Gold prices in terms of major currencies (currency/troy oz)

Source: LBMA, Reuters
5.2 Gold as a safe haven asset

Gold has acted as a safe haven across the globe due to its superior performance during the difficult times such as geopolitical tensions, financial stress and economic hardship. It also works as a hedge against both equity weakness and tension in the bond market, although the relationship with the equities is much stronger compared to the bond market. Gold continue to attract investors during the times of increased uncertainty and risk because the yellow metal is a universally accepted currency carrying no counterparty risk with easy portability, besides the fact that the gold market is highly liquid and truly global.

As evident from the Fig.33-38, during the periods of uncertainty and increased risk, gold performance has been superior compared to other asset class.

It would be worth noting that during the stock market crash in 1987 and more recent subprime crisis, initially gold was an under-performer explained by the fact that investors frequently sell gold against distress in other sectors in order to raise liquidity or to meet potential margins calls. Also gold forms part of some commodity indices and are automatically subject to liquidation as the indices were sold. But as the fear and the uncertainty grew investors return to gold to safeguard their wealth.

During the Asian currency crisis in 1997-98, gold largely found itself under pressure as seen from the Fig.36, but it can be seen as a confirmation of gold’s role as a safe haven asset. This is because at the time of crisis the Korean currency became unacceptable in the international currency markets and the government was facing trouble in servicing its international debt which resulted in the government offering citizens interest bearing won-denominated bonds in return of gold. This scrap gold was then refined by the Korean government and sold into the international market allowing them to raise the dollar to be used for servicing its international debt.
Fig. 35: Performance of gold & other assets: Gulf war (1990)

Source: LBMA, Reuters
Period: (Jul 90- Sep 90)

Fig. 36: Performance of gold & other assets: Asian currency crisis (1997-98)

Source: LBMA, Reuters
Period: (Jul 97- Apr 98)

Fig. 37: Performance of gold & other assets: Dot com bubble (2000)

Source: LBMA, Reuters
Period: (Mar 00- Jul 00)

Fig. 38: Performance of gold & other assets: Sub prime crisis (2007-09)

Source: LBMA, Reuters
Period: (Dec 07- Mar 09)
5.3 Gold as tactical inflation hedge

Gold is renowned as a hedge against inflation mainly due to its ability to hold its real value. What it means is that whenever inflation goes up, price of gold also tends to move up along with it. It can be clearly seen from Fig.39, that during periods of high inflation, gold price had shown upward movement. In the year 1974, when the US average annual inflation rose to nearly 11.1 per cent from the previous year reading of 6.2 per cent, we saw that the average real gold price deflated by the CPI (2011=100) rose to $727 per troy oz from $493 per troy oz, giving a return of 47 per cent. Similarly in the year 1980, when the US average annual inflation rose to nearly 13.5 per cent from 7.6 per cent in 1978, we saw that the average real gold price deflated by the CPI (2011=100) rose to $1,672 per troy oz from $666 per troy oz, giving a return of 151 per cent. The gold’s history of monetary asset and its unique hedging properties makes it an attractive store of value during the periods of high inflation or rising inflation expectations.

The recent rise in the gold price especially after the global financial crisis was partly the result of growing concern over the prospects of resurgence in inflation due to the aggressive policy response put in place around the world with central banks engaged in quantitative easing (QE) program besides several other measures such as easing of monetary policy and buying up of mortgage-backed securities and Treasury bonds which were adopted.

![Fig. 39: Gold price vs US annual CPI inflation (in $/troy oz)](chart.png)

Source: LBMA, US BLS

Note: Real gold price deflated by CPI (2011=100)
Although the prices of gold and crude oil do not exactly mirror one another, the prices of crude oil do affect gold prices. During the period of 1976-2011, crude oil and gold prices showed a positive correlation of 0.86. As seen from the Fig.40, as the crude oil prices rise or fall, in most cases we see similar movement in the gold prices. In the year 1980, when the average US annual inflation rose to nearly 13.5 per cent from 7.6 per cent in 1978, we saw that the average real crude oil price deflated by the CPI (2011=100) rose to $103.6 per barrels from $50.2 per barrels, giving a return of 107 per cent. Similar upside movement was seen in gold price, with the average real gold price deflated by the CPI (2011=100) rose to $1,672 per troy oz from $666 per troy oz, giving a return of 151 per cent. In 2009, however the average real crude oil price deflated by the CPI (2011=100) fell nearly by 38 per cent to $64.9 per barrels from $104.5 per barrels in 2008. While the average real gold price deflated by the CPI (2011=100) rose nearly by 12 per cent to $1,020 per troy oz from $911 per troy oz in 2008.

**Fig.40: Real gold price vs real WTI crude oil price**

(in $/troy oz)

<table>
<thead>
<tr>
<th>US CPI (%)</th>
<th>7.6</th>
<th>13.5</th>
<th>6.1</th>
<th>5.4</th>
<th>3.4</th>
<th>-0.4</th>
<th>3.2</th>
</tr>
</thead>
</table>

Source: LBMA, US BLS & Reuters

Note: Real gold & WTI crude price deflated by CPI (2011=100)
Traditionally, there are four assets namely gold, commodities, real estate and inflation-linked bonds that are perceived to perform well during a high inflation environment. A comparison of these four assets during the high or moderate inflation periods shows why gold is considered superior to hedge the inflation risk (Fig.41).

**Fig.41: Performance of gold & other assets during periods of high or moderate inflation**

![Graph showing performance of gold and other assets](source: LBMA, Reuters)

**Fig.42: Gold price vs Indian annual WPI inflation**

![Graph showing gold price and WPI](source: Reuters, RBI)

**Indian perspective**

It is evident from the Fig.42 that the prices of gold have shown upward trend during the periods of high inflation or rising inflation expectation establishing gold's ability to act as a store of value and therefore as a hedge against inflation.
5.4 Gold prices and interest rate cycle

The relationship between the gold prices and the interest rate cycle is an interesting case as whenever the real interest rates drop below the 2 per cent mark, gold prices have trended upwards. Likewise whenever the interest rates rise above the 2 per cent mark the gold prices have either declined or traded in a range (Fig.43). This is probably again because of gold’s position as an inflation hedge.

Thus if central bank decides to raise interest rates, and thus reduce the money supply, the price of gold would fall as the real interest rates i.e. the nominal interest rates minus the inflation would rise, assuming steady inflation rate.

It is evident from the Fig.44 that whenever real interest rate falls or enters the negative territory gold prices rise. Post the global financial crisis, India managed to make a quick recovery but there was sharp rise in inflation that prompted central bank, RBI to raise the interest rate but the inflation was running into double digits that kept real interest rate in the negative zone thus supporting the bullishness in the gold prices.

Note: For real interest rate calculation shown in Fig.44, bank rate is used before 2001 and post 2001 repo rate.
5.5 Gold prices and US dollar

Historically, gold has been perceived as a good hedge in the event of depreciation in the value of the US dollar against other currencies. Given the fact that the US dollar is the world’s reserve currency and the primary medium for international transaction, it would be worth drawing a relationship between gold and US dollar. The US dollar is one of the key instruments reflecting the investor confidence or lack of it. In the recent financial crisis, the weakness in the US dollar has been an important element contributing to the rally in the dollar gold prices. If the US dollar is weak because of a loss of confidence then gold is likely to be a natural beneficiary as investor hedge risk independently of the dollar activity.

From Fig.45, it is evident that the movement of the gold price and US dollar are inversely related, and during the period from 1971-2011, it shows a negative correlation of 0.5. This inverse correlation is what makes gold a hedge against fluctuations of the US dollar on the foreign exchanges. While the key reason underlying gold’s capability to serve as a hedge against currency fluctuation is the fact that the monetary authorities can debase the value of the paper currency simply by increasing its supply but similar means cannot be applied to debase the value of gold.

From Indian perspective, given the fact that majority of the gold supply comes in the form of imports, the exchange rate between the US dollar and Indian rupee determines the landing cost of the gold. Hence any weakness in the Indian rupee vis-à-vis dollar makes the price of gold costly and vice-versa.
5.6 Gold and other assets – Indian scenario

Gold has proven itself to be an effective portfolio diversifier as the returns are generally uncorrelated with other financial assets.

As evident from the Fig. 48, gold has certainly outperformed most of the leading Indian financial assets.
6. Appendix

Unit conversion

Troy ounce = 31.103 grams  
Tonne = 32,151.74 troy ounces  
Kilogram = 32.1507 troy ounces  
1 tael = 50 grams  
1 tola = 11.6638 grams

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