

Executive Summary

- PGM prices have fallen over themselves in their move lower this year and despite repeatedly looking oversold have continued to sink. Given that the markets are in supply deficits, this has been hard to justify.
- Selling pressure from deleveraging and short selling, combined with an absence of buying interest, seems to be behind the price weakness as buyers have stepped to the sidelines to buy on a hand-to-mouth basis.
- In Platinum, demand from the jewellery industry has been surprisingly weak, especially in China, while jewellery demand in other regions has been more price elastic. Industrial demand has generally held up well, but investment demand has been weak, apart from in Japan.
- In Palladium, all major areas of demand have been steady, apart from investment demand. There has been a pick-up in ETF redemptions and funds became aggressive short sellers.
- Given the significant sell-off in prices in 2015, we believe 2016 will see prices recover and that in turn is likely to prompt bargain hunting and restocking. We expect a strong recovery in investment interest and Platinum jewellery demand, while industrial demand expands slowly.
- Primary supply is expected to remain steady, but a price recovery is likely to see a pick-up in supply from recycled metal, which could rebound significantly.

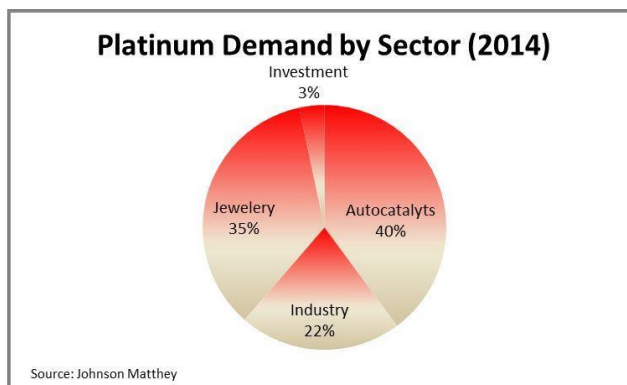
Platinum

Introduction

Platinum price weakness has been relentless, something which has been hard to justify given that the market is forecast to be in a supply deficit this year, as it has been since 2012. Commodities generally have been out of favour with investors and that has led to considerably reduced buying interest and in the absence of buying the selling has had a big impact on prices. There have been two areas where demand has been particularly weak; one is Chinese jewellery demand and the other is investment demand. Demand in other sectors and regions have tended to see moderate growth. The supply rebound from South Africa has also been a depressing factor and the weakening rand and rouble have helped cushion producers from the effect of weaker PGM prices. Had it not been for the weaker currencies then we would have expected more of a supply response. Should prices continue to fall then we would expect more production cuts, but generally we believe PGM prices are now oversold and are likely to rebound. Once a base is seen to be in place we expect a brisk rebound from oversold levels with bargain hunting, consumer restocking and investment interest all likely to chase prices higher.

DEMAND

Platinum demand dropped 5.4 percent to 8.2 million ounces (Moz) in 2014, according to Johnson Matthey (JM). This was mainly on the back of a drop in investment demand, but jewellery demand was also weaker. Demand from autocatalysts and industry continued to see growth. Platinum's diverse consumer base provides the Platinum market with numerous swing factors that help to regulate supply and demand during the economic cycle as each group can be motivated by different events. Demand from jewellery manufacturing has historically been price elastic, while demand from industry tends to be inelastic. Over the past two years, however, jewellery demand has fallen despite the weaker price, but this is down to specific factors in China. Investment demand peaked in 2013, turned lower in 2014, but looks set to be flat this year with strong demand for investment bars in Japan being countered by redemptions in exchange traded funds (ETFs).



Autocatalyst demand

Platinum's use in autocatalysts accounted for 40% of total demand and 65% of industrial demand in 2014, compared with 36% and 65% respectively in 2013. The increased percentage of total demand highlights the ever shifting demand trends in Platinum, with demand from autocatalysts and industry rising, while investment and jewellery demand fell. Autocatalyst demand consumed 3.27 Moz in 2014, which is still less than was used before the financial crisis. At its peak in 2007, some 4.2 Moz was used, which fell to 2.19 Moz in 2009, but a steady recovery has since been underway. Global auto sales continue to recover from the weakness following the financial crisis, but regionally they are not yet all back at the boom time levels seen between 2004 and 2007. US auto sales, which are running around an annualised rate of 18 million units (mu) in recent months, are now higher than the pre-financial crisis levels of 17 mu. The same is true of the UK market, but European new passenger car registrations are still below 2007 levels, although they did start to recover in 2014 and that has continued in 2015. In 2007, 14.79 million vehicles were registered in the EU, which dropped steadily to 11.55 mu in 2013, before climbing 4.8% to 12.11 mu in 2014. In the first ten months of 2015, registrations are up 8.2 percent compared with the same period in 2014; annualised, this would equate to 13.1 mu. In China, vehicle sales have seen continued growth since the financial crisis, but the pace of growth slowed in 2011 and 2012, recovered in 2013 and 2014, and has started to slow again in 2015. In 2014, 23.5 mu were sold, up from 9.4 mu in 2008, but in the first ten months of 2015 sales are up only 1.5% on the same period in 2014.

For Platinum, the European market remains the main area of interest as Europe has a preference for diesel-engine cars that use Platinum-based autocatalysts, whereas the US and Asia have a preference for petrol-engine cars that tend to use Palladium-based catalysts. Globally, Europe consumes 50 percent of the world's Platinum-based autocatalysts, with the other half used across the rest of the world. To what degree the VW scandal will change demand for diesel-engine cars remains to be seen – we expect it to have some impact, but as manufacturing production plants in Europe are geared up for diesel-engine vehicles, we expect they will continue to be produced and sold, even if vehicle prices are cut. In addition, the introduction of Euro 6-compliant catalysts should lead to more Platinum being used as vehicles are fitted with Platinum-rich particulate filters and some will also be fitted with NOx traps that use Platinum and Rhodium. Global auto sales are expected to reach 72.41 mu in 2015, up from 71.15 mu in 2014, according to Scotiabank's Global Auto Report. The main areas expected to see weakness are South America and Eastern Europe, with the all-important

Western European market expected to grow seven percent to 12.95 million vehicles. This should bode well for Platinum demand, as long as there is not too much fall-out from the VW scandal. For 2016, Moody's Investors Service is forecasting global light vehicles sales growth of 2.5 percent in 2016. Gross demand for Platinum in this industry is expected to grow around six percent in 2015 and four percent in 2016.

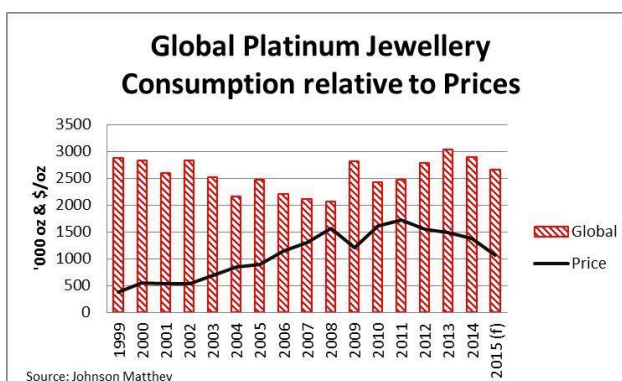
Outside the auto market, demand for heavy duty off-road vehicles and equipment have suffered significantly with the down turn in the commodity and energy markets. As producers have cut costs, demand for heavy duty off-road machinery has fallen significantly and the very size and power of these vehicles, mean they use large amounts of Platinum in their catalytic convertors. Manufacturers of heavy duty vehicles have reported significant reductions in sales in 2015 and are warning of further weakness in 2016.

Industrial demand

Industrial demand, excluding the autocatalyst industry, accounted for around 22 percent of total demand in 2014, and the main users within this sector are the chemical, electronics, medical, glass and petroleum industries. The chemical sector accounted for 31 percent of industrial demand, the electrical and medical industries consumed around 13 percent, the glass and petroleum industries accounted for around 10 percent and other applications consumed around 23 percent. Demand from the petroleum and glass industries tends to fluctuate in line with changes in capacity; use in electronics is more a function of industrial production, while the medical industry is expected to see steady organic growth. Overall though, given sluggish global manufacturing growth with the global manufacturing PMI around 51 in recent months, the outlook for industrial demand outside the auto industry is fairly subdued. Lower oil and therefore fuel prices have hit demand for synthetic fuels and as a consequence a number of gas-to-liquid refinery projects, which use significant amounts of Platinum, have been cancelled and operations at some existing plants suspended. Falling Platinum prices and capacity cuts are likely to have led to destocking, which will have added to the weaker prices, but any turn round in the economic outlook could lead to restocking.

Jewellery demand

China is by far the largest market for Platinum jewellery, consuming around 66 percent of the market in 2014, while Japan accounts for 11 percent and North America and Europe 7 percent. Jewellery accounted for around 35 percent of total Platinum demand in 2014, according to JM. You would expect jewellery demand to be price elastic and in the run up in prices in 2007 and 2008 it was, with jewellery's share of total demand falling to around 24 percent from around 44 percent in the early 2000s. It started to recover as prices pulled back, rising to 31 percent in 2010 and 2011 and 35 percent in 2012 and 2013, but oddly enough the accelerated sell-off in prices since the second half of 2014 has seen demand fall and this is mainly down to factors in China. In Asia, many consider jewellery as an investment as well as an adornment, so there has been a tendency to put off buying as the relentless price falls have countered the argument that it is a good store of value. Also along the investment theme, the booming Chinese equity market in the first half of 2015 saw household/consumer spending diverted to invest in the stock market and then the sharp correction that followed may well have reduced consumers' ability to buy luxury items. China's demand for Platinum jewellery is thought to have fallen 7.9% in 2014 and is expected to fall a further 16% in 2015.



Elsewhere, lower prices are encouraging a pick-up in demand, especially in India, where a new marketing campaign called 'Evara' is promoting the idea that parents give marrying couples a Platinum jewellery set, with items of jewellery for both the bride and the groom. Given that Platinum prices dropped below those of Gold in January 2015, it seems logical to expect Platinum jewellery to win market share from Gold jewellery. Excluding China, demand for Platinum jewellery increased 3.3 percent in 2014 and is expected to grow 6 percent in 2015, as India's Evara promotion gathers momentum.

Looking into 2016, we think the fall in demand from China in recent years may well be creating considerable pent-up demand and once the price slide is seen to have finished we would expect considerable demand from consumers as well as jewellery manufacturers as they look to restock. Given how far prices have fallen, we expect a recovery could unfold at any time. What is more, we are still bullish for long term Chinese retail/household spending on the back of rising disposable incomes and continued urbanisation.

SUPPLY

After production was hit hard by the five month strike in South Africa in 2014, output has rebounded strongly there this year and that has been helped by a weaker rand. Low prices are, however, a threat to supply, with many producers suffering with the low PGM basket price. Weaker prices have also led to a fall in the amount of Platinum returning to the market from recycling, which is proving to be price-elastic. Conversely, low prices have led to a pick-up in ETF redemptions that is adding to supply. As mentioned already, at any one time there are many cross currents affecting the supply and demand fundamentals. Mine supply fell 11.6 percent to 5.126 Moz in 2014 with the fall in South African output accounting for 97% of the fall in global supply. Output did fall slightly in Russia, Zimbabwe and in other areas, but climbed in North America.

In South Africa, we would have expected low prices to have led to more production cuts, but after two years of supply disruptions from strikes and safety stoppages, it looks as though management and the labour force have been keen to keep production running. In 2014, some 1.3 Moz of Platinum output was lost but output this year is expected to recover to reach a four-year high. As well as a full year of production at existing mines, output will have increased as Northam's Booyendal mine ramps up production and Platinum Group Metals Ltd's new Western Bushveld Joint Venture mine comes on stream in the fourth quarter of 2015. These will be somewhat countered by the closure of Glencore's Eland mine, shaft closures at some Lonmin and Impala mines and possible production losses at Royal Bafokeng Platinum Mine and at Atlatza Bokoni mine. As well as some production cuts, capital expenditure has been cut in an effort to reduce current costs so that further production cuts can be avoided during these difficult times. The combination of cutting costs and the weaker rand – that has fallen to 14.2500 from 11.7000 at the start of 2015 and 6.5500 in 2011 – has helped protect South African producers from the full extent of the drop in PGM prices. Since the end of the strikes in South Africa last year Platinum prices have fallen from \$1,520/oz to \$845/oz, a drop of 44%, while rand-Platinum prices have fallen from Rand 16,340/oz at the start of the year to 12,040/oz, a drop of 26%. This year, South African production is expected to climb 21% to 4.295 Moz, from 3.547 Moz in 2014. For 2016, there will be some additions as new production is ramped up, but also a full-year of some shaft closures will lead to some reductions so overall output in 2016 is expected to be flat. However, with prices this low, we believe there may well be room for further cutbacks. Lonmin's rights issue has been agreed by shareholders and that is likely to throw it another life-line for a while, but the low PGM basket price may well see further closures, or cost cutting measures may well lead to labour unrest. On balance, we expect production to remain generally unchanged; if prices stay this low we would expect closures, but generally we expect a price recovery will take pressure off producers.

Russia is the world's second largest producer of Platinum with an output of 709,000 oz in 2014, accounting for 14 percent of global production, according to JM. Output has generally been in decline in recent years; production peaked in 2001 at 1.3 Moz, but fell to a low of 785,000 oz in 2009. It recovered to 850,000 oz by 2011, but has since started to fall again as ore grades deteriorate. In 2015, output is expected to slip 1.4 percent to around 700,000 oz. Like South Africa, the fall in the rouble since mid-2014 will have helped offset the decline in the dollar price of Platinum. The rouble has fallen to 65 to the dollar, from around 35. Without the weaker rouble, PGM production in Russia may well have been cut as most Russian PGM production is generated as a co-product with nickel and copper and the prices of these metals are back at multi-year lows. For 2016, we expect Russian Platinum production to edge lower in line with recent trends.

Zimbabwe's production was hit in 2014 by production disruptions caused by a landslide that led to production losses, but output is expected to recover this year as Zimplats has restarted mining at one of its idled mines to make up for last year's losses. In 2015, output is expected to reach 416,000 oz, up 3.7 percent on 2014's level and 1.5% higher than 2013. The country also has ambitious plans to expand and is joining forces with Russia to develop the Darwendale Platinum project, which would have an eventual capacity of 600,000 oz per annum and a production target of 250,000 oz annually within three years. There was a question mark over future investment in Zimbabwe as the government was pushing existing producers in the country to build a refinery. As an encouragement the government introduced a 15% tax on raw material exports, but this has since been suspended as some producers halted exports in April. Producers are still reluctant to build a smelter, low prices are, if anything, seeing them cut capital spending and they have voiced concern that there is not the volume of mining in the country to make a smelter economically viable. As such, although output may be on the rise for now, we would be wary in case political intervention steps into the arena again. For 2016, we would expect output to be flat.

North American output in recent years has climbed; it rose 8 percent in 2014 to 339,000 oz, providing around seven percent of global Platinum production. Output is expected to remain stable, although with nickel prices falling to low levels the incentive to increase output will be minimal – should prices continue to fall then cutbacks could be made, which in turn would hit PGM output, although cutbacks at this stage look unlikely.

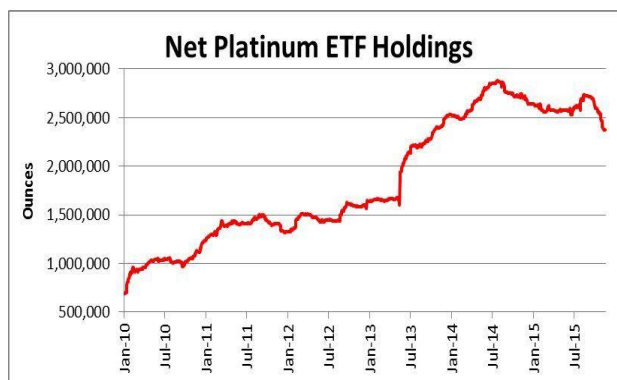
Recycled material

Recycled Platinum comes from old autocatalysts, old jewellery and more recently from recycled electrical equipment. This sector of supply is a growth market in the long run as more of the vehicles that are reaching the end of their life-cycles now have autocatalysts and the introduction of new legislation in some countries (which means electrical waste has to be recycled rather than sent to landfill) has also increased the amount of metal returning to the market. That said, supply from recycling is proving to be quite price-elastic with output falling in 2015 as PGM prices have fallen. With strong auto sales being seen in the US and Europe, you would expect recycling rates to be up and this may be the case, but it appears that those processing scrapped cars may be hoarding the spent autocatalysts, waiting for a price recovery. Scrap from old jewellery is also price elastic, so the amounts of scrap from jewellery climbed between 2010 and 2012 when precious metals prices were rising strongly, but rates have slipped recently mainly as a lot of the old jewellery was sucked out of the woodwork when prices were high, but low prices are now making it less attractive to cash-in old jewellery items. In addition, although Platinum prices are trading below those of Gold, at jewellery stores in China Platinum jewellery pieces tend to have a bigger mark-up than Gold pieces, so when old Platinum jewellery is used to exchange for new pieces, the discount between old pieces and new pieces is high and that has dissuaded jewellery exchanges. It also further tarnishes the idea that Platinum jewellery is a good investment. Recycling from electrical waste is still a small market but one that is steadily growing, being expected to reach 29,000 oz in 2015 from 10,000 in 2010.

For 2016, we expect supply from recycling to pick-up significantly as we expect a recovery in prices to break the log-jam of spent autocatalysts being hoarded by scrap dealers. With Platinum supply from recycled autocatalysts expected to drop some ten percent in 2015, and with recycling picking up around seven percent per annum in former years, a price recovery could lead to a significant rebound in secondary Platinum supply as hoarded material is pushed into the recycling chain along with newly scrapped material.

Investment demand weakens

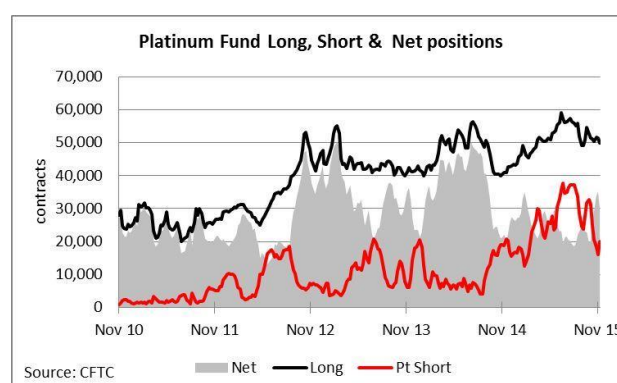
Investor interest in precious metals has been at a low ebb in 2015, there have been numerous reasons not to invest, while there have been many opportunities to invest in other asset classes. For Platinum, the rebound in mine supply, the weak Chinese and emerging market auto sales, the stronger dollar and expectations for a US rate rise have all weighed on investors' sentiment. Initially, holdings in ETFs held up well, but once redemptions started to be seen, then that was yet another negative factor as it meant



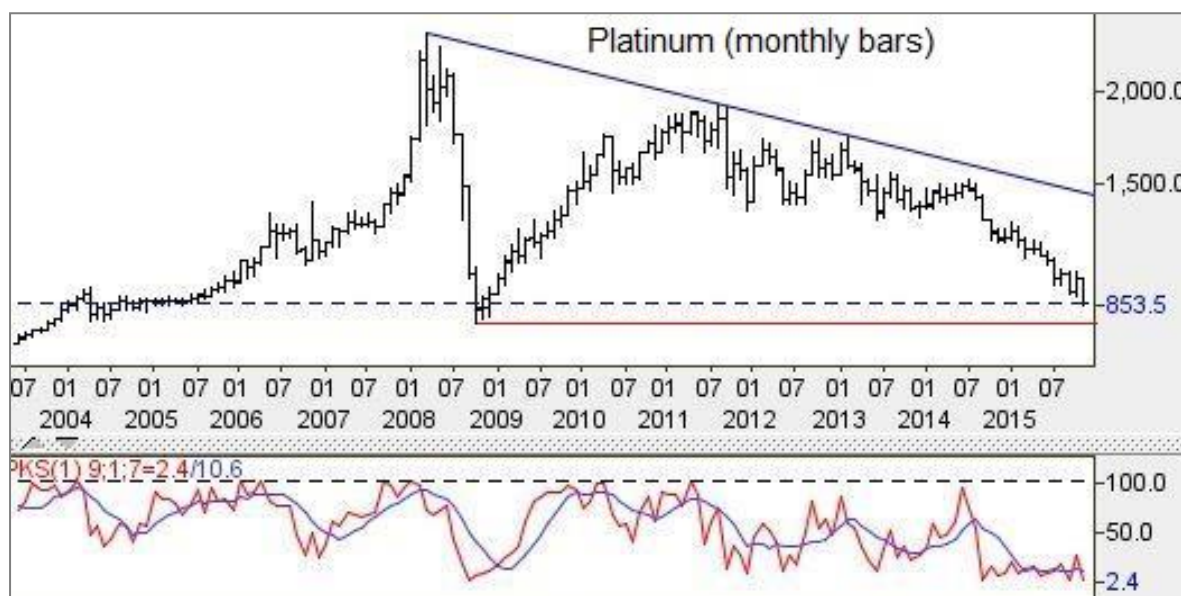
another increase in Platinum supply. The most bullish aspect of the market is how low prices have become, but that has not yet attracted investor buying. Investor interest in ETFs gathered pace during the strikes in South Africa in 2014, but once the strike was settled, profits were taken and holdings dropped accordingly. Holdings peaked at 2.88 Moz in July 2014, dropped to a low of around 2.53 Moz in mid-2015, rebounded in August, as precious metals prices rallied on the back of China's currency devaluation, before heading lower again once it looked as though the Fed would increase interest rates in December. Despite low prices, it now looks as though redemptions are gathering pace and that could become an even bigger bearish issue considering investors still own 2.4 Moz. Since the July peak, some 500,000 oz of Platinum have been sold from ETF holdings. Most regional ETFs have seen redemptions that have varied between 13 and 45 percent, with South Africa's losing 17 percent, but that was the biggest in volume terms with 194,000 oz redeemed. The reason for the concentration of redemptions in South Africa we expect is due to the run up in rand Platinum prices after China's devaluation that lifted precious metals prices, while lowering emerging market currencies, thereby giving South African investors a good exit. The main region to buck the trend has been Japan, where the Mitsubishi yen denominated ETF has increased 150 percent, with 39,600 oz added. In addition to buying via ETFs, Japan has also been a strong buyer of physical Platinum bars. Japan's investment demand is estimated to have jumped to 395,000 oz in 2015, from just 20,000 oz in 2014 and an average of 75,000 oz between 2010 and 2014. Given how low prices are and the fact the market remains in a supply deficit, we expect investor interest to return, but if prices stay low then ETF holdings will remain a potential source of supply.

Funds

The net long fund position (NLFP) was strong in the first half of 2014 as you would expect with the strikes in South Africa. As the shaded area on the chart shows, the NLFP dropped sharply in August 2014 on the back of both long liquidation and short-selling. The short-selling has generally continued until the end of the first half of this year, while the long



liquidation had run its course by the end of October 2014. In the first half of 2015, both the longs and shorts were adding to their positions and the market became more polarised as a result. During the second half, both longs and shorts have been reducing exposure. The shorts have reduced exposure from record high levels, while there has been some stale long liquidation too. As of mid-November, the gross fund long position is still quite elevated, which shows a degree of comfort that prices will rebound, while the gross shorts, although only holding half of their peak holding, are still holding a relatively large position compared with recent years. This suggests there may still be considerable room for short-covering should sentiment improve.



Technical

Platinum prices continue to fall and have given back most of the gains from the 2008 to 2011 rally. Prices have been as low as \$845/oz, the low in 2008 being \$745/oz. Prices are now back at levels that were just below the top of the range that prices held between 2004 and mid-2005. The lower levels of the range in that period were between \$815/oz and \$758/oz. With the downward trend still dominating the chart and the fact it has accelerated since July 2014 there is little to stand in the way of the lows between \$815/oz and \$745/oz being revisited. For a long time now the stochastics have been holding down in at a low level, suggesting little buying interest around, so further weakness cannot be ruled out. Once this sell-off has run its course and prices start to climb again, then a 38.2 percent Fibonacci retracement of the drop from the 2011 highs to the present low (\$845/oz) would see prices back around \$1,255/oz. This would take prices back to just below the series of lows seen between 2011 and 2013, above which we would expect considerable resistance.

Conclusion and Forecast

With the market expected to be in a supply deficit in 2015 for the fourth consecutive year, it is difficult to justify these low price levels. Prices are now well below the levels where they were trading in the latter part of 2005 and 2006, before the power related issues in South Africa drove prices over \$2,000/oz in 2008. The rebound in South African production has been a major negative on sentiment this year and the weaker rand and rouble have helped South African and Russian producers weather the downturn in commodity prices. One of the main bearish factors, however, has been that demand had generally not been price elastic, especially in China, and there are exogenous reasons for that. The government's anti-corruption drive has weakened demand for expensive gifts and a lot of individual discretionary spending seems to have been sucked into the equity market, where a good

deal was no doubt lost. In turn this has also hit demand for jewellery. In addition, the relentless fall in prices has also made investors think twice about buying the metal. Other areas of demand have generally held up well and have seen some growth and that is expected to continue next year. For 2016, we believe prices will bottom out and from these low levels a price recovery will lead to a revival in Chinese jewellery demand and a pick-up in investment demand across a broader base (other than just in Japan as has been the case this year), while we expect mine supply to be stable, but we would expect a pick-up in secondary supply that will lead to an overall pick-up in supply as the year progresses. Prices, however, should put in a strong recovery as bargain hunting and an end to destocking boost apparent demand. Allowing for prices to head lower initially after a Fed interest rate rise, we would expect a trading range between \$800/oz and \$1,200/oz, with prices averaging around \$1,050/oz.

Palladium

Palladium's price performance seems at odds with the metal's fundamentals, the market having been in a supply deficit for four years (including 2015) with the last surplus seen in 2011. Prices have fallen in 2015, as the supply deficit has shrunk, but with the market still set to be in a sizeable deficit in 2015, it seems odd that prices have fallen as much as they have. The reason for the weakness seems to be more due to the lack of buying interest, as sentiment across the commodity market remains washed-out. Prices climbed in 2012, 2013 and for the first eight months of 2014, to a high of \$911.50/oz from a low of \$535.50/oz in 2011; they have since fallen heavily to \$521/oz. Admittedly, the end of the protracted strike in South Africa in 2014 led to a price correction, which is understandable, but the extent of the follow-through weakness has been difficult to justify basis the fundamentals. Prices did rebound strongly in late-August to early-October, climbing to \$724/oz, but the market has since given back all those gains. Indeed, in recent months Palladium prices have been below the lows seen in 2011 when the market was last in a supply surplus.

The bearishness seems to have stemmed from a combination of factors including a recovery in South African production since the strikes ended last year, concerns about Russia's central bank selling stockpiled metals to Norilsk and slow economic growth, especially in China, with the focus on the stalling of growth in auto sales. In turn, these factors, combined with commodities in general falling out of favour with investors, have prompted investors to take profits, which has been most noticeable with the pick-up in ETF redemptions.

On balance though, it appears that Palladium prices have been dragged lower as investors have reduced exposure to commodities and as falling prices have encouraged destocking by those using the metal. For 2016, we would expect many of the bearish pressures to subside, but we are not overly optimistic about a strong recovery in demand, so although prices may get some lift due to having become oversold, they may end up trading sideways until a stronger global recovery gets going. Investor interest is expected to become more of a swing factor now as further redemptions could add to supply, while should low prices and production cuts across commodities see investors interest for commodities pick-up, then investors may see Palladium prices as having potential to recover.

Autocatalysts

Palladium's use in autocatalysts has grown in importance in recent years as there has been strong organic growth in auto sales in emerging markets up until this year and the substitution of Palladium for Platinum in autocatalysts for diesel-engine vehicles has led to stronger growth too. Autocatalysts accounted for some 70 percent of Palladium demand in 2014 and with investment demand for Palladium falling this year, autocatalysts are expected to account for some 80 percent of total demand. With Palladium autocatalysts used mainly in petrol-engine vehicles, the state of auto sales in areas outside Europe is all important. Diesel passenger vehicles are popular in Europe, so the

European auto market influences Platinum more than it does Palladium. Auto sales in the US are going from strength to strength and are now higher than they were before the financial crisis in 2008-2009. In the first ten months of 2015 US auto sales, annualised, have averaged 17.3 million units (mu), up from 16.4 mu in the same period in 2014 and 15.5 million units in 2013. Despite strong US sales, the Palladium market has become worried about the slowdown in Chinese auto sales this year. After years of double digit growth the vehicle population in China has grown rapidly, but in recent years sales have been more volatile and this year some months have seen declines compared with the same period a year earlier, which meant by September year-to-date sales were up just 0.3 percent at 17.06 mu. A 13 percent rebound in sales in October, on the back of the government halving sales tax, meant year-to-date auto sales growth picked up to 1.5 percent, but when compared with 9.8 percent in the same period in 2014, it is understandable that the market has become concerned and why that has weighed on investor sentiment. Much will now depend on whether the government incentive fully revives the market, or whether it does so only for a short period. Structurally, however, we think we should be braced for slower vehicle sales in China as various cities have policies in place to restrict the number of cars on the road in an effort to control pollution and traffic congestion. Also, after years of high growth rates, there is now a much larger pool of second hand cars available for sale, which is likely to erode sales of new cars. In China, the used car market is half the size of the new car market; in most other countries it is three times the size of the new car market. Sales in other Bric countries have also collapsed due to weaker economies and currency weakness. Sales in Russia and Brazil are down 33 and 23 percent in the first nine months of 2015, compared with the same period in 2014. As such, the growth in demand for Palladium from the autocatalyst industry may well slow for structural reasons, independently from cyclical growth.

The degree to which Palladium has won market share from Platinum is shown by the fact that the amount of Platinum used in autocatalysts has dropped 21 percent since 2007, while the amount of Palladium used in autocatalysts has increased 63 percent over the same period. That said, the drop in Platinum's use will not just be down to substitution and thrifting, it will also be due to the fact that the European auto market was in the doldrums until 2014; with Europe's preference for diesel cars, it means the lower demand for autocatalysts has affected Platinum-based catalysts more than Palladium-based ones.

As discussed in the Platinum section, the outlook for the auto industry is for global sales to increase 1.8 percent in 2015 and, according to Moody's Investors Service, by 2.5 percent in 2016. In terms of gross demand for Palladium, the auto industry is expected to grow around one percent in 2015 and in 2016, depending on whether China sees positive auto sales growth. We think it will, but growth will be relatively subdued at around three percent.

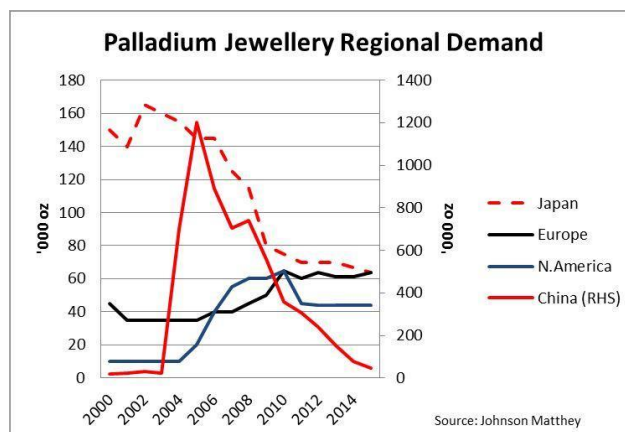
Other industrial uses

Palladium's other industrial uses include electronics, industrial manufacturing including chemicals and pharmaceuticals, other emission control equipment for factories, and petrol-powered machinery, such as marine engines and garden equipment. In 2014, these industries accounted for 20 percent of Palladium demand; in 2015, with less investment demand, they are expected to account for 22 percent. In this category, which consumed some 2.033 Moz in 2014, electronics is the largest user, accounting for 52 percent, followed by dental (23%), chemical (20%) and other uses (5%). Use in electronics and dentistry is in decline as other materials are gaining market share, while use in the chemicals industry is growing as Palladium is used to make catalysts for industry and manufacturing. As emerging markets grow, new manufacturing capacity is built so this area of demand is expected to see ongoing organic growth. Another growth area is its use in water purification, where Palladium is used to clean contaminated groundwater. Palladium's use in electronics has declined steadily to 1.05 Moz in 2014 from 1.55 Moz in 2007, and dentistry now uses around 0.47 Moz, down from 0.63 Moz in 2007 and over one million ounces prior to 2000.

Although demand is slipping in the electronics industry and in dentistry, medium term we expect other applications, such as water treatment and the tighter emission restrictions for factories and petrol-powered machinery, to lift demand.

Jewellery demand

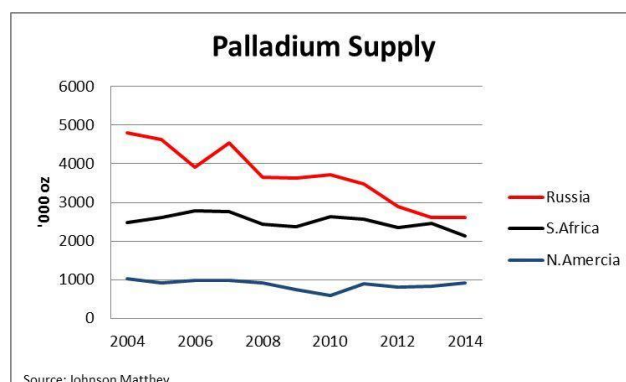
The use of Palladium in jewellery is in decline; it consumed 2.6 percent of total Palladium demand in 2014, down from 19 percent in 2005. Needless to say, Palladium jewellery has had an interesting past ten years or so. Demand took off in 2004 as higher Platinum prices started to squeeze the profit-margins of Platinum jewellery manufacturers, especially in China. Platinum jewellery has been a swing factor within the Platinum market for years, so when prices started to climb above \$850/oz in early 2004, demand for Platinum jewellery started to fall and jewellery manufacturers started to use Palladium, which in early 2004 was trading around \$200/oz. The potential profit margins meant demand soared. In 2003, some 250,000 oz of Palladium was used in the jewellery industry; it climbed to 925,000 oz in 2004, 1,425,000 oz in 2005 and then averaged 1,025,000 oz between 2006 and 2008. But, as the chart shows, the bottom has fallen out of the market in China with some jewellers scrapping jewellery pieces as they are not selling. In other countries demand has flattened as the metal has carved out a niche market as a metal for men's jewellery. However, Japan's interest for Palladium jewellery seems to be waning again and that might be happening as Platinum's premium to Palladium has eased. The premium is last at \$290/oz, down from \$430/oz a year ago, from \$700/oz at the end of 2013 and closer to \$1,000/oz in 2012.



For 2015 and 2016, we expect Palladium demand from the jewellery industry to continue to fall, albeit at a slower pace as Chinese demand for pure Palladium pieces of jewellery drops to zero, but its use in an alloy to make white-Gold continues. Given Japan's affinity for Platinum, we expect the fall in Platinum prices to below those of Gold to boost Platinum sales at the expense of Gold, white-Gold and Palladium. Given the experience Chinese jewellers have had with Palladium jewellery, we would be surprised if the experiment was repeated any time soon. For now, we expect the niche markets for Palladium jewellery in Europe and North America to continue, but they may face competition now that the price differentials between Gold, Platinum and Palladium have narrowed.

Supply

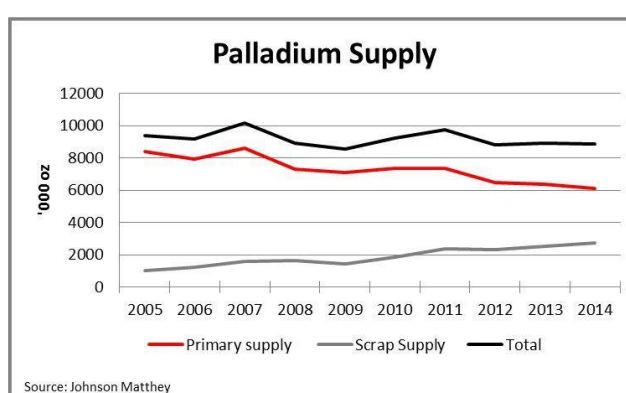
Total Palladium supply, including recycled metal, amounted to 8.86 Moz in 2014, down from 8.90 Moz in 2013, a drop of 0.5 percent. Mine supply accounted for 69 percent and recycled material 31 percent, according to Johnson Matthey (JM) data. As the chart opposite shows, supply from Russia is in decline; output in South Africa dropped in 2014, but will have recovered this year to around the average seen between 2010 and 2013, while in North America production continues to edge higher.



Supply has fallen in recent years for two reasons. Firstly there has been a structural change in that Russian sales from stockpiles have been in decline. Between 2004 and 2010, sales from stockpiles averaged 1.2 Moz per annum. They dropped to 0.78 Moz in 2011, 0.26 Moz in 2012 and 0.10 Moz in 2013 and appear to have since dried up, with the view being that surplus stocks have been depleted. Secondly, last year saw production fall 13.7 percent in South Africa because of the long strike, but output in other regions did increase 1.7 percent. The net effect was that mine supply fell 4.2 percent to 6.104 million tonnes, according to JM.

Mine output has rebounded in South Africa this year, with output expected to be around 2.55 Moz, higher than in 2014 and 2013, but around the level seen in 2011. Production elsewhere is expected to slip as lower prices have led producers to cut costs. For 2015, while output in South Africa climbs 420,000 ounces, output in other areas is expected to drop 74,000 ounces. Given low PGM and base metal prices, we would not be surprised if production suffered further in 2016 as producers continue to try to cut costs, which may well lead to further closures of mine shafts and possibly at nickel mines where PGMs are often a by-product.

Other than potential for cuts to primary production, secondary supply is likely to become the main swing factor in overall supply. Low prices this year have seen secondary supply squeezed with some collectors of scrap PGMs reportedly hoarding the scrap, waiting for prices to recover. As such, secondary supply seems set to become more price elastic. Estimates suggest scrap shortages will lead to 235,000 oz less recycled metal reaching the market this year, but as the scrap has been generated, but not processed, there is potential for a larger than normal pick-up in recycled metal reaching the market next year should prices recover enough to encourage scrap collectors to sell the scrap they have hoarded.



Another potential extra source of supply could come from Norilsk, as earlier in 2015 it is believed that the Russian Central bank agreed to sell Norilsk some Palladium from its stockpile. So far Russia's Gokhran, the State Precious Metals and Gems Repository, is believed to have sold two tonnes to Norilsk. This is considerably less than the market expected, but it may be sales will be made in batches. The motives behind such a deal remain unclear, but the fact Norilsk is getting extra supply mean, we think, there is more chance of the metal being made available to the market than had it stayed with the central bank. That said, as the world's largest Palladium producer, Norilsk would have little interest in flooding the market with Palladium.

Supply of Palladium from recycled material is now roughly equal in size to the output from Russia or South Africa and it is a growth market. The global vehicle population is growing and a higher percentage of vehicles that are now scrapped were originally fitted with Palladium autocatalysts. Palladium should also benefit starting now and in the years ahead from the substitution that has taken place since 1999, where Palladium has gained market share from Platinum in autocatalysts. In time this should mean even more Palladium is recycled. As mentioned above, supply from recycled material is likely to have dipped in 2015, as low prices have seen scrap collectors hold on to material, but overall this is a growth area of supply. This year Johnson Matthey expects 2.517 Moz to be recycled, down from 2.752 Moz in 2014, but up from around one million ounces in 2005.

With production in South Africa rebounding in 2015 after the losses due to strike action last year, the country is expected to account for 39.5 percent of mine supply and 28 percent of total supply. Low

prices have hit South African producers hard this year, but producers have been somewhat cushioned by the weaker rand. Times are difficult though, and if prices stay down at these levels then further production cuts are likely. With capital expenditure being reined in as producers cut costs, output is likely to suffer in the years ahead, which will make it harder for producers to respond when supply needs to be increased.

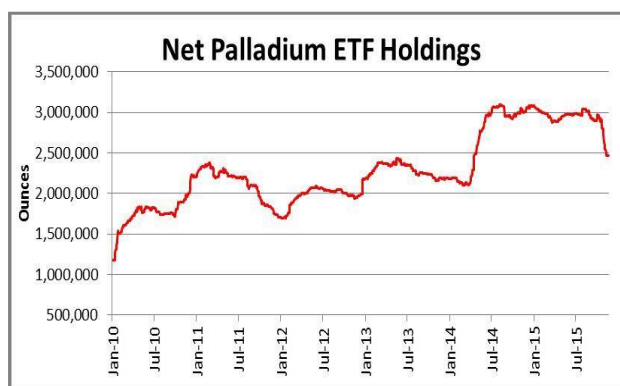
North American supply accounts for 13.5 percent of total mine production and production seems set to remain steady as there have been few disruptions. However, with a lot of Palladium being produced as a by-product with nickel and copper, which is similar to the situation in Russia, any production cuts in these metals could see Palladium output fall. Nickel prices have recently fallen to levels not seen since 2003, so a producer response to low prices is possible.

Palladium output in Zimbabwe climbed 21 percent to 323,000 oz in 2013, but it has since stabilised, although there is room for production to edge higher in line with higher Platinum output. That said, output in the country could be disrupted again if the government is not satisfied that producers are committed enough to build the refinery it wants. The government suspended a 15 percent tax on exports of raw materials earlier this year as producers needed more time, but given low PGM prices and the need for producers to cut capital expenditure, it may well be that plans to build the refinery become delayed. This is especially so as producers in the country do not seem convinced a local refinery will be cost effective. Given the current set-up, we would not be surprised to see further discontent between producers and the government that could lead to supply disruptions.

In 2015, Palladium supply is expected to increase by around 110,000 oz, some 1.5 percent, mainly on the back of the recovery in production in South Africa, which will be offset by lower supply from recycled metal. For 2016, we believe there may well be further output losses from production cuts, but as that is likely to lift prices, it may in turn see supply from recycled metal pick-up, especially as scrap collectors are believed to have been hoarding scrap this year. On balance, with metal prices as low as they are, we think production cuts will lead to supply falling again in 2016, after rebounding in 2015.

Investment demand slows

ETF investors' interest picked up significantly during the strikes in South Africa last year and investors remained committed for over twelve months after the strike ended. Redemptions only started to be seen in late-October 2015, after the FOMC meeting made it more likely that interest rates would rise in December. As the chart shows, ETF holdings have since plunged, falling to 2.46 Moz from 2.95 Moz in the first half of October. The

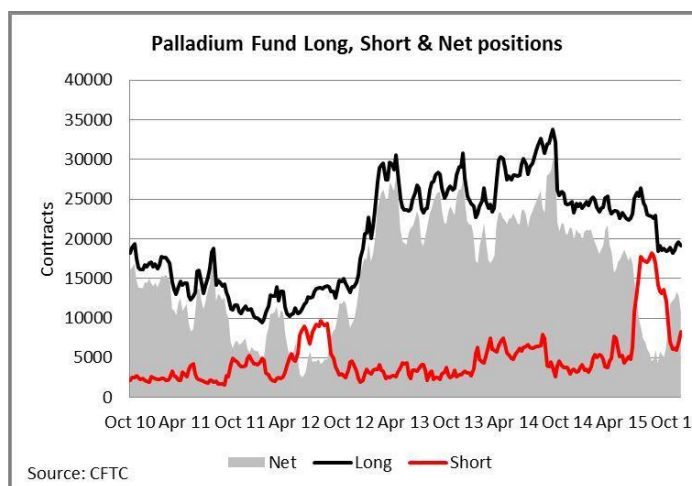


weakness was not just Palladium orientated, the more hawkish stance by the Fed zapped confidence across metals. Interestingly, the bulk of the redemptions came from South African ETFs. This we think is due to the fact that the African ETFs were only launched in April 2014 when Palladium prices were around Rand 8,000/oz and, having seen rand prices down to as low as Rand 6,780/oz in August, investors have taken advantage of the recent rally to take profits. The rally was triggered by the devaluation of the Chinese yuan that led to a sell-off in the emerging market currencies and a rally in precious metals prices. As a result, Palladium priced in rand got a double boost with prices rallying to Rand 9,700/oz; they have since fallen back to Rand 7,800/oz. Since the end of September, out of 506,000 oz of redemptions, 412,715 oz (some 82 percent) have been in the South African ETFs. This suggests most investors in other countries have remained committed to their holdings in the ETFs.

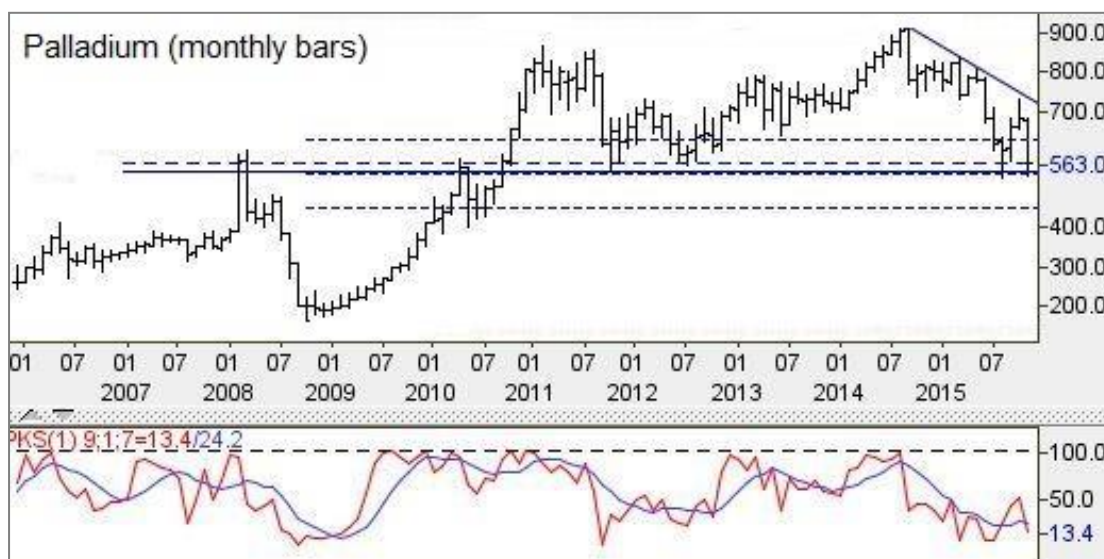
Key will be whether these low prices start to attract more investors. Given low prices and a supply deficit, we would expect investment interest to recover fairly quickly once it looks as though prices have found support.

Funds

The funds have been active in Palladium over the past year, firstly the longs started to take profits soon after the South African strikes finished and they have been cutting exposure since. The shorts started to aggressively sell the market in May 2015 – whether this was on the back of poor Chinese auto sales is unclear, but the short selling continued until prices started to rebound in the aftermath of China’s currency devaluation, which triggered a rebound in Gold prices, with the PGMs following suit. While the longs have stabilised in recent weeks, the noise in the market has been driven by the action of the shorts. The gross short position returned to the upper levels of its lower longer term range seen before May 2015 and although shorts have increased exposure recently, we would be surprised if there was much interest to short the market further at these price levels. In May, when the short selling gathered pace, prices were around the \$760/oz level. The combination of low prices and a gross long position that is near the lowest it has been for three years may well mean there is room for investors to get bullish again; this will be even more likely if it looks as though further production cuts are going to be made.



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Technical

Palladium prices have been trending lower since September 2014 and prices have breached support seen in 2011 and 2012, which lay between \$536/oz and \$555/oz, but prices are finding some support in that area now. Recent lows are also around the resistance levels seen in 2008 and early 2010, so

the combination of former resistance and former support either side of the \$550/oz level may mean prices are able to build a base in this area. The stochastics have been trending lower; they turned higher in the August to October rally, but have now turned weaker again, so it does not look as though prices are about to run higher any time soon. On balance we would expect continued good support in the \$500-\$550/oz area with resistance just above \$700/oz from the down trend line.

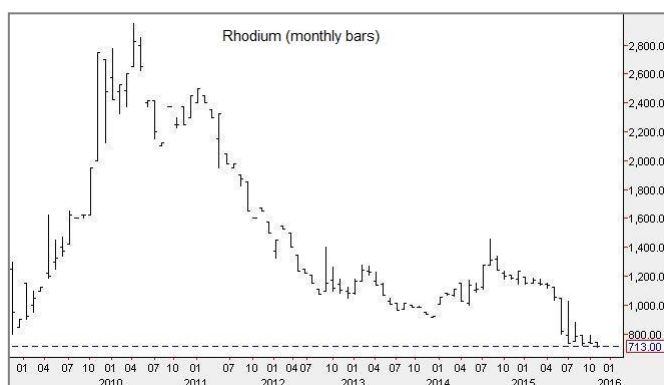
Conclusion and Forecast

Palladium's supply fundamentals look supportive, the market remains in a supply deficit and low prices may well see further supply responses, either from primary producers, or via cutbacks to by-product production. While prices remain low, secondary supply is also likely to be weak, but is likely to be price elastic on the upside. The outlook for industrial demand is subdued, as Chinese auto sales are likely to remain weak in 2016, although we expect a gradual improvement in industrial output from other uses. Given low prices and a fall-off in investment interest in 2015, we would expect investment demand to become a strong swing factor once prices look set to recover.

For 2016, we would look for prices to trade in the \$500/oz to \$750/oz range, with prices averaging around \$650/oz.

Rhodium Outlook

Rhodium prices picked up in 2014 in line with Platinum and Palladium due to the strikes in South Africa. Given that nearly 80 percent of primary supply comes from South Africa, it is surprising Rhodium prices did not react more on the upside, but like the other PGMs prices have gone on to sink to fresh multi-year lows in 2015 and at the time of writing are on the lows at around \$708/oz and have fallen below the previous lows of \$915/oz in December 2013.



As the chart shows, prices had been in the doldrums for a long time as during the financial crisis the slump in vehicle sales had led to an oversupply situation, which meant producers had little option but to stockpile material. Unlike Platinum, Palladium, Gold and Silver, investment demand for Rhodium is limited. There is a Rhodium ETF and investment bars are available, but the metal could not be considered a mainstream investment. That said, the fact there are vehicles to invest in Rhodium may see investor interest pick-up once the fundamentals turn more bullish as investors would no doubt like the fact that Rhodium prices rallied to \$10,000/oz in 2008.

Demand

Rhodium's biggest market is autocatalysts where 82 percent of metal is consumed, with chemicals using 9 percent, glass 5 percent, the electrical industry 0.5 percent and other industries using around 3 percent. Although the high prices in 2008 did see demand drop sharply in 2009 to 716,000 oz (from 897,000 in 2008 and 1,036,000 oz in 2007), demand has recovered steadily since. In 2010 demand was 887,000 oz and it has climbed each year since, to reach 1,003,000 oz in 2014, but it is expected

to fall to 983,000 oz this year due to a drop in demand from glass manufacturers, according to Johnson Matthey.

With the market in oversupply between 2008 and 2012 stocks built up, but with the swing into a supply deficit in 2013 and with the deficit enlarged by the strike in South Africa in 2014, the fundamentals improved slightly. However, the combination of a recovery in South African production and weaker demand this year has led to the market being in a supply surplus again. The situation would have been worse had scrap collectors not hoarded material due to the low metal prices.

The outlook for Rhodium demand in 2016 is not overly bright as there are signs of slower growth in Europe vehicle sales – registrations slowed to 2.6 percent in October, compared with January to October registrations of 8.2 percent, so we wait to see if October was just a blip or a sign that the tide is changing. Chinese auto sales were also slowing significantly, until the government incentives were initiated in October, but again it is now a case of wait and see if the government measures turn sales higher again. Stricter environmental standards for diesel engines in Europe will lead to stronger growth for Rhodium, but most Rhodium is used on petrol autocatalysts, so the pick-up in use from diesel vehicles will not be that great.

In other industries, demand from the glass industry is expected to recover having dipped in 2015 on the back of destocking as old glass technology was dismantled, but as new capacity is built Rhodium demand is likely to pick-up, especially as Rhodium prices are below those of Platinum and glass manufacturers can alter the mix of Platinum and Rhodium they use.

Indeed, with Rhodium prices below those of Platinum and nearer to Palladium, weightings of Rhodium in catalytic convertors may pick-up as to various extents all three PGMS can be substituted for one another.

Investment interest

Investment interest in Rhodium may well pick-up if investors start to see prices recover. Whereas before the launch of the ETF in June 2011 it was difficult to invest Rhodium, the ETF has changed that. The ETF holds around 106,000 oz of Rhodium, down from 126,000 oz a year ago.

Supply

Rhodium is mined as a co-product along with Platinum, Palladium and other PGMs, so output cannot easily be tweaked to match demand, hence after the financial crisis the surplus built up as producers were unable to regulate Rhodium mine output on its own. Mine output peaked in 2007 at 824,000 oz, it dropped to 695,000 oz in 2008 when power outages in South Africa hit production (which led to the jump in prices to \$10,000/oz), but rebounded to 734,000 oz in 2010, before slipping to 694,000 oz in 2013 and 623,000 oz in 2014, according to Johnson Matthey data. Production in 2014 fell as a result of the strikes in South Africa, but it has picked up significantly this year to an estimated 736,000 oz.

South Africa is the largest producer, supplying around 80 percent of mine supply in recent years and 57 percent of total supply, including supply from recycled material. Russia is the second largest producer accounting for 11 percent of mine supply, while Zimbabwe is the third largest producer providing 5 percent of mine output and North America produces 3 percent. When recycling is taken into account then recycling is the second largest source after South Africa's mine supply, being equivalent to 38 percent of mine supply, while it accounts for 28 percent of total supply.

For 2016, mine supply is not expected to change much, but like the other PGMs supply from recycled material could pick-up significantly if prices entice recyclers to release metal into the market.

Rhodium scrap is mainly collected from recycled autocatalysts and the amount of metal from this source is likely to increase as the global vehicle population grows. Legislation on the recycling of electronic-scrap means more scrap will also be recycled in the years ahead.

Balance

After 2007 the Rhodium market moved into a supply surplus until 2013 when South African supply was affected by strikes and safety stoppages, as was the case in 2014 as well. During this time it is estimated that the surpluses led to the build-up of some 500,000 oz of Rhodium; in 2013 and 2014, supply deficits have led to a drawdown of some 100,000 oz, which means stocks are still high.

Rhodium supply is estimated to amount to some 1,016,000 oz in 2015, including recycled material, while demand is forecast at 983,000oz, giving a supply surplus of 33,000 oz. With potentially the net stock build in recent years now being some 433,000 oz, including 2015, it is going to take a considerable time before the market becomes tight again.

Conclusion

The outlook for Rhodium demand is tied in with the global outlook for vehicle sales, so for next year we would expect only a slight pick-up in industrial demand. A pick-up in supply from recycling may well mean another year of supply surplus, in which case prices are likely to struggle on the upside, unless investment interest grows, or consumers restock. We envisage prices holding in the \$600 to \$1,200/oz range in 2016.

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