



A Review of the Chinese Silver Market

Prepared by GFMS Ltd
for **The Silver Institute**

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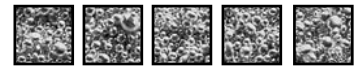


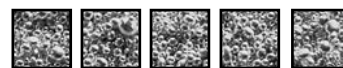
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INTRODUCTION

GFMS have been conducting research in China for around 20 years, initially focused on the gold market, but since the early 1990s looking at the silver market too. Over this time, we have been able to compile the most comprehensive databases on Chinese silver supply and demand.

However, GFMS are never complacent regarding our data series, and we are always striving to improve our data collection and coverage. In the context of China, this is all the more important considering this market's impact both on silver supply over the past five years, and its potential impact on the demand side going forward. China is the most important emerging market for silver, and has the potential to rival both Japan and the United States in industrial uses of the metal, the capacity to become one of the largest photographic markets in the world, and harbors the possibility of growing to be a significant fabricator and consumer of jewelry.

However, detailed information on the evolving structure of the market is difficult to determine with a high degree of certainty and the drivers of demand are also opaque. And although we are confident as to the overall accuracy of our data, we would readily concede that there are aspects of this complex and diverse market that still defy precision. It is with this in mind that we approached The Silver Institute to commission a report on the Chinese market.

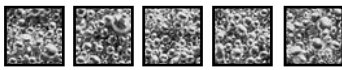
Although it was our intention at the start of this project to arrive at a definitively accurate data series for this complex market, it has become quite clear over the past year that this will not be easily achieved. This is not to say that the current effort has been a failure. Far from it. The work we have done has established those components of the China supply, demand balance which are reliable and those which carry degrees of uncertainty. Where alternative views exist, we have tested them in the context of a times series and sense checked them in terms of what one might consider to be reasonable.

The main reason for the uncertainty about recent developments was the liberalization of the Chinese silver market that began, *de facto*, in the late 1990s. Up until this time, the People's Bank of China's (PBOC)

control of the market meant that while there was without doubt an unofficial dimension to the market, the overwhelming volume of (in particular) demand from fabricators was met from official sources, and this provided a means for more accurate data analysis.

This no longer holds true and, to derive a clear statistical picture, it is necessary to survey a substantial range of fabricators located across a diverse geographical area. Our view is that it is better to address these data collection issues in the present, before they become a material issue in the global supply and demand balances

Clearly there are areas of particular interest, for example the level of government and quasi-government stocks. Notwithstanding this, there are other less high profile aspects of the market that are also important, for instance the level of recycling. This report examines all of the key elements of the supply/demand equation, as well as testing various scenarios in which key components of both sides of the equation are changed.



EXECUTIVE SUMMARY

- For many years, China has been the fastest growing large economy in the world. As a result, its Gross Domestic Product (GDP) is twice the size it stood at merely 10 years ago, and China's economy is now the second largest in the world when adjusted for Purchasing Power Parity¹. More recently, joining the WTO has put the country in line with regulations that govern the global trading community.

It thus becomes immediately obvious that this fast growing, industrial in the main, economy has great potential for silver demand. This is chiefly through industrial uses of the metal, even though the country is also on track to becoming a huge photographic market (initially in terms of consumption rather than fabrication). Furthermore, consumption and production of silver jewelry is expected to grow rapidly in future, albeit from a relatively low base.

- The main risk to this rosy scenario is that the economy falters. In this regard, inflation, major income inequalities, particularly from a rural-urban perspective – with the corollary of problems such inequalities could induce – and weak financial institutions, all point to some serious challenges in the years ahead. China's success in surmounting these obstacles to a further "great leap forward" in GDP and living standards will be of singular importance not just to that country but also to the rest of the world.

- The potential for Chinese silver demand to expand becomes clearer when analyzing how China's growth has impacted the market so far. Looking at its share of global fabrication demand, China has grown from around 3% a decade ago, to well over 6% in 2004. In 2005, this share is expected to increase further, as GFMS forecast local fabrication demand to outpace growth in the global figure for fabrication.

This increase in Chinese silver demand, positive though it might look, has been greatly overshadowed by increases in demand for other industrial commodities, such as base metals. China's shares of global aluminium and copper demand in 2003 – at 19% and 20% respectively – were not far from twice the figures

they stood at half a decade ago and, according to GFMS Metals Consulting², are forecast to continue expanding, at least for the medium term.

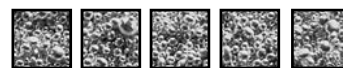
- With 63.8 Moz (1,984 t) of mine production in 2004, China is currently the world's fourth largest silver producing country. This supply comes from a considerable number of smaller mines, rather than a few large ones. This fragmentation of the mining sector, as well as the tight control and distortion of the market by the PBOC and central planning committees, that took place for much of China's history – which created incentives for producers to use unofficial channels to dispose of their production – makes collection of mine production data a difficult process. As a result, there are conflicting views regarding the historical data on mine production. Nevertheless, there is a general consensus that it grew rapidly in the 1980s and 1990s.

- Finally, it should be noted that any published data on silver supply – including refining/scrap production – should be viewed with extreme caution, as there are potential issues of double-counting, as well as errors in the identification of the source or type of silver supply – i.e. whether it is mine production, scrap or a change in stocks. Taking such data at face value can therefore lead to the creation of an erroneous picture of the market.

- The bulk of scrap supply in China comes from photographic and electronic uses. Control and distortion of the silver market by the authorities has adulterated the official data on scrap supply. GFMS research has concluded that, during the regulated years, the majority of scrap was actually sold through unofficial channels, mainly to the local market or exported to Hong Kong. Furthermore, tax evasion/relief issues – mainly with regards to environmental legislation, i.e. tax relief for "environmentally friendly" activities – are also understood to have caused misreporting of scrap volumes, particularly with regards to the breakdown by source. It is thus very difficult to put together a historical data series on scrap supply and, in fact, there are many differing views on the subject. GFMS have, of course, applied a number of "reality checks" to ensure that the scrap data fits within the overall Chinese supply/demand context.

1. Purchasing Power Parity is defined as a method of measuring the relative purchasing power of different countries' currencies for the same types of goods and services in order to make more accurate comparisons of standards of living across countries.

2. GFMS Metals Consulting is a sister company of GFMS Limited and focuses on base metals, steel and ferro-alloys.



- The past five years have seen rising interest in the amount of silver that has been recovered from base metals concentrates in China. The major jump in the amount recovered that was recorded in 1998 is one fact not to be contested, but the same cannot be claimed for the absolute volumes recovered. We know that during the early to mid 1990s, the amount of silver recovered was very small, as the tight regulation of the silver market made shipments of concentrates into China highly uneconomic. Our estimates are that the recovery from imported concentrates stood at less than 3.2 Moz (100 t) per year until the late 1990s - tiny compared to the other elements of silver supply in China. The picture has changed dramatically since then. Our estimate for 2004 was that the silver contained in imported concentrates reached just over 32.2 Moz (1,000 t), equivalent to over one half of Chinese mine production. The last five years have seen an approximate three-fold increase in volumes recovered. This increase has mainly been driven by China's remarkable GDP growth, and the increase in demand for the relevant base metals this has caused

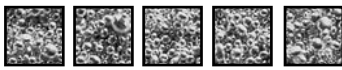
Looking at these figures though, one should keep in mind that recovery volumes are hardly an indication of increased global silver supply. It is merely a change or redirection in the flow of metal. After all, the silver contained in these concentrates has already been counted in the original exporting country's secondary silver mine supply.

- Data on demand for silver was much easier to collect during the time of official control of the market. One had simply to take the PBOC data, and correct this to allow for unofficial activity. Since the liberalization of the silver market, measuring demand has become a lot harder, due to the large degree of fragmentation of the Chinese market. Difficulty is added by the fact that it is often hard to distinguish between genuine local fabrication (from bullion) and products manufactured from imported silver semis or other intermediate silver containing materials. Nevertheless, our data indicates that the bulk of demand is from the industrial sector, particularly electrical and electronic end-uses. Jewelry demand has also been growing rapidly, much of it for export. For example, China has now become the second largest source of US silver jewelry imports. Overall, Chinese silver fabrication demand has grown rapidly in recent years, at an average annual rate of 12% in the last five years for instance.

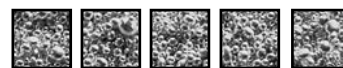
- GFMS research has shown China to be a simultaneous importer and exporter of silver bullion. Curiously, imports have been identified even during times when China was a major exporter of the metal. Imports of bullion take place mainly to satisfy needs for a particular quality of metal, or to meet time constraints. Exports on the other hand – until the last couple of years in the main unofficial – were driven by the discount the PBOC's buying price bore to the international price. The bulk of China's exports of silver were channeled to Hong Kong. Overall, the country has been a net exporter for the past decade. More recently, and in particular in 1998 and 1999, silver exports rose to unprecedented levels, and remain buoyant to this day, although it appears they may plateau in 2005 as mine supply and concentrate imports peak. Another important point is that China's silver exports have been to a variety of countries in Europe, East Asia, the Middle East and, of course, to India, which has frequently been the largest consumer of silver exported from China.

- GFMS was one of the first organizations to point out that since 1998 China has contributed to global silver supply through a run down of domestic bullion stocks, mainly from official and quasi-official inventories. We furthermore believe such stocks still exist, albeit at significantly lower levels than in the mid-1990s. More open to debate is of course the question of the actual magnitude of this de-stocking (and consequently how much bullion may still be held by the Chinese). GFMS estimate that supply to the market from Chinese bullion stocks in 2004 reached some 34 Moz (1,050 t) and peaked at nearly 67 Moz (2,100 t) in 1999.

- In the past, China was a country with a substantial local surplus, i.e. local supply from scrap and mine production comfortably exceeded domestic fabrication demand. In 2004, it reached nearly 19 Moz (600 t), down from 26 Moz (813 t) in 2001. Provisional estimates for the country's supply and demand of silver in 2005 suggest this internal surplus will fall noticeably, perhaps even as low as around the 3.2 Moz (400 t) mark. With mine production unlikely to show any dramatic increase, and scrap levels in the country being reasonably low, future increases in fabrication demand are expected to lead to China moving into a deficit situation over the next few years. Whether the country will become a net importer of metal, of course, depends upon whether government stock sales at some point come to an end.



- After decades of strict control of the silver market, the 1977-2000 period saw major changes in policy and attitude towards the precious metals markets in general, and hence silver. This led to the deregulation of the silver market in China, the outcome of which was the establishment of the Huatong Silver Exchange and later the Shanghai Gold Exchange. Currently China has an essentially free silver market. Nonetheless, some indirect barriers are maintained, primarily through the tax treatment of silver. In particular, the ability or not to deal in value added tax (VAT)-free metal, as well as different levels of VAT. Furthermore, there are restrictions on activity on both exchanges, as membership is limited to Chinese individuals and institutions. Trading in silver futures has also yet to appear, although it is currently under consideration (it already exists, albeit at a very basic level, for gold). Finally, there is some talk of the possibility of other exchanges being launched in future on which silver could be traded.



Chapter 1

Macroeconomic Backdrop

GDP growth in China, at an average of over seven percent since the death of Chairman Mao in 1976 and currently in excess of 9% in 2005 according to the National Bureau of Statistics, has been the fastest of the major economies in the world. Valued at US\$1.65 trillion at end 2004, GDP has effectively doubled in the last decade and the per capita share is well over \$1,000, although this masks both vastly different regional incomes and the higher purchasing power of money in China. At the start of the new millennium, Chinese leadership, through its espousal of protectionist policies, early agricultural reform and aggressive exporting, appears to have beaten a new and highly successful path in terms of development theory. Agriculture's overall share is now less than 15% while services account for nearly 35% of this vibrant growth.

In purely cash terms, China ranks as about the seventh largest economy in the world, but on a Purchasing Power Parity (PPP) basis, to allow for lower prices for most local goods and services, China leaps to second, after the United States. It's GDP, at a PPP adjusted US\$6.5 trillion, is nearly two thirds of the size of the US economy, is ahead of Japan and is way ahead of India's PPP US\$3 trillion. On this basis, China accounts for around 11% of world GDP. It is also notable that in 2004 China accounted for perhaps over a quarter of near 5% growth in world GDP.

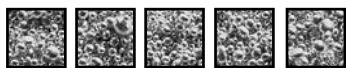
China: Sources of Recent Economic Growth

	1980	1990	1995	2000	2001	2002	2003	2004f	2005f
GDP current prices US\$bn	302	388	700	1081	1176	1266	1410	1583	1761
GDP Growth (%)	7.9	3.8	10.5	8.0	7.5	8.0	9.1	8.5	8.0
CPI (%)	6.0	3.1	17.1	-0.8	0.7	-0.8	1.2	3.5	3.0
Growth in Power Consumption (%)	5.5	1.8	6.9	10.0	11.0	14.0	16.0		
GNP (% share): Agriculture	30.1	27.1	20.5	18.6	15.2	14.8	14.4		
Industry	48.5	41.6	48.8	49.3	51.1	51.2	51.1		
Services	21.4	31.3	30.7	32.1	33.6	34.0	34.5		
Exports	12.6	16.0	21.2	21.9	25.8	26.9	35.8		
Imports	6.0	13.8	18.9	17.3	23.4	25.4	35.5		
Investment	35.2	34.7	40.8	37.7	37.9	38.2	39.3		

Source: IMF and China Statistical Yearbook

China is also now a member of the World Trade Organization (WTO) and thus set on a new path which takes it away from the protectionist policies of the past which have fuelled growth up to now. Opinion is divided as to whether China can master the stresses that WTO membership will generate, particularly on the financial system and the agriculture sector. The reaction of the rest of the world to China's membership (conscious that political clout closely follows on from trading might) has been relief that China is now bound into the world trading community through WTO regulations. China's accession in 2002 after protracted negotiations (over 13 years) has brought a number of unique commitments, some affecting silver and silver jewelry, which have exacted a heavy price in terms of agricultural subsidies and restrictions on textiles. In return, China can now write WTO rules, and stand on equal terms in trade with all 149 WTO members.

From the point of view of silver, the requirements of the WTO have already borne fruit: China has thrown open the manufacturing and sale of silver to all comers, including foreign firms. Duties on imported finished and semi-finished products are falling. True, the import and export of bullion is still restricted, but this area cannot be long defended. Similarly, foreign participation on the exchanges (Shanghai Gold Exchange or SGE, to the extent that it is operational, and Huatong Nonferrous Metal Wholesale Marketplace) will need to be examined, if a level playing field according to WTO stricture is to be given to all players, foreign or Chinese. The recent announcement by New York Mercantile Exchange (NYMEX) and the SGE that they will examine ways in which to cooperate may signal progress in this area.



China's economy has therefore arrived at an important juncture with the world economy and could play an important and dominating role in the near future. Already it is taking over 30% of world cotton consumption (not surprising given its output of textile exports) and 20% each of world copper and soybean consumption.

Its appetite for energy is immense, and at 270m tons of oil (of which nearly 40% is imported), it currently consumes nearly 10% of world oil production. This dependency will tie China ever more closely into the world economy and indeed into the geopolitics of oil. Chinese geologists estimate that China's demand for many key minerals over the next 30 years may exceed domestic production by as much as a factor of five. This bodes well for silver offtake, especially in industrial applications.

The sustained 7% pace of economic growth in China (in fact rising to 9.5% in 2004) is probably historically unprecedented in any modern country, yet it looks sustainable. Recent State Council (China's Cabinet of Ministers) forecasts suggest that even on a low growth scenario China expects growth of 5-6% a year to 2020, while a continuation of present strong trends would see only a slight slackening to 7-8%. Manufacturing, foreign investment and exports, based on China's seemingly endless supply of inexpensive labor, are at the heart of this success and a series of trade surpluses have pushed China's reserves to around US\$440 bn, over 25% of GDP. Growing income inequality and the poor status of the major banks remain among the biggest downside risks.

Electricity Demand as a Growth Proxy

The statistical reliability of China's high GDP growth rates has often been questioned and there have been a number of attempts to find a suitable proxy, the most accessible being electricity consumption. Over the period from 1979, electricity consumption data suggests that the official GDP data may actually underestimate growth rates, since power consumption has been consistently above GDP by several percentage points. In the boom of 2003, power consumption saw an unsustainable 16% annual growth. Not surprisingly, China has some power shortage problems to address despite installing 25 GW of new capacity annually, the equivalent of the UK national grid every two years or that of the United States in about every 12 years.

OECD Projections for China to 2005

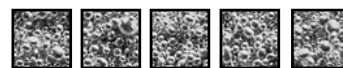
	2002	2003	2004	2005
Real GDP growth	8.0	9.1	8.3	7.8
Inflation (CPI)	-0.8	1.2	3.0	2.0
Current account balance (\$ billion)	35.4	29.6	20.3	26.3
Current account balance (% of GDP)	2.9	2.1	1.3	1.5

Source: OECD

What is also striking about the new structure of the Chinese economy is that the share of agriculture is so small (about 15%) and falling, while industry is static at about 50%. Gross Fixed Capital Formation (addition to the stock of fixed capital) is running at an astonishing 38% of GDP - sustained by domestic booms in construction (although a slowdown was witnessed in 2004). It is also fed by vast amounts of foreign direct investment (FDI of US\$60bn in 2004 according to the Chinese Ministry of Commerce) which contributes directly to export processing industries.

This is, therefore, an economy in rapid transition to becoming completely modern in the sense of depending on industry, services and trade for its growth. It is also noticeable that imports are now creeping up as consumers exert the purchasing power that a savings ratio of 40% of GDP confers on them. In 2004, the trade account surplus grew to US\$32bn, a 26% increase on 2003). The real issue is however that China has a vast bilateral trade surplus with the United States, some US\$176bn. This proved a particularly thorny issue during last year when the blue collar US states were the marginal voters and the loss of manufacturing jobs to China became an electoral and political issue in the United States. In reality, half of all China's exports to the United States arise from the operations of US manufacturers based in China. China's cheap labor and export incentives are simply too attractive to US direct investment; the US consumer benefits in terms of low prices at Wal-Mart, one of the chief US buyers of Chinese made products.

China is now in fact in the uncomfortable position of being a victim of its own successes. Foreign exchange reserves, fed by massive export gains, are around US\$610 bn and the strong political and economic pressure for the authorities to sever the Renminbi (RMB) link to the US dollar has seen a modest recent revaluation. Some commentators (for example, investment bank CSFB) were suggesting in early 2004 that a rate of RMB5 might emerge in the next 18



months. This rate would be disastrous for many of China's fledgling industries and, in any case, emerging trade deficits might be heightened by sluggish exports and the increased purchasing power that a much revalued RMB would confer on consumers.

The services account would also suffer from any revaluation of the RMB: 60 million Chinese tourists went abroad in 2003 - as though the whole of Britain or France had emptied itself - many to Hong Kong.

China: Contribution to Global GDP Growth

(% points)	2001	2002	2003	2004 (e)
Global Growth	2.0	2.7	3.2	4.0
PP Share				
US	1.0	0.6	0.7	1.0
Japan	0.0	0.1	0.2	0.1
Europe	0.4	0.2	0.2	0.5
Other Asia	1.1	1.4	1.4	1.4
China	0.9	1.1	1.1	1.1

Source: CSFB and IMF

Yet there is a paradox and challenge to the authorities in this success: there remain 600 to 800 million small farmers in China, who have seen growth in incomes pass them by since the euphoria of the first agricultural reforms in 1979. These are the people who will be displaced as WTO reforms begin to bite and China reduces agricultural subsidies. These small Chinese market gardeners are in no position to compete on price, even at home, with global agribusinesses.

The authorities hope to urbanize these farmers but the creation of the necessary 150 million new jobs in the next decade will tax their ingenuity, while failure may threaten social cohesion. The farmers were also often the people who placed their savings in gold, at least at the beginning of the gold liberalization process, when they had distinctly more disposable cash.

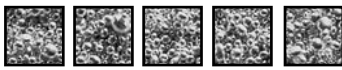
The table above shows that China is now contributing about a quarter of world GDP growth and the same as the United States and twice that of the EU. Japan has of course lagged for all of this decade. China has also become a major impetus to the growth of world trade (defined as exports plus imports). In 1990, China contributed only 0.8 percentage points (pp) to world trade growth of 13.6%. In 2002, when world trade grew only 4%, China contributed 2% pp. China is thus becoming a stimulus on a global basis even when

world trade is depressed and it is of great importance to the whole world that China has a stable political and economic system that delivers stimulus year in and year out. Or put another way, the synchronization of a US and Chinese downturn could be a major economic disaster.

China's per capita GDP, aided by a tough family planning policy, has risen to US\$1,000 and indeed in some areas (for example, Shanghai) it now exceeds US\$5,000, which is the starting point for the growth of discretionary spending on luxuries including gold and jewelry. China also has an enviable Debt Service Ratio of 7.8% (as a percentage of exports of goods and services), on total debt of US\$164bn (basis 2003). China has, in effect, exported itself into success. In any case, its foreign exchange reserves at US\$610bn provide a cushion against debt demands, though the overwhelming dollar share of this constitutes both a headache and a political responsibility for the Chinese authorities. Gold, officially at around 600 tons (19.2 Moz), is less than 2% of reserves. There has been continuous speculation that China will at some point diversify further into other currencies (such as the euro) or into a higher weighting for gold (or possibly silver?). For the moment, this is not the case, but rumors surface from time to time.

Domestic consumption is now a major driving force in long-term growth. Private consumption growth was running at 9-10% in the 1990s, but has since moderated to about 5-6%. The shift to consumerism is critical since it marks a further weakening of the planned economy, which was for so long the major driving force. Since China cannot yet satisfy its consumers domestically, this shift has implications for China's trading partners (Germany and Japan are currently benefiting from Chinese imports) and Honda expects China to be its third largest market after Japan and the United States by the year 2006. Companies like Samsung and Motorola now see at least 15% of their global sales arising in China. The implication for silver from the new powerful role of the domestic consumer is covered elsewhere in this report.

Despite these successes, the picture that emerged in 2004 in China is of an economy surging forward, but in many of the wrong directions. Inflation, for long muted or falling, has risen to a six year high of about 3% (and possibly 8% on some measures). Investment in cement, steel and aluminium, once booming, is now falling back and over-capacity is re-appearing with



increasing inventories in these sectors. Indeed it was noticeable in early April 2004 that the giant Nanchang Iron and Steel postponed new capacity plans in the face of falling prices for steel, expected to be down 10% in the year. At the same time, banks are reported to be following central bank guidance to cut back loans to uneconomic investment projects and in Beijing and Shanghai there is visible evidence of a halt in building work.

There are therefore a number of external risks hanging over the economy of which the most immediate and underestimated is probably that of US protectionism. The US electoral cycle had a strong influence last year because of the many marginal blue collar jobs threatened by WTO openness in general and Chinese manufacturing in particular. US intransigence could easily dent China's extraordinary export drive.

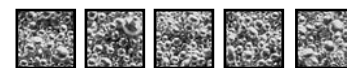
Yet WTO membership is also seen in China as a major threat to Chinese jobs - not in manufacturing but in agriculture where there are still up to 800 million small farmers who cannot compete with US and European agribusinesses. The danger here is of social instability in a country where the social security net is not well developed. There are also well-grounded fears that China's banking system, particularly the large unreformed state owned banks, may not be able to turn the corner on bad debt resolution, nor compete with foreign banks in the longer term under WTO relaxations.

There is no consensus on the path that Chinese short to medium growth will take. CSFB for example (March 2005) are forecasting GDP growth of 8.6% in 2005 but see the economy slowing to 7.2% in 2006 as Chinese authorities react to slow the economic cycle in an effort to counter rising inflation and worsening bottlenecks within the economy. Conversely, with the government taking a more accommodative position towards investment another surge of industrial capacity is forecast to follow, peaking towards the end of this year or early next. Concerning the exchange rate, there would be no revaluation, though upward pressures might produce a strongly appreciated rate of RMB5 to the US Dollar over the period to 2006 compared to about RMB8.28 at the moment.

A further challenge to China is the increase in the age dependency ratio: by 2020 the percentage of the population above 60 will have risen to 16%, and there will be perhaps three workers to support every

person not employed - as opposed to 30 in the early 1970s. Perversely, China will also have to find jobs for another 150 million people who will enter the workforce between now and 2020. This vast increase, greater than the workforces of much of Europe as a whole, will bring without doubt yet greater pressure on housing, water and the environment. China also fears that the rural population, disrupted by WTO membership, may prove inassimilable in the cities because of its continuing low level of education and skills.

In conclusion, it is not surprising that many Chinese economists are poised between justifiable pride in the undeniable achievements of the past 25 years of economic development and fears over the limits to growth. To these concerns must be added the uncertainties that political transition to a more representative society will bring and the difficulty in imposing a legal framework on what has been a society without much respect for laws. However, recent amendments to the constitution to protect both human rights and private property, not on the agenda since the 1990s, are seen as extremely positive changes. China's leaders have shown great skill in arriving at this present successful economic juncture so further steady progress on all fronts seems the likely outcome.



Chapter 2

Introduction to the Chinese Silver Market

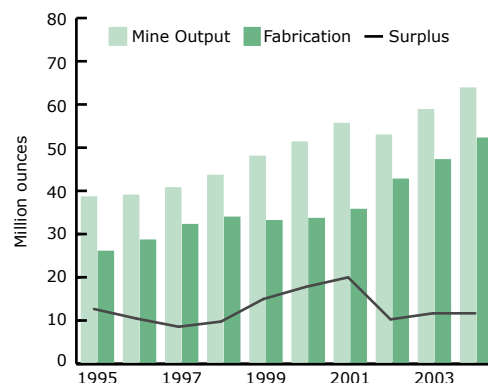
China's association with silver is a long one (the first silver coins were minted in 1183AD), with the country at one time conducting its monetary policy via a silver standard (going off the standard in 1935). Following the revolution in 1949, silver took something of a back seat from the perspective of official policy, and it was only in the late 1970s and the 1980s that government officials woke up to the importance of the metal for the Chinese economy. It is certainly true that, during the late 1970s and early 1980s, China was not a large producer of silver. This was a cause for considerable concern in the State Council at the time, who then decided that in order to support China's industrialization and to move towards self-sufficiency, local production needed to be expanded.

This led to a series of supportive policies being put in place to boost domestic production, with the People's Bank of China (PBOC) being given sole responsibility for setting prices and buying and selling silver. As a result of these measures, production increased rapidly through the 1980s. A number of large primary silver mines were brought on stream, silver rich base metals operations were developed and smelter and refining capacity was upgraded to facilitate efficient extraction. It is our view that China was almost certainly a surplus producer of silver by the end of the 1980s and has remained so ever since.

Chinese Silver Supply and Demand

Moz	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Supply										
Mine production	38.6	39.0	40.7	43.7	48.0	51.3	55.6	52.9	58.8	63.8
Scrap (total)	4.3	4.5	4.6	5.8	5.9	6.0	6.2	6.3	6.6	7.7
From Imported Concentrates	2.5	5.3	6.4	10.1	8.1	13.9	20.4	20.4	30.8	33.9
Total Supply	45.4	48.7	51.8	59.6	62.0	71.2	82.2	79.7	96.2	105.4
Fabrication Demand										
Electrical and Electronics	9.1	9.4	10.2	9.8	9.9	10.3	10.3	10.9	11.8	12.8
Solders and Brazing Alloys	5.1	5.5	5.8	6.3	6.4	6.7	6.9	7.9	8.7	9.7
Industrial and Decorative	4.0	4.2	4.4	4.6	4.7	4.9	5.1	6.7	7.1	7.7
Photography	5.6	5.8	6.0	6.1	3.7	3.9	4.5	5.7	5.8	6.1
Jewelry & Silverware	1.4	2.4	3.1	4.7	6.3	6.7	7.4	9.4	11.5	13.7
Official Coins	0.8	1.4	2.8	2.4	2.3	1.2	1.5	2.1	2.3	0.0
Total	26.0	28.6	32.2	33.9	33.1	33.7	35.7	42.7	47.2	49.9
Balance	19.4	20.1	19.5	25.7	28.8	37.6	46.6	37.0	49.0	55.5

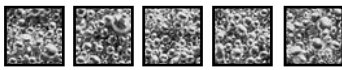
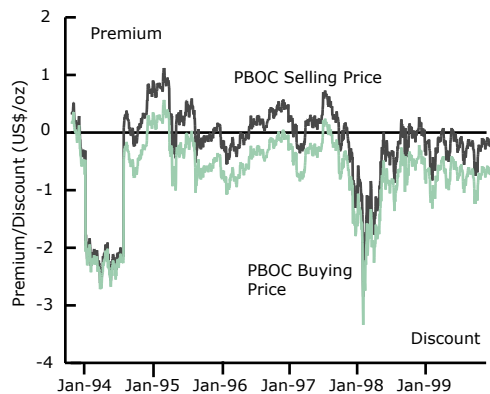
Mine Production over Fabrication Surplus



Source: GFMS

Although the PBOC was the sole official buyer and seller of silver (and gold) up until the liberalization of the market in the year 2000, GFMS data has always pointed to an important unofficial market for the metal. One of the primary motivations for this has been the differences between the PBOC's official buying and selling prices and the price prevailing in the international market.

As can be seen from the graph on the following page, the PBOC prices often diverged significantly from the prevailing international price, with the resultant incentives for miners and smelters to ship (illegally) directly to end consumers, or to Hong Kong. (The former British colony was the recipient of reasonable volumes of silver from China throughout the 1980s and 1990s.) Estimating flows into Hong Kong over this period was just one of the myriad statistical difficulties associated with China and its complicated and opaque

**Buying/Selling Price Premium/Discount**

Source: GFMS

price and tax structure in particular tended to muddy analysis of many aspects of the supply and demand balance.

Starting with the supply side, the absolute volume of mine production cannot be known with certainty although much work has been done on reducing the margin of error. Firstly, price and tax incentives (or disincentives) still distort the market, so that actual production levels are not always fully reported. Secondly, the fragmented nature of the industry and the many different sources of material constitute a significant hurdle in collecting comprehensive data (and since the PBOC has relinquished control of the silver market, data collection has become more difficult).

Data on scrap supply is also extremely difficult to assess. As we make clear in Chapter 4, scrap is one of the "swing" factors in the supply and demand balance but we are confident that our understanding of silver scrap supply factors in other markets stands us in good stead to making sense of scrap supply in China. Also, while we would concede that it is possible GFMS data currently underestimates this source of silver, considering China's relatively recent economic growth, the stock of above-ground silver in fabricated products is small, which limits recovery volumes. Continuing with the scrap theme, there have been reports in recent years of a sharp rise in recovery of silver (indeed, all the precious metals) from imported material (in particular electronics scrap). While these volumes have risen, it seems unlikely that they have been large enough to materially alter the supply and demand balance.

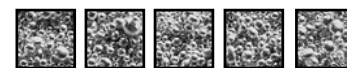
One area about which much has been said over the past six years is silver recovered from imported base metals

concentrates. Chapter 5 examines this in considerable detail. As a consequence, it is one of the data series about which we have the highest degree of confidence. GFMS data shows that recovery of silver from imported concentrates has indeed grown rapidly since 1999 and that this has provided at least some of the surplus silver which has been exported over this time period.

GFMS data sets on the demand side are bench marked on offtake during the 1990s and have been reality checked with reference to official transactions at this time. Growth in offtake since the late 1990s has been more difficult to pin down but it is highly likely that GFMS estimates are close enough to reality so as not to fundamentally affect the issue of whether or not the market is in deficit or surplus (i.e. even revisions are unlikely to see the market swinging from say a deficit requiring stock drawn downs to a surplus in which stocks are being built).

The final area of interest concerns the import and export of silver (here referring specifically to bullion as opposed to semi-fabricated products; Chapter 6 examines this in more detail). China has recorded imports of silver in a variety of forms through most of the 1990s, much of this being related to the shift in manufacturing and assembly of goods from countries like the USA and Taiwan to the mainland. These volumes tended to be modest and often lower than the unofficial export of the metal to Hong Kong. However, the net trade balance tended, in the main, to be relatively small. All of this changed in the late 1990s as the PBOC relinquished control of the silver market and exports rose sharply. As is explained in more detail in Chapter 6, this is another area about which GFMS have a high degree of confidence in our estimates.

The analysis of the Chinese silver market boils down to the size of these individual components of supply and demand and how they net off against one another. The ultimate reality check of any time series is to see if it stacks up against the available data as time runs forward. In many instances, it comes down to a simple statistical implication that cannot be supported by the evidence, for example, the world suddenly runs out of silver stocks. We would argue that the GFMS supply and demand series stands up to the "time series reality check". What is at issue here is not whether the absolute volumes of silver estimated are exactly correct, but if the indicative balances are in the right direction i.e. surplus or deficit. In conclusion, the one thing that is not in doubt is that China's appetite for silver has grown alongside the recovery of the metal within the country itself.



Chapter 3 Mine Supply

Based on current GFMS estimates, China produced around 63.8 Moz (1,985 t) of silver in 2004, ranking it the number four global producer after Mexico, Peru and Australia. However, none of the top 20 silver producing companies operate in China, and none of the world's top 15 producing silver mines are Chinese, indicating the degree of fragmentation of the industry and the existing lack of high ranking deposits being mined there. China's closed door policy until recent years has also prevented technologically advanced exploration and mining and thus unsystematic databasing of exploration data has proliferated. GFMS Mining and Exploration³ views China as having a very attractive geological setting for silver, particularly with abundant thick volcano-sedimentary silver hosts (and potential hosts) in extensional basin belts across the region. Its large number of known silver deposits (most frequently in polymetallic association with lead and zinc) remain poorly explored, and our view is that the potential for significant new discoveries or upgrading current deposits by mine exploration is high.

In the light of new data made available to GFMS by a leading Chinese mining consultancy, the Chinese silver mine production series as it appears in our annual publication, the 2005 *World Silver Survey*, has been revised upwards. The revised series hinges on identifying as much lead, zinc, copper, gold and primary production as possible on a mine-by-mine basis and by deducing the silver output at each operation from knowledge of ore grades, milling rates and metal in concentrate production. A caveat that should be added

here is, while the level of confidence with the series is now much higher, as the data capture improves further amendments cannot be ruled out.

Top Silver Producing Countries 2003 and 2004 (Moz)

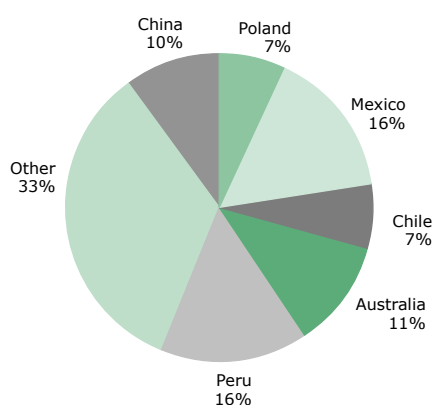
	2003	2004
1 Mexico	94.7	99.2
2 Peru	93.9	98.4
3 Australia	60.2	71.9
4 China	58.8	63.8
5 Poland	44.2	43.8
6 Chile	42.1	42.8
7 Canada	41.2	40.6
8 United States	39.9	40.2
9 Russia	34.3	37.9
10 Kazakhstan	23.3	20.6

Silver output in China in 2004 stood at a provisional 63.8 Moz (1,985 t), a 9% increase on the figure for 2003 of 58.8 Moz (1,828 t). The bulk of the output was generated as a by-product of mining copper, lead and zinc with lesser amounts sourced from primary sources and gold operations. Assessing the largest component of the split first, the acceleration of the development of the silver rich lead/zinc ores in northeast China in recent years, principally the northern half of Inner Mongolia, is thought to have made a major contribution to last year's overall 5.0 Moz (157 t) growth in output. Silver from copper mines (the degree of confidence is greater in the figures reported here because almost 75% of reported copper production can be identified to specific operations) also registered an increase in 2004, with estimates putting the rise from this category at roughly 5% year-on-year.

Looking back to earlier periods of silver production,

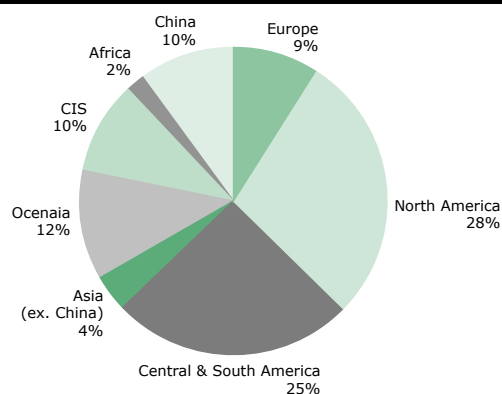
3. GFMS Mining and Exploration are part of the GFMS Group and offer geotechnical services and advisory services on project search and acquisition.

Top Six Global Silver Mining Countries, 2003

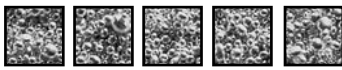
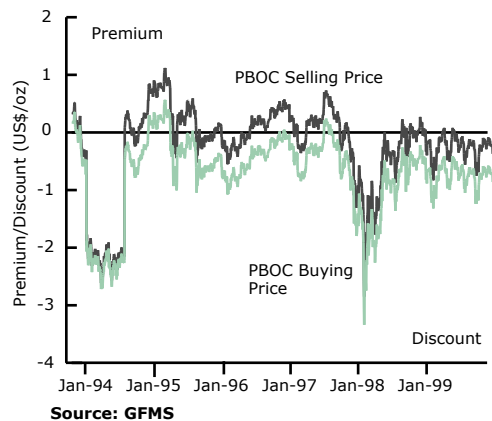
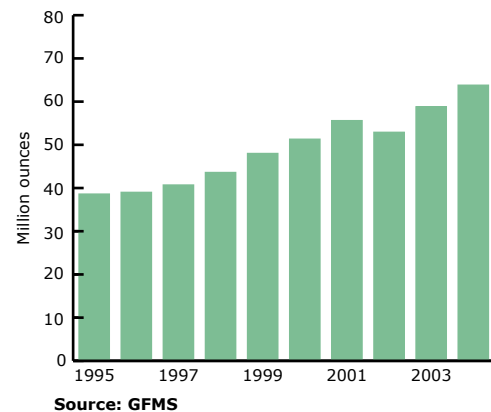


Source: GFMS

Regional Silver Mine Production, 2003



Source: GFMS

**Buying/Selling Price Premium/Discount****Chinese Silver Mine Production**

when analyzing Chinese mine supply it needs to be borne in mind that published data was complicated in the past by the PBOC's buying policies (which often saw silver being bought at prices well below the international price, which encouraged unofficial sales outside of the data collecting net) and various other institutional and tax incentives which still encourage miners not to fully report (or report anything at all) their production. Furthermore, GFMS believe that there does appear to be areas of double counting which is especially pertinent when it comes to adding up production data for mines and for smelters separately. This is examined in more detail later in this Chapter.

There are a number of differing opinions as to what the level of production was pre-1980s, mostly because of the lack of definitive data. One view is that mine output at this time would have been no more than 8.0 Moz (250 t) per annum, against consumption of over 14.5 Moz (450 t). This alternative view also argues that mine production grew strongly in the 1980s and 1990s to reach a level of around 48.2 Moz (1,500 t) per annum (from a starting figure of around 8.0 Moz (250 t)). However, GFMS believe that the implied growth rate over this period to achieve over 48.2 Moz (1,500 t) of output is not plausible. GFMS data suggests growth of around 3 times while this other view would suggest that output surged by over 6 times. Therefore, it is our view that production must have been higher than 8.0 Moz (250 t) pre-1980 and was more likely to have been around double this suggested volume.

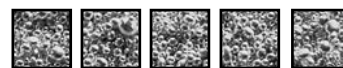
Although it would be of obvious interest to know with a higher degree of certainty what mine production in China was in the period following the Revolution, it is probably safe to say that relative to today's levels it

was not great. Furthermore, to the extent that this is of interest today, it pertains to approximate levels of stocks being held by the PBOC and other public organisations at the time substantial dishoarding began in the late 1990s. Our view is that one can construct a reasonable starting level of such stocks by examining the behavior of the bank over this period.

Fortunately, the analysis of mine production is not entirely dominated by contradictory and conflicting views. For instance, there is widespread consensus that output grew rapidly in the 1980s, the catalyst for this being a State Council directive to increase output so as to not to jeopardize China's economic growth. Much of the exploration at this time was focused on primary sources of silver, and during this decade eight large, independent silver mines (Tongbo, Guixi, Siping, Shanxi, Lianjiang, Zhaoyuan, Fengning and Zhushan), were developed. It seems likely that these mines alone boosted total production by at least 10-15% over the course of the decade.

In addition to these primary mines, substantial development effort went into base metals projects; the State Council also identified non-ferrous metals as a key strategic economic area of concern. What little data is available also points to silver production from these sources, in particular lead and zinc mines, having risen sharply in the 1980s.

As mentioned previously, the pricing policy of PBOC tended to cloud the statistical picture of mine production during the 1980s and for much of the 1990s. At its most basic, policy at the time encouraged the systematic under-reporting of production (as dictated by the five year plans that were part of the



centrally planned economy). As the graph earlier in this Chapter showed, the PBOC buying price for silver was regularly lower than that in the international market. Indeed, GFMS estimate that the Bank's buying price was below the international for more than 89% of the period for which we have data (1989 to 1999). Consequently, there was a powerful incentive not to sell to the PBOC, and miners either contracted directly with end users in China or shipped the metal to places like Hong Kong. This would most certainly have led to under-reporting of output to the official statistical agencies and the PBOC.

The lower buying price was not the only price distortion, however. For much of the period covered here, the PBOC's selling price was significantly higher than the international price (see the price discount and premium graph). In a sense there was a double incentive to sell directly to industrial users; firstly the mine could get a higher price, and industrial users could get a lower price. These arbitrage opportunities were at times very powerful and will most certainly have resulted in under-reporting of production, and most importantly, demand as well (GFMS data points to prices falling to as much as a \$2.80 discount on the PBOC's buying price and as much as a \$1.12 premium on the selling side; in other words, the PBOC would buy silver at a discount to the international price and at the same time was selling it at a large premium).

The other important distortion prevalent at this time related to the five year planning system. Under this arrangement, production targets were set by a central committee, often with little or no regard for the harsh production realities on the ground. As a consequence of these plans, many mines simply decided to under-report their initial production levels so as to ensure that they could meet the growth targets handed down to them by officials in Beijing (and this has been confirmed to GFMS by mine managers).

These problems were especially acute in the gold industry, but were also common-place in silver. This behavior in turn saw mines building stockpiles of metal through which they could smooth their reported production profile and deliver on target. GFMS believe that some of the de-stocking seen in the late 1990s and early 2000s would have come from these stocks.

For the purposes of this report, GFMS have attempted to track down as much data on silver mine production and smelting/refining as possible. Unfortunately,

because of the high degree of fragmentation in the industry and the fact that centralized control and administration of silver production was *de facto* ended in the late 1990s, no single agency has taken it upon themselves to continue collecting this data.

Appendix 1 summarizes the production data that we have been able to collect and breaks it down into three categories:

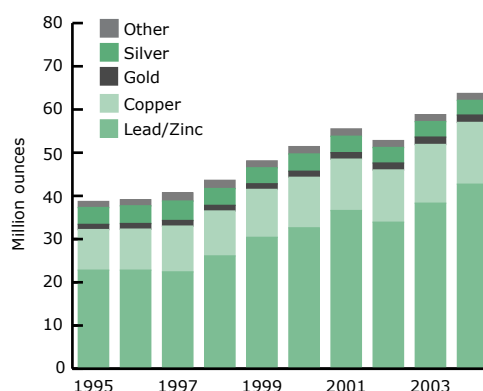
- 1) mines
- 2) smelters/refining companies
- 3) smelters/refining companies and mines.

The key statistical issue at hand centers on the extent to which there is double counting of the figures in each category. Put somewhat differently, is it legitimate to assume that each category is independent of the other? Not surprisingly, there is no simple answer to this question. Part of the difficulty centers around the two main sources of data on mine production and smelting, namely the National Bureau of Statistics (NBS) and the China Nonferrous Metals Industry Association (CNIA). The full breakdown of the NBS' data is given in Appendix 1, but in summary it shows production under the following three categories as:

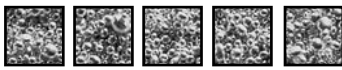
- 1) Mining Companies (including gold, silver, lead, zinc and copper) - 10.5 Moz (326 t)
 - 2) Smelter/Refining Companies - 64.0 Moz (1,992 t)
 - 3) Smelter/Refining and Mining Companies - 52.8 Moz (1,642 t)
- (all data for calendar year 2003).

By contrast, data from the CNIA puts silver production from copper, lead and zinc smelting at 63.1 Moz (1,962 t) for 2003, and total national silver recovery in that year at 117.9 Moz (3,666 t). At no stage does

Chinese Silver Mine Production



Source: GFMS



either statistical agency separate out recovery from scrap (local or imported) or recovery from imported concentrates, which makes it almost impossible to strip out the key elements of supply with a view to tying down exactly what the constituent parts are.

GFMS' view is that there is most likely double counting in the NBS data series. In other words, it would be erroneous to simply add production from each of the three categories listed above (which would suggest production at close to 128.6 Moz (4,000 t) in 2003). Of course, the received wisdom on the silver market in China is that production from all sources is in the region of 128.6 to 144.7 Moz (4,000 to 4,500 t), and it seems highly probable to us that these estimates have been based on an uncritical reading of the NBS data. For instance, GFMS have anecdotal evidence to suggest that many smaller mining companies sell their crude silver output to smelters for upgrading, and that this production is being counted at stage one as mine production and then again in the smelters' data, effectively double counting the material. Having said this, what stands out with the NBS data is that recorded mine production is so low, suggesting that some "proper" output is actually being recorded in either the second or the third category outlined above.

Further complications emerge when one examines the methodology of the data recorded by the NBS in the first instance. For example, a prominent Chinese mining and smelting company have provided data to GFMS showing that in 2003 their total production was around 11.3 Moz (350 t). Of this, 5.1 Moz (160 t) was from the smelting/refining of lead brought from the local market and imported sources while 6.1 Moz (190 t) was from their mining operation. However, NBS statistics record their production in 2003 as having been only 9.7 Moz (301 t). Quite what is the source of this discrepancy is not clear, suffice to say that it suggests the possibility of some under-counting of production too.

There are other examples of this also. For instance, another company has a capacity to produce 9.6 Moz (300 t) of so-called 1#, 2# and 3# silver ingot. However, only 20% of the 9.6 Moz (300 t) is produced from lead and zinc concentrates that were purchased in the domestic market with the other 80% being recovered from scrap. However, this company does not appear to be included in NBS' statistics.

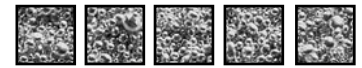
CNIA data is also not consistent with NBS data. As mentioned above, their data points to total production

having touched 117.9 Moz (3,666 t) in 2003, up from 103.4 Moz (3,217 t) in 2002 and 64.7 Moz (2,013 t) in 2001 (incidentally, growth that is similar to our own estimates of the increase in recovery from imported concentrates over this time). However, their smelter data points to only 63.1 Moz (1,962 t) of silver output in 2003 and 51.8 Moz (1,612 t) and 44.9 Moz (1,397 t) in 2002 and 2001 respectively. In our view, this implies an implausibly large contribution from imported concentrates, indicating that the difference is made up from this source as well as scrap or that the total estimated production level is too high (possibly through double counting).

Data on the breakdown of production by source does not shed much light on this matter either. The last comprehensive data available (based on data for the period 1993 to 1998 from China National Non-ferrous Metals Corporation) suggests that the share of lead and zinc has fallen while that of gold has risen. In effect, it is not really possible to try to pin down mine production on the basis of the source splits because of imported concentrates. As we discuss at length in Chapter 5, this source of silver has risen sharply in recent years, and has distorted not only the statistical picture pertaining to the sources of the metal, but the overall estimation of domestic production as well.

It is important to highlight that the statistical variances that have been mentioned may arise because of inaccurate reporting from the suppliers of the data, that is, the mining and smelting companies. As GFMS know, is it impossible to produce reliable statistics when the raw data is not accurate and this would certainly be an issue for the NBS and other data collection agencies.

Finally, it is worth reiterating why a robust statistical estimate of mine production in China is so important. There is now enough hard data (from both within China and from elsewhere) available which shows that China has become a major exporter of silver in the past five years. The source of this silver has major implications as to how China will impact on the global market over the next few years. If the growth in China's exports has simply been a result of rising mine production, this has profound ramifications for the global market i.e. China would be a massive surplus producer of silver. If on the other hand, these flows have been the result of de-stocking, the implications are quite different. And finally, if the source of this additional metal is simply imported base metals concentrates, the conclusions are similarly different.



Chapter 4 Scrap Supply (Domestic and Imported)

GFMS have devoted significant resources to measuring scrap supply in China and the impact of this key variable on the silver market's price dynamics. It should be noted, however, that scrap supply is one of a market's most difficult statistical areas, not least because of the fragmented nature of the business in most countries (and China is no exception).

Scrap matters because, were the volume of recycled silver greater than previously estimated (with fabrication numbers unchanged), this would necessarily imply commensurately higher bullion stocks (this is why higher scrap is included as one of the scenarios examined in Chapter 7). In other words, the extra supply from higher scrap would either had to have been absorbed by government/investors in the form of bullion or the amount of dishoarding required to balance the market would have had to be smaller.

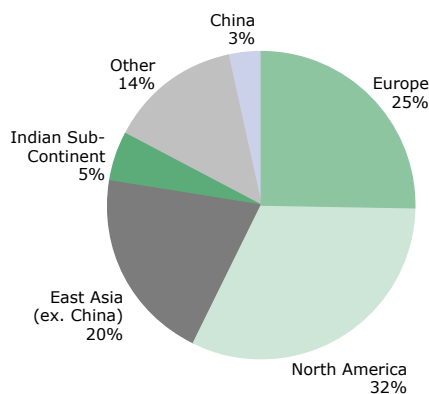
One issue that makes the construction of a time series on scrap in China particularly difficult is the fact that until 2000, the Chinese silver market was, *de jure* at least, controlled by the PBOC (see Chapter 8 for more on the deregulation of the Chinese precious metals markets). All buying and selling of silver had to be conducted via the Bank, and this included silver (gold was similarly constrained until recently). In effect, this meant that scrap silver had to be sold to the bank at

the same price as mine production i.e. at a discount, and often quite a steep one, to the international price. It is not difficult to deduce that because the official selling price for silver was above the international price, there was every incentive for users of silver to buy directly from scrap merchants, and for the latter group to sell directly to the former.

GFMS research on the Chinese silver market in the 1990s shows that this was what happened. Indeed, our information suggests that very little scrap silver was sold to the PBOC, and that most ended up either directly in the local market or exported to Hong Kong (the assays of the silver coming into the former British colony were always a clue to its origin, and often they pointed to scrap). Consequently, any official data collected on scrap at this time was derivative more often than not and hence subject to greater estimation errors.

Local estimates of Chinese silver scrap recovery vary enormously. Over the past 10 years, GFMS have heard numbers ranging from as low as a few hundred tons to as much as 96.5 Moz (3,000 t) per annum! More so than in the case of mine production, estimating Chinese production of recovered silver from scrap is difficult because there are a multitude of small-sized producers in the principle recycling areas of Zhejiang and Hunan Province. Recovery is mainly from used film, scrap capacitors and used computer and contact materials. It is reported for example that Xianju County in Zhejiang produces 9.5-13 Moz (300-400 t) of recovered silver from film, a figure we believe is far too high. Elsewhere, Yongxing County in Hunan is reported by some local analysts as having annual capacity of around

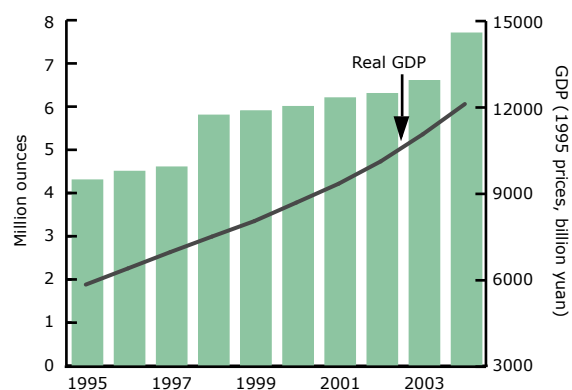
Regional Silver Scrap Supply, 2003 *



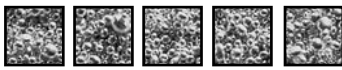
* as percent of global total

Source: GFMS

Chinese Silver Scrap Supply



Source: GFMS



48-51 Moz (1,500-1,600 t), mainly from capacitor materials, slag and solutions (probably photographic).

However, not all of the silver recovered there originates from these materials, and our information is that there is a substantial inflow of lead and zinc concentrates. Most interestingly, GFMS research suggests that this county has systematically exaggerated their scrap recovery data so as to avoid tax. It is a little known fact outside of China that producers involved in scrap recovery enjoy preferential tax treatment (in particular, they do not pay production taxes if they are involved in producing "environmentally friendly products"). Consequently, any data showing recovery of silver from scrap in these counties should be treated with caution; it is probably genuine mine production.

It is also important to distinguish between domestically generated and imported materials. Until the late 1990s this was not much of an issue because, as already noted, the PBOC controls on the market effectively precluded any imports of silver bearing scraps. However, following the liberalization of this market, there has been plenty of evidence (anecdotal at least) of a significant rise in imports of scrap (in particular, electronics scrap).

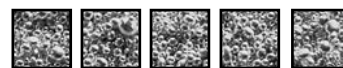
It is perhaps significant that on May 30th 2002, the Chinese government announced it would crack down on illegal imports of scrapped computers and other high-tech scrap from the United States and other developed countries (the Basel Action Network, a Seattle based global network of toxics and development activist organizations, alleges that substantial amounts of hazardous electronic wastes are exported from the United States to Asian countries such as China, India and Pakistan for recycling). At that time, a list of banned items was drawn up which included television sets, computers, photocopying machines, video cameras and telephones. It goes without saying that estimating these flows is extremely difficult given that so many of them were (and still are) illegal. In addition to these problems, it is often the case that smelters taking scrap feed are not in a position to identify whether it is of domestic or foreign origin.

Added complications concerning imported scrap, especially of electronics origin, are firstly, whether the material is actually re-used or genuinely scrapped, and secondly, just how much high grade material is actually shipped in. In the case of the former, our information suggests that much of the imported electronics "scrap"

is actually re-used (or at least many of the components are removed and used in other applications), meaning that only a small proportion of the potential contained precious metals are recovered. In the case of the latter, a number of scrap dealers have mentioned to GFMS that problems of assaying and recovery of precious metals in scrap means that potentially high yielding material is rarely sent to China. In essence, it appears as if the technical difficulties associated with the assaying of the precious metals content of, in particular, electronics scrap, preclude many Chinese operators from bidding for such material. Similarly, concern about recovery efficiencies means that most high grade material is processed elsewhere in the world (for example Japan). Our view is that this is not a huge source of silver in China.

In any discussion of scrap, it is important to get a fix on the above ground stock of the metal in fabricated products. One of the main reasons for the relatively small scrap number GFMS have for China is that industrialization is a relatively recent phenomenon. Hence fabrication use of silver for locally consumed products would have been low and the recovery of metal from these sources would be consequently smaller relatively than in a country like Japan. Having said this, there is little doubt that, as the above ground stock of items like computers, air conditioners and so forth increase, recovery will continue to rise.

An area in which there has been rapid growth in scrap supply recently is in photography. Estimates of the recovery of silver from photographic products (amateur film and paper, X-rays and graphic arts mainly) vary widely, from as little as a 3.2 Moz (100 t) per annum to as high as 32.2 Moz (1,000 t). Needless to say, given the fragmented nature of the industry and the multitude of processing laboratories for amateur photography (KingStar Photo Research, for example, estimate that Retail Minilab Outlets in operation in 2002 amounted to all of 25,500, up from only 17,000 in 1998), it is very difficult to calculate the amount of scrap recovered from these sources directly. One useful "reality" check on this data is to look at the theoretical levels of recovery that would be possible based on consumption data. For example, KingStar Photo Research estimate that the Chinese market consumed around 125 million square meters of photo paper in 2002 and 255 million rolls of film (36 exposure film equivalent). Basis GFMS data and calculations, we estimate that this would be equivalent to around 7.5 Moz (230 t) of (theoretically) recoverable silver. X-ray



Top Silver Recyclers

Moz

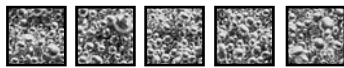
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
United States	46.0	48.4	51.8	55.7	57.4	62.4	64.5	59.2	56.8	53.3
Japan	27.3	27.1	27.8	29.2	29.5	29.8	29.9	30.2	29.9	28.3
Germany	14.8	15.4	16.1	16.4	16.1	16.7	16.8	16.7	19.0	18.3
UK & Ireland	7.4	7.6	8.4	10.8	11.5	10.9	11.1	13.6	13.0	12.2
India	9.6	6.4	9.6	11.9	6.7	6.4	6.4	6.8	9.5	10.4
CIS	7.7	7.4	7.1	8.8	7.7	7.9	8.1	8.5	9.0	9.5
China	4.3	4.5	4.6	5.8	5.9	6.0	6.2	6.3	6.6	7.7
South Korea	3.3	3.4	3.6	7.8	5.3	5.3	5.5	5.8	6.1	6.3
France	4.7	4.5	4.3	4.1	4.0	3.5	3.9	3.9	4.1	3.8
Italy	3.2	3.5	3.4	4.7	3.4	3.4	3.5	3.6	3.6	3.3

Source: GFMS

and other film would contribute around another 9.5-11 Moz (300-350 t) at the theoretical maximum, assuming all film was consumed and scrapped in the same year. If, as is the case in most countries, X-rays are usually kept for a period of around five years, it seems unlikely that recovery from this source would be much more than 2.6 Moz (80 t) per year.

In light of these comments, it does seem possible that combined recovery from photographic sources could be in the region of 3.2-4.8 Moz (100-150 t) per annum, which in turn would mean that GFMS' view of total scrap recovery before this report was on the low side. Based on our field research over the past year, this is the one area in the supply and demand balance that we are most inclined to adjust (in this case upwards) although any revisions will take place in the publication of the 2006 *World Silver Survey*.

One final reality check on the data for Chinese scrap is to compare volumes with those seen in more developed economies that have substantial above-ground stocks of silver bearing products and well developed recycling infrastructures (such as the United States and Japan). The table below demonstrates that China is already in the top 10 of global recyclers of silver, recovering greater volumes than highly industrialized countries like France. Taking our high scrap scenario figure of 16.1 Moz (500 t) places China as the fourth largest recycler of silver in the world, and it seems unlikely to us that recovery is significantly higher.



Chapter 5

Silver in Base Metal Concentrates

As discussed in the introduction to this report, one of the key statistical issues in China over the past six years has centered around the question of the quantities of silver that are recovered domestically from imported base metals concentrates. Indeed, a commonly heard explanation for the sharp rise in smelter silver output since 1998 is that recovery from imported concentrates has jumped (coinciding with the *de facto* liberalization of the silver market). It is our view that silver recovery from this source has increased sharply. However, the statistical concern revolves around the absolute volume of silver being recovered and GFMS and GFMS Metals Consulting have spent considerable time and effort looking into this matter.

It is worth reiterating a point repeated elsewhere in this report right from the beginning. It seems unlikely to us that considerable quantities of silver were recovered from imported concentrates in the early and mid-1990s. The reason for this is simple. At this time, the market was still tightly controlled by the PBOC, who were the only official purchasers of domestically recovered silver. As we show in Chapter 3, this official purchasing price was often significantly lower than the international price. Consequently, it was unlikely that any organization would ship high silver containing concentrates to China for processing because they would have ended up receiving lower prices for the recovered silver (and exports were very difficult to effect at this time). The table below illustrates the GFMS estimates for the silver contained in concentrates imported into China since 1995 (this does not necessarily equate to recovery).

Silver in imported concentrates, all forms, Moz

1995	2.5	2000	13.9
1996	5.3	2001	20.4
1997	6.4	2002	20.4
1998	10.1	2003	30.8
1999	8.1	2004	33.9

Source: GFMS

As can be seen from this table, GFMS estimate that recovery from these sources would have been less

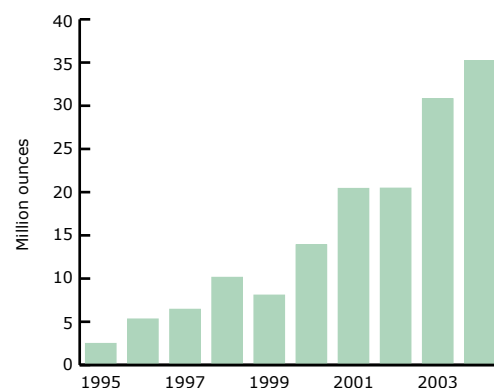
than 3.2 Moz (100 t) a year in the mid-1990s, and only really became a major supplier of silver towards the end of the decade. Our estimates, the basis of which are explained in detail below, point to silver contained in concentrates having been slightly over 32.2 Moz (1,000 t) in 2004. Measured against Chinese domestic mine production of 63.4 Moz (1,985 t) in 2004, it can be seen that concentrates are now a major supply side factor in the domestic market.

Sources of Supply:

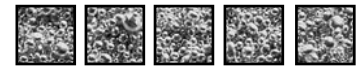
- Between 1999 and 2003 Chinese imports of copper, lead and zinc concentrates have risen by 115%, 300% and 1,596% respectively.
- This has led to a 282% increase in silver contained in concentrates over the five years.
- GFMS estimate that the amount of silver contained in these concentrates has increased from 8.1 Moz (251 t) in 1999 to over 35.2 Moz (1,095 t) in 2004.

Silver is an almost inevitable by-product of copper, lead and zinc production and as such the increasing amounts entering China in base metal concentrates should not necessarily be viewed as reflective of rising domestic demand for silver. While higher silver grades in concentrates may sometimes have been desirable, we do not believe this has been much of a factor in China's selection criteria for base metal concentrates. The prime motivation, of course, has been China's huge appetite for lead, copper and zinc. Increased by-product contents of silver (and indeed gold) will almost certainly have been viewed as a second order effect,

Chinese Silver Contained in Concentrates



Source: GFMS



sometimes beneficial, sometimes not; depending on the timing match between outturn as refined silver and domestic demand.

In any event, in terms of its bearing on the world silver market, China's rising imports of concentrates - and the growing amount of associated silver - should not be overplayed. In the final analysis, this metal already appears in the GFMS supply/demand balances as mine production in its country of origin. Therefore, what we are seeing here is a change in the flows of mine-supply rather than a factor affecting silver's fundamentals.

In the period 1999 to 2003, Chinese domestic consumption of zinc increased by 96%, copper by 100% and lead by 126%. This rapid growth, along with the expansion of China's toll refining sector, has caused increasing volumes of concentrate to be shipped into the country. The majority, if not all of these concentrates, contain silver in varying degrees, dependant upon the nature and source of the material. Silver grades can range from between 5 grams to 15,000 grams per ton and some at the lower end of the range may not be fully recoverable, if at all. This is particularly the case with zinc concentrates where the degree of difficulty in achieving silver recovery can be high. Where lead and zinc are mined together but produced as separate concentrates, producers will strive to direct as much of the silver as possible into the lead concentrate so as to maximize its ease of recovery and thus, payable return.

Copper: silver in imported concentrates (Moz)

	1998	1999	2000	2001	2002	2003
Australia	0.3	0.3	0.3	0.6	0.4	0.4
Canada	0.3	0.2	0.5	0.5	0.5	0.3
Chile	0.8	0.7	1.5	1.7	1.1	2.0
Indonesia	0.0	0.0	0.0	0.0	0.1	0.1
Mongolia	0.6	0.8	0.8	0.9	0.9	1.0
Peru	0.1	0.1	0.1	0.2	0.4	0.5
Total*	2.2	2.4	3.4	4.3	3.9	5.1

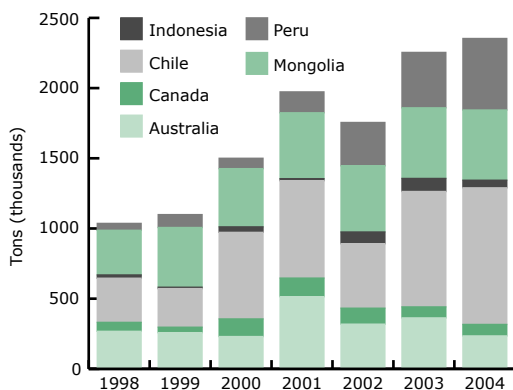
Source: GFMS

*inc. "other countries"

Since 1999, Chinese consumption of primary copper has increased by an average of almost 20% per annum. Meanwhile, domestic mine production has managed to grow by only 4% per annum while production of refined copper rose by 11% per annum, on the back of concentrate imports. Despite this, there remained a sizeable gap and this (as the table shows) has been filled by surging imports of refined copper.

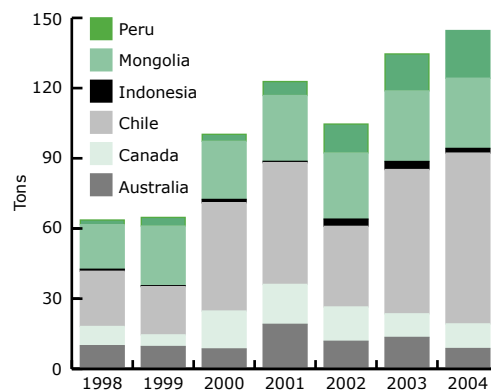
The expansion of China's copper smelting and refining industries has taken over much of the lost capacity brought about by closures in the United States and Europe. Chinese global market share in smelting of copper concentrates is now 13.3%, up from 8.5% in 1999. Meanwhile for mine production, its global market share in 2003 stood at just 4.5% and is likely to decline in the years ahead. This serves to highlight China's obvious dependence on raw material imports in order to sustain its spectacular growth.

Chinese Copper Concentrate Imports (Main Trading Partners)

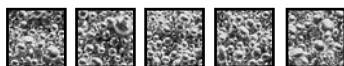


Source: WBMS

Copper: Estimated Tonnage of Contained Silver (Main Trading Partners)



Source: GFMS



Chinese copper market, 1999-2005

(000 tons*)

	1999	2000	2001	2002	2003	2004e	2005f
Consumption	1,514	1,892	2,365	2,766	3,031	3,350	3,640
Mine	533	613	605	597	607	625	650
Refine	1,174	1,371	1,523	1,633	1,772	1,950	2,150
Import conc	375	544	677	673	801		
Import ref	418	687	835	1,181	1,357		
Export conc	0	10	22	11	21		
Export ref	100	116	51	77	64		

* contained copper

Source: ICSG, GFMS-MC

Copper concentrate imports

(000 tons concentrate)

	1998	1999	2000	2001	2002	2003
Australia	268	258	230	514	319	363
Canada	64	39	126	132	114	78
Chile	315	275	617	694	459	822
Indonesia	23	10	39	14	83	93
Mongolia	318	425	415	469	472	503
Peru	49	92	74	149	309	395
Total*	1,183	1,250	1,813	2,255	2,065	2,682

Source: WBMS

*inc. "other countries"

The table above shows the total gross weight of copper concentrates entering China for smelting and refining while the table on page 21 shows the GFMS estimates of the level of silver contained in these concentrates.

The four largest exporters of copper concentrate to China are Chile, Mongolia, Peru and Australia. While copper production is expected to increase in all of these countries in the next two years, overall concentrate supply is likely to remain somewhat tight and China's continuing economic growth seems set to ensure that its smelters will remain aggressive bidders for available concentrate supplies.

Earlier this year, tight supplies of copper concentrates depressed treatment and refining charges (TC/RCS) to record lows. At that level, it seems that even the Chinese smelters - with their benefits of low labor costs and strong domestic demand - had had enough and the majors joined together to agree some modest production cut-backs and to coordinate future concentrate purchases through a single purchasing team. This seems to be having some effect on the concentrate market as a whole and we understand that TC/RCS are improving.

Mine production this year is up at Chile's Escondida as the mine expands capacity and we understand that an increased proportion of this material is now going to China. In Peru, concentrate output is sharply higher due to the re-start of Tintaya and a change in the mining plan at Antamina towards copper rich ore (although this is at the expense of zinc production).

Mongolian production is largely from Erdenet's mines. This represents a huge change in comparison with the early 1990s when over 90% of Mongolian material went to the Soviet Union for treatment and refining. The Mongolian concentrate has a silver content in the range of 50-70 g/t.

Lead: silver in imported concentrates (Moz)

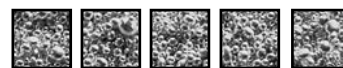
	1998	1999	2000	2001	2002	2003
Australia	0.9	1.1	2.2	2.4	0.8	1.8
Canada	1.2	0.0	0.9	1.2	0.8	1.0
Namibia	0.2	0.5	0.2	0.3	0.8	0.7
Peru	1.9	1.5	1.1	1.2	3.8	8.3
North Korea	0.1	0.1	0.2	0.2	0.2	0.5
United States	0.7	0.3	0.3	0.2	1.6	3.4
Total*	7.6	5.5	10.0	12.8	12.6	21.9

Source: GFMS

*inc. "other countries"

Lead contains the most silver of all the base metal concentrates with grades ranging from 200 g/t to as much as 15,000 g/t, although the average is much lower at around 1,000 g/t. The higher grades within lead concentrates mean that the majority of silver contained in base metal concentrates enter China this way, more than double copper and zinc put together.

Smelter capacity continues to grow in China, while supply of lead concentrates from domestic sources has remained relatively steady.



Chinese lead market, 1999-2005 (000 tonnes)

	1999	2000	2001	2002	2003	2004e	2005f
Consumption	524	590	700	950	1,183	1,275	1,325
Mine	549	660	599	641	618	660	695
Refined	918	1,100	1,195	1,325	1,578	1,650	1,730
Import conc	93	158	255	216	374		
Import ref	7	8	15	33	29		
Export conc	14	2	0	0	0		
Export ref	450	443	448	399	438		

* all figures refer to contained lead

Source: ILZSG, GFMS-MC

Against a backdrop of fairly static global lead production, China has boosted its market share from 14.6% in 1999 to 23.4% in 2003 and may reach 25% in 2006. However, difficulty in sourcing further volume at the concentrate level, with mine production having declined in recent years, is likely to place even greater emphasis on secondary supplies. This is despite smelter closures in Europe, Australia and the United States over the last two years. Material previously destined for smelters such as Noyelles Godault in France had already been finding its way to China.

Lead concentrate imports

(000 tons concentrate)

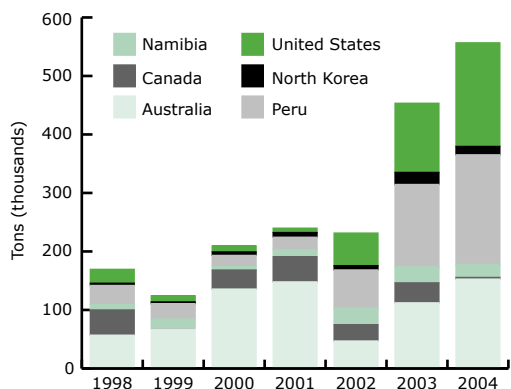
	1998	1999	2000	2001	2002	2003
Australia	57	67	136	148	47	112
Canada	43	0	33	43	28	34
Namibia	9	17	6	12	28	27
Peru	33	26	19	21	65	141
North Korea	4	3	6	8	7	21
United States	24	10	10	7	56	118
Total*	236	170	311	397	389	679

Source: WBMS

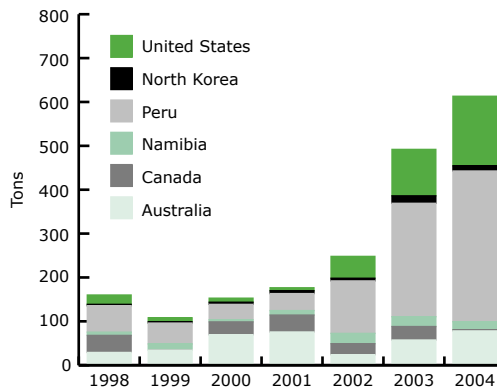
*inc. "other countries"

Higher imports of lead concentrates and scrap have enabled China to achieve a 23% increase in refined lead production despite lower domestic mine output. Scrap

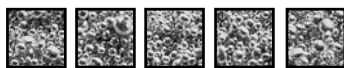
Chinese Lead Concentrate Imports (Main Trading Partners) **Lead: Estimate Tonnage of Contained Silver (Main Trading Partners)**



Source: WBMS



Source: GFMS



imports, of course, contain no associated silver. The key feature about the lead concentrate market is one of structural tightness. There are very few mine projects coming online this year and, as a result, the International Lead and Zinc Study Group is forecasting a 0.8% increase to lead concentrate output. Although this is expected to be the first increase in concentrate production since 2000, it will do little to ease the supply shortage. One of the few new sources of supply on the horizon is Ivernia's Magellan lead mine in Western Australia. This is expected to produce some 2,250.6 Moz (70,000 t) of lead in concentrates commencing from early 2005, although the mine will only be selling on the spot market for two years before a refinery is commissioned.

The lead bull market has been driven both by a structural decline in concentrate production and China's expanding appetite for the metal. We expect that shortages of concentrate will continue for the next two years at least and this will serve to restrain the amount of associated silver entering China's smelters.

Zinc: silver in imported concentrates (Moz)

	1998	1999	2000	2001	2002	2003
Australia	0.2	0.1	0.0	1.4	1.4	1.8
Iran	0.0	0.0	0.1	0.1	0.3	0.4
Kazakhstan		0.0	0.0	0.1	0.2	0.0
Peru	0.0	0.0	0.0	0.7	0.9	0.8
U.S.A.	0.0	0.0	0.0	0.1	0.1	0.0
Vietnam	0.0	0.0	0.1	0.1	0.1	0.2
Total*	0.3	0.2	0.4	3.2	3.9	3.7

Source: GFMS

*inc. "other countries"

Zinc concentrate imports (000 tons)

	1998	1999	2000	2001	2002	2003
Australia	20	10	0	155	146	189
Iran	10	8	35	33	116	132
Kazakhstan	0	0	0	22	65	6
Peru	0	0	0	123	154	137
USA	0	0	0	55	36	5
Vietnam	4	12	26	38	49	69
Total*	53	44	78	653	785	746

Source: WBMS

*inc. "other countries"

In the next two years, China's imports of zinc should slow as domestic mine production rises and the availability of concentrates from Peru declines as Antamina switches its focus from zinc production

to copper. Chinese mine production in 2004 rose noticeably and this is expected to be sustained going forward. This will soon be added to by Yunnan Jingding Zinc's new 200,000 tons a year zinc mine and smelter complex in Lanping City, where production was scheduled to start in early 2005. Feed for the project will come from joint venture partner Sichuan Hongda's lead-zinc deposit in Lanping city.

In conclusion, while it is clear that the amount of silver contained in all base metal concentrates imported by China is substantial - and has increased three-fold in the last five years - this is not a new dynamic in terms of the world's supply/demand balance for silver.

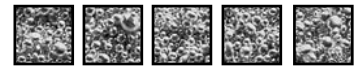
GFMS already systematically track mine production of silver throughout the world and include in its data sets silver produced as a by-product of base metal (and gold) mining. In 2004, by-product production accounted for fully 70% of total world-wide mine supply.

What we are witnessing here is a redirection in the flow of base metal concentrates driven by China's vibrant economy and its resultant need for these metals in order to sustain its booming manufacturing and construction industries. While the consequent increase in by-product silver contents will have been partially absorbed by China's rising domestic silver demand (subject to timing matches), the remainder will have been a contributory factor to China's silver exports of recent years.

Silver content of base metal concentrates (Moz)

	1998	1999	2000	2001	2002	2003
Copper	2.2	2.4	3.4	4.3	3.9	5.1
Lead	7.6	5.5	10.0	12.8	12.6	21.9
Zinc	0.3	0.2	0.4	3.2	3.9	3.7
Total	10.1	8.1	13.9	20.3	20.4	30.7

Source: GFMS



Chinese zinc market, 1999-2005

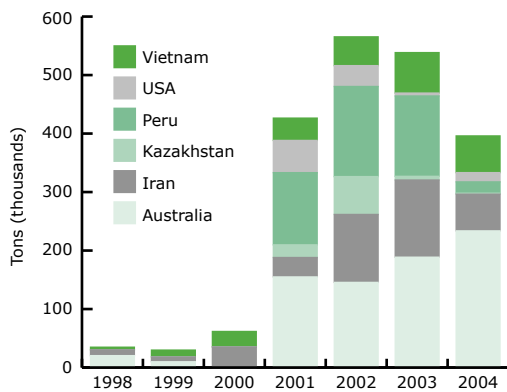
000 tonnes*

	1999	2000	2001	2002	2003	2004e	2005f
Consumption	1,200	1,350	1,500	1,750	2,045	2,175	2,350
Mine	1,476	1,780	1,572	1,624	1,637	1,750	1,850
Refine	1,703	1,957	2,078	2,155	2,292	2,475	2,600
Import conc	22	39	384	393	373		
Import ref	16	17	22	69	136		
Export conc	119	70	7	2	0		
Export ref	507	561	544	472	451		

* all figures refer to contained zinc

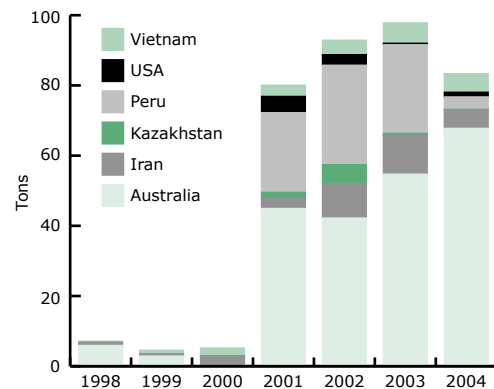
Source: ILZSG, GFMS-MC

Chinese Zinc Concentrate Imports (Main Trading Partners)

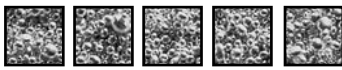


Source: WBMS

Zinc: Estimated Tonnage of Contained Silver (Main Trading Partners)



Source: GFMS



Chapter 6

Demand

GFMS data on demand has been benchmarked using supplies made to the market by the People’s Bank of China (PBOC) during the 1990s with adjustments made to allow for the direct flows of mined material to end users (see previous Chapters for more on this). Since the liberalization of the market (discussed elsewhere in this report) at the end of that decade, together with the withdrawal of the PBOC from active involvement in silver, we have had to rely more heavily on our own ‘on-the-ground’ market research which has made it more difficult to pin down with certainty absolute levels of offtake. While we are confident that most areas have experienced growth over recent years (with the exception of photography as a result of major structural changes in the Chinese market), the extent of this growth is not always easy to discern.

In the Chinese context and as GFMS have highlighted over the past decade, it has not always been easy to separate out domestically fabricated silver products from imported ones. For example, the huge growth in the assembly business in China (particularly in the electrical/electronics sector) has traditionally been fed from imported intermediate products but this has been changing in the past five years with increasing but unquantifiable amounts of components for China’s assembly industry now being produced domestically from raw bullion. This has tended to cloud the statistical

picture and has added to the uncertainty of establishing reliable growth estimates for silver demand.

Chinese Silver Fabrication Demand

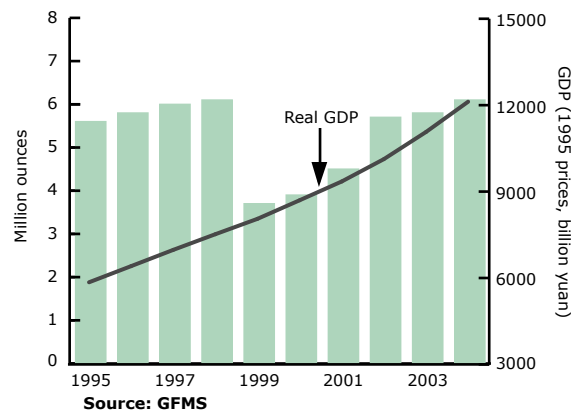
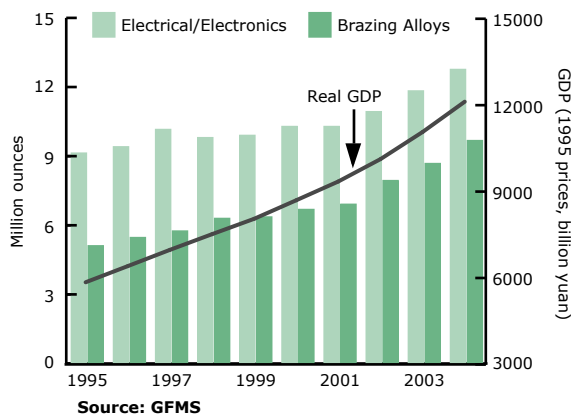
Moz	2000	2001	2002	2003	2004
Photographic	3.9	4.5	5.7	5.8	6.1
Electrical/Electronics	10.3	10.3	10.9	11.8	12.8
Brazing Alloys	6.7	6.9	7.9	8.7	9.7
Others (incl. batteries)	2.9	3.0	4.2	4.5	4.8
Plating	2.0	2.1	2.5	2.6	2.8
Coin	1.5	1.5	2.1	2.3	2.3
Jewelry	6.7	7.4	9.4	11.5	13.7
Total Demand	34.0	35.7	42.7	47.2	52.2

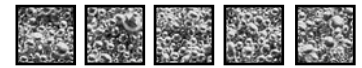
GFMS have traditionally broken down Chinese silver demand into seven key categories covering photography, electronics/electrical, brazing alloys and solders, other (including batteries, chemicals and so on), plating (non-electronics), coins and jewelry. The table above shows GFMS estimates for these categories over the past five years.

Basis our research, electrical and electronics account for the largest slice of demand in the industrial field with jewelry offtake being the largest demand category. The phenomenal growth in jewelry demand in recent years is substantiated by the surging exports to markets like the United States.

Looking forward, the combination of growth in domestic consumption and manufacturing for export will continue to result in double digit growth in Chinese silver demand. Firstly, domestic consumption

Chinese Silver Industrial Fabrication Chinese Silver Photographic Fabrication





will play a critical role in driving demand higher. Looking at industrial demand, rising income levels and urbanization mean more and more Chinese are spending money on cars, white-goods, electronic devices and so forth. In terms of silver jewelry consumption, the outlook is not so rosy if the past is used as a guide. While silver jewelry and silverware has a long tradition in China, it has mainly been in the poorer rural areas. Urban Chinese shun silver jewelry, preferring gold and even platinum but there are signs that this could change as international trends take hold where better designs, branding and promotion along with changing spending habits (for example "self-gifts") have resulted in widespread popularity of silver jewelry.

Secondly, increased silver use in the production of Chinese made goods for export will no doubt rise but it will mostly be offset by a comparable drop, ceteris paribus, in silver offtake in the country where production has either shifted from or has declined because of competitive pressures from China. There is of course the possibility that the shift of production to China results in lower production costs that will eventually flow through to pricing which in turn stimulates higher global consumption of those products.

Imports and Exports of Silver

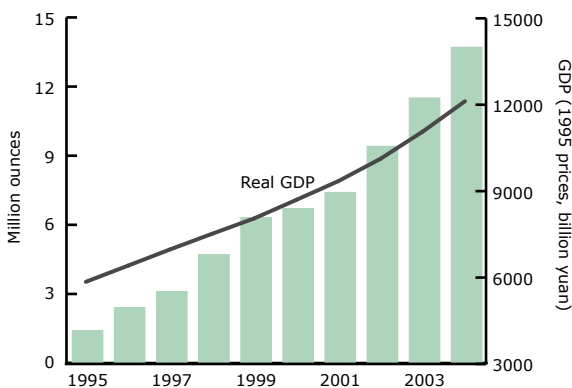
There has been considerable discussion about the volume of Chinese silver imports and exports over the past decade or more. GFMS' field research has

consistently highlighted the fact that China has been and continues to be an often simultaneous importer and exporter of silver (both officially and unofficially). Official imports of silver have been an ongoing feature of the market, even when China was exporting substantial volumes of the metal to the rest of the world. This rather curious state of affairs was related to, firstly quality issues and, secondly, timing issues.

In the case of imports, certain industrial users of silver, especially foreign operations with stringent quality requirements, have brought metal in despite this being more expensive than sourcing locally. This has been especially true in areas such as electronics/electrical and photographic uses (our information is that silver nitrate was imported in the late 1990s for these very quality concerns). With regard to exports, flows of metal out of China have never been continuous, responding instead to price differentials as and when they have emerged. From time to time, the spot availability of silver in China has often been tight, resulting in imports when the prevailing scene at the macro level has been one of exports.

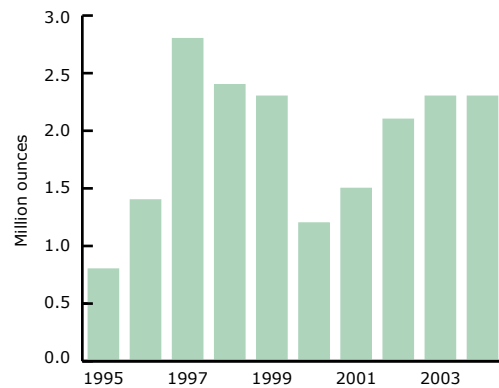
In addition to the "official" flows of metal into and out of China, there have been substantial "unofficial" shipments over the years, usually outbound. During the 1990s, the price disincentives in the domestic market saw substantial outflows of metal, mainly into Hong Kong, although later on direct shipments to places like India and Thailand were being made.

Chinese Silver Jewelry Fabrication

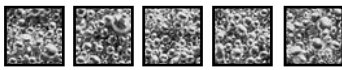


Source: GFMS

Chinese Silver Coin Fabrication



Source: GFMS



China - "official" flows of silver bullion (Moz)

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Imports	0.7	0.8	1.1	1.1	1.4	3.4	4.7	6.5	8.4
Exports	0.5	0.2	0.7	2.2	8.0	6.1	38.5	65.0	92.9

Source: GFMS and trade sources

As the graph on this page shows, there were at times extremely large price disparities between the PBOC's buying price and the international price and this was a powerful incentive to either sell directly into the local market, to export unofficially, or to build stocks until more favorable prices emerged. Our view is that all three strategies have been at play and the degree to which any one was dominant depended on the price differentials and market conditions.

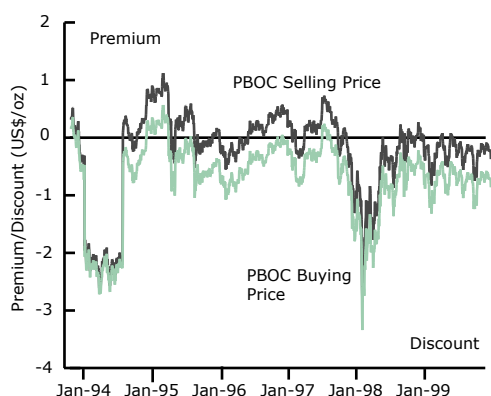
GFMS data points to these outflows having been extremely large in the late 1990s and early 2000s. GFMS believe China has actually been a net exporter of silver over the past decade, though the volumes in earlier years were relatively modest (typically around 3.2 Moz - 100 t). In fact, based on other proprietary data, we believe that China has been exporting silver, mostly unofficially, since the late 1980s. The main driver behind this was again the fact that the PBOC purchasing price for silver was consistently below the international price, which encouraged unofficial flows of the metal to Hong Kong.

The real sea change in activity occurred in 1998, when exports ratcheted up dramatically from the year before. Our view is that around half of these flows

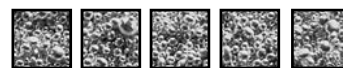
were what may be termed genuinely official shipments with most of this material going to Europe. The term "genuinely" official is important, as GFMS have always distinguished between these and what we have termed "quasi-official" exports. As we have discussed in some detail in the World Silver Surveys over the past few years, it has long been our understanding that silver stocks in China have been built up and held directly by the People's Bank of China (what we term genuinely official), other public agencies ("quasi-official") and by what may be termed the private sector. (There are two main recycling and recovery centers in China, employing tens of thousands of people, which have effectively operated privately for the past decade.)

1998 turned out to be only a taster of things to come and the floodgates opened in 1999 with the outflow of metal from China increasing, basis GFMS estimates, by a factor of close to four. Although the volumes have fallen back slightly since then, they have remained at elevated levels. The destinations for these exports have remained essentially unchanged over the years and include Europe, India, Thailand, Taiwan, Malaysia and Dubai amongst others. However, there were some fairly large shifts in the volumes being shipped with flows to Europe having dropped markedly in 2001 (by over two-thirds).

Buying/Selling Price Premium/Discount



Much was made of the liberalization of the Chinese silver market at the beginning of 2000 when the government ended its 50-year monopoly on sales and purchases of silver. The most obvious manifestation of this was the Huatong Silver Exchange, which was given exclusive rights to trade and manage the silver market. To date, this innovation has not enjoyed the expected success with most trading of silver within China is being done directly between counter parties due to the ongoing dispute regarding the charging of value added tax (VAT).



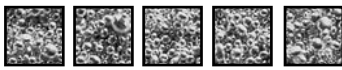
Hong Kong - "official" flows of silver bullion (tonnes)

	1997	1998	1999	2000	2001	2002	2003	2004
Imports	4.3	2.9	9.3	9.3	49.5	45.0	49.5	56.2
Exports	1.0	9.5	40.3	45.3	43.1	40.4	24.9	27.3

Source: GFMS and trade sources

It is our view that the elevated levels of exports since the opening of the market has been perpetuated, in part at least, by the high level of VAT (20%) applied to silver trades. It is no coincidence that as a consequence of the wrangling over VAT, export quotas for silver have increased dramatically since 2000 (although part of this is really just legislation catching up with reality). For instance, in 2000, four exporters were granted export quotas totaling 13.5 Moz (420 t). By 2001, this had grown to 37.9 Moz (1,180 t) via 16 exporters, and by 2004, the quota was well over 98 Moz (3,000 t) via more than 30 companies. For 2005, it is our understanding that the quota has been initially set at 113 Moz (3,500 t).

The official Hong Kong trade data also appears to be playing a bit of catch-up. Recorded imports rose from only 9.3 Moz (289 t) in 2000 to around 56 Moz (1,748 t) per year in the past few years, most of which originated from China. The bulk of the re-exports have been destined for India, Thailand and Dubai.



Chapter 7

Deregulation

From 1949 to 1982, private individuals in the new People's Republic were forbidden to own gold and silver and the "Monopolistic Purchase and Management" system (MPM) for gold and silver was implemented. The main aim of this system was to prohibit all outflows of gold and silver, initially from the communist liberated areas, and to encourage deposits of gold and silver for the new Renminbi currency at a set rate. Circulation of gold and silver and private trading were forbidden; gold and silver ornaments could not be sold privately. Gold and silver mining did not feature in the planning process and investment in the industry was depressed.

In the years that followed the food shortages which followed the disastrous "Great Leap Forward" movement in 1958, which forced China to buy grain abroad (in part with gold), silver and gold policy was really one of benign neglect. Indeed, much of the story at that time focused on gold, and the depleted national reserves exposed the neglect of the gold industry. However, it was not possible to remedy this systematically in the 1960s because of the havoc caused by the Cultural Revolution (1966-76). In view of these domestic upheavals, gold and silver had not surprisingly retained their attraction as a store of value, and, during the Autumn of 1966 Red Guard searches in Shanghai City alone are reported to have turned up some 1.1 Moz (35 t) of gold, presumably in bullion or coin, and 14.5 Moz (450 t) of gold and silver jewelry.

In 1976, at the end of the Cultural Revolution, gold was again the metal on the agenda, with some 2.6 Moz (81 t) being sold abroad after the ominous Tangshan earthquake and Chairman Mao's death which seemed to foretell a change of dynasty. Similarly, there were reports of gold swaps after the events of Tiananmen in June 1989, when China's credit rating was low.

The Chinese economy entered a new phase in 1979 with Deng Xiaoping's "Open Door Policy". This new policy brought to the fore problems of imbalances between the supply and demand of both gold and silver. It was at this time that the State Council, aware that these imbalances could constrain economic growth (especially in the case of silver), began to implement policies to boost mine production of both metals. Consequently, we can be sure that the production of

gold and silver rose strongly, by annual average rates of between 8 and 10%, through the late 1980s and early 1990s.

The main thrust of official policy in this period was:

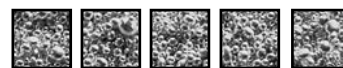
- centralized administration of the silver and gold industry;
- centralized buying and selling of silver and gold;
- increases in purchase prices to mines;
- reduced taxation;
- subsidization, and low interest loans.

In 1993, there appeared "non-government gold and silver exchanges" of which the Ganwang Gold Exchange in Haicheng in Liaoning Province was the main example. The background to these exchanges is unclear: one source cites unhappiness in the mines over the official gold and silver prices. The move was however almost certainly in response to the call for greater freedom in the economy by Deng Xiaoping that year. It is most certainly the case that a substantial portion of silver and gold traded went into the free-trade non-government exchanges, so any data for Chinese national silver and gold production from this period should therefore be treated with extreme caution.

The official ideological reaction saw to the closing of these exchanges, and the suppression of debate on liberalization of the precious metals market. The end result was of course a massive increase in smuggling and unofficial sales, mainly of gold.

There was from 1980 to 1990 a State Development Fund (SDF) for gold, which came under the Ministry of Finance and the PBOC, and was mainly used for geological exploration, administration and start-up costs. In the case of gold, while the central purchase price was only RMB95 (US\$11.5) per ounce, the SDF could provide assistance up to RMB350 (US\$ 42.7) per ounce - though this still only made up the purchase price to about 60% of the world spot price at the time, and was probably not sufficient to deter leakage of production into unofficial domestic and foreign channels. Our understanding is that a similar arrangement was in place for silver at this time.

By the mid-1990s, it had become clear to the authorities that current gold and silver policy was not working (this was communicated privately to GFMS at



the time), but there was a degree of decision making paralysis, not least of all because the PBOC was constrained at that time by the State Council (who had delegated the task of management of both metals to the Bank). By 1997, the PBOC was aware that their stocks of silver were more than sufficient for China's own fabrication needs, and so began a period of benign neglect, reflected in the fact that the official buying and selling price was left unchanged in spite of massive movements in the international price.

In effect it turned out that silver was seen by the authorities as the metal through which to test the process of deregulation. As a direct result of the "softly softly" approach to silver market deregulation, public data and official commentary during this period was rare. Somewhat ironically, considering that gold market liberalization was seen as following that in silver, it is easier to construct the history of the former's evolution rather than the latter's.

In the period 1997 to 2000, there were important changes in policy and thinking that led to the deregulation of the domestic silver trade which culminated in the establishment of the Huatong Silver Exchange in 2000 (and ultimately the Shanghai Gold Exchange - SGE - in late 2001). The Huatong Nonferrous Metal Wholesale Marketplace was designated by the State Economic and Trade Commission as the only official trading platform in China, and initially had 56 silver trading members, including nonferrous metals producers, processing firms and institutional consumers and wholesalers.

Ironically, given that silver was the first to be deregulated in this fashion, it is gold that has done much of the running on the exchange front. The primary reason for this is tax related, in particular Value Added Tax (VAT). At the time of the launch of the silver exchange in 2000, the main unresolved problem centered around the treatment of VAT (of 17%) on trades conducted on the exchange. Members of the exchange argued for zero rating, but for various reasons a deal with the tax authorities was not struck. Consequently trading volumes did not take off, and at the time of writing, it appears as if most producers and users of silver have opted to trade off the exchange, and usually with no VAT, or with a percentage of VAT being paid (it is not uncommon to find users paying an average of 5-6% "VAT". There is also a huge market in receipts which enables users to avoid VAT altogether). On the Shanghai Gold Exchange, by contrast, an

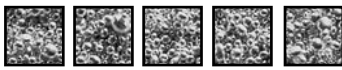
agreement was reached on the treatment of VAT on deals conducted on the exchange, and trading volumes have risen steadily since its opening.

Notwithstanding these problems with silver, it is remarkable how much progress has been made in four short years. In praise of the Chinese efforts at deregulation, it should be said that it is almost easier to spell out what few controls remain, than to go over the lengthy list of alleviations.

In terms of what remains to be done, it is worthwhile turning to the gold market, and the extensive 1998 road map proposed by the World Gold Council. The following areas still require deregulation:

- Implementation of futures trading (under consideration).
- Foreign ownership of seats on the Exchanges (not yet being considered)
- The possibility of other exchanges (for example in Shenzhen - this is not yet being mooted by the authorities.)

China's policy successes in the silver market are considerable - the PBOC has now stood back from its position as monopoly buyer and seller of silver; the Shanghai Gold Exchange is dealing gold - and platinum; amalgamated mining companies are conducting IPOs and floating on the Shanghai and Hong Kong Stock Exchanges; and producers and users of silver can freely buy and sell the metal (albeit often without paying VAT). When one thinks of the expropriation of all private gold and silver in the Great Cultural Revolution (which ended only in 1976), then the structural and ideological change has indeed been momentous.



CONCLUSIONS

The research that GFMS and our counterparts have conducted for this report has highlighted many differing opinions about the current state of the Chinese silver market. Of particular note is that there is very little consensus as to the size of various components of the silver supply and demand balance. On the supply side there are widely differing views as to the size of mine production, scrap, recovery from imported concentrates and flows from stock. On the demand side, there is equally little consensus, although the range of views is typically narrower than in the case of supply.

That said, it must be pointed out that such alternative views are seldom, if ever, based on systematic market research or specific knowledge and tend to be the expression of feelings and opinions derived from, at best, sketchy anecdotal evidence. It is also true that when such views are expressed, they only ever relate to one component of the market and never consider the effect that would have on the wider market, if it were to be true. These alternative views are then oft repeated such that they in themselves become the anecdotal evidence of others. It is an old adage that if something is repeated often enough it eventually becomes accepted wisdom.

But at GFMS, we welcome such views and opinions because they force us to challenge our own assumptions and to ensure that our analysis of the situation is based on the best research we can do coupled with a careful assessment of the areas of doubt.

In terms of our past research on China, we would point to two things which enable us to feel comfortable with the research work we have done. The first of these is that our research on silver is at least partly interrelated with our research on gold with many of our research contacts being active in both metals. This is particularly the case among the banking, trading, refining and jewelry communities. It is widely accepted that we have it right on gold and therefore that our information sources are reliable. It is hard to imagine that where these information sources coincide, we could be receiving clear guidance on gold but not on silver. Secondly, an independent review of the Chinese silver market was conducted by another consultancy in 2001 and its findings, to which GFMS were privy, were

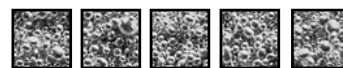
broadly supportive of the conclusions we had reached.

In setting out our conclusions, it is useful to begin with the parts of the supply and demand balance about which we have good information and a high degree of confidence. On the supply side, one area that we have been able to tie down concerns the recovery of silver from imported concentrates. It is worth noting that it has been suggested that this source of metal accounts for virtually all of the growth in silver production in China since the market was opened up in 1998. Implicit in this view is that recovery of silver from concentrates is around 64 to 97 Moz (2,000 to 3,000 t) per annum (which, added to domestic mine production of nearly 64 Moz (2,000 t) would give rise to supply of around 161 Moz (5,000 t).

Based on our detailed research on this, we believe this is not true and are confident that recovery from these sources is just over 32.2 Moz (1,000 t) per annum. On the demand side we can be equally confident about the jewelry data. Not only does our production figure match with data we have from the local market, but it also fits well with jewelry import data we have from countries like the United States and Germany. Our photographic data is also similarly robust.

Moving to areas about which there is less certainty, the most important is clearly mine production. At its most basic level, does China produce significantly larger volumes of silver from domestic mine sources than GFMS currently estimate? The important thing to recognize here is that the question is not one of marginal adjustments; quite frankly, if mine production happened to be as much as 20-30% higher, this would not materially alter the GFMS analysis of the Chinese market.

If mine production is in the region of 112.5 to 144.7 Moz (3,500 to 4,500 t) as some suggest, this has massive implications for GFMS' analysis, and more importantly, for the global silver market. The advantage of the GFMS time series methodology is that it forces the analyst to reconcile not only current years, but previous ones too; after all, mine production is not something that simply comes and goes in a short space of time. Usually, higher mine production today implies an elevated production profile in the past (assuming no new massive mines have come on stream). And higher production in the past implies that the silver must have gone somewhere - to demand (implying that historical



and current estimates of this are too low) or to stocks (implying massive stock building). Based on running these scenarios through time, it seems unlikely to us that mine production can be as high as is suggested in some quarters. The resultant stock scenarios are simply not credible. Having said this, we do believe that mine production is higher than current GFMS estimates (based on revisions to Chinese lead mining data), which, all other things being equal, would suggest a smaller stock run down each year than currently calculated (see Chapter 3 for more on this). However, it seems unlikely that this will fundamentally alter the conclusions of this report.

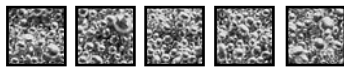
Scrap is an area about which hard information is even more difficult to gather than for mine production. A variety of institutional factors such as taxes have conspired to keep this sector of the market particularly opaque. As discussed in Chapter 4, we are receptive to the idea that our scrap data for China, especially if imported materials are counted, may be too low. Having said this, assuming even a substantial rise in scrap recovery (doubling it over current GFMS estimates) would not affect our basic analysis and conclusions about this market. We have found little evidence to suggest that scrap volumes are as large as has been suggested in some quarters (this is explained in more detail in the scrap chapter).

Industrial demand for silver is another area about which there is a higher degree of statistical uncertainty. Having said this, we are reasonably confident with the benchmarked figures from the 1990s, and it seems unlikely to us that offtake would have moved dramatically out of line with these. Furthermore, alternative views of industrial demand tend to suggest our numbers may be too high. If true, this would indicate that industrial demand now is flat to, or lower than, our benchmarked 1990s numbers. Given the phenomenal economic growth in China in recent years, this hardly seems realistic.

As far as stocks are concerned, we believe that China still holds both official and quasi-official stocks of silver. At the time of writing, we believe that these stocks would amount to between two to three times annual Chinese fabrication demand, although the degree of uncertainty about these figures is high. While it is possible to construct supply and demand scenarios that differ substantially from the GFMS position and which result in stocks being significantly higher or lower, these fail to stand up to scrutiny. What is not in any doubt

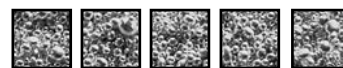
is the fact that China is currently a surplus producer of silver (from both domestic and imported sources) and will continue to export large volumes of the metal. Quite how much will continue to be exported is partially a function of the reservation price at which official and quasi-official stocks are mobilized. Recent indications are that this reservation price is much higher than in the past.

In the final analysis, and after a year's work, we remain confident that GFMS' supply and demand data series for the silver market in China is as accurate a depiction as is possible given the areas of doubt we have described. Having said that, China is changing rapidly and in response to that we have stepped up our research effort there by establishing full time representation within the country. We remain receptive to alternative view-points on the market and will continue to stress test and explore these to a conclusion. No doubt, China will remain an important feature of the world silver market for many years to come.

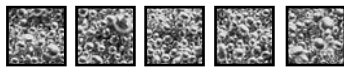


Appendix - Mine Production and Smelter Output

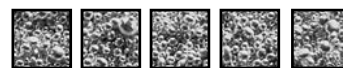
Mine	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Associated ores	Ownership	Province
Shandong Zhaojin Group Co.	75,307	127,273	3.21%	69.00%	Gold	State-owned	Shandong
Guangxi Long'an County Fenghuang Silver Industry Co.	33,217	37,145	0.94%	11.83%	Silver	State-owned	Guangxi
Liuzhou Huaxi (China Tin) Group Co. Ltd	43,296	32,326	0.82%	-25.34%	Tin	State-owned	Guangxi
Hebei Fengning Silver Mine	36,502	29,975	0.76%	-17.88%	Silver	State-owned	Hebei
Yunnan Mengzi Metallurgy and Mining Co. Ltd	19,103	24,223	0.61%	26.80%	Lead and Zinc	Other Limited Company	Yunnan
Hunan Jiangyong County Silver-Lead-Zinc Mine	9,421	11,492	0.29%	21.98%	Lead and Zinc	State-owned	Hunan
Hunan Guiyang Heli Mining Co. Ltd	-	8,589	0.22%		Lead and Zinc	share-holding Company	Hunan
Hunan Chenzhou Qiaokou Lead-Zinc Mine	8,264	7,150	0.18%	-13.48%	Lead and Zinc	State-owned	Hunan
Gansu Liuyuan Huaniushan Industry Group Co. Ltd	7,000	6,400	0.16%	-8.57%	Gold	Other Limited Company	Gansu
Hebei Chicheng Wanquansi Silver-Gold Co. Ltd	7,828	6,369	0.16%	-18.64%	Silver	Limited company	Hebei
Zhejiang Suichang Gold Mining Co. Ltd	7,010	5,491	0.14%	-21.66%	Gold	State-owned	Zhejiang
Hebei Zhangjiakou Lead-Zinc Group Co. Ltd	10,573	5,417	0.14%	-48.77%	Lead and Zinc	Congregate	Hebei
Shaanxi Luyang Jialing Gold Mining Co. Ltd	5,463	4,514	0.11%	-17.37%	Gold	Other Limited Company	Shaanxi
Inner Mongolia Xingye Mining Co. Ltd Fusheng Silver-Lead-Zinc Mine	2,604	4,315	0.11%	65.69%	Lead and Zinc	Limited company	Inner Mongolia
Shandong Laizhou Jincang Mining Co. Ltd	5,244	4,142	0.10%	-21.00%	Gold	Other Limited Company	Shandong



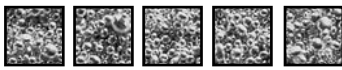
Mine	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Associated ores	Ownership	Province
Fujian Youxi Minrong Mining Co. Ltd	-	3,759	0.09%		Lead and Zinc	Other Limited Company	Fujian
Hebei Zhangjiakou Chicheng County Pengjiagou Silver Mine	-	2,747	0.07%		Silver	State-owned	Hebei
Henan Songxian County Jinniu Co. Ltd	2,209	1,906	0.05%	-13.72%	Gold	State-owned	Henan
Shandong Gold Mining Co. Linglong Gold Mine	530	706	0.02%	33.12%	Gold	State-owned	Shandong
Henan Xichuang County Changcheng Enterprise Group	651	661	0.02%	1.54%	Gold	State-owned	Henan
Shandong Gold Mining Group Sanshandaog Gold Mine	628	512	0.01%	-18.39%	Gold	State-owned	Shandong
Shandong Gold Mining Co. Ltd Xincheng Gold Mine	1,661	502	0.01%	-69.78%	Gold	State-owned	Shandong
Guangxi Longtoushan Gold Mine	310	458	0.01%	47.88%	Gold	State-owned	Guangxi
Jiangsu Jinyuan Gold Co. Ltd	513	280	0.01%	-45.42%	Gold	JV of state and private	Jiansu
Hunan Changning Longwangshan Gold Mine	696	128	0.00%	-81.61%	Gold	State-owned	Hunan
Shandong Linqu County Gold Mine	55	59	0.00%	7.27%	Gold	Congregate	Shandong
Shandong Gold Group Jiaojia Gold Mine	798	-	0.00%	-100.00%	Gold	State-owned	Shandong



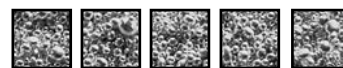
Company	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Main Products	Ownership	Province
Henan Yuguang Gold-Lead Group Co. Ltd	250,800	301,333	7.60%	20.15%	Lead and Zinc	State-owned	Henan
Yunnan Copper Industry Co. Ltd	239,351	297,108	7.50%	24.13%	Copper	Limited Company	Yunnan
Hunan Zhuzhou Smelting Group Co. Ltd	212,396	295,639	7.46%	39.19%	Lead and Zinc	State-owned	Hunan
Shenzhen Zhongjin-Lingnan Nonfermet Co. Ltd Shaoguan Smelter	195,028	234,241	5.91%	20.11%	Lead and Zinc	Limited Company	Guangdong
Jiangxi Copper Industry Co.	120,980	220,115	5.55%	81.94%	Copper	State-owned	Jiangxi
Hunan Shuikoushan Nonferrous Metals Co. Ltd	230,719	195,874	4.94%	-15.10%	Lead and Zinc	State-owned	Hunan
Hubei Daye Nonferrous Metals Co.	80,016	94,090	2.37%	17.59%	Copper	State-owned	Hubei
Anhui Tongling Nonferrous Metals Group Co.	66,486	72,505	1.83%	9.05%	Copper	State-owned	Anhui
Gansu Baiyin Nonferrous Metals Co.	48,550	63,950	1.61%	31.72%	Copper	State-owned	Gansu
Shandong Yantai Nonferrous Metals Group Co. Ltd	50,567	59,865	1.51%	18.39%	Copper	State-owned	Shandong
Anhui Chizhou Nonferrous Metals (Group) Co. Ltd	23,064	45,448	1.15%	97.06%	Lead and Zinc	State-owned	Anhui
Gansu Jinchuan Group Co. Ltd	16,451	22,740	0.57%	38.23%	Nickel and Cobalt	State-owned	Gansu
Zhongjin Gold Co. Ltd, Henan Zhongyuan Gold Smelter	17,047	17,604	0.44%	3.27%	Gold	Limited Company	Henan
Liaoning Huludao Nonferrous Metals Group Co. Ltd	24,567	12,030	0.30%	-51.03%	Lead and Zinc	State-owned	Liaoning
Guangxi Nandan Twinkling Start Antimony Industry Group Co. Ltd	-	3,398	0.09%		Antimony	State-owned	Guangxi



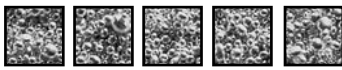
Company	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Main Products	Ownership	Province
Henan Linghua Group Co. Ltd	24,450	1,294	0.03%	-94.71%	Nitrogenous Fertilizer	State-owned	Henan
Shanxi Datong Gold Mining Co. Ltd	911	1,006	0.03%	10.45%	Gold	Limited Company	Shanxi
Guangxi Longtoushan Gold Mine	310	458	0.01%	47.88%	Gold	State-owned	Guangxi
Inner Mongolia Keleqinqi Jinchanshan Gold Mine	297	420	0.01%	41.41%	Gold	State-owned	Inner Mongolia
Jilin Linjiang Gold Co.	-	300	0.01%		Gold	Congregate	Jilin
Inner Mongolia Chifeng Songshan Yin Hai Gold Industry Co. Ltd	264	284	0.01%	7.58%	Gold	Other Limited Company	Inner Mongolia
Guangxi Nandan Nanxing Metallurgy and Chemical Industry Co. Ltd	1,204	106	0.00%	-91.20%	Antimony	Joint Venture	Guangxi
Guangxi Hechi Nanfang Nonferrous Metals Smelting Co. Ltd	29	34	0.00%	17.24%	Antimony	Private-run Limited Company	Guangxi
Hunan Huachang Antimony Industry Co. Ltd	414	-	0.00%	-100.00%	Antimony	Limited Company	Hunan



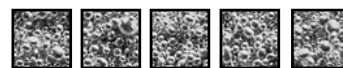
Company	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Main Products	Ownership	Province
Hunan Chezhou Jingui Nonferrous Metals Fabrication Co.	176,160	292,363	7.38%	65.96%	Silver	Private	Hunan
Hunan Yongxing County Xihe Smelter	163,364	200,743	5.07%	22.88%	Gold	Private	Hunan
Zhejiang Xianfeng Precious Metals Co. Ltd	184,493	159,763	4.03%	-13.40%	Silver	Private-run Limited Company	Zhejiang
Hunan Yongxing County Lead Industry Co. Ltd	26,238	159,196	4.02%	506.74%	Lead and Zinc	Congregate	Hunan
Ningxia Tianma Metallurgy and Chemical Industry Co. Ltd	18,200	127,880	3.23%	602.64%	Lead and Zinc	Private-run Limited Company	Ningxia
Henan Anyang Yubei Metals Smelter	-	105,000	2.65%		Lead and Zinc	Congregate	Henan
Tianjin Ri'erpu Precious Metals Co. Ltd	57,212	87,585	2.21%	53.09%	Tungsten and Molybdenum	State-owned	Tianjin
Yunnan Xinli Nonferrous Metals Co. Ltd	84,114	75,397	1.90%	-10.36%	Lead and Zinc	Other form of Limited Company	Yunnan
Hunan Chezhou Jinwang Industry Co. Ltd	-	60,000	1.51%		Other nonferrous metals	Private-run Limited Company	Hunan
Shanghai Xinye Copper Industry Co. Ltd	35,766	49,324	1.24%	37.91%	Copper	Other form of Limited Company	Shanghai
Beijing Precious Metals Smelter	22,834	49,064	1.24%	114.87%	Silver	Congregate	Beijing
Hanzhou Fuchunjiang Smelting Co. Ltd	25,467	36,582	0.92%	43.64%	Copper	Other form of Limited Company	Zhejiang
Anhui Wuhu Hengxin Copper industry Group Co. Ltd	43,076	32,750	0.83%	-23.97%	Copper	Private-run Limited Company	Anhui
Hunan Yongxing County Bolin Smelter	17,440	32,271	0.81%	85.04%	Gold	Congregate	Hunan
Hunan Guiyang Yungui Metal Smelting Co. Ltd	3,283	26,135	0.66%	696.07%	Lead and Zinc	Shareholding Limited Company	Hunan



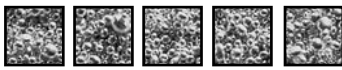
Company	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Main Products	Ownership	Province
Hunan Yongxing Mayang Smelter	13,642	18,639	0.47%	36.63%	Lead and Zinc	Congregate	Hunan
Guangdong Luoding Jinyue Smelter	3,052	17,156	0.43%	462.12%	Lead and Zinc	Private	Guangdong
Tianjin Datong Copper Industry Co. Ltd	18,868	14,430	0.36%	-23.52%	Copper	JV	Tianjin
Jiangxi Wannian County Silver Industry Co. Ltd	7,285	11,784	0.30%	61.76%	Silver	Private	Jiangxi
Guangxi Nanning Smelter	19,355	10,527	0.27%	-45.61%	Antimony	State-owned	Guangxi
Guangxi Liuzhou Huandong Metallic Materials Co. Ltd	23,100	10,046	0.25%	-56.51%	Antimony	Private	Guangxi
Yunnan Tin Industry Group Co. Ltd	9,014	8,744	0.22%	-3.00%	Tin	Other form of Limited Company	Yunnan
Zhejiang Shaoxing Light Weaving City Precious Metals Co. Ltd	7,332	8,599	0.22%	17.28%	Silver	Other form of Limited Company	Zhejiang
Anhui Tongling Chemical Industry Group Co. Ltd	9,602	8,594	0.22%	-10.50%	Phosphate fertilizer	State-owned	Anhui
Hunan Yongxing County Congbao Smelter	775	6,272	0.16%	709.29%	Gold	Private	Hunan
Leijin Nonferrous Metals Smelter Chezhou Co. Ltd	-	5,757	0.15%		Lead and Zinc	Foreign-invested	Hunan
Shanghai Yongsheng Metals Smelting Co. Ltd	8,379	5,672	0.14%	-32.31%	Silver	Other form of Limited Company	Shanghai
Hunan Yongxing County Bolin Antimony Smelter	8,083	5,653	0.14%	-30.06%	Other precious metals	Congregate	Hunan
Hunan Guiyang County Yinxiang Nonferrous Metals Smelting Co. Ltd	-	5,590	0.14%		Lead and Zinc	Shareholding Limited Company	Hunan
Hunan Yongxing County Honghua Metallurgy Plant	3,907	5,564	0.14%	42.41%	Lead and Zinc	Private	Hunan



Company	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Main Products	Ownership	Province
Gansu Huixian County Ge'erde Metallurgy and Chemical Industry Co. Ltd	5,921	5,334	0.13%	-9.91%	Silver	Other form of Limited Company	Gansu
Hunan Yongxing County Xiwang Smelter	2,389	5,161	0.13%	116.03%	Gold	Private JV	Hunan
Xu Xiongfei Smelter	-	5,131	0.13%		Gold	Private	Hunan
Hunan Yongxing County Xiaoyong Smelter	1,465	4,156	0.10%	183.69%	Gold	Private JV	Hunan
Hunan Yongxing County Lishui Smelter	1,641	3,803	0.10%	131.75%	Gold	Private	Hunan
Wang Xiaokang Smelter	-	3,625	0.09%		Gold	Private	Hunan
Jiangsu Dongtai Liangduo Soldering Welfare Plant	2,588	2,767	0.07%	6.92%	Silver		Jiangsu
Henan Luoyang Copper Fabrication Group Co. Ltd	10,702	2,606	0.07%	-75.65%	Febrication of common nonferrous metals	Other form of Limited Company	Henan
Hunan Yongxing County Wu Yunming Smelter	763	2,374	0.06%	211.14%	Silver	Private	Hunan
Hunan Yongxing County Shenwen Smelter	1,987	2,229	0.06%	12.18%	Gold	Private	Hunan
Hunan Yongxing County Hongchang Smelter	1,502	2,062	0.05%	37.28%	Gold	Private	Hunan
Zhejiang Yixing Precious Metals Smelter	4,810	1,904	0.05%	-60.42%	Gold	Cooperative	Jiangsu
Liaoning Xindu Gold Co. Ltd	3,045	1,704	0.04%	-44.05%	Gold	Other form of Limited Company	Liaoning
China National Gold Group Corp. Liaoning Er'daogou Gold Mine	2,701	1,478	0.04%	-45.27%	Gold	State-owned	Liaoning
Hunan Yongxing County Mingjin Smelter	5,847	1,377	0.03%	-76.45%	Gold	Private	Hunan



Company	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Main Products	Ownership	Province
Hunan Yongxing County Longmen Smelter	1,705	1,168	0.03%	-31.50%	Gold	Private JV	Hunan
Hunan Yongxing County Liuzhigang Smelter	1,805	1,012	0.03%	-43.93%	Gold	Private	Hunan
Hunan Yongxing County Qiankun Smelter	996	1,001	0.03%	0.50%	Gold	Private	Hunan
Hunan Yongxing County Huayun Smelter	2,272	947	0.02%	-58.32%	Gold	Private	Hunan
Hunan Yongxing County Bolin Enterprise Smelter	1,154	941	0.02%	-18.46%	Silver	Congregate	Hunan
Yonghe Smelter	783	859	0.02%	9.71%	Gold	Private	Hunan
Guangxi Gongcheng County Ping'an Yindian Mining Co. Ltd	-	691	0.02%		Lead and Zinc	Other form of Limited Company	Guangxi
Hunan Yongxing County Huhai Smelter	828	676	0.02%	-18.36%	Lead and Zinc	Private	Hunan
Jiangxi Guixi Qiansheng Chemical Industry Co. Ltd	900	600	0.02%	-33.33%	Other precious metals	Private-run Limited Company	Jiangxi
Zifei Smelter	596	579	0.01%	-2.85%	Gold	Private	Hunan
Kaiyuan Smelter	568	569	0.01%	0.18%	Gold	Private	Hunan
Hunan Yongxing County Bolin Kouquan Village Smelter	752	494	0.01%	-34.31%	Silver	Congregate	Hunan
Xiezu Smelter	482	476	0.01%	-1.24%	Gold	Private-run	Hunan
Jiangsu Dongtai City Jinyuan Smelting Co. Ltd	-	465	0.01%		Silver	Private-run Limited Company	Jiangsu
Shandong Laizhou Tiancheng Co.	2,328	400	0.01%	-82.82%	Febrication of precious metals	Congregate	Shandong
Jiangxi Guixi Sanyuan Smelting and Chemical Industry Co. Ltd	986	379	0.01%	-61.58%	Febrication of other precious metals	Other form of Limited Company	Jiangxi



Company	Output in 2002 (Kg)	Output in 2003 (Kg)	Market share in 2003 (%)	Y-on-Y change (%)	Main Products	Ownership	Province
Kunming Guiyan Platinum Industry Co. Ltd	415	287	0.01%	-30.84%	Febrication of precious metals	Shareholding Limited Company	Yunnan
Hebei Xuanhua Zhangquanzhuang Gold Mine	328	239	0.01%	-26.93%	Gold	Congregate	Hebei
Jiangsu Jiangyan City Xintai Precious Metals Co. Ltd	7,150	201	0.01%	-97.19%	Gold	Shareholding Limited Company	Jiangsu
Hunan Yongxing County Tongji Smelter	1,209	174	0.00%	-85.61%	Antimony	Private-run	Hunan
Shanghai Precious Metals Smelter	634	114	0.00%	-81.95%	Silver	Congregate	Shanghai
Henan Luoyang Gold Co. Coal Test Plant	62	86	0.00%	37.50%	Gold	State-owned	Henan
Guangxi Jinchengjiang Chengyuan Smelter	38	46	0.00%	21.05%	Lead and Zinc	Private-run Limited Company	Guangxi
Yunnan Geological and Mineral Resources Co. Ltd Beiya Branch	269	38	0.00%	-85.87%	Gold	Shareholding Limited Company	Yunnan
Hebei Xuanhua County Dabaiyang Gold Mine	178	35	0.00%	-80.16%	Gold	Congregate	Hebei
Hunan Liuyang City Qibaoshan Gold Mine	210	26	0.00%	-87.48%	Copper	Congregate	Hunan
Liaoning Jinzhou Liulonggou Gold Mine	52	22	0.00%	-56.65%	Gold	Congregate	Liaoning
Hunan Zhuzhou Qingshui Smelter	31	10	0.00%	-67.74%	Lead and Zinc	Congregate	Hunan
Inner Mongolia Baotou Copper Smelter	566	-	0.00%	-100.00%	Copper	State-owned	Inner Mongolia

About GFMS

GFMS is an independent London-based research company, focused on the gold, silver and PGM markets, and best known for its flagship publication, the annual Gold Survey.

GFMS is based in London, UK, but has representation in Australia, China, India and Russia, and a vast range of contacts and associates across the world.

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