



# Summary and Outlook

## Platinum

Demand for platinum in 2003 edged up by 50,000 oz to 6.52 million oz. Purchases of metal by the autocatalyst industry increased robustly but demand from the jewellery market dropped, primarily as a consequence of the sharp rise in the price of platinum. Supplies of platinum expanded more rapidly than demand, rising by 270,000 oz to 6.24 million oz. The market, therefore, remained in deficit for the fifth year in succession but the gap between supply and demand narrowed.

Purchases of platinum for use in **autocatalysts** jumped by 23 per cent to 3.19 million oz in 2003. In North America, auto makers bought substantially more metal than the year before, when inventories of platinum were used to supplement purchases. European demand climbed to a record high on the back of further growth in diesel car sales, and Japanese autocatalyst demand for platinum was boosted by new heavy-duty diesel emissions regulations in Tokyo. The burgeoning Chinese car market provided additional demand in the Rest of the World region, whilst tightening emissions standards worldwide also helped to support platinum use.

Demand for platinum from the global **jewellery** industry dropped by 13 per cent in 2003 to 2.44 million oz as both Chinese and Japanese manufacturers cut back their purchases of the metal. In China, the fast climbing spot price of platinum meant that profit margins throughout the sector were squeezed; whilst in Japan there was a significant increase in the volume of metal recycled from stocks. In both markets, the higher platinum price enhanced the competitiveness of white gold jewellery.

Total **industrial** demand for platinum softened to 1.52 million oz. Electrical demand rose as orders for electronic goods containing hard disks rebounded from the downturn the year before, and shipments of high temperature thermocouples to the steel industry increased. Offsetting this, however, was a drop in purchases of platinum-clad equipment by the glass industry as manufacturers stepped up efforts to minimise their holdings of metal and as fewer new glass furnaces came on stream in Asia.

Net demand for physical platinum **investment** products slumped to just 15,000 oz. The rising price of the metal stimulated sales of greater volumes of coins and bars back to the market and affected new purchases by investors.

- **Demand** for platinum in 2003 increased by just under 1 per cent to 6.52 million oz. Autocatalyst purchases of platinum climbed but demand from the jewellery sector fell.
- Purchases of platinum for use in **autocatalysts** surged by 600,000 oz to 3.19 million oz. US auto companies returned to the market for almost all their metal requirements, having run down stocks in 2002, whilst diesel car sales in Europe grew rapidly.
- **Jewellery** demand for platinum dropped by 380,000 oz to 2.44 million oz. The rising platinum price cut profit margins for Chinese jewellery fabricators and affected retail sales in Japan.
- **Industrial** demand for platinum weakened to 1.52 million oz. Use of the metal in hard disks increased but glass manufacturers reduced their holdings of metal and less new capacity was added in Asia.
- **Supplies** of platinum grew by 4.5 per cent to 6.24 million oz. South African output expanded steadily and Russian sales increased, but North American production dropped.
- The platinum market remained in deficit for the fifth year in succession. Funds built up substantial long positions and the **price** climbed by 40 per cent to a peak of \$842 in December, the highest fixing since March 1980.

**Supplies** of platinum grew by 270,000 oz to 6.24 million oz in 2003. The expanding pgm mines in South Africa and Zimbabwe delivered higher platinum output, while shipments from Russia rose as primary production was supplemented by sales from stocks. These increases outweighed a drop in North American platinum sales.

The platinum **price** performed remarkably in 2003, appreciating by more than 35 per cent from the opening fixing of the year of \$600 to the final fixing of \$814. Although platinum supply continued to lag behind physical demand, the strength of the price owed much to purchasing of platinum futures by funds through the NYMEX and TOCOM exchanges.

The speculative buying of platinum was part of a substantial flow of fund money into commodities as a whole in 2003, related to the weakening US dollar and rising global industrial output. In addition, the appreciation of the rand meant cash flows and profit margins for South African pgm producers were reduced, raising market expectations that expansions to supply would be deferred. These were confirmed in December when Anglo Platinum scaled back its expansion programme, reducing its target production for 2006 by 500,000 oz to 2.9 million oz.

Platinum Supply and Demand '000 oz		
	2002	2003
<b>Supply</b>		
South Africa	4,450	4,670
Russia	980	1,050
North America	390	295
Others	150	225
<b>Total Supply</b>	<b>5,970</b>	<b>6,240</b>
<b>Demand</b>		
Autocatalyst: gross	2,590	3,190
recovery	(565)	(645)
Jewellery	2,820	2,440
Industrial	1,545	1,520
Investment	80	15
<b>Total Demand</b>	<b>6,470</b>	<b>6,520</b>
<b>Movements in Stocks</b>	<b>(500)</b>	<b>(280)</b>
		



Impala suspended mining at the Crocodile River operation in South Africa in 2003 due to very difficult geological conditions underground.

## Supply

Supplies of platinum from **South Africa** increased by 5 per cent to 4.67 million oz in 2003, a new record high. The total, however, was not as great as it might have been as several mine and process plant expansions slipped behind schedule.

Anglo Platinum produced 2.3 million oz of refined platinum in 2003, an increase of just over 2 per cent on the previous year but 100,000 oz below the initial plan. Output at the group's expanding Waterval mine jumped higher but did not hit target, whilst adverse geological conditions at the Modikwa joint venture slowed development of the mine. Refined platinum output at Anglo Platinum was also affected by the simultaneous commissioning of a new smelter at Polokwane, and a new converting process and slag cleaning furnace at Rustenburg, which caused a higher than planned temporary build-up in pipeline stocks of metal.

A combination of the appreciation of the rand, falling palladium and rhodium prices, and rising local costs caused Anglo Platinum to re-evaluate its long-term expansion programme in 2003. In December the group announced that it would reduce the pace of development at several projects, including the planned new mines on the eastern limb of the Bushveld Complex. As a result, Anglo Platinum now expects to produce a total of 2.9 million oz of refined platinum in 2006 compared with the previous target of 3.4 million oz.

Production from Impala Platinum's core lease area remained broadly stable in 2003 at a little over 1 million oz of refined platinum. At the Crocodile River mine, however, in which Impala holds an 83 per cent interest, output suffered due to very difficult geological conditions underground. In November, Impala halted mining at the site and in March 2004 reported that it had reached an agreement in principle to sell its entire interest in the operation to the Salene Platinum Consortium. During 2003 Impala also announced its intention to divest its 27 per cent shareholding in Eastern Platinum and Western Platinum, the operating subsidiaries of Lonmin, but the deal had not been finalised by late April 2004.

Platinum output from Lonmin's operations increased by 21 per cent last year to 916,000 oz. This was achieved despite the company's new smelter being out of action for repair for almost the entire year. The volume of ore mined jumped due to the open cast

exploitation of shallow reserves of UG2 ore, and average grades and recoveries also increased.

Northam Platinum successfully increased pgm output in 2003 as the volume of ore rose and head grades improved. Production of pgm attributable to Aquarius Platinum jumped by more than a third as mine production at all of its operations increased, and output at SouthernEra's developing Messina project also climbed.

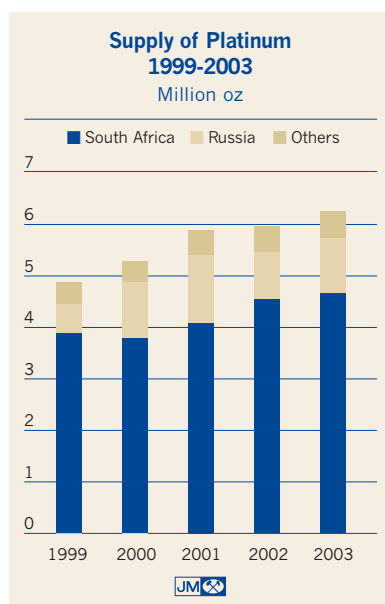
Supplies of platinum from **Russia** increased by 7 per cent to 1.05 million oz in 2003 as mine production was supplemented by sales of metal from stocks. The sales of metal from inventories are believed to have been made primarily, if not entirely, by the state treasury, Gokhran, rather than by the Central Bank. A decree to repeal the secrecy laws concerning pgm production data was signed by President Putin in November, but it now appears that further procedures have to be completed before details of geological reserves and mine production can be released.

**North American** supplies of platinum dropped by almost 25 per cent in 2003 to 295,000 oz – due almost entirely to a slump in pgm output at Inco. The fall was partly predicted (the depletion of a pgm-rich ore zone at one of the company's mines) and partly unexpected (a three month strike during the summer). In contrast, **Zimbabwean** platinum production accelerated to 140,000 oz in 2003, an increase of almost 50 per cent, as expansions of the Ngezi and Mimosa operations bore fruit.

## Demand

The **autocatalyst** industry purchased a record total of 3.19 million oz of platinum in 2003, up by 23 per cent compared with the year before. In North America, purchases of platinum by auto manufacturers jumped to 880,000 oz, a year-on-year increase of 310,000 oz. Much of the surge in buying was because US auto makers had substantially depleted their inventories of platinum during 2002, and so had to purchase almost all of their metal requirements in the market last year.

Purchases of platinum by the European auto industry climbed by 11 per cent in 2003 to 1.34 million oz, propelled by rising demand for platinum-based autocatalysts for diesel cars. Sales of diesel cars in Europe rose by over 5 per cent to exceed 6 million





units for the first time as their market share grew to more than 43 per cent. In addition, average platinum loadings per car increased as manufacturers introduced models that meet tighter emissions limits that will be imposed under Euro IV regulations.

The introduction of new heavy-duty diesel emissions legislation in the Tokyo metropolitan area was largely responsible for an 19 per cent increase in Japanese autocatalyst demand for platinum in 2003, the total rising to 510,000 oz. Trucks and buses operating in Tokyo and surrounding areas that did not meet the tough NOx and particulate matter emissions limits were required to be retrofitted with diesel oxidation catalysts or catalysed particulate filters.

Platinum demand for autocatalyst manufacture in the Rest of the World accelerated by 21 per cent to 460,000 oz, driven by a phenomenal rise in new car production and sales in China. Output of Chinese manufactured cars leapt to just over 2 million units, up from 1.21 million in 2002, whilst new car sales soared by 72 per cent, also to over 2 million vehicles. Car sales in India also increased rapidly in 2003, nearing the 700,000 mark, whilst emissions regulations in both countries continued to tighten.

Global demand for platinum from the **jewellery** industry fell by 380,000 oz in 2003 to 2.44 million oz as manufacturers in both China and Japan purchased significantly less metal than the year before.

Purchases of platinum for jewellery manufacture in China dropped by 19 per cent to 1.2 million oz, the first fall since the market started to develop in the mid-1990s. Profit margins on platinum jewellery in China dropped throughout the year as the spot price of the metal increased faster than rising retail prices.

As a result, platinum stock levels were reduced throughout the industry, manufacturers deferred purchases of metal, many increased their output of higher margin white gold jewellery, and some suspended production of platinum jewellery altogether. A combination of higher prices for platinum jewellery, fewer new platinum designs coming to the market, plus increased choice and promotion of white gold items resulted in retail sales of platinum jewellery falling by an estimated 10 per cent in 2003.

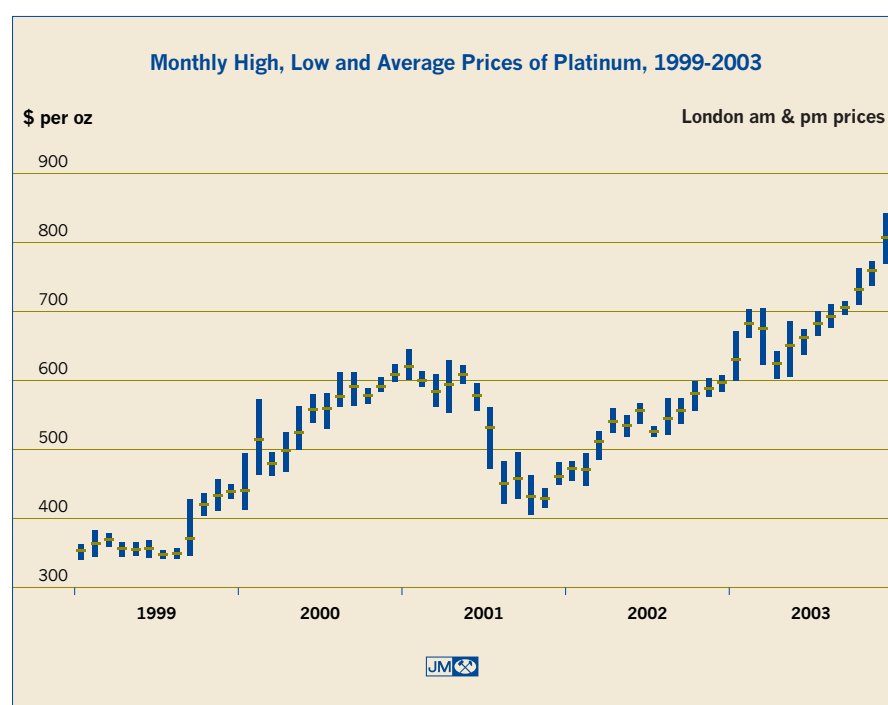
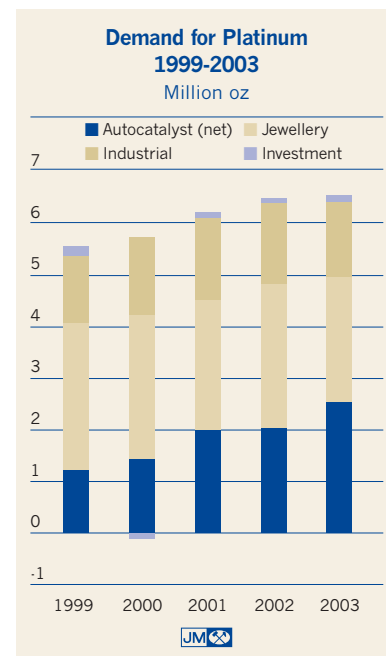
On a more positive note, the advent of trading of platinum on the Shanghai Gold Exchange in August enabled manufacturers to source metal more easily

and made pricing more transparent. By the end of the year more than 246,000 oz of platinum had been bought via the exchange.

In Japan, purchases of platinum for jewellery manufacture slid by 15 per cent to 665,000 oz, around half the level of demand of four years ago. Although platinum jewellery maintained its overall market share, the Japanese jewellery market as a whole contracted. In addition, purchases of platinum by manufacturers fell due to a further rise in the volume of stock recycled, with the liquidation of inventories from bankrupt companies contributing a significant amount of metal to the market.

North American purchases of platinum for jewellery were stable in 2003 at 310,000 oz. Increased penetration of white gold jewellery at the lower priced end of the market was offset by increased platinum sales in higher price brackets of both the fashion and bridal sectors. Growth in the UK platinum jewellery market was the highlight in Europe, sales of platinum jewellery remaining subdued in Germany and Italy. Overall, platinum demand for jewellery manufacture in the region increased by 6 per cent to 170,000 oz.

Total **industrial** demand for platinum slipped marginally lower in 2003 to 1.52 million oz; purchases of metal for electrical applications climbed but





From August 2003 onwards, Chinese users of platinum were able to purchase physical metal, effectively free of VAT, via the Shanghai Gold Exchange.

demand for platinum from the glass and chemical industries fell.

A strong recovery in sales of computers and other electronic goods led to a rebound in shipments of hard disks in 2003, following two years of depressed demand. This fed through to a rise in purchases of platinum, a key component of the magnetic alloys used in hard disk manufacture. Demand for platinum wire used in high temperature thermocouples also increased as production of both steel and semiconductors rose.

In the glass industry, the growth in manufacturing capacity for LCD glass continued in Asia but the rate of new plant construction fell. In addition, the high price of the metal led many glass companies to minimise their inventories of platinum equipment and to defer purchases of new products. The emphasis on reducing the amount of platinum held throughout the glass industry led to an increase in the volume of metal sold back to platinum refiners and fabricators.

After two years of very good orders for platinum-based catalysts, demand from the bulk chemicals industry slipped in 2003. Less new paraxylene manufacturing capacity was planned and suppliers of catalysts to the silicones industry had some success in trifling the percentage of platinum used per catalyst. Demand for platinum in other applications rose

modestly: orders for catalysts from the petroleum refining industry and consumption of platinum in biomedical applications and turbine blades increased, but the market for platinum-gold dental alloys fell (a reaction to the higher prices of both metals).

## Outlook

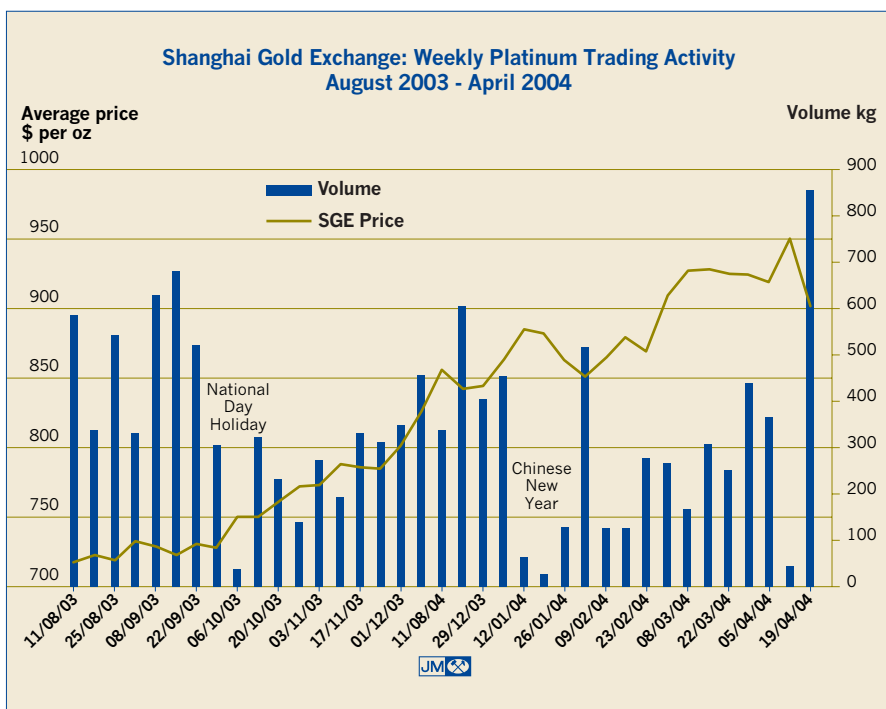
The gap between platinum demand and supply narrowed in 2003 and the market is set to move close to equilibrium in 2004 – it could even be in the position of a small surplus. A substantial increase in supplies is forecast, whereas growth in total demand is projected to be slight as increased purchases by the auto industry are likely to be offset to a large extent by weaker jewellery demand.

Chinese jewellery demand may well fall for the second year in succession in 2004. This will largely depend on how jewellery manufacturers and retailers respond to movements in the price of platinum over the course of the year and whether they can earn attractive profit margins.

Although good volumes of metal were sold to jewellery manufacturers during the first few days of January, ahead of the Chinese New Year holiday, demand subsequently weakened when the price of the metal surged. Reports from China suggested that some jewellery manufacturers were continuing to migrate an increasing proportion of output to white gold, whilst a handful began to experiment with the production of palladium jewellery. However, when the price of platinum fell sharply in late April, Chinese purchases of platinum jumped (see chart).

Little change is projected for platinum purchases by jewellery manufacturers in other regions in 2004. The Japanese market is forecast to stabilise, after three years of very weak demand, as improving economic growth feeds through to greater consumer confidence. In Europe and North America, platinum jewellery is likely to face further pressure in lower price brackets from white gold but this could be offset by higher sales in the bridal sector.

Purchases of platinum by the global automotive industry are forecast to climb to another record high in 2004, regardless of moves by some car manufacturers to switch more heavily in favour of palladium in gasoline autocatalysts. The increase in platinum demand will again be propelled by yet higher sales of diesel cars in Europe as they gain further market share from gasoline vehicles.





In addition to higher diesel car sales, the strict limits on particulate matter emissions set under the Euro IV regulations will necessitate the introduction of catalysed diesel particulate filters (DPF) on an increasing number of larger, heavier diesel car models. In addition, although a majority of smaller diesel cars will be able to meet Euro IV limits without the use of catalysed DPF, they are becoming increasingly popular optional extras.

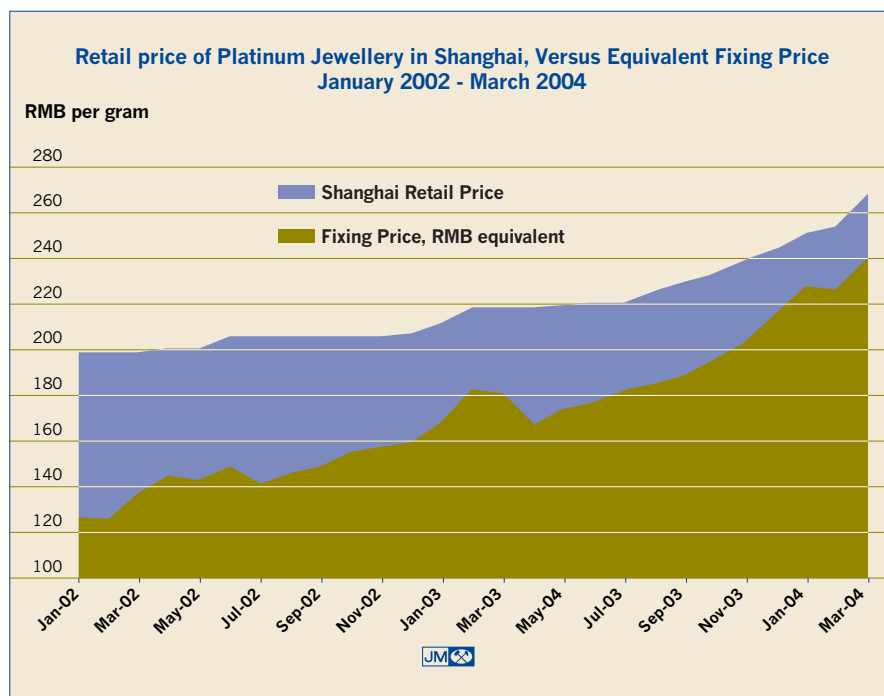
As in 2003, purchases of platinum by the US auto industry this year will closely reflect the underlying level of consumption of the metal in autocatalysts. This is expected to fall slightly as palladium-based catalysts replace platinum-based formulations on some vehicles, a reaction to the large premium that has developed between the price of platinum and that of palladium. The impact on metal demand is likely to be more pronounced in 2005 as catalyst changes take effect on an increasing proportion of new models.

Following the one-off rise in Japanese autocatalyst purchases of platinum in 2003 due to the Tokyo heavy-duty diesel legislation, demand is forecast to edge lower in 2004. The effect of this, however, should be outweighed by greater use of the metal in China and India as light vehicle production continues to expand rapidly. South Korean car output is also expected to show good growth this year, after having been largely static in 2003.

Demand for platinum in industrial applications is forecast to improve, supported by rising shipments of hard disks in the electrical sector. Glass industry demand is expected to increase, with most manufacturers having reduced their metal holdings as far as possible in 2003, and consumption of platinum in catalysts for the chemicals industry is also likely to trend upwards.

Total supplies of platinum are projected to rise significantly faster than demand this year. South African output is likely to exceed 5 million oz for the first time as more metal flows from expansion projects at most of the existing producers. Output from the Zimbabwean pgm mines will also continue to grow, and North American shipments are expected to recover from last year's fall.

During the first quarter of 2004, the platinum price continued to be driven upwards, with much of the momentum coming from fund buying of futures. The price climbed rapidly from an opening fixing of \$815 on the 2nd of January to almost \$870 in mid-month



before dipping back towards \$820 by early February as Chinese buying fell away. The rally then resumed as funds reacted to a substantial weakening of the US dollar and appreciation of the South African rand by increasing their long positions in platinum. By the middle of March the price had passed \$900 and it peaked with a fixing of \$937 on the 19th April.

From the 20th of April onwards, however, funds suddenly turned net sellers of precious and base metals as the US Federal Reserve hinted that US interest rates were likely to rise in the relatively near future and the dollar subsequently strengthened. As an initial burst of long liquidation pushed the price downwards, additional sell orders were triggered. The rush to close out positions accelerated and by the afternoon fixing on the 29th of April the platinum price had plunged to \$783.

In conclusion, the platinum market is projected to be closer to balance in 2004, and supplies may even exceed demand for the first time since 1998. To what extent this easing of the fundamentals affects the price of the metal will mainly depend on whether the late-April fund sell-off in platinum proves to be a temporary phenomenon or the start of a more permanent readjustment of speculative portfolios. Our forecast price range for platinum for the next six months is \$780 to \$920, the large spread reflecting the potential for further volatility in the market.



## Palladium

- **Demand** for palladium recovered by 9 per cent in 2003 to 5.26 million oz but this was still the third lowest total for a decade.
- Purchases of palladium for use in **autocatalysts** jumped by 410,000 oz to 3.46 million oz as US car companies used far less metal from inventories. Thrifting, however, reduced the underlying consumption of the metal.
- The **electronics** industry purchased 895,000 oz of palladium, an increase of 18 per cent versus 2002 when use of stocks depressed demand.
- The use of palladium in **dental** alloys dropped by 8 per cent to 725,000 oz in 2003. In Japan, the largest market, demand slumped when the state subsidy for dental treatment was cut.
- **Supplies** of palladium rebounded by 23 per cent to 6.45 million oz in 2003. Unlike the previous year, Russian production was fully sold and South African output expanded.
- With supplies rising faster than demand, the palladium market surplus widened to 1.19 million oz. The palladium **price** consequently weakened, ending the year at \$193, some \$41 below the opening fixing in January despite growing fund investment.

the metal in autocatalyst manufacture; on the contrary, use of the metal fell for the third year in succession as thrifting continued in all regions. However, because US car companies used far less palladium from inventories than they had in 2002, they purchased substantially more metal in the market in 2003.

Purchases of palladium for the manufacture of **electronic** components, the second largest market for the metal in 2003, also increased, jumping by 135,000 oz to 895,000 oz. Again, the rise was largely because manufacturers had run down excess inventories during 2002 (both of palladium pastes and finished components), and so bought substantially more metal in 2003. As in the auto industry, however, the underlying use of palladium decreased year-on-year. The average palladium content of conductive pastes was further reduced and the miniaturisation of components continued.

Demand for palladium in **dental** alloys dropped to 725,000 oz in 2003, a fall of 60,000 oz. Although the decline in the price of palladium stimulated modest improvements in demand in the European and North American markets, purchases of metal by the Japanese dental sector slumped as a result of a cut in the government subsidy for dental treatment.

Demand for palladium in **other** applications weakened by 2.5 per cent to 590,000 oz as purchases of the metal for use in both jewellery alloys and chemical catalysts edged downwards.

**Supplies** of palladium surged to 6.45 million oz in 2003, an increase of 1.2 million oz from the previous year. Shipments of palladium from Russia jumped by more than 50 per cent to 2.95 million oz as sales of metal by Norilsk Nickel closely reflected mine output, the company having withheld a substantial volume of its production from the market in 2002. Supplies of palladium from South Africa and Zimbabwe also climbed, rising in line with expanding platinum output and outweighing a fall in North American production.

The palladium **price** staged a brief rally from \$234 to just over \$270 during the first few weeks of 2003, as industrial demand picked up following a typical year-end lull in December 2002. However, from early February through to mid-April the price weakened, sliding to a six year low of \$144.

Strong fund buying of palladium futures in August and September then produced a second rally, which reached \$232, but large offers of physical metal and a lack of interest from industrial purchasers had driven

Global demand for palladium increased by 430,000 oz in 2003 to 5.26 million oz, primarily as a result of a sharp rise in purchases by US auto makers, who used far less metal from stocks than the year before. Purchases of metal by electronic component manufacturers also increased following depletion of inventories in 2002. In both industries, however, the underlying use of the metal fell due to thrifting.

Supplies of palladium surged by 1.2 million oz in 2003 to reach 6.45 million oz, closer to the level of global mine production than at any time over the past decade. As ever, Russian shipments of palladium were a major influence – Norilsk Nickel sold all of its production in 2003 after having held back a substantial proportion of its output the previous year.

The increase in supplies of palladium outweighed the improvement in demand, leading to a surplus of 1.19 million oz – this coming on top of substantial surpluses in the previous two years. Consequently, the palladium price was under pressure for much of 2003, despite the fact that buying of futures by funds accelerated during the second half of the year. Palladium ended the year at \$193, 17.5 per cent below the opening fixing of \$234 in January.

Purchases of palladium by the **autocatalyst** industry recovered by 13 per cent in 2003, rising to 3.46 million oz. This was not due to an increase in consumption of

Palladium Supply and Demand '000 oz		
	2002	2003
<b>Supply</b>		
South Africa	2,160	2,310
Russia	1,930	2,950
North America	990	940
Others	170	250
<b>Total Supply</b>	<b>5,250</b>	<b>6,450</b>
<b>Demand</b>		
Autocatalyst: gross	3,050	3,460
recovery	(370)	(410)
Dental	785	725
Electronics	760	895
Other	605	590
<b>Total Demand</b>	<b>4,830</b>	<b>5,260</b>
<b>Movements in Stocks</b>	<b>420</b>	<b>1,190</b>





the palladium price back under \$200 by the end of the year. The price softened despite the fact that funds continued to open substantial long futures positions.

By the end of 2003, hedge funds and other investment funds had built up a total net long futures position equivalent to over 500,000 oz of palladium on NYMEX, and were estimated to have accumulated a similar sized net long position on TOCOM. On top of this, derivatives contracts equivalent to an estimated 1.5 million oz or more of palladium are believed to have been arranged through over-the-counter deals.

The speculative investment in palladium was part of a wider boom in the commodities markets as a whole but ran counter to the supply and demand fundamentals of the metal. Funds were partly attracted to palladium due the conviction that the widening premium between it and the price of platinum would become unsustainable, which would encourage auto companies to increasingly favour the use of palladium in gasoline autocatalysts. In addition, there was an awareness that US auto industry stocks were likely to be depleted during 2003. In short, having sunk to a low point of under \$150, the palladium price was seen as having considerably more upside potential than downside risk.

## Supply

Russian sales of palladium jumped by 53 per cent to 2.95 million oz in 2003. In contrast to the previous year, when it withheld a significant proportion of its production, Norilsk Nickel sold its entire output in 2003. The majority of the metal was shipped under contracts with end users, with the remainder being sold via the spot market. Some palladium, estimated to be less than 10 per cent of total Russian supplies, is also believed to have been sold from central government stocks last year.

Norilsk's deal to acquire a majority shareholding in Stillwater Mining Co. was finalised in June. The 877,169 oz of palladium that were used as part payment for its Stillwater holding were exported from Russia to London before the end of March 2003 but as the metal was not sold to end users during 2003 it does not appear in our supply figures for the year.

A bill to amend the Russian state secrecy legislation covering data on pgm reserves, production and sales (excluding those made by the state) was passed by both houses of the Russian parliament in October last year and was signed by President Putin in November.

The bill then came into effect in February 2004 but it now appears that further procedural hurdles must be overcome before data on pgm production can be published.

Supplies of palladium from **South Africa** grew by 7 per cent to 2.31 million oz in 2003 as pgm mining and processing expansions gathered pace. The rate of increase in refined palladium output was slightly higher than that of platinum as UG2 ore (which generally has a higher palladium content than the Merensky Reef) accounted for a greater percentage of the total volume of ore mined. Sales of palladium from the two pgm mines in **Zimbabwe** also climbed, in proportion to rising platinum output.

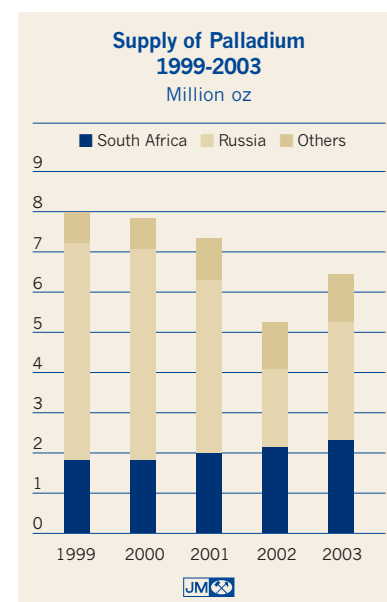
Palladium production in **North America** slipped by 50,000 oz to 940,000 oz in 2003. Output from Inco dropped sharply (in line with the fall in the company's platinum production), and reduced mining rates at the Stillwater mine led to a decrease in Stillwater Mining's refined palladium output. These negative factors, however, were largely offset by a jump in palladium output at North American Palladium following the successful commissioning of a new primary crusher.

## Demand

Purchases of palladium by the **autocatalyst** industry last year recovered from the slump of 2002, rising by 13 per cent to 3.46 million oz, an increase of 410,000 oz.

The improvement in purchases of palladium was due almost entirely to a marked upturn in buying by the US auto industry. In 2002, US auto companies consumed well over 1 million oz of palladium from inventories, and a significant volume of metal was also sold back to the market. Although some US auto makers continued to run down their remaining stocks of palladium in 2003, they sourced a much greater proportion of their metal requirements from the market, with buying increasing during the second half of the year. Consequently, North American purchases of palladium for autocatalysts almost doubled from 640,000 oz in 2002 to 1.21 million oz in 2003.

In sharp contrast to the rise in the volume of metal purchased, the amount of palladium consumed in the manufacture of autocatalysts dropped for the third year in succession as a number of leading car companies continued to thrift catalyst loadings. This was particularly true in North America, where use of the





metal fell by more than 20 per cent.

In Europe, an 11 per cent drop in gasoline car production in 2003 had a knock-on effect on palladium demand; purchases of the metal in the region fell by 160,000 oz to 1.21 million oz.

Japanese purchases of palladium increased by 4 per cent to 540,000 oz in 2003 but the improvement was due to the fact that use of stocks had depressed purchases in 2002, albeit on a much smaller scale than in the USA.

With palladium trading at a substantial and widening discount to platinum in 2003, some car companies took steps to reduce their platinum consumption by electing to switch to palladium-based catalysts on new gasoline vehicle models. These decisions, however, came too late to have any significant impact on palladium demand in 2003.

Consumption of palladium in the **electronics** industry in 2003 continued to be adversely affected by thriftiness, as well as by the ongoing miniaturisation of components. Despite a sharp upturn in sales of multi-layer ceramic capacitors (MLCC – the largest electronics application for palladium) and an increase in palladium-based MLCC manufacturing capacity in Asia, use of the metal dropped by 7 per cent overall.

Nevertheless, purchases of palladium jumped by 18 per cent year-on-year to 895,000 oz. As in the auto industry, electronic component manufacturers ran down excess inventories in 2002 (in this case, of palladium pastes and finished components), depressing purchases of palladium. With stocks having returned to normal levels by 2003, demand for the metal rebounded.

Demand for palladium for use in **dental** alloys dropped by 60,000 oz to 725,000 oz in 2003, a fall of 8 per cent. The reduction in overall demand was a result of a slump in Japan, by far the largest market for palladium-based dental alloys. A proportion of the cost of the 20 per cent palladium alloy used in dentistry in Japan is reimbursed under a state-run programme. However, in April 2003, the percentage of the cost payable by patients was increased from 20 to 30 per cent (having risen from 10 to 20 per cent just four years earlier). This had an immediate negative impact on the number of visits for dental treatment made by the Japanese public. Palladium demand in Japan for the year as a whole consequently fell by 20 per cent to

405,000 oz, the lowest level for more than a decade.

The slide in the Japanese market greatly outweighed modest improvements in demand in North America and Europe, where the fall in the price of palladium and rise in the price of gold made dental alloys based on the former more competitive.

Purchases of palladium for **industrial** and other markets edged down by 15,000 oz to 590,000 oz in 2003. A fall in the use of palladium-based catalysts by the bulk chemicals industry outweighed a slight increase in demand for palladium catchment gauze by nitric acid producers. Purchases of palladium for use in jewellery alloys slipped in 2003 due to the contraction of the Japanese platinum jewellery market, where the most common platinum alloys contain between 5 and 15 per cent palladium. In addition, Chinese jewellery manufacturers used less palladium in white gold alloys, preferring less expensive metals such as nickel, silver, tin and zinc.

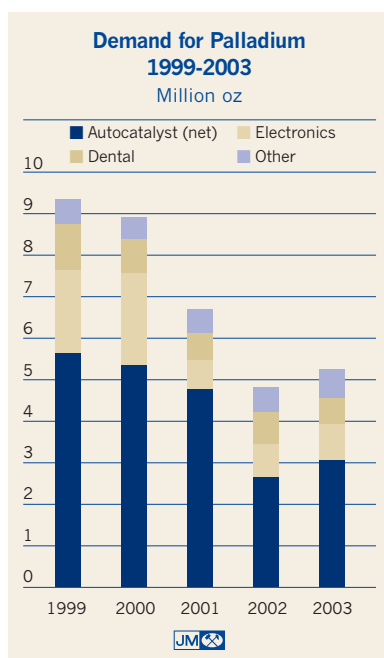
## Outlook

The first three and a half months of 2004 were marked by further heavy buying of palladium futures by funds via the New York and Tokyo futures exchanges and through over-the-counter deals. With offers of physical metal easing from the high levels seen at the end of 2003, the speculative buying finally had a conspicuous impact on the price of palladium, which climbed from \$194 at the beginning of January 2004 to hit a peak of \$333 on the 13th of April.

Trading sentiment towards the metal was boosted by an announcement by a European autocatalyst company in early April that it had developed a diesel car catalyst containing a proportion of palladium in place of platinum. (Because of the particular operating environment of diesel exhausts, diesel oxidation catalysts have to date contained only platinum).

However, between the 20th and 22nd of April, the palladium price plunged, hit by the long liquidation of fund futures positions that was seen across both the base and precious metals markets. The price dropped from a morning fixing of \$321 on the 20th to an afternoon fixing of \$257 on the 22nd of April, a fall of 20 per cent in three days. The price of palladium subsequently recovered somewhat on the 23rd, moving up to trade between \$270 and \$280.

Despite the burst of long liquidation, hedge funds and other investors still held very substantial long



positions in palladium towards the end of April 2004. The perception remained that, although the spread between platinum and palladium had narrowed (closing from \$613 on the morning of the 20th to \$549 on the afternoon of the 26th), it was still unsustainably large and that the possible upside in palladium was greater than the downside in platinum.

We forecast a further increase in auto industry purchases of palladium for use on gasoline vehicle autocatalysts in 2004, as stocks within the US auto industry were largely depleted during 2003. In addition, switching to greater use of palladium-based autocatalysts for gasoline vehicles will begin to have a greater impact. Nevertheless, thriftiness will continue to affect consumption of the metal in autocatalysts in most major markets in 2004.

Demand for palladium in dental alloys should also improve this year as the number of dental treatments performed in the Japanese market starts slowly to recover. In addition, North American demand for palladium-based dental alloys is likely to rise moderately for the third year in succession if the price of palladium remains significantly below that of gold.

Purchases of palladium for use in electronic applications are projected to weaken slightly in 2004, despite further growth forecast for component sales. Thriftness, miniaturisation and the rising recovery of palladium from electronic scrap (particularly in Europe where new legislation will come into effect in 2005) are expected to depress purchases of the metal.

The contraction of profit margins on platinum jewellery in China to very low levels during the final quarter of 2003 and first quarter of 2004 led a number of manufacturers to start producing palladium jewellery. With much less competition than in the platinum jewellery sector, participants were able to price in much higher profit margins.

We estimate that in excess of 250,000 oz of palladium were purchased by Chinese jewellery manufacturers during the first three months of 2004 as stocks of palladium jewellery were built up. However, by late April manufacturers and retailers were reported to be disappointed with the initial level of sales, with suggestions that palladium jewellery has not been well received by the public.

In summary, we believe that palladium demand has the potential to rise faster in 2004 than it did in 2003, driven by a higher level of purchasing by the US auto industry as the impact of stock use finally dissipates.

Demand for palladium-based dental alloys should also improve, and an upturn in the use of palladium catalysts by the chemicals industry is likely.

At the same time, supplies of palladium are expected to rise substantially in 2004: South African mine and plant expansions will deliver significantly more metal this year; in the region of 400,000 oz of palladium is expected to be supplied under contract to the autocatalyst market from the stocks held by Stillwater Mining; and recovery of palladium from autocatalysts is projected to climb rapidly as heavily palladium-loaded catalysts that were fitted to vehicles in the mid-1990s are recycled in increasing volumes.

The physical palladium market, therefore, will remain in substantial surplus in 2004. As was demonstrated during the first four months of the year, however, the price of palladium has become largely divorced from the fundamentals of supply and demand. The weight of speculative investment has been responsible for supporting the price, and additional substantial buying by funds would have the capacity to drive it back to recent highs. On the other hand, any further concerted long liquidation of the still very large speculative positions could lead to a sharp correction downwards. On balance, we believe that palladium is likely to trade between \$200 and \$340 over the next six months.



The volume of palladium recovered from scrapped autocatalysts climbed by 11 per cent in 2003 to 410,000 oz, and is forecast to rise even more rapidly in 2004.

