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Metals Focus
Precious Metals Weekly

Gold
US CPI surged to a 40-year high of 7.0% in December. Gold has hold steady near $1,820 following the latest inflation data.

Silver
Short covering lifted net COMEX longs to five-week high.

Platinum
Cummins to build a 1GW PEM electrolyser factory in China, with state-owned oil giant Sinopec.

Palladium
According to the China Passenger Car Association, retail passenger vehicle sales fell by 7.7% y/y in December to 2.14m units.

The green economy and the silver deficit

Last year, there was noticeable rise in investor interest concerning the role that precious metals might play in the green economy. This was particularly true for silver and platinum. In terms of the latter this mostly relates to the development of the hydrogen economy, which is still in its relative infancy, and especially in terms of platinum demand.

However, our research shows that it is already important for silver, and that is before we consider the scope it has to grow further. Its current scale also puts the silver market into a physical deficit and this position has a strong likelihood of becoming structural. This article summarises and updates the key findings of the presentation given by Metals Focus at the IPMI's conference in Dublin in November 2021.

Photovoltaics

The star of silver use in the green economy over the last decade has been photovoltaics (PV). As shown overleaf, installations have grown massively over the last decade, up from a modest 16GW in 2010 to 158GW in 2021. Much of this has been driven by the push to reduce CO_2 emissions, but we cannot ignore how lower costs have also contributed. A corollary of this, however, has been a major cut in the amount of silver used on each cell; we estimate that a typical cell in 2021 would only have contained around 20% of the silver used in 2010. Despite that thrifting and substitution, we estimate that silver in PV has risen from around 5% of total silver demand in 2010 to over 10% by 2021.

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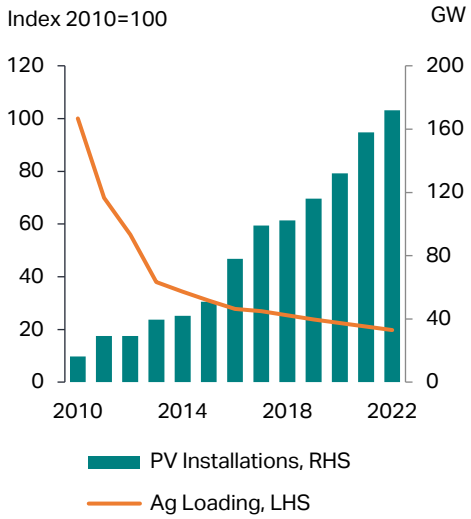
Photovoltaics: Installations vs Loadings



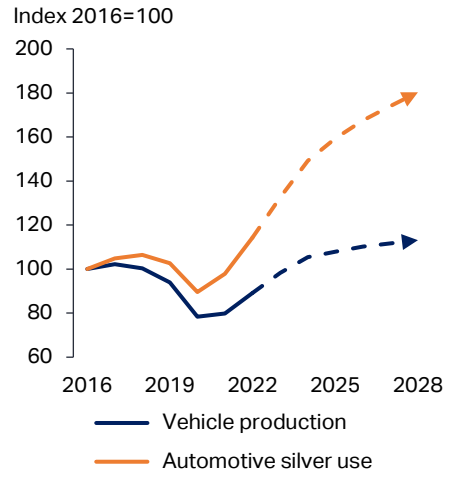
Source: Metals Focus, GTM

There is no sign of this importance slackening either. It is true that cost pressures remain, with efforts to reduce silver use continuing. Much of the focus here is on advances in screen printing, which have the potential to cut the current thickness of silver paste-derived conductive lines from a standard range today of 30-35 microns to an average of 30 microns and within three years a good number could be down to 25 microns. However, that is being countered by the adoption of HJT (hetero-junction) technologies, which use about 50-80% more silver but are much more efficient. HJT also suffers from high capital costs, which has slowed its adoption. This could accelerate if costs come down, but again that could mean lower silver use per cell.

It is hard to predict which technology will come to dominate in the coming years, nor whether current research into alternatives to silver can be commercialised on a large scale. As a result, we estimate that loadings will continue to drift lower at a pace similar to recent years' moderate speed. We initially expected that this would all translate into slight growth in silver use in 2022 but we have recently seen forecasts suggesting much higher installations, perhaps as much as 200GW. If this were to occur, PV's silver demand in 2022 would rise by well over 10%. Thereafter however, end-use could plateau as ongoing thrifting counters still high installation figures plus the bonus from the replacement of end-of-life cells (those installed before say 2010).

The Automotive Industry

Promising Potential of Silver Use in Automotive



Source: Metals Focus, LMC Automotive

While silver demand in PV might start to plateau, the opposite is true for silver use in the automotive industry. As shown in the chart alongside, much will stem from the recovery in vehicle production as the chip crisis eases, but total silver use is forecast to rise at a much stronger pace than mere vehicle numbers.

Some of this is due to factors unconnected to the green economy, such as the growing adoption of complex infotainment systems or new relatively equipment such as reversing cameras and lane departure warning sensors. However, battery electric vehicles (BEVs) require much greater amounts of silver than do internal combustion engine (ICE) vehicles. These areas includes the two electrodes per battery (of which there can be thousands) and the powertrain's wiring. The latter needs silver (typically in a 70:30 copper:silver mix) because of the high voltages involved. The extent of the multiple in silver use of BEV / ICE is unclear due to the variety and novelty of the systems being used, the fact that silver is used in a variety of places within a vehicle and lastly that components pass through several tiers of suppliers, making it hard for individual suppliers to know precise silver loadings.

All that said, our current estimates, as shown in the pie chart, point to PV being roughly twice the size of automotive and that the bonus

LBMA Trade Data

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GOLD

$174B

RECORD SINGLE DAYS VOLUME

SILVER

$30B

RECORD SINGLE DAYS VOLUME

PLATINUM & PALLADIUM

$3B & $5B

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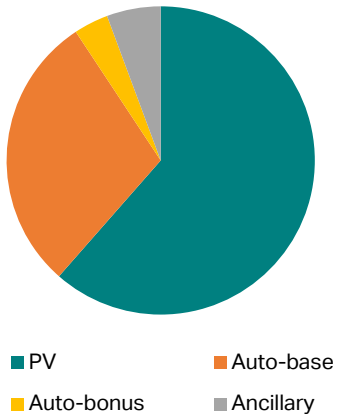
Relative Scale of 2021 Green Economy's Silver Uses



Source: Metals Focus. Note: "bonus" represents extra silver needed through a switch from ICE to BEV.

Silver Supply & Demand

Moz	2020	2021	2022F
Supply			
Mine Production	780.5	829.4	887.6
Recycling	181.7	191.6	198.0
Hedging Supply	8.5	-	5.0
Official Sector Sales	1.2	1.0	1.0
Total Supply	**971.8**	**1,021.9**	**1,091.6**
Demand			
Industrial	486.5	524.0	552.9
Photography	27.9	28.9	27.1
Jewellery & Silverware	178.7	213.5	248.3
Physical Investment	198.8	263.4	300.0
Hedging Demand	-	15.0	-
Total Demand	**891.9**	**1,044.8**	**1,128.4**
Physical Balance	**79.9**	**-22.9**	**-36.7**
Silver Price (US$/oz)	20.55	25.14	25.20

Source: Metals Focus

generated by vehicles being BEVs accounts for around 10% of automotive use. This relative importance however will rapidly change in the next few years as PV plateaus and as BEVs numbers surge; it would not surprise therefore if this BEV "bonus" reaches 20% in a few years and that total automotive use becomes similar in scale to PV demand.

Ancillary Green Economy Uses

It is important to note that our estimates for silver use in PV only account for silver in the cell and in automotive for silver in a vehicle. However, that is not the totality of their silver needs. For instance, some silver is used in BEVs' charging facilities and some in PV's connections and switches. Other renewable energy sources (such as wind and tidal power) also use silver in various areas, as does the low carbon nuclear power industry. All such uses are small however and, combined, these might be equivalent to around 10% of PV demand.

The Silver Balance

Uniquely for the four main precious metals, silver saw a deficit last year and is forecast to remain in deficit this year. While the switch from a surplus in 2020 was far from solely driven by the green economy, silver would have been in surplus in both 2021 and 2022 without this. The fact that green demand is forecast to grow strongly in the next few years only adds to trends in other supply and demand segments. As a result, and as subscribers to our Five-Year Silver Forecast will know, the deficit is expected to grow in the coming years.

However, the impact this will have on the silver price is far from clear. Ample above-ground stocks and the price sensitivity of important elements of the supply/demand balance (Indian jewellery and silverware demand for instance) will limit any fundamentally driven upward pressure. Furthermore, investor activity and the gold price are expected to retain their dominance over silver's price behaviour, especially in the short term. This explains why weakness in the silver price could become pronounced 2023 onwards.

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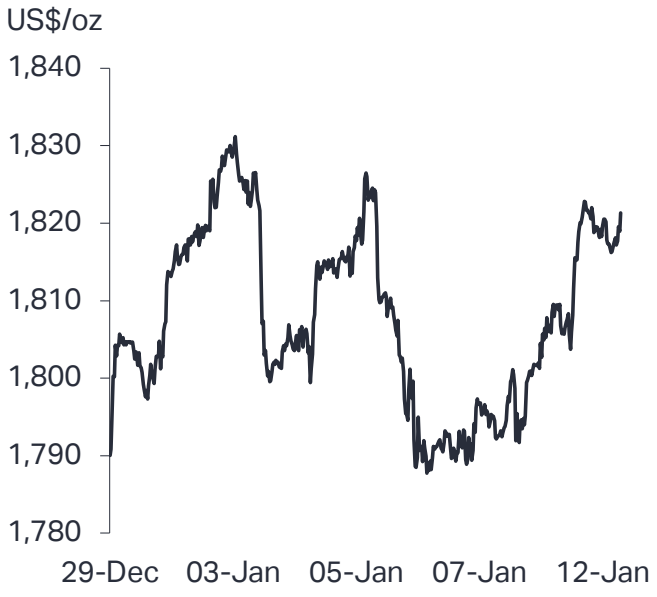
Charts - Precious Metal Prices, US$/oz

Gold

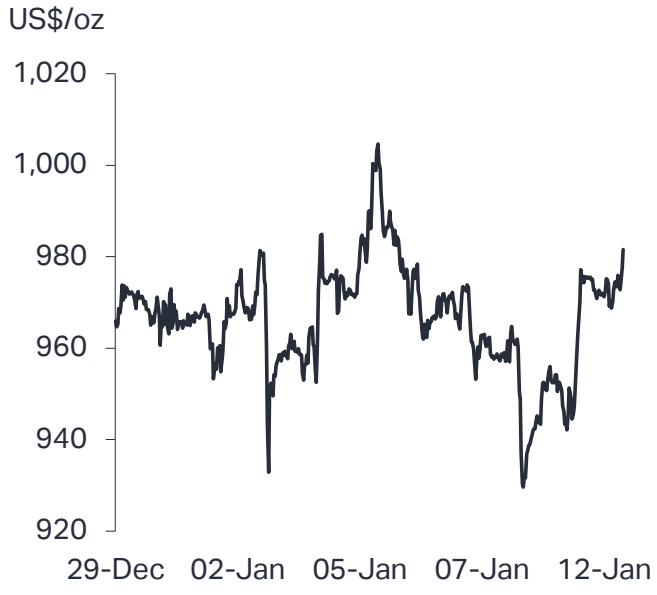


Source: Bloomberg

Silver

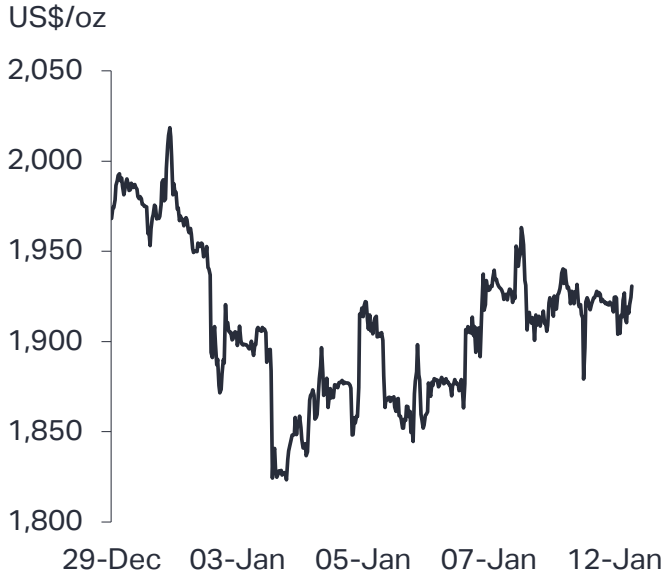
Source: Bloomberg

Platinum



Source: Bloomberg

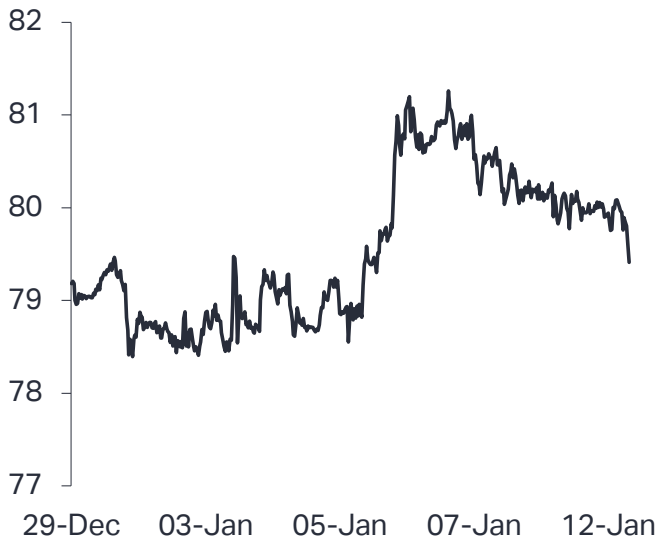
Palladium



Source: Bloomberg

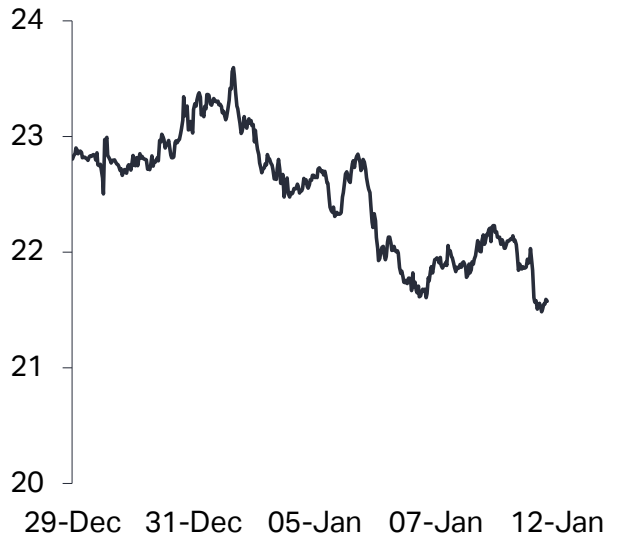
Charts - Ratios & Spreads

Gold:Silver Ratio



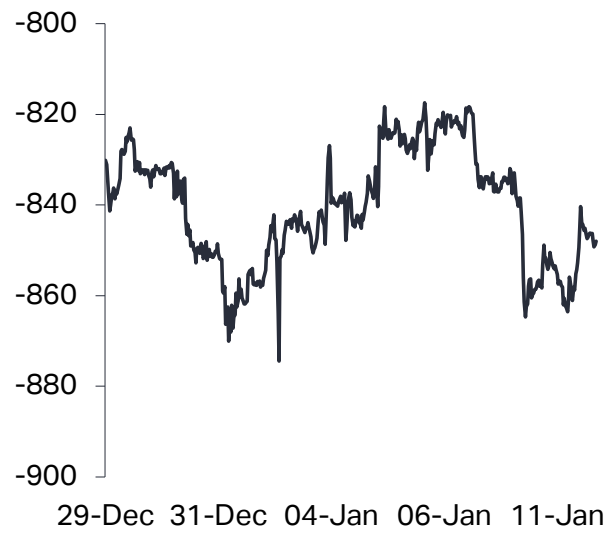
Source: Bloomberg

Gold:Oil (Brent) Ratio



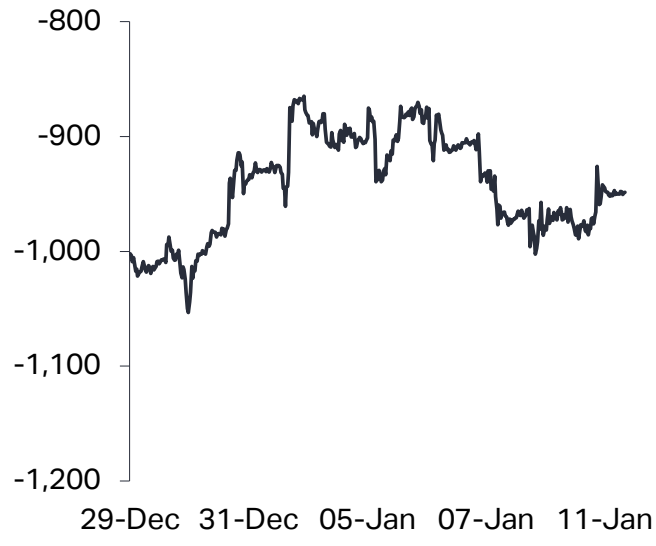
Source: Bloomberg

Platinum-Gold Discount, US$/oz



Source: Bloomberg

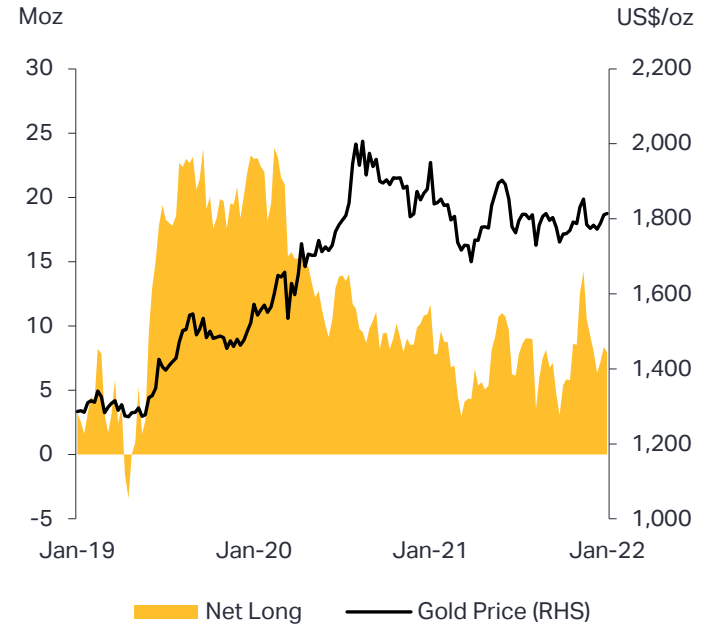
Platinum-Palladium Discount, US$/oz



Source: Bloomberg

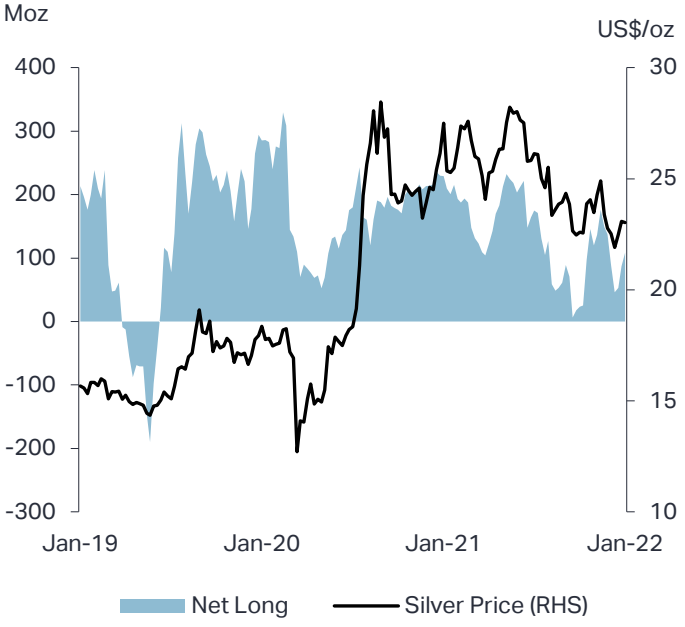
Charts - CME Futures Net Positions*

Gold



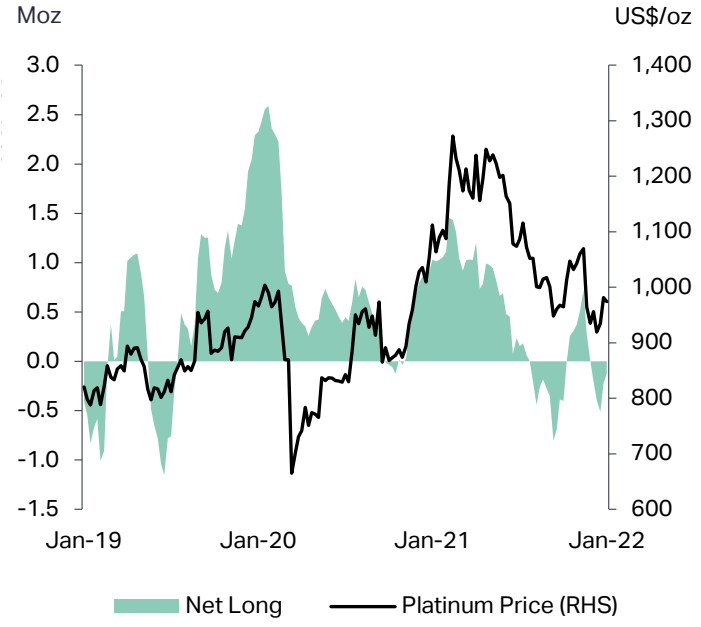
*Managed money positions; Source: Bloomberg

Silver



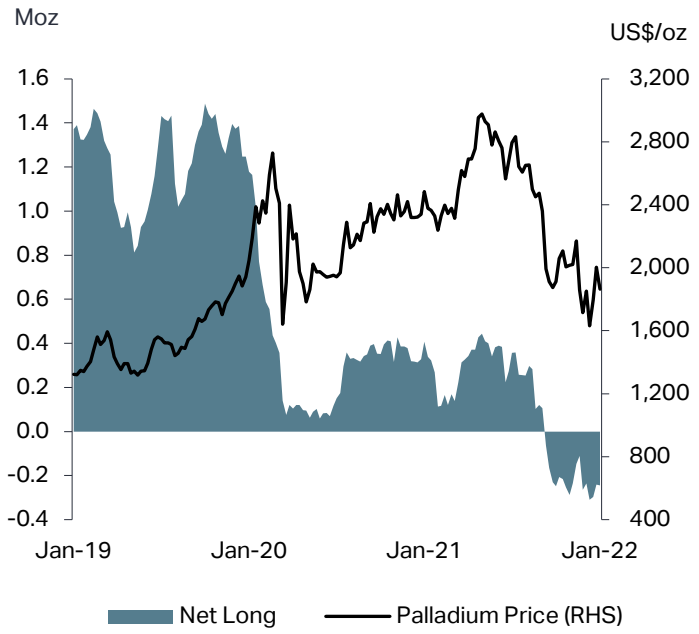
*Managed money positions; Source: Bloomberg

Platinum



*Managed money positions; Source: Bloomberg

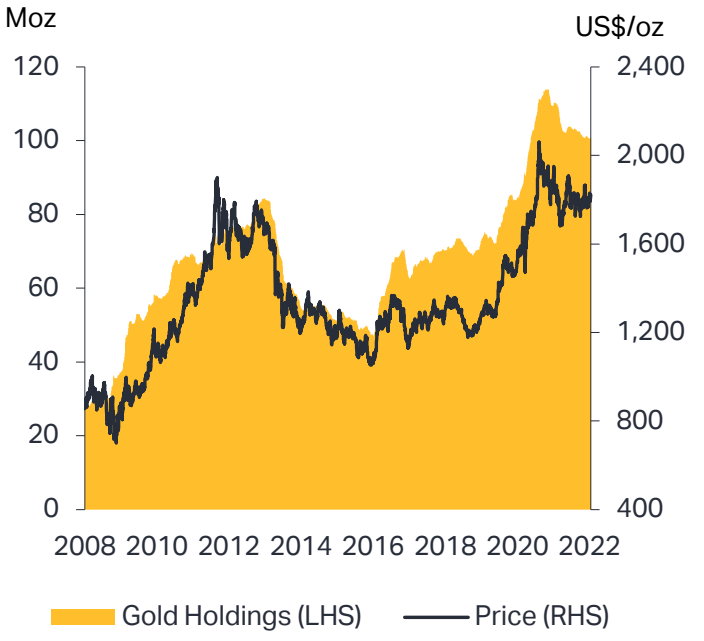
Palladium



*Managed money positions; Source: Bloomberg

Charts - ETP Holdings

Gold

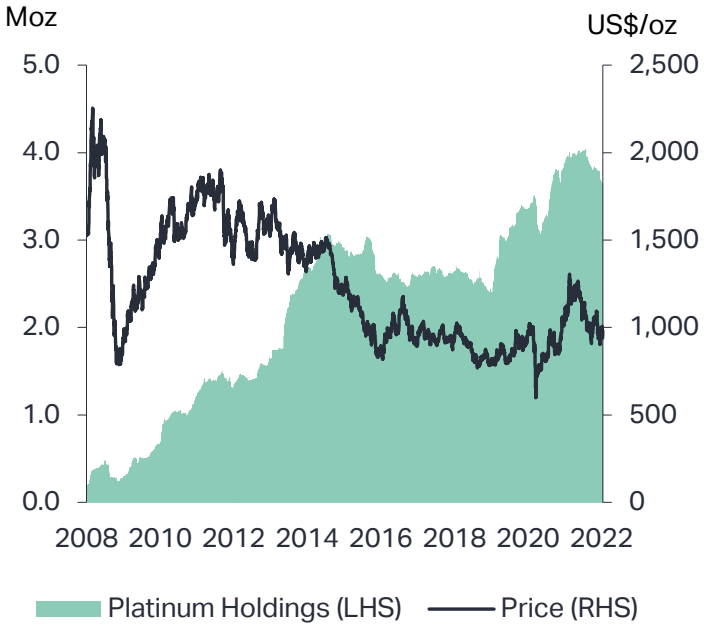


Source: Bloomberg

Silver

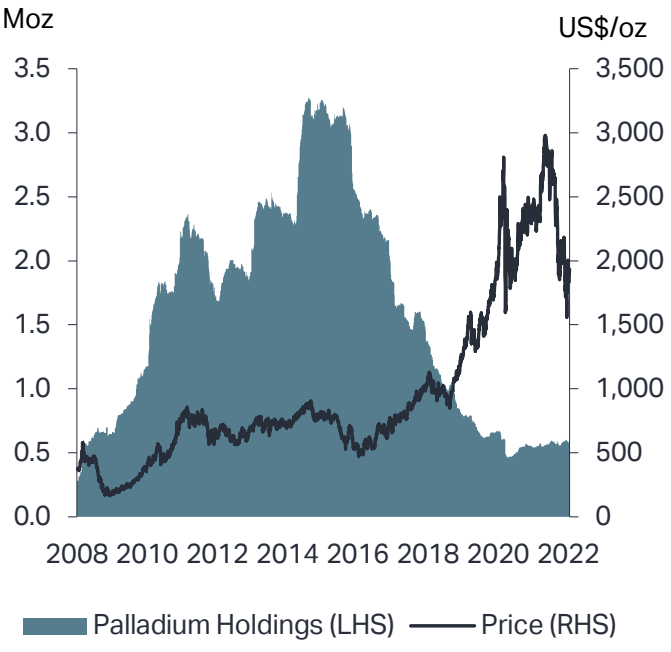
Source: Bloomberg

Platinum



Source: Bloomberg

Palladium



Source: Bloomberg

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