

IPMI European Chapter

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Demand Dynamics: From Economic Uncertainty to Applications

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2023: A difficult and uncertain year... things can only get better?

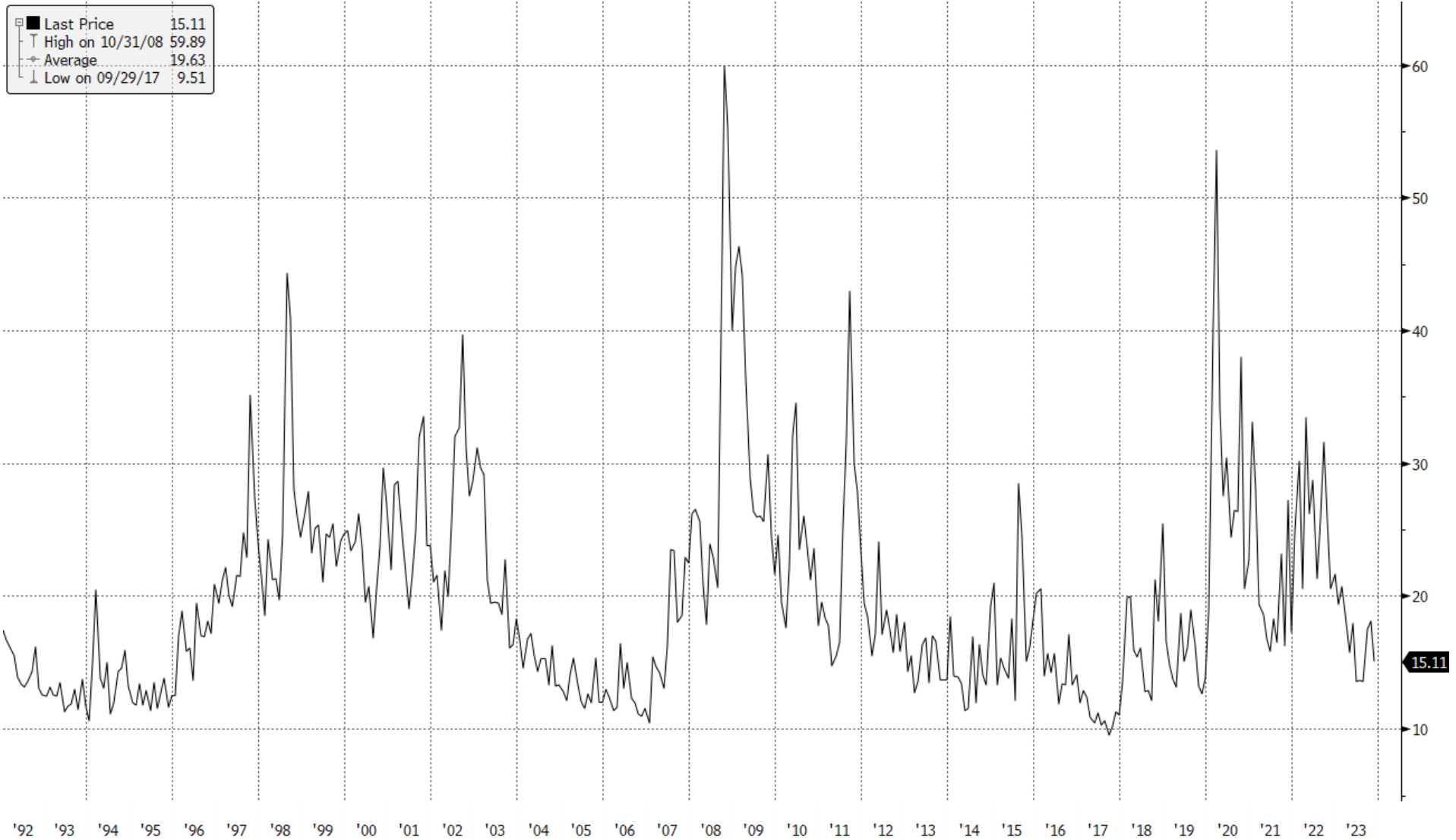
Source: Mitsubishi from the Financial Times



Financial Times

Is global economic and geopolitical uncertainty being priced in?

VIX: Chicago Board Options Volatility Index

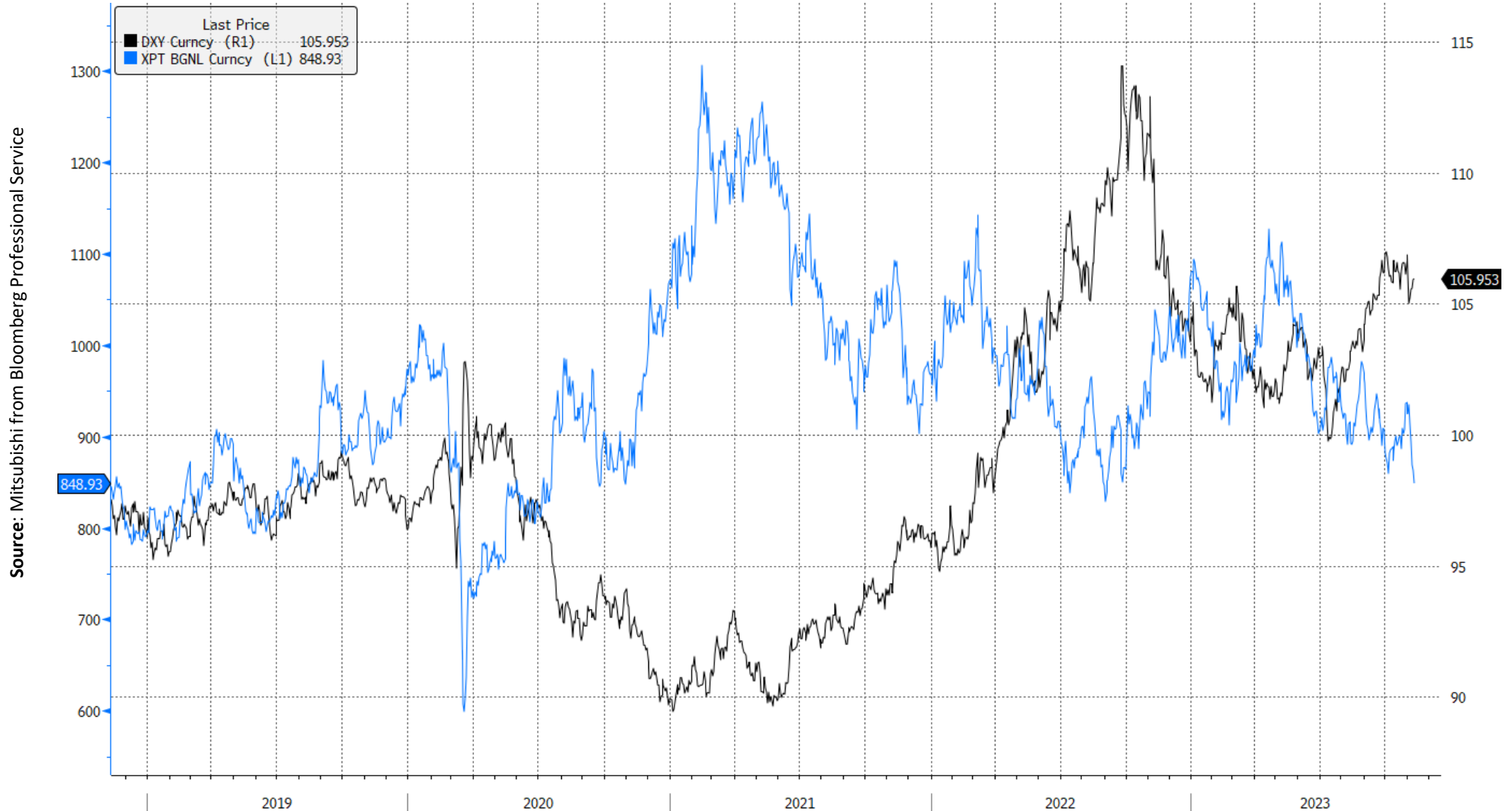


Source: Mitsubishi from Bloomberg Professional Service

What the dollar is telling us...

Platinum (US\$/toz)

DXY: Dollar Strength Index

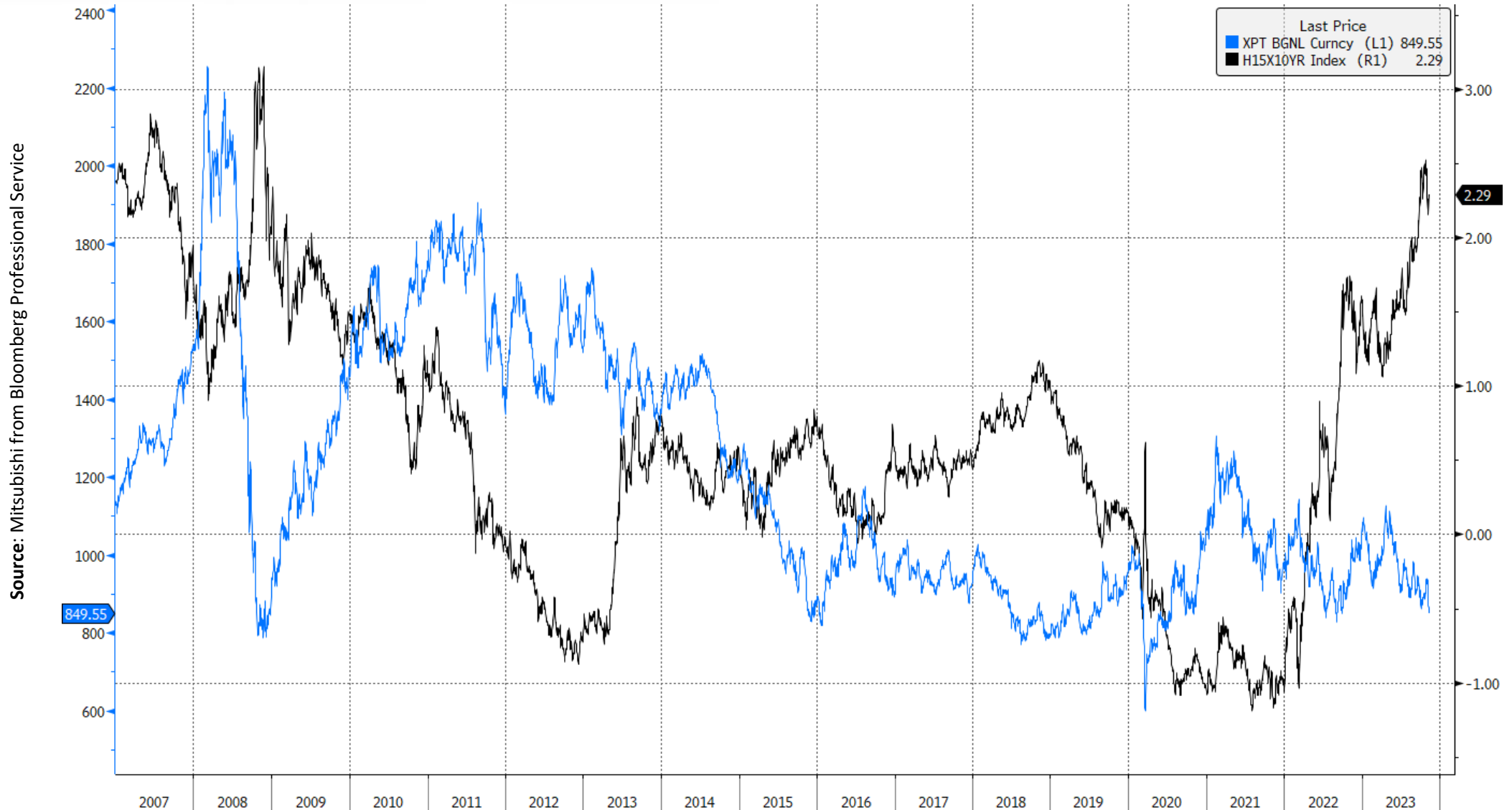


Source: Mitsubishi from Bloomberg Professional Service

Positive inflation adjusted yield environment is challenging for precious

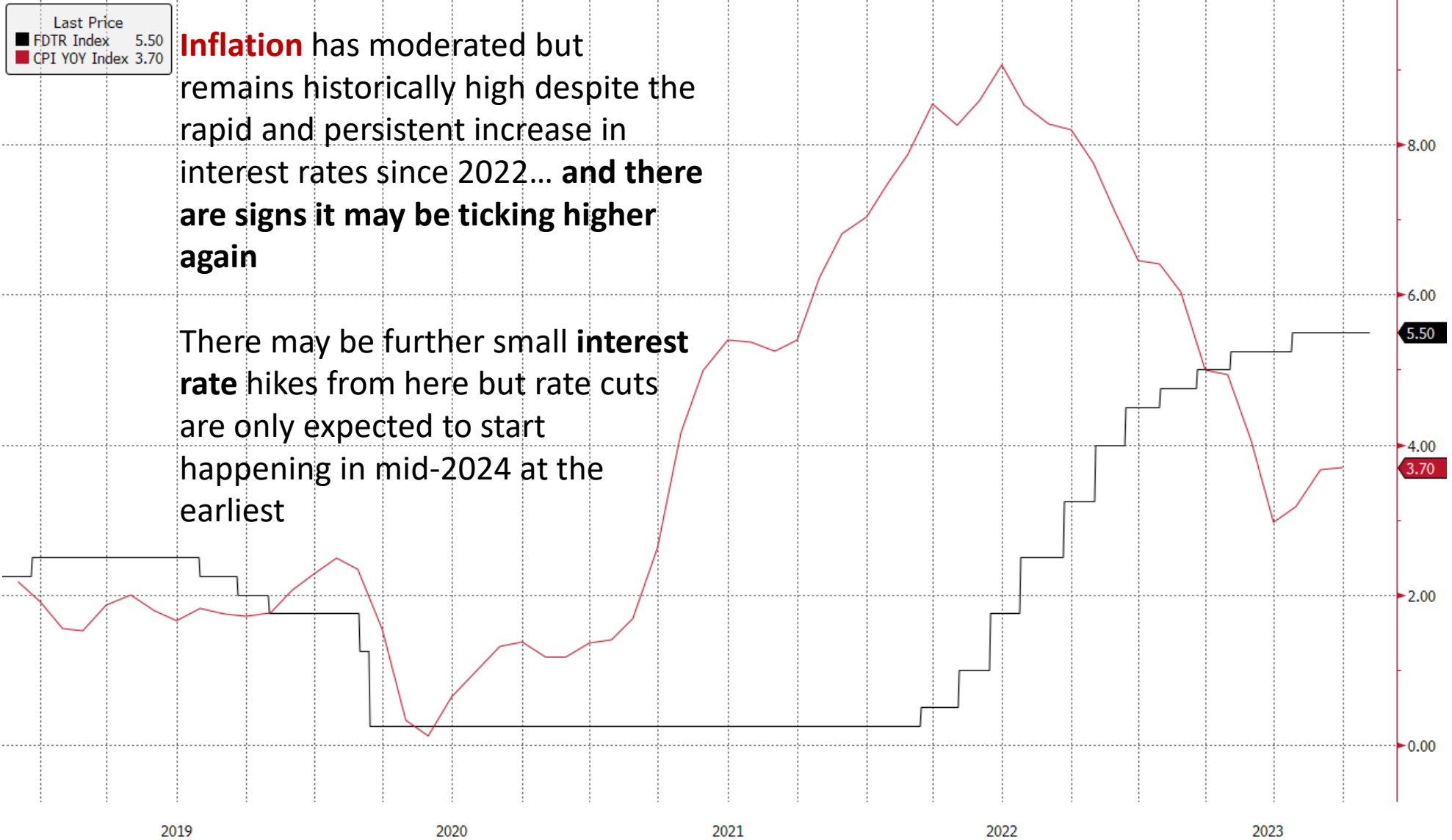
Platinum (US\$/toz)

US Real Yield (% , 10-year US Treasury yield adjusted for inflation expectations)



US interest rates and inflation

US CPI inflation (% YoY) Fed Funds Target Rate (%)



Inflation has moderated but remains historically high despite the rapid and persistent increase in interest rates since 2022... **and there are signs it may be ticking higher again**

There may be further small **interest rate** hikes from here but rate cuts are only expected to start happening in mid-2024 at the earliest

Source: Mitsubishi from Bloomberg Professional Service

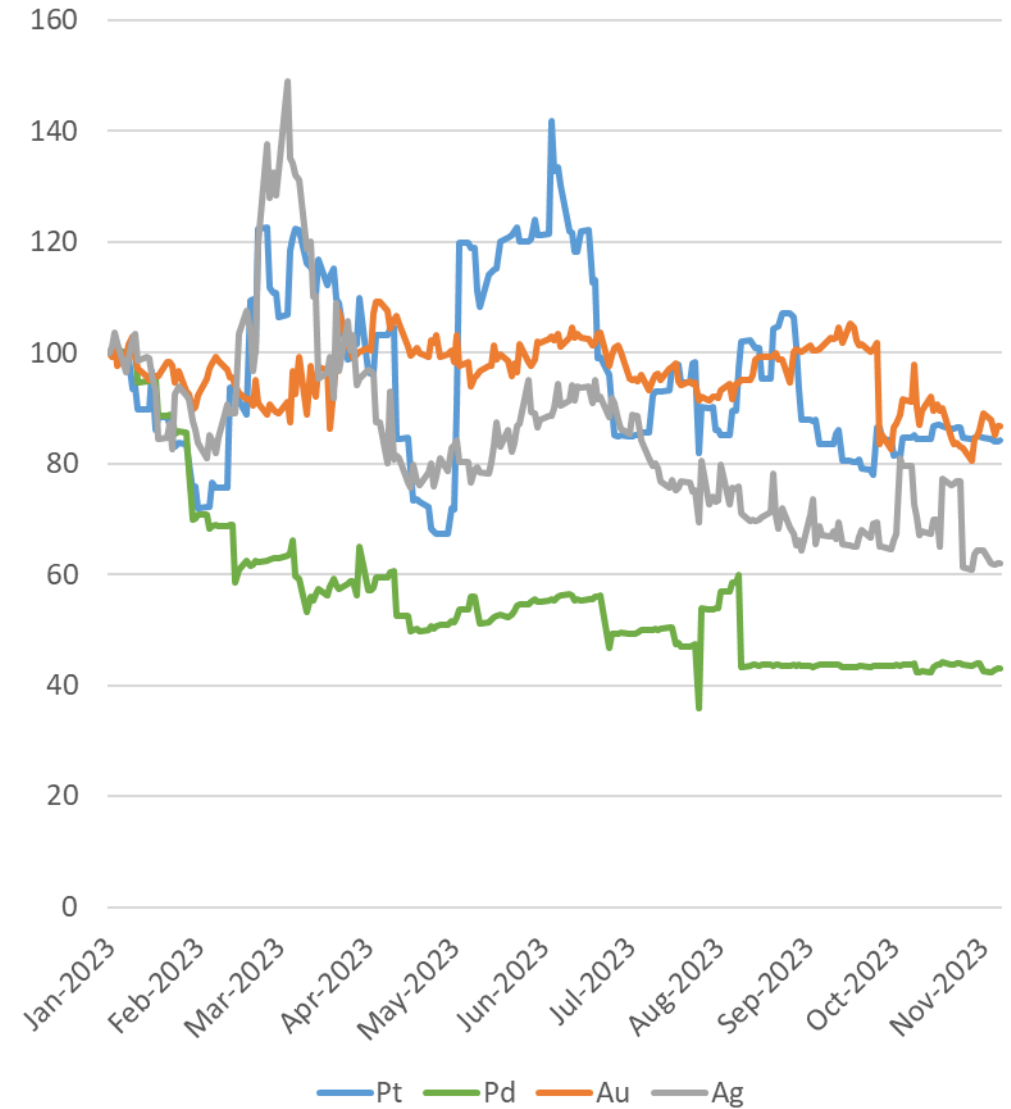
Metal prices and lease rates

Gold, Pt, Pd prices (\$/toz)

Silver prices (\$/toz)

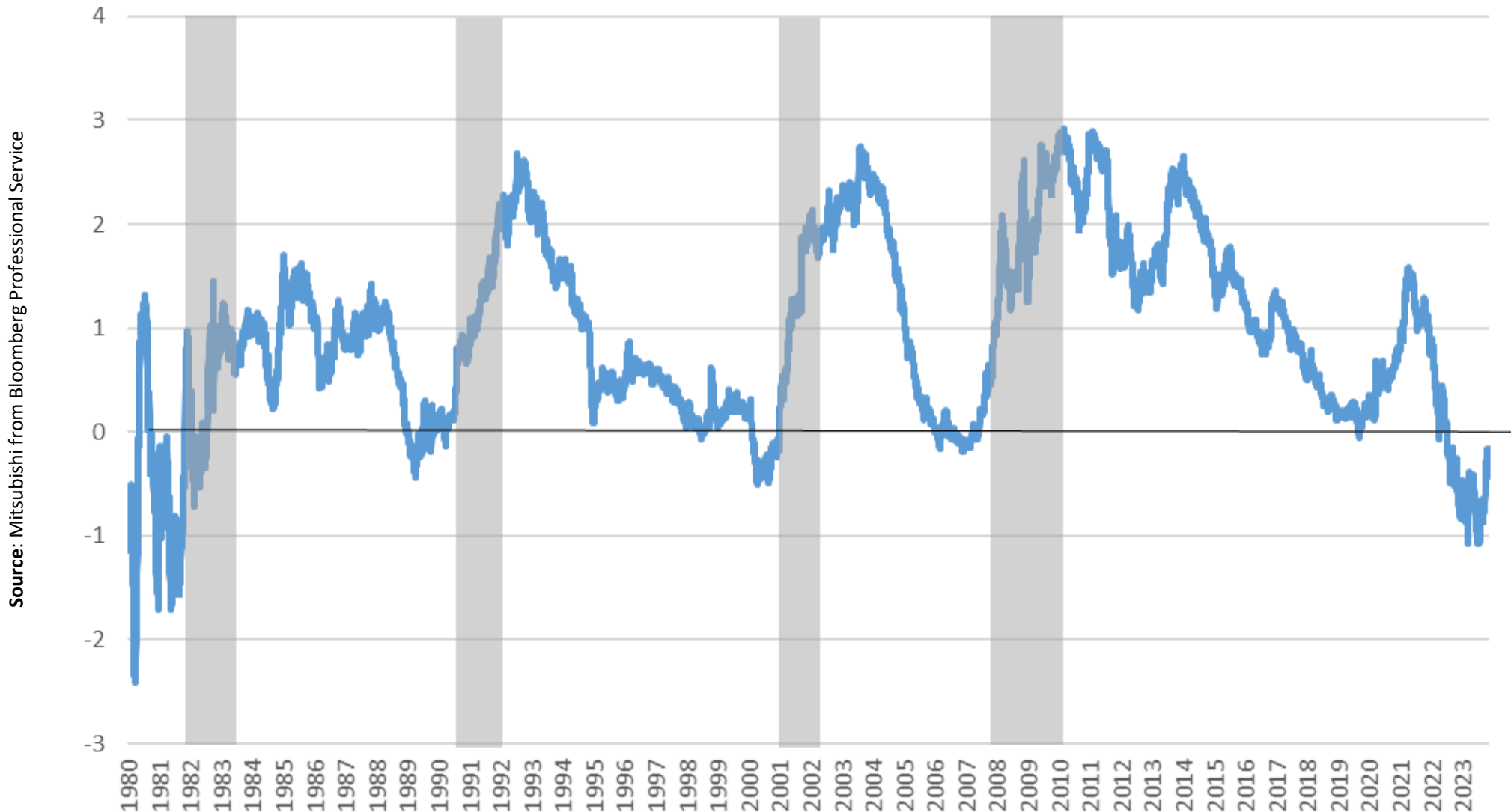
Indexed lease rates (where 1st Jan 2023 = 100)

Source: Mitsubishi from Bloomberg Professional Service



2-year yield remains above the 10-year yield: harbinger of recession?

US 10-year yield minus 2-year yield (%)



Source: Mitsubishi from Bloomberg Professional Service

Economic uncertainty = risk hedging in precious metals?

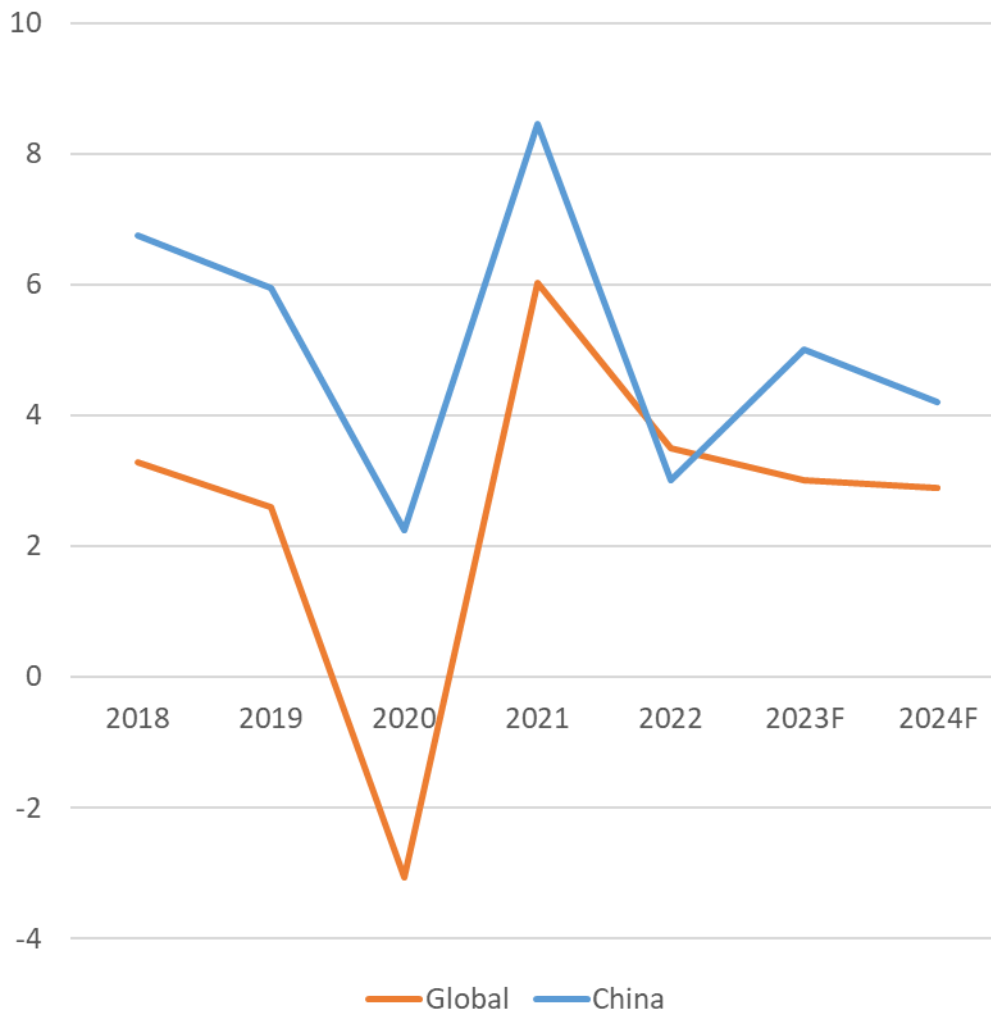
Gold ETF holdings (ounces, millions)



Source: Mitsubishi from Bloomberg Professional Service

2024: Global economic growth expectations are moderating

Global and China GDP Growth (% YOY)

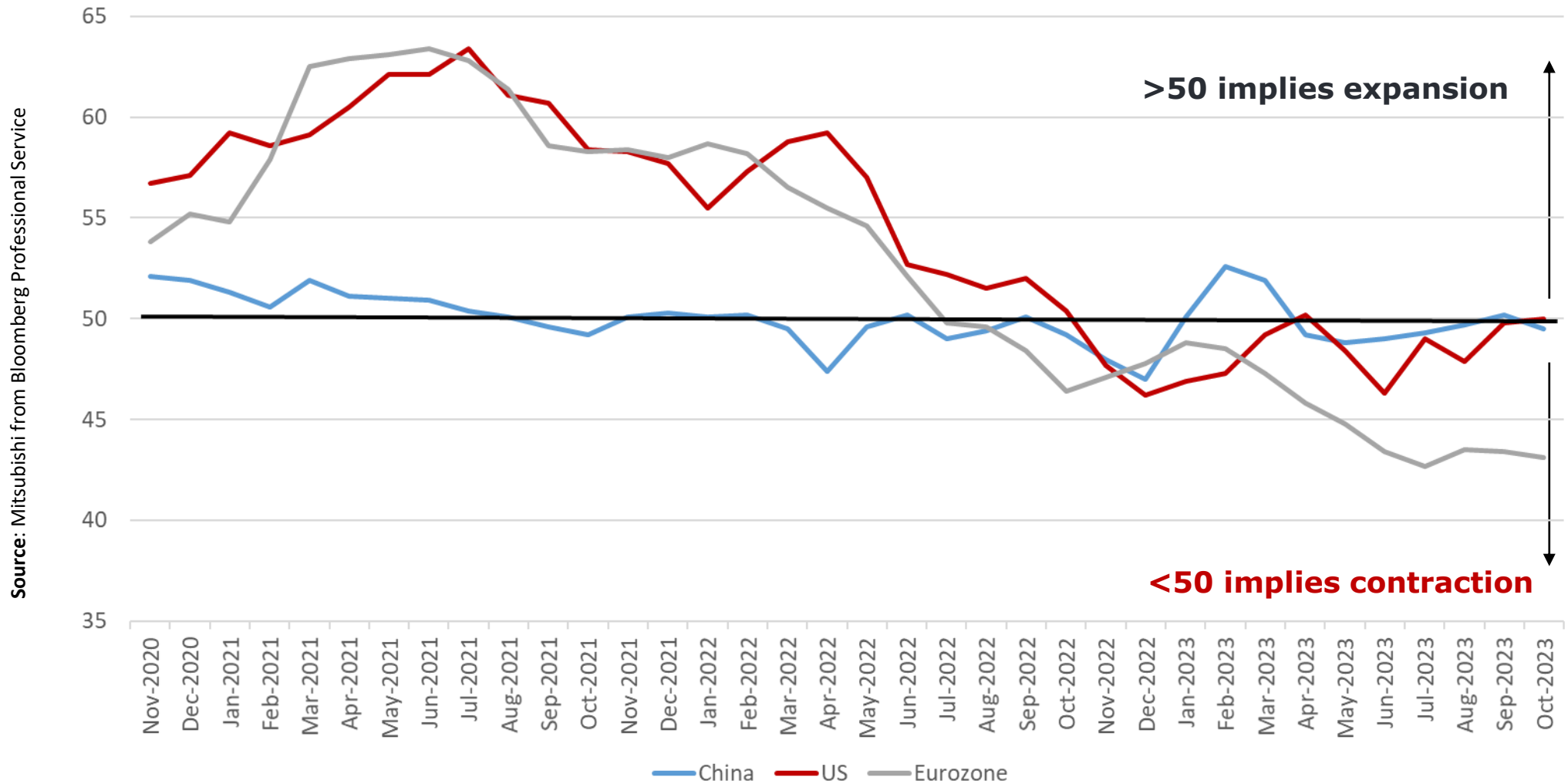


- The **International Monetary Fund (IMF)** sees growth moderating from its 2022 level to 3.0% in 2023 and 2.9% in 2024, well below its historical average (2000-19)
- A **slow, uneven recovery** is expected:
 - **Chinese** growth increased to 5.4% in 2023 but expected to moderate to 4.6% in 2024 as the property sector crisis bites
 - **US growth** steady at 2.1% in 2023 but expected to slow to 1.5% in 2024 amid **debt ceiling** and **presidential election**
 - **EU:** growth likely to have slowed to 0.7% in 2023, picking up to 1.2% in 2024
- **Balance of risks** remains tilted to the downside

Source: Mitsubishi from IMF

Manufacturing indices pointing lower

Manufacturing Purchasing Managers' Indices (PMI)



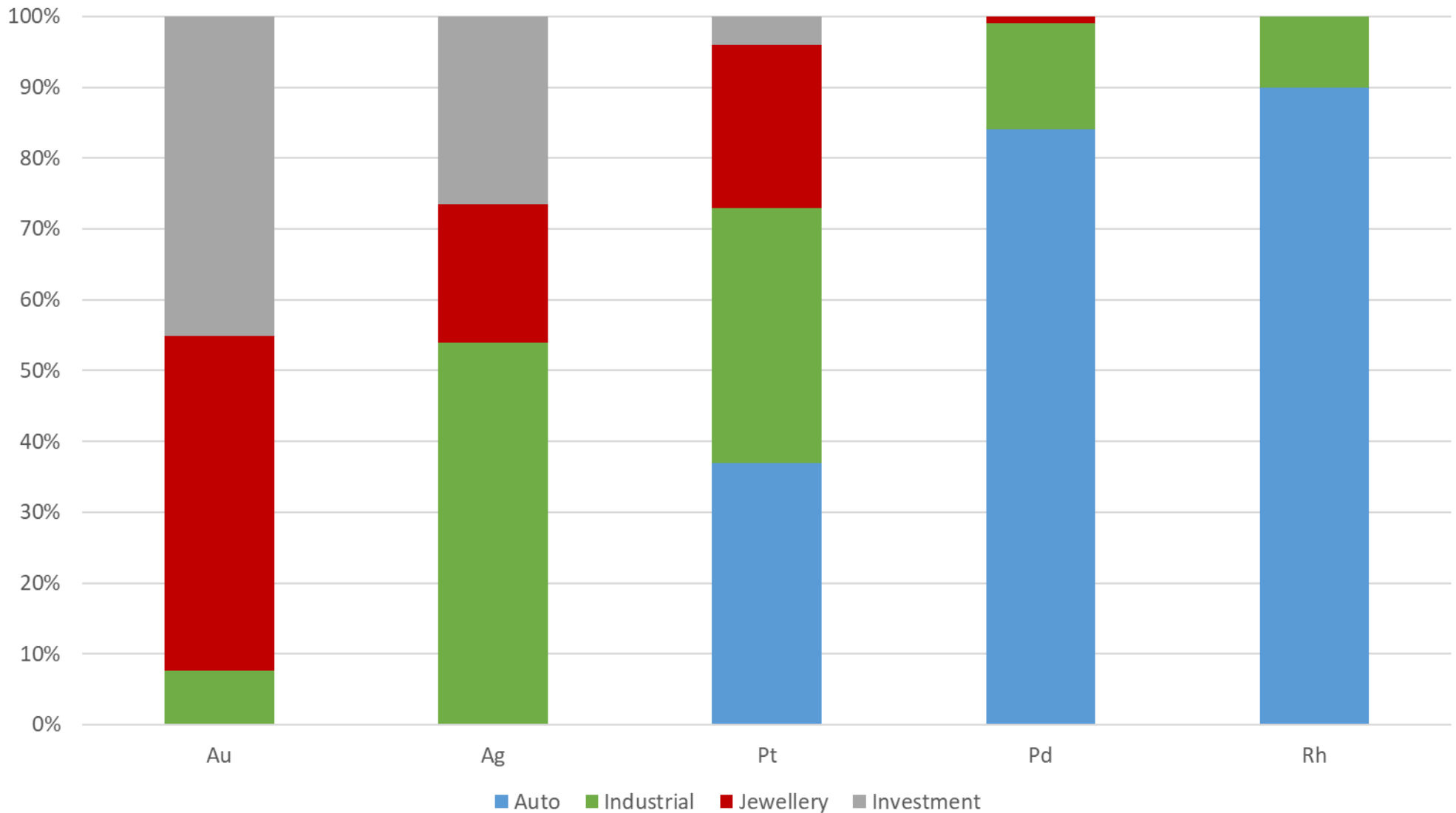
>50 implies expansion

<50 implies contraction

China US Eurozone

PGMs: at greatest risk of industrial demand slowdown

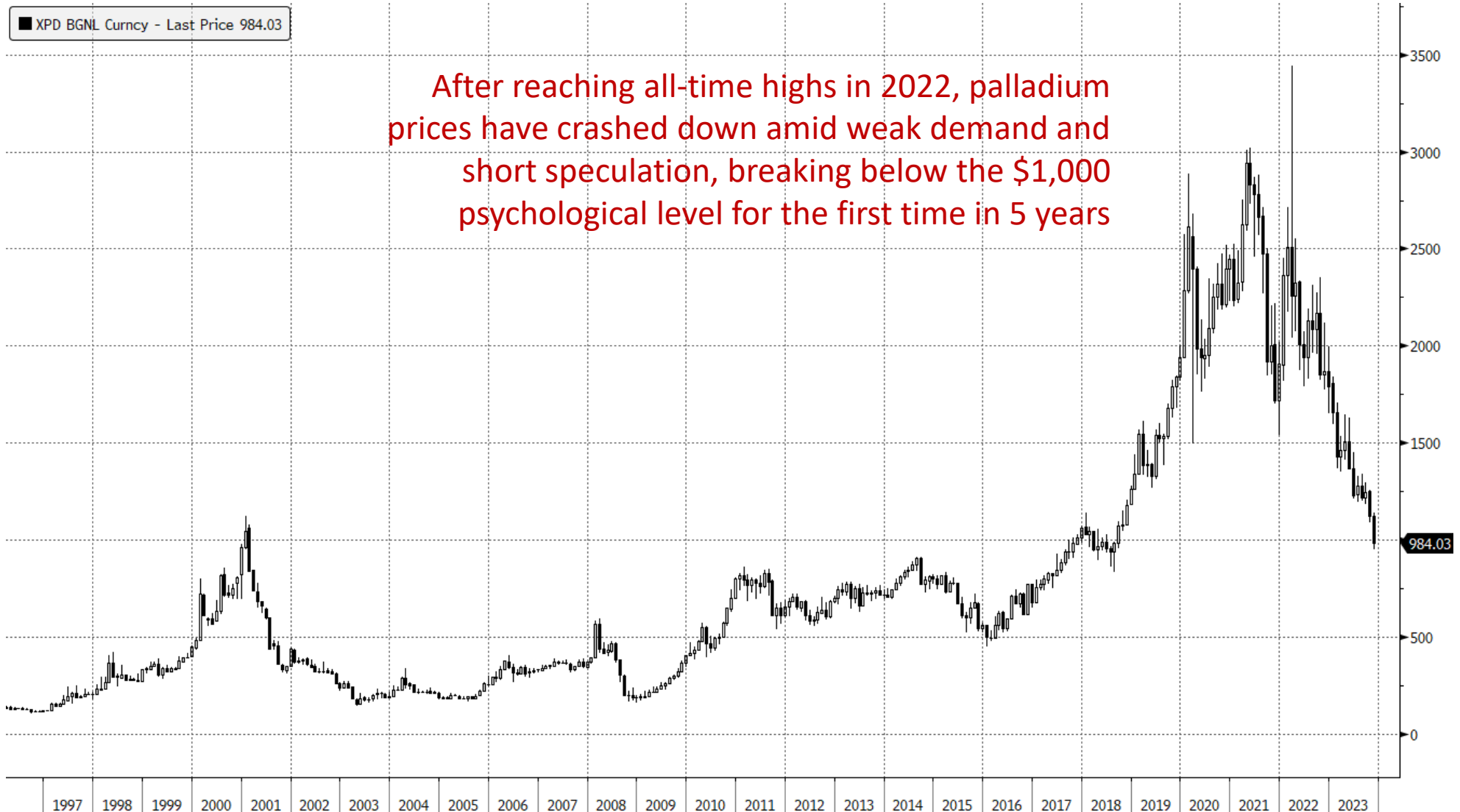
Share of major demand areas (5 year averages)



Source: Mitsubishi from Johnson Matthey (PGM data), Metals Focus/World Gold Council (Gold data), Metals Focus/Silver Institute (Silver data)

What about palladium? - 5 year lows

Palladium (US\$/toz)



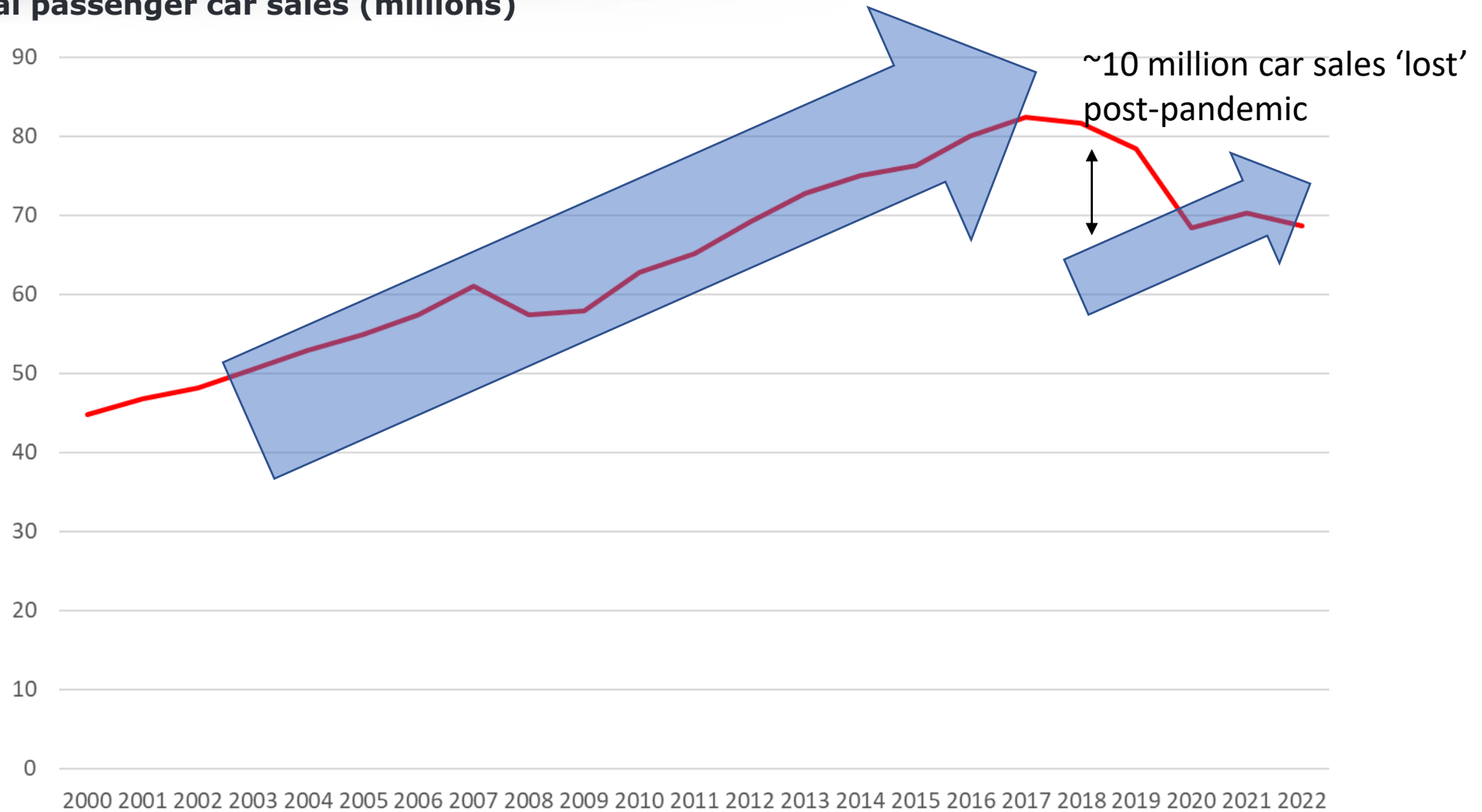
Platinum and palladium approach parity: no more substitution?



Source: Mitsubishi from Bloomberg Professional Service

Car sales: post-pandemic recovery but not yet caught up

Global passenger car sales (millions)



Source: Mitsubishi from IHS/Bloomberg/national auto associations (after Watson, 2023)

View from Europe: Euro 7

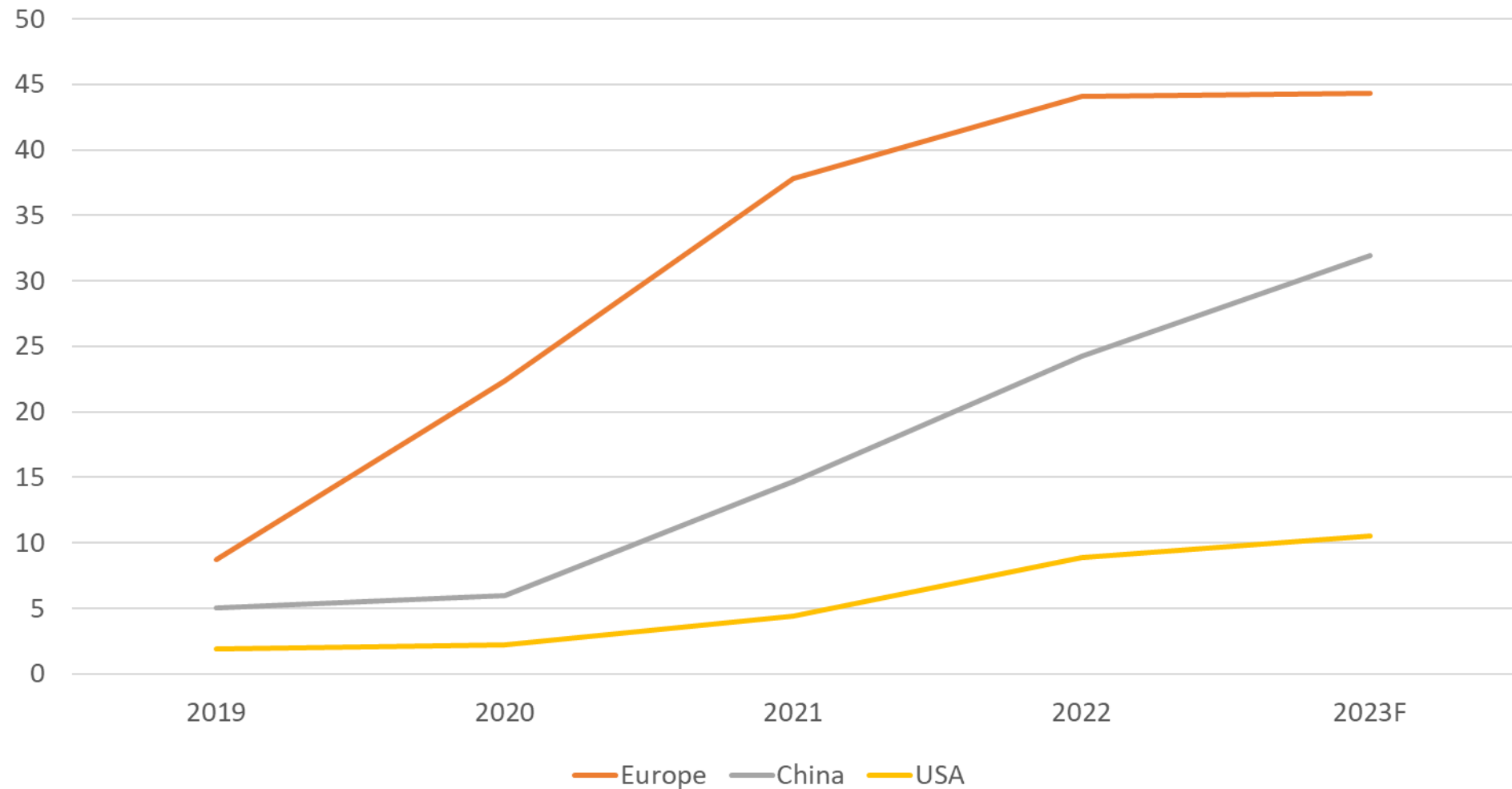
STOP PRESS: NOVEMBER 9TH : European Parliament voted on a significant watering down of the Euro 7 legislation, this is said by OEMs to be “a more realistic approach to Euro 7”

Key points:

- **Back to Euro 6:** NOx limits on gasoline cars relaxed to 60 mg/km as per previous Euro 6
- **Heavy duty trucks:** slightly tougher test standards
- **Particulate matter** for brakes and tyres will be regulated for the first time
- **Original timetable was passenger cars from mid-2025 Commercial vehicles from mid-2027 **now both delayed by 30 months****
- **No provision for e-fuels** though this may be negotiated in at a later date
- **Impact on PGM demand previously thought to be positive, now neutral to negative thanks to the watering down of the proposals**
- **China and India** It remains to be seen how they will adapt the Euro 7 legislation in their forthcoming China 7 and Bharat 7 legislation, respectively

Evolution of electrified vehicles in key markets

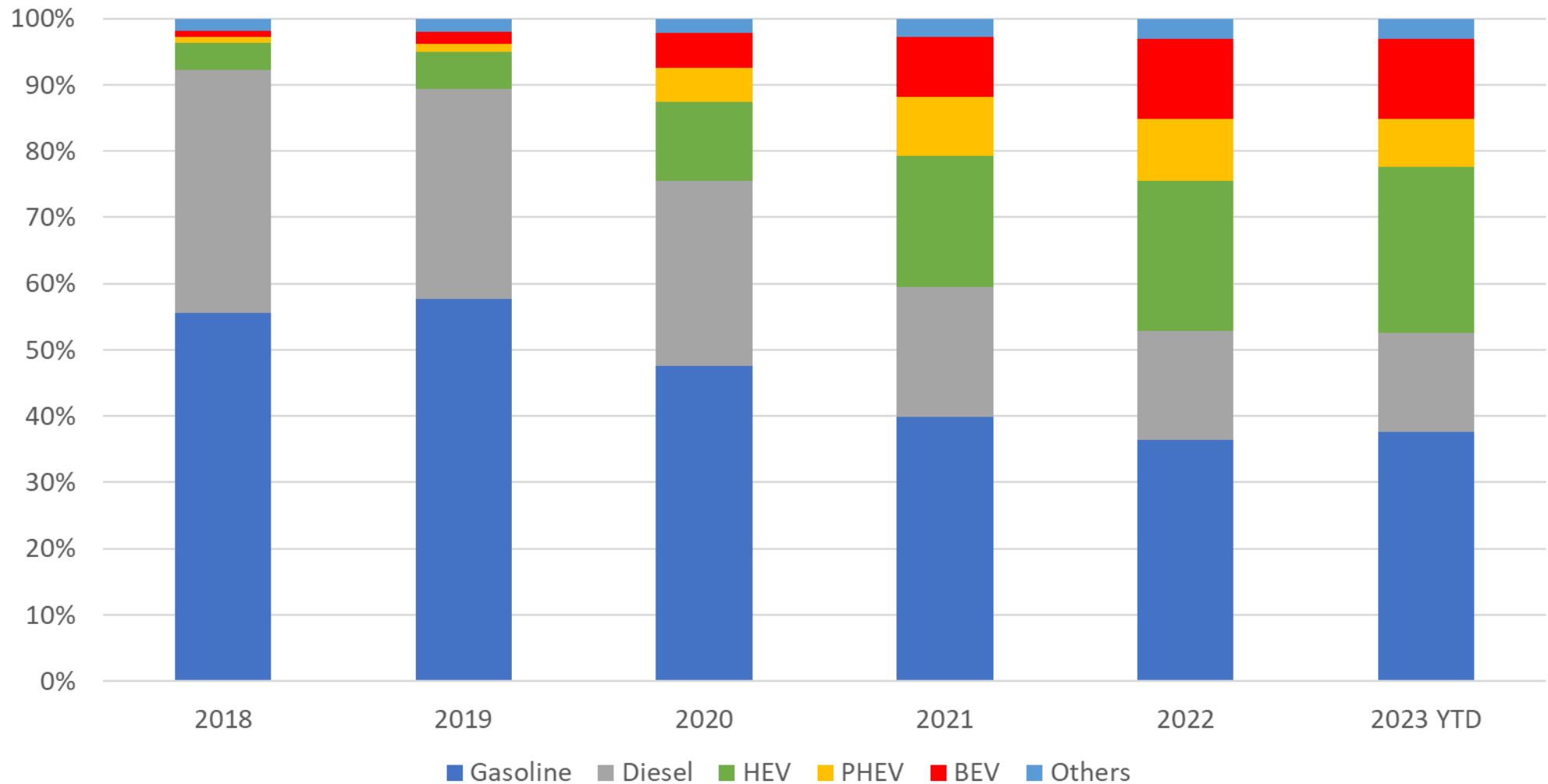
Electrified vehicle market share (% , includes BEVs, hybrids)



Source: Mitsubishi from various national auto associations / Bloomberg Professional Service

Evolution of powertrains in Europe

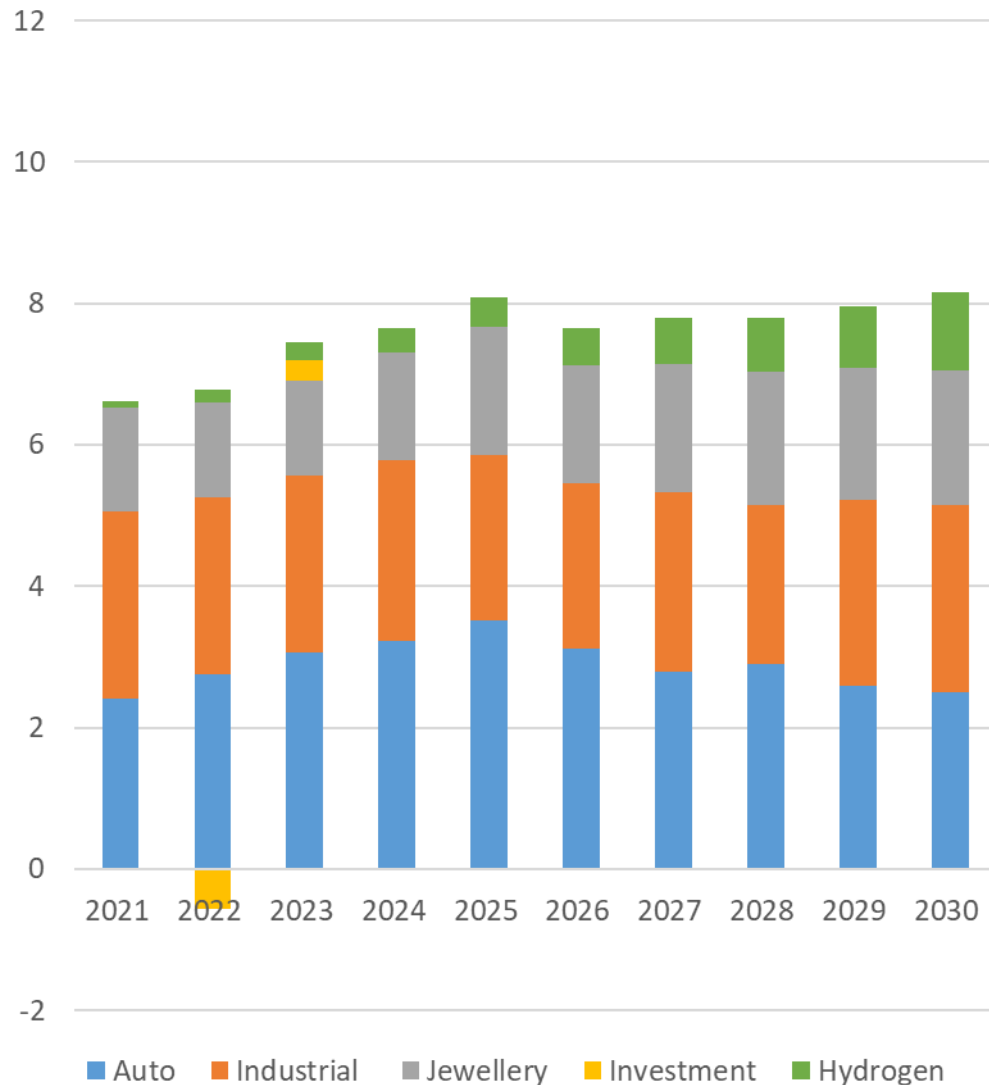
European market share by powertrain



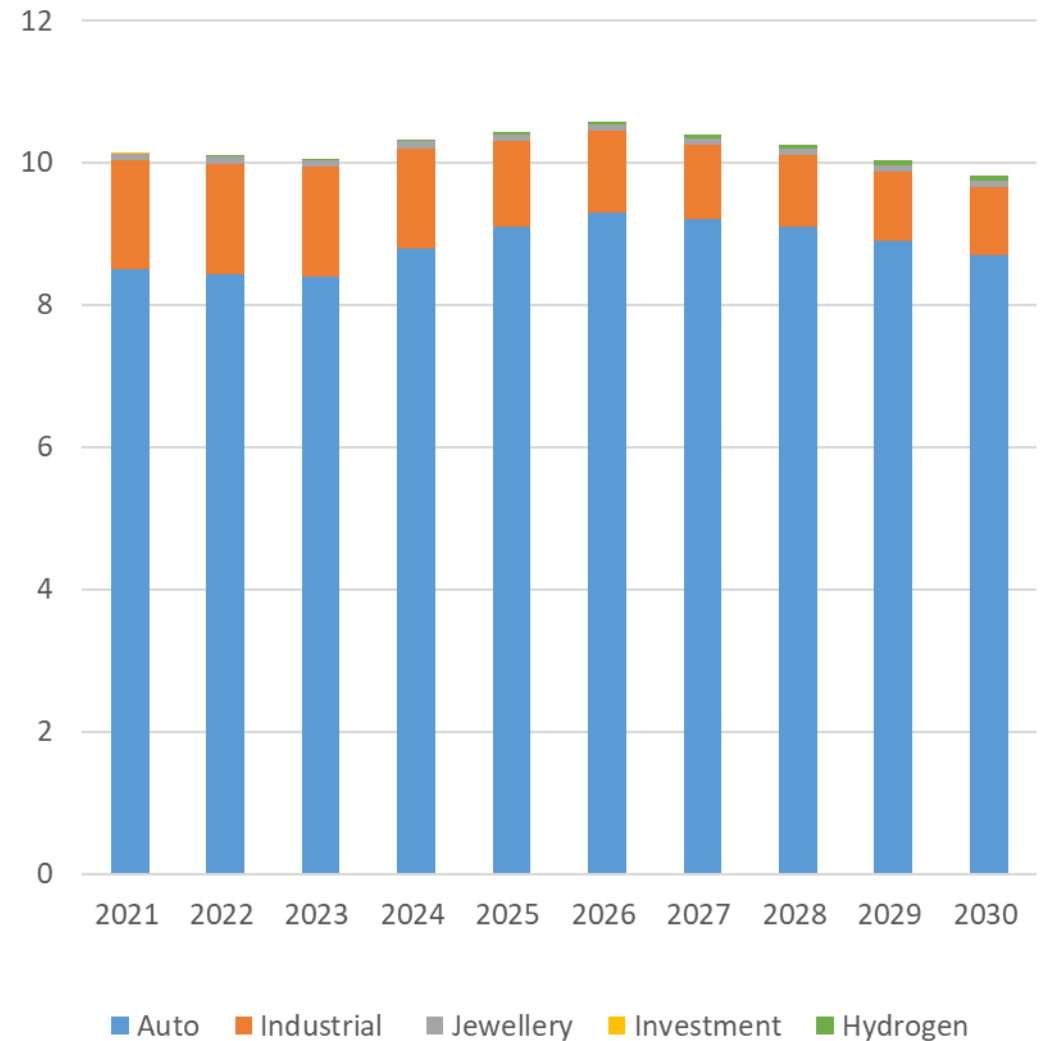
Source: Mitsubishi from ACEA

Platinum and palladium: demand comparison

Platinum demand (Moz)

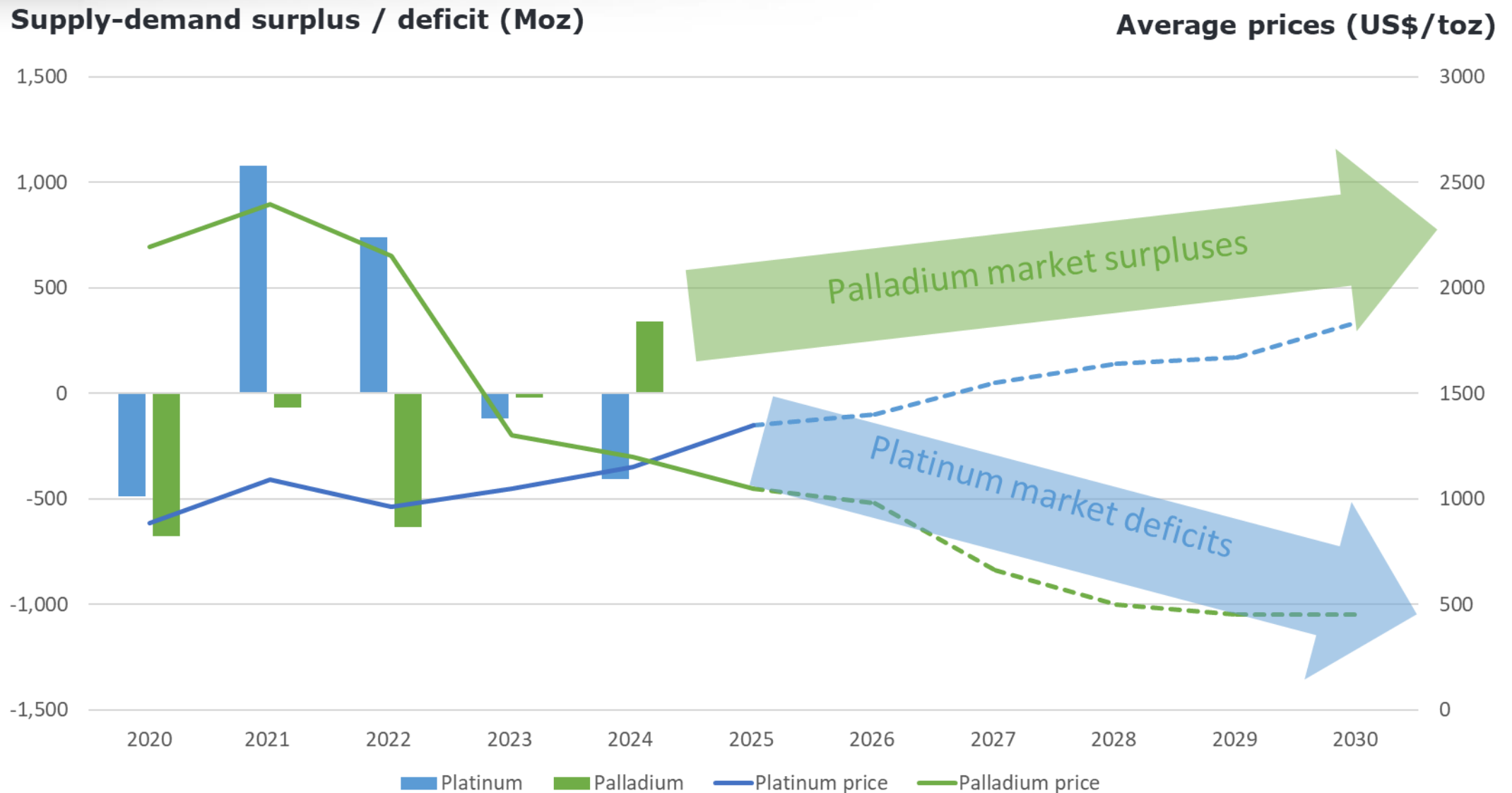


Palladium demand (Moz)



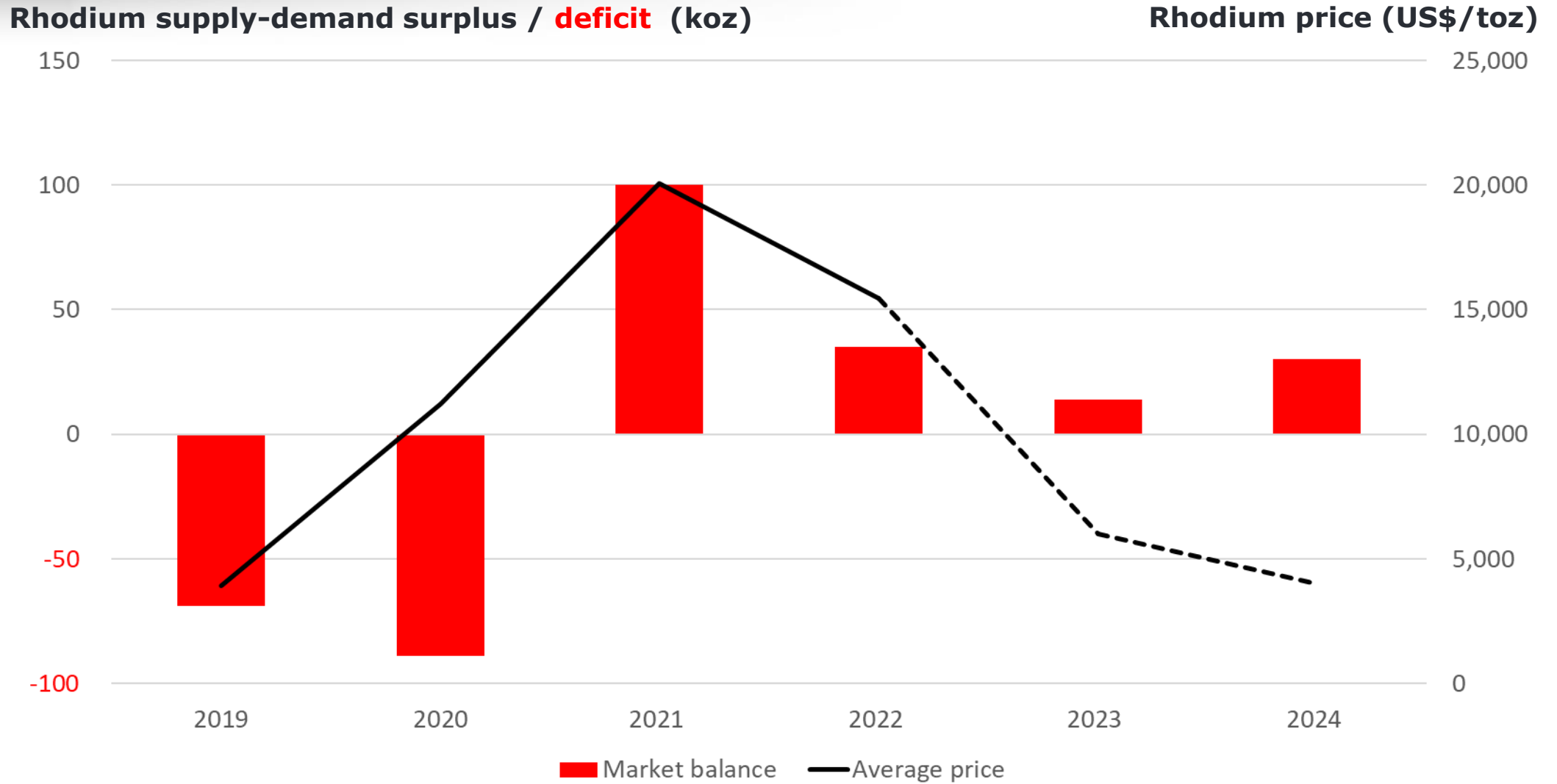
Source: Mitsubishi based on Johnson Matthey demand data (to 2022) Mitsubishi forecasts (2023-)

Comparing long term platinum and palladium market balances



Source: Mitsubishi based on Johnson Matthey demand data (to 2022) Mitsubishi forecasts (2023-)

Rhodium: moving into oversupply?



Source: Mitsubishi based on Johnson Matthey demand data (to 2022) Mitsubishi forecasts (2023 & 2024)

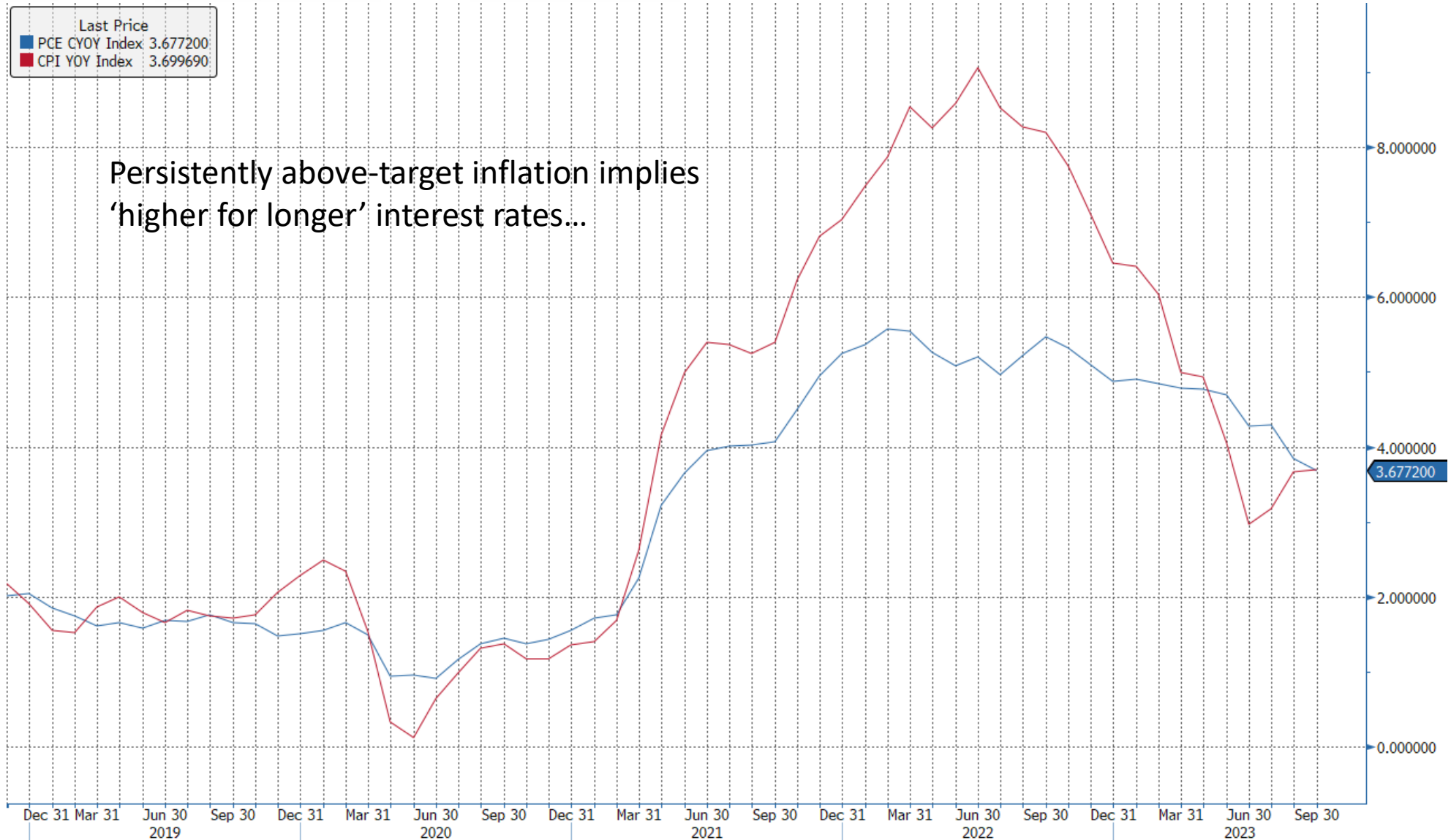
New applications?

	Upstream hydrogen			Midstream hydrogen			Downstream hydrogen					
	PEM electrolysis	Alkaline electrolysis	SMR	LOHC	Ammonia	Methanol	PEM fuel cells	Hydrogen purification	Hydrogen peroxide	E-fuels	SAF	
Pt	Blue			Blue		Blue	Blue			Blue		
Pd				Green		Green		Green				
Rh												
Ru	Yellow				Yellow		Yellow					
Ir	Purple						Purple					

Thank you!

US inflation measures are converging but remain high

US CPI inflation (% YoY) Core Personal Consumption Expenditure (PCE) inflation (% YoY)



Source: Mitsubishi from Bloomberg Professional Service

Yield environment is negative for precious metals

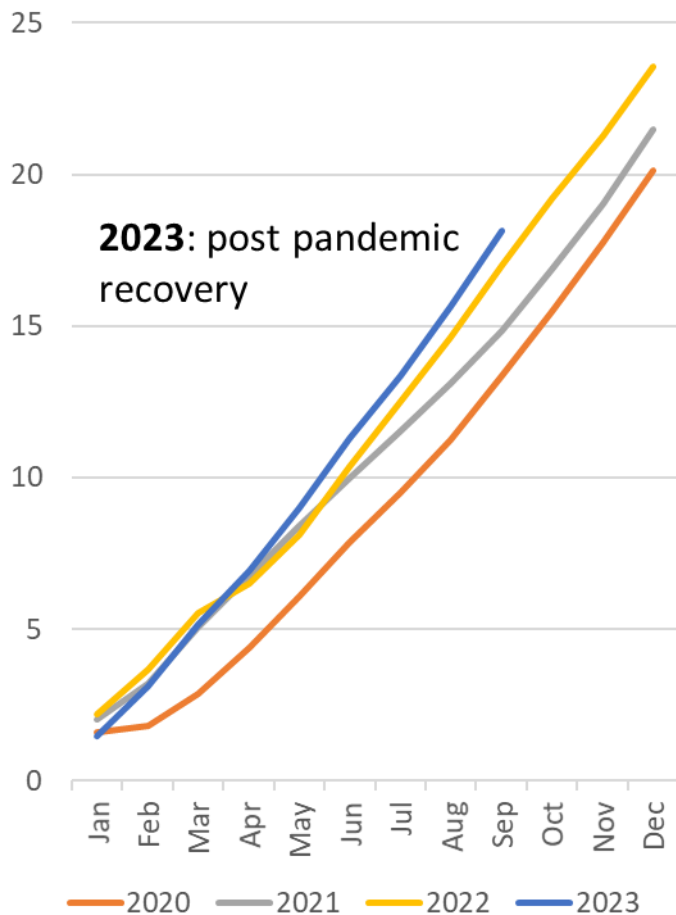


Source: Mitsubishi from Bloomberg Professional Service

Automotive demand: Car sales in key markets show slow recovery

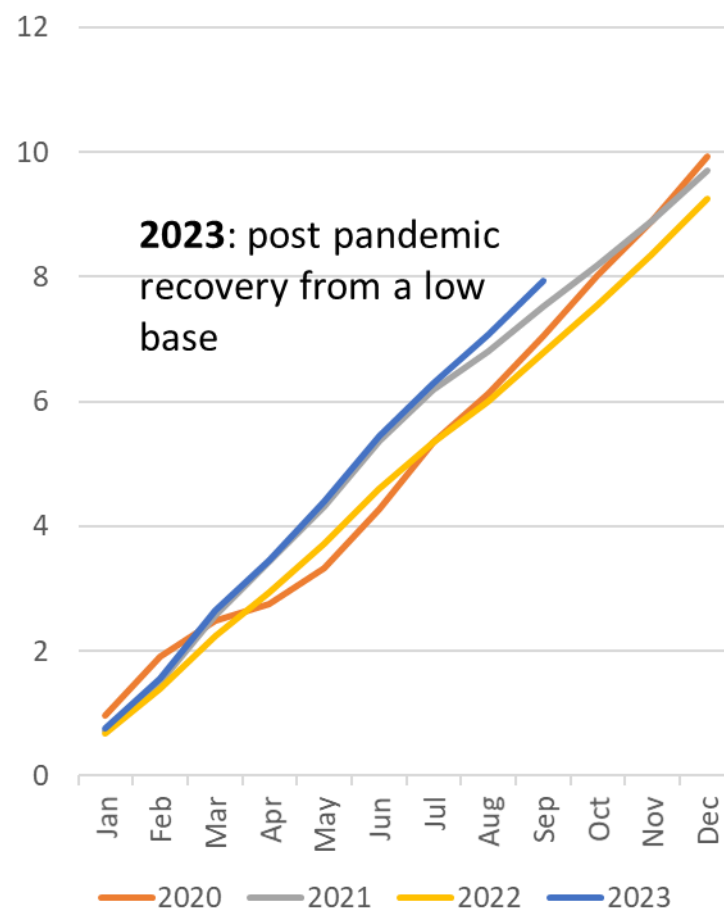
China

Cumulative monthly sales (millions)



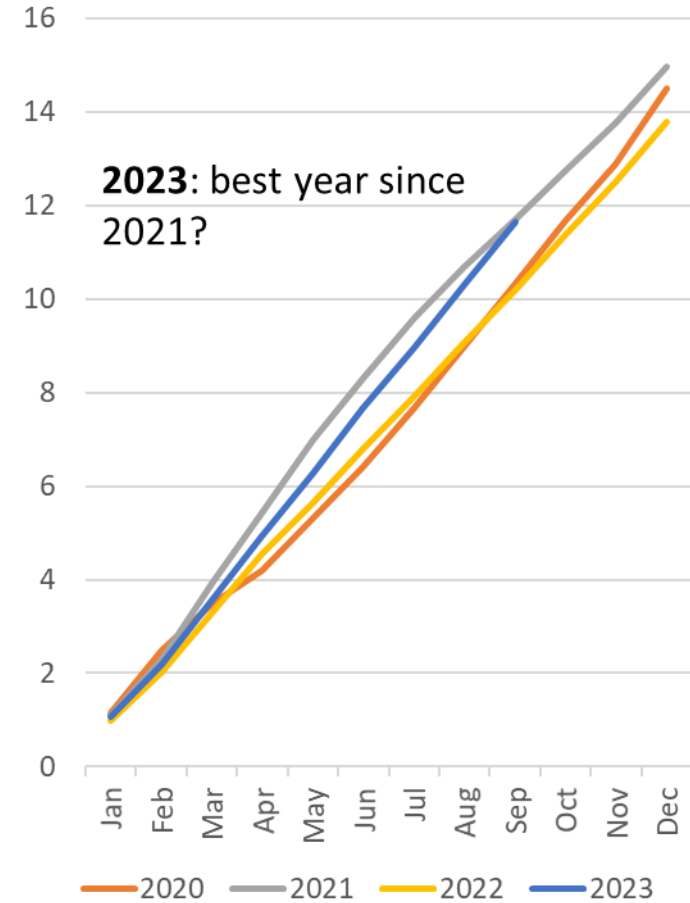
Europe

Cumulative monthly sales (millions)



USA

Cumulative monthly sales (millions)



Source: Mitsubishi from various national auto associations / Bloomberg Professional Service

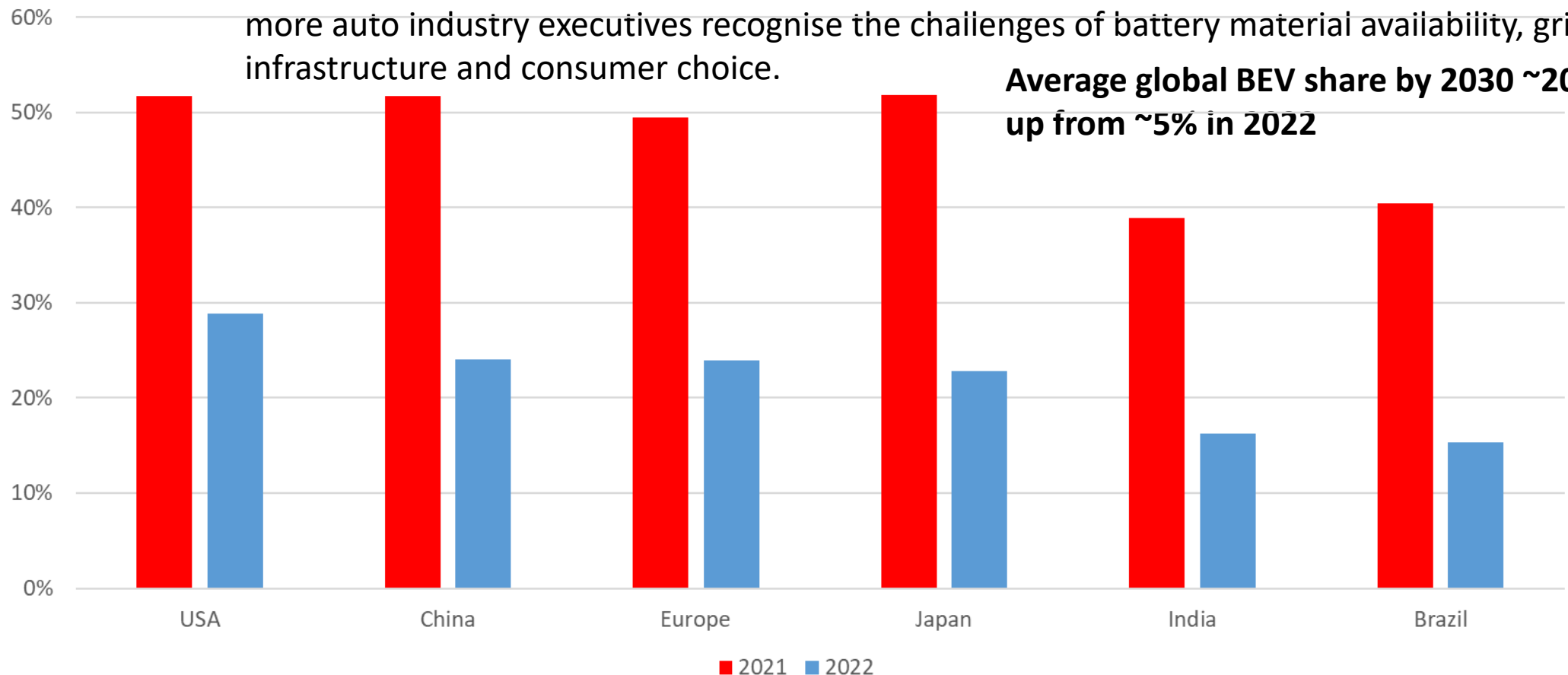
BEV adoption: readdressing the more optimistic forecasts

KPMG'S Annual Global Automotive Executive Survey: comparison of 2021 and 2022:

“By 2030, what percentage of new vehicles sales do you believe will be battery-powered (excluding hybrids) within each market?”

Expected BEV adoption by 2030 has roughly halved between the 2021 and 2022 surveys as more auto industry executives recognise the challenges of battery material availability, grid infrastructure and consumer choice.

Average global BEV share by 2030 ~20%, up from ~5% in 2022



Source: Mitsubishi from KPMG Global Automotive Executive Survey 2021 and 2022 <https://experience.kpmg.com/gaes-2022#/subpage/home>