

WORLD SILVER SURVEY 2002 - A SUMMARY

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This report is a summary of the *World Silver Survey 2002*. The *World Silver Survey (WSS)* is an annual review of the international silver market. It contains the only truly global analysis of the world's silver markets and has been produced by Gold Fields Mineral Services (GFMS), the London-based analysts of global precious metals markets, on behalf of The Silver Institute in Washington since 1994. The *WSS* is a unique source of silver supply and demand statistics for more than sixty countries. It contains a comprehensive analysis of investor activity, worldwide silver stocks and bullion flows as well as a lucid and concise account of the financial, economic and social factors underlying market trends. Details on how to order the full 80-page *WSS* can be found on Page 8.

1. Review and Outlook

2001 was an unusually difficult year for those involved in the silver market. Producers of the metal had to cope with prices that were down 12% on the hardly buoyant levels of the previous year. Those sectors that make up the main consumers of silver, especially electronics, were hit by a decline in sales volumes. It was this weakness in fabrication demand (the use of silver in manufactured goods) that was the main reason for the price falling.

Nevertheless, there were at least a couple of positive developments last year. Firstly, some feared the silver price might sink below the psychologically important level of \$4 but this threat never materialized. In fact, prices have rallied since end-January 2002 to well over \$4.50 at the time of writing. Secondly, and for the first time in over a decade, there were virtually no net sales out of private sector bullion stocks.

As noted earlier, the most influential change in the

Silver - Its Unique Properties

Silver's unique properties include its strength, malleability and ductility, its electrical and thermal conductivity, its sensitivity to and high reflectance of light and, despite it being classed as a precious metal, its reactivity which is the basis for its use in catalysts and photography. This versatility means that there are few substitute metals for silver in most applications, particularly in high-tech uses in which reliability, precision and safety are paramount.

supply/demand balance last year was, arguably, the 5% decline in fabrication demand. The scale of this fall might not seem great but this bare number understates the impact this factor had on the price. This is because fabrication would have been lower still had it not been for healthy growth in Indian demand, itself largely in response to lower prices. Strong Indian demand was an important reason why silver did not fall through the \$4 mark last year.

The prospects for silver prices to move higher in 2002 are, to a large extent, dependent on the strength of the world economy. A rebound in global GDP growth would lead to higher demand for a wide range of silver containing products. In particular, the health of the electronics industry (a key silver consumer) will be one to watch as it was in this area that demand boomed in 2000 and then bust in 2001.

The scope for a price recovery may be restricted by supply-side factors such as mine production. Having grown modestly last year, albeit to a new record level, mine output may fall in 2002 but any decline will be slight - probably less than 1%.

A more difficult factor to predict is how much silver the market will receive from government or private sales of bullion stocks. China dominated government sales in 2001 and, for the time being, it seems to have the ability to maintain this high level of sales, which may constrain price gains in 2002. In addition, private investors could turn willing sellers if the price rose notably above current levels (at the time of writing \$4.50-\$4.60). The converse was true in 2001 - private

World Silver Supply and Demand

(Million ounces)

	2000	2001	Change y-o-y
Supply			
Mine Production	581.2	590.0	2%
Net Government Sales	78.1	85.7	10%
Old Silver Scrap	179.2	184.2	3%
Producer Hedging	-	20.4	n/a
Implied Net Disinvestment	97.7	-	n/a
Total Supply	936.3	880.3	-6%
Demand			
Fabrication			
Industrial Applications	377.1	338.5	-10%
Photography	219.5	210.2	-4%
Jewelry & Silverware	281.4	287.6	2%
Coins & Medals	29.8	27.2	-9%
Total Fabrication	907.8	863.6	-5%
Net Government Purchases	-	-	n/a
Producer Hedging	28.5	-	n/a
Implied Net Investment	-	16.8	n/a
Total Demand	936.3	880.3	-6%

Source: GFMS

investors were reluctant to sell then as they thought the price too low. This was largely why disinvestment disappeared from the supply/demand table on page 2.

2. Silver Price Developments in 2001

Silver prices spent most of 2001 under pressure, slipping from a high in January of \$4.82 to levels little above \$4 by late November. This left the average for the year, \$4.37, down a significant 12% year-on-year. 2001 at least ended on a brighter note, with silver fixing at \$4.52 on December 31st or only 7 cents down on the year's first trading day.

There were three key features to price behavior last year: the post-September 11th rally; the end-year lease rate-driven rally and, lastly, a continuation of the decline broadly in place since mid-1998.

The rally that followed the September 11th attacks was the most dramatic with the price rising around 10% in just a week. This is seen very much as a case of silver riding the coat tails of gold. It is difficult to argue that silver is generally regarded as a safe haven by investors; in this instance for example, prices soon slipped to back below pre-incident levels whereas gold subsequently maintained a "crisis premium".

The strongest rally of the year occurred towards the end of 2001. This took silver from \$4.09 on November 28th to a high of \$4.85 on January 10th (2002). The surge came about through one or more large stock holders taking actions that drastically curtailed the supply of metal for lending. This ramped up lease rates (in effect, the interest paid on borrowed silver), which in turn forced up prices themselves. The rally was slightly unusual in that it was unique to silver. It is quite common for silver to shadow the moves that the gold market makes, as happened in May 2001. The extent to which silver copies gold has, however, shrunk over the last decade or so.

The decline in silver prices since the 1997-98 rally had been due to a variety of factors but the continuation of this trend last year was mainly a result of the 5% fall in fabrication. Weak fabrication had such an impact partly through the absence of alternative forms of demand. Gold fabrication fell more sharply (by 7%) but gold prices built steadily in 2001 as higher investment took up the slack. That this did not happen for silver underscores its lack of wide investor interest.

Silver - Trading Details

Silver is predominantly traded on the London Bullion Market and Comex in New York. The former, as the global hub of OTC (Over-The-Counter) trading in silver, is the metal's main physical market. Here, a bidding process generates a daily reference price known as the fix. Comex, in contrast, is a futures and options exchange. It is here that most fund activity is focused.

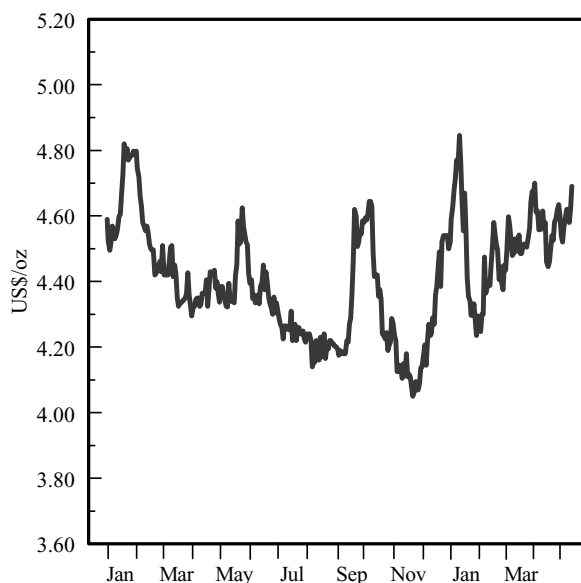
Silver is invariably quoted in US dollars per troy ounce.

Supply-side factors tended to have less of an effect on prices in 2001 than demand issues. The chief exception here was sustained Chinese exports. It was thought these would fall at sub-\$5 levels but exporters' price expectations seem to have ratcheted down, helping keep prices under pressure.

Given 2001's far from positive supply/demand fundamentals, it was perhaps not surprising that the end-year rally should prove short lived. However, it may be significant that prices at the time of writing are still above pre-squeeze levels and the speculators involved may feel this qualifies their operations as a success. As such, the market could well see a similar event being repeated.

This leads to the question of whether prices broke their long run slide in December. Theory states that futures markets "predict" changes in the fundamentals and there are fair grounds to suppose it has correctly done so now - the market's Achilles heel last year was soft fabrication demand but, as noted earlier, this could be eliminated in the second half of 2002.

The Silver Price since January 2001



3. Supply - Developments in 2001

- Total supply contracted by 6% last year, to reach 880.3 Moz (27,381 t).
- Mine production was up by a modest 1.5%, despite a sharp fall in US silver output.
- Government sales were almost 10% higher year-on-year but still below 1999 levels.
- Scrap supply rose by 5.0 Moz (155 t).

Overall silver supply fell noticeably last year. The fall in global supply was recorded despite a fairly robust performance on the **mine production** front: output was 8.8 Moz (274 t) higher than in 2000, and reached a new record level of 590.0 Moz (18,351 t). This increase was the result of significant growth at a number of base metals operations. (As explained on the next page, 75% of silver is mined as a by-product of other metals such as copper.) This was particularly the case in Peru and Chile where silver by-product from lead/zinc and copper mines rose by 3% and 4% respectively. In contrast, gold mines reported a marked fall in their silver by-product (in the United States, the decline was as much as 39% year-on-year).

Many primary silver mines struggled under the pressure of poor prices and a number announced early closure. In the United States, output from primary mines (see page 5 for definition) fell by almost 10%. The large primary silver mines of Mexico, however, achieved excellent results. For example, Industrias Peñoles, the world's largest silver producer, reported a 16% increase in output. In addition, a ramping up of operations at a number of new primary mines (Pan American's Huaron and La Colorada, Hecla's San Sebastian and the Martha mine, recently acquired by Coeur) further contributed to the small increase in overall primary output. As these mines grow to full capacity, they could generate a further modest rise in primary output this year.

The generally weak outlook for base metals prices (with the possible exception of lead) and the implementation of numerous production cutbacks at zinc and copper operations announced towards the end of 2001 would suggest that there is little scope for higher silver mine output from these sources in 2002. On the other hand, Antamina, Peru's new zinc/copper mine, is expected to produce possibly as much as 6.2 Moz (200 t) this year, which would go a long way to counter falls elsewhere. Nevertheless, a small drop in

Silver Supply - Its Components

Mine production is unsurprisingly the largest component of silver supply. It normally accounts for a little under two-thirds of the total (last year was slightly higher at 67%).

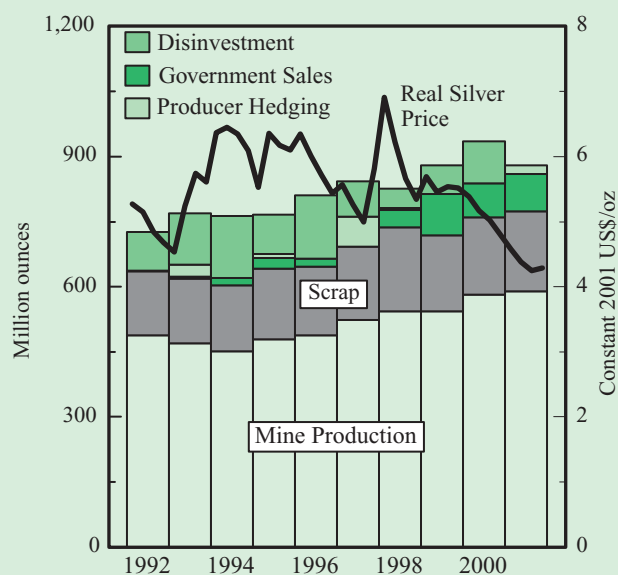
But mine production is not the sole source - the others being scrap, disinvestment, government sales and producer hedging. Scrap, or more properly, "old scrap", is the silver that returns to the market when recovered from existing manufactured goods or waste. This could include old jewelry, photographic chemicals, even discarded computers (but it excludes silver that is returned untransformed by the manufacturing process - so called "process scrap"). Old scrap normally makes up around a fifth of supply.

Disinvestment and government sales are similar in that both comprise the return to the market of old coins or bars respectively by the private sector or governments. It is worth bearing in mind that these sources may not add to supply every year on a net basis. In some years, individuals have been net investors (as appears to have been the case last year) and governments net buyers (as occurred most recently in 1997).

The final, though normally minor, component of supply is

producer hedging or the early sale by mining companies of future production, a form of "accelerated supply". Hedging may also not appear every year as an element of supply on a net basis as it can contribute to demand (the case in 2000).

World Silver Supply

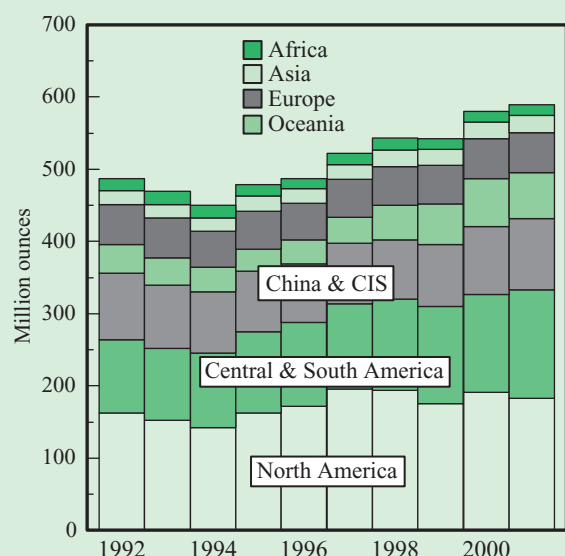


Mine Production - Where It Comes From

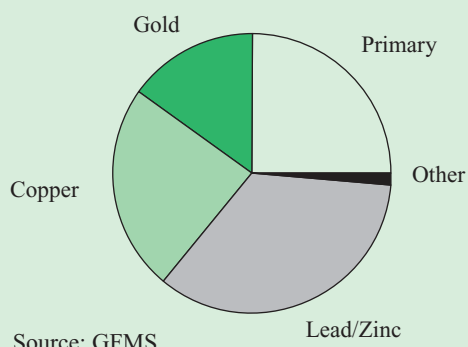
Geographically, just over half of mined silver comes from the Americas with Mexico, Peru and the United States, respectively, the first, second and fourth largest producing countries. The third largest is Australia.

Of greater market relevance, however, is the type of mine that silver comes from - most silver emerges as a by-product of the mining of other metals. Only around a quarter of output comes from mines where the main source of revenue is silver, a so called primary silver mine. As shown in the graph below, much more comes from lead/zinc mines. This is important as the price of silver will only have a direct impact on primary output, which means the amount of silver mined is more a function of the price of other metals.

World Silver Mine Production



Silver Mine Production by Source Metal (2001)



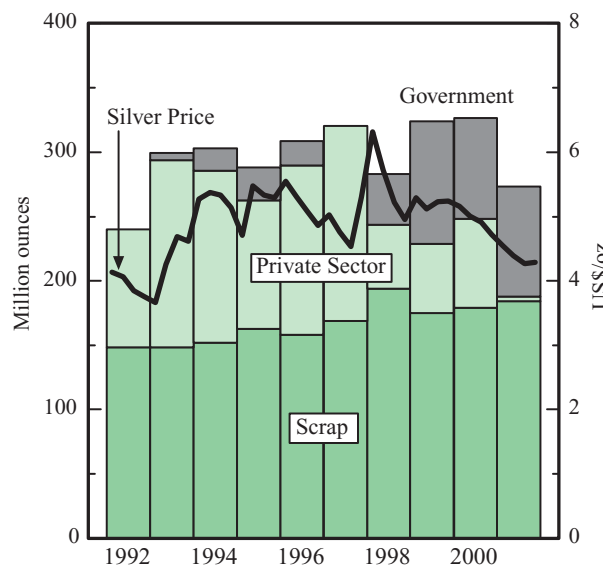
mine production is anticipated this year, largely due to further falls in silver produced at gold, and to a lesser extent, copper mines.

Producers added further to physical supply via **hedging**, which increased last year after two consecutive annual declines. Producer hedging generated an estimated 20.4 Moz (634 t) of accelerated supply. Much of the activity was concentrated around the brief periods of higher prices in May, September and, particularly, in the last weeks of the year (and into 2002). Producers used these rare opportunities to add to nearly depleted hedge books, mainly through options. Though the increase in net hedging was not insignificant, it was interesting to note that the number of producers who are actively engaged in this form of price protection shrank again last year.

Secondary supply in the form of **scrap** was also up modestly in 2001, increasing by almost 3% to reach 184.2 Moz (5,730 t). Scrap provided just under 21% of all physical supply last year. The increase was mostly from the United States, which saw unusually high levels of recycling of finished product inventories due to the slowdown in the electronics sector.

Government sales increased by a substantial 7.6 Moz (236 t) to reach 85.7 Moz (2,666 t) during 2001. As much as three-quarters of all sales originated from China, where government disposals continued for the fourth consecutive year. As for the rest of the world, the most significant contribution came from a further rundown in US Defense Logistics Agency stocks. This silver was used in coins produced by the US Mint.

Supply from Above-ground Stocks



4. Demand - Developments in 2001

- Total fabrication was nearly 5% lower in 2001 at 863.6 Moz (26,859 t).
- The decline was mainly due to a sharp drop in industrial demand.
- Photographic offtake fell for the second successive year, by over 4% to 210.2 Moz (6,539 t).
- Fabrication of jewelry and silverware was up over 2% last year, largely due to a rise in Indian demand.
- Output of coins and medals fell by 9% as a result of lower demand in the United States and Germany.
- For the first time in over a decade, it appears as if investor activity may have added to demand.

In last year's *World Silver Survey*, GFMS noted that one of the main factors behind the record level of offtake in 2000 was the strong rise in world GDP growth. In 2001 however, world economic growth slumped to its lowest level since the early 1990s. It is therefore not surprising that global fabrication fell back to below the 1999 level. Industrial and photographic demand was particularly affected, falling to three- and six-year lows respectively. But it was the decline in **industrial demand** that stood out last year, falling by over 10% to 338.5 Moz (10,529 t). Not only was offtake affected by the economic downturn but there was also a significant element of destocking. The electrical and electronics sectors were noticeably affected, with offtake falling by nearly one-fifth to 132.5 Moz (4,123 t). Nowhere was the slide more evident than in the United States and Japan, which posted declines of 33% and 27% respectively. European industrial fabrication was not as badly hit but still fell a significant 8% due to poor domestic demand in a number of key markets.

At 4%, the decline in the **photographic** demand for silver was relatively modest but 2001 was the second successive year in which silver offtake fell. This was due to four main developments in the traditional silver halide market. Firstly, the slowdown in world economic growth impacted on both consumer imaging and the graphic arts industry. Secondly, the fallout from September 11th not only postponed an economic recovery but directly resulted in a fall in travel, which further impacted on the consumer film market. Thirdly, there was an element of stock carry-over of both silver nitrate and film products from late 2000. Finally, digital technologies appear to have made a

minor contribution to the decline in silver offtake though such inroads into the silver halide market are expected to grow more significantly in the future.

These factors contributed to the weakness in the North American market, which fell by around 9% to a five-year low, and in Europe, where offtake dropped by more than 5%. In contrast, Japanese demand was marginally higher last year, although this was solely due to some production being brought back onshore.

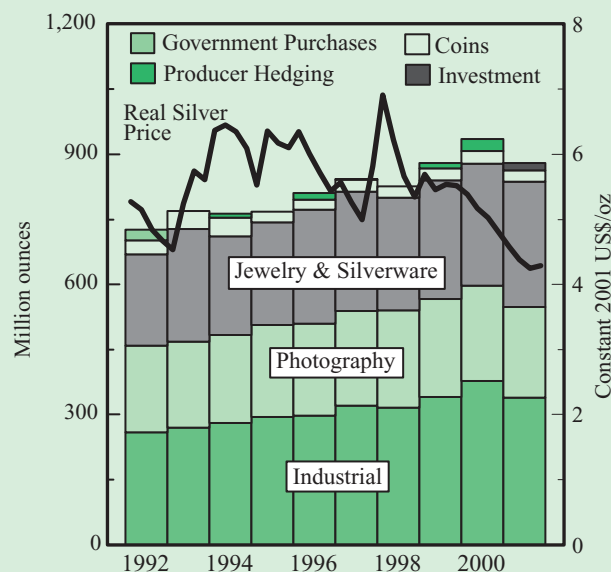
One of the few bright spots on the demand side was the modest rise in the **jewelry and silverware** sector. It may be surprising to note that offtake was actually lower in nearly all of the major fabricating regions; but

Silver Demand - Its Components

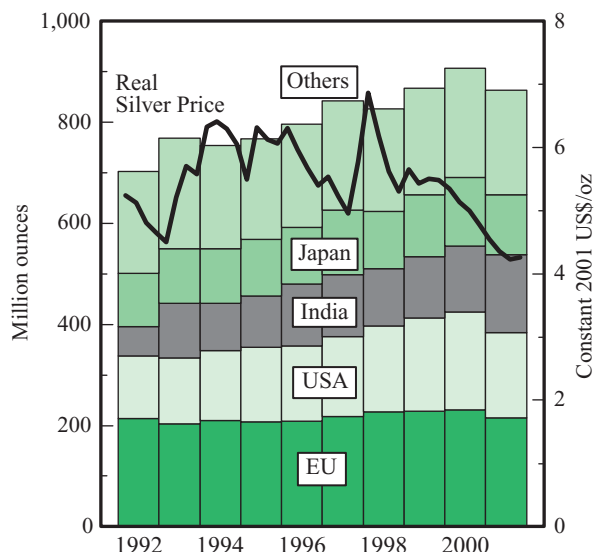
Demand is dominated by three main categories: jewelry and silverware; industrial and photographic fabrication. These accounted respectively for 33%, 38% and 24% of demand last year. These shares have been broadly stable though photographic's share has slipped a little over the last decade. Coin demand, the final part of fabrication offtake, has also seen a slight fall in its share of the total.

The remaining elements of demand, government purchases, producer hedging and investment, are alike in that, on a net basis, they may not feature every year on the demand side. The official sector, for example, has not generated significant net purchases since 1992, whilst investment's appearance on the demand side last year was the first in a decade. Net hedging contributed to supply last year though it added to demand as recently as 2000.

World Silver Demand



World Silver Fabrication



a modest increase in East Asia and, more significantly, a strong rise in the Indian sub-continent, left total demand up 2.2% at 287.6 Moz (8,944 t). The rise in Indian demand was mainly driven by the lower rupee silver price and a reasonably good monsoon. This took Indian jewelry and silverware fabrication from around 9% of total global demand in 2000 to nearly 12% last year.

The rise in East Asian demand was mainly attributable to a close to 8% rise in Thai demand. Elsewhere, Italy (easily Europe's most important market in this category) saw a large drop in fabrication. This was the first time in five years that Italian demand has declined. Its fall was the main driver behind the more than 13% drop in European demand.

In contrast to the growth in jewelry and silverware, fabrication of **coins and medals** fell by nearly 9% in 2001 to 27.2 Moz (846 t). The silver coin market is dominated by just two countries, the United States and Germany, both of which experienced a fall in silver coin output last year. In particular, German coin minting was nearly one-third lower due to the production of fewer commemorative coins and a lower total mintage for those issues which were released.

Finally, last year saw a swing away from significant levels of net **disinvestment**, which had been such a feature of the market during the 1990s as well as in 2000. This was primarily due to the weakness in the (dollar) price of silver and the unwillingness of private holders of bullion stocks to sell at low and declining prices.

Silver's Fabrication Uses

Industry: Silver can be found in many electrical applications, particularly conductors, switches and contacts. Contacts provide junctions between two conductors that can be separated and through which a current can flow, and account for the largest proportion of electrical demand. The main uses of silver in electronics include pastes for silk-screened circuit paths, multi-layer ceramic capacitors, silvered film in electrically heated automobile windshields, and in conductive adhesives.

The ease of electro-deposition of silver, mainly from the salts silver cyanide and potassium silver cyanide, accounts for its widespread use in plating.

The joining of materials through silver brazing or soldering alloys is facilitated by the metal's fluidity and strength. These alloys are used widely in applications such as refrigeration equipment, automobiles and aerospace.

Miscellaneous industrial uses for silver include mirrors, batteries, as a catalyst in numerous chemical reactions and as a bactericide and algacide.

Jewelry and Silverware: Silver possesses working qualities similar to gold, enjoys greater reflectivity and can achieve the most brilliant polish of any metal. Pure silver (999 fineness) does not tarnish easily but to make it durable for jewelry, it is often alloyed with small quantities of copper. It is also widely used with base metals in gold alloys. Sterling silver, at a fineness of 925, has for long been the standard for silverware. Plated silverware usually has a coating of 20-30 microns, while jewelry plating is only 3-5 microns.

Photography: The photographic process is based on the presence of light-sensitive silver halide crystals, prepared by mixing a solution of soluble silver, usually silver nitrate, with a soluble alkali metal halide such as sodium chloride. Within this sector, the consumer market is the largest with the printed images taking slightly more silver than that used in the films themselves. Just a little smaller is the demand from radiography whilst the graphic arts account for much of the remaining offtake. Photographic film manufacturers demand very high quality silver.

Coins: Historically, silver was more widely used in coinage than gold, being in greater supply and of less value, thus being practical for everyday payments. Most nations were on a silver standard until the late 19th century with silver coin forming the main circulating currency. But after the gold rushes, the silver standard increasingly gave way to gold. Silver was gradually phased out of regular coinage, although it is still used in some circulating coins and in bullion coins for investors.

Copies of the full *World Silver Survey 2002* report and previous editions can be obtained by contacting The Silver Institute at the address or telephone number below. For copies outside of North America, contact GFMS at the address beneath that. The standard price per copy is US\$175, • 190 or £115.

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Notes:

Units used:

Supply and demand data are given in units of million troy ounces (Moz) rounded to one decimal place and then, bracketed, in units of tons (t) rounded to the nearest whole number. 1 Moz = 31.103 t (metric tons), 1 ton = 32,151 troy ounces, 1 ton = 1,000,000 grams (g)

Terminology:

“-” = not available or not applicable, “y-o-y” means year on year, “dollar” refers to the US dollar unless otherwise stated, “implied net (dis)investment” is the residual derived from combining all the other GFMS data on silver supply/demand as shown in the table on Page 2.

Prices:

Unless otherwise stated, US dollar prices are for the London Silver Market fixing.

Table Rounding:

Throughout the tables, totals may not add due to independent rounding.

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