Heraeus

PRECIOUS FORECAST
2022

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OUTLOOK 2022

Markets normalising in 2022

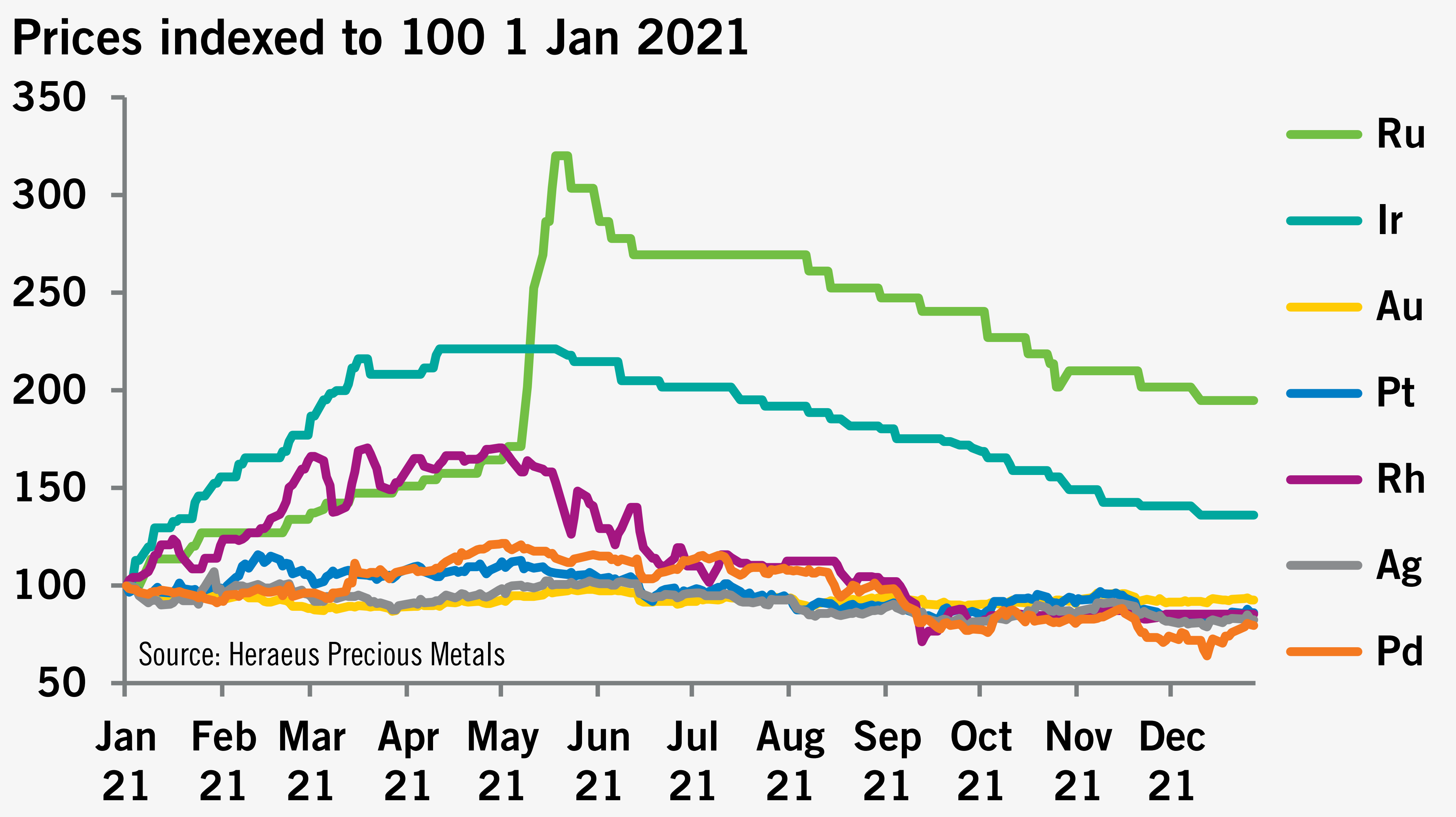
The PGM markets are still in the process of returning to normal following last year's supply and demand shocks (Russia's PGM production shortfall and the automotive semiconductor chip shortage). The coronavirus remains a factor, but its effects should gradually recede. Vaccines are much more widely available and the latest Covid variants appear to be less dangerous. That should allow a gradual return to normal and a rebalancing in the economy towards spending on services and away from goods.

Gold and silver failed to benefit from the return of inflation in 2021. However, inflation is forecast to remain elevated this year, and the Federal Reserve and ECB have been slow to react. The ECB is not intending to raise interest rates this year, whereas the market has priced in several rate hikes by the Fed. If the Fed fails to deliver, or the ECB becomes even slightly more hawkish, that could favour the euro. Gold remains a safe haven and insurance against policy errors, and the price could have a weakening dollar as a tailwind. If that turns out to be the case, then silver is favoured to outperform gold.

The small PGMs' prices reached record levels in the first half of last year as the impact of processing problems in South Africa continued to be felt. However, liquidity improved with the recovery of refined production in South Africa and the processing of stockpiled material, and the prices retreated in the second half of the year. For iridium and ruthenium, the return to lower price levels is expected to continue. Price volatility could be a feature for rhodium as the market is forecast to be balanced this year, so even small shifts in the supply or demand outlook could influence the price.

The palladium market is also finely balanced, with supply recovering in Russia and an expected rebound in automotive demand from a ramp-up in light-vehicle production as the availability of semiconductor chips improves over the course of the year.

The platinum market remains substantially oversupplied on an industrial basis. ETF investment shrank as the price retreated last year and investors will need to return to sustain any rally in the price. Platinum is still cheap relative to gold and palladium, and high inflation could result in more investor interest in real assets.



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2021	2022
Avg. 1.19	Forecast:
High 1.23	High 1.26
Low 1.12	Low 1.08
Change +5%	

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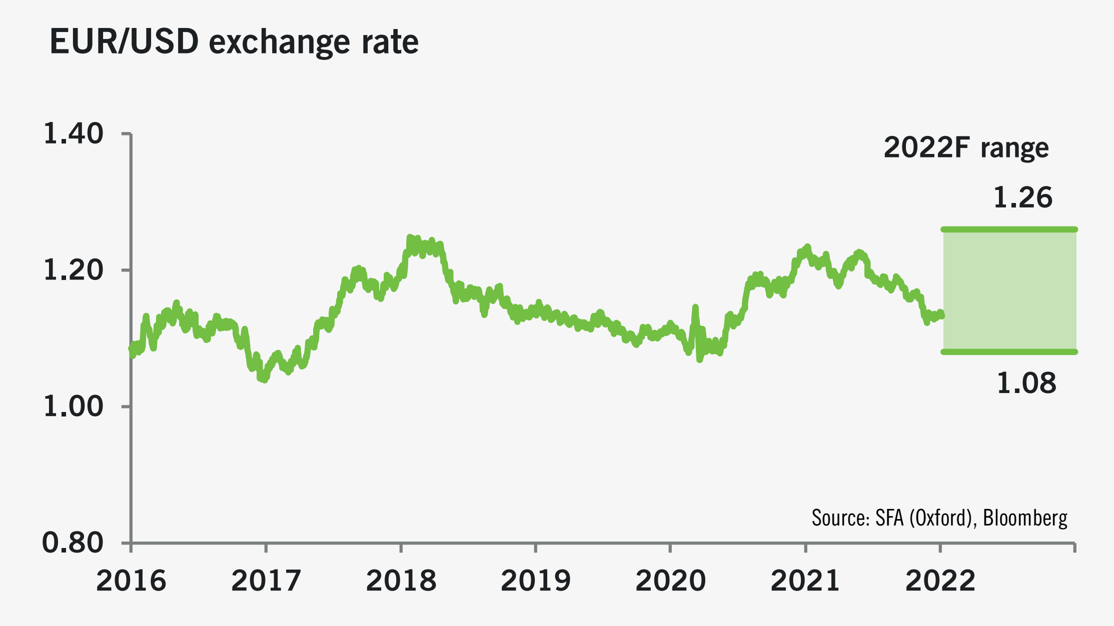
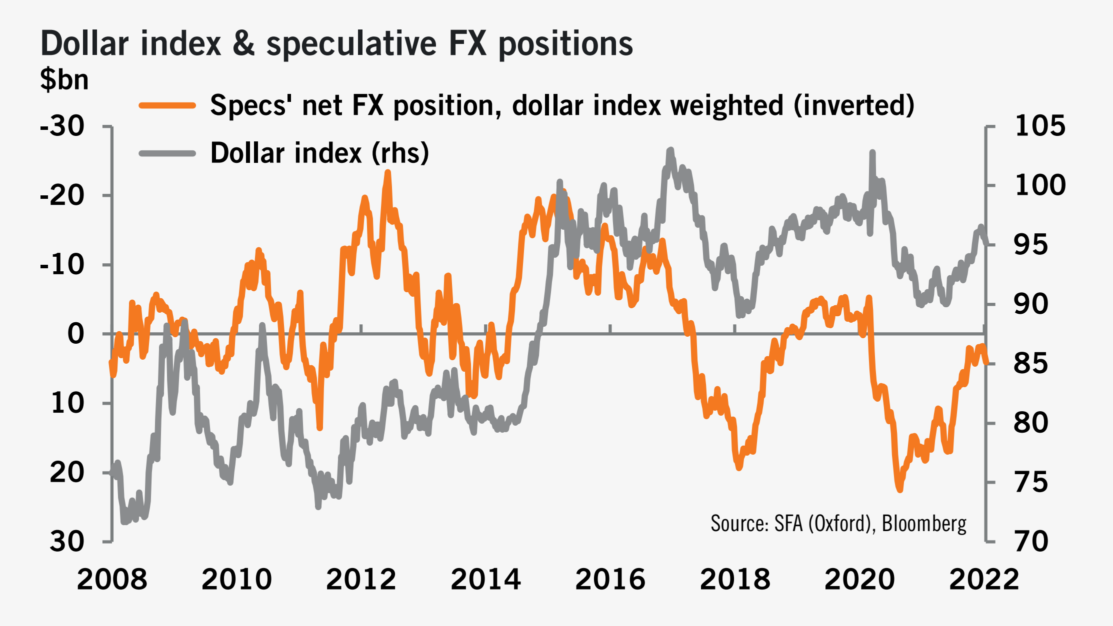
FORECAST – EUR/USD

A reversal to euro strength is possible

The US dollar may have limited upside from current levels. The dollar spent last year trading between 1.25 and 1.05 to the euro for a seventh consecutive year. It was a year in which the dollar gradually strengthened, and this shifted speculative traders' foreign exchange positions from being short the dollar in January to near neutral by the end of December. Speculative positions tend to become net long the dollar before the period of dollar strength ends. This suggests that while the dollar could strengthen further in the short term, a reversal to a stronger euro is likely in the next few months.



US economic strength should be priced in. IMF forecasts for US GDP growth in 2022 moved higher as 2021 progressed to 5.2%, whereas economic growth forecasts for the Eurozone were only upgraded in the first half of the year (4.3%). That leaves the US economy looking more robust than the Eurozone, which would support a stronger dollar. During the winter, coronavirus restrictions have also become more severe in some Eurozone countries than in the US, which will have a further negative economic impact. However, this should be priced in to the exchange rate already, and it is easier for the Eurozone and euro to surprise to the upside when expectations are low.



Higher inflation in the US could weaken the dollar. In the US, the CPI reached 7.0% year-on-year in December. Meanwhile, Eurozone inflation (MUICP) hit 5.0% year-on-year in December, while in Germany the CPI was 5.3% year-on-year. Typically, countries with higher inflation see their currencies weaken against those countries with lower inflation. On an inflation differential basis, higher inflation in the US favours the euro.

The ECB is lagging behind the Fed and other central banks in tightening monetary policy. The Fed has become about as hawkish as it can get, with asset purchases on track to end in March and a two thirds chance of a rate rise in the same month predicted by the futures market. The ECB is ending PEPP purchases in March, but the APP continues and the ECB has resolutely stuck by its plan for no rate rises this year. If the ECB starts to move somewhat faster, that would be supportive for the euro.

Speculative foreign exchange futures positions are signalling limited upside for the dollar. The situation at the start of 2022 is the opposite of that at the beginning of 2021. Speculative futures positions are almost neutral on the dollar, having been quite short the dollar at the start of 2021. During the year, the dollar strengthened and the speculative position against the dollar was reduced. Turning points have typically occurred when the speculative positioning in FX futures is net long the dollar. That leaves a little room for further dollar strength in the near term but that could reverse by mid-year.

Overall, the euro is favoured to strengthen against the US dollar, trading in a range between 1.08 and 1.26 as it has done for the last seven years. Neither inflation nor economic growth is sufficiently skewed to one region over the other to suggest a move out of the established range, but sentiment is currently more favourable towards the dollar which leaves room for the euro to surprise to the upside.

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2021	2022
Avg. $1,803/oz	Forecast:
High $1,952/oz	High $2,120/oz
Low $1,688/oz	Low $1,700/oz
Change -7%	

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FORECAST – GOLD

Ongoing inflation and a weaker dollar to support the gold price

Inflation risk is positive for gold. The Fed and ECB are a long way behind the curve in combating inflation. In the US, inflation was 7.0% in December and in the Eurozone it was 5.0%. The Fed is now moving as fast as it can to reduce asset purchases before moving to raise interest rates, but that first rate rise is still several months away. Meanwhile, the ECB is reducing, but not ending, its asset purchases and expects inflation to come down, and so is not predicting a rate increase in 2022.

Real interest rates are likely to remain negative. With a slow and steady outlook for rate rises in the US, real interest rates will remain firmly negative. Even as some base effects reduce year-on-year inflation comparisons, ongoing supply chain issues mean inflation is likely to remain well above the Fed's 2% target. Therefore, real interest rates should remain negative which is usually an environment in which gold performs well.

Dollar strength may fade, supporting a higher gold price. Speculative positions in currencies vs. the dollar are marginally net short the dollar and close to becoming net long. This usually precedes a change in trend. Near term, the dollar could strengthen further but the trend looks likely to change in 2022.

Central banks are likely to continue adding gold to their reserves. In 2021, more than 400 t of gold was added to reserves, a significant increase over a very low 2020 total. However, purchases in 2022 may not be as high because around half of that gain appeared to be large, one-off purchases from Brazil, Hungary and Thailand.

Jewellery demand is expected to improve somewhat, following a substantial recovery in 2021. Chinese jewellery demand more or less recovered to pre-pandemic levels last year, but economic growth is predicted to slow this year and that could impact consumer spending. The outlook is brighter for India. Indian jewellery demand did not recover fully last year but could do so this year as strong economic growth is anticipated as the impact of the pandemic recedes.

Total supply is forecast to edge higher this year. Mine output is expected to have hit a new record in 2021, but that gain was mostly offset by a drop in recycled gold owing to the lower price. A marginal new record could be possible for mine production this year and with robust prices expected in 2022, recycling is likely to be somewhat higher.

Investment demand will need to pick up to lift the gold price. Concerns about inflation, geopolitics or the overvaluation and potential volatility of other assets could see safe-haven demand for gold increase. Stock markets in the US and Europe are at, or near, all-time highs and valuations are very high compared to history. On top of which, bond yields are still very low, so it would require only a small increase in yields to inflict capital losses on bond holders. In real terms, inflation is already causing losses. Negative real interest rates and dollar weakness are expected to support the gold price. **Gold is forecast to trade in a range between $2,120/oz and $1,700/oz this year.**

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2021	2022
Avg. $25.13/oz	Forecast:
High $29.45/oz	High $32.00/oz
Low $21.70/oz	Low $20.00/oz
Change -17%	

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FORECAST – SILVER

Solid industrial demand and continued investor interest

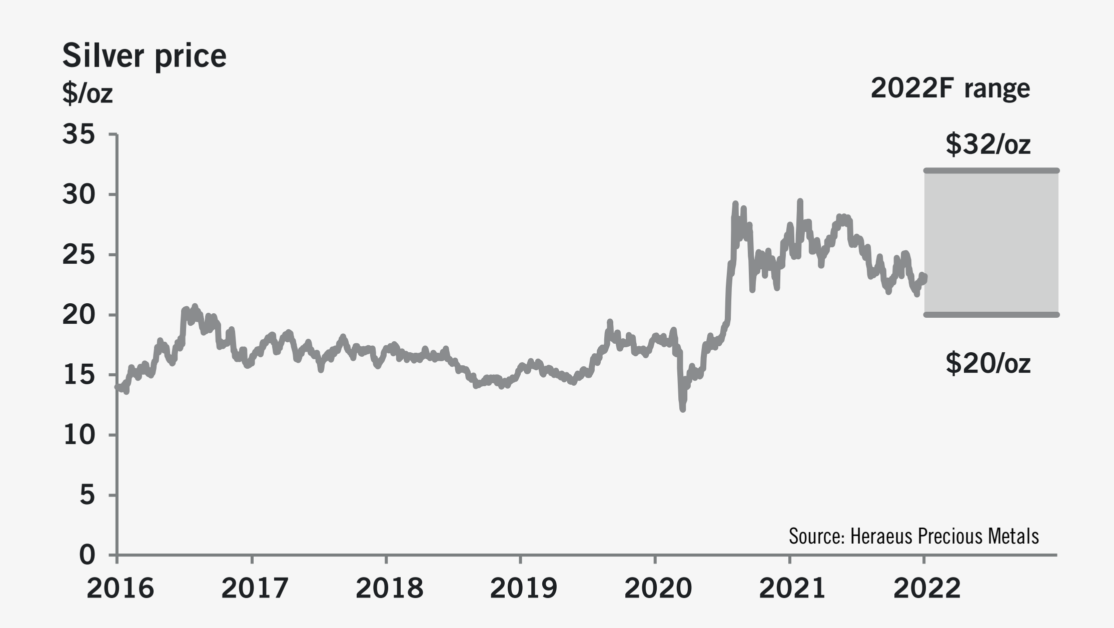
Silver industrial demand is set to increase. Double-digit growth in solar photovoltaic (PV) installations is predicted for 2022. Installations are projected to surpass 200 GW for the first time, only five years after the 100 GW level was reached. Installations in key markets such as China, India, the US and Europe are all expected to expand in 2022. The highest growth is coming from the distributed generation segment (residential, commercial and industrial), with rising module costs having seemingly very little impact on PV's appeal. That is despite supply chain constraints (particularly for polysilicon) which are likely to continue to be a bottleneck for the PV market until new planned capacity ramps up from 2023, and also policy uncertainty in China. However, the acceleration of the global energy sector's shift from fossil fuel-based production and consumption to renewable sources is still expected to see solar PV continue to record strong year-on-year growth, thus supporting silver demand.

Electronic and electrical silver demand will benefit from a post-Covid recovery in global smartphone sales this year, as well as the continued roll-out of 5G and the falling cost of 5G handsets. Annual smartphone shipments are estimated to reach 1.39 billion units in 2022, growing 3.8% year-on-year, driven by the usual device replacement cycle as well as increased demand from emerging markets. In 2022, 5G smartphone production is forecast to reach 660 million units, a share of 47.5% in the overall smartphone market. In China, 5G smartphone penetration is estimated to have now surpassed 80%, so manufacturers are expected to be shifting their focus to other regional markets, such as the US and Europe. Electronic demand associated with the automotive industry is also forecast to rise modestly this year as the impact of the semiconductor chip shortage lessens and global light-vehicle production rebounds.

Silver mine supply is predicted to slip in 2022 and return to the downward trend that was temporarily reversed by a post-Covid rebound last year. Mine production has been declining since 2016 and despite rising demand and high prices, there is limited opportunity for new supply as the majority of silver is mined as a by-product (of gold and base metals). Production levels could also be impacted by ongoing geopolitical risks in South America during 2022. Incentivised by high prices, secondary silver supply is expected to grow again this year, making up the supply shortfall that would exist from mined production alone.

Demand for silver jewellery and silverware is expected to return to nearer pre-pandemic levels. India is the largest market for silverware and silver jewellery fabrication and the pandemic restricted the rebound in demand last year. With India's economy forecast to grow strongly this year as the impact of the pandemic lessens, further recovery is anticipated for jewellery and silverware demand.

Silver is forecast to trade in a range between $32/oz and $20/oz, outperforming gold. The silver price spent 2021 consolidating after making a high in February amid an attempted short squeeze by retail investors. Surprisingly, the rise in inflation failed to ignite a rally in silver (or gold), even with strong investor interest. Inflation is likely to remain above the Fed and ECB's targets as the reduction in asset purchases is delaying any rise in interest rates (the ECB may not lift rates at all), and investors are expected to add to their holdings as inflation and negative real interest rates will remain a concern. Speculative positioning in silver in the futures market has fallen back, leaving the potential for more upside if traders move back into silver.



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2021	2022
Avg. $1,098/oz	Forecast:
High $1,309/oz	High $1,300/oz
Low $910/oz	Low $850/oz
Change -14%	

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FORECAST – PLATINUM

More investor interest is needed to shrink the surplus

The industrial platinum market is predicted to have a surplus of over 1 moz once again in 2022. However, that is lower than in 2021 as the trend has now shifted to a narrowing surplus with demand growing faster than supply. Overall investment demand had a relatively poor year in 2021, as a fall in ETF holdings offset much of the gain from bar and coin sales. Stronger investment in ETFs will be needed to help lift the price this year. Platinum remains cheap compared to gold and, with inflation running hot, real assets such as platinum may benefit from renewed investor interest.

Primary platinum supply is expected to increase by 4% to 6.4 moz in 2022. In South Africa, refined output is forecast to be slightly higher than in 2021 and is again boosted by the refining of some stock that built up owing to earlier processing problems. There has been some recent M&A activity amongst South African PGM miners, but this is not likely to influence PGM production this year. Mine output is also expanding in Zimbabwe, and Russian production returns to normal following the mine flooding incident that impacted two mines early last year.

Secondary platinum supply is projected to be slightly higher this year than last year as jewellery recycling is forecast to be moderately higher. However, autocatalyst recycling could be flat or slightly lower owing to the knock-on impact of the semiconductor chip shortage on the second-hand car market. The lack of new light vehicles for sale has resulted in much stronger demand for second-hand vehicles, particularly in the second half of 2021. This, in turn, has resulted in fewer old vehicles being scrapped. New car production is forecast to be much higher this year, but the second-hand market is likely to remain tight.

Global automotive platinum demand is predicted to grow by 14% to almost 3.0 moz. The majority of that growth is coming from increased light-vehicle sales combined with the wider roll-out of autocatalysts with higher platinum loadings for gasoline light vehicles. In 2021, light-vehicle production was severely hampered by a lack of semiconductor chips and was only ~1 million units higher than in 2020. This year, even with the lingering effect of the chip shortage, light-vehicle production is expected to rise by over 8 million units.

Diesel's market share in passenger cars is forecast to continue to decline in Europe which erodes platinum demand. However, while global heavy-duty vehicle (HDV) production is predicted to be little changed this year from 2021, with HDVs now having to meet China VI legislation, higher loadings are expected to lift platinum demand from this segment.

Global industrial demand is forecast to expand by 4% in 2022. Most industrial uses are expected to see modest increases in demand, led by ongoing capacity expansion in the glass industry and increasing silicone production in China. Petroleum is the only sector that is predicted to see lower platinum demand this year. Although petroleum demand remains robust, there were significant capacity expansions in 2021, some of which had been delayed by the pandemic from 2020, which resulted in particularly strong demand. Hydrogen economy-related platinum demand from fuel cells and electrolysers is set to continue to grow rapidly from a relatively small base.

Jewellery demand is estimated to increase modestly this year, despite declines in China and North America. After a strong recovery in 2021, North American platinum jewellery demand is expected to dip this year. China also saw a rebound in demand that is not likely to be maintained this year. However, higher demand is forecast for India, Japan and Western Europe which more than offsets those declines.

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2021	2022
Avg. $1,098/oz	Forecast:
High $1,309/oz	High $1,300/oz
Low $910/oz	Low $850/oz
Change -14%	

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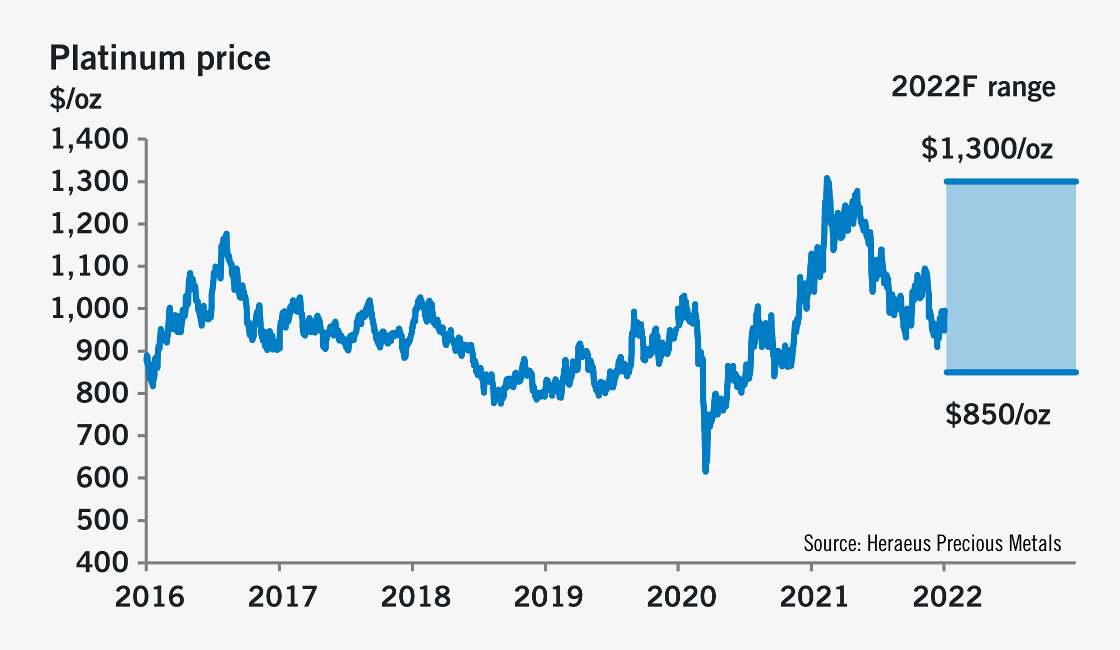
FORECAST – PLATINUM

More investor interest is needed to shrink the surplus

Investment demand was modest in 2021 owing to a 262 koz fall in ETF holdings which offset a large part of the demand for coins and bars. Global ETF holdings hit a record of almost 4 moz in May but subsequently declined as the price slipped back over the remainder of the year.

The platinum price is forecast to trade between $1,300/oz and $850/oz. The industrial market balance is still projected to have a large surplus, so investment demand will need to improve to help lift the price. Platinum remains cheap compared to gold and palladium and if the gold price rallies as anticipated, then the platinum price is expected to move higher too.



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2021	2022
Avg. $2,405/oz	Forecast:
High $3,000/oz	High $2,250/oz
Low $1,580/oz	Low $1,400/oz
Change -20%	

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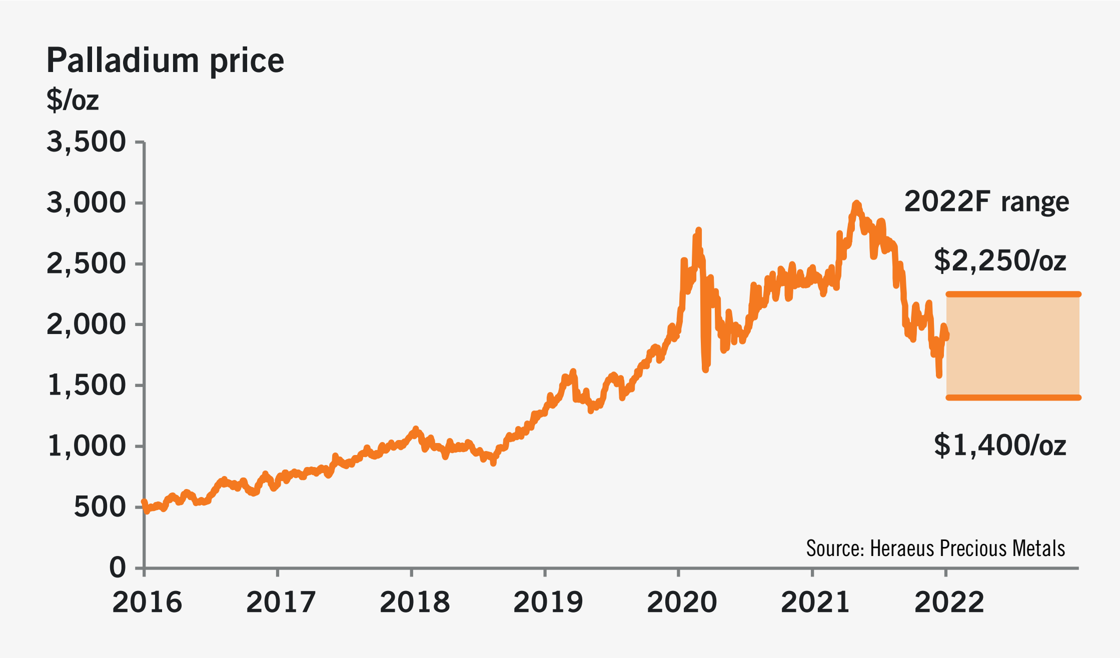
FORECAST – PALLADIUM

Market close to balance

The palladium market is forecast to have a very small surplus this year. Automotive demand is expected to grow strongly, as light-vehicle production jumps after the worst of the semiconductor chip shortage is over. Offsetting that is the recovery in primary supply from Russia, along with growth in other regions, and higher palladium recycling. However, if the second-hand car market remains tight, then secondary supply could disappoint which would move the market into deficit.



Automotive palladium demand is estimated to reach a record 8.5 moz this year. Light-vehicle production is predicted to surge by over 8 million units as the semiconductor chip shortage is mostly at an end. That said, lack of chips is still expected to be a constraint and light-vehicle production is not likely to recover to 2019 levels. The upside to palladium demand from recovering light-vehicle sales is slightly eroded by the wider roll-out of gasoline autocatalysts which have some platinum substituting for some palladium. In addition, the rapid increase in BEV production has removed some of the upside for automotive palladium demand by taking market share from gasoline vehicles, but automotive demand is still forecast to be at a record level this year.

Palladium's industrial demand is predicted to decline by 6% this year. This represents a resumption of the long-term contraction in industrial demand. In 2021, global industrial demand was little changed from 2020 owing to significant expansion of chemical capacity utilising palladium catalysts in China, which is not expected to be repeated this year. The high palladium price has resulted in thrifting and substitution of palladium in electrical components. It has influenced dental demand as well, where, in addition, palladium-based alloys have also lost out to more cosmetically appealing alternatives.

Primary palladium production is forecast to increase by 7% this year. Russian production has recovered following the mine flooding incident that impacted output last year. However, scheduled smelter maintenance is expected to restrict refined output to around 2.7 moz. South Africa, Zimbabwe and North America are all predicted to increase production this year. South African supply is again boosted by the processing of the remaining stock that built up owing to some processing problems in 2020.

Secondary supply is projected to increase as greater numbers of light vehicles are scrapped. The historical tightening of emissions standards in the US and Europe is also resulting in a gradual increase in the PGM loadings on the spent autocatalysts. However, with the chip shortage still having an impact on new car production, demand in the second-hand car market could remain stronger than normal which could limit to some extent the number of vehicles being scrapped.

The palladium price is expected to remain volatile this year as the market is finely balanced and any events which change supply or demand could shift the market further into surplus or into deficit. **The palladium price is forecast to trade between $2,250/oz and $1,400/oz.**

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2021	2022
Avg. $21,169/oz	Forecast:
High $30,950/oz	High $22,000/oz
Low $12,950/oz	Low $7,500/oz
Change -15%	

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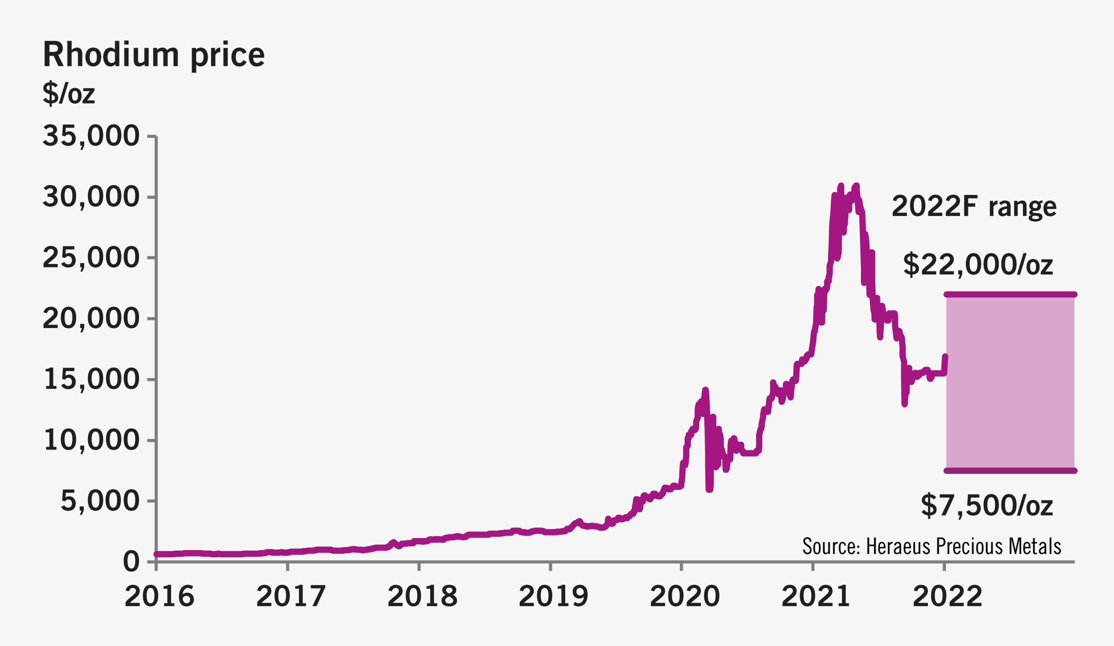
FORECAST – RHODIUM

A balanced rhodium market in 2022

The rhodium market is forecast to be balanced this year, as recovering automotive demand is set to rise more than supply. The production and processing problems that resulted in a very tight market during the first half of 2021 have been overcome, and with increasing metal availability the price retreated significantly from its record high. With improved liquidity, further price normalisation is anticipated this year, but the market is finely balanced so price volatility could remain a feature.

Primary rhodium supply is expected to expand by 3% this year. South African production has recovered to pre-Covid levels and the processing of stock adds a small additional amount of rhodium to the total. Russian rhodium output is also expected to be modestly higher this year with the recovery of production from the two mines that suffered from flooding in early 2021.



Secondary supply is predicted to grow by 4%, owing to greater numbers of vehicles being scrapped. However, with the semiconductor chip shortage holding back new car sales, second-hand cars have been more sought after and it is possible that fewer will be scrapped than anticipated.

Automotive rhodium demand is projected to exceed 1 moz for the first time this year, resulting in automotive demand reaching 89% of total consumption. Light-vehicle production is predicted to jump by more than 8 million units, as the chip shortage that severely restricted production in 2021 is mostly overcome. This, combined with the slightly higher loadings required to meet tightening emissions standards, is forecast to result in automotive demand escalating by 17% this year.

Rhodium industrial demand is forecast to increase by 3% this year. While price-induced thrifting of rhodium in glass applications has mostly run its course, a modest further decline in glass demand is predicted. However, this is more than offset by growth in chemical requirements, as demand from the nitric acid industry picks up after some price-induced substitution last year, and a small gain in other end-uses.

The rhodium price is estimated to range between $22,000/oz and $7,500/oz. With the market forecast to be balanced, any changes to supply or demand could result in sharp price movements. Risks to supply could come from underperforming recycling, and the three largest South African PGM mining companies will start wage negotiations with the mining unions later this year which does leave open the possibility of a strike. Meanwhile, rhodium demand is dependent on the automotive industry having sufficient chips available to meet the higher light-vehicle production expected this year.

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2021	2022
Avg. $608/oz	Forecast:
High $945/oz	High $600/oz
Low $295/oz	Low $250/oz
Change +95%	

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FORECAST – RUTHENIUM

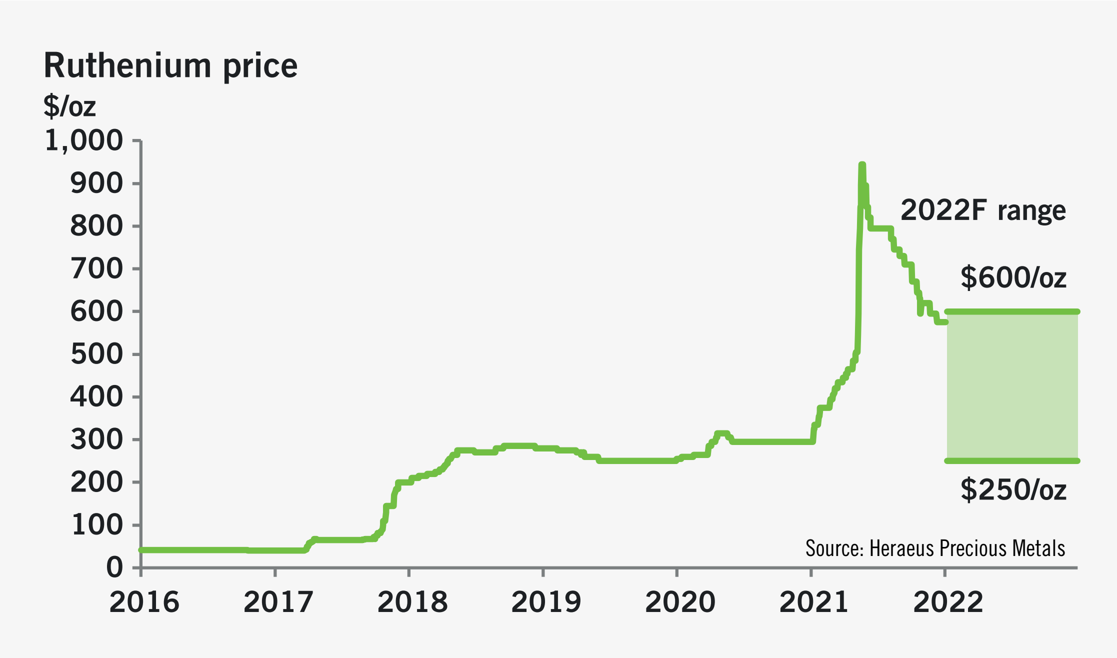
Supply growth matches demand growth

The ruthenium market is projected to be in surplus this year. Supply is forecast to rise by around 2%, as production problems in Russia have been overcome and some stock is processed in South Africa, and match growth in demand.

Refined ruthenium supply is forecast to increase modestly this year. Production from South Africa is boosted by the processing of some stock that built up as a result of processing problems. Russian output is recovering now that the mines that were flooded are back in operation, and production from Zimbabwe is also expected to grow slightly this year.

Ruthenium electrical demand is holding steady. Hard disk drive (HDD) technology continues to advance and increase the data density on the disks. HDDs continue to have a price advantage over solid state devices and, with data storage requirements climbing rapidly for cloud services and other applications, near-term demand looks secure. Heat-assisted magnetic recording (no Ru) has been developed and units are being sold, but it is not yet available for the mass market. Other existing technologies are being improved which is extending the use of ruthenium.

The high price in 2021 resulted from processing problems in South Africa which tightened the market significantly at a time when demand was expanding. With refined output back on track in South Africa and improving metal availability, the price spent the second half of last year trending lower. **The ruthenium price is forecast to trade between $600/oz and $250/oz this year.**



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2021	2022
Avg. $5,437/oz	Forecast:
High $6,750/oz	High $5,000/oz
Low $3,050/oz	Low $2,500/oz
Change +36%	

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FORECAST – IRIDIUM

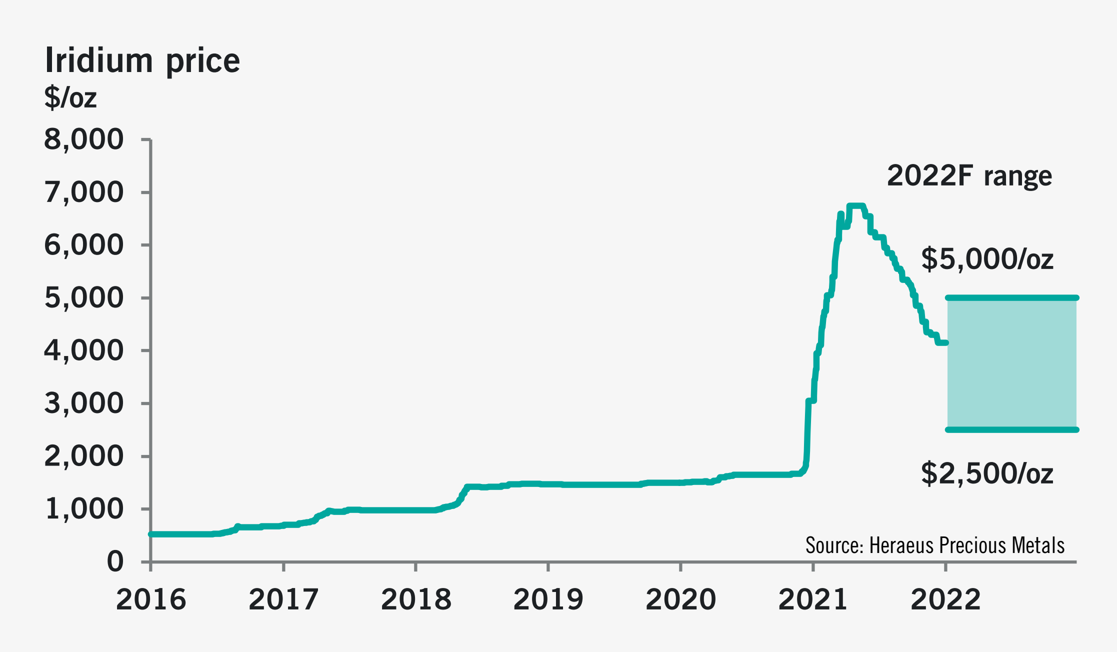
Price to retreat further on improved market liquidity

The iridium market is predicted to have a small surplus this year, but the surplus is expected to shrink slightly from last year as demand growth outpaces supply growth. South African production is again expected to be lifted slightly by the remaining stockpiled material that built up in 2020 being processed. Russia's output is set to recover this year, with the two mines that suffered from flooding early last year now back in production. In addition, output in Zimbabwe is predicted to edge up.

Stronger demand is anticipated, in particular in automotive and hydrogen uses. Other end-uses are forecast to experience flat to slightly higher requirements. The rebound in automotive production this year is expected to result in higher iridium demand for spark plugs. Iridium use in the hydrogen economy (with platinum in electrode coatings) in proton exchange membrane (PEM) electrolysers is set to increase sharply this year, although it remains a relatively small part of total demand. Numerous electrolyser projects have been announced, although not all utilise PEM technology. PEM electrolyser technology has a market share of about a third, but that share is expanding.

5G is taking off and supporting electrical demand for iridium. Iridium crucibles are used to make lithium tantalate for surface acoustic wave (SAW) filters. China has the world's largest 5G network and significant 5G smartphone sales but produces only a fraction of the SAW filters it needs for domestic 5G smartphone production. The Chinese authorities want to improve the domestic supply situation so there is likely to be an increase in production of lithium tantalate in China. Outside of China, 5G smartphone sales are expected to grow rapidly.

Last year, the iridium price reached a record high owing to processing problems in South Africa that restricted refined metal availability. Once they had been resolved and market liquidity improved, the price began to fall back. With a surplus market anticipated this year, **the price is forecast to trade between $5,000/oz and $2,500/oz.**



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