



Supply-demand outlook

PGMs and the post-COVID world

IPMI EUROPEAN CHAPTER

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Mitsubishi Corporation offers a broad range of trading services in **Precious Metals** designed to add value and create international business opportunities **utilizing over 40 years of experience** in Precious metals business.

Through its extensive relationships across a wide range of industries, Mitsubishi provides clients with a **“Value Chain” of precious metals services**: from raw metal supply and secondary recycling to the provision of credit and financial risk management.

Mitsubishi offers a range of risk management products which can be customized to develop strategies that best suit our clients' requirements:

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- **Leases and consignments**;
- Futures, options, financially settled swaps, location swaps;
- Financial commodity products for Investment (Index Linked Notes, ETFs).



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- **PGM Market overview**
- **PGM supplies**
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 - Auto chip shortage
 - Post-COVID demand surge
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Record high Rh, Pd prices, multi-year highs in Pt in 2021

Indexed prices (1st January 2020 = 100)

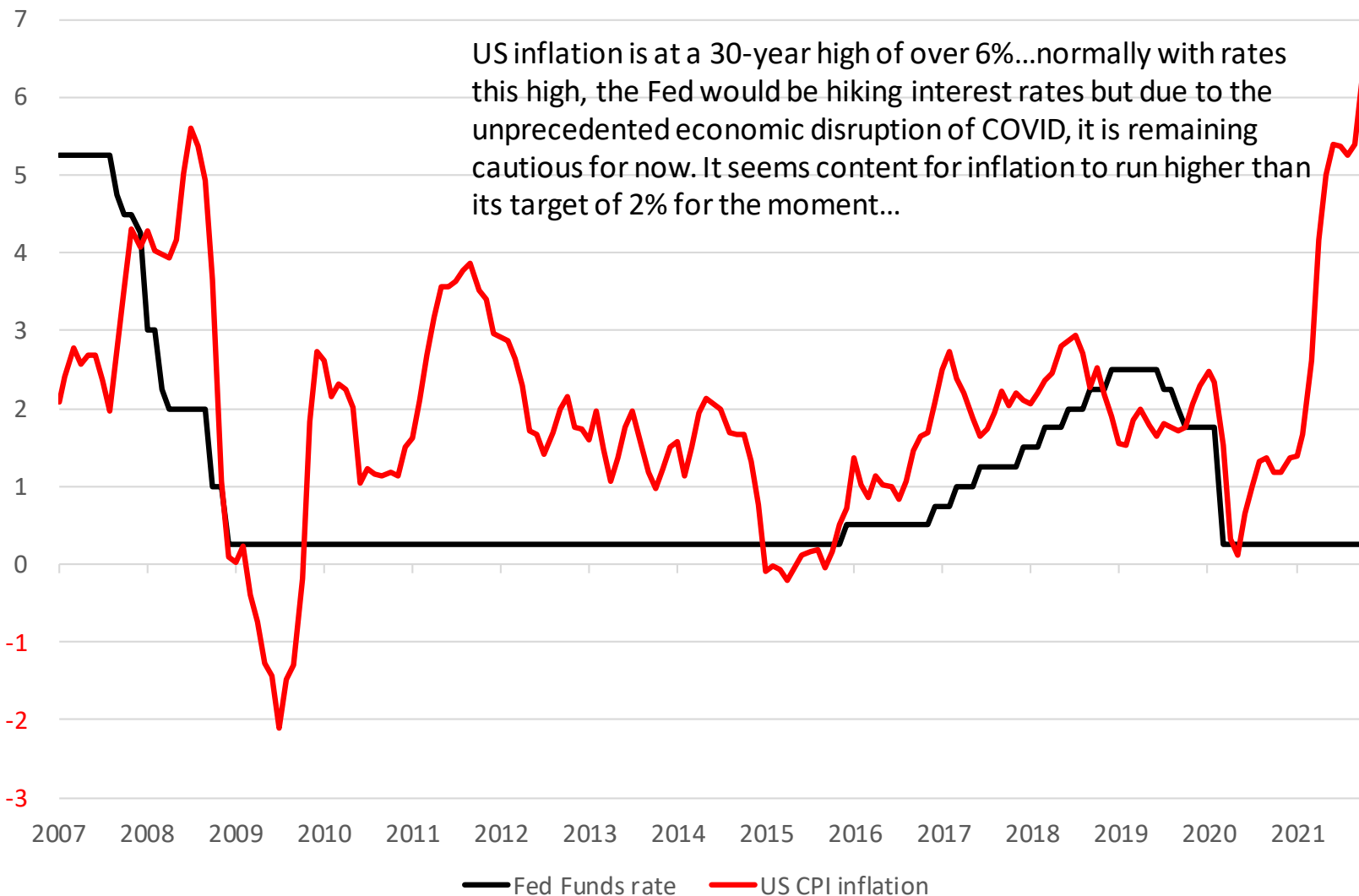


Macroeconomic overview

Stimulus, loose monetary policy, supply chain issues, post COVID rebound = inflation

US CPI inflation (% YoY) US interest rates (%)

Source: Mitsubishi from Bloomberg Professional Service

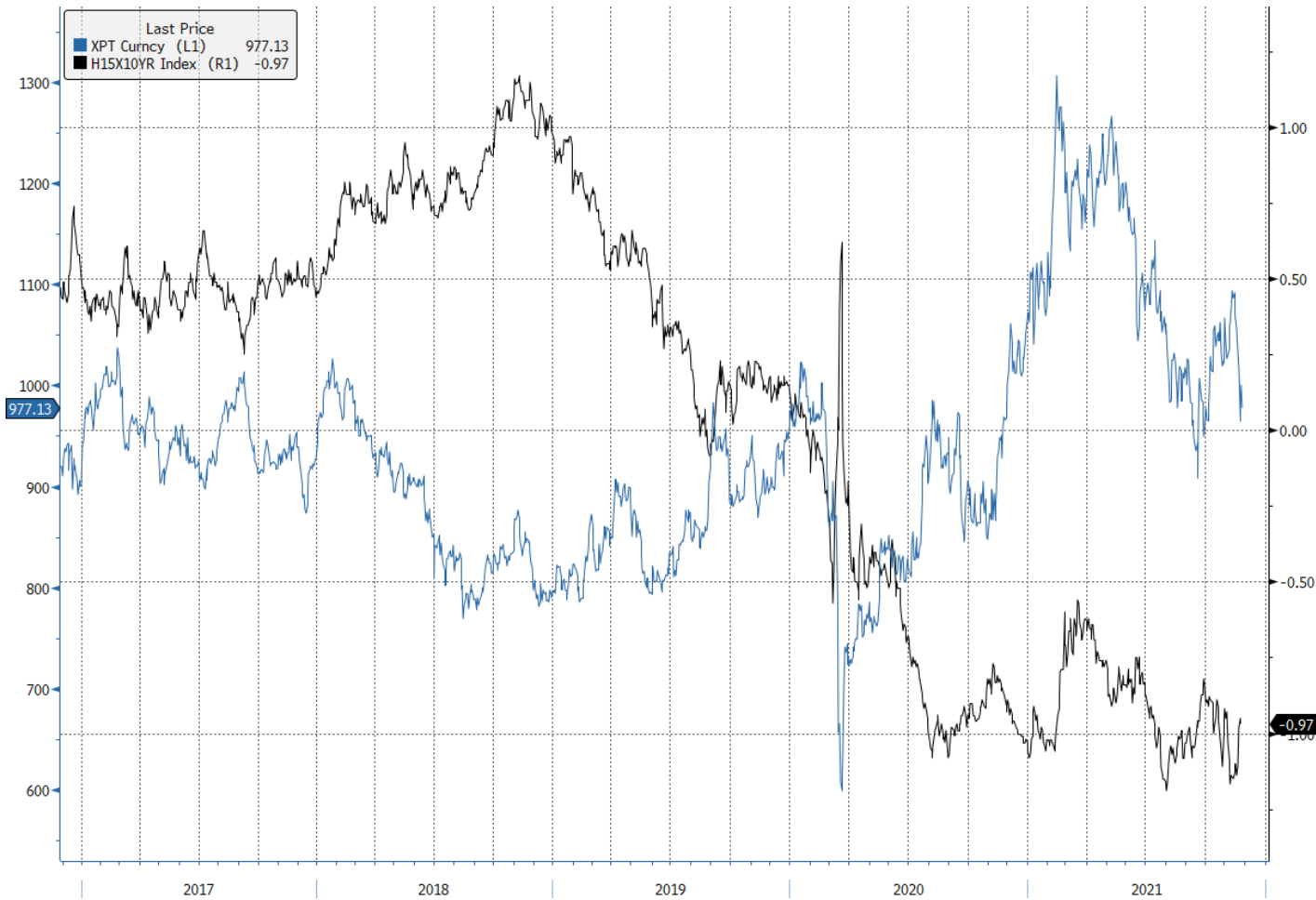


Macroeconomic overview

Negative real rates still supportive of non-yielding assets

Platinum (US\$/oz)

Real rates (Inflation adjusted 10 year US Treasury yields, %)



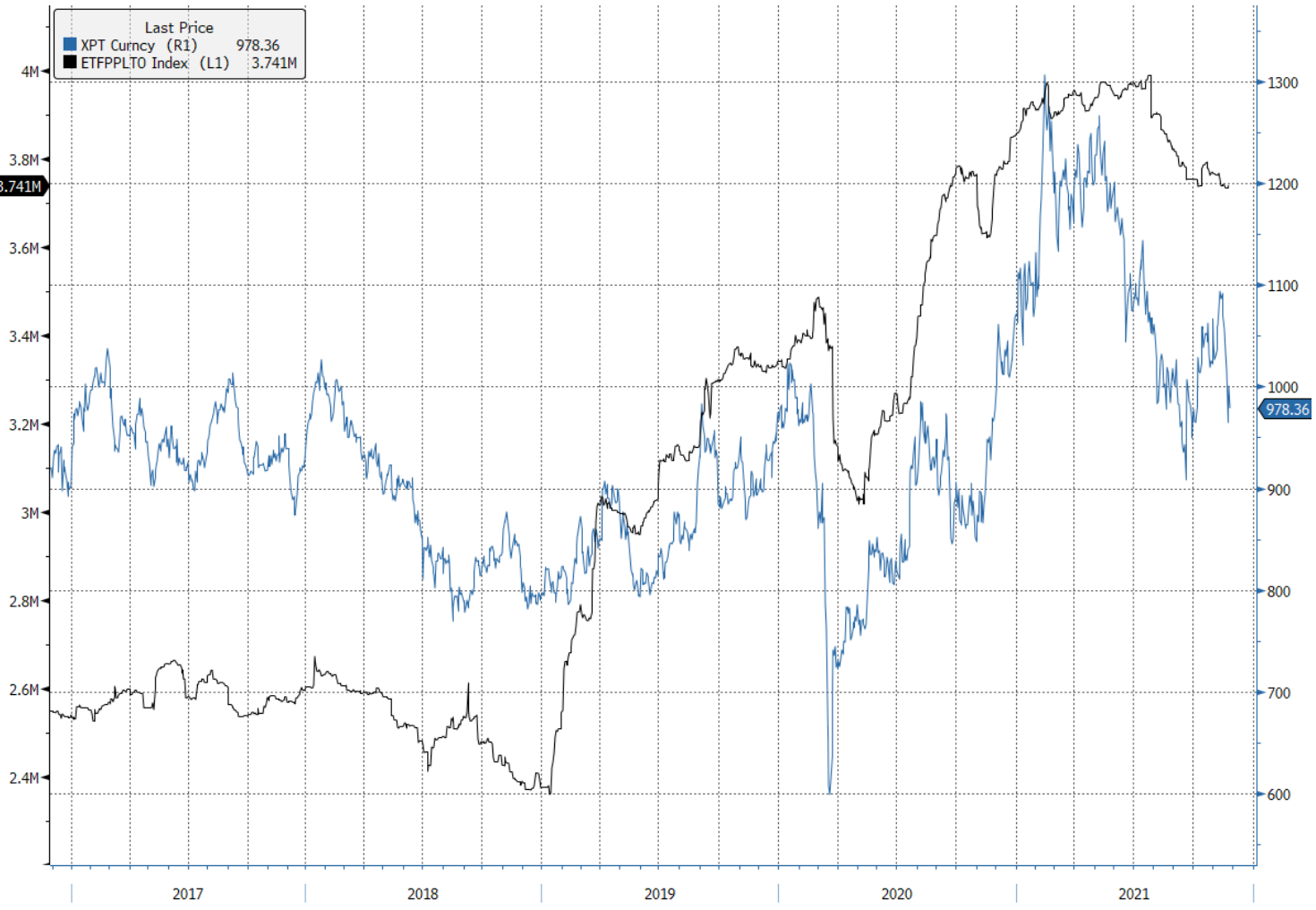
Source: Mitsubishi from Bloomberg Professional Service

Fed rate hikes are thought to be some time away despite inflation >6%: the combination of low rates and high inflation are a positive combination for non-yielding assets

Platinum ETF investment demand has driven market tightness but can investment be sustained in a higher interest rate world?

Platinum ETF Holdings (Moz)

Platinum price (US\$/oz)



Source: Mitsubishi from Bloomberg Professional Service

Platinum: the long view

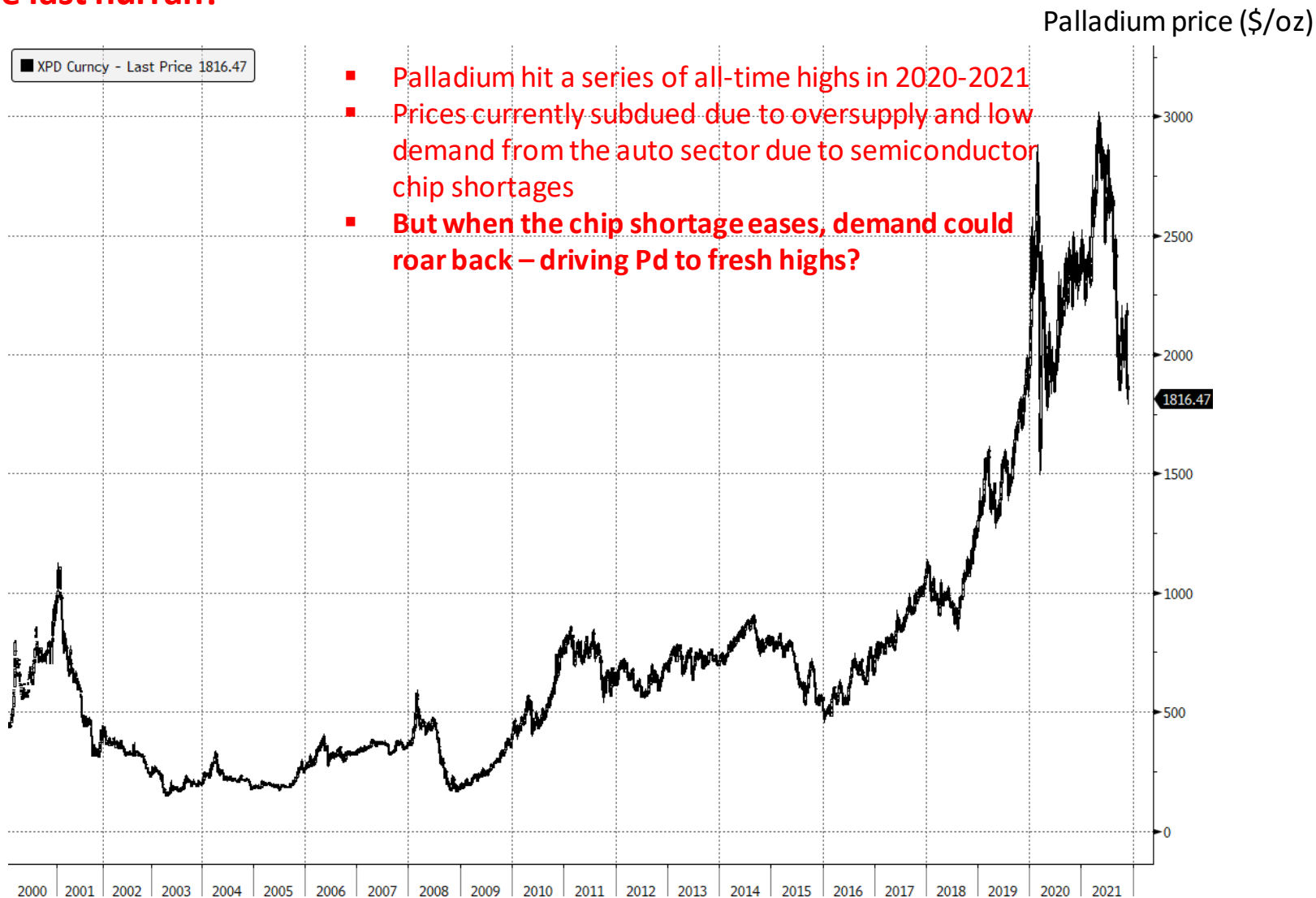
Breaking out of long term downtrend?



Source: Mitsubishi from Bloomberg

Palladium: the long view

One last hurrah?

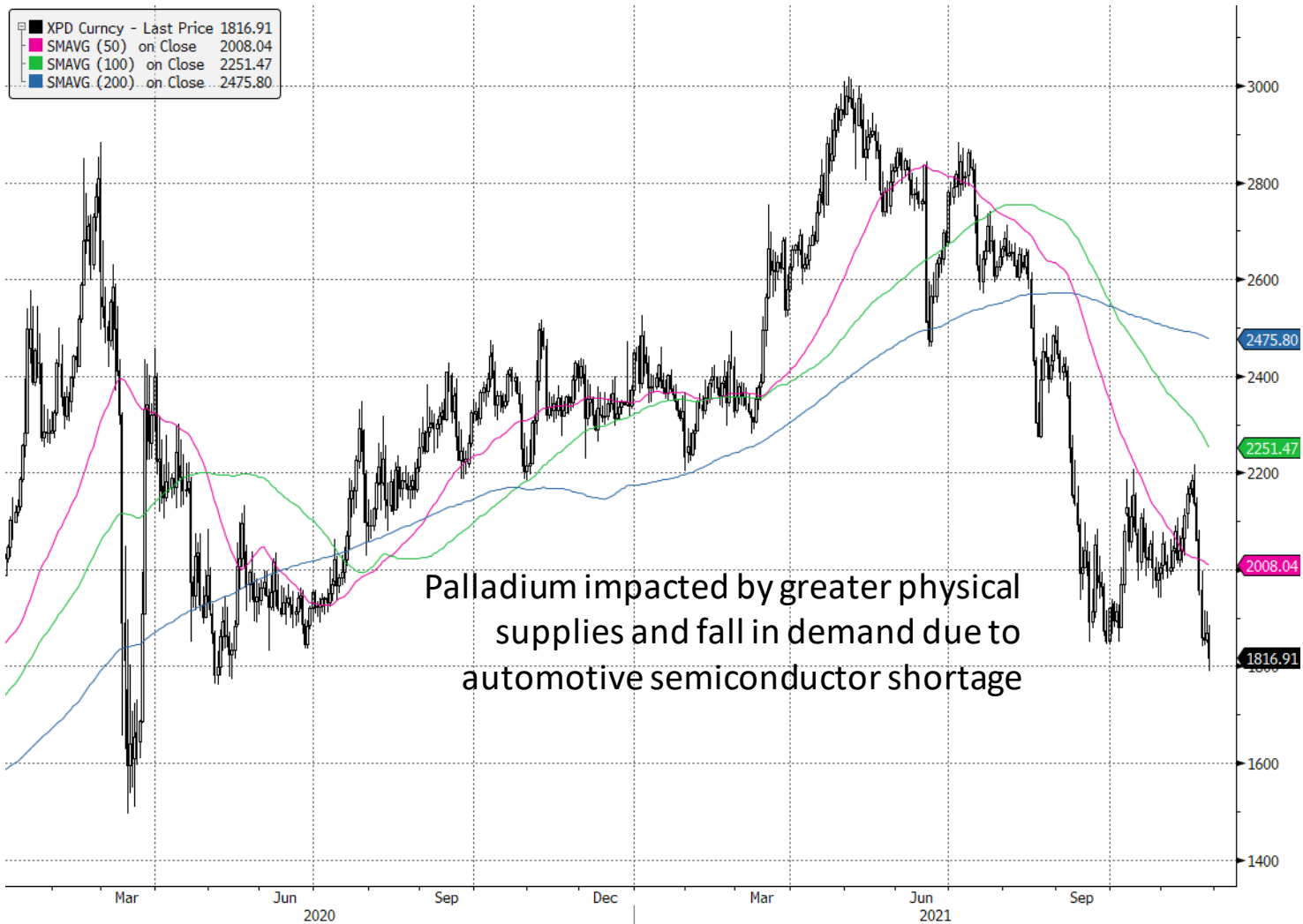


Source: Mitsubishi from Bloomberg

Palladium

Support / resistance around the \$2,000 level

Palladium price (\$/oz)

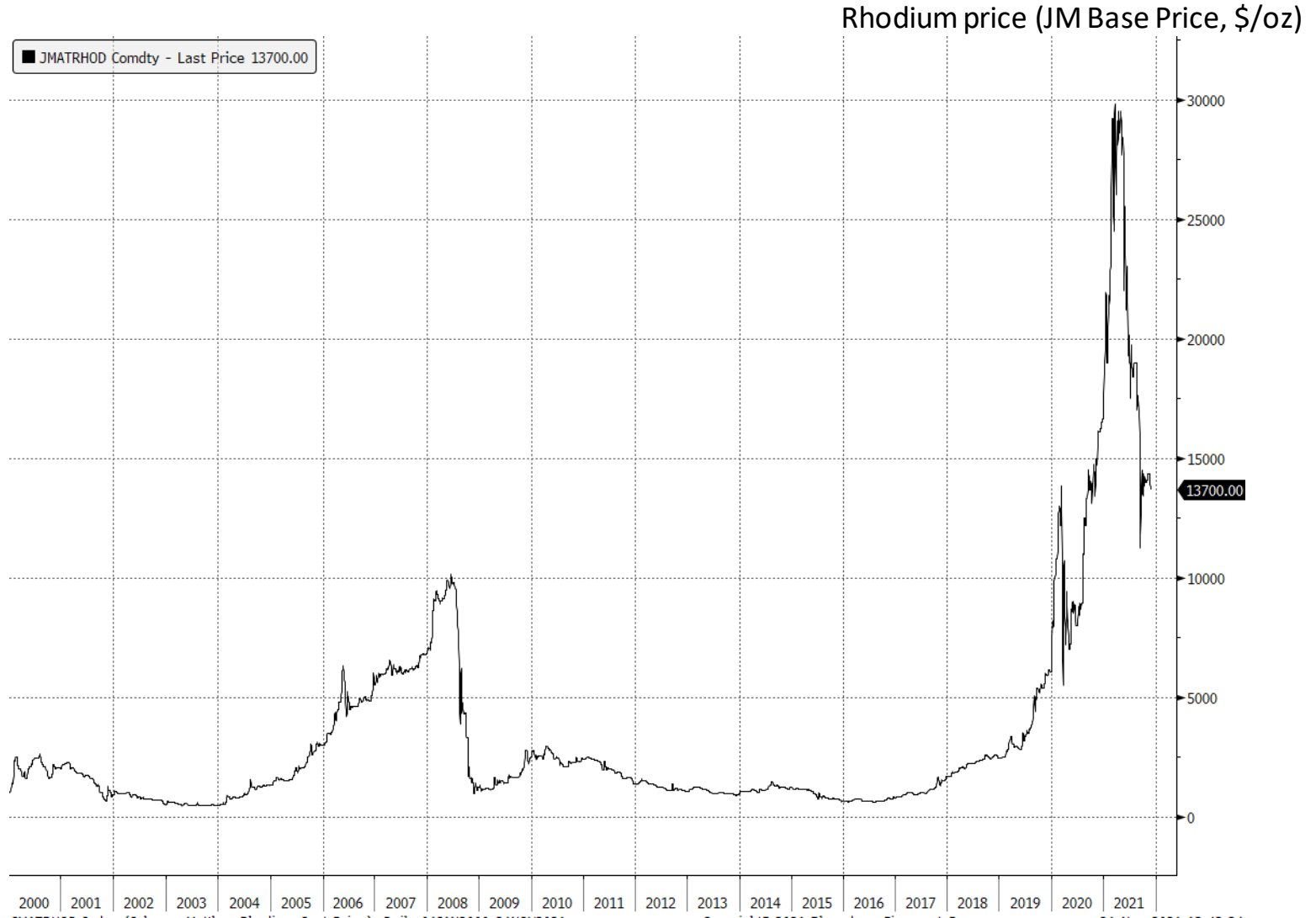


Source: Mitsubishi from Bloomberg

Rhodium: the long view

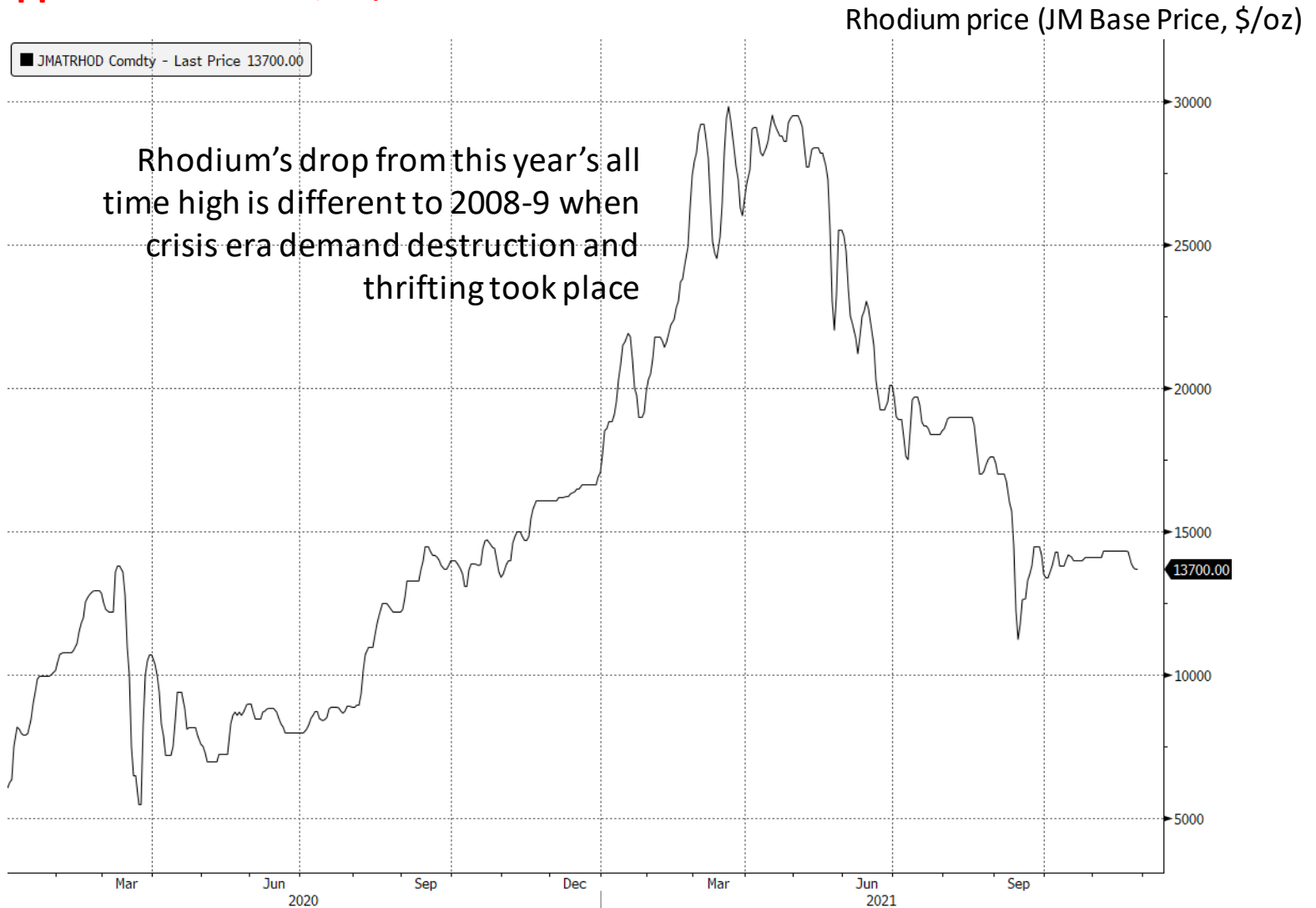
One last hurrah?

Source: Mitsubishi from Bloomberg



Rhodium

Support around the \$14,000 level



Source: Mitsubishi from Bloomberg

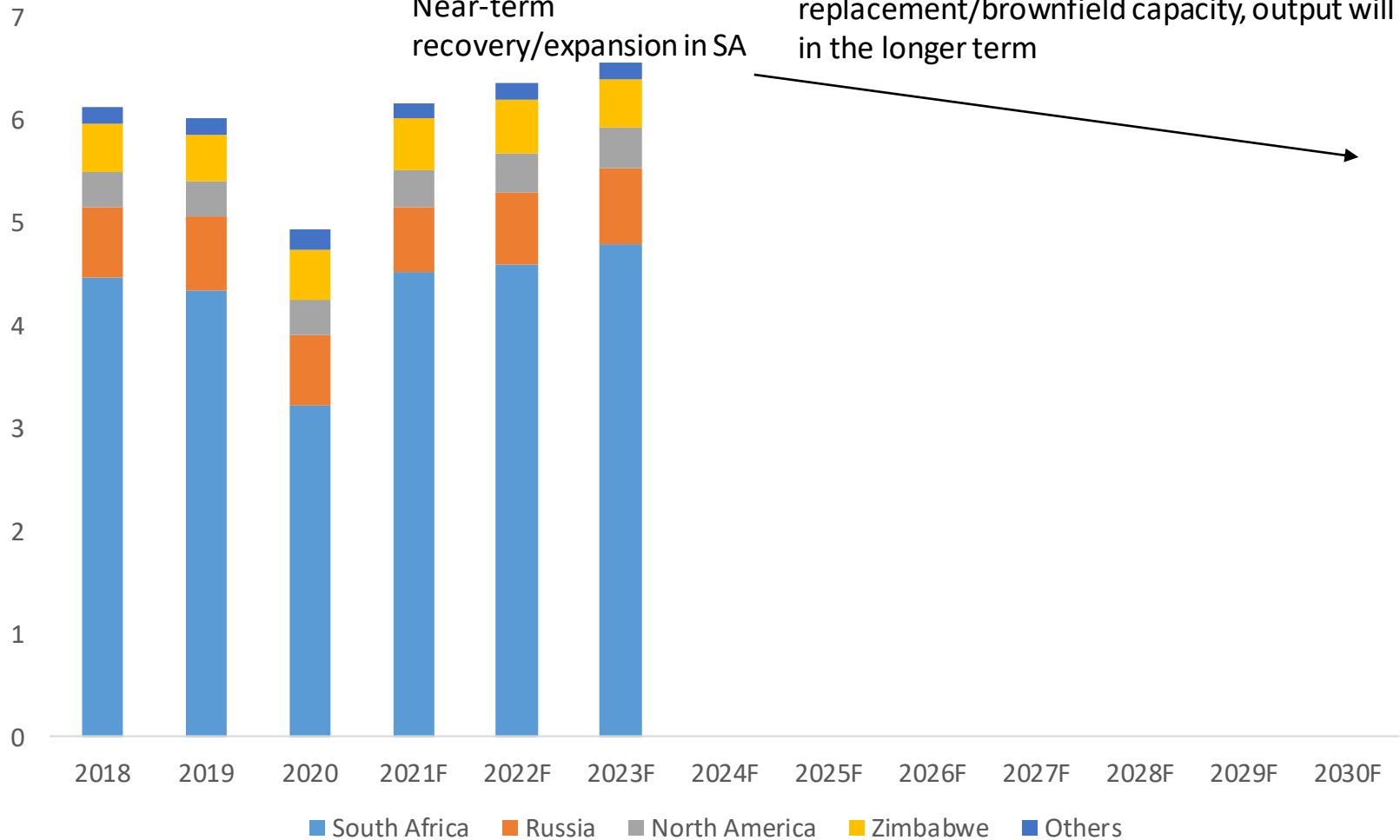
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Platinum supplies

Source: Mitsubishi from JM (to 2020) Mitsubishi forecast for 2021-

Platinum supply forecast (Moz)



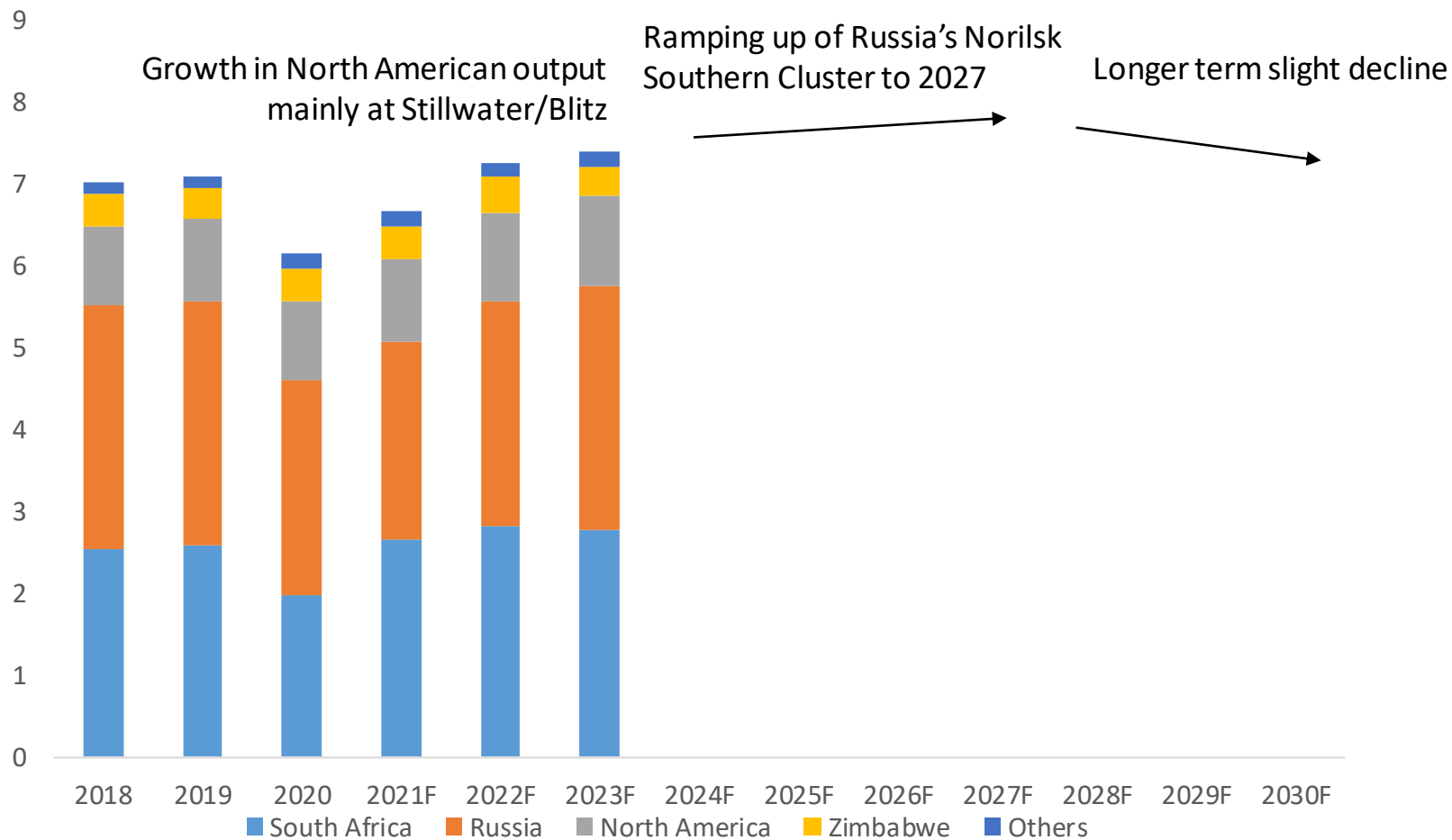
Without further investment in replacement/brownfield capacity, output will decline in the longer term



Palladium supplies

Palladium supply forecast (Moz)

Source: Mitsubishi from JM (to 2020) Mitsubishi forecast for 2021-

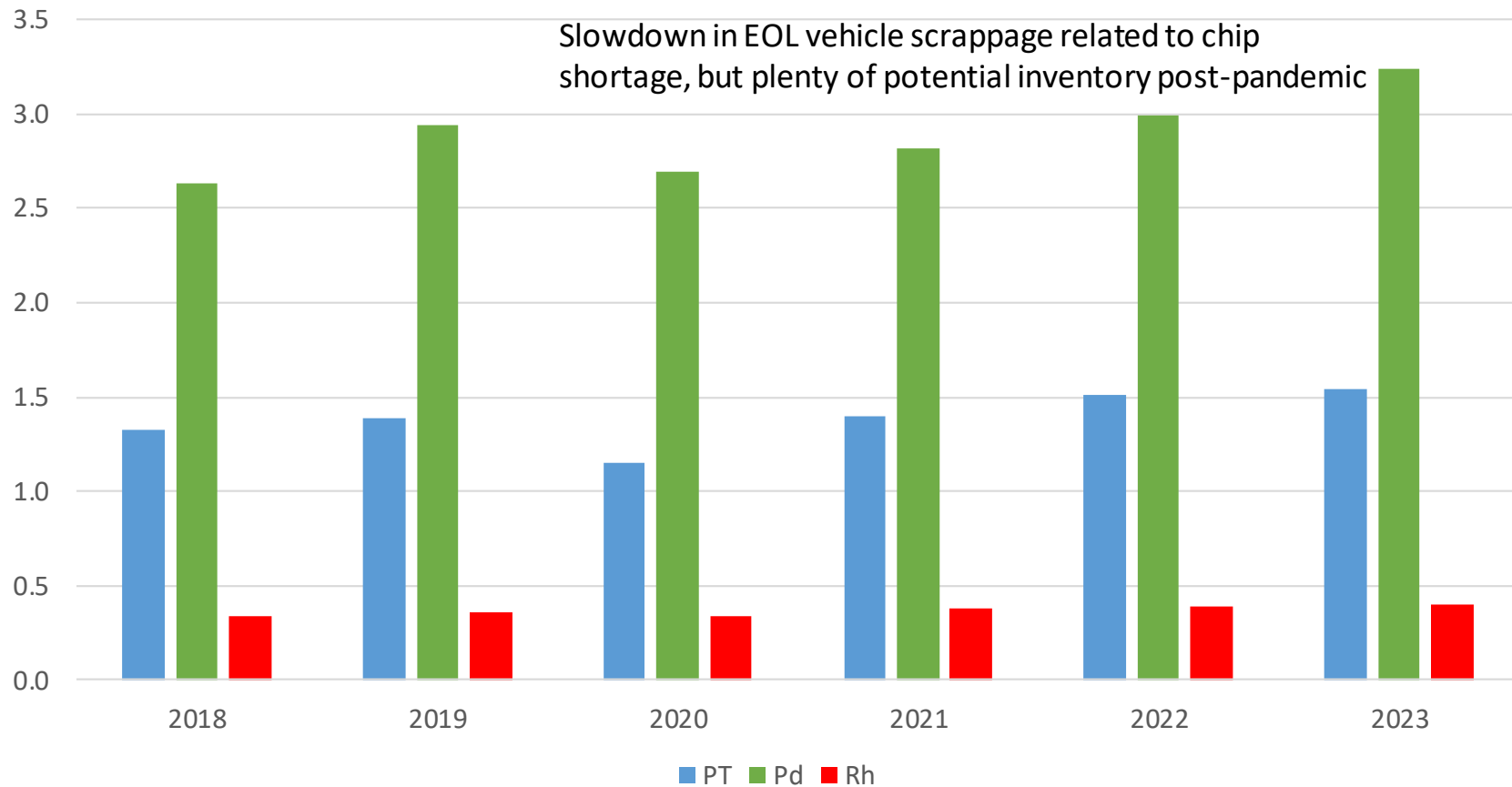


Recycled supplies

Rebound in scrap but will be limited by ongoing new car shortage

PGM autocatalyst recycling (Moz)

Source: Mitsubishi from JM (to 2020) Mitsubishi forecast for 2021-3



Source: Mitsubishi from Johnson Matthey (to 2020) Mitsubishi forecasts (2021-2)

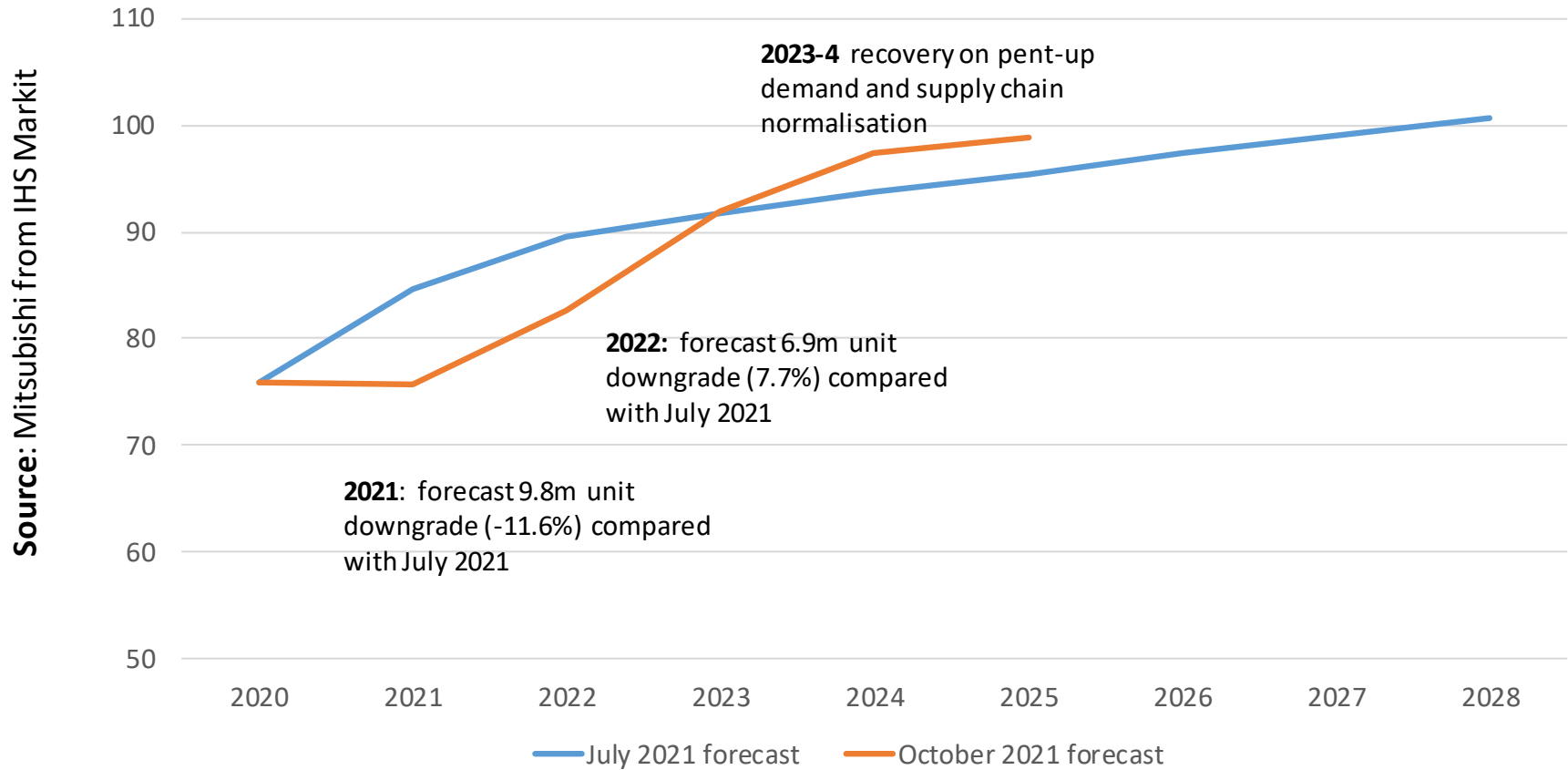
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Automotive demand

Significant downgrade to 2021-22 vehicle forecasts

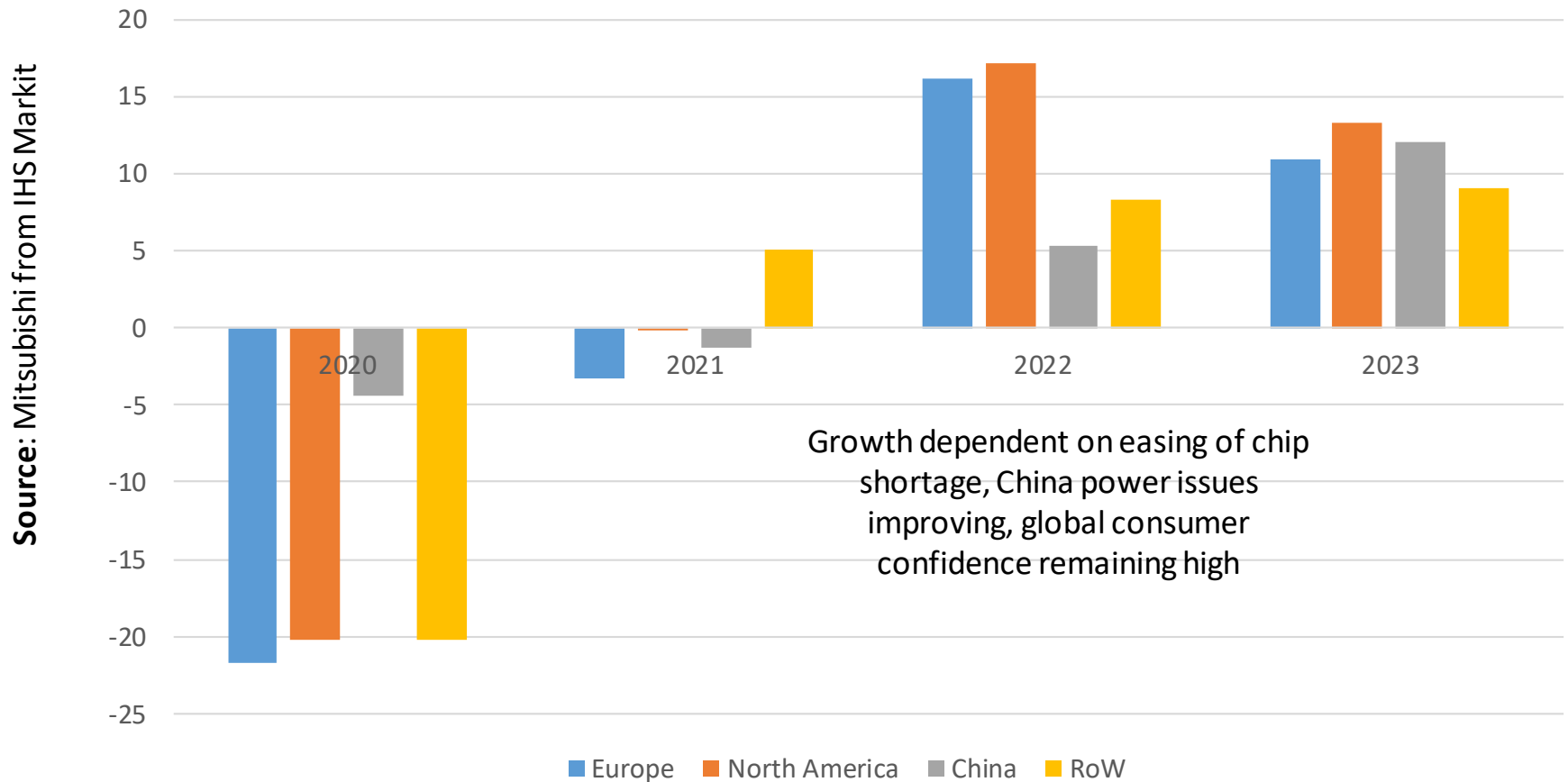
Global light duty vehicle sales forecast (millions, October 2021 update)



Automotive demand

Return to growth in all markets in 2022

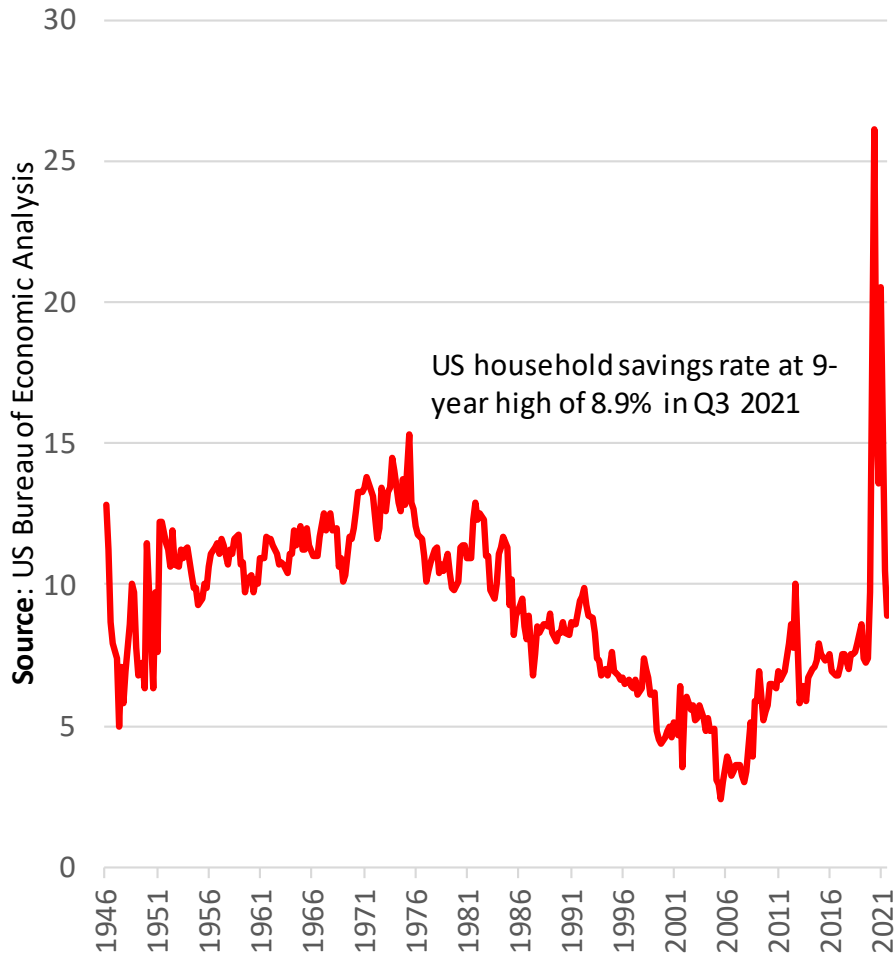
Global light duty vehicle sales forecast (millions, October 2021 update)



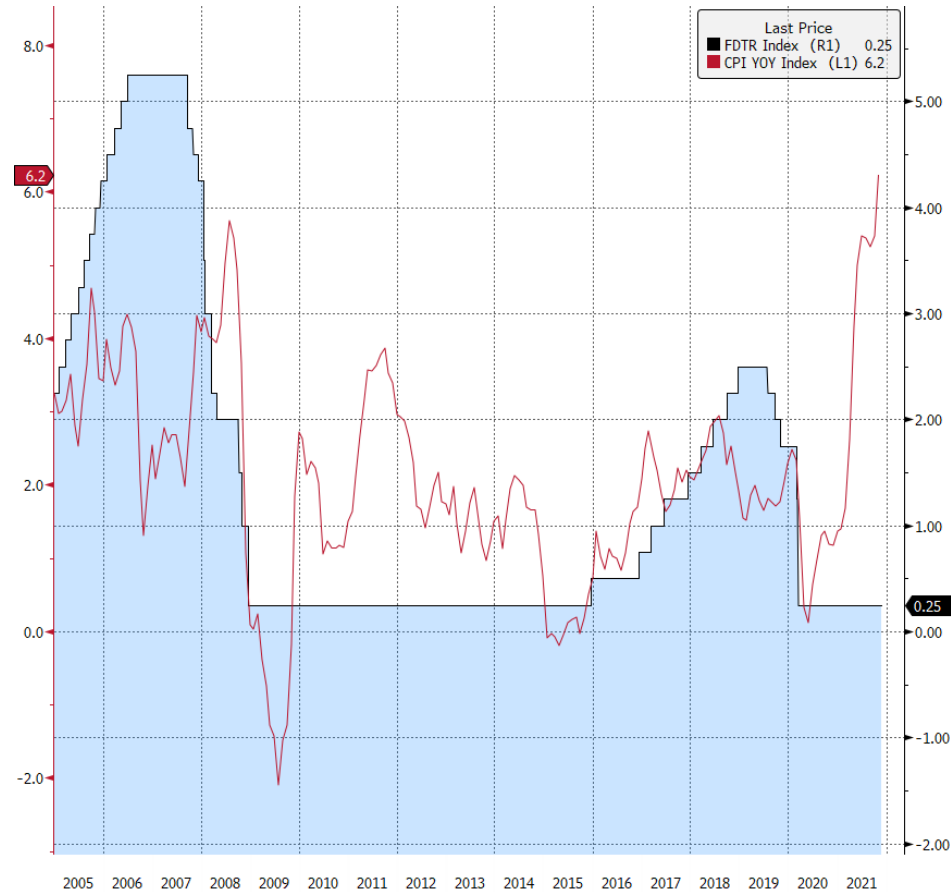
Automotive demand

Will favourable economic conditions last?

US household savings rate as percentage of income



US CPI (YoY, %)

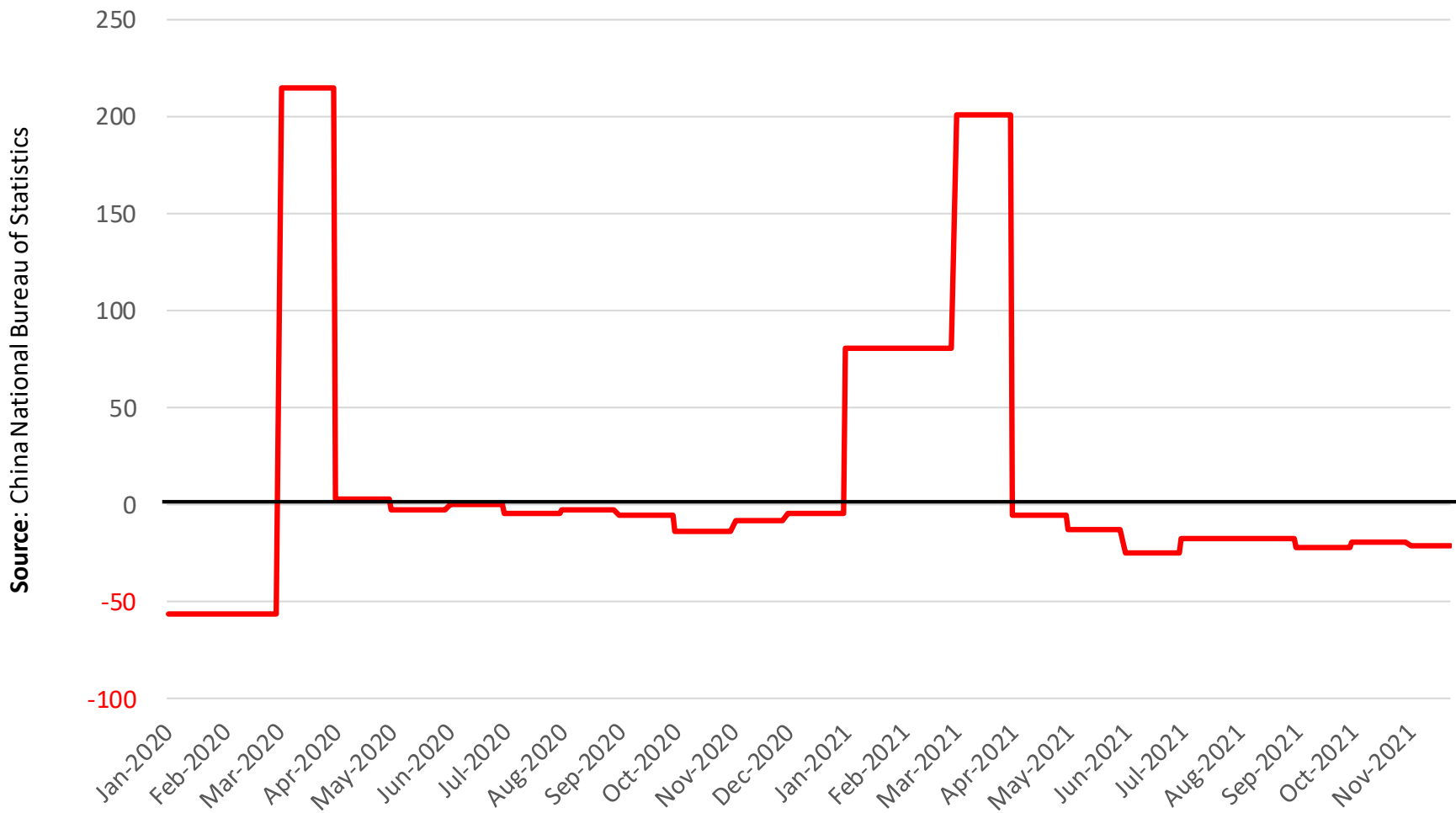


Fed Funds target rate (%)

Automotive demand

China electricity supply

Implied surplus or deficit of electricity production in China (bn kWh)

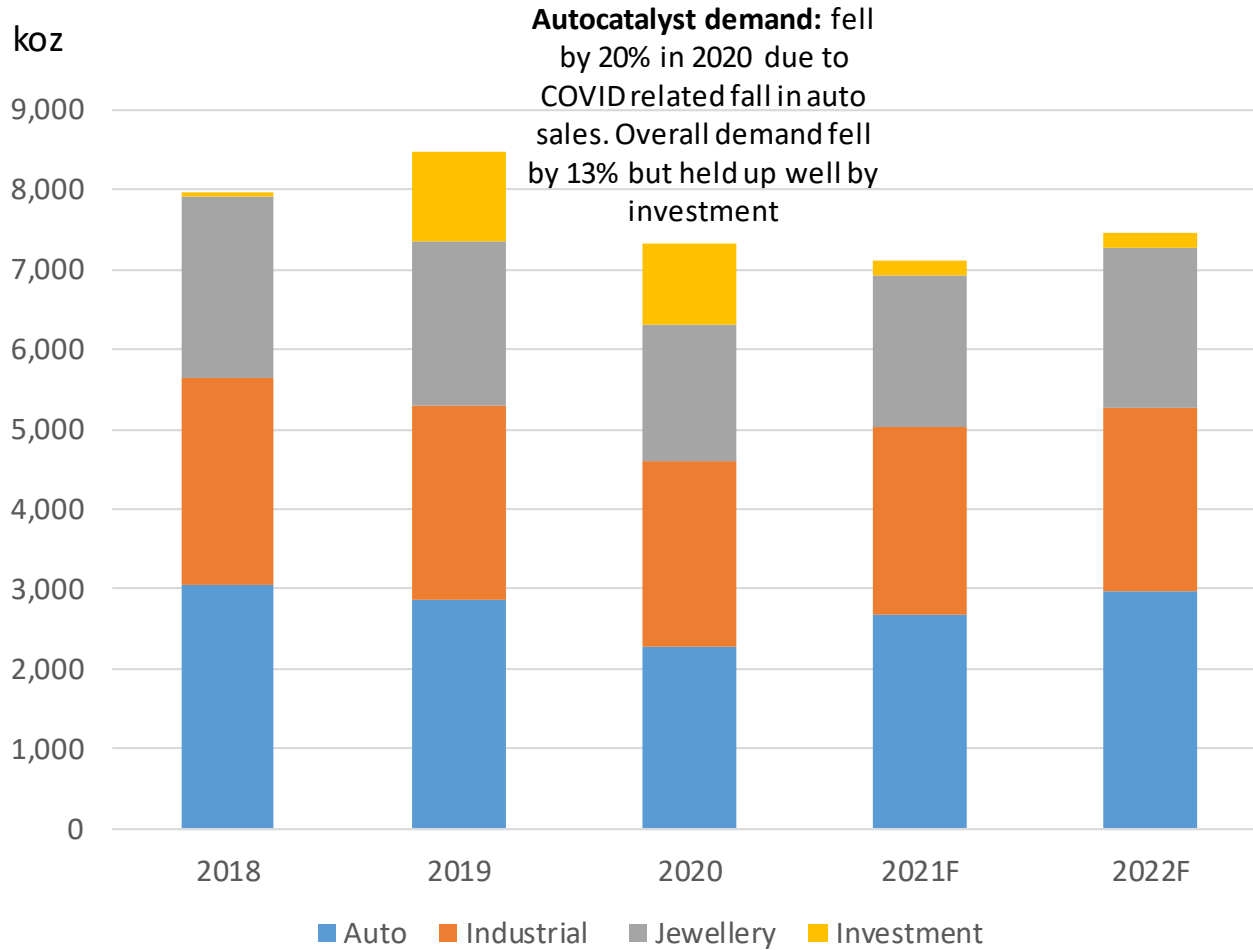


Source: China National Bureau of Statistics

Platinum demand

Demand recovery in all areas other than investment in 2021

Source: Mitsubishi from JM (to 2020) Mitsubishi forecast for 2021-2



2021-22:

Investment demand will be much lower than in 2020, helping push the market into surplus

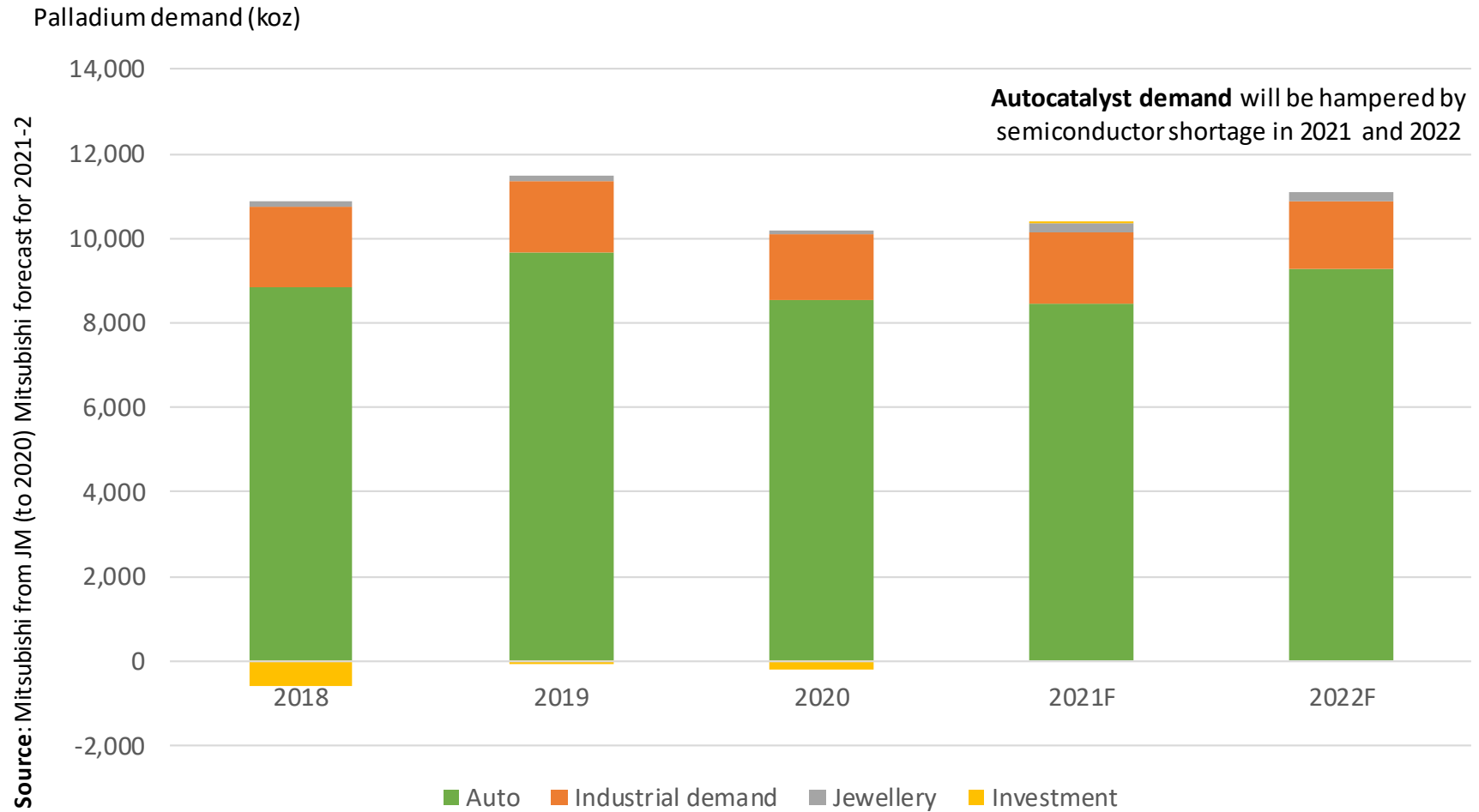
Jewellery demand has recovered at wholesale level

Industrial demand to see growth in the glass sector and new hydrogen applications

Autocatalyst demand is helped by **substitution** and heavy duty demand but remains contingent on semiconductor availability

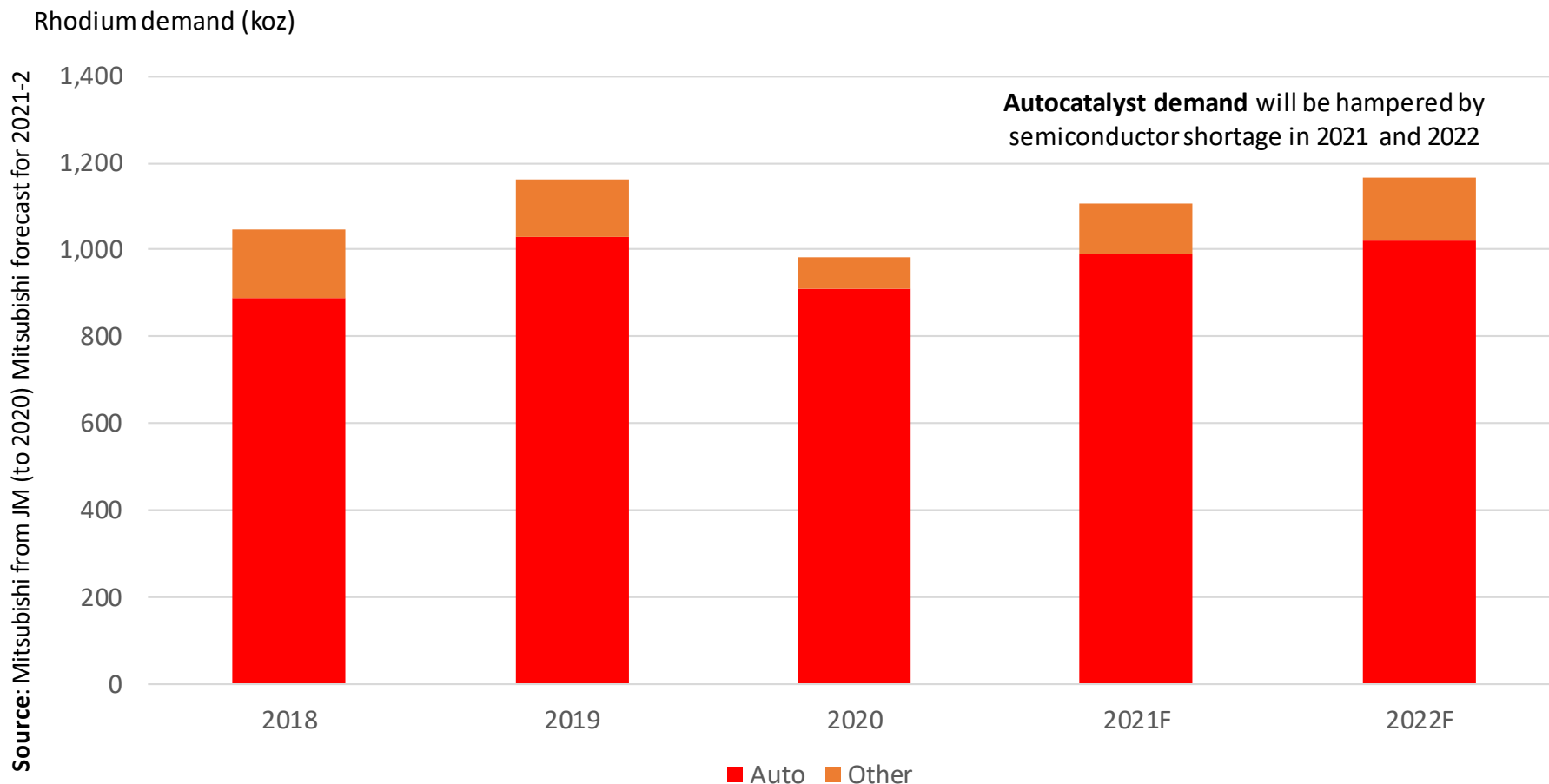
Palladium demand

Recovery in 2021, but not as strong as it would be due to semiconductor shortage



Rhodium demand

Slower recovery and impact of thrifting

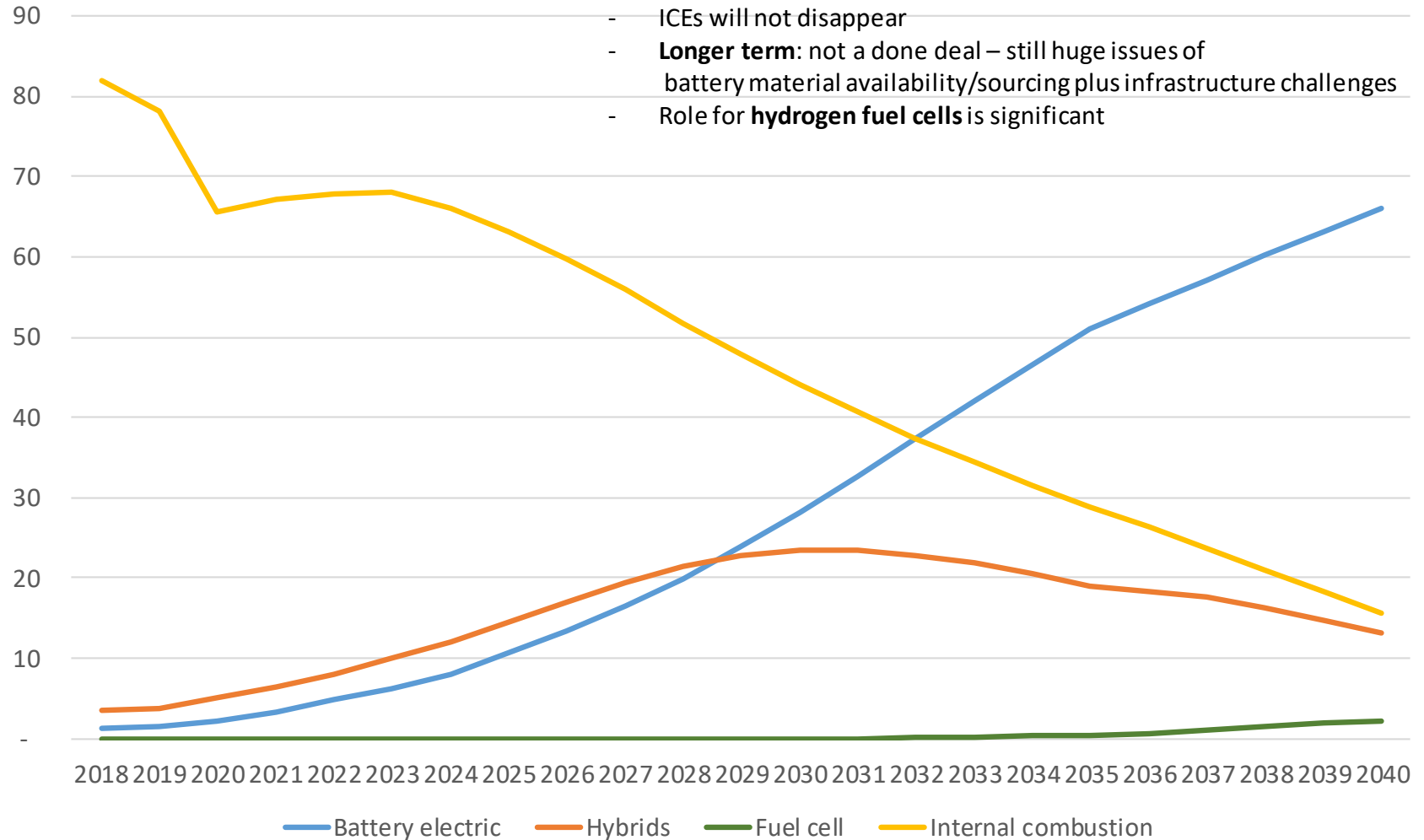


Impact of electrification

Forecast of annual battery electric passenger vehicle sales (millions)

Source: Mitsubishi from Bloomberg New Energy Finance, June 2021 data

- **Short term:** Chip shortage will delay EV introduction
- Ongoing role for hybrids (HEV and PHEV)
- ICEs will not disappear
- **Longer term:** not a done deal – still huge issues of battery material availability/sourcing plus infrastructure challenges
- Role for **hydrogen fuel cells** is significant

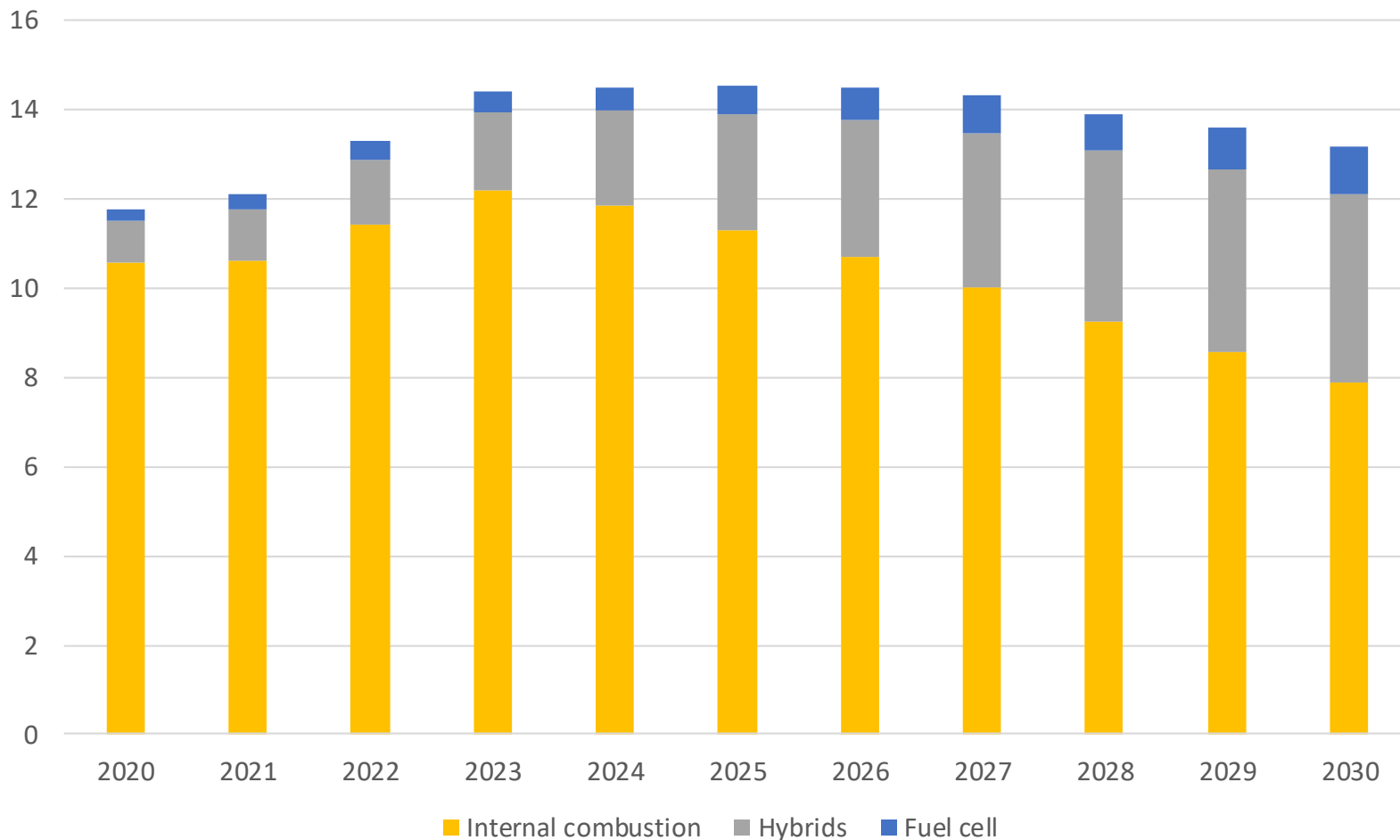


Impact on PGM of electrification

PGM demand remains robust despite increasing electrification

PGM demand by engine type (Moz) Note figure for BEVs is zero

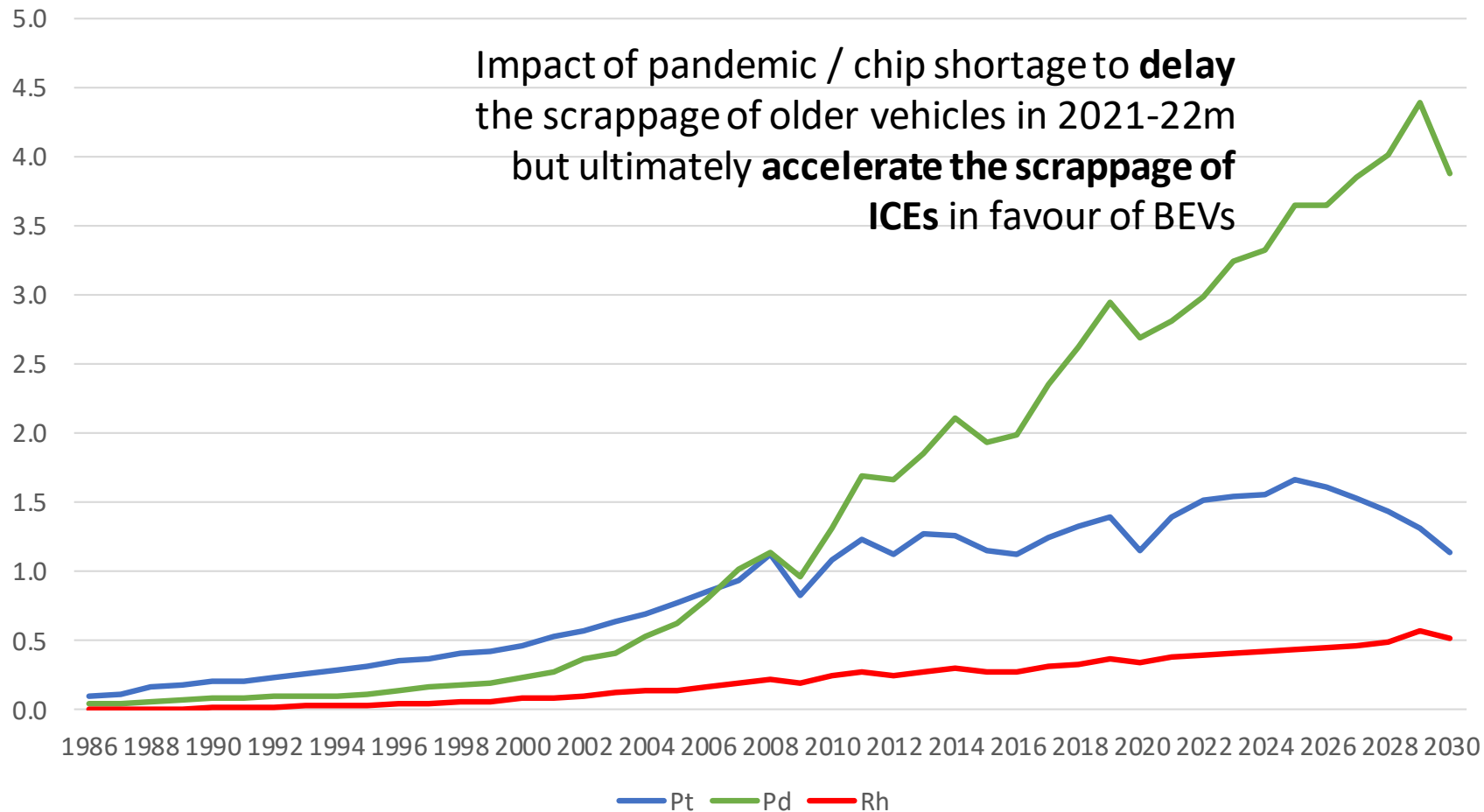
Source: Mitsubishi forecasts based on Bloomberg New Energy Finance vehicle data



Impact on Recycling

PGM Autocatalyst Recycling (Moz, theoretical maximum)

Source: Mitsubishi from Johnson Matthey (2020 and prior)
Mitsubishi forecasts (2021-onwards)



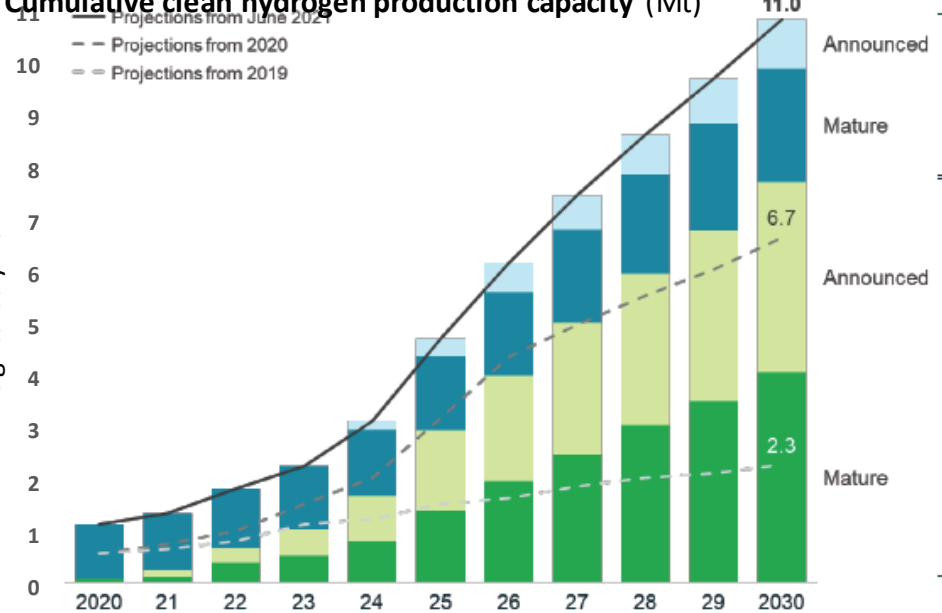
Hydrogen

PGM demand in fuel cells and PEM water electrolysis

Cumulative clean hydrogen production capacity (Mt)

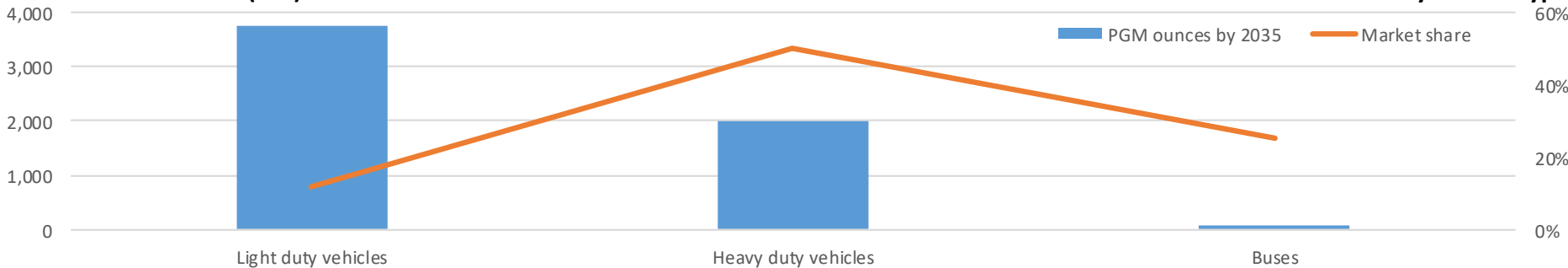
Cumulative clean hydrogen production capacity (Mt)

Source: Hydrogen Council/McKinsey "Hydrogen Insights" July 2021



- The Hydrogen Council / McKinsey estimates that by 2030, cumulative installed electrolyser capacity could reach 70 GW, from ~3 GW today
- PGM demand could increase by ~10 koz for every 1 GW of installed capacity
- PGM demand in **fuel cells** set to accelerate rapidly in the 2030s

PGM demand in 2040 (koz)



Source: Mitsubishi forecasts

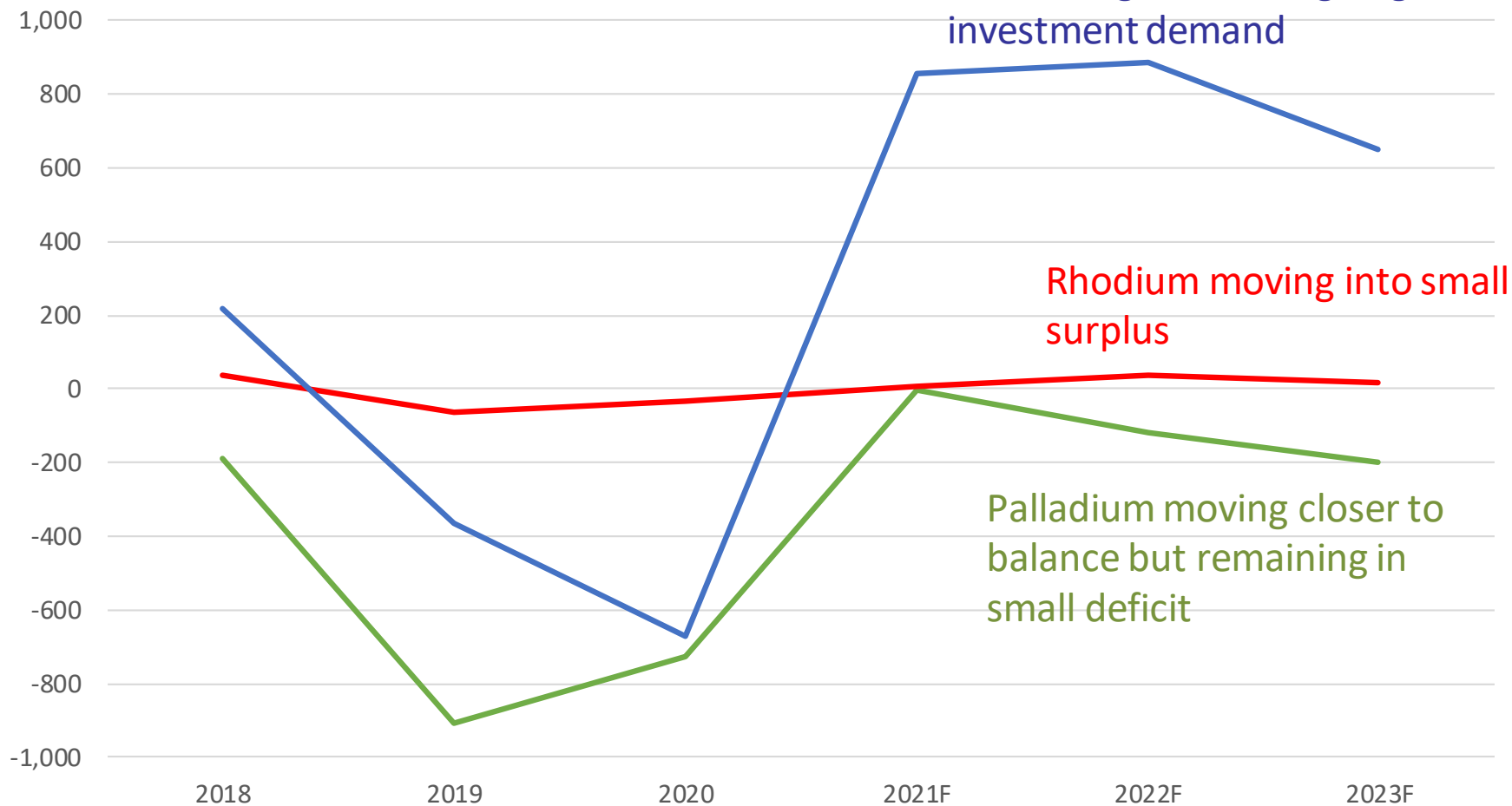
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PGM

Outlook

Market balance (koz)



Platinum moving into surplus without significant ongoing investment demand

Rhodium moving into small surplus

Palladium moving closer to balance but remaining in small deficit

Mitsubishi forecasts

PGM Summary

- **Platinum:** greater physical availability and the impact of the chip shortage on automotive offtake in 2021 however platinum is less exposed to the chip shortage and is also benefitting from substitution and growth in heavy duty. Investment will be a key swing factor as markets price in tapering/interest rate rises.
- **Palladium:** Russian mine supply disruption but also demand constraints from slowdown in automotive sector in 2021-22. Impact of semiconductor shortage greater on Pd than on other metals.
- **Rhodium:** off the recent highs, greater physical availability plus the automotive slowdown points to short term weakness?
- **Macroeconomic** situation shifting as tapering/rate rises are anticipated, though high inflation at present and prospects of further inflation from massive fiscal stimulus is supportive of prices
- **Longer term challenges and opportunities:** electrification is for real, but so is the hydrogen economy

Thank you!

SAVE THE DATE:

IPMI PGM REFINING CONFERENCE

2ND MARCH 2022

ORLANDO, FLORIDA

Part of the IPMI Winter Meetings

See you there!