

PRECIOUS APPRAISAL

No. 14
2nd May 2022



- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

MARKET SPOTLIGHT

Could Ford’s electric pickup be a catalyst to reduce PGM demand in the US?

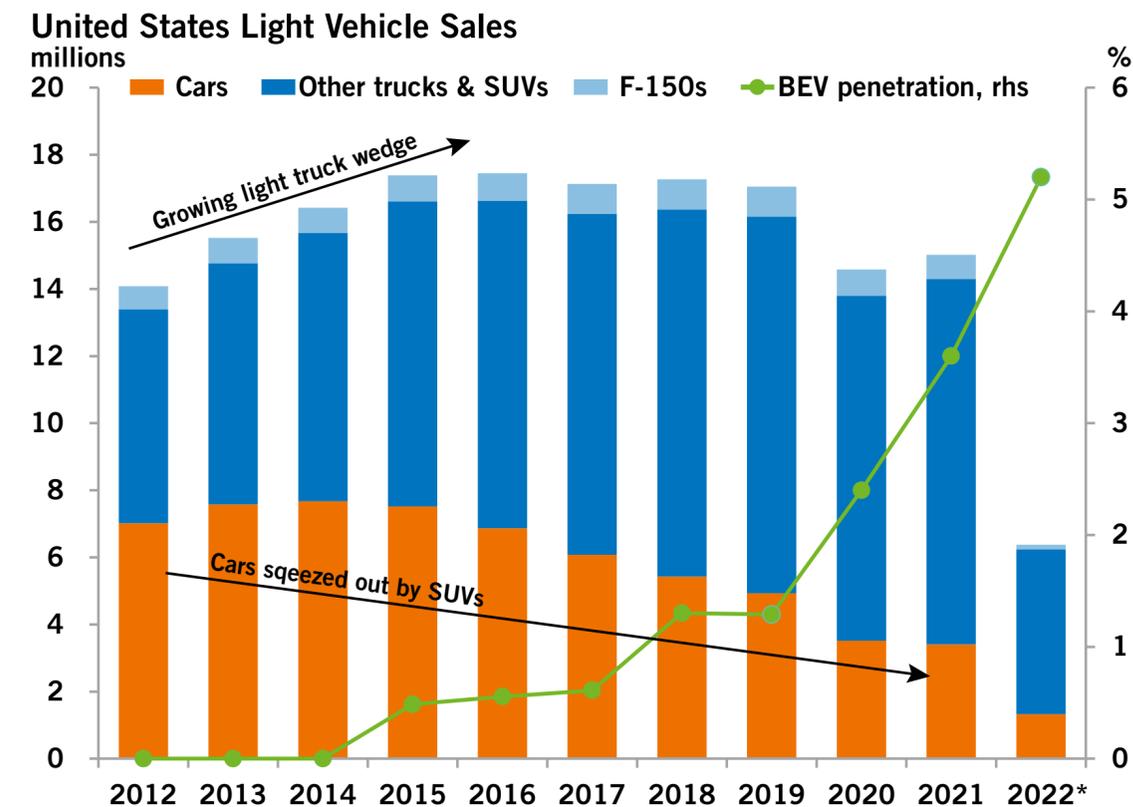
Ford is in the driving seat. The F-150 pickup truck is the best-selling light vehicle (LV) in the United States. In 2021, LV sales in the US topped 15 million units, of which 11.6 million (78%) were light trucks (vans, minivans, SUVs and pickups). The F-series has dominated the sector, selling 726,000 units. “America’s Truck” is now going electric with the F-150 Lightning. The US LV market is second only to China’s in terms of volume and PGM demand. This year is forecast to be a post-Covid record for US automotive PGM demand, with 1.7 moz of palladium plus 200 koz of rhodium.

The F-150 Lightning could kick-start greater adoption of BEVs in the US due to the light truck’s large market share. Current BEV market penetration in the US is ~5% (around half-a-million vehicles), lagging both Europe (10%) and China (21%).

The Lightning wins on price and availability. The Lightning will be only the third commercially available electric pickup on the market after the GM Hummer electric (much more expensive) and the Rivian R1T (small volume production). The base Lightning costs less than the average new LV in the US, but there is still an electric premium of around 30% over the ICE model (before any subsidies). The base model of the Lightning starts at \$40,000 compared to the equivalent ICE-powered F-150 model at \$30,000. Ford has now halted new orders for the Lightning, indicating good demand for the truck, and has revised production plans upwards twice to 150,000 units p.a. by mid-2023.

However, nearly a third of the orders come from BEV households. In a survey of customers who have ordered an F-150 Lightning, 31% said they have previously owned or currently own a BEV. This suggests early BEV adopters are looking to upgrade their existing electric car to a pickup now one is available. Therefore, initial demand does not represent a 100% loss of ICE vehicle sales. Clearly, in the longer term the level of BEV sales will determine the outlook for palladium and rhodium demand.

Recovery in LV production is lifting PGM demand this year from the depressed level of 2021, even as more BEVs are also produced. Globally, rhodium automotive demand could reach a record 1 moz this year, with palladium reaching a record 9 moz in 2023. However, in the near term, supply chain problems and macroeconomic weakness are holding back LV production and sales, which could continue to weigh on palladium and rhodium prices.



Source: SFA (Oxford), IEA, Wards Intelligence, Cox Auto. *2022 data is for Q1 only.

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Gold

| 79 Au | | CLOSE | WEEKLY CHANGE | HIGH | DATE | LOW | DATE |
|----------|-------|-------|---------------|-------|------------|-------|------------|
| | \$/oz | 1,910 | -1.52% | 1,921 | 25/04/2022 | 1,872 | 28/04/2022 |
| | €/oz | 1,812 | 0.82% | 1,821 | 29/04/2022 | 1,762 | 25/04/2022 |

Dollar strength has not overly dented gold’s appeal. The gold price and the US dollar typically have a strong inverse relationship (\$ up = gold down). Over the last two quarters, this relationship has broken down as other factors have become more important drivers of the gold price. Gold has been held up well, firstly by rising inflation and then by heightened geopolitical tensions. This is despite the strong-dollar headwind as expectations of interest rate rises have grown. The Federal Reserve’s Open Markets Committee meeting on Wednesday this week will decide on the next step for monetary tightening in the US economy. The market is pricing in a 50-basis point hike to the federal funds rate as a foregone conclusion, following increasingly hawkish statements from the chairman, Jerome Powell, and other officials in recent weeks. The market is also pricing in many more rate rises over the course of the year. However, the contraction in US GDP seen in Q1 could derail those plans. Hot inflation and a less hawkish Fed could still provide support for gold in the near term.

Global gold jewellery demand was down 7% in Q1 to 15.2 moz, compared to the first three months of 2021. The jewellery giants India and China account for 60% of global demand. Together, their 2.8 billion inhabitants use 42 moz p.a. for jewellery. Both countries have seen declines in gold jewellery demand in Q1 year-on-year. Chinese demand fell by 9% to 5.9 moz, while Indian demand slumped further by 26% to just over 3 moz (source: World Gold Council). Prior to the most recent Covid outbreak and sharp rise in the gold price, Chinese retail demand was relatively strong, particularly in the build-up to the Chinese New Year Festival on 1 February. However, the reduction in demand can be mostly attributed to strict lockdown measures enforced on the key gold manufacturing and purchasing cities of Shenzhen and Shanghai in March, causing demand to dry up. In India, demand for gold jewellery is strongly price-sensitive, and so as metal prices rose in late February into March, demand waned. Despite the largest local price discount in 18 months of up to \$60/oz, consumers stayed away from gold, awaiting a drop in price. Adding to this, the third Covid wave spilled over into this year in India, heavily impacting the busy wedding season – normally a time of heightened jewellery purchases. Second-quarter demand should see a modest boost in India as the gold price has fallen approximately 6% since the March highs. Hindus looking to buy gold may seize the moment to buy if they have been holding off due to high prices, as dealers offer seasonal discounts in the run-up to Akshaya Tritiya – an auspicious time to buy gold – on 3 May.

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Silver



| | CLOSE | WEEKLY CHANGE | HIGH | DATE | LOW | DATE |
|-------|-------|---------------|-------|------------|-------|------------|
| \$/oz | 23.08 | -4.96% | 23.93 | 26/04/2022 | 22.89 | 28/04/2022 |
| €/oz | 21.89 | -2.73% | 22.45 | 27/04/2022 | 21.77 | 29/04/2022 |

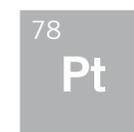
Mexico’s silver production to rise this year. The world’s largest silver producer Fresnillo reported a 5% jump in production in Q1 year-on-year. Quarterly silver production reached 13.3 moz in Q1 despite labour and equipment supply chain issues. This increase is mainly attributed to the commissioning of a new plant and greater contribution of ore from the Juanicipio operations in southern Mexico. This quarter, the operation contributed 1.3 moz of silver to total production and a further ramp-up to 85-90% is expected by the end of the year. When in steady-state operation, Juanicipio will produce 11.7 moz annually over the life of the mine. Fresnillo expects 2022 silver production to be 50.5-56.5 moz, a potential 13% increase compared to 2021 production of 50 moz which represented a 1% decrease on the previous year. At the top end of guidance, Fresnillo would be responsible for 6.7% of projected mine supply in 2022 and help to keep Mexico as the largest silver-producing country.

Gold:silver ratio breaks 81 as silver underperforms gold. The silver price followed the other precious metals lower last week as part of a broad commodity sell-off. Heavy losses came mid-week, hitting an intraday low of \$22.89/oz on Thursday. For the first time since mid-December 2021, the gold:silver ratio poked above 80, indicating silver is the underperformer of the pair. Silver finished the week 5% down from the previous Friday and more than 12% down from the eight-month high close of \$26.37/oz reached on 8 March.

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Platinum



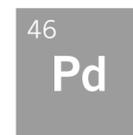
| | CLOSE | WEEKLY CHANGE | HIGH | DATE | LOW | DATE |
|-------|-------|---------------|------|------------|-----|------------|
| \$/oz | 942 | 0.59% | 945 | 29/04/2022 | 908 | 27/04/2022 |
| €/oz | 894 | 2.92% | 897 | 29/04/2022 | 852 | 25/04/2022 |

Royal Bafokeng Platinum’s Q1 production results showed a modest overall increase across the PGMs. Overall platinum-in-concentrate production reached 72.2 koz, an increase of 7.4% year-on-year for the first quarter. The growth is attributed to an increase in head grade at the company’s Bafokeng Rasimone Platinum Mine, but it still makes up a small proportion of overall South African production, estimated to be 4.6 moz for the year. This Q1 report from RBP will be the final production disclosure prior to the expiry of Implats’ takeover offer in mid-June. Implats currently holds 37.62% of RBP shares while rival Northam holds 34.68% – just below the 35% threshold for a mandatory takeover offer.

Of the precious metals, platinum has the weakest fundamental support for its price. Supply is far outstripping demand, and the market is currently in a significant surplus (excluding investment) of >1 moz. High inflation would have suggested that investment into real assets would have boosted platinum. However, the interest has not been there for platinum as ETFs have seen outflows of 174 koz (-5%) year-to-date, a continuation of the longer-term trend of retail divestment seen since mid-2021. The Japanese platinum price has flirted with the ¥4,000/g level this year, as yen weakness has offset platinum price declines. ¥4,000/g is a threshold above which retail investors start to take profits and sell physical platinum bars. If the price stabilises above this psychological barrier, some bar sales are to be expected. In Q1’21, the price moved above ¥4,000/g and investors sold around 100 koz of platinum bars. Later in the year, the price fell back and investors returned to being net purchasers, but even so for the year as a whole they were net sellers of platinum bars.

PRECIOUS METALS REVIEW

Palladium



| | CLOSE | WEEKLY CHANGE | HIGH | DATE | LOW | DATE |
|-------|-------|---------------|-------|------------|-------|------------|
| \$/oz | 2,296 | -4.10% | 2,337 | 29/04/2022 | 2,076 | 25/04/2022 |
| €/oz | 2,179 | -1.82% | 2,204 | 29/04/2022 | 1,938 | 25/04/2022 |

Nornickel maintains production guidance for 2022 despite a potential consumables and parts shortage owing to restrictions on imports to Russia. The company has not altered its guidance for PGM production originally issued before the invasion of Ukraine and any sanctions, which still stands at 2.5-2.7 moz of palladium. This is good news for the automotive market, which is the largest user of palladium, as Russian supply this year is predicted to be 38% of global supply. Nornickel confirmed that operations had remained uninterrupted and it is currently using new logistical arrangements and exploiting opportunities with alternative suppliers. In the company’s first results statement since Russia invaded Ukraine, palladium production was 8% lower in Q1 year-on-year, falling to 706 koz. The drop was due to a high base in the comparative period owing to elevated levels of work-in-progress feedstock processing. Nornickel also announced it has signed an agreement with the Russian State Atomic Energy Corporation to potentially develop a nuclear icebreaker fleet that could ensure year-round port/shipping access to the Arctic ports. This aligns with Chief Executive Vladimir Potanin’s statement earlier this year alluding to alternative routes for metals out of the country after Russian airliners were barred from EU airspace.

Concerns over demand in China saw the palladium price slump. The palladium price plummeted nearly 13% intraday on Monday last week before limping back to \$2,296/oz by Friday. Concerns over Chinese automotive demand rose along with Covid cases in Beijing and traders reacted to the implications of a potential lockdown in China’s capital city. China is the country with largest demand for palladium as it uses 32% of supply, mostly for autocatalysts. When automotive demand fell off a cliff in 2020 following the original coronavirus outbreak, it did not take long for the automotive sector to bounce back as lockdowns were eased relatively quickly. The current “Zero-Covid” policy of the CCP could make things worse this time around as there is potential for cities and provinces to flip-flop between lockdown and freedom as cases surge and recede. This would hobble any recovery in auto production and sales, thus potentially stifling automotive palladium demand into the next quarter and weakening the palladium price further.

PRECIOUS APPRAISAL

2nd May 2022

01 MARKET SPOTLIGHT

02 GOLD

03 SILVER

04 PLATINUM

05 PALLADIUM

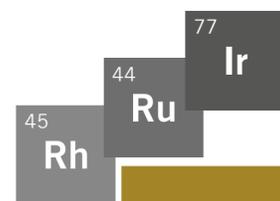
06 **RHODIUM, RUTHENIUM, IRIDIUM**

07 TRENDS AND INVESTMENTS

08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Rhodium, Ruthenium, Iridium



| | RHODIUM | RUTHENIUM | IRIDIUM |
|----------------|-------------|-----------|------------|
| Reporting Week | \$19,550/oz | \$695/oz | \$5,550/oz |
| Previous Week | \$19,950/oz | \$695/oz | \$5,750/oz |

The hydrogen economy is set to add to iridium and ruthenium demand. A new energy report by McKinsey outlines the future demand for hydrogen as governmental climate and energy goals begin to be met. It predicts that by 2035, green hydrogen could make up 60% of total supply (110 mt), compared to the negligible amount currently produced. Approximately 22 mt of hydrogen projects have been announced to date, roughly half of which are expected to use proton-exchange membrane (PEM) electrolyzers that contain iridium anodes. PEM electrolysis is more suited to green hydrogen production than the alkaline electrolysis alternative thanks to its high efficiency and fast dynamic response to power input. Currently, hydrogen applications account for a small portion of overall iridium (electrolyzers) and ruthenium (fuel cells) consumption but demand is expected to grow as the hydrogen economy expands. However, iridium supply is relatively inflexible, and thrifting of iridium will be necessary. This is typically what happens over time with new technologies as processes are made more efficient and costs reduced, as has been seen with silver use in solar cells.

The ruthenium price remained stagnant for another week, closing at \$695/oz, the same price since the beginning of March. Both rhodium and iridium suffered minor slides in the price last week, closing 2% and 3.5% down at \$19,550/oz and \$5,550/oz, respectively.

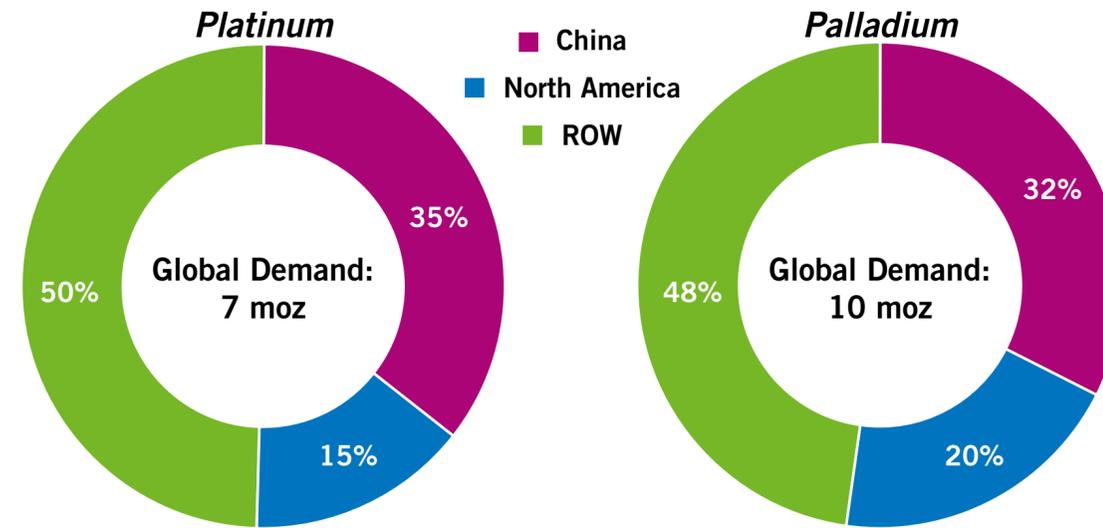
PRECIOUS APPRAISAL

2nd May 2022

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIIDIUM
- 07 **TRENDS AND INVESTMENTS**
- 08 ABOUT HERAEUS

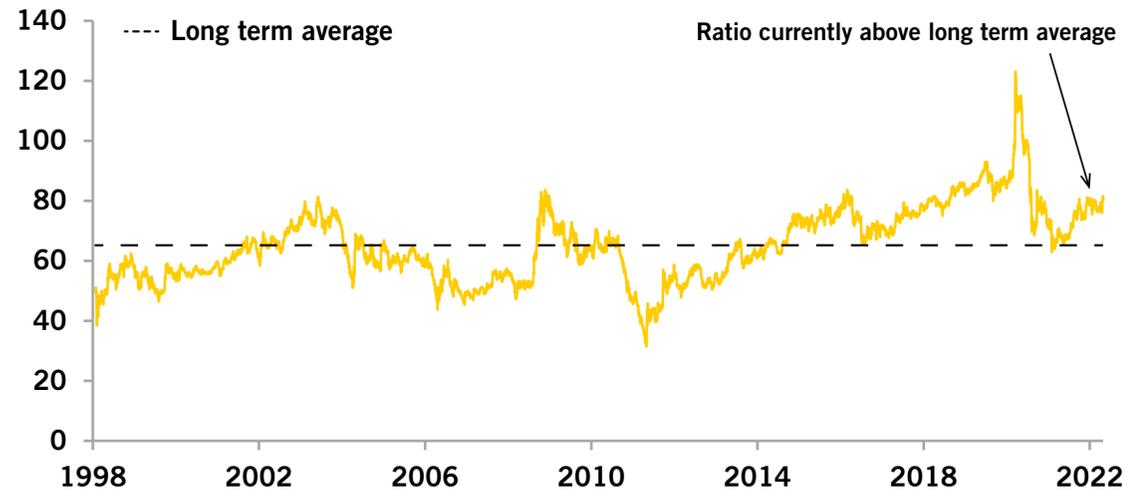
TRENDS AND INVESTMENTS

Platinum and palladium demand



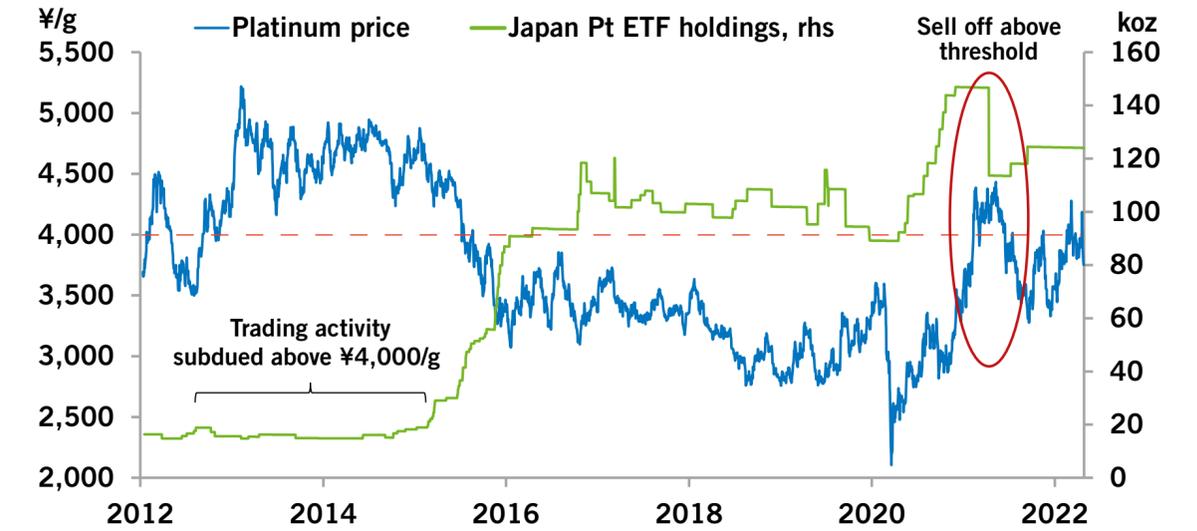
Source: SFA (Oxford)

Gold:silver ratio



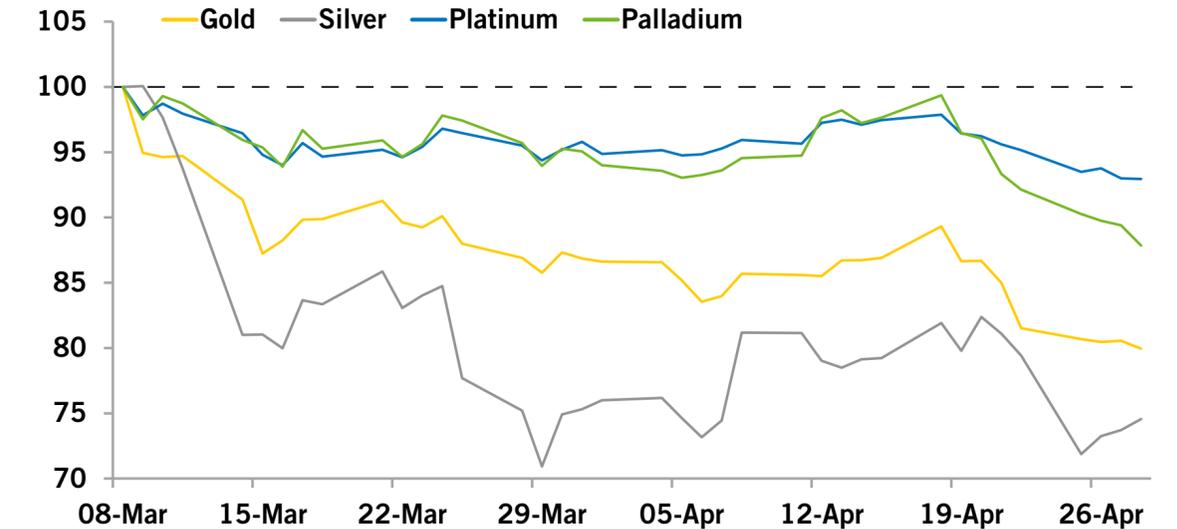
Source: SFA (Oxford), Bloomberg

Japanese platinum investors' price sensitivity



Source: SFA (Oxford), Bloomberg

Precious metals prices indexed to 8 March



Source: SFA (Oxford), Bloomberg

PRECIOUS APPRAISAL

2nd May 2022

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 **ABOUT HERAEUS**

ABOUT HERAEUS

Learn more about important trends in the precious metals markets on a weekly basis with our Heraeus Precious Appraisal. **Please subscribe: www.herae.us/trading-market-report.**

Heraeus Precious Metals

Europe, Middle East, Africa & other regions

Phone: +49 6181 35 2750
edelmetallhandel@heraeus.com

South East Asia

Phone: +852 2773 1733
tradinghk@heraeus.com

USA

Phone: +1 212 752 2180
tradingny@heraeus.com

China

Phone: +86 21 3357 5658
tradingsh@heraeus.com



Heraeus, the technology group headquartered in Hanau, Germany, is a leading international family-owned portfolio company. The company's roots go back to a family pharmacy started in 1660. Today, the Heraeus group includes businesses in the environmental, electronics, health and industrial applications sectors. Customers benefit from innovative technologies and solutions based on broad materials expertise and technological leadership.

Heraeus Precious Metals is a leading provider of precious metals services and products. We combine all activities related to our comprehensive expertise in the precious metals loop – from trading to precious metals products to recycling. We are one of the world's largest refiners of platinum group metals (PGMs) and a leading name in industrial precious metals trading.

The Heraeus Precious Forecast is produced in collaboration with:

SFA (Oxford) Ltd

United Kingdom
Phone: +44 1865 784366
www.sfa-oxford.com
The Oxford Science Park,
Oxford, United Kingdom, OX4 4GA



consulting analysts in tomorrow's commodities and technologies

Disclaimer

This document is being supplied to the recipient only, on the basis that the recipient is reasonably believed to be a professional market participant in the precious metals market. It is directed exclusively at entrepreneurs and especially not intended for the use of consumers.

The material contained in this document has no regard to the specific investment objectives, financial situation or particular need of any specific recipient or organisation. It is not provided as part of a contractual relationship. It is not and should not be construed as an offer to sell or the solicitation of an offer to purchase or subscribe for any investment or as advice on the merits of making any investment.

This report has been compiled using information obtained from sources that Heraeus and SFA (Oxford) Ltd ("SFA") believe to be reliable but which they have not independently verified. Further, the analysis and opinions set out in this document, including any forward-looking statements, constitute a judgment as of the date of the document and are subject to change without notice.

There is no assurance that any forward-looking statements will materialize. Therefore, neither SFA nor Heraeus warrants the accuracy and completeness of the data and analysis contained in this document.

Heraeus and SFA assume no liability for any losses or damages of whatsoever kind, resulting from whatever cause, through the use of or reliance on any information contained in this document. However, in so far as a liability claim exists under German law, Heraeus and SFA shall have unlimited liability for willful or grossly negligent breach of duty.

Unless expressly permitted by law, no part of this document may be reproduced or distributed in any manner without written permission of Heraeus. Heraeus specifically prohibits the redistribution of this document, via the internet or otherwise, to non-professional or private investors and neither Heraeus nor SFA accepts any liability whatsoever for the actions of third parties in reliance on this document.