MKS PAMP

Precious Metals Outlook

Metals Forecasts for 2024

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Summary of our Precious Metals Forecasts

MKS PAMP 2023 Forecasts, Revision History vs Actual Averages						
	Original forecast (Jan '23)*	Banking Crisis forecast revisions (March '23)	**Mid-Year Update (average forecast)**	Mid-Year Update (high – low range)	Actual 2023 Average	**Actual vs Forecast (MidYears Revision)**
Gold	$1880/oz	$1930/oz	**$1930/oz (unchanged)**	$1850 - $2100/oz	$1,943	**1%**
Silver	$22.50/oz	$24/oz	**$24/oz (unchanged)**	$21.50 - $27/oz	$23.40	**-3%**
Platinum	$1100/oz	$1100/oz	**$1050/oz (downgrade)**	$900 - $1150/oz	$968	**-12%**
Palladium	$1800/oz	$1600/oz	**$1400/oz (downgrade)**	$1200 - $1600/oz	$1,342	**-4%**
Rhodium	$13,000/oz	$11,500/oz	**$8000/oz (downgrade)**	$3000 - $12,000/oz	$6,632	**-17%**

MKS PAMP Group 2024 Forecasts		
$ / oz	**Average 2024 Price forecast***	**High - Low Price Range**
Gold	$2,050	$1900 - $2200
Silver	$25.00	$21.50 - $30.00
Platinum	$1,050	$800 - $1200
Palladium	$1,000	$800 - $1350
Rhodium	$4,500	$3000 - $8000

**forecast submitted to LBMA analysts survey*

Source: MKS PAMP

A Summary of Precious Metals Expectations & Forecasts for 2024

→ An expected easing Fed cycle, as global growth slows, puts Gold/Silver back in vogue with PGMs under pressure in the short-term

Gold Prices will print another new record in 2024 as the Fed cuts rates sooner rather than later. The positive feedback loop of a peaked US$ and peak real US yields against a backdrop of slower global growth, ongoing deglobalization (and thus ongoing Central Bank dedollarization), messy geopolitics, unsustainable global debt paths and a very under owned investor community ensures gold will return as a safe diversifier, even at these higher prices. **Average forecast $2050/oz**

Silver will rally alongside Gold with upside potential hinging on investor participation outweighing some mild contraction in industrial demand. **Average forecast $25/oz**

PGMs could face pressure as economic growth slows. Platinum is expected to surpass Palladium as investment demand, contingent on higher Gold prices, and resilient industrial demand keep it relatively buoyed. Palladium remains susceptible to volatility. The sector is vulnerable to potential supply cuts. **Average Platinum forecast $1050/oz for and $1000/oz for Palladium**

Macro Trends In 2023: Wars, Recessions & Stagflation Driving Haven Demand

2022 – Higher inflation, QT regime & War Regime

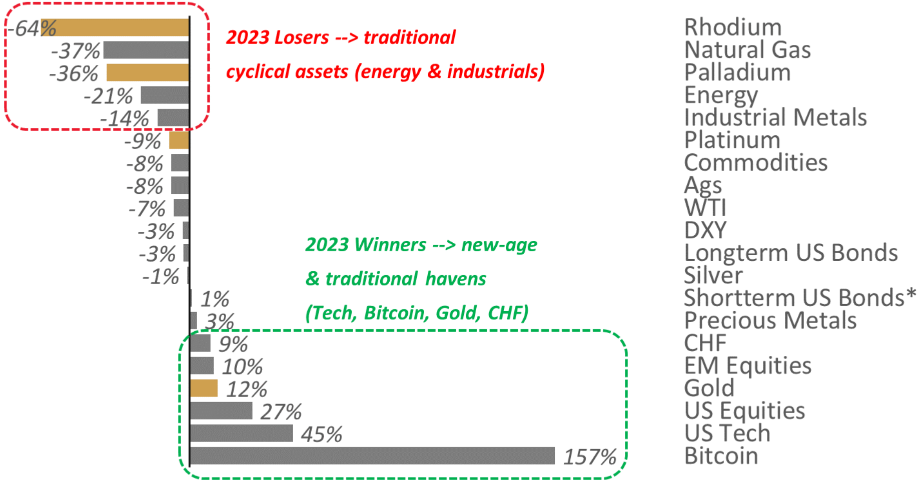
- Energy crises / outperformance
- Bear Market in EM & US Stocks and L/T Bonds

2023 – Disinflation, Renewed Geopolitics, Late cycle

- Wrongfooted: China didn't reopen strongly, US didn't enter a recession
- 'Old' & 'New' Havens Outperform → Precious Metals, US Tech, Bitcoin, CHF, US$)
- Energy rerates from 2022 highs
- Bear Market in US bond extend from 2022
- Industrial PGMs collapse
- Little macro synchronization typical of late cycle dynamics

→ The world is short trust and short havens

2023 Performances Across Macro Assets



*Precious Metals

MKS PAMP, Bloomberg

A Summary of Macroeconomic Expectations for 2024: Late & Easing Cycles

2023 was just as challenging as 2022 - two wars, messy disinflation, ongoing deglobalisation, a shock US regional banking crisis at a time when two consensus views (Chinas reopening and a US recession) did not come close to playing out. **Here are our top key assumptions & themes for 2024 →** The Fed is done and most global Developed World Central Banks will enter easing cycles to boost demand. Inflation has fallen, but not to target and the recoveries will now disappoint with typical late, not mid cycle, dynamics such as rising Unemployment materializing. The geopolitical backdrop remains fragile and global political/election & policy risk is high.

- **Global Growth:** The global economy will be weak in 2024 as the delayed effects of rate increases catch up with us putting margins under pressure and causing cracks in the labor markets. Global growth will be ~½ pp weaker in 2024 vs 2023, mostly due to the US and China, well below its historical average (2000-19).

- **Inflation** – the global monthly pace for core inflation has reversed the majority of the pandemic run-up. However with the lagged effects of monetary policy, further growth weakness is likely, making the "last mile" in the inflation fight a struggle. The largest risk is if inflation does not return to targets, which will play out in even "higher for longer" rates and much lower growth profile in the medium to long term.

- **The Fed & Central Banks** – the Fed pivot is here and so the peak in real US rates and the US$ is now behind us. Surgical Fed cuts, to boost growth, will likely occur sooner (1H, possibly 1Q'24); the Fed must maintain independence but at the same time earlier rate cuts provide enough time lag for easing to boost the real economy into US elections. US data looks more consistent with late-cycle trends (vs a mid-cycle slowdown) and with inflation falling, global monetary policy (led by the Fed but excluding the BOJ) will now be now easing and will ease much more in years 2024-25.

A Summary of Macroeconomic Expectations for 2024: Late & Easing Cycles

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- **FX trends** – US interest rates will decline at a faster clip than in other DM countries, "US exceptionalism" should corrode as US data sours and the country enters a contentious election cycle. Thus the potential FX outperformers in '24 should be currencies most hurt by the US$'s positive carry in 2023 – Gold, JPY and to a degree the EUR. EM FX should be on the backfoot givens Chinas weak investment growth in turn hurting imports, but can still stand to tactically rise amidst a Fed pivot.

- **Geopolitics:** deglobalization is continuing at a fast rate given two ongoing wars (Russia/Ukraine, Israel/Hamas) compounded by one-sided Western-driven policy making. War risk increases sanction risk which will drive ongoing dedollarization and continue to upend commodities markets. 40 countries (representing 42% of global GDP) have national elections in 2024 creating political/policy risks. India, Taiwan, Russia, South Africa, Europe (European Parliament) and of course the US elections will be closely monitored.

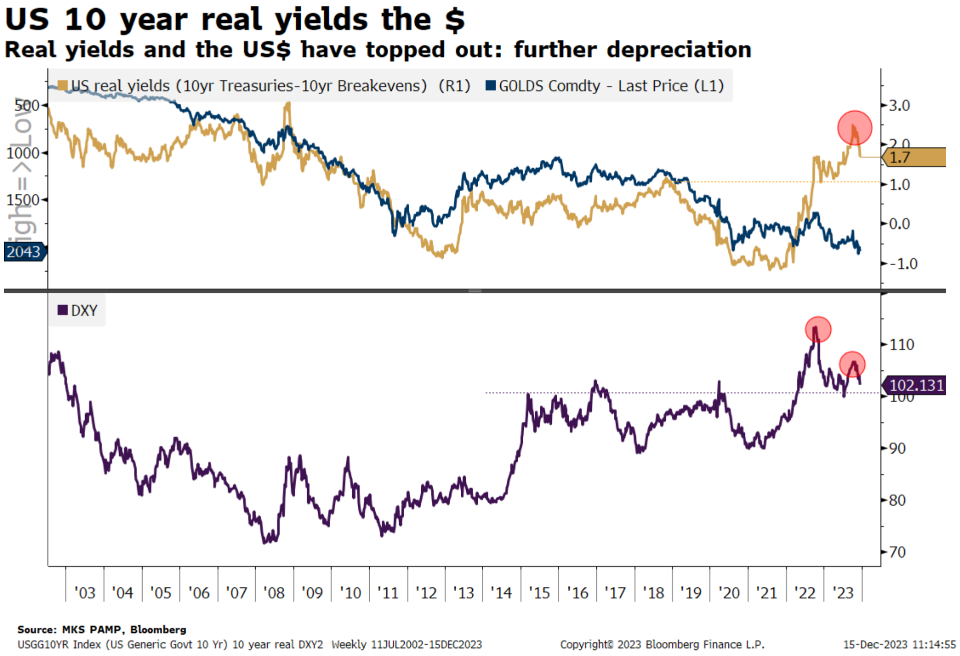
The US$ Topped Out in ‘22 & Again In ’23 – Lower Peaks & Further Depreciation

- “US exceptionalism” (relatively stronger economic growth and relatively higher interest rates than the US’ developed economy peers) has peaked and thus the US$ peak is behind us.

- Tactical weakness will be most notable in the Fed rate cutting cycle in 2024 when interest rates spread narrow and consensus positioning really unwinds.

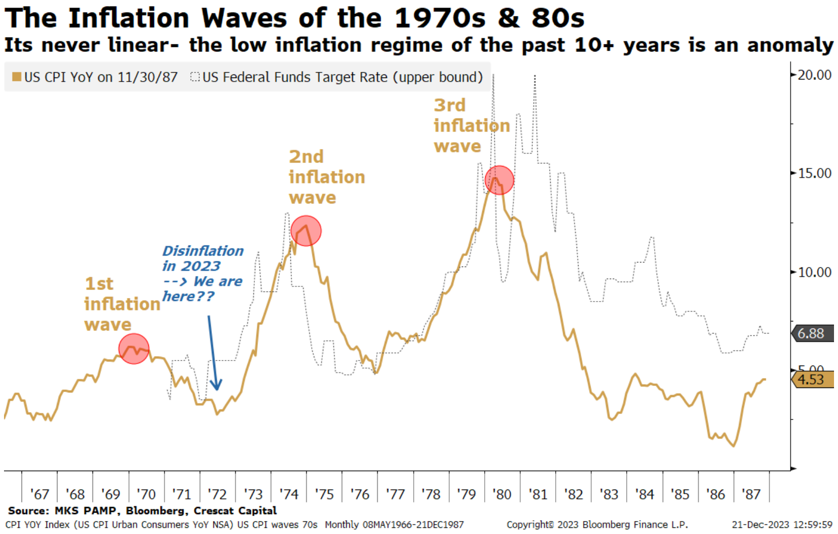
- The reversal in the US rate cycle expected in 1H 2024 is also positive for risk assets and high-beta precious metals, encouraging investors to rotate away from the safe-haven US$.

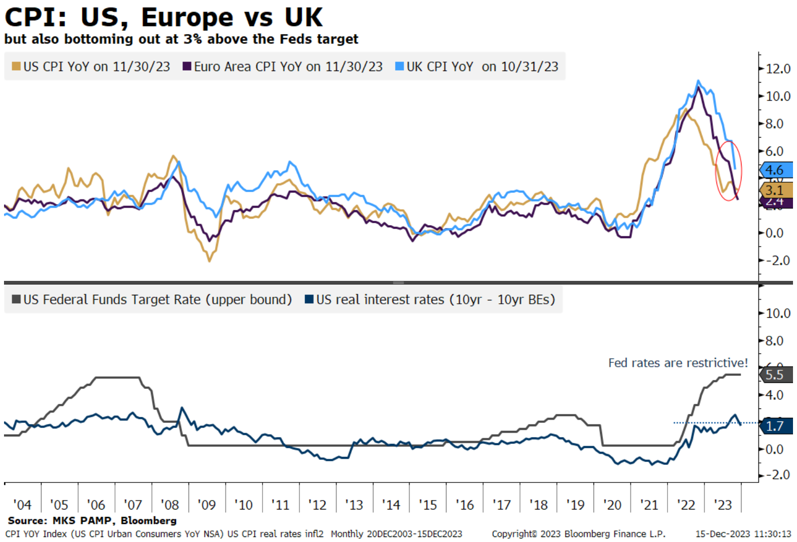
- The threat of further de-dollarization from non-Western players, especially given higher sanction risk with two ongoing wars, is a headwind for both US$ flows but also negatively impacts “USA” sentiment.



Disinflation Across The Developed World But Still Above Targets

- The disinflation in 2023 (inflation moderated but did not return to target) is occurring much faster than the market expected. But the market (and Central Banks!) should not claim victory over inflation too early especially considering the 1970s playbook highlighting the risks of doing so. Inflation is still above the Feds (and other CB) targets, and it's the last mile that is tricky given a messy mix of supply & demand dynamics and monetary policy lags.





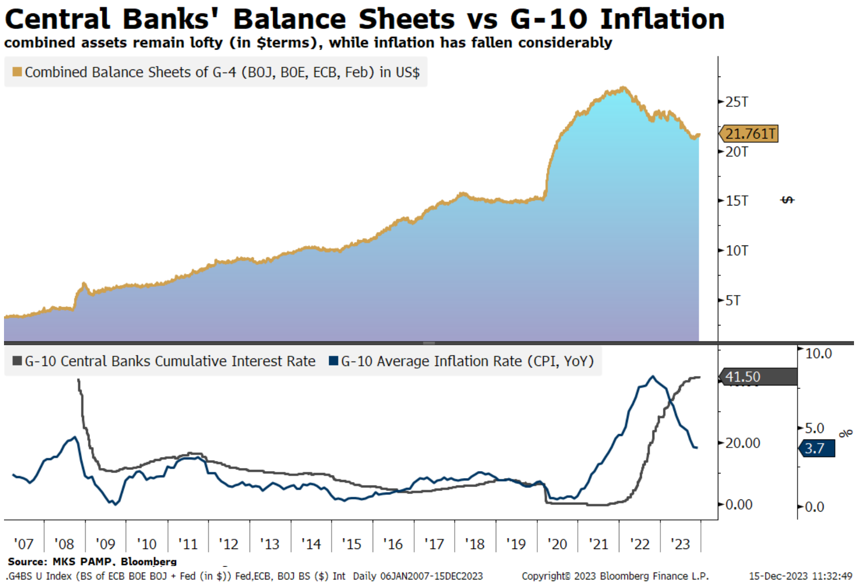
The Combined Assets Of The Fed, BOJ, ECB + BOE Is Still >$22tn With Average G-10 Inflation Significantly Lower vs 2022 Levels

- Strong & synchronized hiking of G-10 interest rates in 2022 with some continuation in 2023 saw 4200bp of cumulative rate hikes to combat average G-10 inflation at 8-10%, multi decade highs. G-10 average inflation has since fallen from 8.2% peak to 3.7%.

- The "Big 4" (Fed, BOJ, ECB + BOE) still own ~$22tn in assets on their Balance Sheets, down from $26tn peak in 2021; QT (Quantitative Tightening) has only erased ¼ of the assets CB purchases in response to COVID.

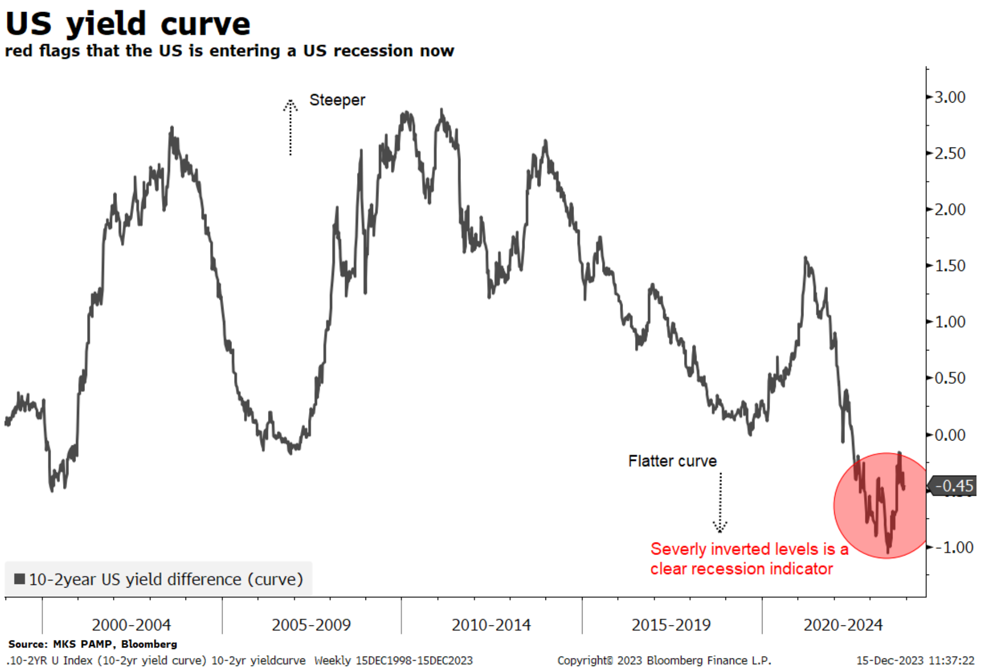
- Any liquidity withdrawal and fear of continued G-10 QT will drive expected financial markets volatility & can negatively impact financial conditions and risk assets.

- On the contrary, a collective easing cycle from DM CBs, given lower inflation but still lofty CB Balance Sheets, implies a liquidity injection that will spur a rise in riskier assets.



The US 10/2year Yield Curve Remains In Deep Recessionary Territory Signaling Hard Landing Risks Are High

- There are plenty of recessionary indicators pointing to a current or impending US recession.
- The inverted US yield curve (the well regarded 10-year less 2-year yields) continued to flatten in 2022 & 2023 to unprecedented levels not seen since the 1980s.
- Still, although the Fed has paused and is likely to pivot, the US yield curve may still flatten further if growth surprises to the upside and the Fed targets “higher rates for longer”.



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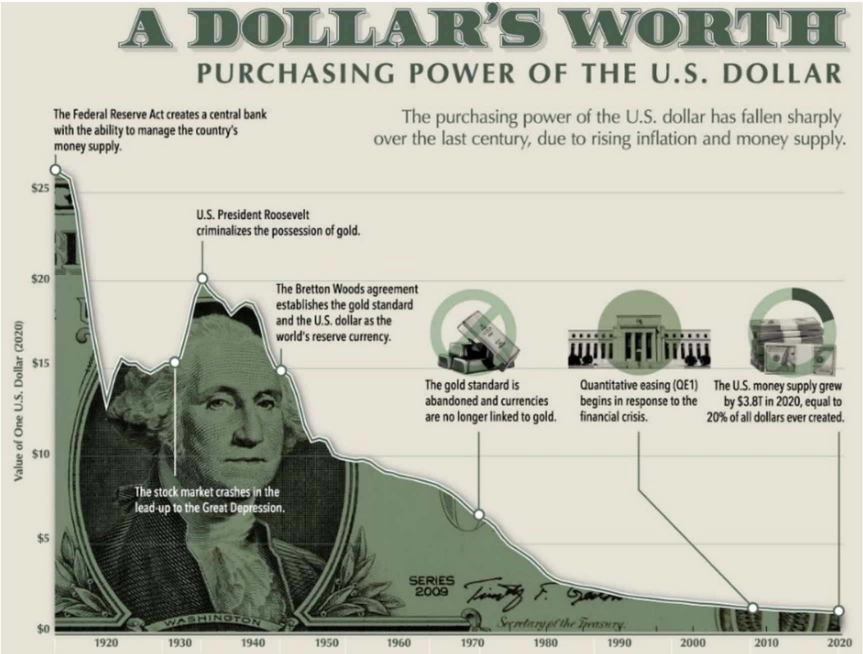
The Rise of Global Debt, Deglobalization & The Global Monetary System

- Globally and in the US, ballooning debt with disproportionate access to credit, fuels income gaps. Strong structural inflationary forces & higher interest rates are a toxic combination for indebted countries creating risks of fiscal/debt crises never seen before.

- There is also competition for scarce resources now exacerbated by the energy transition, greater regional divergences, deglobalization, and reemergence of “big” fiscal policy.

- Globally, there is more confrontation with higher risk of an international / domestic conflict; hot wars are becoming the norm. US hegemony and thus US$ hegemony is being increasingly questioned

- The rise of global debt creates an accelerated path to an unstable & divided / bi / multipolar world. The effects of that is accelerated de-dollarization and the weaponizing of commodities (re-commoditization)



Source: US Bureau of Labor Statistics – Consumer Price Index, Morris County Library of Historical prices. Visual Capitalist

Macro Uncertainties & Grey Swans* To Monitor In 2024

- Inflation suddenly accelerates from their higher bases
- Global growth falls faster than expected
- Government policy failure (*e.g.: energy. Climate policy breaks the EU. A sovereign crisis in 2012 could not do it, neither could an immigration crisis in 2015, but a climate policy crisis in 2024 could be what breaks the EU)*
- A Central Bank policy mistake (*e.g.: sticky inflation or global hard landing leads to another major spike in interest rates and/or the US$, in turn leading to another liquidity crisis)*
- A commodities crisis given ongoing policy weaponization
- A spate of debt crises / Fiscal spiral
- China (slowdown OR a growth surprise, regulatory reform, debt issues*). E.g.: Chinas recovery never happened and they may be forced to turn to the West to rekindle commercial relationships.*
- Escalating geopolitical tensions or terrorist attack
- US Elections rail risks *(e.g.: Biden withdraws from the US Elections - markets are pricing in zero chance of Biden not being nominated).*
- Supply chain risks increase given accelerated deglobalization
- Social upheaval / protests especially as the cost of living crisis bites, into a year jampacked with national elections
- Official currency intervention *(e.g.: as global monetary system is being rewired/reworked where direct & indirect currency intervention becomes the norm)*
- AI / Cybersecurity failure / hack *(e.g: Investors discover AGI has taken over markets and embeds itself into the very plumbing of the financial system)*
- Extreme weather event
- Asset bubbles burst even further

** Grey Swans are cousins to Black Swans: Grey Swan is a low-probability high-impact event that few expect VS Black Swans which are high-impact events that no one expects (almost impossible to predict).*

Source: MKS PAMP, UBS, Macrohive

2. Gold Outlook & Forecast

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Gold: A New Year, A New Opportunity For Another New High

Base case: 2024 average price forecast $2050/oz: Gold Prices will print another new record in 2024 as the Fed cuts interest rates and the global economy slows. The convinced Fed pivot is a Fed policy bias that is targeted to boost growth (rather than respond to disinflation) which will likely occur sooner rather than later. The Fed must maintain independence but at the same time earlier interest rate cuts provide enough time lag for easing to boost the real economy into US elections. These surgical rate cuts allow for a slow landing scenario and will boost Gold in 1H'24, potentially frontloading price increases into Q1'24 as prices are forward looking. The positive feedback loop of a peaked US$ and peak US real yields against a backdrop of slower global growth, ongoing deglobalization (and thus ongoing Central Bank dedollarization), messy geopolitics, unsustainable global debt paths and a very under owned investor community ensures gold will return as a safe diversifier, even at these higher prices.

2024 high-low range: $1900/oz (new physical/fundamental floor $50 higher vs the revised 2023 floor) - $2200/oz (a new high peak $65 above the current peak of $2135/oz).
(50% probability)

Bullish case: ~$2500/oz target: *30% probability*
Bearish case: ~$1600/oz target: *20% probability*

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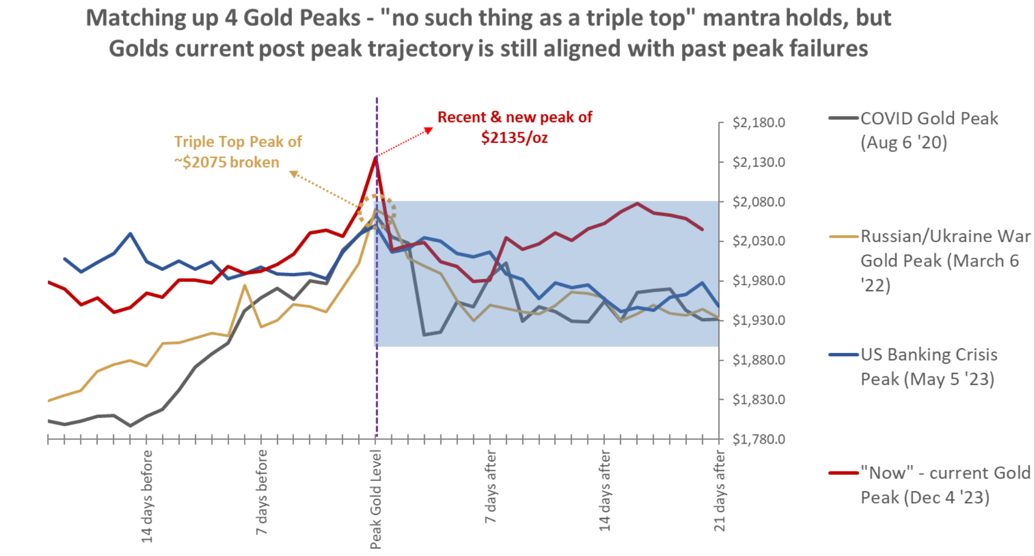
Gold Technicals – Triple Top Falls With New All-Time-High At $2135/oz

- Gold made 2 technical statement breakouts in 2023 - in March 2023 in response to the US banking crisis and in December 2023 as a new war (Israel-Hamas) and Fed pivot created a supportive backdrop.

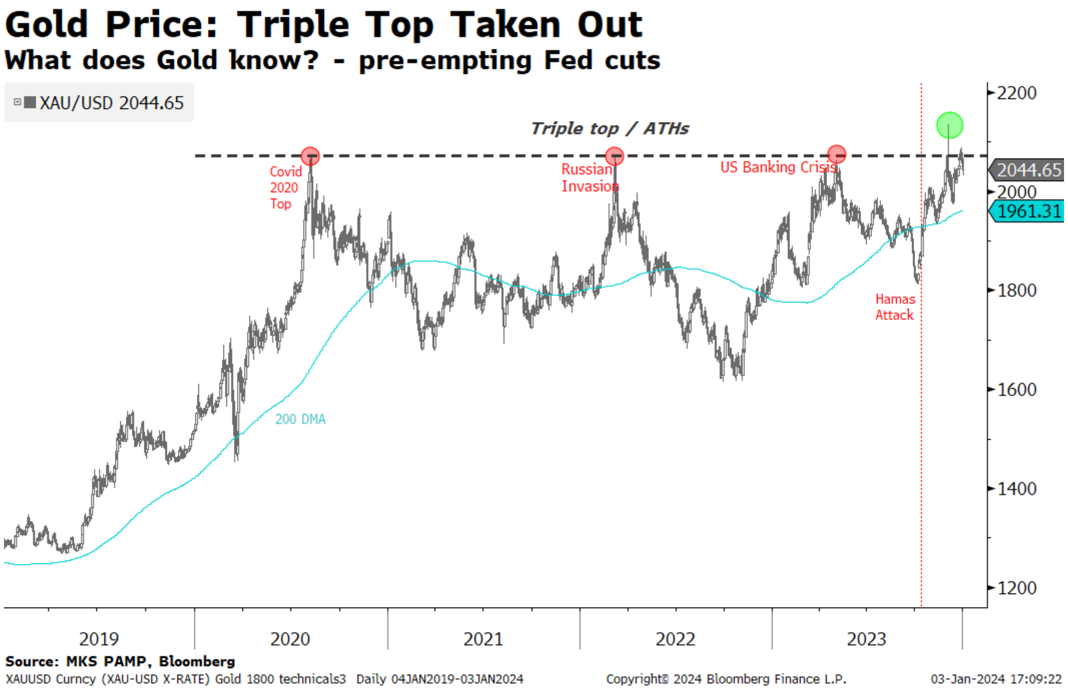
- Gold has become sensitive to Fed cut expectations and the repricing higher has been (smartly) aligned with an aggressive shift in Fed policy solidified at the December FOMC in which they see three cuts in 2024, more than they previously had forecasted *(vs market pricing of 6x rate cuts at the time of writing!)*

- Gold's post 2023 All-Time-High (ATH) trajectory has been aligned with flat-to-lower pricing following previous peaks. However, structurally, Golds remains in a mild but convinced technical bull market awaiting a new catalyst to revisit and break ATHs again.



* All Gold price closes except for Dec 4 '23 (high price of $2135/oz)
Source: Bloomberg, MKS PAMP

Gold Technicals – Triple Top Falls With New All-Time-High At $2135/oz



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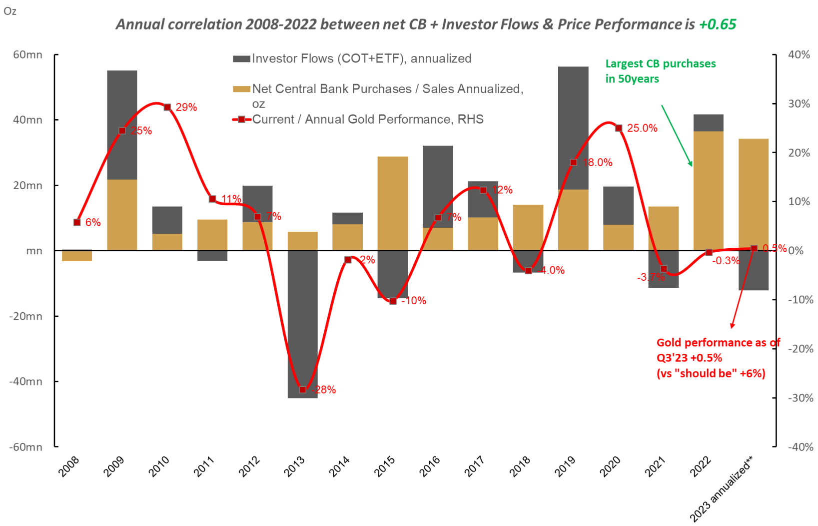
Official Sector Inflows Offset Somewhat By Investor Outflows

- As of Q3’23, Central Banks officially bought 800 tonnes of Gold, 3x as much as what investors had sold during the same period. OTC deleveraging and producer-related selling made up for the difference.
- Investors (ETF + COT) continued to deleverage given higher interest rates and the cost to hold an expensive insurance asset. They have sold 1.3mn oz in 2023 offsetting only a little of known CB inflows.
- Overall, CB demand is net supportive and a core crutch of a higher floor regime underpinning our bullish Gold outlook. Central Bank purchases is not (yet) super bullish but could be given increasing sanction risk which has proven to lead to increased dedollarization policies. The thinking is ongoing war risk = sanction risk = dedollarization = higher Gold floors.

Known Gold Flows: Annual Central Bank vs Investor Flows

Annual correlation 2008-2022 between net CB + Investor Flows & Price Performance is +0.65



Note: CB flows are most recent data from WGC and as of Sept 30 2023. Data includes unknown/unreported buying from participants in 2022 & 2023 as estimated by WGC
https://www.gold.org/goldhub/research/gold-demand-trends/gold-demand-trends-full-year-2023
Price performance & ETF flows are as of same period (Q3'23) 2023 which are net Global ETF flows + net CFTC COT paper flows

Source: IMF, Bloomberg, MKS PAMP, CFTC, World Gold Council

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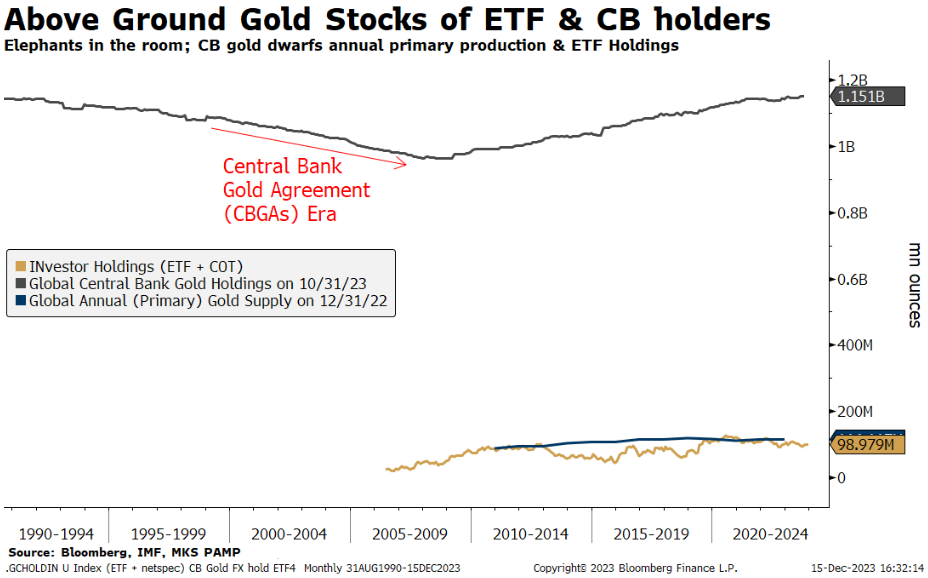
Central Bank Gold Trends: Aggressively Adding On Price Dips

- Central Banks Holdings, at 1.2bn oz, is currently over 10x the size of annual Gold supply & ETF Holdings. The largest Gold participant is now active and CB activity, together with the Fed, will continue be a new driving force for Gold prices in 2024.

- Commodities (Gold and Oil especially) continue to regain their footing as a settlement medium given sanctions, EU import bans, Oil price caps and an increasingly partitioned global commodities market.

- As de-globalization accelerates, largely non-G-10 nations are expected to continue to "re-commoditize " and ramp up Gold holdings. But increased CB activity is also potentially bearish *if* prices become too attractive incentivizing selling/lending or if this major market prop (buying) is removed.

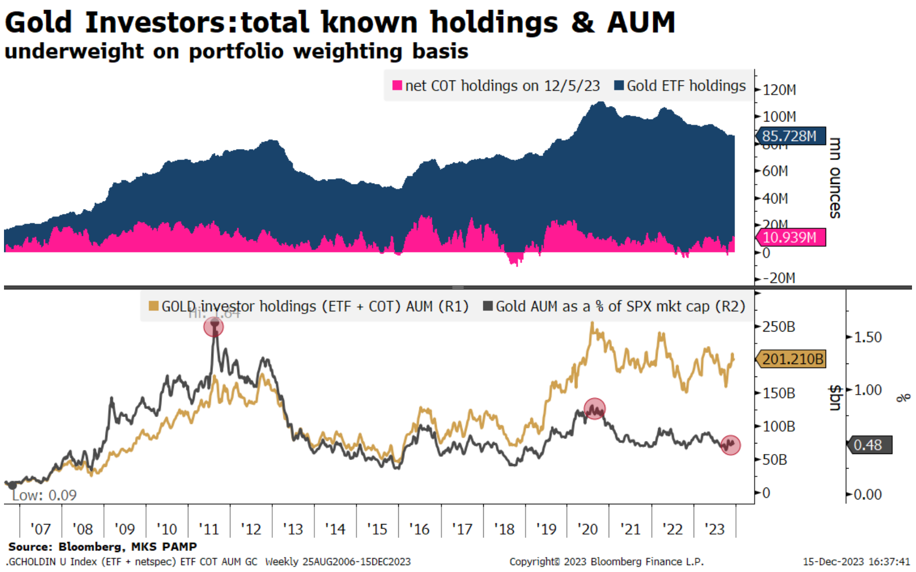


Investors Are Still Underweight Gold & Remain Pivotal In 2024

- Gold Investors own $200bn worth of known Gold products (ETFs + COT), vs peak of $250bn (2011) and low of $50bn (2015). While these holdings are quite lofty on an historical basis, its is very underweight on a portfolio allocation basis. These gold holdings account for approximately ~0.5% of equity portfolios, 1/3rd of the high allocation/market share seen in 2011 (as per our proxy).

- The risk with higher real rates is that much of this AUM will continue to unwind creating a structural headwind, mostly evident through ETF deleveraging.

- However, given that we believe the Fed is closer to cutting than hiking again, allocations to the precious metals space will likely increase from a range of strategic investors (HNWIs, SWFs, etc) in 2024. That's especially true as the traditional 60/40 portfolio failed in 2022, underperformed in 2023 and is driving a reassessment of allocations to alternatives. In addition, the larger generalist crowd could reengage in typical FOMO type fashion if/when Gold prices makes new highs and trends.



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Gold Held Above $1800/oz As Both The US$ & Real Rates Peaked in 2023

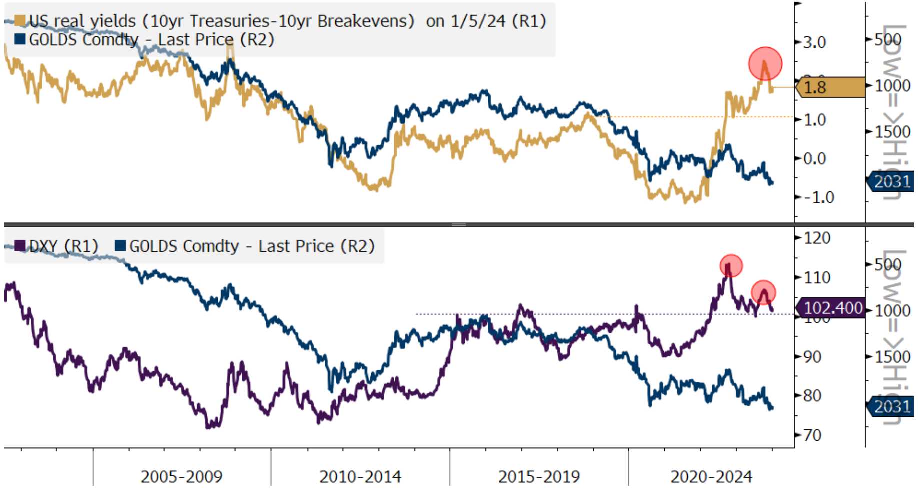
- Continued physical demand, from Far & Middle East consumers to Central Banks ensured Gold did not respond as macro models had predicted to a toxic combination of both massively higher real rates & a strong US$ in 2023. Floors were inserted higher.

- While Golds sensitivity to real rates has weakened in 2023, there is still a respected and clear asymmetric relationship between real rates & Gold: Gold rallies *more* with softening real rates, than it falls (when real rates rise). This long-term asymmetry has remained in place, setting Gold up as attractive alternative (amidst a pool of shrinking havens) for lower rates ahead.

- US real rates & the US$ topped out in 2023 as US data soured. Now with the Fed pivot, the removal of these two core driving headwinds for Gold into 2024 will ensure prices trade more "freely" taking cues from US economic data and new structural flows.

Core Gold Drivers: US 10 year real yields & the $

Real yields and the US$ have topped out: further depreciation



Source: MKS PAMP, Bloomberg

USGG10YR Index (US Generic Govt 10 Yr) 10 year real DXY2 Weekly 11JUL2002-08JAN2024 Copyright© 2024 Bloomberg Finance L.P. 08-Jan-2024 09:32:29

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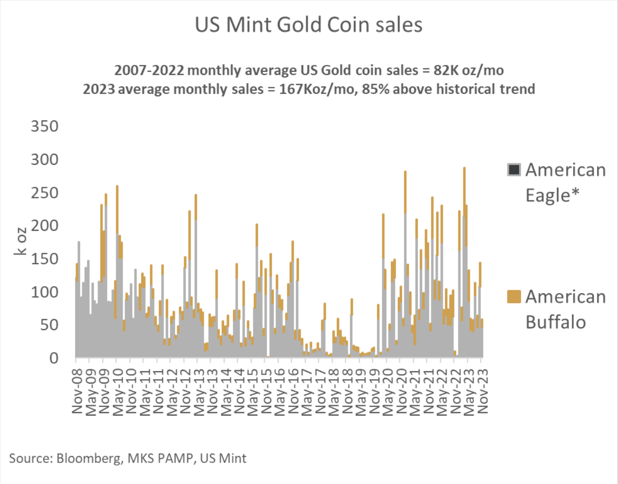
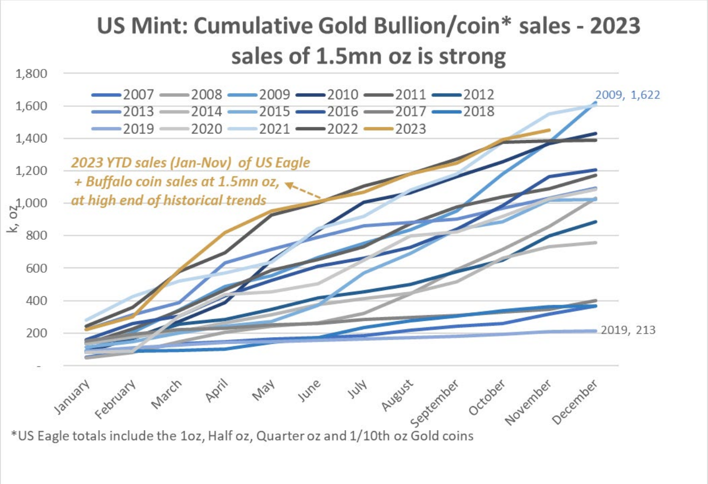
Bullion Demand: Still Resilient Bullion Demand In 2023 Given Bumper 2022

- The retail coin & bar market in both Silver & Gold boomed in 2022, with 2023 general demand trends marginally lower. Physical gold investment is expected to fall just 2% YoY to 38.4mn oz due to a collapse in German sales (a revised sales tax regime has hit sales) offsetting healthy gains seen in Turkey and China.

- Retail demand for Precious Metals should continue to remain steady, albeit down from recent record volume & premium levels into 2024, given looming recession concerns and rising geopolitical & US political risks.

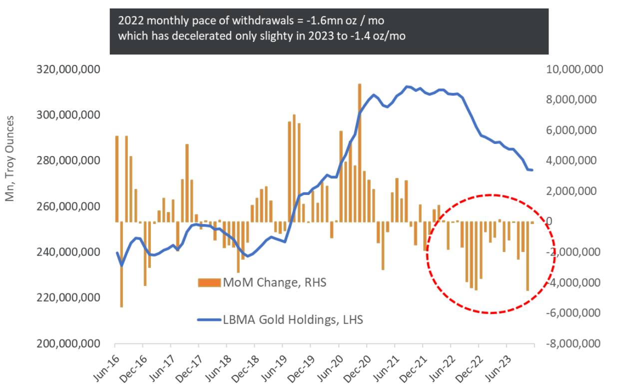




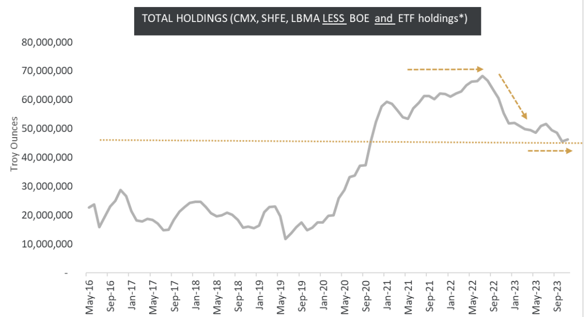
***Physical investment covers demand for bullion coins, nonofficial coins and medals and small bars. Numismatic coin are not included*

Physical Liquidity → Falling Quickly BUT Still Above pre COVID Levels

- LBMA vaults hold only 276mn oz, its lowest since June 2020. The monthly average pace of withdrawals of -1.5mn oz / mo in 2022 has only marginally subsided in 2023 to -1.4mn oz/month. Similarly, the BOE also holds near cyclical low levels of Gold with 164mn oz in its vaults.
- However, the global physical liquidity pool (as *proxied* by COMEX + SHFE + LBMA less BOE & ETF holdings) is still 46mn oz , which is 2/3rd of peak levels and well above pre-COVID levels (*even if one removes/accounts for the ~5mn oz of non-deliverable large bars COMEX holds*). The palpable shift in physical trends from 'West to East' is evident in the changes, but total Gold liquidity is still relatively better supplied vs Silver through this lens (see slide 35). Overall, its neither a bullish nor bearish development but one to monitor, as pricing centers & opportunities increasingly shift East.



Source: LBMA, MKS PAMP



**physical liquidity is proxied only by known above ground OTC stocks in Precious hubs -> London (LBMA), NY (CME), Asia (SHFE) & BOE. Clearly there are other exchange stocks (SGE, Tocom) which we have not included. Assuming all ETFs are held in LBMA / London or NY vaults, ETF holdings AND BOE vaulted gold are thus deducted from LBMA, CME & SHFE to avoid double counting*

Source: Bloomberg, MKS PAMP, LBMA

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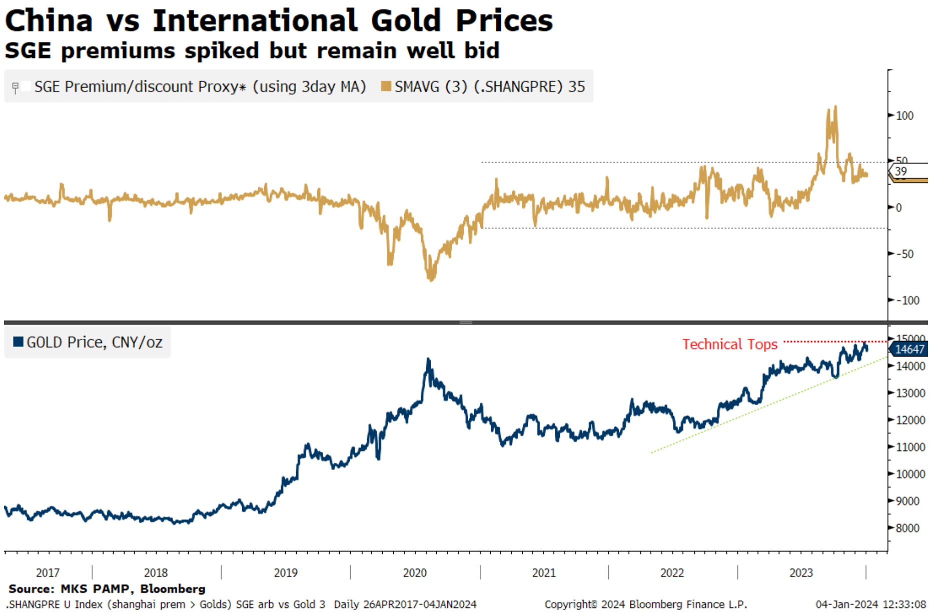
Physical Demand: Strong 2023 Demand Creates A Robust Foundation

- Physical demand was abnormally strong given prices (especially in local currency terms) in 2023 as consumers continue to show less price sensitivity. Regional premiums hit historical highs in many Gold-hub regions such as Turkey and China, indicating unrelenting demand and restrictive policies around Gold supply/imports.

- Jewelry demand softened slightly in 2023 amidst higher Gold prices but overall has continued to hold up relatively well vs 10 year trends and vs past higher price environments. Risks to this sector remain, given the slower economic growth in many markets and continued pressure on consumers from the cost-of-living crisis. With higher prices, dishoarding is still evident from some traditional physical Gold countries given the price surge in local currency terms.

- The return of physical support is expected to stay robust into the seasonally strong Q1 period around Chinese New Year. India & SE Asia demand will reemerge convincingly with lower Gold prices.

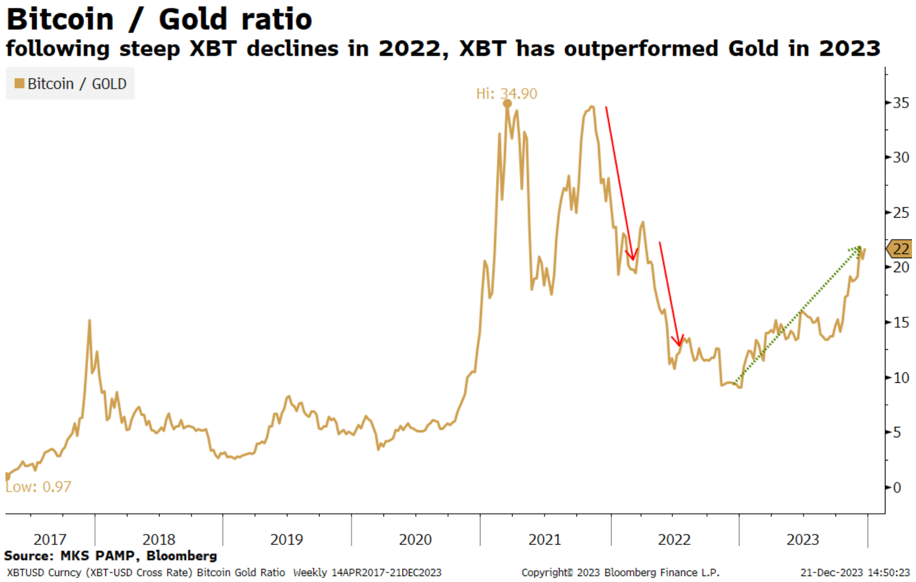


Gold / Bitcoin Relationship: Strong Crypto Outperformance After SBF

- While the Bitcoin/Gold correlation is weak at best (gold bugs just aren't crypto bugs and vice versa) they remain on the same side of the anti-fiat, deglobalization, easing Fed policy argument.

- After FTXs implosion in 2022, the loss of confidence for the crypto ecosystem (indirectly) boosted the appeal of real assets, such as Gold, as alternative fiat or inflation hedges. However, the post SBF (Sam Bankman-Fried) crypto world is deemed more mature, with rogue actors removed and thus remains a growing threat to older havens like Gold.

- Overall, while crypto has emerged from a 2 year “winter” even stronger, its little match vs Gold in becoming institutionally investable in the nearterm. Bitcoin/crypto requires reliable integration within Traditional Finance (‘tradfi’) infrastructure that will likely take several years to build out.



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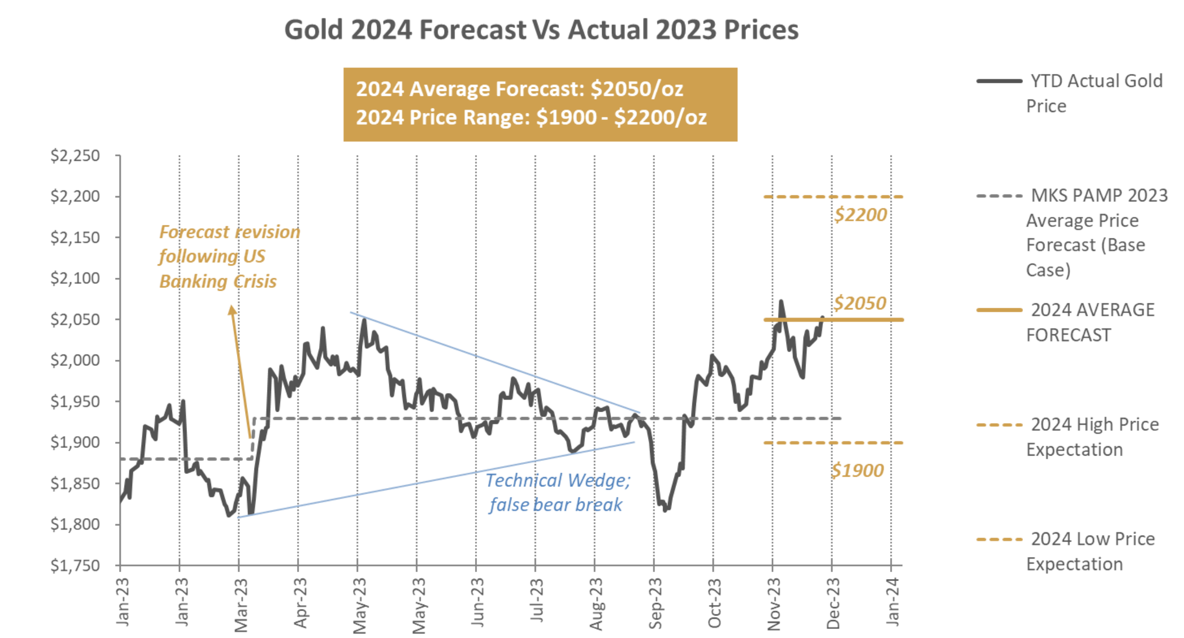
Gold Outlook & Forecast For 2024



Source: Bloomberg, MKS PAMP

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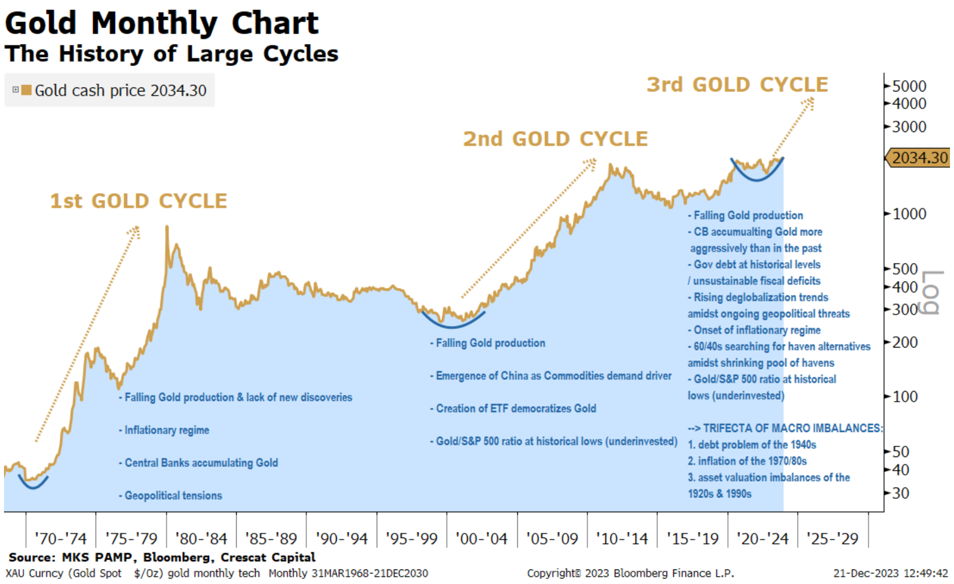
The Bull Case For Gold → Core Risks To Monitor For Further Upside



Bullish case (~$2500/oz target), dependent on:

1. Sustained lower global growth and/or much faster further cooling of inflation, drives aggressive Fed cuts earlier
2. Reevaluation of 60/40 portfolio allocations, given equity market volatility, leads to renewed strategic investment inflows into the metals space
3. CB / Fed policy mistake leads to a loss in confidence in the global monetary system and thus a structurally weaker US$ and/or revisiting Gold in the system
4. Asian or CB physical demand is stronger than expected, responding to higher floors quicker than expected
5. New "off-calendar" geopolitical / political risks (e.g.: US elections) or a Developed World fiscal crisis escalates creating a destabilizing threat to the late cycle global economy

(30% probability)

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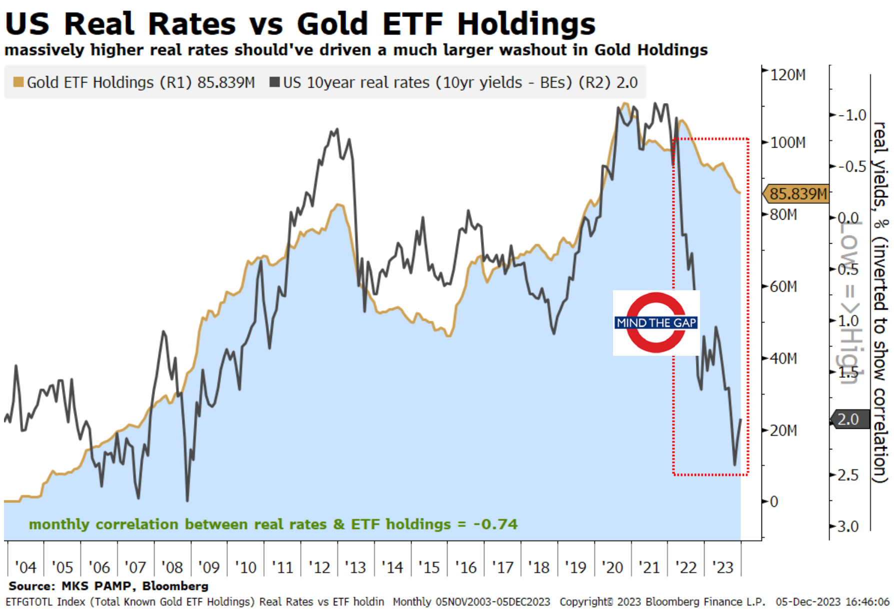
The Bear Case For Gold → Core Risks To Monitor For Gold Bulls



Bearish case (~$1600/oz target), dependent on:

1. Sticky inflation leading to "Higher for Longer" Fed inducing further large-scale deleveraging in precious metals especially ETFs
2. Asian physical demand disappoints
3. US or China hard landing: new recession lows put in before responsive easing monetary policies lead to larger rallies (V-shaped recovery)
4. CBs monetize and sell/lend recent Gold purchases (vs storing the metal) if it loses its appeal as a geopolitical or inflation hedge and/or comes under further sanction & policy risk
5. A US$ liquidity crunch forces further deleveraging in expensive to hold insurance policies (like Gold)

(20% probability)

MKS PAMP

3. Silver Outlook & Forecasts

Silver – Sweet Spot Emerging With A Lower US$ Environment

Base Case: Average forecast $25/oz

Silver will rally alongside Gold with bullish potential hinging on investor participation outweighing some mild contraction in industrial demand. Silver has more upside risk than Gold, because 1) it's relatively cheaper vs its past price peaks, 2) is more elastic to a weaker US$ environment, 3) is physically tighter with less readily available stocks, and 4) fundamental deficits are expected throughout this decade; its high beta characteristic vs Gold is attractive in a Fed induced soft landing. While late cycle dynamics will see likely result in some mild contraction of around ~5% in industrial demand from another record high in 2023, retail and investment can more than make up for this shortfall; Silver ETFs have shown they can accumulate ~30-40mn oz in a couple weeks. Overall, after months of being a forgotten asset class, investor focus in Precious Metals will return as the decline in the US$ extends once the Fed pivots in 2024.

2024 high-low range

$21.50/oz (new physical/fundamental floor) - $30/oz (old high)

(50% probability)

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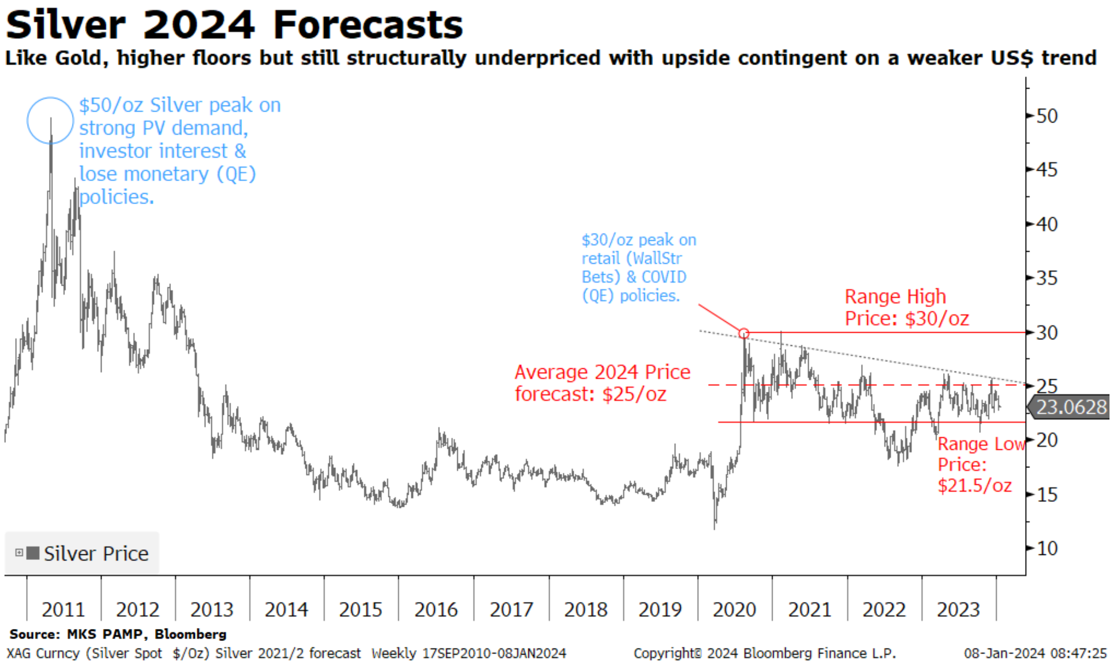
2024 Silver Outlook: Upside Risks Outweigh Downsides Ones Into A Late Cycle

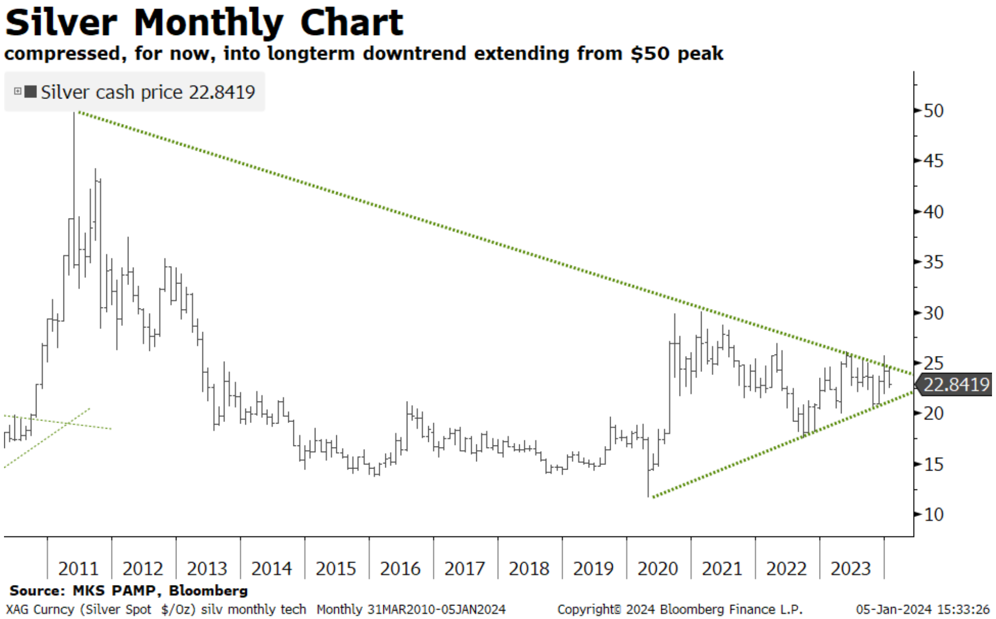


Silver Prices Found Strong Support Below ~$21/oz in 2023

- Silver's high in 2022 ($26.94) as Russia invaded Ukraine and again in March 2023 during the US Banking Crisis ($26.10) was short-lived, and didn't reach previous peaks around $30/oz.

- Silver has proven to be more elastic to Quantitative Tightening (QT) & Fed hikes, vs Gold, and the repricing to the lower $20s was aligned with an aggressive hawkish shift in Fed policy in 2022. Similarly, the convinced Fed pivot n Dec '23 and expected rate cuts in 1H'24 will be a natural tailwind for investment demand to reengage and drive higher price ranges, despite some headwinds from late cycle impact on industrial demand.

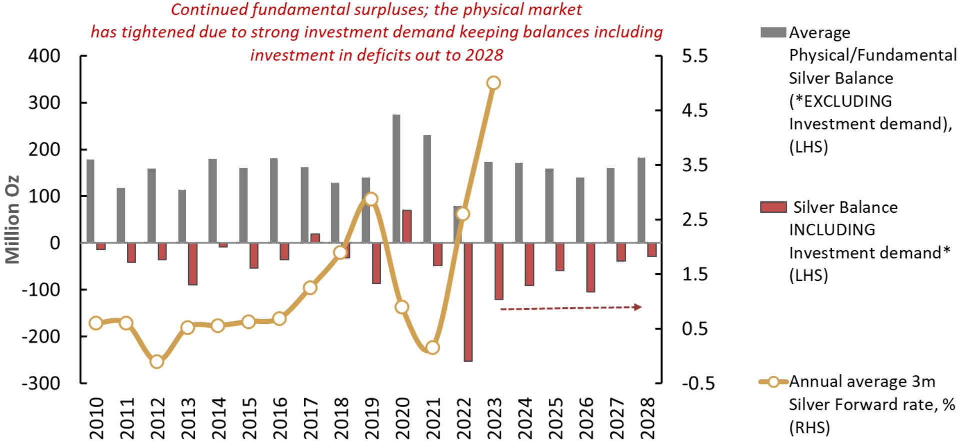
- A soft landing, a Fed pivot and somewhat resilient industrial demand while investment expands into a election year should rerate Silver above $25, although with mine supply expected to ramp up in 2024, violent rallies may be short-lived.



Investment Demand Is Keeping The Market In A Deficit From 2022 - 2028

- Fundamental surpluses (ex investment demand) peaked in 2020 and is dropping at a fast rate (from a 250mn oz surplus in 2020 to average surpluses of ~160mn oz in 2023-2028).
- Investment demand, which can average between 200-300mn oz / year is strong, steady and enough to tilt the market into a sustained deficit from 2023 onwards.
- The emergence of retail (sporadically and in some regions) and physical (especially at lower prices), but especially industrial demand generated from the electrical economy, can contribute to growing deficits. Growth in 1) photovoltaics/PVs (50% of new additions of solar capacity in 2023 stemmed from China, the highest proportion since 2017), 2) power grids, 3) consumer electronics, and 4) vehicle output has ensured industrial Silver demand is ~630mn oz, +8% YoY. While industrial demand isn't expected to hit another record in 2024 due slower economic growth, its not expected to contract considerably.
- Mild deficits (including investment demand) are expected to remain a feature of Silver into 2028, shrinking above ground stocks and providing the backdrop for fundamentals to play a larger role in pricing.

Silvers Fundamental Supply/Demand Balance* vs Forward Curve - investment demand is keeping the market in a deficit from 2022 onwards



*The average published market surplus/deficit from GFMS, Metals Focus/Silver Institute, adjusting for investment demand (i.e.: *excluding* physical coin/bar, ETF and COT flows)

Source: Bloomberg, MKS PAMP, Metals Focus/Silver Institute, GFMS

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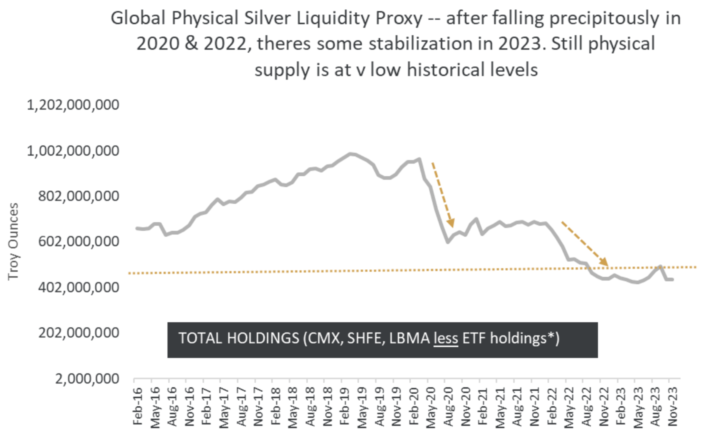
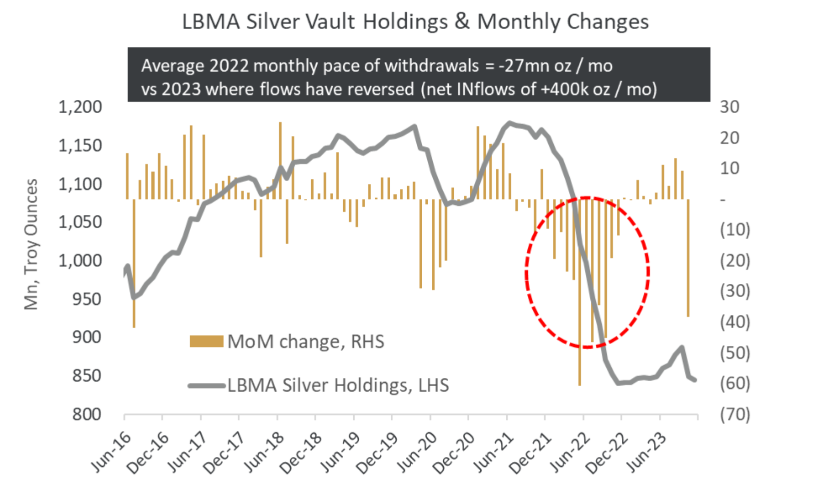
Known Sources Of Physical Liquidity → Low Levels Of Silver Stocks

- LBMA vaults hold only 845mn oz, its lowest since the LBMA started publishing in 2016. Monthly average pace of withdrawals of 30mn oz / mo in 2022 has subsided in 2023. However, the global physical liquidity pool (as *proxied* by COMEX + SHFE + LBMA less ETF holdings) is 437mn oz (half of peak holdings of almost 1bn oz in mid 2019). That helps to explain regional tightness, outsized premiums and is a necessary underpinning for constructive prices in 2024.



*physical liquidity is proxied only by known above grouund OTC stocks in Precious hubs -> London (LBMA), NY (CME) and Asia (SHFE, only). Clearly there are other exchange tocks (SGE, Tocom) which we have not included. Assuming all ETFs are held in LBMA / London vaults, ETF holdings are thus deducted from LBMA, CME & SHFE to avoid double counting

Source: Bloomberg, MKS PAMP, LBMA



Source: LBMA, MKS PAMP

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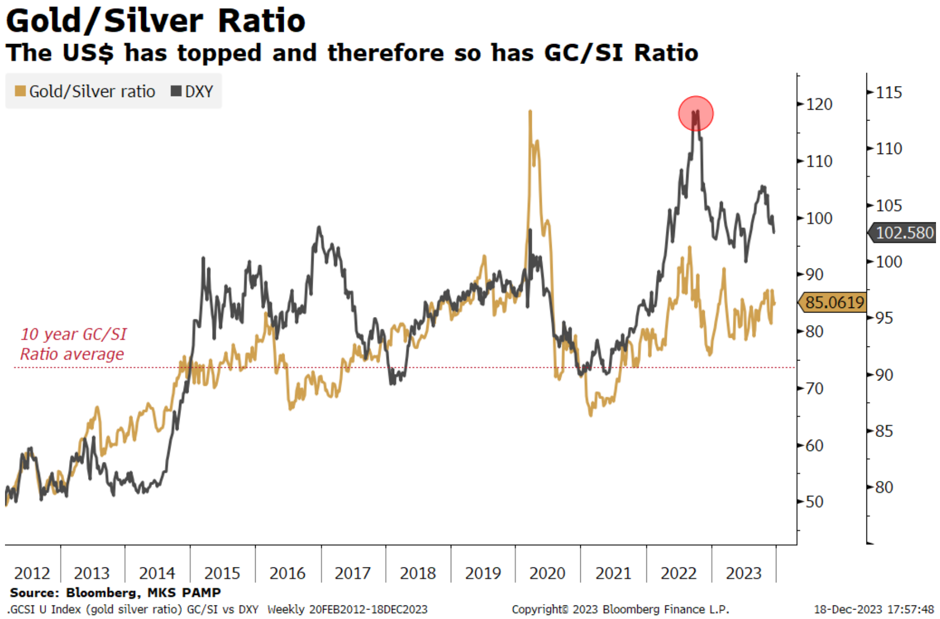
GC/SI Downside As Silver Is More Sensitive to US$ Weakness Vs Gold

- The Gold/Silver ratio fell steeply in 4Q'22 from ~95 toward ~75 as a combination of momentum-driven buying, lack of physical liquidity and a much lower base boosted Silver prices more so than Gold. Since then, the ratio has remained compressed largely between 80 and 90 in 2023.

- So long as a soft recession is the base case, industrial and retail demand can withstand higher prices while investment demand can ramp up on a lower US$ trajectory; Silver prices should continue to outperform into the late cycle and the GC/SI ratio should fall below 80. Note, however, that risks are binary – a hard landing will undoubtedly ensure the Gold/Silver ratio rallies back through 90 as seen during past "fear periods".



Retail Investor Demand Falls To 3 Year Lows

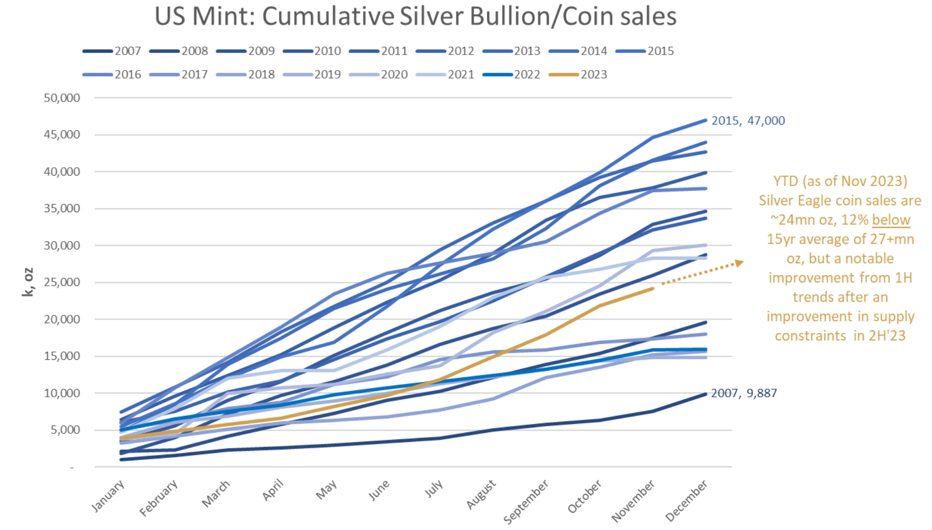
- Retail silver investment is due to slide by 21% YoY led by a slump in Germany sales, along with weaker purchases in India on volatile currency trends. Still total global demand is expected to hold 323mn oz, only a 3-year low.

- Sales of silver bars and coins in the US remained resilient in Q2'23 as the US Banking Crisis drove an overreach for physical assets and safe haven buying. However, physical demand since then has slowed but not collapsed.

- US Silver premiums collapsed from the lofty levels seen in 2022 as a mix of weaker demand coupled with an alleviation in the constrained supply of Silver blanks amongst Mint suppliers, has helped.

- Overall, while the inflation hit to discretionary consumer incomes will moderate some retail inflows in 2024 given our higher price outlook, demand growth should hold up vs long-term historical averages given ongoing geopolitical risks and the uncertainty around the US election.

***Physical investment covers demand for bullion coins, nonofficial coins and medals and small bars. Numismatic coin are not included*



*US 1oz Silver Eagle
Source: MKS PAMP, US Mint

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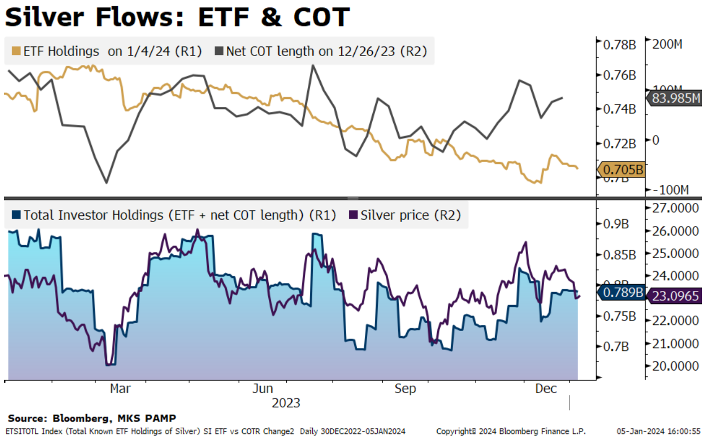
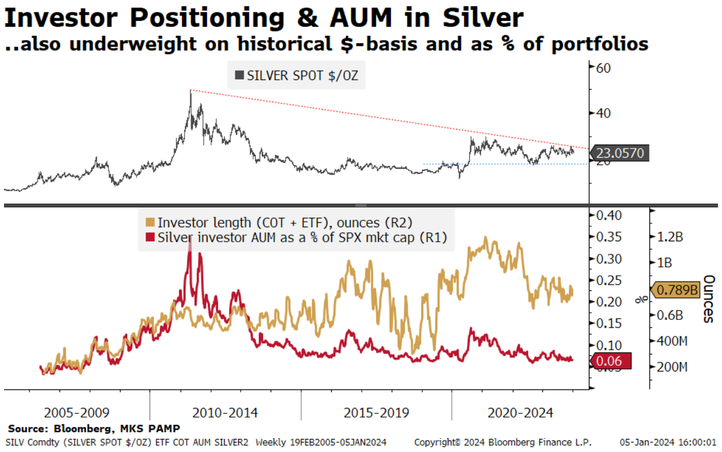
Investors: ETFs & COT Remain Net Sellers Creating Some Price Pressure

- Silver investors (ETF + COT) sold over 100mn oz in 2023. Together they still own almost 790mn oz of Silver, almost at cyclical lows. Prices did not collapse in 2023 indicating some additional OTC/physical demand was sufficient in processing this net investor deleveraging.

- Investors are very under owned and have capacity in 2024 to ramp up precious metals' exposure, with portfolios only allocating approximately 0.07% of AUM to Silver (*as per our proxy*) vs historical allocation highs of ~0.4% in 2011.





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Silver Outlook & Alternative Scenarios in 2024

Base case: 2024 average price forecast $25/oz: the combination of 1) continued strong industrial and retail demand, 2) potential for investor resubscription as the Fed cuts & global growth slows, and 3) limited stock availability, all create asymmetric upside risk for Silver.
2024 high-low range: $21.50/oz (new physical/fundamental floor) - $30/oz.
(50% probability)

Alternative scenarios to Silvers base case:
Bullish case (~$35/oz), dependent on:
1. Gold outperformance, which is dependent on geopolitics, the Fed and other underlying potential catalysts (e.g.: sovereign debt issues etc.).
2. Accelerated industrial demand; strong growth in emerging (e.g.: automotive, electronics & 5G apps) and/or accelerated use in renewable energy which governments are promoting despite a late cycle slowdown.
3. a convincing China rebound, after its prolonged economic weakness, leads to broad-based pent-up demand for all commodities.
4. Prolonged physical tightness & stockpiling.

(35% probability)

Bearish case (~$18/oz), dependent on:
1. A higher for longer Fed on higher-than-expected inflation inducing further large-scale positioning deleveraging in precious metals.
2. Hard landing in China, the US or Europe; all industrials including Silver would be pressured to new recession lows on softer demand.
3. Liquidations from recent stock builds (India, retail crowd) if price expectations turn over.

(15% probability)

4. PGM Outlook & Forecasts

Platinum 2024 Outlook → Playing For Fundamentals To Play Out

Base case: 2024 average price forecast $1050/oz
2024 High – Low range = $800 - $1200/oz

Platinum is expected to post another deficit (including investment demand) in 2024 which should remain quite similar to the deficit in 2023 of ~500K oz. Demand continues to be well supported by both automotive (higher light duty vehicle sales, the acceleration of hybrids and continued substitution of Platinum for Palladium in gasoline autocats, *despite* prices nearing parity) and industrial (glass & chemical) demand. A soft-landing outlook should marginally crimp demand, but akin to the thinking in Silver, higher investment demand (for high beta precious products) should more than compensate for lower industrial/auto demand. The threat of larger than expected supply misses due to mine closures (especially at PA-rich North American mines and cuts at older Western Bushveld mines) AND secondary supply which should remain weak, will support prices into 2024. We are much more constructive Platinum (and PGMs) post recession, where upside prices remain contingent on Gold remaining in a bull market trend, the ignition of the macro recovery and the convincing pivot of fundamental balances from multiyear surpluses to multiyear deficits.

(50% probability)

Platinum Prices Found Decent Support But Couldn't Rebound Through $1100/oz

- Platinum attempted to take out the $1100/oz ceiling several times in 1H'23 but it was all short-lived. Investor (especially SA ETF flows) were sensitive to Eskom related headlines, which has since subsided significantly; the pace of load-shedding has fallen in Q4'23, making the release of WIP (Work-In-Progress) stock possible, and thus rallies capped.

- Demand largely surprised to the upside in 2023, supply (both primary & secondary) have missed expectations, and Gold has rallied strongly YET Platinum prices fell 9% in 2023. Fundamentals don't always explain all of price movement and the combination of 1) largescale investor deleveraging (ETFs + COT sold 160k oz in 2023, but saw large outflows in Nov'23), and 2) recession fears, 3) China uncertainty, have naturally kept prices subdued.

- There remains a continued disconnect between physical market trends and macro/speculative/positioning which is widening into the late cycle backdrop and is setting Platinum up for post recession gains when physical and macro finally realign.

Palladium 2024 Outlook → Switching To A Surplus In The Medium-Term But Trajectory Won't Be Linear With Ongoing Volatility

Base case: 2024 average price forecast $1000/oz
2024 High – Low range = $800 - $1350/oz

Structural headwinds in the form of ongoing substitution in gasoline vehicles (Platinum was relatively cheaper, more readily available and less volatile than Palladium), the recent rising market share of EVs (although US & European EV penetration rates have plateaued) and an expected surge in secondary supplies due to higher auto recycling, puts Palladium on a path of rising surpluses.

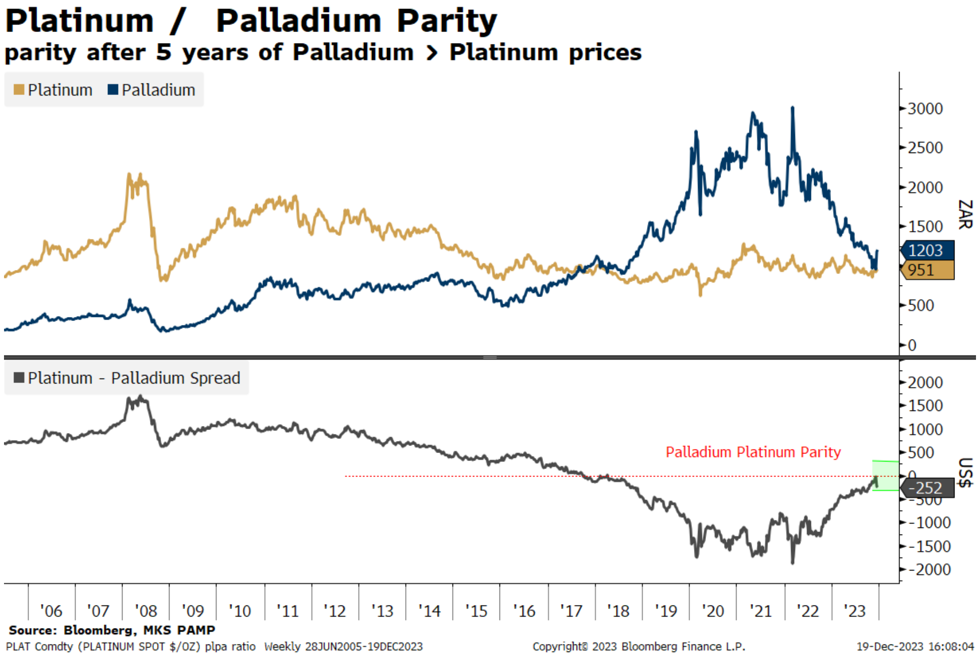
Still, Palladium is expected to post another large deficit of around ~-800k oz this year in the face of rising supply risks into 2024. There remains a disconnect between prices (which are extremely forward looking and thus significantly lower vs recent peaks) and the current fundamentals (ongoing deficits with rising supply risks). The outlook should remain fragile and unconvincing into a soft-landing backdrop. However, any incremental shift higher in demand or a quicker fall in supply will create tactical bullish opportunities and continued volatile trading in 2024 supporting our rather wide high-low range. That may stem from secondary supplies (which should remain weak into 2024 as recession fears constrain scrappage rates), the greater threat of closures of PA-rich mines a sustained EV sales downturn, all of which remain underpriced.

(50% probability)

Palladium 2024 Forecasts
squeezey price action still possible on supply constraints & positioning

Source: MKS PAMP, Bloomberg
XPD Curncy (Palladium Spot $/Oz) Palladi 2023 forecast Weekly 25DEC2012-22DEC2023 Copyright© 2023 Bloomberg Finance L.P. 22-Dec-2023 12:18:22

Platinum-Palladium Spread & Demand Implications Given Parity



- Platinum has been at a discount vs Palladium for 5+ years prompting auto reengagement and substitution.
- However, the PT-PD spread has narrowed which should reduce the incentive to substitute PT for PD (one could argue it could encourage greater Palladium adoption in the future, as the autos and OEMS have the R&D & technology in place).
- The PT-PD spread is coalescing around the psychological $1000/oz level for each metal. We expect the spread to trade in a relatively tighter $500 range around parity in 2024, but with volatile moves driven largely by Palladium.

Supply: Statement Repricing In the Rand PGM Basket Will Have Implications

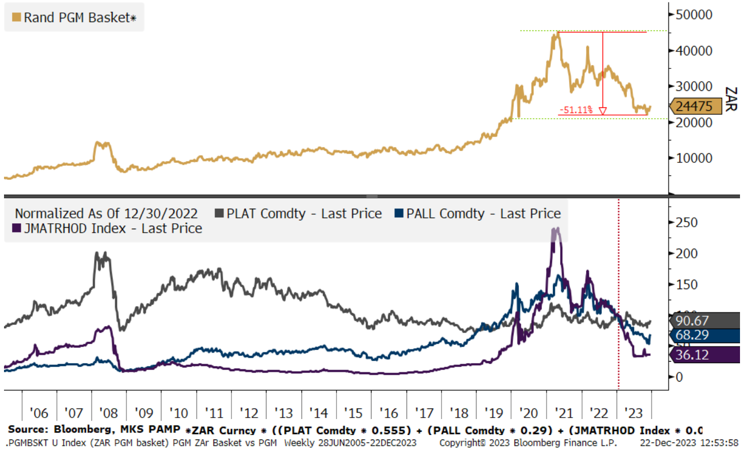
- A new era has (already) begun in 2023 given the momentous fall of the Rand PGM basket. The producer friendly environment of years 2018-2022 (higher prices + large physical dislocations) has shifted back into a consumer-friendly environment (lower prices + ample availability). The PGM ZAR basket price, is down 50% from its 2021 peak, which has squeezed platinum producers' margins making mines in the 4th quartile of the cost curve loss-making.

- Theres diverging thoughts on the supply outlook for 2024 amongst analysts: the “no cuts/supply will grow” argument centers around 1) well capitalized SA operations following years of profitability (‘dont bet on SA producers doing the right thing quickly’ mentality), 2) Palladium is byproduct to (Russian) nickel production hamstringing mining's response, 3) North America is due to *lift* output even taking cost cutting measures into account after incidents in 2022 & 2023, 4) SA holds general elections in April/May making substantial production/job cuts unlikely. The “production cuts/supply will fall” argument rests on 1) South African producers have already announced closures of unprofitable shafts & various cost-saving measures – the largest PGM producer has cut capex & production by ~10% (‘follow the leader’), 2) PA-rich and older mines are especially under threat but cuts will just take time to really materialize given the required process/consultation period before significant job losses are made.

- We believe production cuts will be surgical and measured over 2024 (large statement & the associated largescale job losses is unlikely but not impossible) with natural attrition taking place. That ensures supply (the traditionally more predictable input in Supply-Demand models!) even tougher to estimate for the market. Overall, SA PGM production has peaked, it’s the rate of decline that will hold key insights behind the outlook for PGMs in the medium-long term.

PGM ZAR prices: heavy losses in 2023

PGM prices normalized to Jan 2023

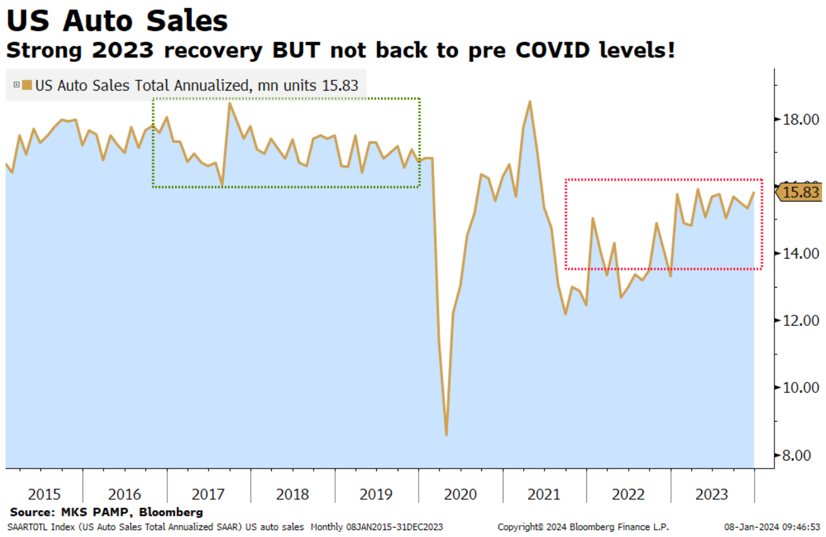


Global Auto Market Ends 2023 On A High But Still Below Pre-COVID Levels

Global auto sales are expected to grow ~3% YoY (S&P Global Mobility forecasts new vehicle sales to reach 88.3mn units) with challenges still lurking from recession risks, tighter credit conditions, and tapering electric vehicle (EV) subsidies. The US light duty auto market ended 2023 on a high, as sales soared, up 12% vs 2022. American consumers were undeterred by higher prices, rising interest rates and a chip shortage that slowed assembly lines, and purchased 15.6mn new vehicles last year, the largest YoY increase in over a decade. Still, LDV sales have not returned to the pre-COVID levels of 17m vehicles and there're signs of a cooling market. China's market should benefit from continuing pent-up demand with 26.4mn units expected in 2024 (a 4.2% YoY).

Global sales for electric (EV) vehicles is expected to reach 13.3mn units in 2024, (a 16.2% share of global vehicle sales), driven by major markets (China & Europe). Still while the industry anticipates double digit growth, the risk is to the downside for EV sales as concerns around charging infrastructure, battery supply chains, and policymaking support rise; 2024 is a year in which EV makers will be tested as they need to secure "mission-critical" suppliers to scale successfully.

Overall, global auto sales of 88mn units expected in 2024 is still a full 5mn units short of pre-COVID levels of 93/94mn units seen in 2017/2018. While the industry believes the scapegoat for the severe downturn in Palladium & Rhodium prices is the EV penetration rate, there is an underappreciation of the effect of the dramatic reduction in auto sales pre vs post COVID. PGM auto loadings have *risen* substantially now vs pre-COVID levels with real world testing and so a large contributor to PGM weakness is both the "lost" auto demand (of around 10mn oz) during COVID and the current auto sales running 5mn unit per year below pre-COVID levels.



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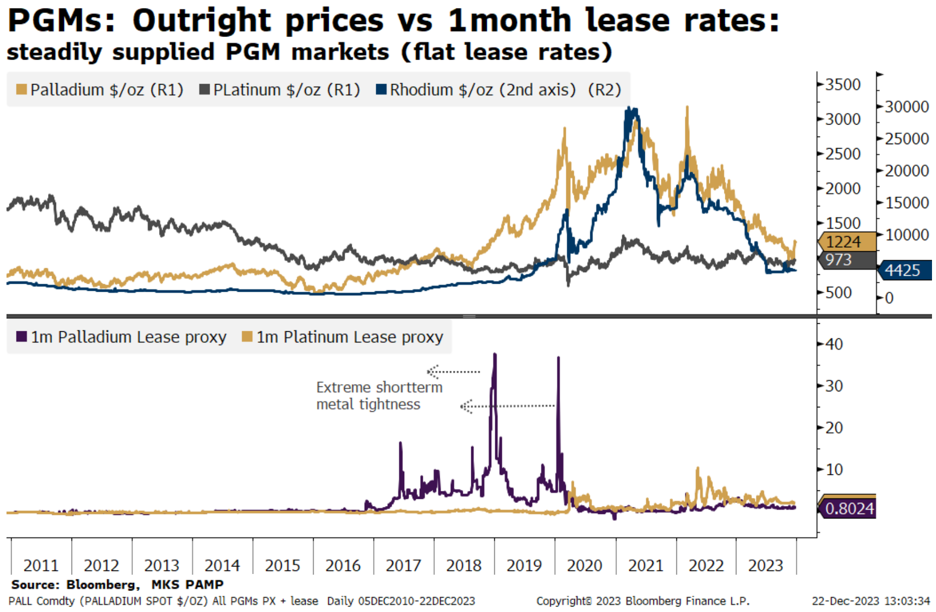
Physical Markets Still Susceptible To Minor Dislocations

- Intermittent curve backwardation (rising lease rates) and unpredictable physical location & sponge premiums - although most dislocations remain short-lived vs past trends - indicates tightening fundamentals and the ongoing drawing of Above Ground Stocks is notable, especially in Platinum.

- With supply cuts from loss producing shafts & operations a growing risk into 2024, PGM metal availability is expected to be choppy as concerns around reliable supply & unpredictable policies (around sanctions & trade) complicate seasonal trends; intermittent physical dislocations will continue and can accelerate if demand just remains relatively stable vs 2023 trends on soft landing expectations. PGM volatility, driven by physical market volatility, should remain well bid & supported in 2024 given late cycle macro dynamics and increased headline risk.



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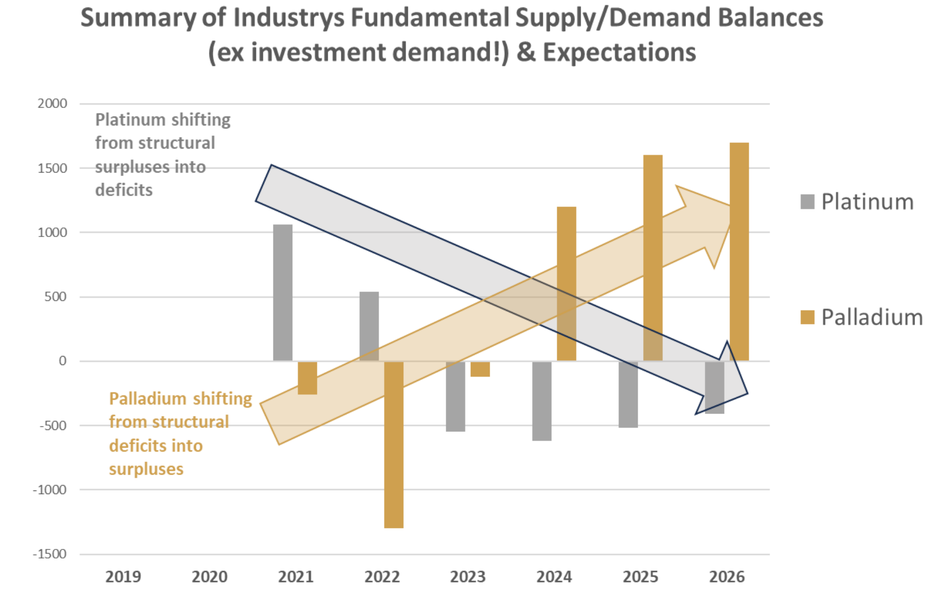
PGMs Remain On The Backfoot Into Recession But Showcase Diverging L/T Trends

Platinum & Palladium are stepsisters with different fundamental pasts & futures. While both PGMs should trade defensively into a recession they're expected to have widely diverging long-term trends.

The general consensus for the fundamental backdrop is that Platinum is shifting from structural surpluses into deficits (H2 economy, industrial demand, China restocking & constrained supply) while Palladium is shifting from deficits into surpluses (the ongoing duel threat of ongoing penetration from BV at the expense of ICE vehicles & an expected surge in secondary supplies due to higher auto recycling).

We do not disagree with this consensus but are increasingly aware that 1) the transition won't be as linear and smooth as markets expect, 2) consensus calls in and of themselves are risky especially in commodities, 3) the best solution for lower pricing is… lower pricing and that can ignite future demand applications



Source: MKS PAMP, Company reports & presentations at Platinum Week 2023

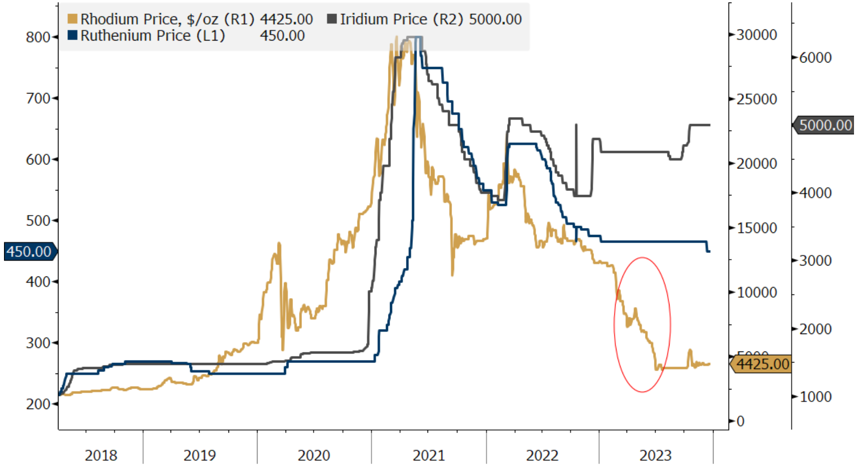
Minor Metals: Iridium, Ruthenium & Rhodium

- Rhodium should post a mild deficit in 2024, due to a fall in primary (SA) production and still weak secondary supply due to lower vehicle scrappage rates. Demand from autos is expected to be flat-lower as those countries with the highest EV adoption rates are also the ones with tighter emission standards removing a core underpinning; however, prices have largely reflected this. Chinese destocking by glass manufacturers is nearer the end (vs the beginning) and while demand and recession risks will keep prices on the defensive, any mine closures from SA has the potential for prices to reignite both volatility and upside. We have a cautious outlook with prices expected to range $3000-$8000 and average around current levels ($4500/oz).

- Ruthenium & Iridium are expected to have diverging balances with Iridium expected to post another deficit (as supply from SA contracts for another consecutive year), while Ruthenium is expected to post a surplus (albeit smaller vs last year). Fundamentally, Iridium's outlook remains robust (outside of a hard landing) even despite the reduction in Iridium loadings in electrolyzers (in favor of other PGM containing catalysts).

Minor PGM Prices

Capitulation in Rhodium in stark contrast to OPGMs



Source: MKS PAMP, Bloomberg

JMATRHOD Index (Johnson Matthey Rhodium Spot Price) Rhodium & minor PGMs Daily 05APR2018-22DEC2023

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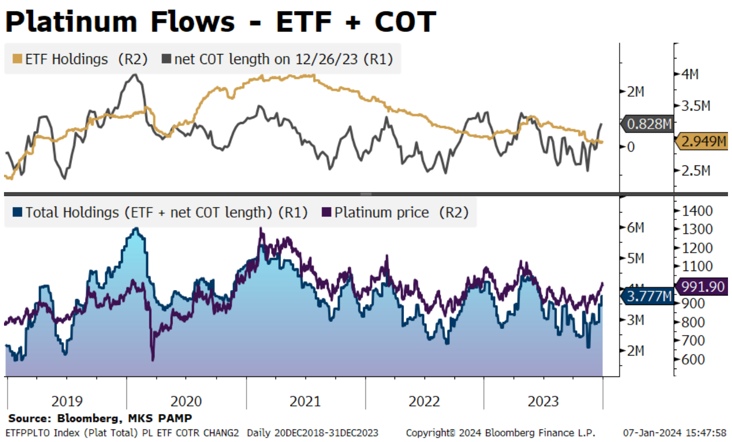
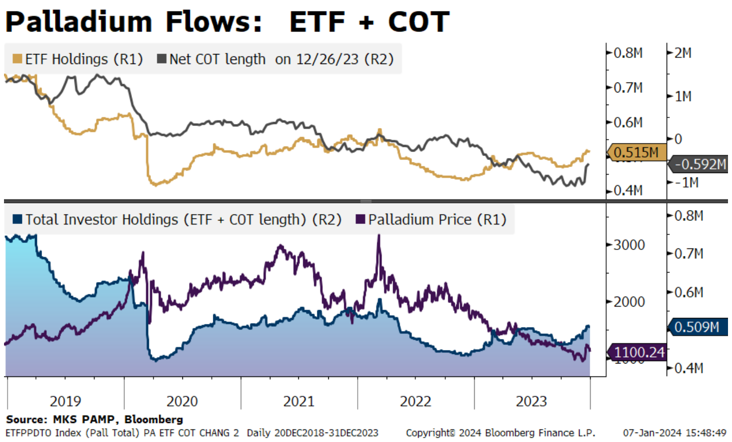
PGM Investors: Neutral-Bullish PT Positioning vs Quite Bearish PA Bets

- Platinum investors (ETF + COT) sold 160K oz in 2023 (at one point net outflows were as large as -1.3mn oz, almost 1/3rd of holdings). Eskom-related ETF bets were quickly unwound while COT flows seems to be technically driven. Overall, Platinum ETF investors still hold ~3mn oz, while gross COT positioning is net long 830K oz, indicating current known investor positioning is neutral-bullish

- Palladium investors remain net short, where COT positioning is on aggregate net short 510K oz (after reaching a max short of -1.1mn oz), indicative of the expectation of future surpluses. Overall, investors actually purchased 62K oz in 2023 led mostly by ETFs while COT reduced gross max short positioning with late year buybacks.

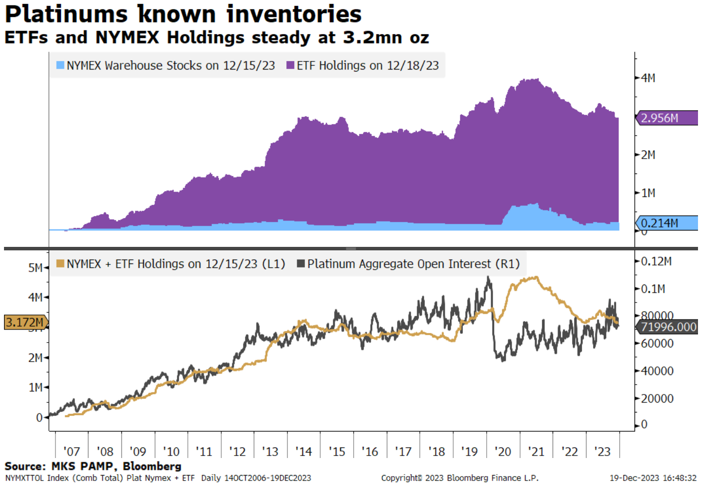


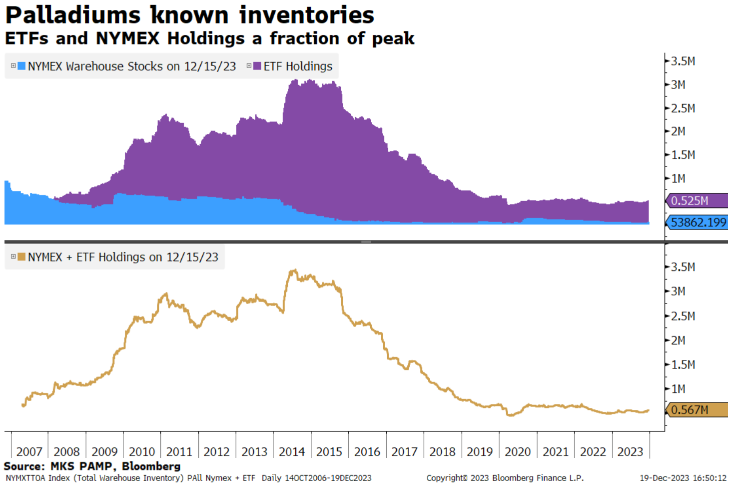


Known Sources Of PGM Liquidity: NYMEX Holdings & ETFs

- NYMEX Platinum warehouse stocks & ETF Holdings are back near 2020 lows; the shift of metal from above ground/known sources to underground/OTC sources saps liquidity & visibility and drives volatility across forward curves and physical premiums, although with still ~3.2mn oz available dislocations are short-lived.

- Palladiums known liquidity has only 567k oz, a fraction (1/6th) of peak holdings, providing much less of a known physical buffer.





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PGMs: Drivers of Pricing in The Near & Medium-LongTerm

	Near-term	Medium - Long Term
Platinum	Macro-economic, Gold-trends & investment demand, HDD thrifting, SA supply dynamics	Above Ground Stocks, jewelry demand, hydrogen, Industrial capacity/supply chain changes, HDD electrification
Palladium	Russian supply, recycling recovery, potential PA-rich production cuts, CTA shorts, auto (ICE vs EV) sales	Pace of electrification, new demand application drivers, reversal of auto switching, recycling & Russian supply growth
Rhodium	Fiberglass & other inventory destocking, auto sales, SA supply	Pace of electrification, industrial demand, SA supply trajectory, Chinese recycling growth

Source: MKS PAMP, Implats, Johnson Matthey

PGM Outlook & Alternative Scenarios In 2024

Platinum

Upside risk $1400+/oz, dependent on:

1. Supply disruptions and/or steeper than expected production cuts (e.g.: >300K oz)
2. Sustained Gold outperformance (PT is a cheaper Gold proxy) driving strong investment inflows
3. China and/or Europe growth outperformance
4. Green Hydrogen / electrolyzer production ramp-up accelerates stockbuilds

(25% probability)

Downside risk $700-/oz, dependent on:

1. Hard landing in China, the US or Europe
2. Higher interest rates for longer (large-scale positioning deleveraging in precious metals given theres still ~3mn oz in investor products)
3. Persistent SA & Russian destocking of WIP material into weak demand if marginal production cuts fail to ignite price lift

(25% probability)

Palladium

Upside risk ($1500+/oz), dependent on:

1. Supply disruptions and/or steeper than expected production cuts from PA-rich mines
2. China growth outperformance unleashing pent-up demand
3. BEV penetration rate slows especially if it occurs in China; further EV policy U-turns
4. Largescale investor shortcovering and/or reengagement

(25% probability)

Downside risk ($500-/oz), dependent on:

1. Ramp up of Russian commodities supplies or destocking of Russian/SA inventories
2. Hard landing in China, the US or Europe
3. Higher interest rates for longer (large-scale positioning deleveraging in precious metals
4. BEV adoption accelerates in US (especially) and Europe bringing forward price weakness & souring sentiment
5. Autocat recycling in China takes off (once policies are in place)

(25% probability)

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Thank you

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