



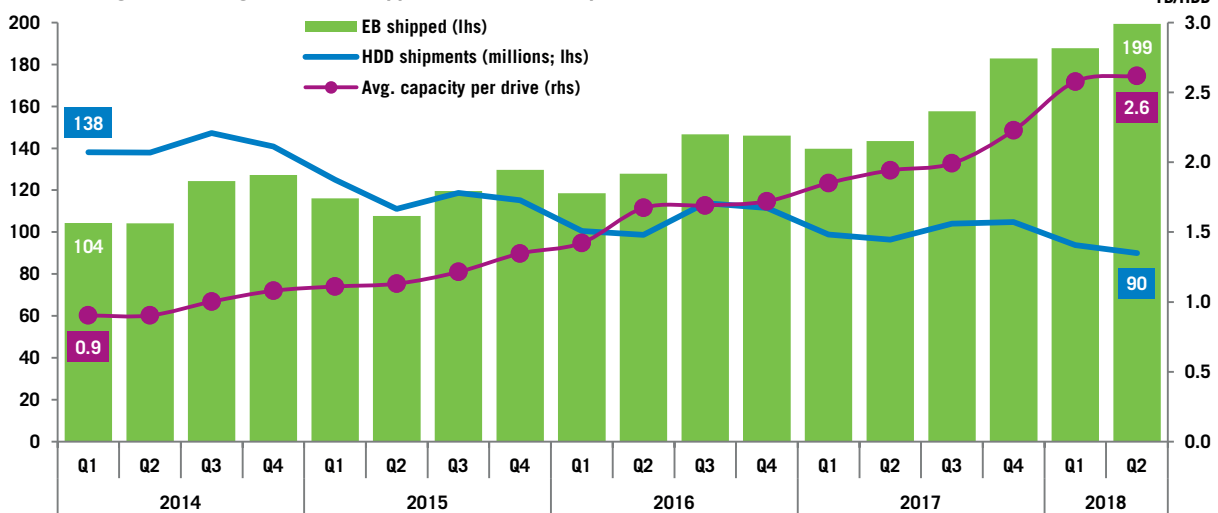
MARKET SPOTLIGHT

Cloud storage expansion positive for ruthenium demand

Hard disk drive (HDD) shipped memory capacity continues to increase despite an ongoing decline in overall unit sales. The world's two largest HDD manufacturers, Western Digital and Seagate (together >75% of the market), reported growth in HDD storage capacity – exabytes (EB) – shipped in their FY2018 results for the year to the end of June. In capacity terms, shipments were up 24% and 29% respectively year-on-year, but combined unit deliveries decreased by an estimated 3%. Overall, global shipments fell by around 7% to fewer than 400 million drives in FY2018, the lowest 12-month total in over a decade.

EB growth is largely a result of greater shipments of high-capacity enterprise HDDs, used for cloud storage and data centres. Western Digital's enterprise unit sales were 13% higher and its data centre EB shipments were up 60% from FY2017. As a result, the average capacity of all the HDDs shipped by the company in FY2018 jumped approximately 33% year-on-year to 2.4 terabytes (TB)/HDD, while Seagate's average rose 29% to 2.2 TB/HDD. This suggests that **the average number of disks (platters) per HDD has increased.**

Western Digital and Seagate HDD EB shipped vs. total HDD shipments



Source: SFA (Oxford), Western Digital, Seagate. Note: 1 EB = 10¹⁸ bytes = 1 million TB (1 TB = 10¹² bytes)

Higher capacities and more platters equal higher PGM content per drive. An increase in the average number of platters per HDD should be beneficial for demand of the PGMs used in the platters (platinum and ruthenium) and the accompanying read-write heads (iridium). Currently, HDD platters comprise just 2% of platinum usage but ~8% of ruthenium demand and therefore, as a reasonable proportion of demand in a deficit market, **any meaningful increase in HDD consumption could have a significant impact on the ruthenium market,** which is ~7 times smaller than that of platinum.

HDDs are a pillar of ruthenium demand. A high price might encourage thrifting, but current and next-generation technologies are likely to continue to use ruthenium. Requirements for cloud storage capacity are forecast to continue to expand along with growth in big data and personal data storage needs.



PRECIOUS METALS REVIEW

79 Au Gold

	Close	Weekly change	High	Date	Low	Date
\$/oz	1,212	-0.47%	1,217	09/08/2018	1,206	10/08/2018
€/oz	1,063	1.26%	1,065	10/08/2018	1,041	07/08/2018

Investors remain ambivalent to gold as they can achieve better returns on equities and bonds, for now. The preferred 'risk-off' asset was US Treasuries. The 10-year yield stayed close to 3% as a record \$28 billion of the notes were auctioned last Thursday. The 30-year and 3-year Treasury sales were also all-time and 8-year highs respectively. Meanwhile, the 'risk-on' option of US equities drew in funds as they gained last week on economic strength and a reasonably good earnings season. The S&P 500 Index moved within touching distance of its January all-time high. This occurred in spite of the finalisation of \$16 billion of US tariffs and China announcing it is prepared for a "protracted war", a statement supported by strong growth in China's trade data. Negative gold sentiment spread as speculators pushed shorts on futures to 45% of their total contracts and ETF holdings declined 360 koz, although this sets up the possibility for a sharp price rally should sentiment change, even moderately.

US sanctions on Iran increased investor demand but had an opposite effect on Turkey, while high local prices reduced net demand in both. The Iranian government is attempting to maintain the country's currency at around 40,000 to the US dollar but reports suggest the unofficial price is in excess of 100,000. The World Gold Council showed Iranian investment demand surging by over 200% year-on-year in Q2 of this year, but a 35% fall in jewellery demand puts total Q2'18 demand up 43% to 21.7 tonnes. The Turkish lira was down 73% year-to-date as of Friday, but, unlike Iran, this has not raised investment demand (which fell 50% in Q2'18) and jewellery also declined 10%. The high local gold price in both countries has increased recycling as consumers have been prompted to sell their gold. This is another example of gold fulfilling its function as a safe asset in crisis situations. Demand from these countries is relatively small and, combined, was 5% of global demand in 2017.

47 Ag Silver

	Close	Weekly change	High	Date	Low	Date
\$/oz	15.33	-1.17%	15.51	09/08/2018	15.28	06/08/2018
€/oz	13.44	0.52%	13.92	10/08/2018	12.85	07/08/2018

Silver coin sales benefitted more than gold in July as prices fell month-on-month. Silver coin sales at the US Mint and Perth Mint increased 103% and 112%, respectively, from June to July, reaching 885 koz and 487 koz. The upturn is in response to the price: the monthly average fell 5% to \$15.72/oz and with the price now at \$15.33/oz, August is likely to see large sales as well. The gold price also fell and coin sales grew by 43% and 78% month-on-month at the US and Perth Mints, respectively.

Pandora, the world's largest silver jewellery company, reduced 2018 revenue guidance to +4-7% from +7-10%, implying a reduction in its demand for silver. The company's sales centre on charms (53% of revenue) and this segment underperformed expectations in Q2'18. Other segments (bracelets, rings, earrings, and necklaces) saw growth, and improvement was spread across all regions, suggesting the downturn is based on fashion trends rather than fundamentals of the silver jewellery market, which is a fifth of global demand.

78 Pt Platinum

	Close	Weekly change	High	Date	Low	Date
\$/oz	830	-0.89%	840	09/08/2018	821	06/08/2018
€/oz	728	0.88%	731	10/08/2018	711	06/08/2018

Threats of strikes at Impala over the recent major job-cut announcement did not have a major impact on the platinum price. The price mostly tracked the moves in gold: the platinum discount to gold grew \$1/oz last week as the white metal lost \$7/oz to gold's \$6/oz. Two weeks ago Impala released plans to cut 13,000 jobs and 230 koz of platinum supply over the next three years. Following the announcement, the president of

the Association of Mineworkers and Construction Union (AMCU), which represents 70% of Impala's employees, has threatened strike action across all of Impala's mines. While talks have not yet started, the threat of strikes is real given the long strikes in 2012 and 2014. This puts a question mark over Impala's platinum production, which was 1.53 moz in 2017 and accounts for over 20% of global platinum supply.



PRECIOUS METALS REVIEW

⁴⁶ Pd **Palladium**

	Close	Weekly change	High	Date	Low	Date
\$/oz	912	-0.57%	923	07/08/2018	894	08/08/2018
€/oz	800	1.13%	800	10/08/2018	771	08/08/2018

US auto sales fell marginally year-on-year in July to 16.68 million units, following four consecutive months of growth all above 2%, according to the Bureau of Economic Analysis. This is evidence of the expected weakness for H2'18, as forecasts for 2018 are below the sales performance of H1'18, which could feed through to palladium demand. This downturn seems to have been accepted by the auto companies as they did not increase incentives to sustain sales volumes. Instead, they have been shifting incentives to focus on light trucks, a positive move for palladium amid the overall bearish news as the autocatalysts in heavier vehicles contain

higher amounts of palladium and rhodium. However, the overall market is now experiencing the headwinds, as highlighted last month. Higher interest rates reduce the affordability of the car loans which have been supporting the market. It is reported that automakers are focusing on tighter control of production and stock. In an environment of weaker sales, this implies a slowdown in palladium demand in H2 which will not be supportive for the price given that palladium's price gains since the financial crisis have been largely based on strong auto sales growth in the US and China.

⁴⁵ Rh ⁴⁴ Ru ⁷⁷ Ir **Rhodium, Ruthenium, Iridium**

	Rhodium	Ruthenium	Iridium
Reporting week	\$2,345/oz	\$270/oz	\$1,425/oz
Previous week	\$2,325/oz	\$270/oz	\$1,425/oz

Vishay Intertechnology, a Fortune 1,000 company that produces electronic components, has reported strong demand for resistors, a key demand sector for ruthenium. The company reported that Q2'18 sales of resistors and inductors reached \$252 million, a rise of 21% on Q2'17 and 31% on Q2'16. Additionally, Vishay's CEO said that growth was limited by its capacity as backlogs lengthened to 5.4 months from 5.1 months in Q1'18, and that the company is expanding capacity. He also stated that demand growth was being supported by all regions and Vishay and other companies were being

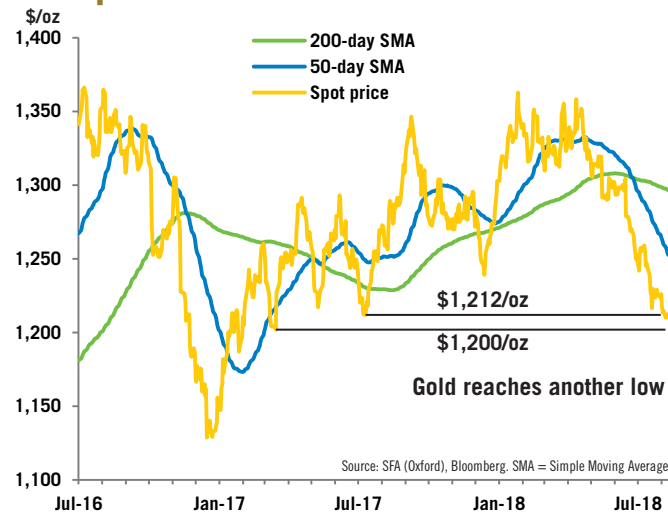
overwhelmed with orders. Ruthenium demand from the electrical sector makes up approximately a third of total demand, which has been strong this year, creating a tight market. The price has jumped by 35% year-to-date, with supply creating more upside risk for the price.

Rhodium was the only mover in the small PGMs, gaining \$20/oz to reach \$2,345/oz. Iridium and ruthenium held ground at \$1,425/oz and \$270/oz, although the markets remain tight.

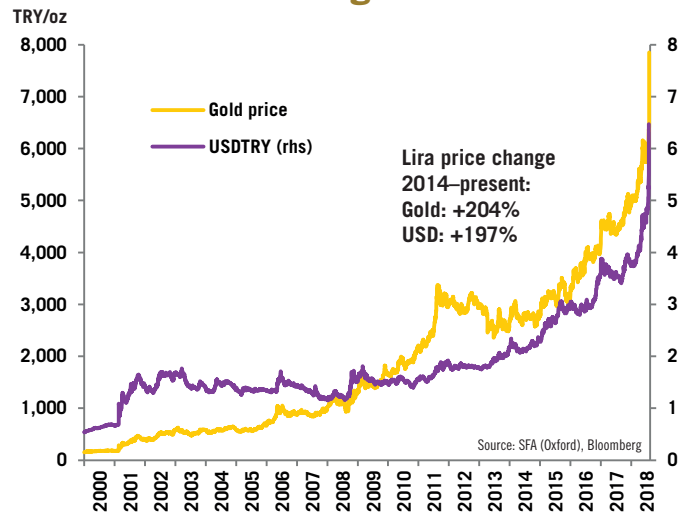


TRENDS AND INVESTMENTS

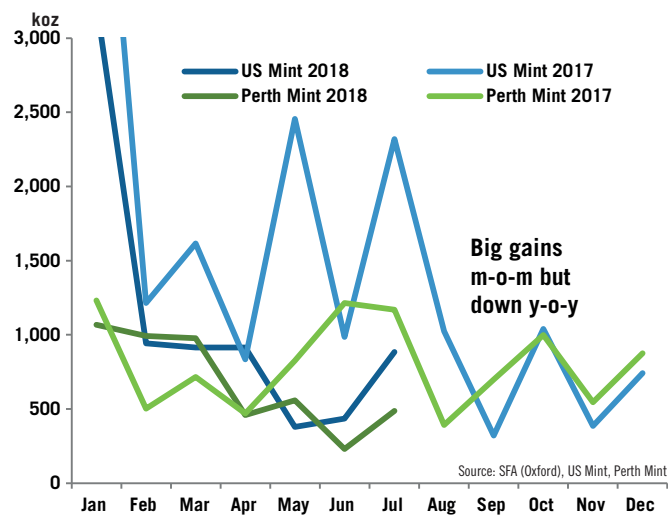
Gold price



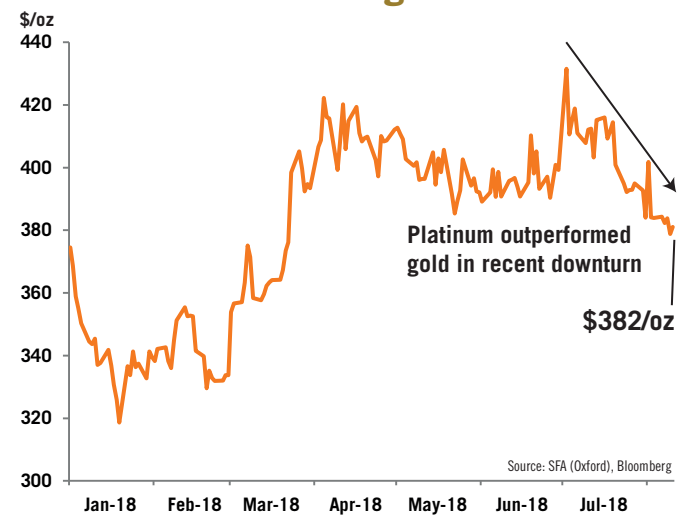
Turkish lira cost of gold and USD



Silver coin sales



Platinum discount to gold



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