Gold and Silver

Supply, Demand, Prices
Refining
Market Realities And Marketing Hype

CPM Group

Management & Economics Society (MES) of CIM (Canadian Institute of Mining, Metallurgy, and Petroleum)

17 May 2023
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Managing Partner
CPM Group LLC

Today's Topics

Gold

Supply, Demand, and Price

Silver

Supply, Demand, and Price

Refining

Market Realities And Marketing Hype

Specific issues related to gold and silver

Gold and Silver are hybrid assets: financial and commodity

- **They trade like major currencies and U.S. Treasury securities.**
- **They are both quasi-currencies and commodities.**

Investment demand is the key factor affecting prices; and investment demand is driven by economic, financial, and political developments more than by supply and demand fundamentals.

Gold and Silver are highly secretive markets.

- **This is one characteristic that attracts people and entities to these metals.**

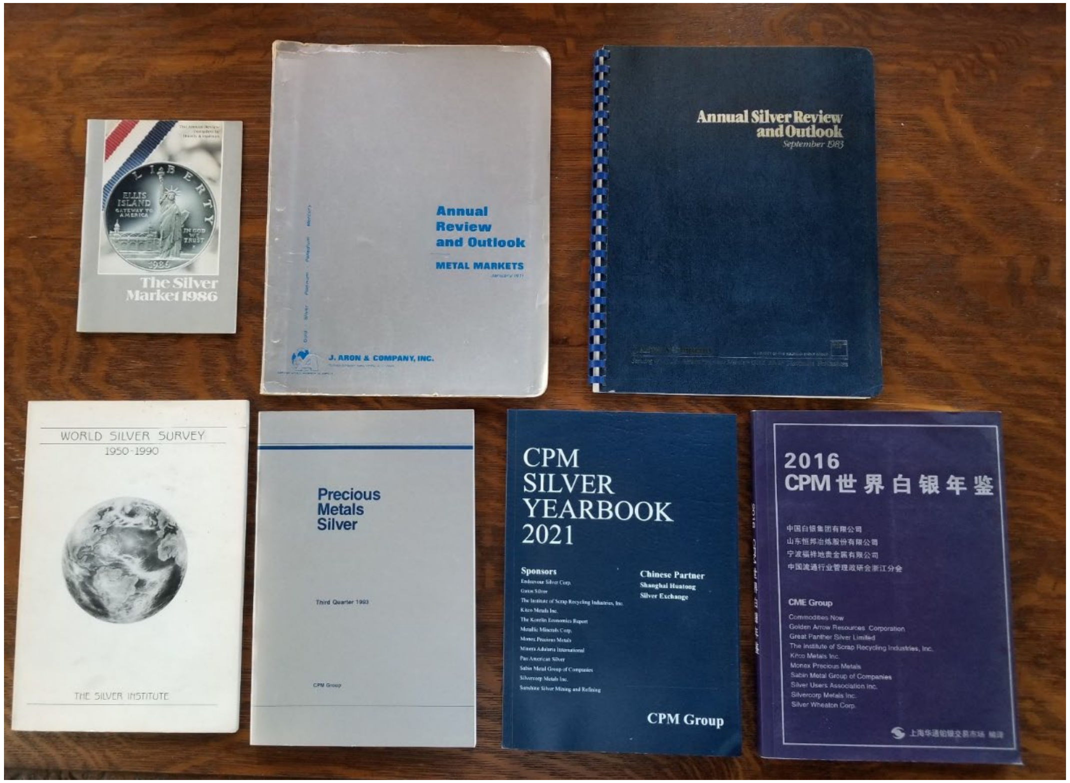
Their markets are full of misinformation.

- **Bad data**
- **Marketing disguised as research**
- **Poor methodology**
- **Belief-based commentary**

What Is CPM Group And Why Listen To Us

CPM Silver Surveys And Yearbooks Since The 1970s

Gold, PGMs, Copper, Oil and Gas, Other Metals, etc., too.



Why Listen To CPM

Experience
Knowledge
Global Contacts, Plugged Into the Markets

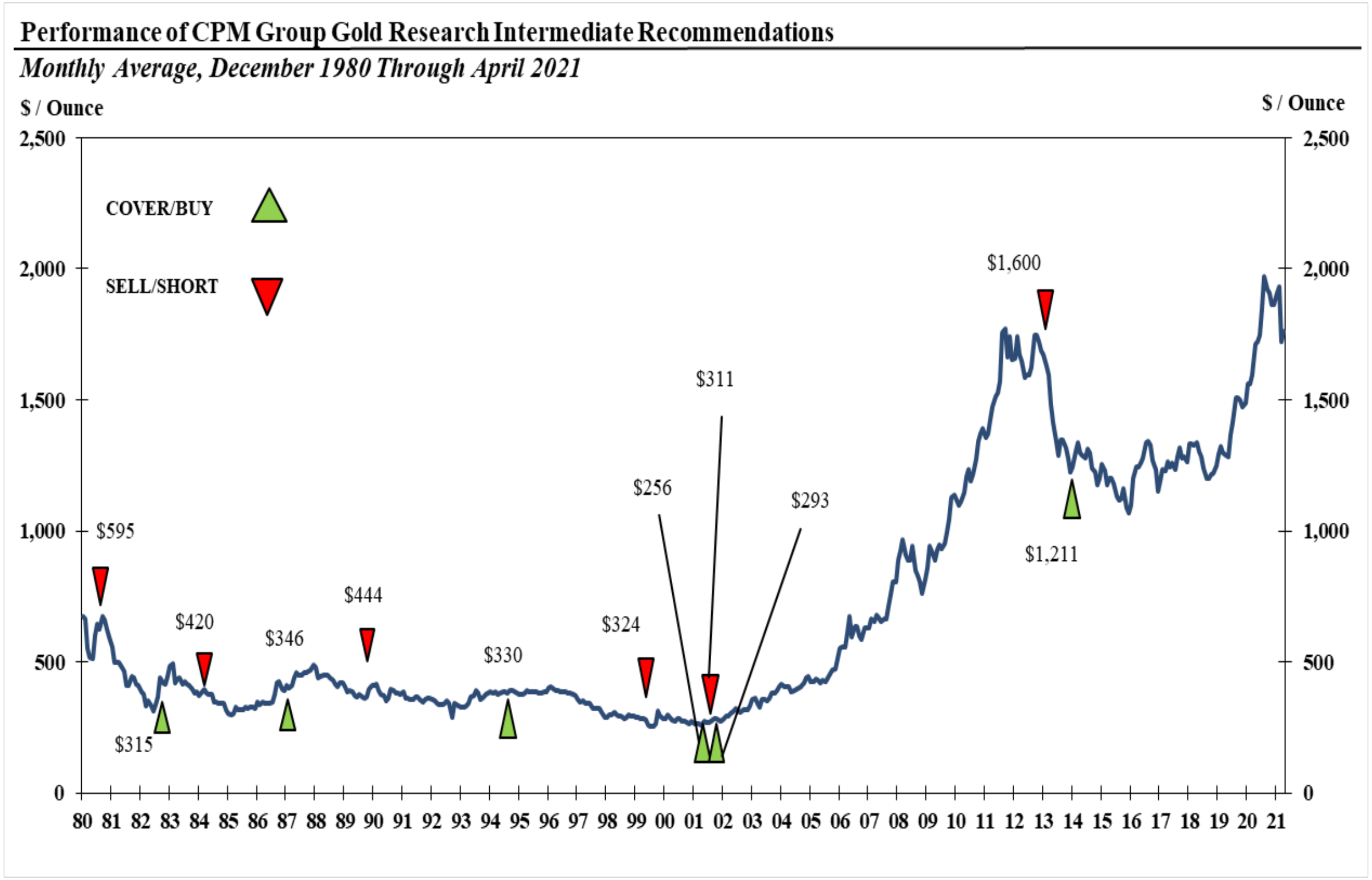
Integrity
Unbiased

We have been successful in our research and analysis since the 1980s.

We sell information, research, data, knowledge, and the application of these.

We do not sell or market silver or silver mining or exploration stocks.

CPM's Intermediate-Term Gold Recommendations



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CPM’s Intermediate-Term Gold Relative Performance

Portfolio 3 bought and sold gold over 40 years based on CPM Group's intermediate term projections and recommendations, as published in its annual yearbooks and other reports. It also sold gold short based on those same reports.

Gold Investment Returns: Three Portfolios

	Portfolio 1 **Bought and Held Gold**	**Portfolio 2** **Bought and Sold Gold**	**Portfolio 3** **Bought, Sold, and Shorted Gold**
Initiated Positions*	1,000,000	1,000,000	1,000,000
Gold Price: $594.92			
December 1980			
Value as of April 2021	2,825,646	30,676,424	129,531,644
Gold Price: $1,732.22	2.83	30.68	129.53
Return as of April 2021	182.6%	2967.6%	12853.2%
Annualized Rate of Return	2.75%	8.94%	12.9%

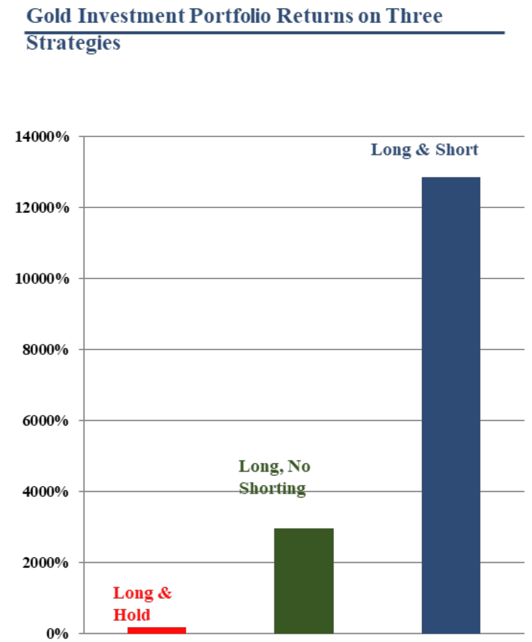
Notes: Portfolio 1 would have bought gold in December 1980. Portfolio 2 would have waited until CPM Group's first buy recommendation, which occurred in June 1982, to purchase its gold. Portfolio 3 would have sold gold short in December 1980, reflecting CPM Group's bearish intermediate term outlook at that time. All data based on market prices and published projections and recommendations. Background data and information available on request.

Portfolio 3 is not adjusted for the costs of the short gold positions during that time.

Interest rates used are one year T-Bills

Source: CPM Group reports.

17 May 2021



CPM Intermediate Term Silver Track Record

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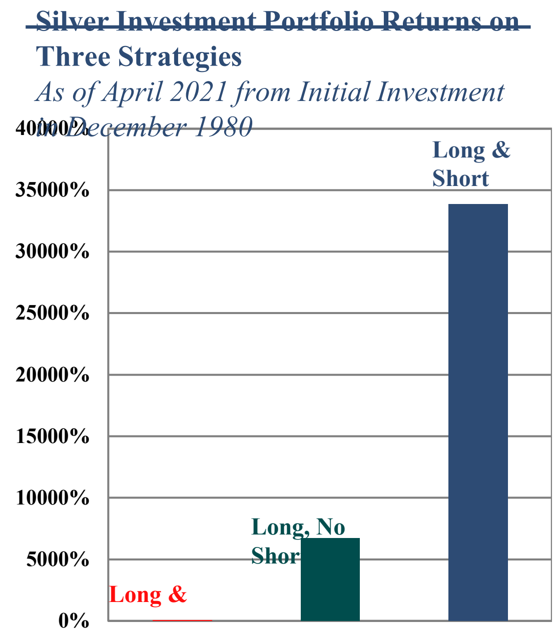
CPM's Intermediate-Term Silver Relative Performance

	Portfolio 1 Bought and Held Silver	Portfolio 2 Bought and Sold Silver	Portfolio 3 Bought, Sold, and Shorted Silver
Initiated Positions*	1,000,000	1,000,000	1,000,000
Silver Price: $16.28			
December 1980			
Value as of April 2021	1,577,669	68,008,077	339,456,047
Silver Price: $25.68	1.58	68.01	339.46
Return as of April 2021	57.8%	6700.8%	33845.6%
Annualized Rate of Return	0.25%	11.74%	18.1%

Notes: Portfolio 1 would have bought silver in December 1980. Portfolio 2 would have waited until CPM Group's first buy recommendation, which occurred in June 1982, to purchase its silver. Portfolio 3 would have sold silver short in December 1980, reflecting CPM Group's bearish intermediate term outlook at that time.
All data based on market prices and published projections and recommendations. Background data and information available on request.
Portfolio 3 is not adjusted for the costs of the short silver positions during that time.
Interest rates used are one year T-Bills
Source: CPM Group reports.
8 June 2021



Gold

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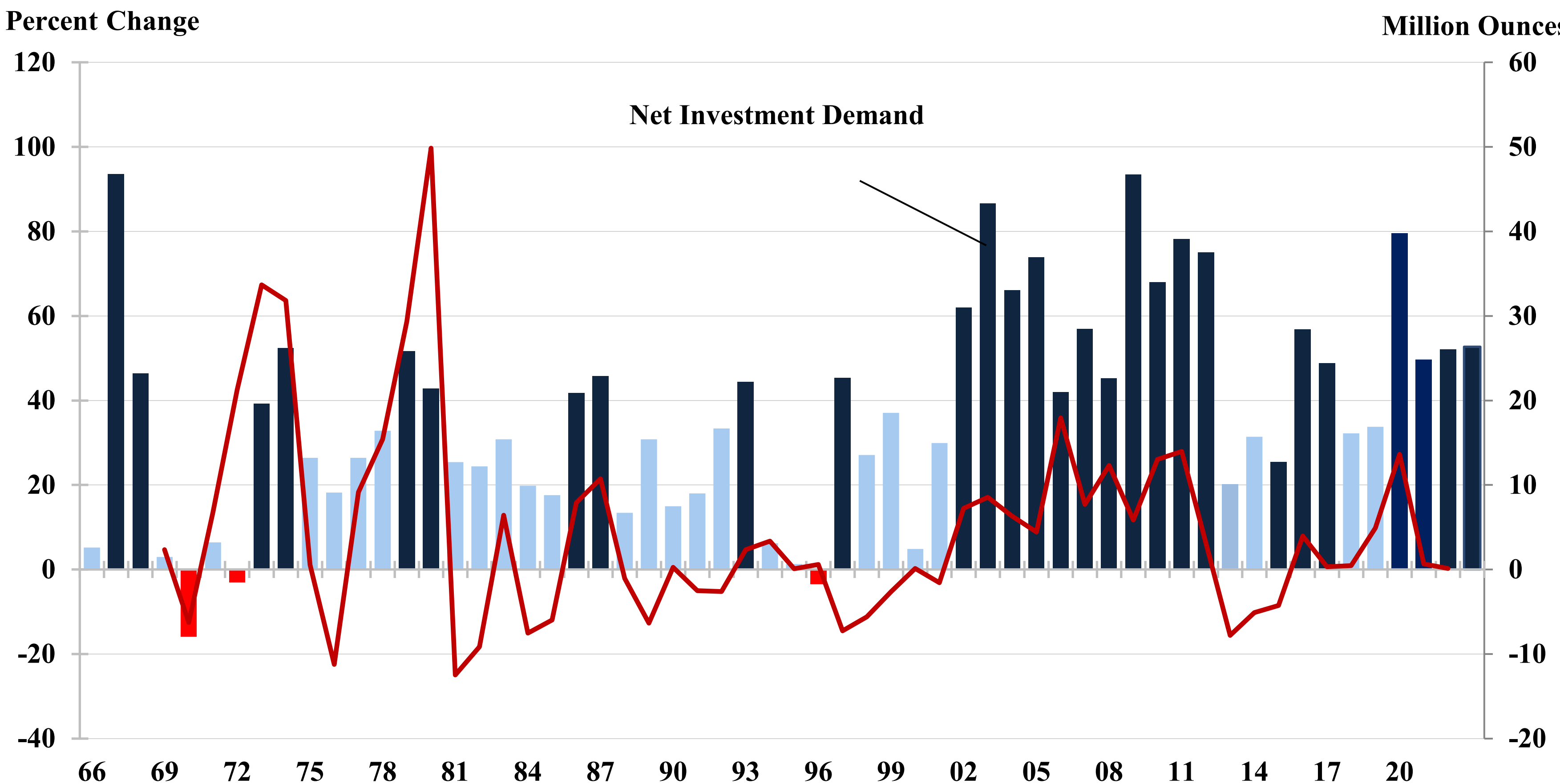
Gold Investment Demand Remains Elevated

Gold Investment Demand

Annual, Investment Demand Projected Through 2023 Prices Through 2022



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Investment Demand

Gold Does Not Correlate Greatly With Other Assets And Economic Trends

Gold And Silver As Investments In Diversified Institutional Portfolios

Long - Term Correlations

Monthly Data

Gold	Inflation	TWD	DJIA	S&P	T-Bill	T-Bond	Silver
1970 - 2021	9%	-34%	-4%	-5%	1%	-1%	70%
1970 - 1990	9%	-34%	2%	-2%	-2%	10%	71%
1978 - 1982	6%	6%	32%	13%	-13%	3%	85%
1990 - 2021	-4%	-36%	-13%	-9%	2%	-9%	67%
2000 - 2021	0%	-40%	-13%	-9%	1%	-13%	74%
2002 - 2021	2%	-40%	-10%	-9%	1%	-14%	75%
2008 - 2021	-5%	-38%	-10%	-8%	3%	-14%	77%

Source: CPM Group
January, 2022

Gold and silver are excellent portfolio diversifiers in that they have very low to no statistical correlations with other assets such as stocks and bonds.

They also do not move closely against the dollar or closely in line with inflation… in contrast to what many people believe.

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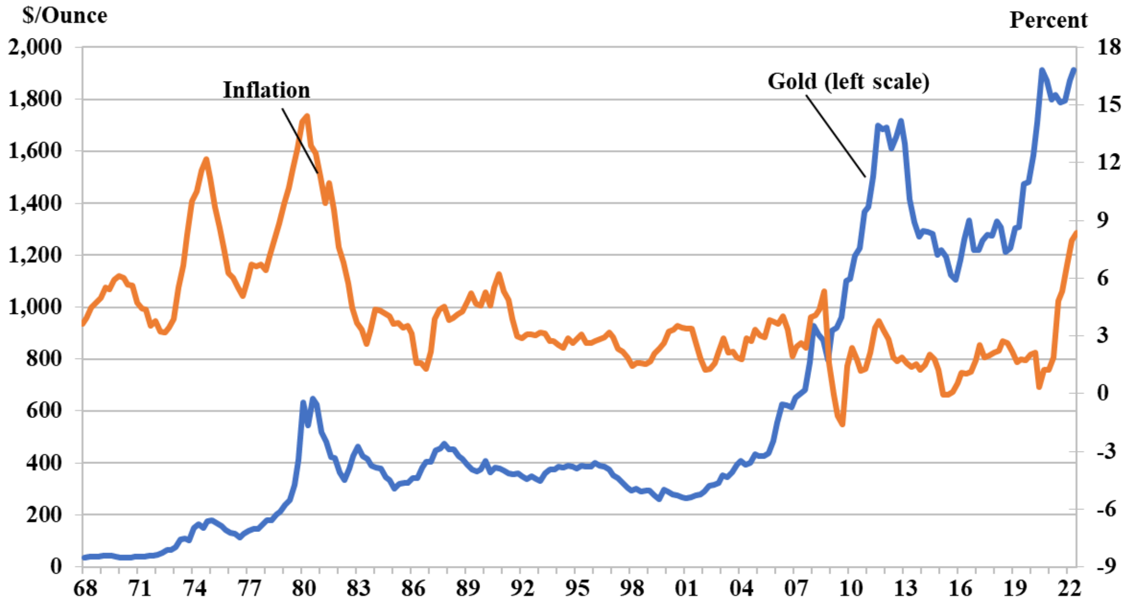
Gold's Long-Term Statistical Correlation With U.S. CPI Inflation

Gold and U.S. Inflation

Quarterly, Through Second Quarter 2022



From: CPM's *2022 Gold Yearbook*

Long - Term Correlations

Monthly Data

Gold	Inflation
1970 - 2021	9%
1970 - 1990	9%
1978 - 1982	5%
1990 - 2021	-4%
2000 - 2021	0%
2002 - 2021	2%
2008 - 2021	-8%

Source: CPM Group
January, 2022

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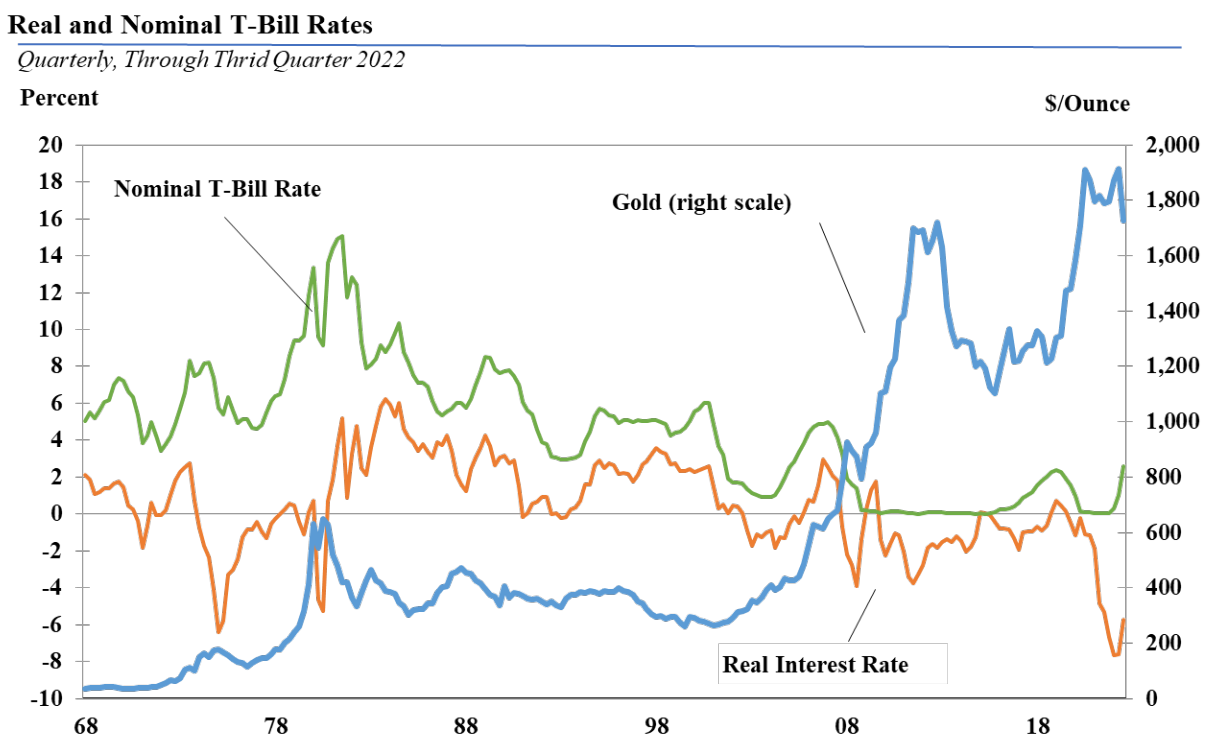
The Dollar Is Not Collapsing

The Dollar's Two-Month Decline In Perspective

Real Interest Rates Do Matter To Gold



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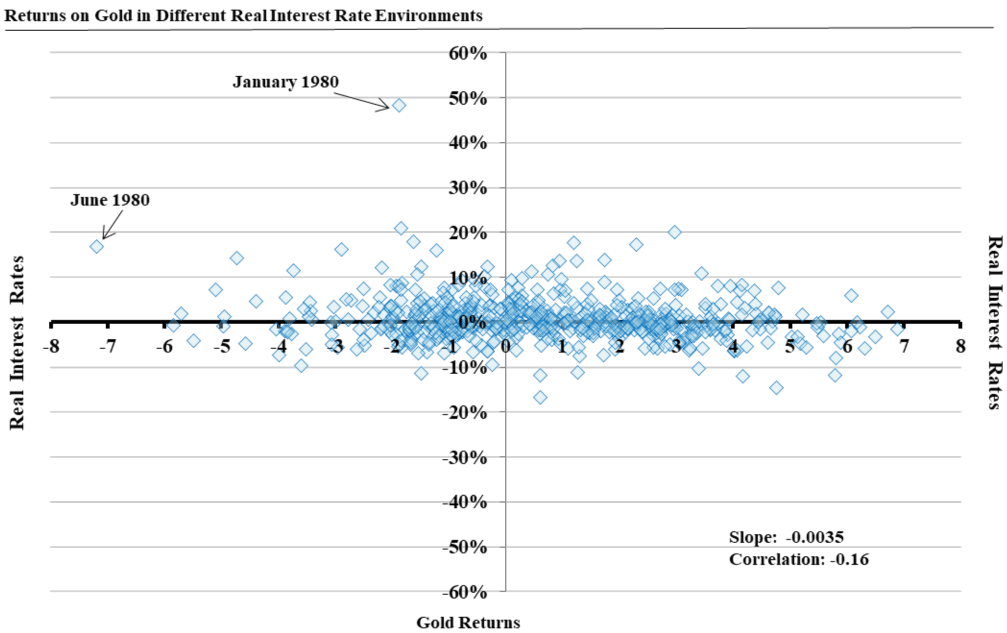
But The Relationship: Real Gold Price Changes To Real Rates Is -16%



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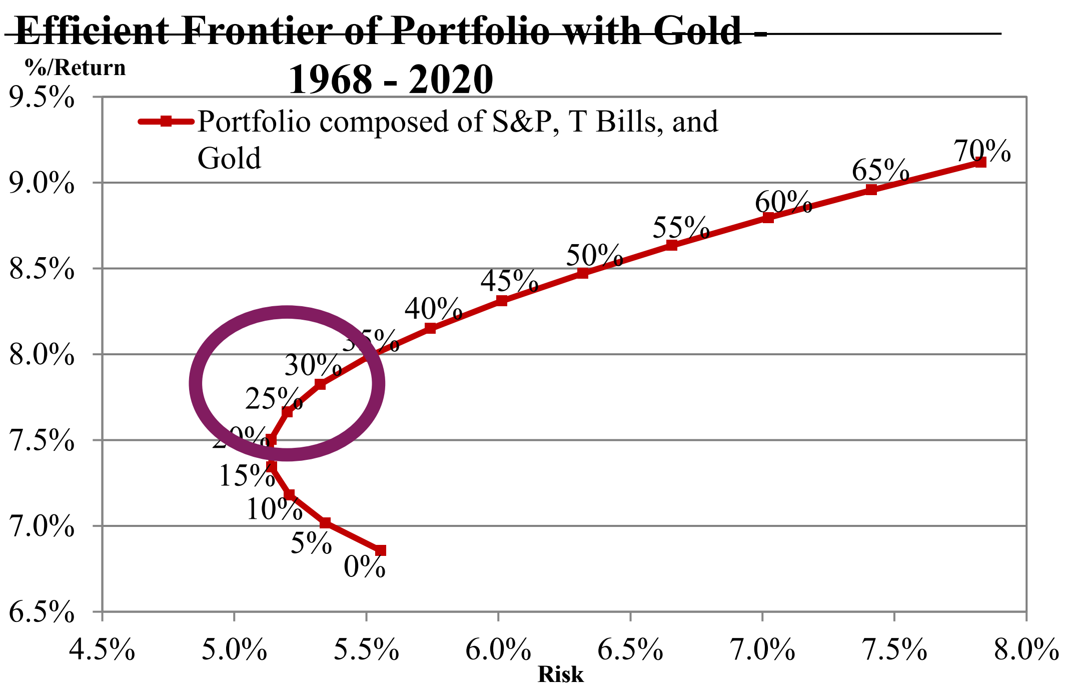
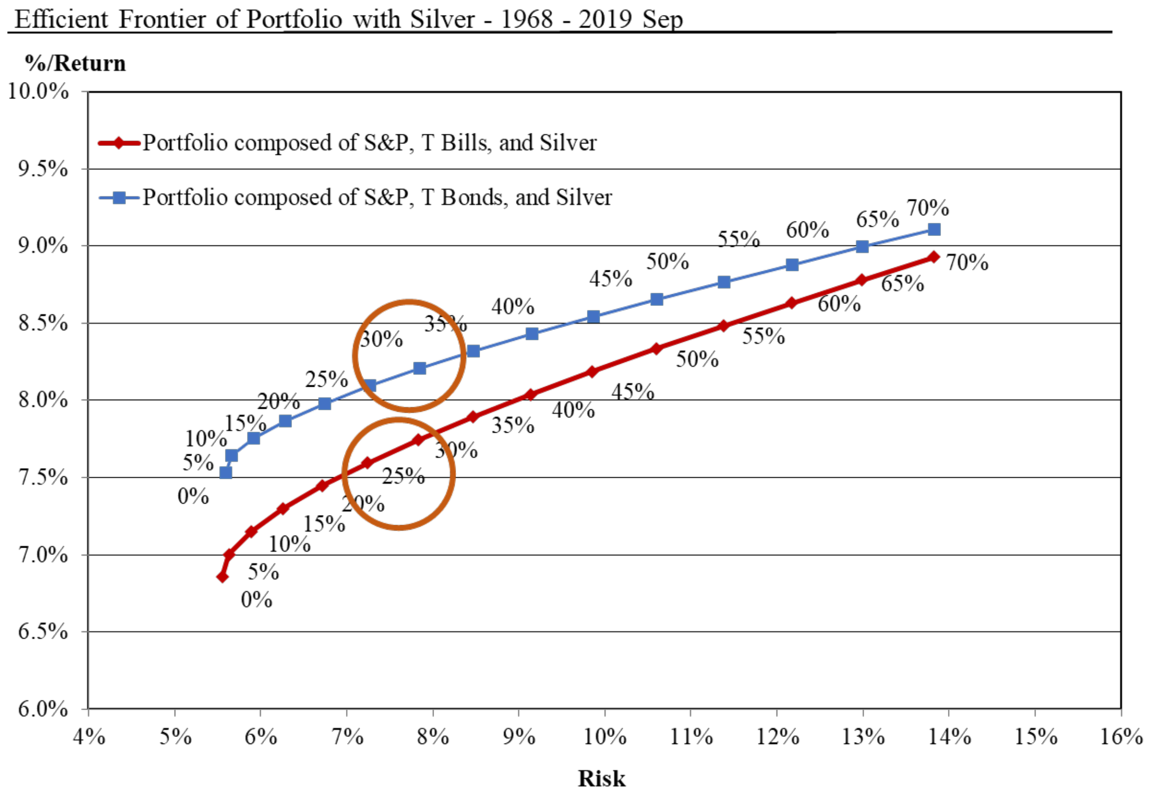
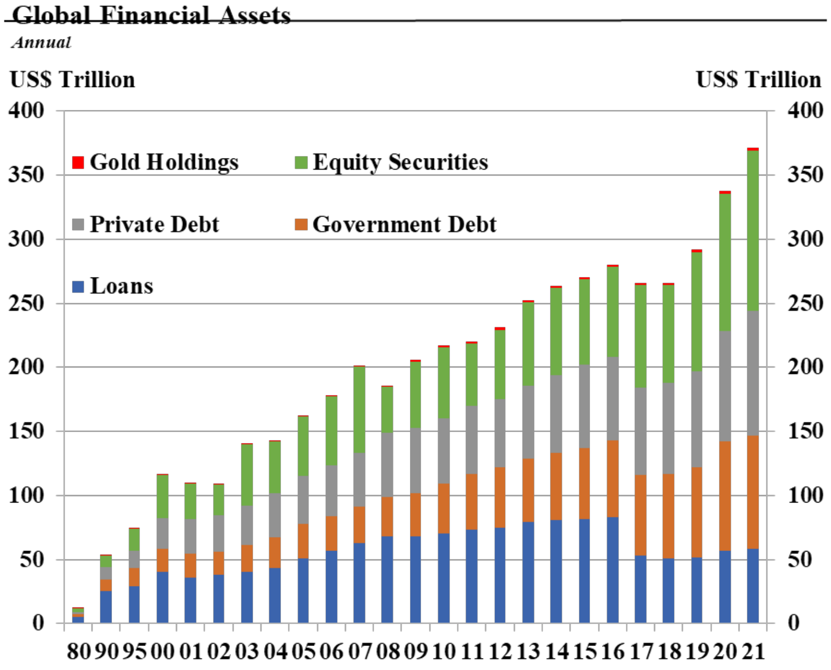
Gold's Optimal Role In A Portfolio Historically

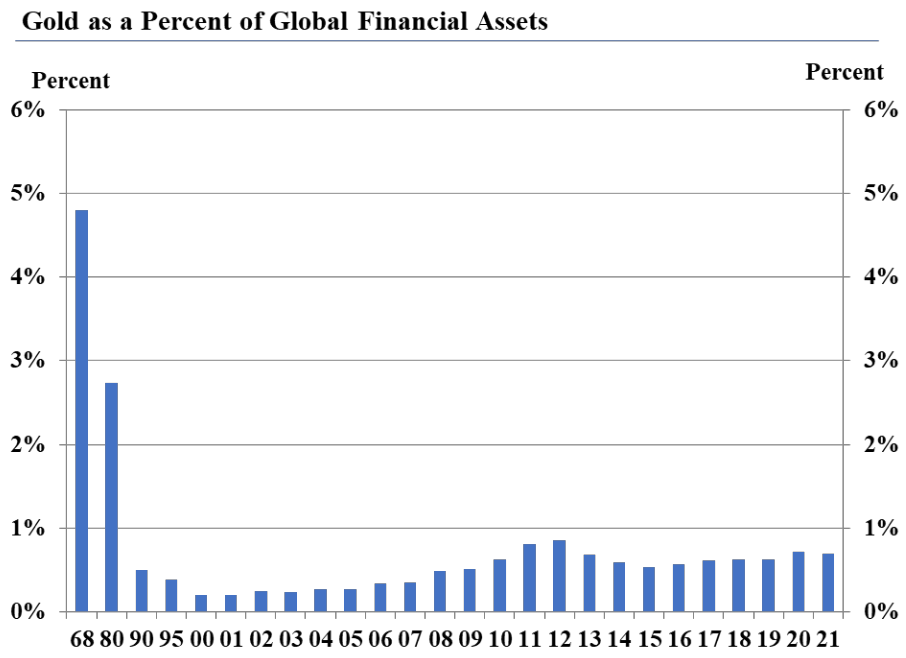


Silver's Optimal Role In A Portfolio Historically



And Yet, Gold And Silver Are Less Than 1% Of Global Wealth





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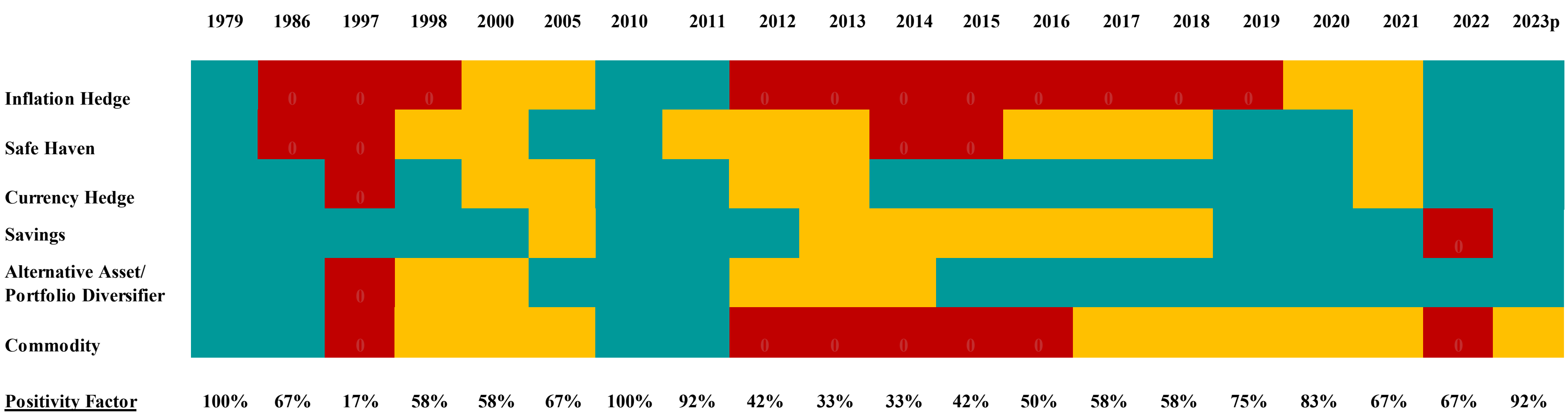
Factors Influencing Gold Investment: Largely Positive

Factor Analysis: Gold Investment Demand



Note: CPM estimates of market concensus.
Source: CPM Group
March 2023

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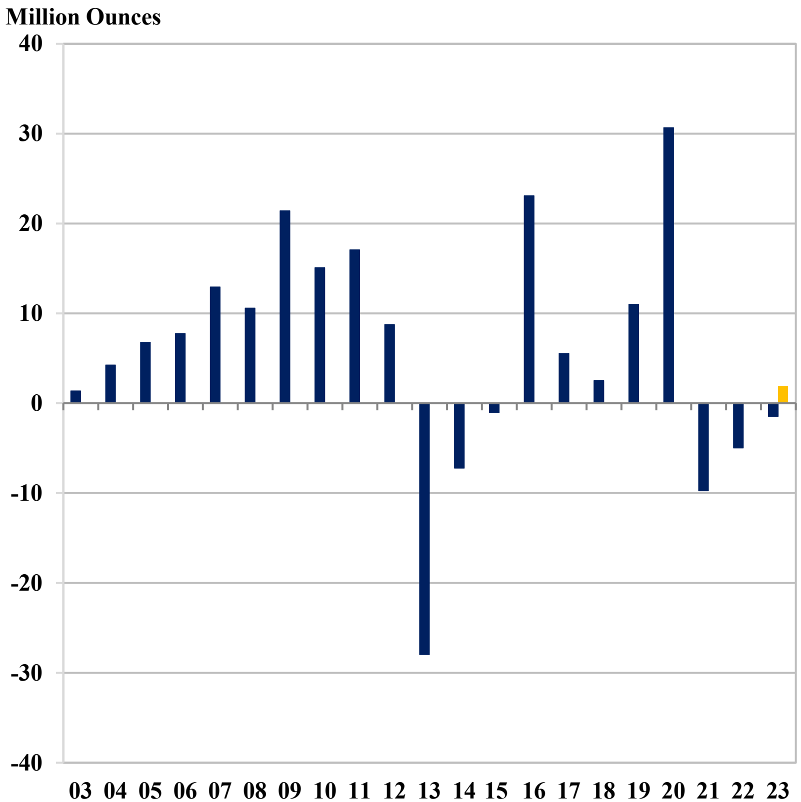
Gold ETF Holdings: Off But Still High

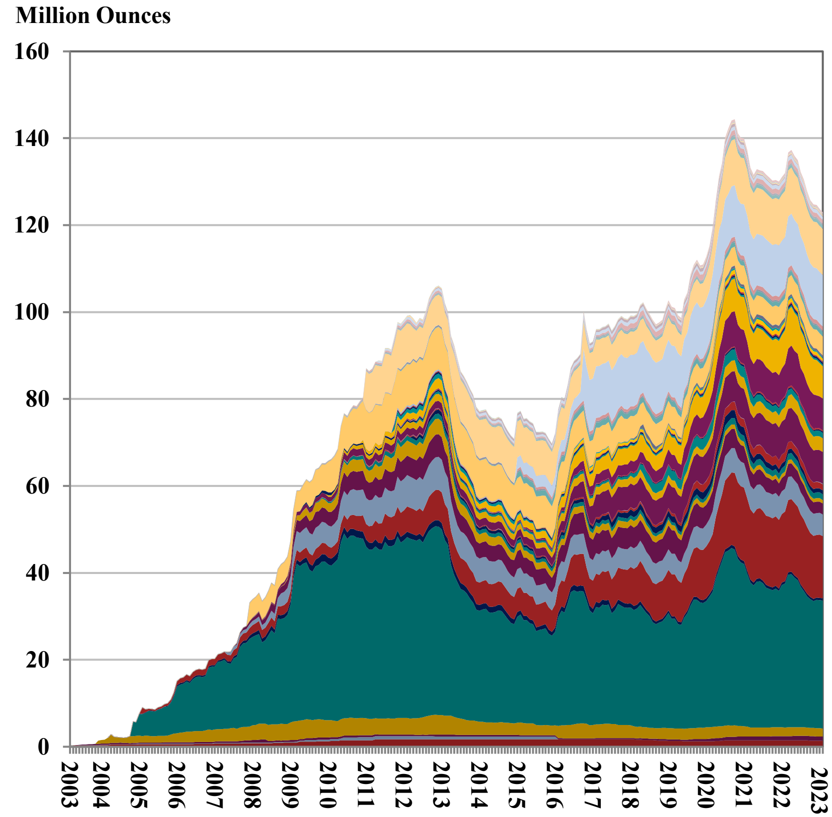
Annual Net Changes to Gold ETP Holdings

Feb. 2023



Monthly Exchange Traded Products' Physical Gold Holdings

Feb. 2023



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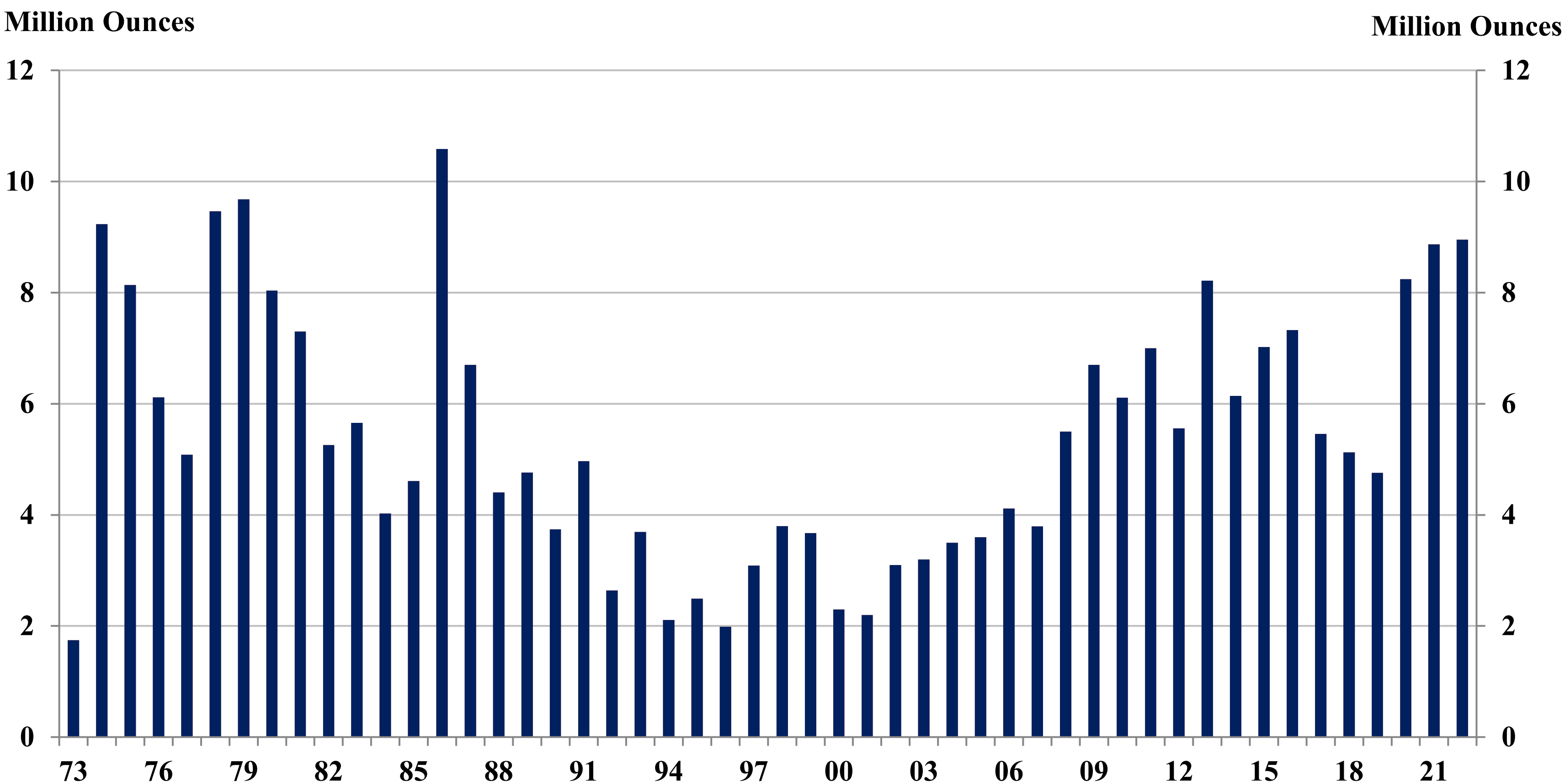
Gold Coin Demand: Going Strong

Gold Coin Demand

Annual, Through 2022

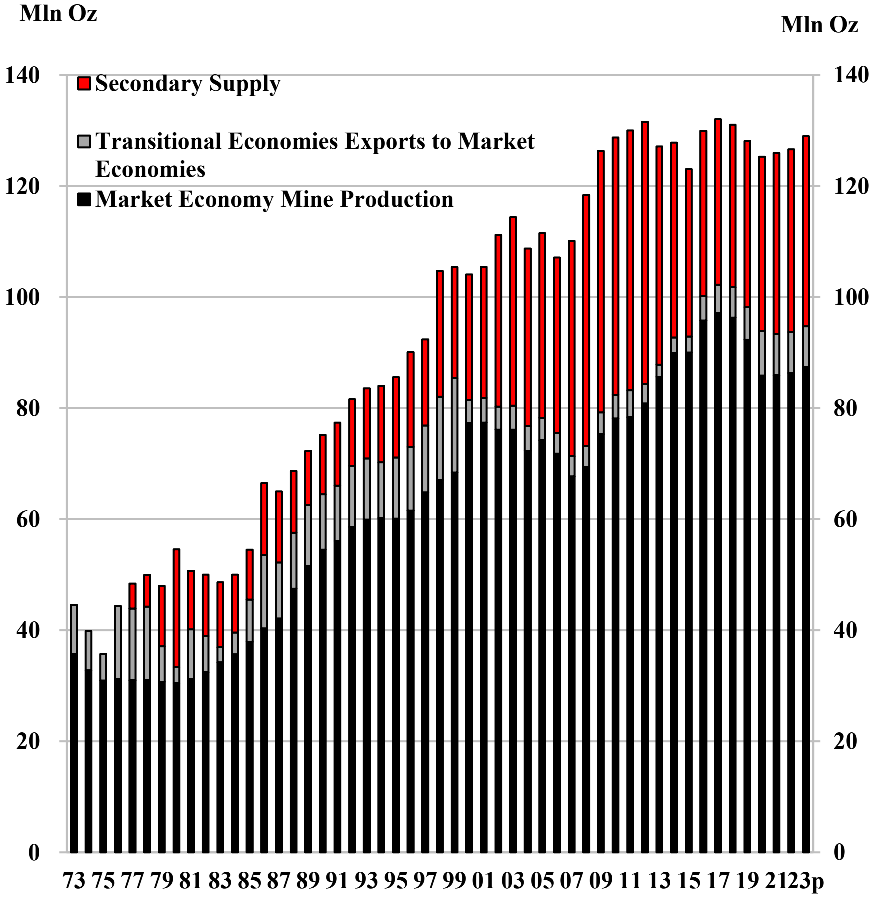


Supply

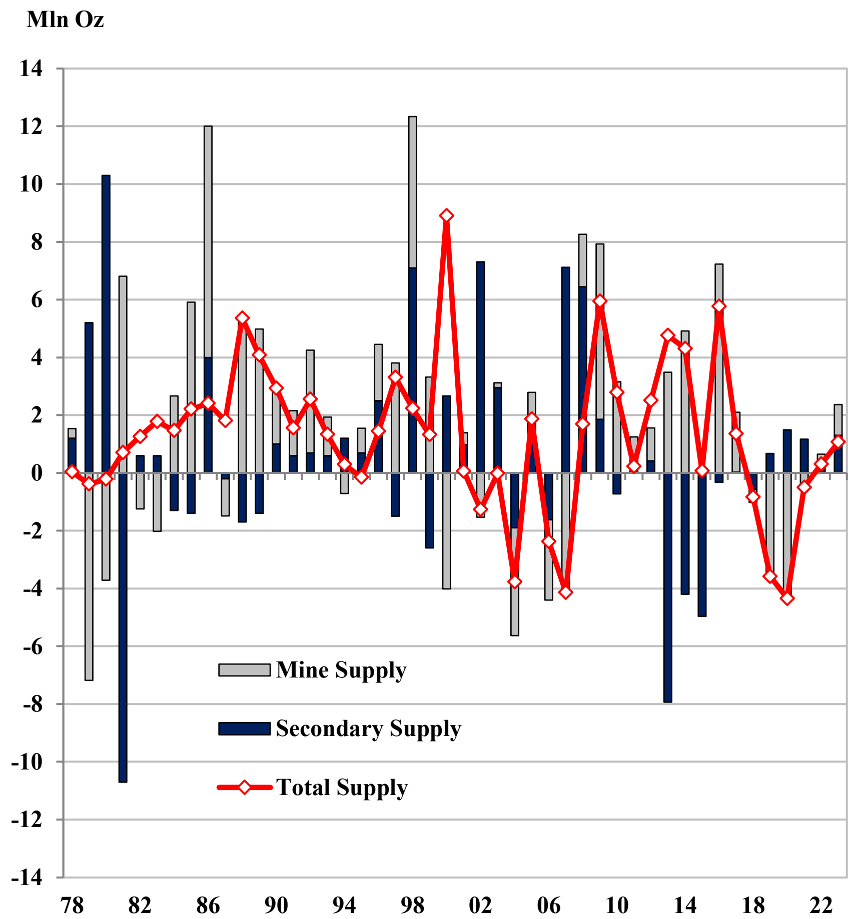
Total Supply Forecast To Eclipse 2019 Levels

Total Gold Supply

Annual, Projected Through 2023



Year-on-Year Net Changes to Gold Mine Supply, Secondary Supply, and Total Supply



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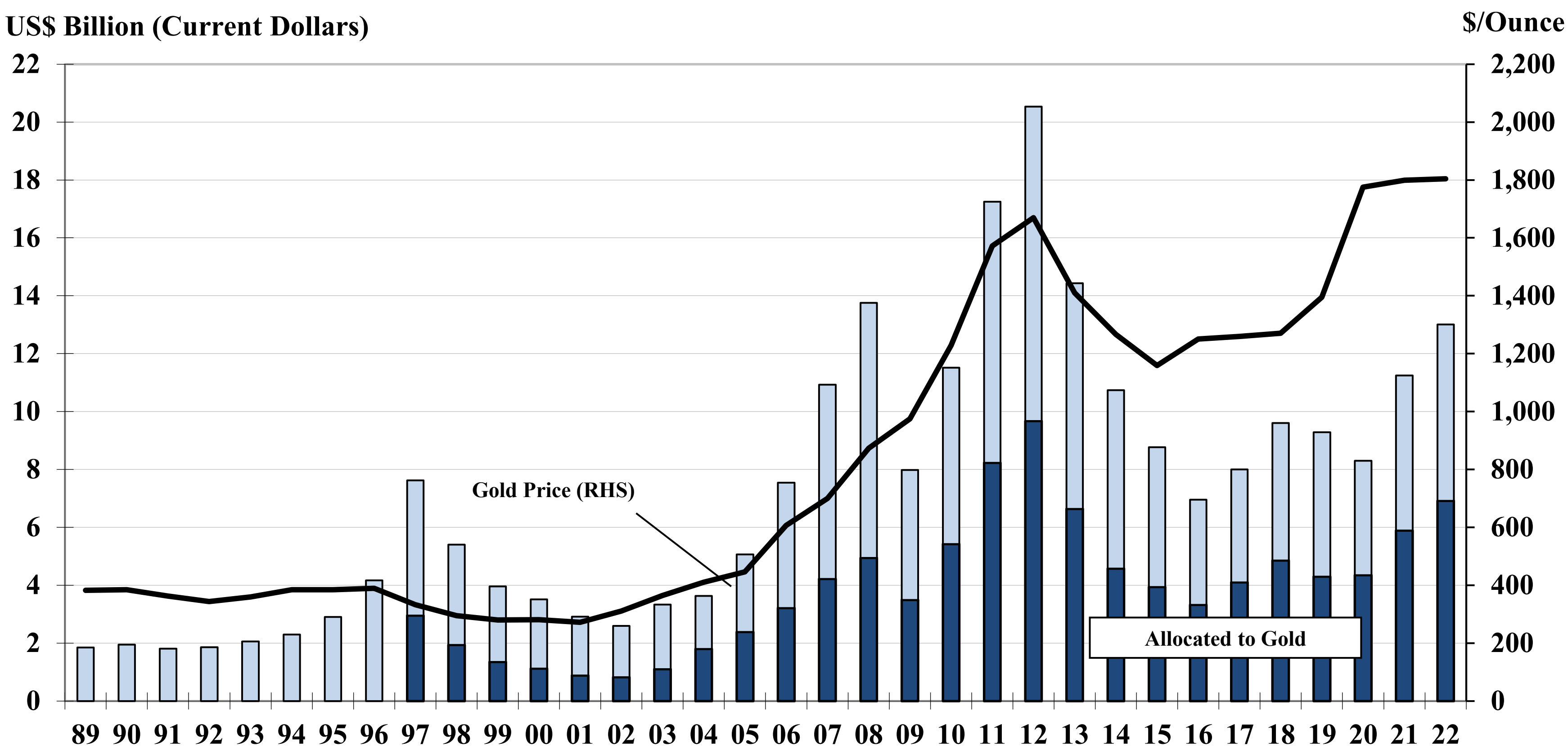
Exploration Budgets: Finally Gaining Momentum

Worldwide Nonferrous Exploration Budgets And Annual Average Gold Prices



Source: S&P Global Market Intelligence

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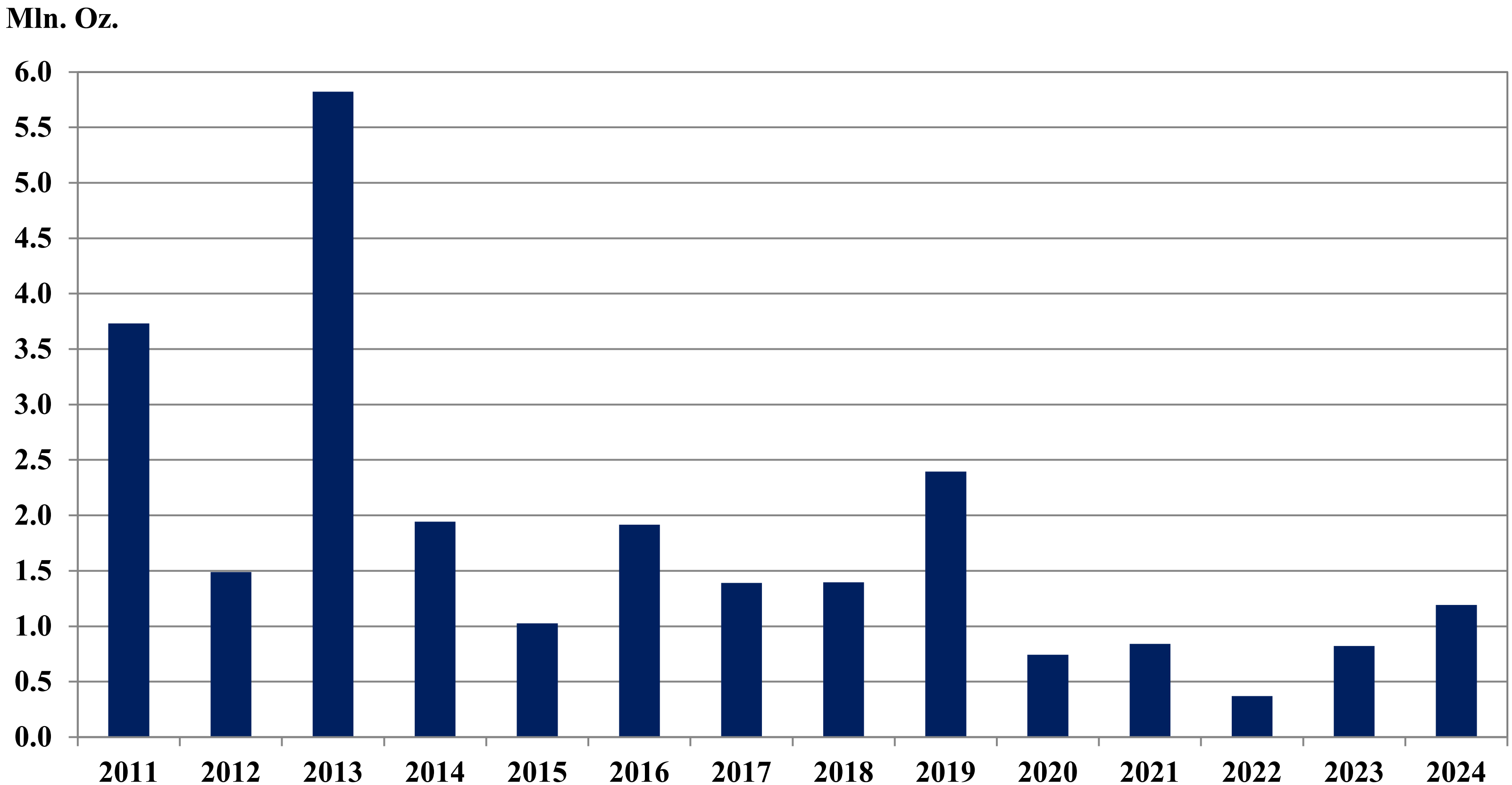
New Capacity Additions

Dec 2022: Estimated Total Annual Gross Gold Mine Production Capacity Additions Since 2011



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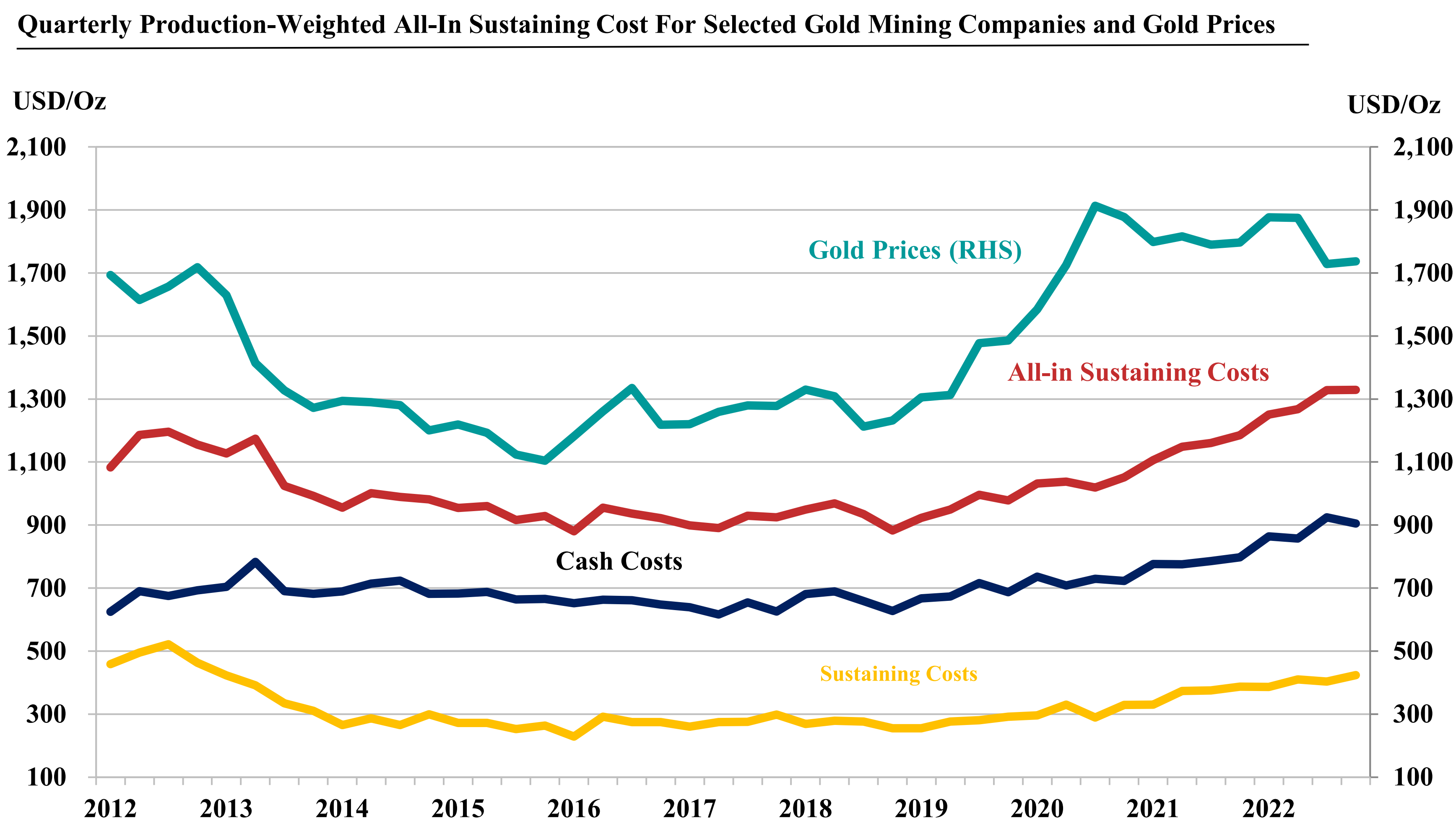
AISC Reach Record Highs



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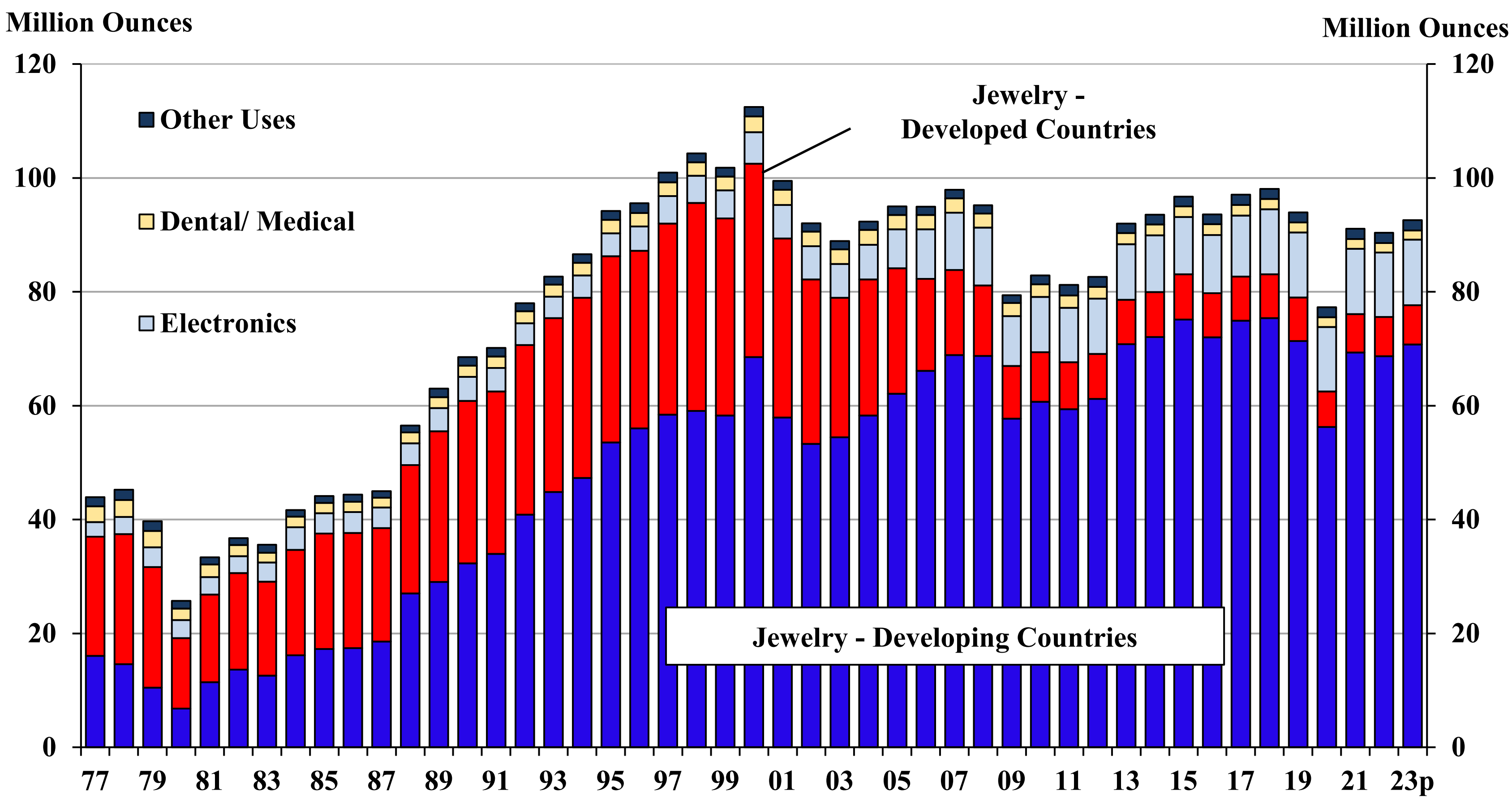
Fabrication Demand

Gold Fabrication Demand Set To Recover This Year

Gold Fabrication Demand

Annual, Projected Through 2023



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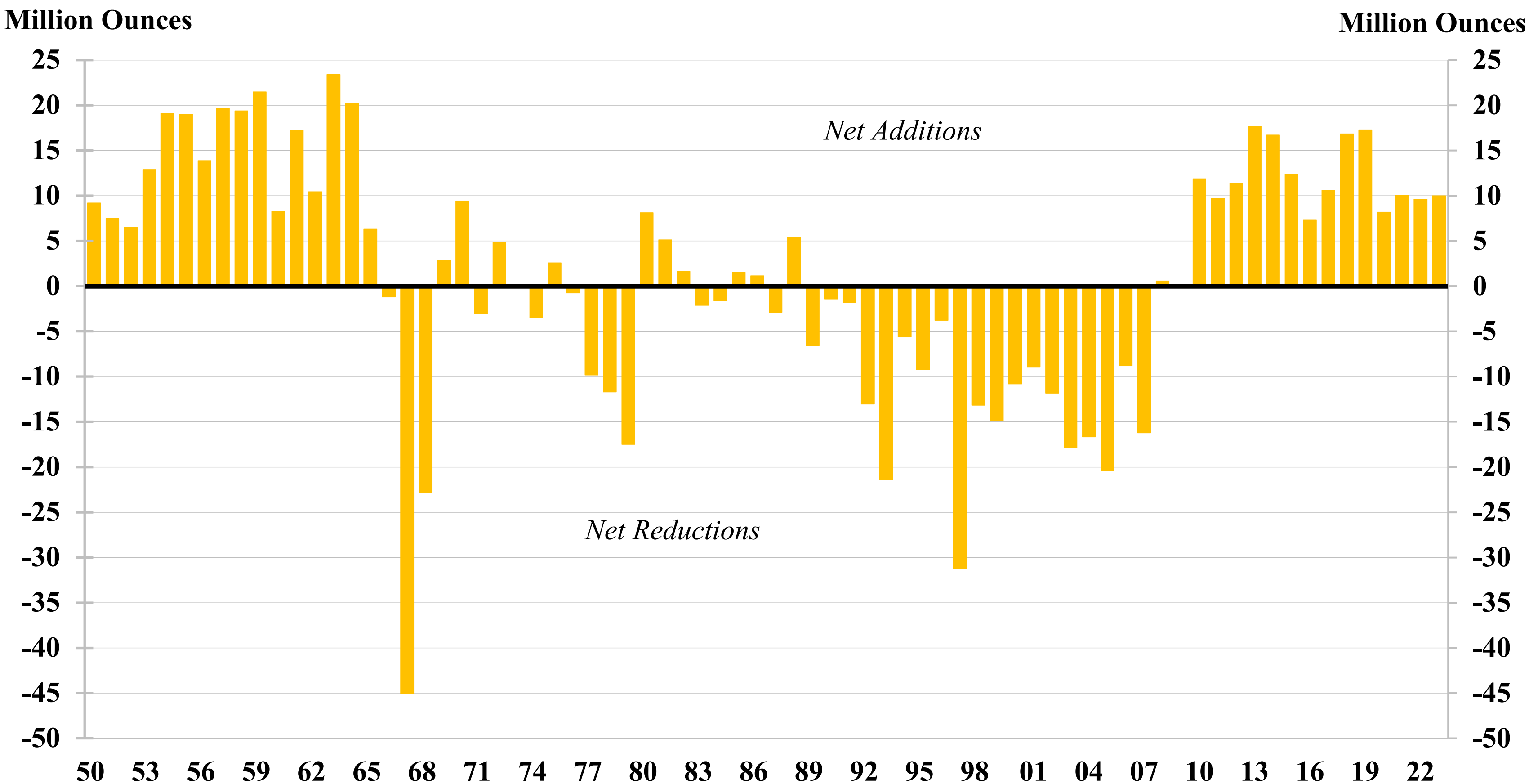
Central Bank Demand

Central Banks Remain Steady Buyers

Official Transactions

Annual Data, Projected through 2023



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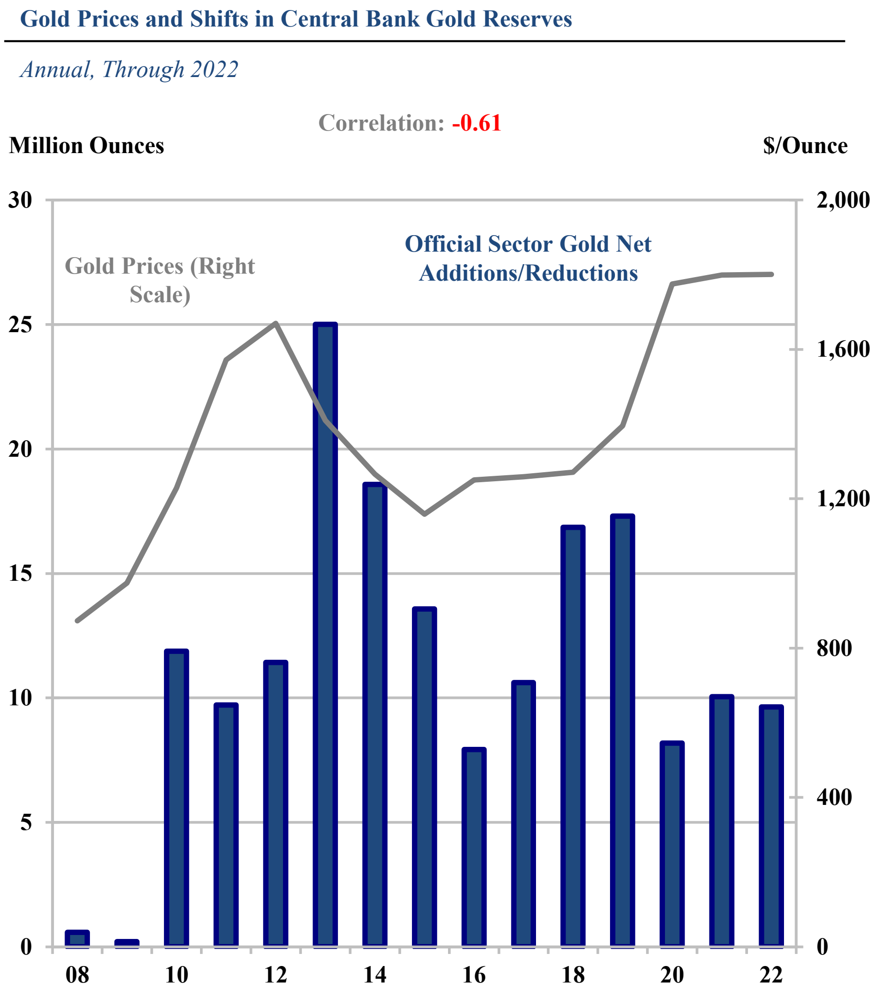
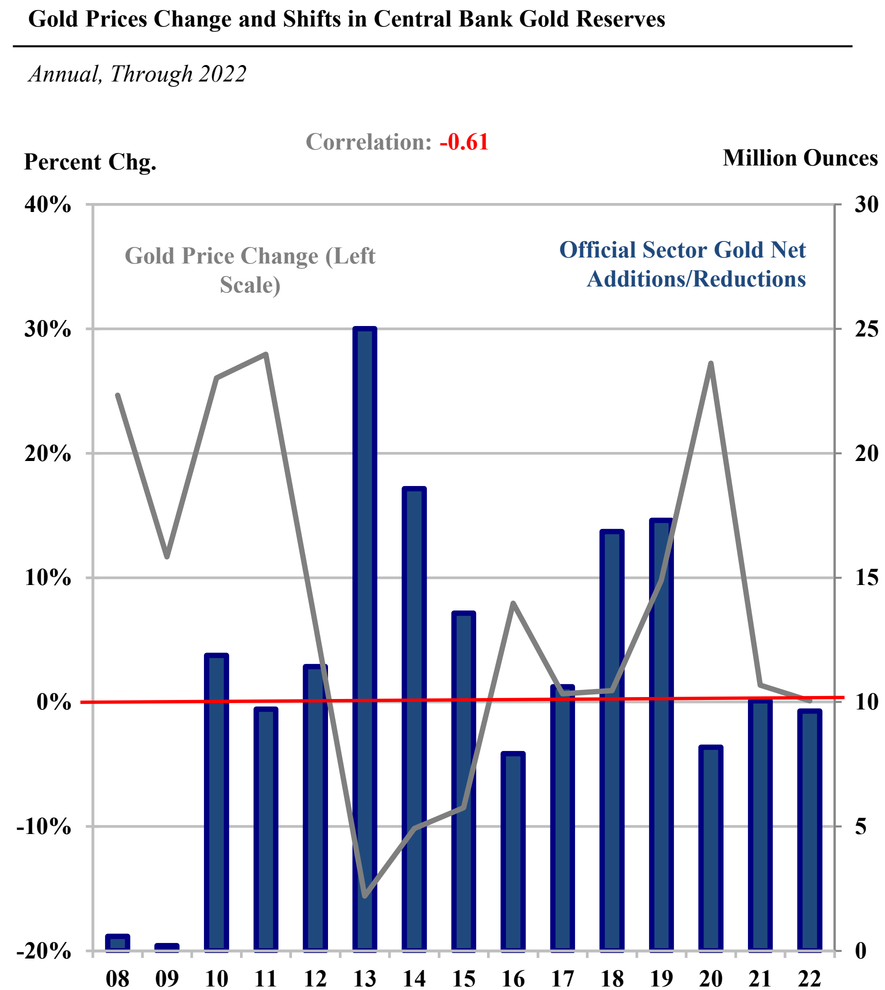
Central Banks Net Buyers Despite High Prices





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Which Banks Have Been Selling (8)

	Year-End 2021	YTD 2022	Net Change 2021-2022	Month of Reporting To IFS
Countries Decreasing Reserves				
Kazakhstan	12.94	11.31	-1.630	Dec
Australia	2.25	1.83	-0.416	Dec
Germany	108.00	107.87	-0.127	Dec
Poland	7.42	7.35	-0.070	Dec
Mongolia	0.31	0.25	-0.056	Dec
Philippines	5.11	5.07	-0.035	Dec
Bosnia	0.10	0.05	-0.048	Dec
Malta	0.00	0.00	-0.001	Dec
Subtotal Gross Increases			-2.384	
Subtotal Net Changes			10.223	

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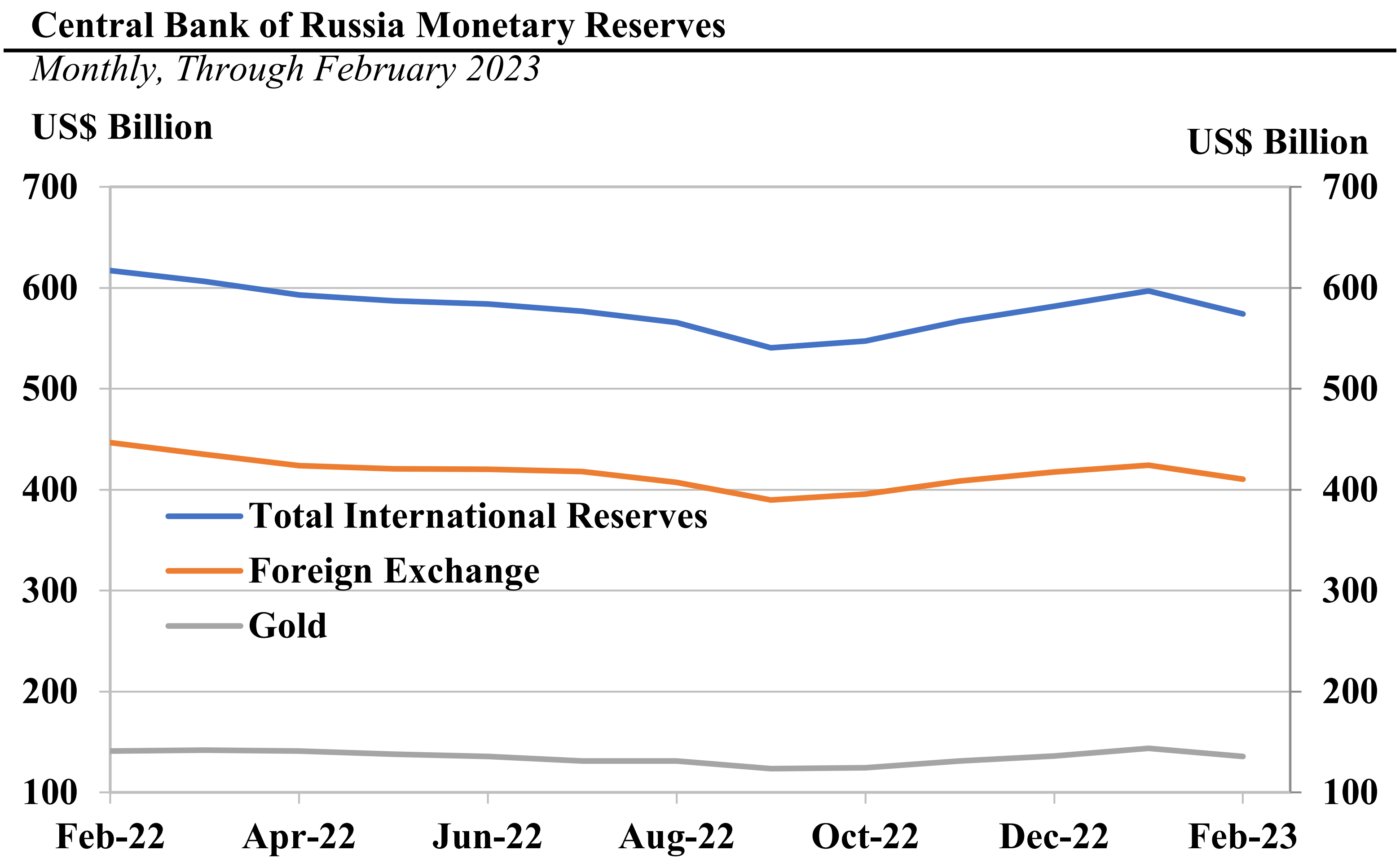
Which Banks Have Been Buying (22)

Changes in Central Bank Gold Reserves in 2022
Million Troy Ounces

	Year-End 2021	YTD 2022	Net Change 2021-2022	Month of Reporting To IFS
Countries Increasing Reserves				
Turkey	16.89	19.41	2.522	Dec
China	62.60	64.64	2.040	Dec
Egypt	2.60	4.04	1.438	Dec
Qatar	1.82	2.95	1.127	Dec
Iraq	3.10	4.19	1.092	Dec
Uzbekistan	11.64	12.73	1.090	Dec
India	24.25	25.32	1.070	Dec
UAE	1.78	2.41	0.628	Dec
Russia	74.00	74.51	0.510	Dec
Argentina	1.76	1.99	0.224	Dec
Tajikistan	0.06	0.27	0.208	Dec
Kyrgyz Republic	0.33	0.53	0.199	Dec
Ecuador	1.01	1.09	0.081	Dec
Ireland	0.31	0.39	0.081	Dec
Cambodia	1.62	1.69	0.064	Dec
Croatia	0.00	0.06	0.062	Dec
Oman	0.00	0.06	0.060	Dec
Czech Republic	0.34	0.38	0.045	Dec
Serbia	1.20	1.24	0.036	Dec
France	78.33	78.34	0.010	Dec
Albania	0.09	0.10	0.010	Dec
Belarus	1.72	1.72	0.009	Dec
Subtotal Gross Increases			12.607	

Central Bank Of Russia Monetary Reserves



Source: CBR

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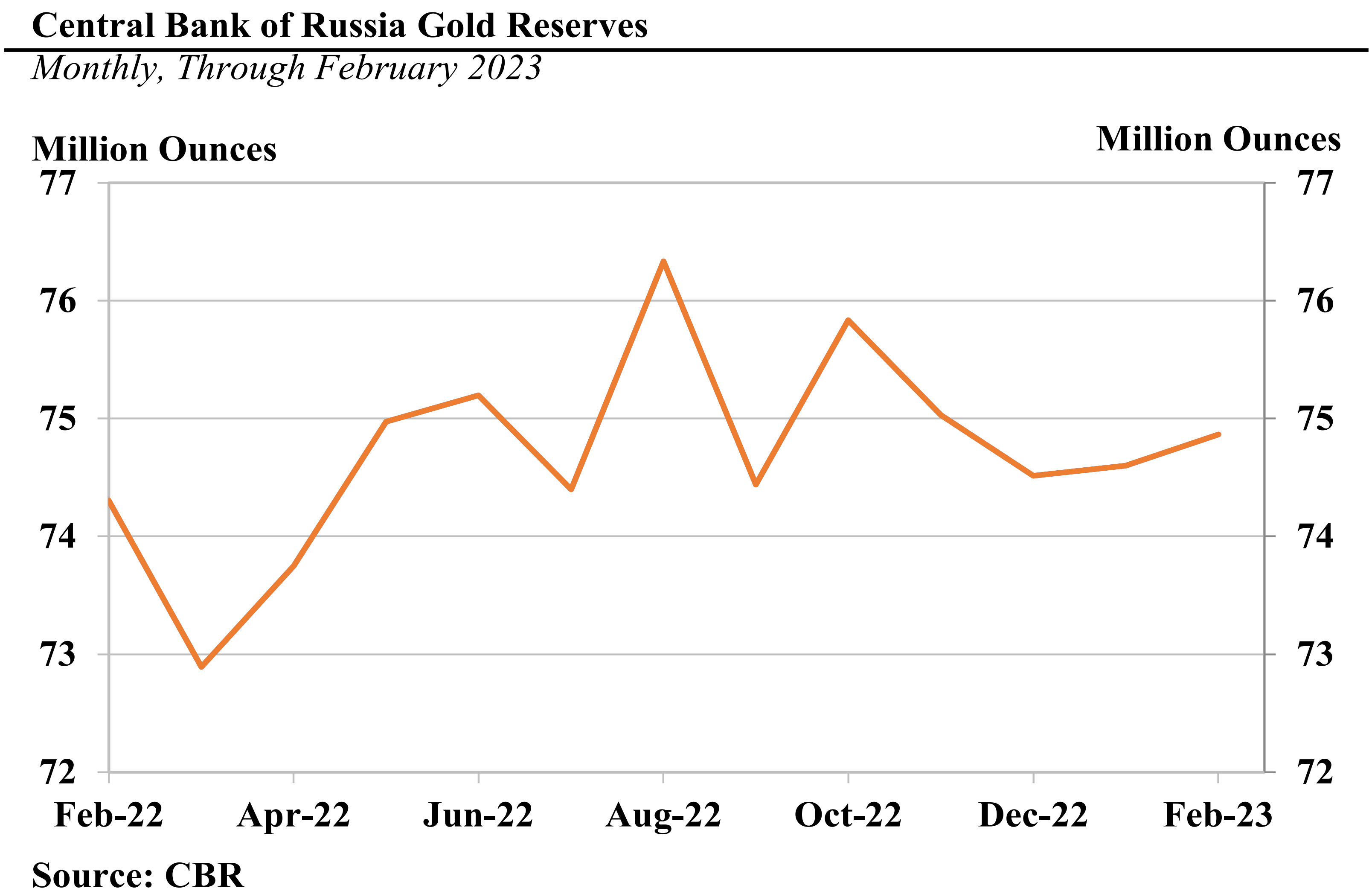
Central Bank Of Russia Gold Reserves



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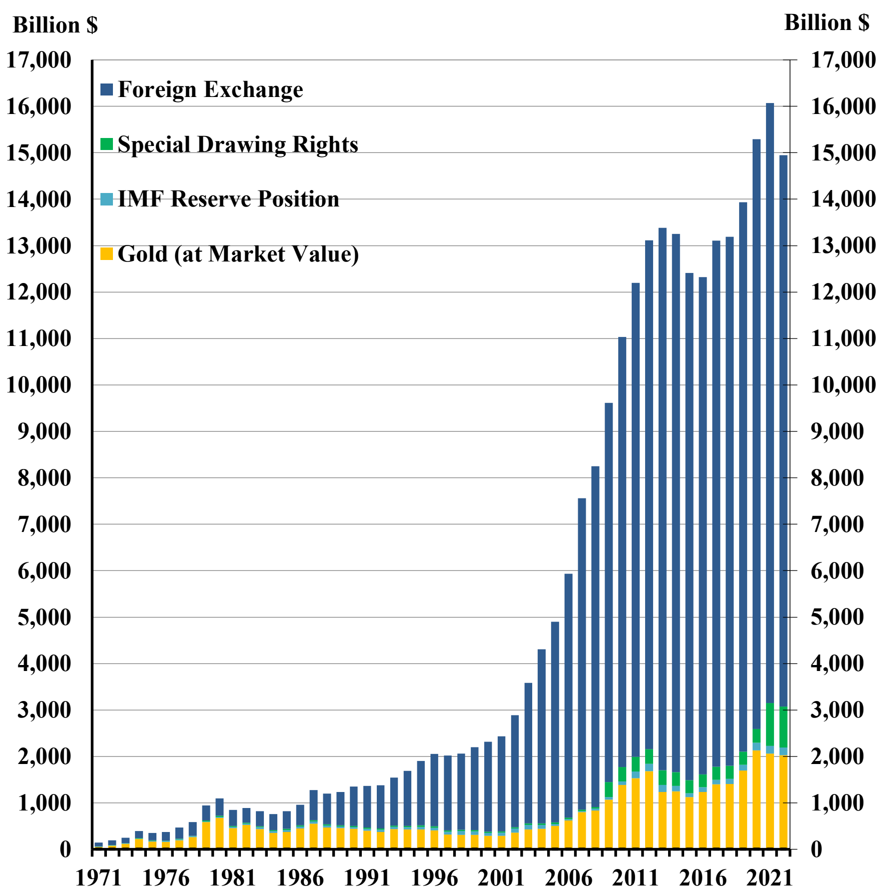
Central Bank Reserve Composition

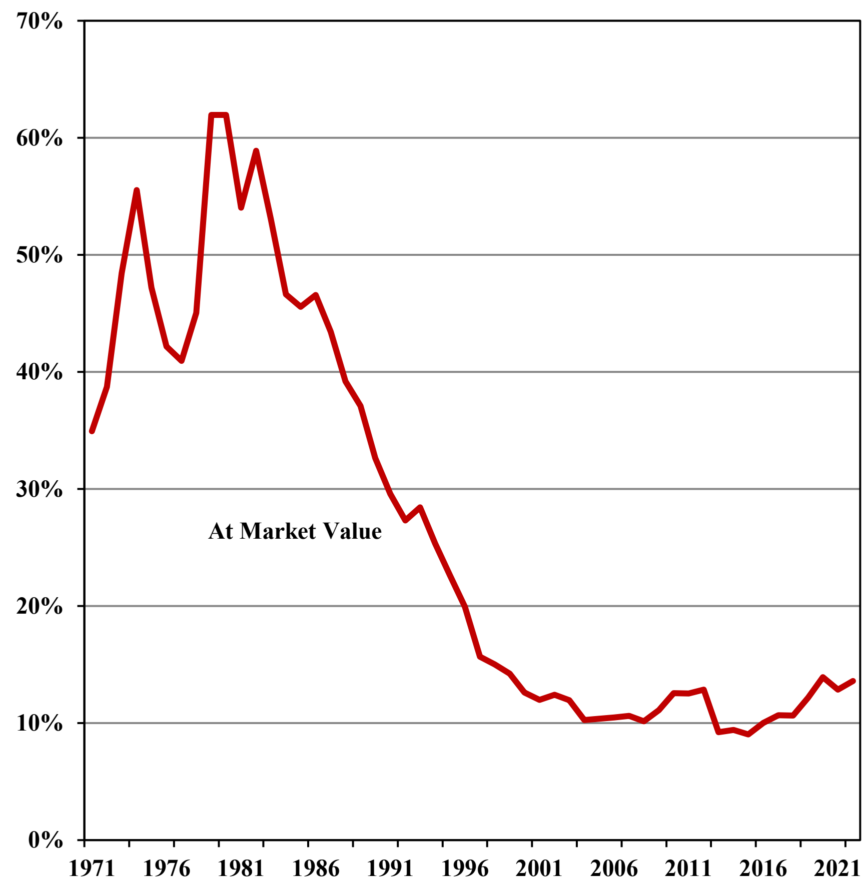
Composition of Global Monetary Reserves

Annual, through 2022



Gold as a Percent of Total Central Bank Reserves

Annual, through 2022



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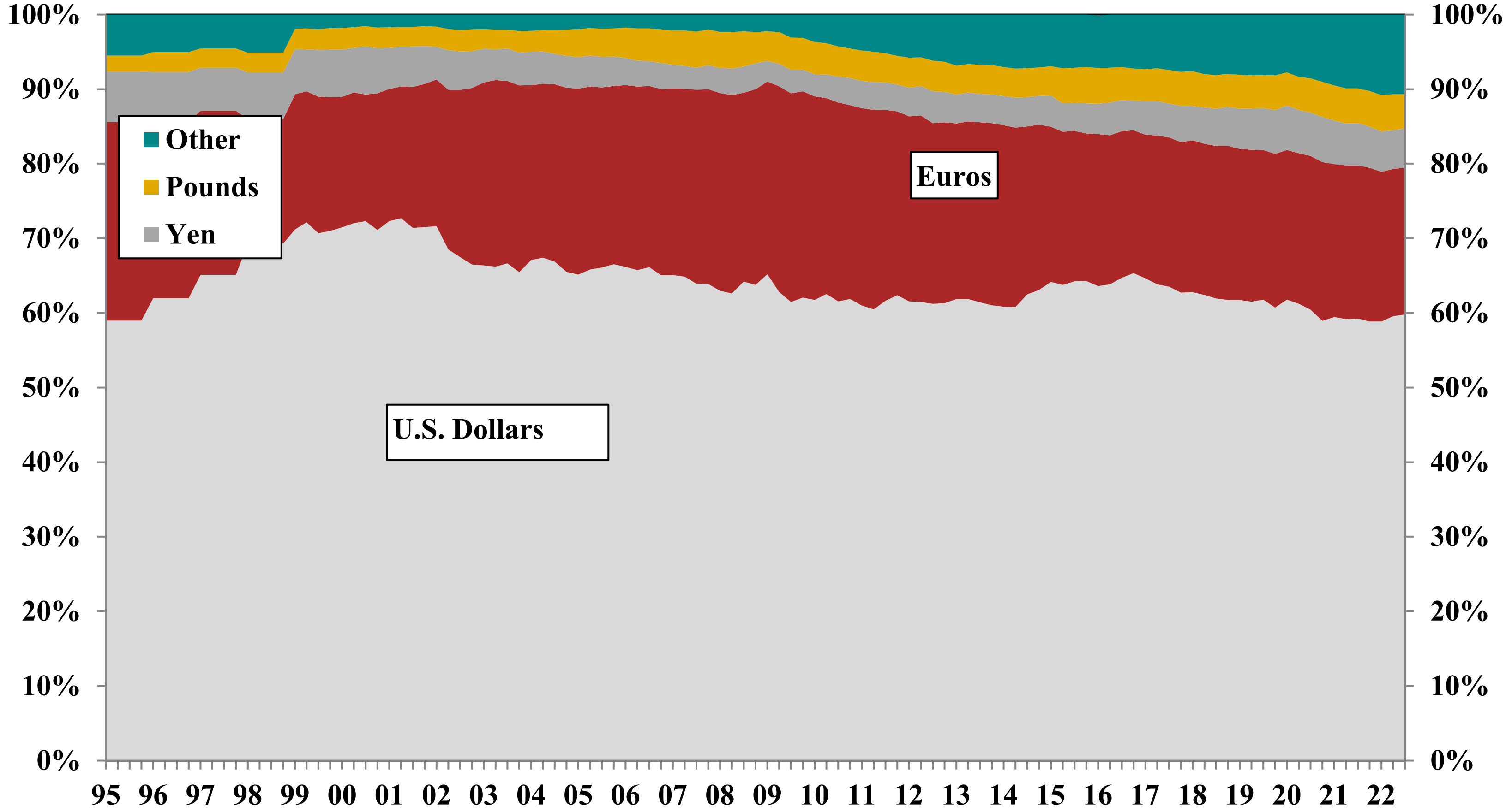
Central Banks Are Not Dumping Dollars

Currency Composition Of Official Foreign Exchange Reserves

Quarterly Data, through September 2022



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Silver

Silver Prices In 2022, Through April 2023

Silver Prices: 1 January 2022 to 15 May 2023

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Silver Prices

1. Silver prices averaged $21.82 in 2022, down $3.46 and 13.3% from $25.28 in 2021.

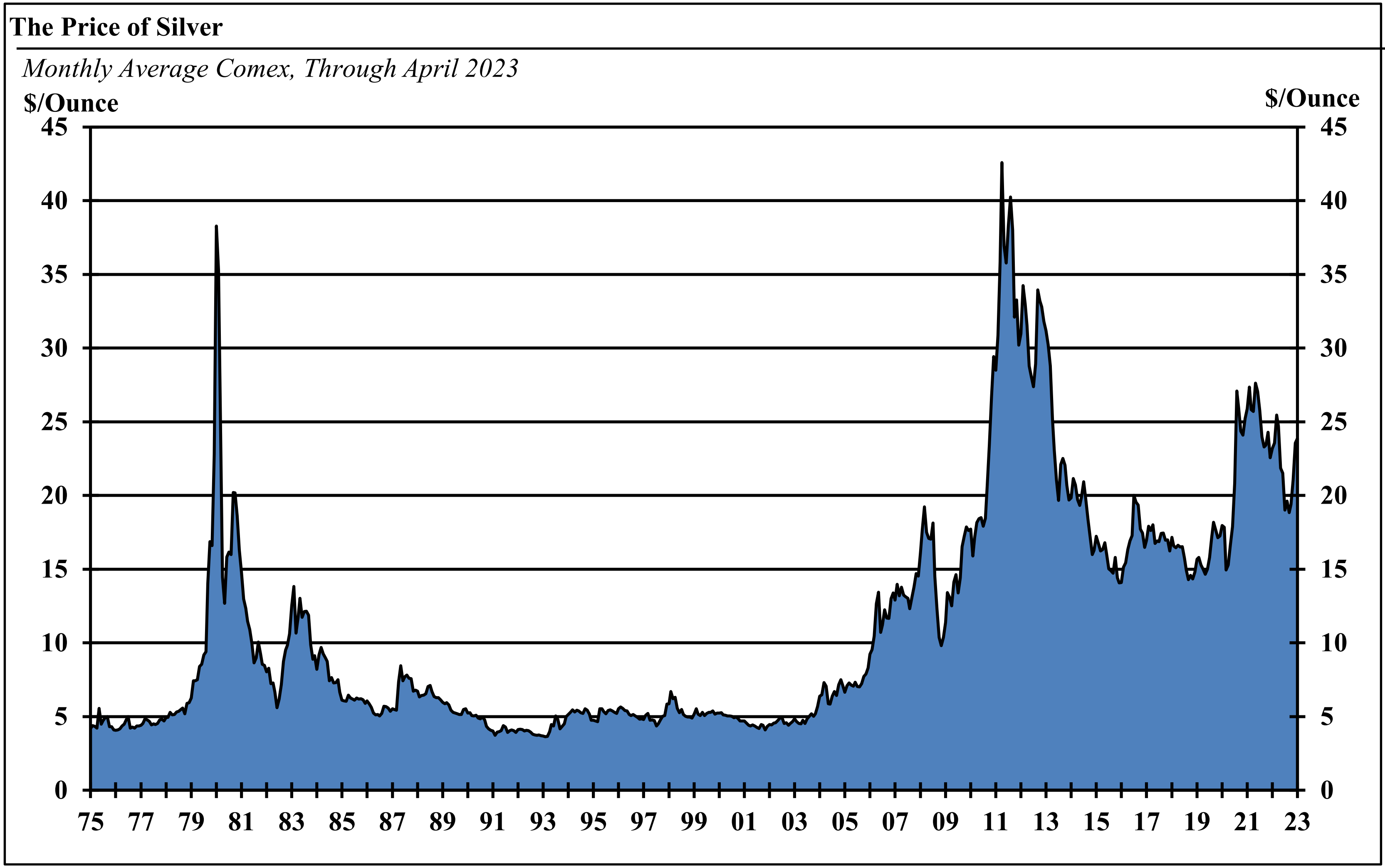
2. Silver prices were the 5th highest average price on record.

3. In the first four months of 2023 silver averaged $23.34. CPM projects 2023 prices will average around $24.42.

3. Silver prices peaked at $26.90 in March 2022. Prices fell 34% to a low for the year of $17.67 in September. They then rose sharply, ending the year at $24.04.

4. Prices declined in 2022 because investors were not buying as much silver as they had in 2020 and 2021.
   a) They were buying far less than silver marketing promoters suggested
   b) Some investors were selling.

The Price Of Silver



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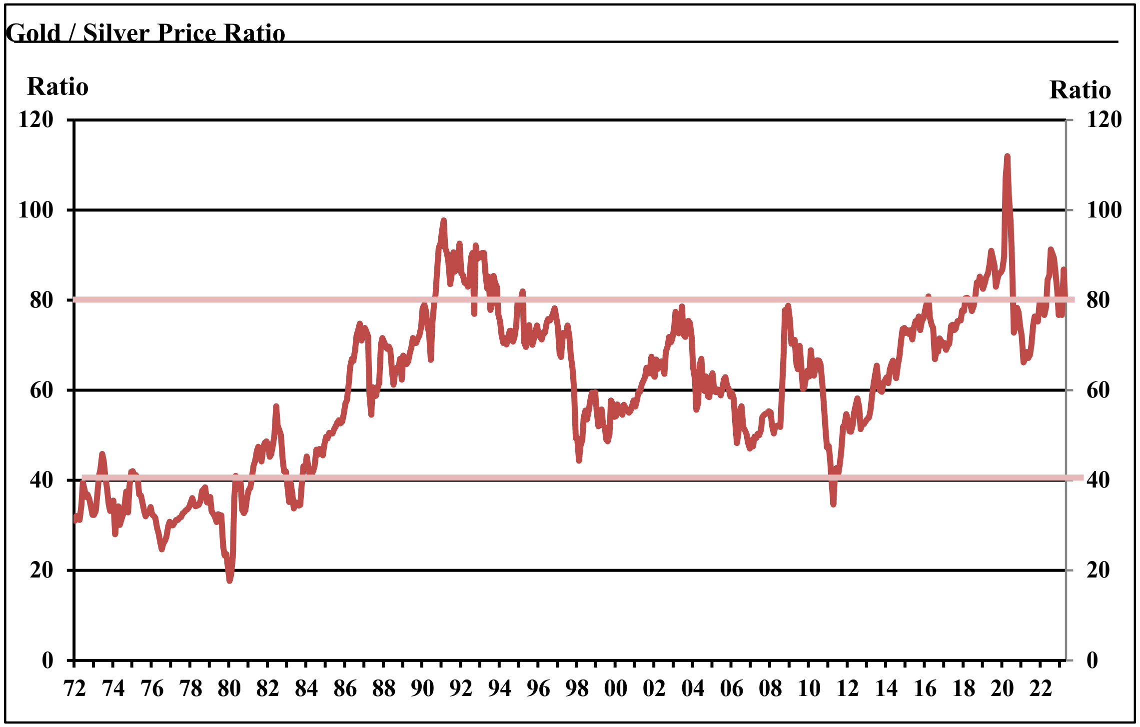
The Gold/Silver Price Ratio



1. CPM does not follow the gold/silver ratio, because it tells us nothing about potential future trends in gold and silver prices.

2. The gold/silver ratio merely shows the historical range of the relative value of gold and silver.

3. That range is enormous: from 16:1 to 112:1, spending most of the time between 40 and 80.

4. Others pay attention to the ratio, so we show it.

The Silver Market Is Amply Supplied

1. The silver market has not been in a deficit over the past four years.
    a) Silver market promoters add investment demand estimates to fabrication demand to claim the market is in a deficit, but that is in inaccurate and inappropriate way to look at any commodity market.

2. Newly refined silver has been more than fabrication demand for the past 17 years.

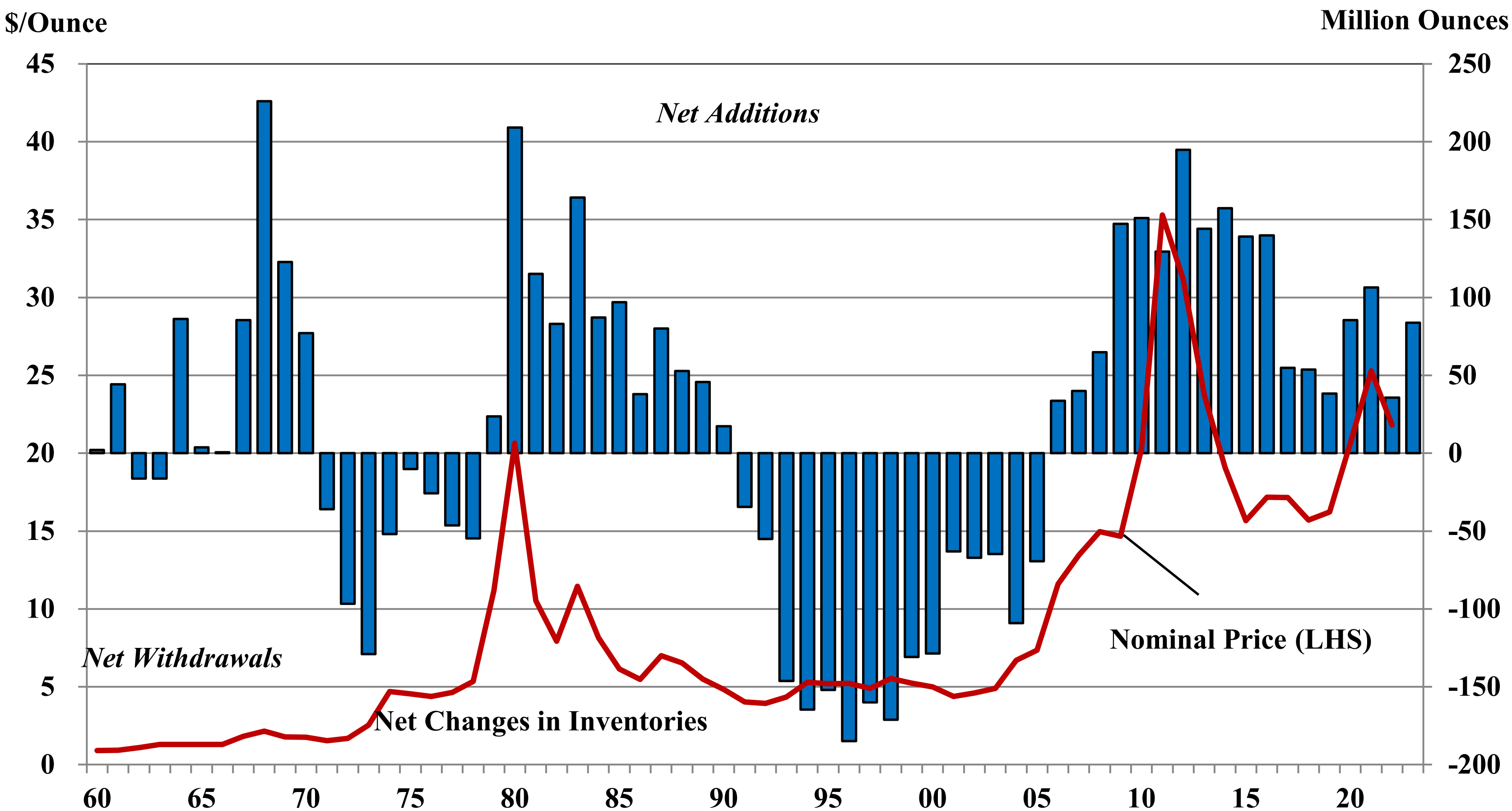
3. Investors have bid the price higher twice during this time: From 2006 through 2011, and since 2019.

4. There also are ample above-ground inventories of refined silver.
    1. An estimated 5.57 billion ounces,
    2. Including 2.3 billion ounces of silver bullion coins.

Silver Market Balance: Investors Bidding Silver Higher

Silver Market Balance

Annual, Projected Through 2023. Prices through 2022.



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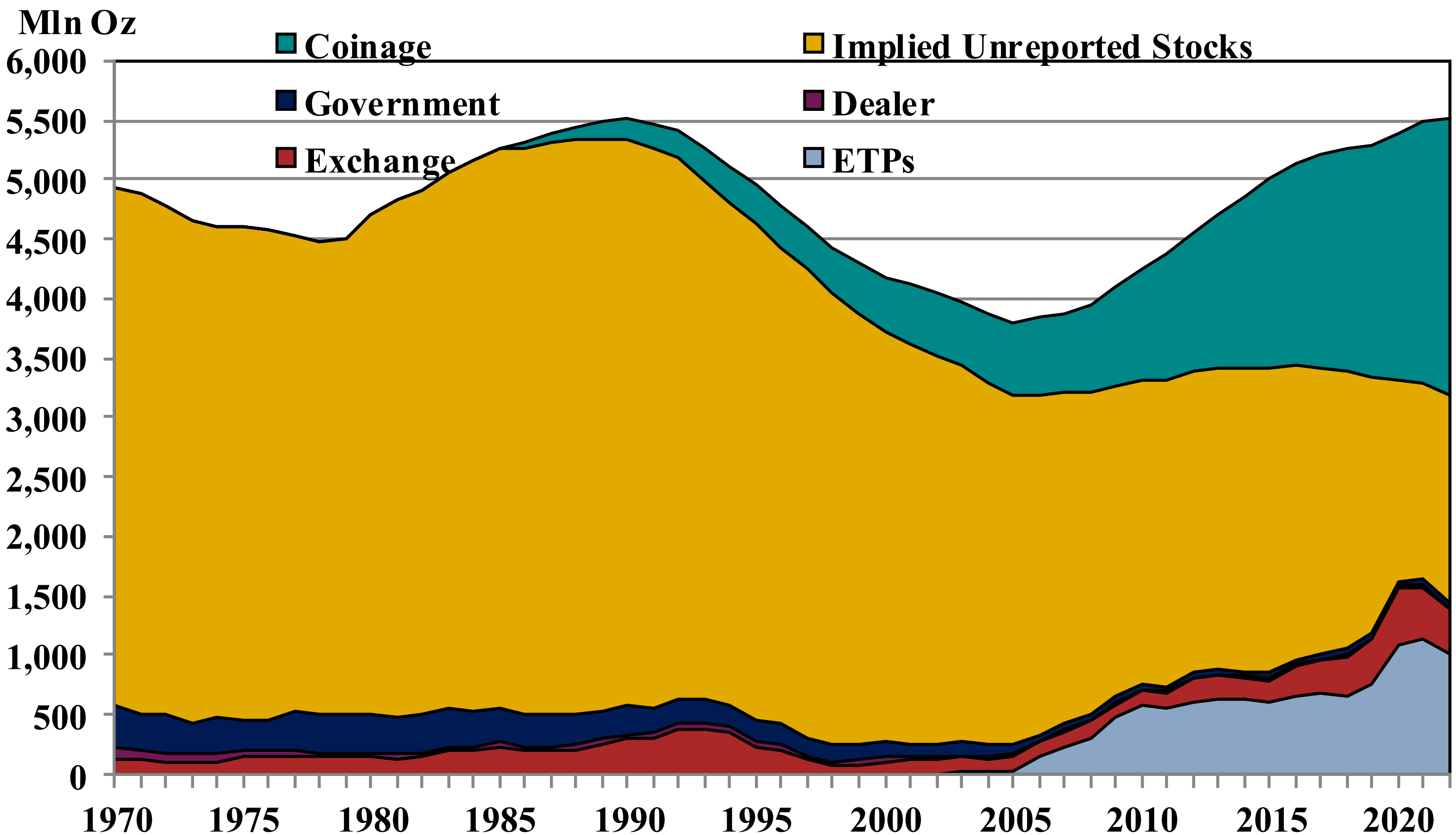
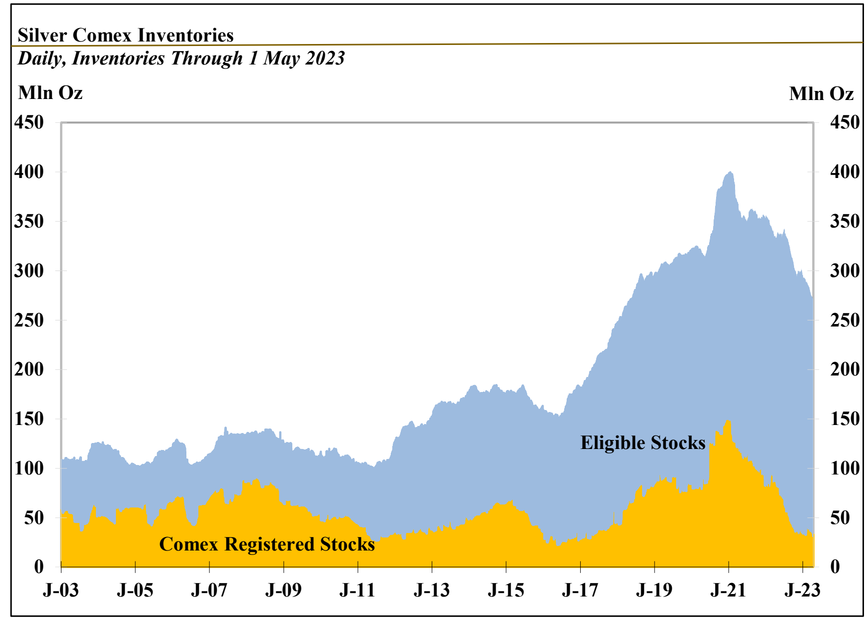
5.57 Billion Ounces Of Above Ground Silver Bullion Inventories

Silver Bullion Inventories

Year-end Data, Through 2022



London And New York Silver Inventories Declined As Demand Recovered



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London’s Silver Went To India And Other Asia, And The U.S. Via Canada

Silver Exports From United Kingdom To Top Countries

Million Ounces, January Through December 2022

India	183.3
Canada	75.5
Switzerland	40.8
Turkey	32.9
Germany	16.0
Spain	10.8
United States of America	7.0

Sources: CPM Group, UN Comtrade

May 2023

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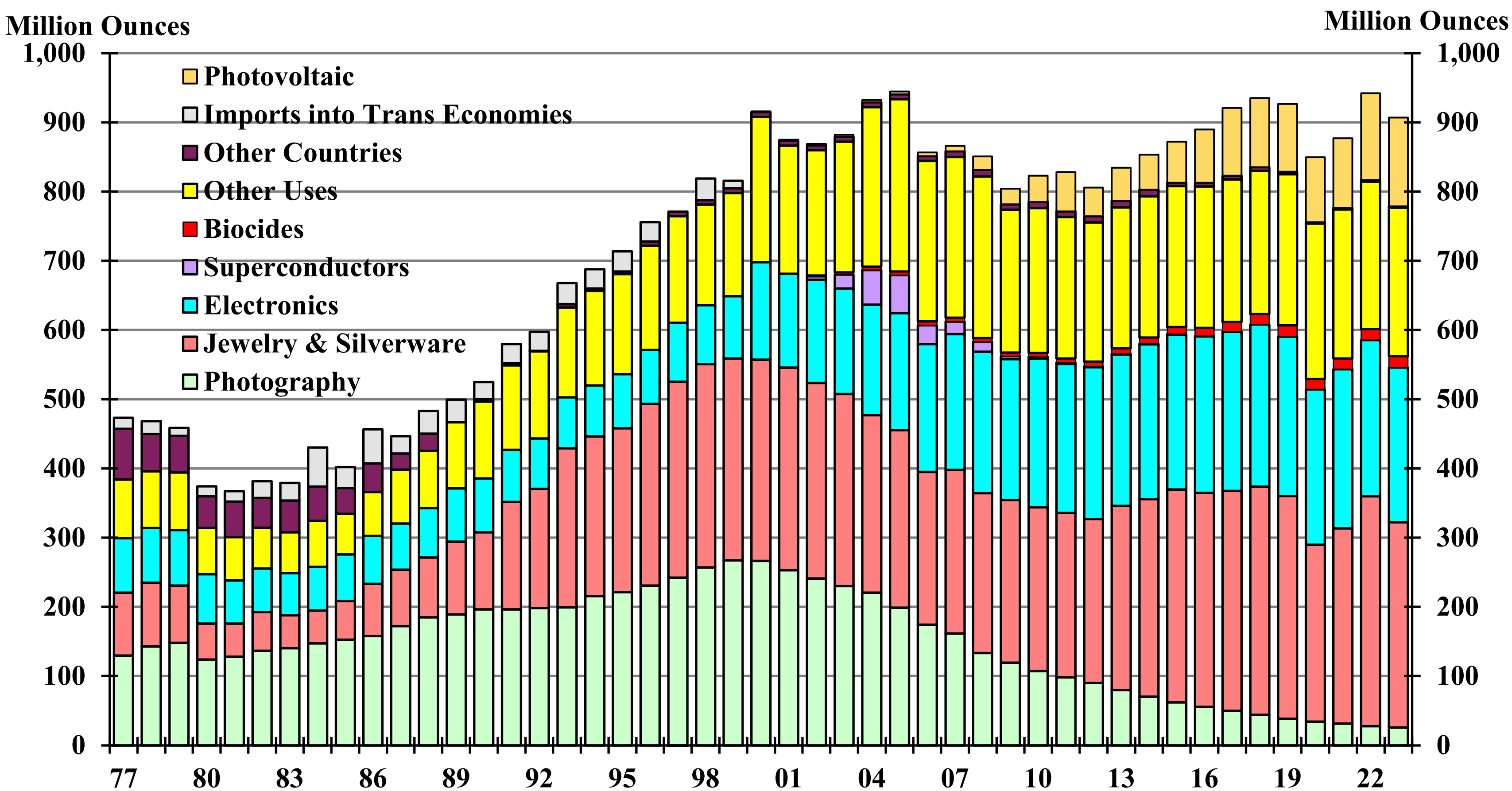
Fabrication Demand

Fabrication Demand Neared Record High Levels

Silver Fabrication Demand
Projected Through 2023



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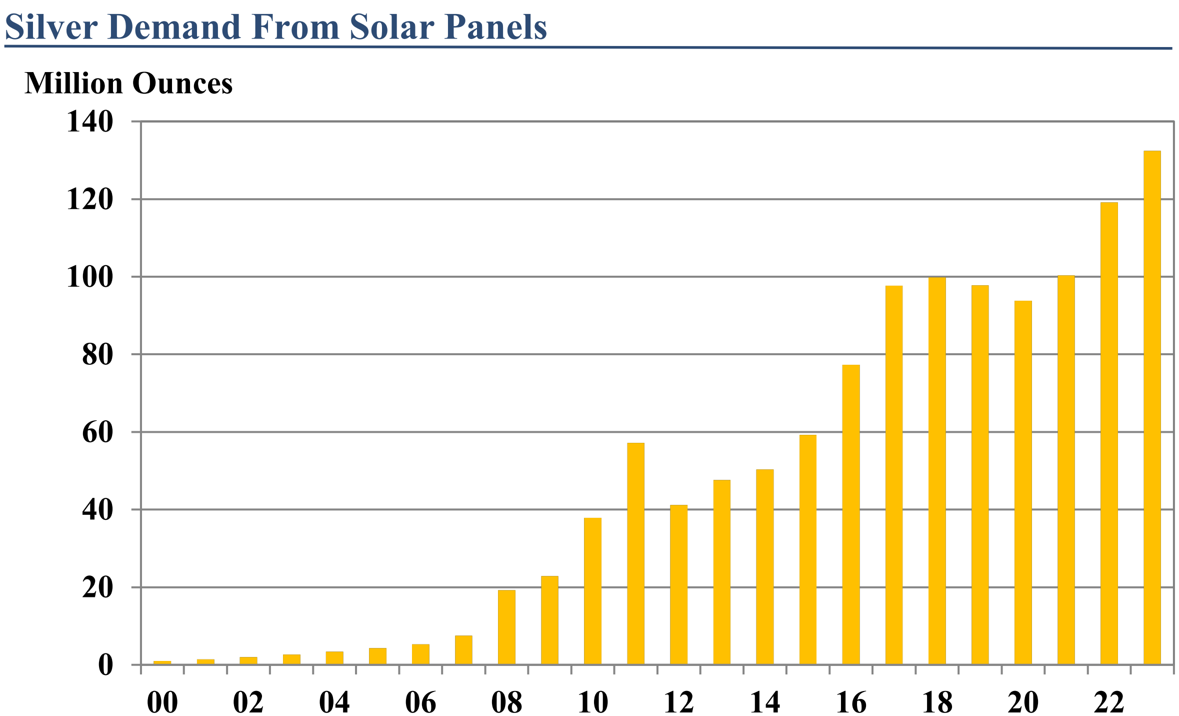
Silver Use In Solar Panels



From: CPM's February 2023 *Precious Metals Advisory*

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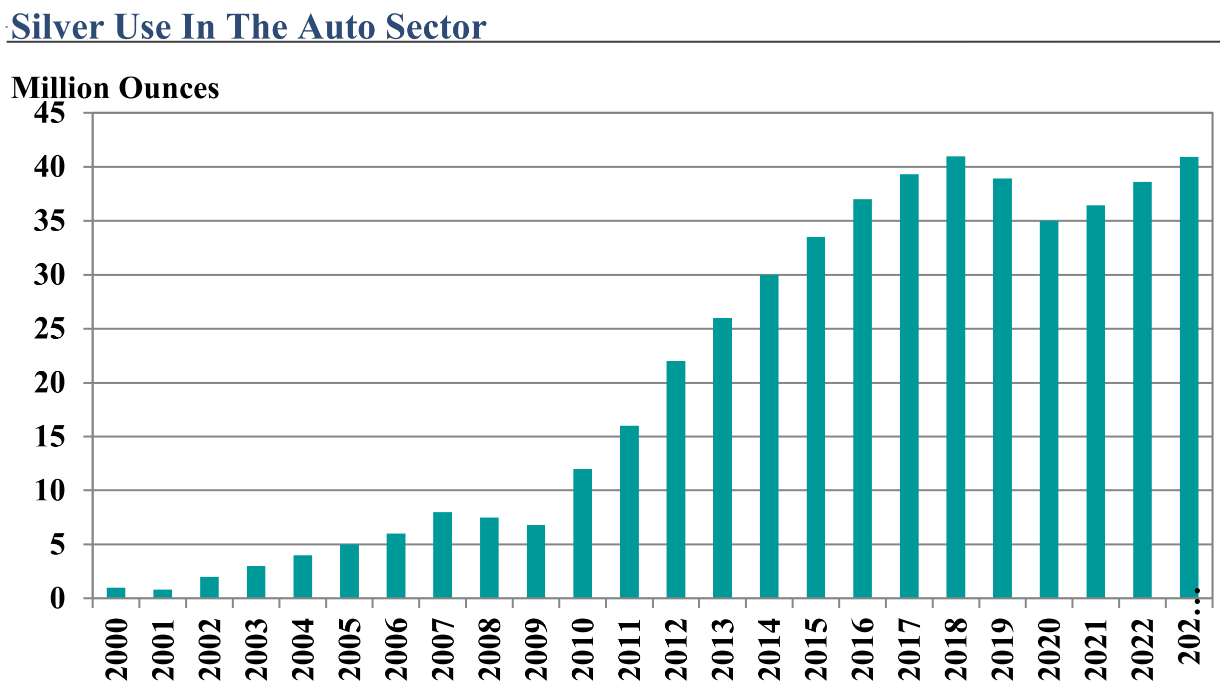
Silver Use In Auto Electronics



From: CPM's February 2023 *Precious Metals Advisory*

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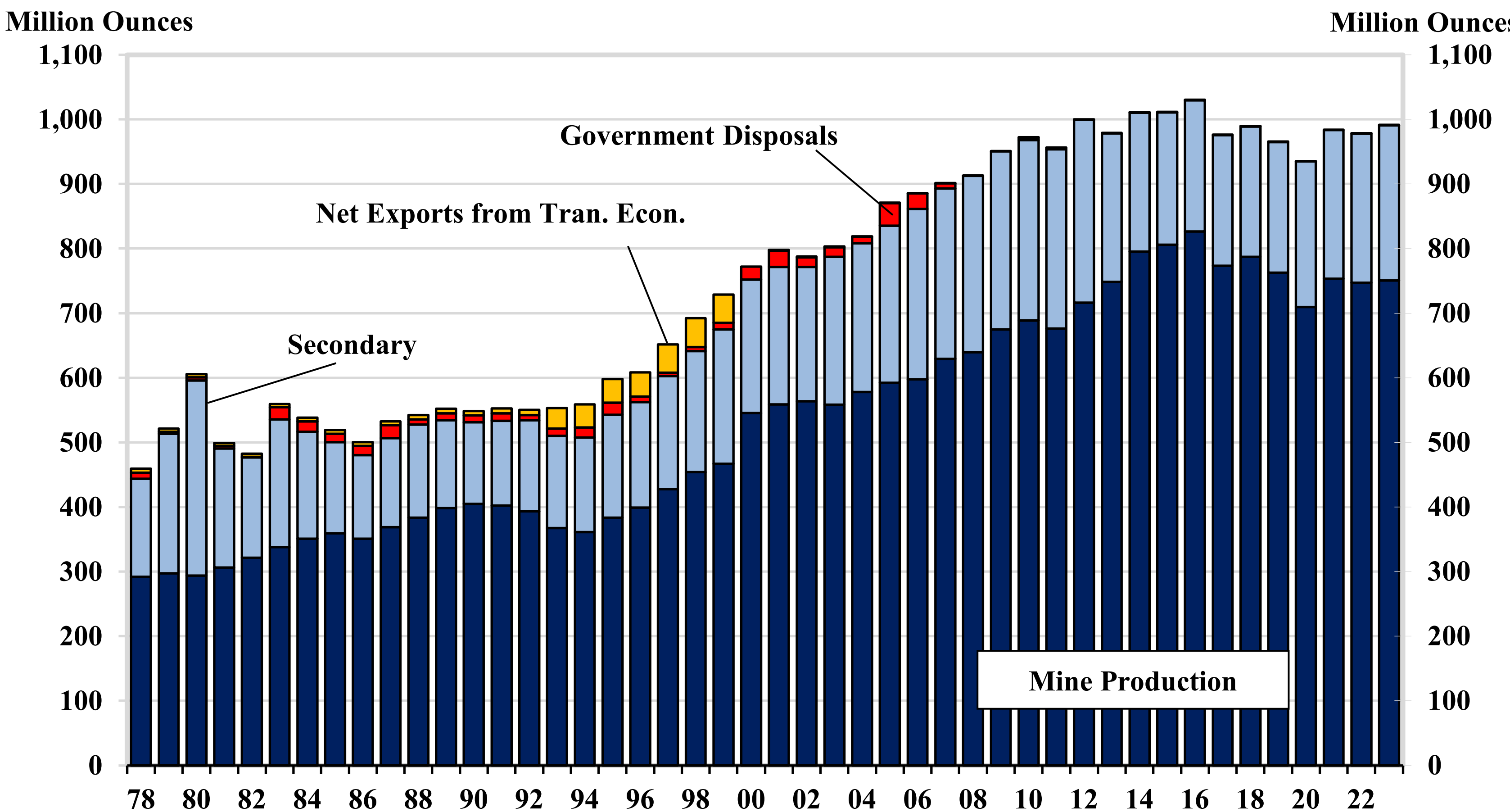
Supply

Total Silver Supply

Total Annual Silver Supply

Projected Through 2023



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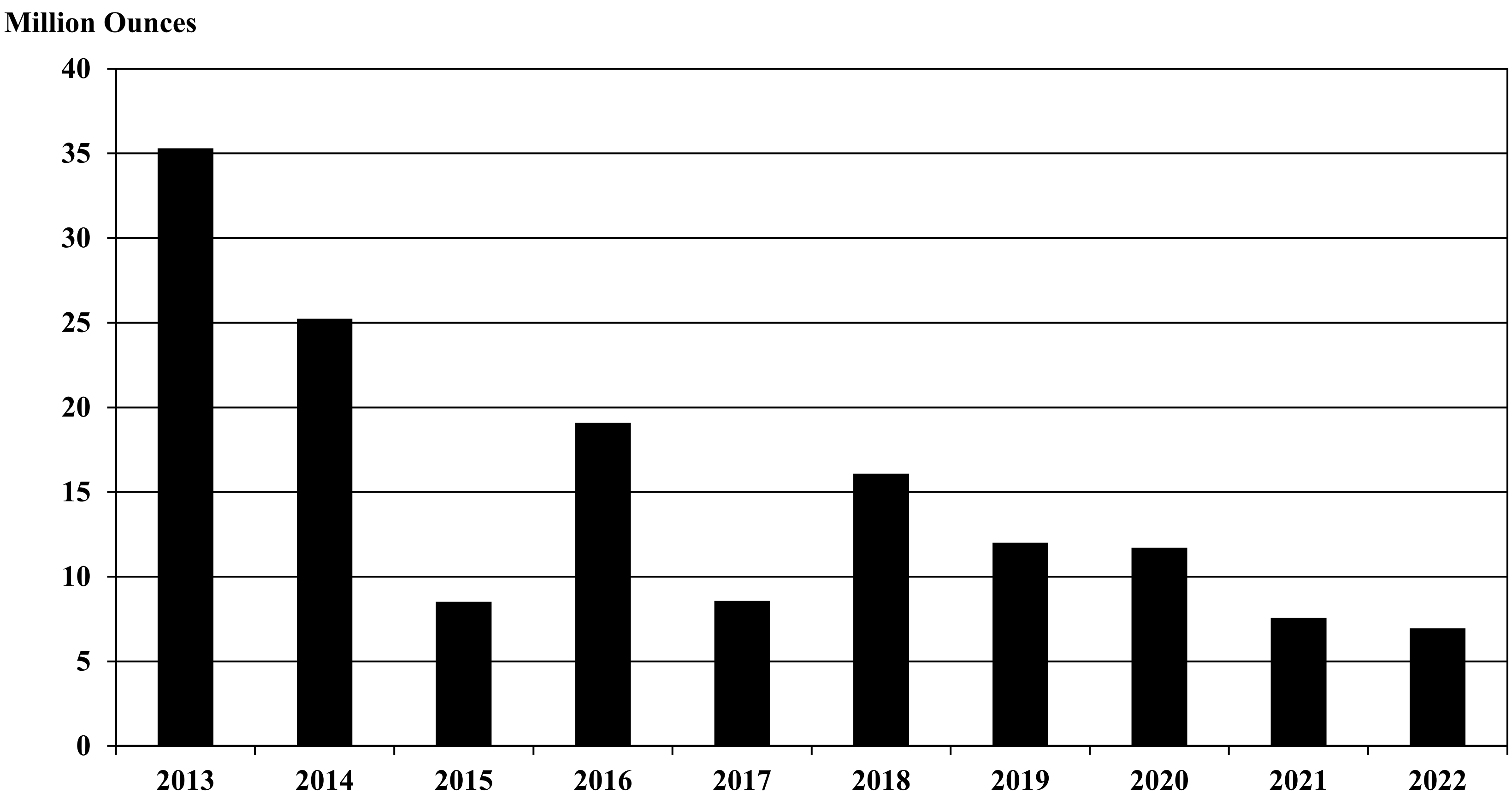
New Mine Capacity: Weak Trend Expected To Change

Silver Capacity from Near-Term Mine Development Projects



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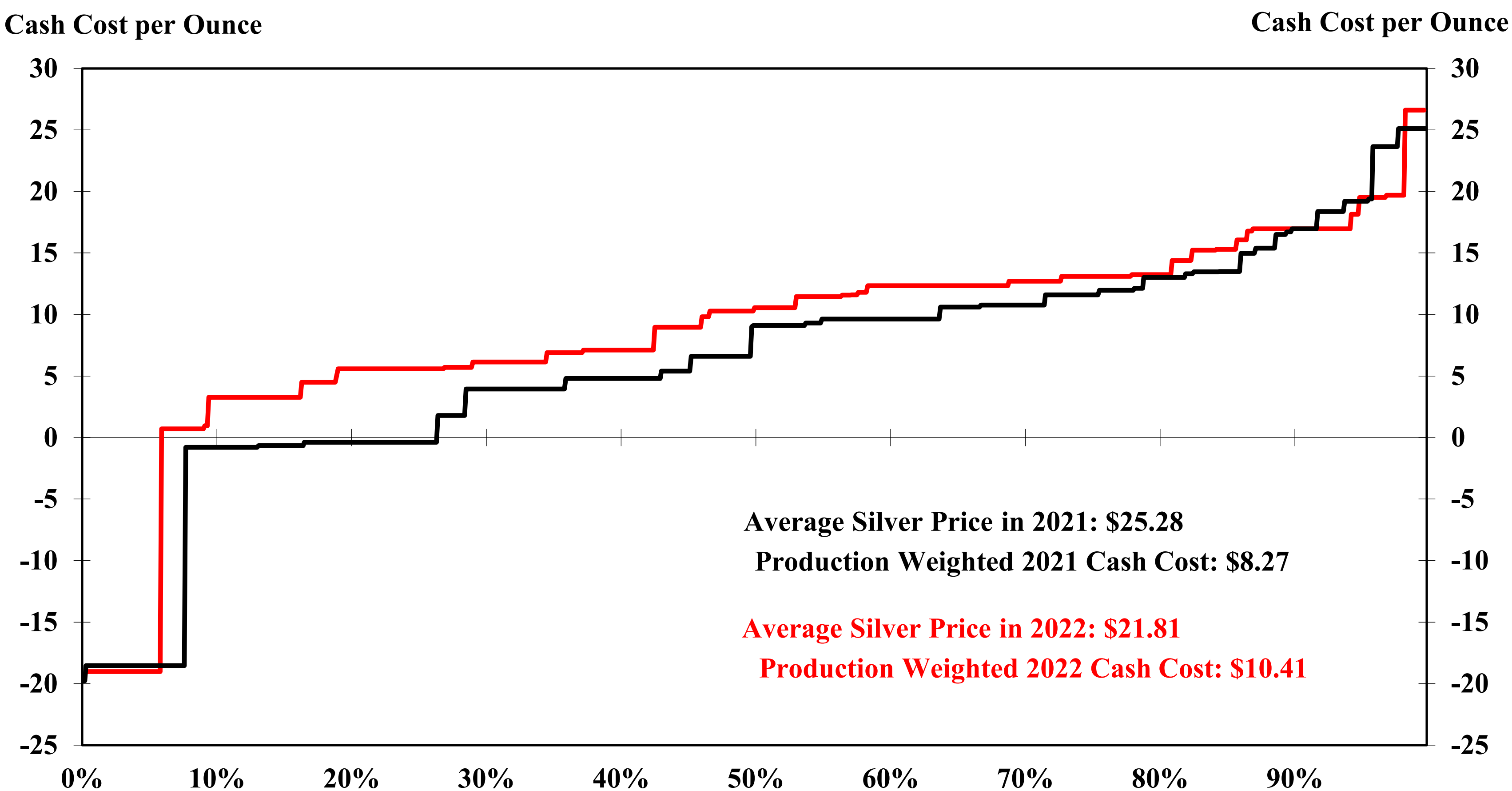
Cash Costs Reach Record Highs

Primary Silver Producers' Cash Costs in 2022



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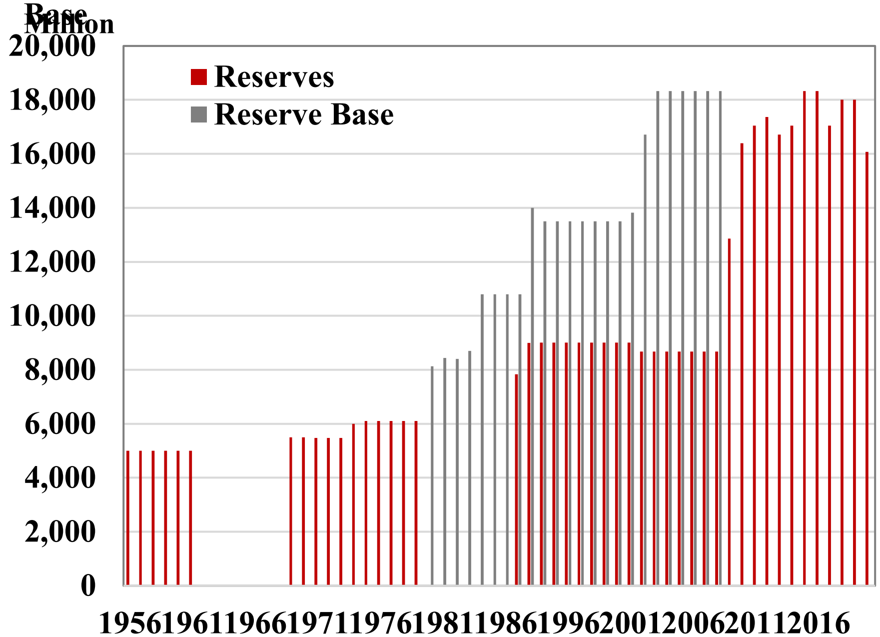
Silver Reserves and Reserve Base

In the intervening years, from 1981 to 2022, the world mined ___ million ounces of silver, ___ times the reserve base at the start of the period. And it had more reserves at the end of the period than when it started.

Silver Reserve and Reserve Base



Silver Reserves and Reserve Base

Million Ounces

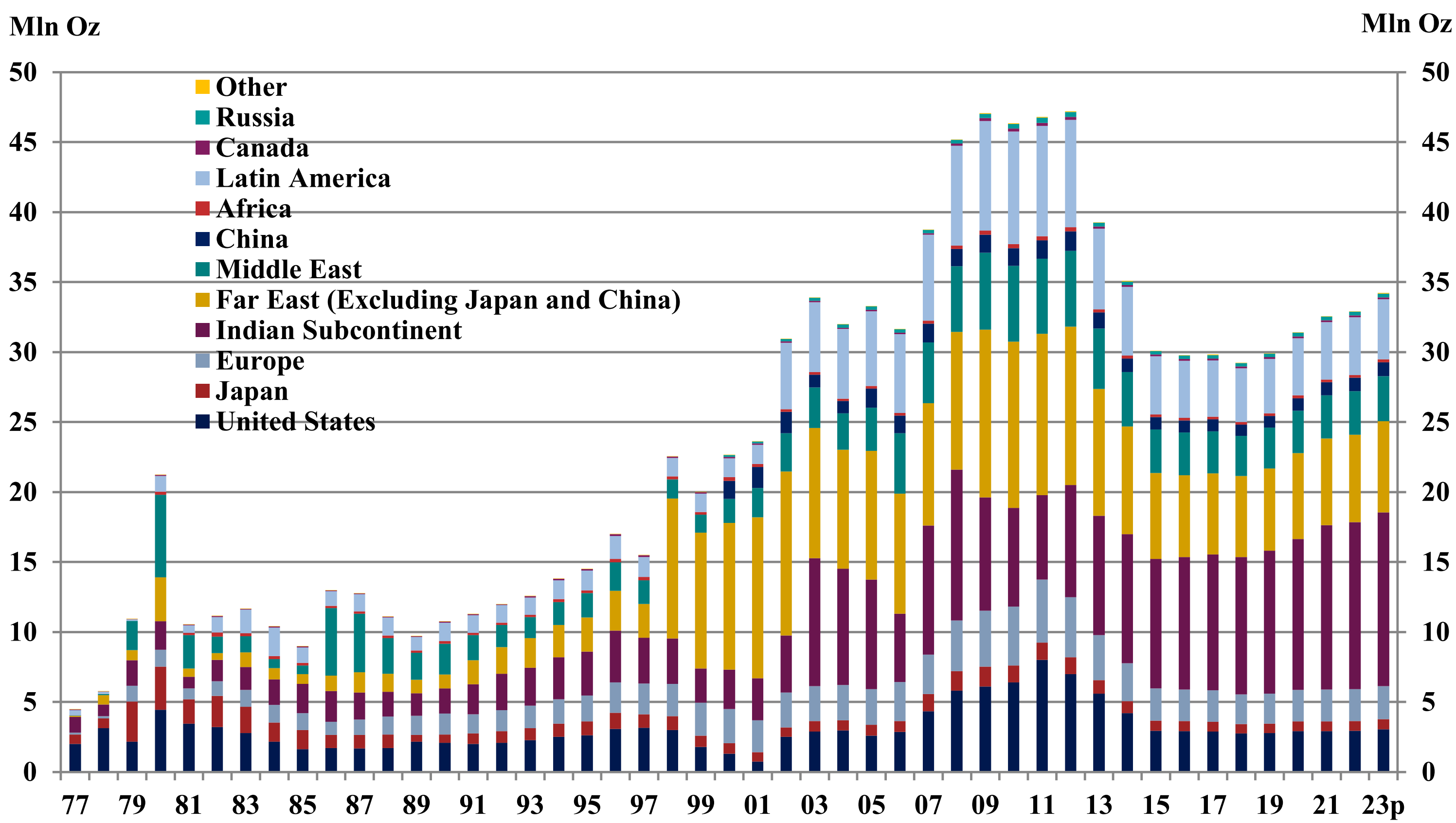
	Silver	
Year	**Reserves**	**Reserve Base**
1981	**N/A**	**8,100**
1988	**7,830**	**10,800**
2005	**8,681**	**18,326**
2008	**8,681**	**18,326**
2020	**16,057**	**N/A**

Refining

Gold Secondary Recovery From Old Scrap

Annual Gold Secondary Recovery

Annual, Projected Through 2023



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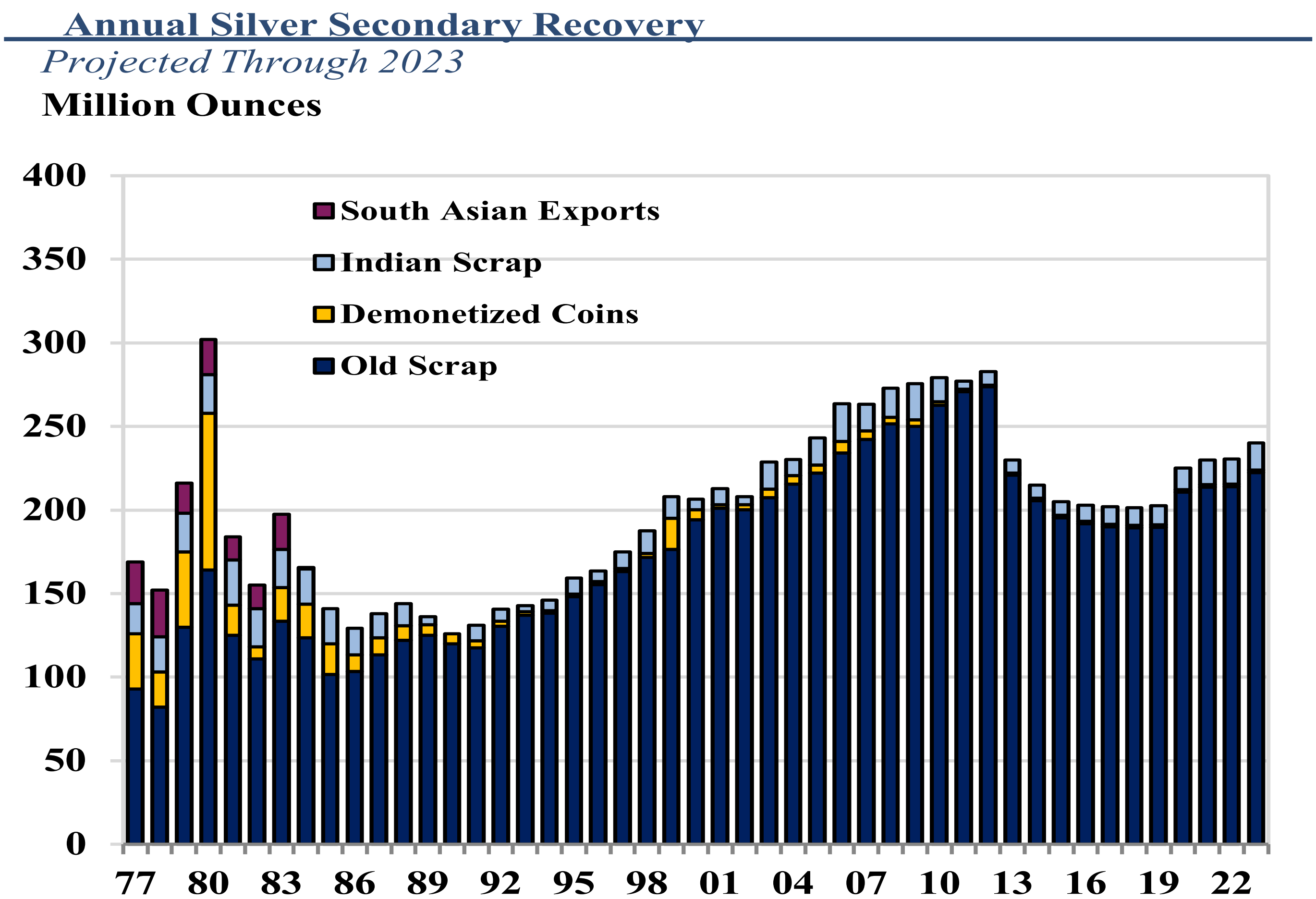
Silver Secondary Recovery From Old Scrap



Is Bad Data Better Than No Data At All

The Markets Are Clogged With Bad Data And Analysis

These are from a 2014 CPM presentation!

- **"The Fed won't let the Bundesbank have its gold for seven years."**
    - **That is not what happened. CPM had the director of foreign exchange and gold operations at the Bundesbank speak at our 2014 Gold Yearbook launch about what really was happening.**
    - **https://www.youtube.com/watch?v=c48O8Oq1920**

- **"Comex will run out of gold."**
    - **That was 2014. Has not happened yet.**

- **"All the gold in London and Zurich is going to Asia."**
    - **More on this in the next three slides.**

- **"Higher interest rates will push gold prices lower."**
    - **Nominal interest rates remained close to zero for the next 7 years, real rates remained negative.**

"All The Gold In Switzerland Is Going To Asia…"

Swiss <u>net</u> gold imports have totaled 373.5 <u>million ounces</u> 2008 – Q3 2022

<u>Swiss Gold Imports and Exports</u>

Troy Ounces

32.1507466

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022YTD Through September	2008 - 2022-9
Import	**67,028,294**	**70,275,359**	**74,811,540**	**85,892,006**	**72,821,184**	**99,039,121**	**71,873,991**	**82,245,018**	88,767,633	76,890,825	72,128,464	67,312,925	69,504,384	71,219,787	54,539,658	1,124,350,189
%CH		4.8%	6.5%	14.8%	-15.2%	36.0%	-27.4%	14.4%	7.9%	-13.4%	-6.2%	-6.7%	3.3%	2.5%	-23.4%	
Export	**41,632,098**	**31,826,410**	**50,523,291**	**58,457,227**	**50,476,769**	**89,287,542**	**56,105,914**	**58,883,514**	64,021,010	50,099,062	43,711,480	38,237,301	37,923,863	43,500,153	36,181,421	750,867,055
%CH		*-23.6%*	*58.7%*	*15.7%*	*-13.7%*	*76.9%*	*-37.2%*	*5.0%*	*8.7%*	*-21.7%*	*-12.7%*	*-12.5%*	*-0.8%*	*14.7%*	*-16.8%*	
Net Trade	**25,396,196**	**38,448,949**	**24,288,249**	**27,434,779**	**22,344,415**	**9,751,579**	**15,768,076**	**23,361,504**	**24,746,623**	**26,791,764**	**28,416,984**	**29,075,624**	**31,580,521**	**27,719,634**	**18,358,237**	**373,483,135**
%CH		*51.4%*	*-36.8%*	*13.0%*	*-18.6%*	*-56.4%*	*61.7%*	*48.2%*	*5.9%*	*8.3%*	*6.1%*	*2.3%*	*8.6%*	*-12.2%*	*-33.8%*	

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022YTD Through September	
Import	67,028,294	70,275,359	74,811,540	85,892,006	72,821,184	99,039,121	71,873,991	82,245,018	88,767,633	76,890,825	72,128,464	67,312,925	69,504,384	71,219,787	54,539,658	
Export	(41,632,098)	(31,826,410)	(50,523,291)	(58,457,227)	(50,476,769)	(89,287,542)	(56,105,914)	(58,883,514)	(64,021,010)	(50,099,062)	(43,711,480)	(38,237,301)	(37,923,863)	(43,500,153)	(36,181,421)	
Net Trade	25,396,196	38,448,949	24,288,249	27,434,779	22,344,415	9,751,579	15,768,076	23,361,504	24,746,623	26,791,764	28,416,984	29,075,624	31,580,521	27,719,634	18,358,237	373,483,135

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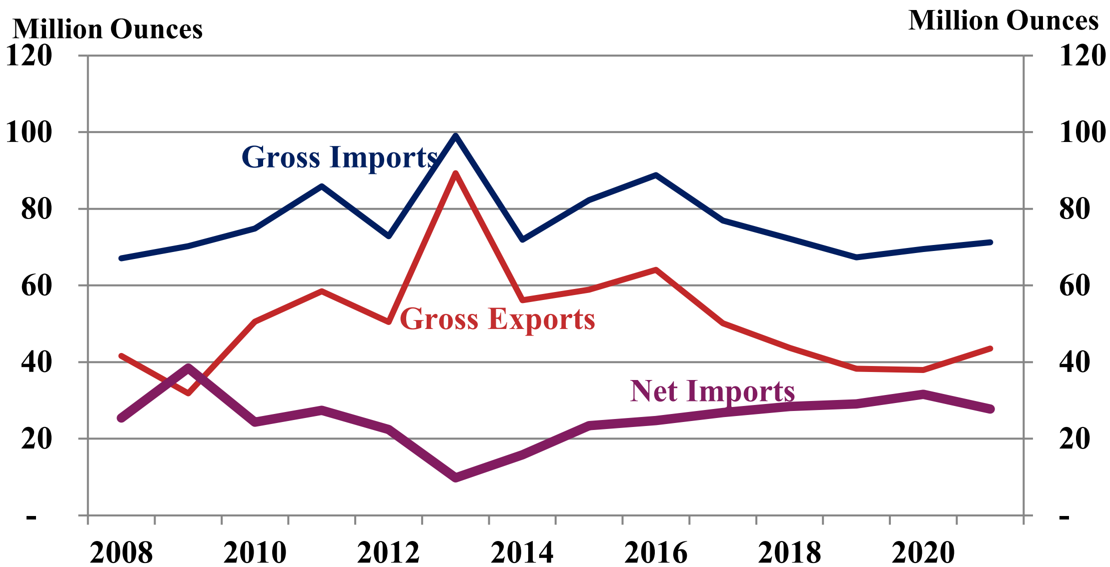
Switzerland Is Not Running Out Of Gold

Swiss Gold Imports and Exports

Annual Data



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Switzerland Running Out Of Gold?

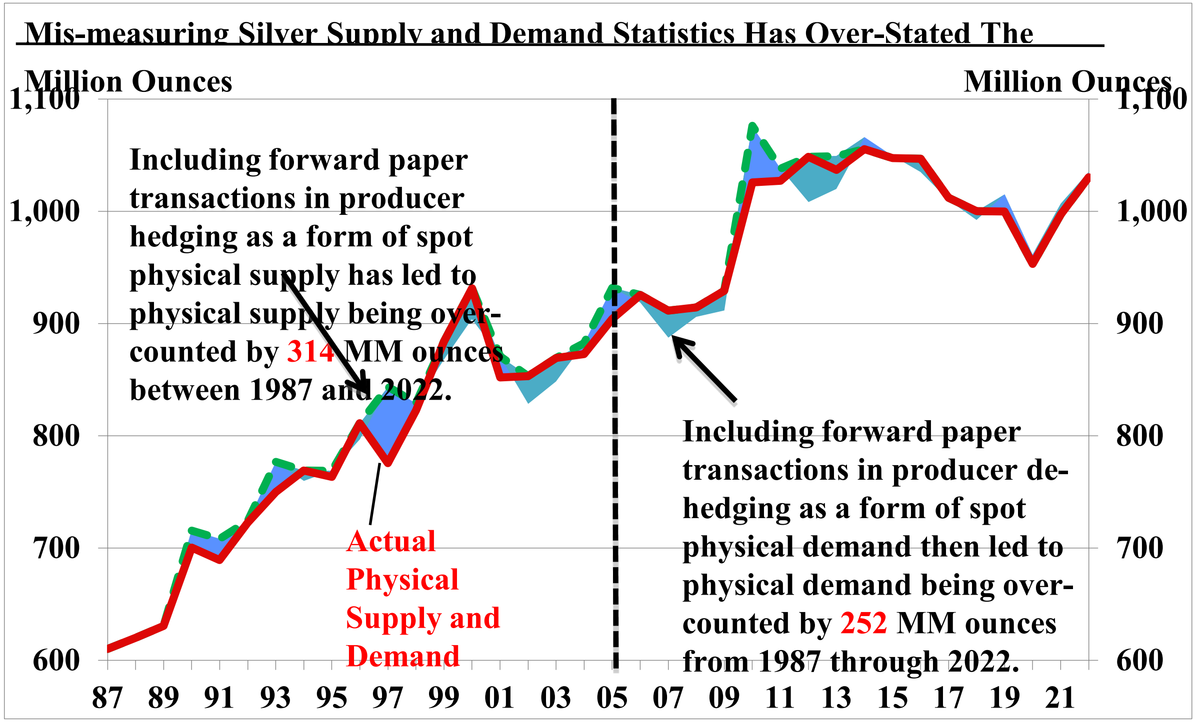
Yes, That's Right.

Swiss gold net imports gold totaled 373.5 million ounces from 2008 through Q3 2022.

Chinese gold investment demand totaled 135.5 million ounces over the same time.

MORE INVESTORS BOUGHT MORE GOLD STORED IN SWITZERLAND OVER THE PAST 15 YEARS THAN THEY BOUGHT GOLD STORED IN CHINA.

Silver: Producer Forwards Do Not Involve Spot Physical Purchases and Sales



What about all those other forwards from smelters, refiners, industrial users, buy and sell side investment groups?

Why not count them?

The origins of this error are fascinating and telling.

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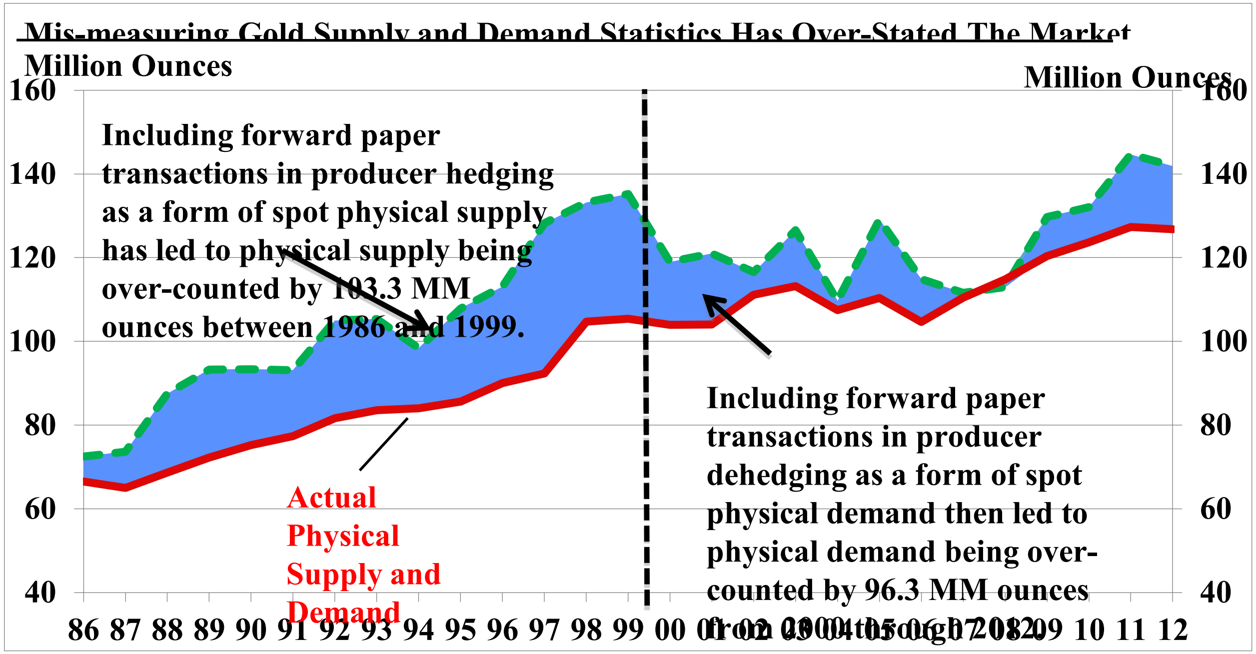
Gold, Too: Adding Any & Only Producer Forwards Distorts Supply and Demand

Counting forwards as spot supply or demand leads to over-counting physical markets – around 200 million ounces of gold, just to 2012.



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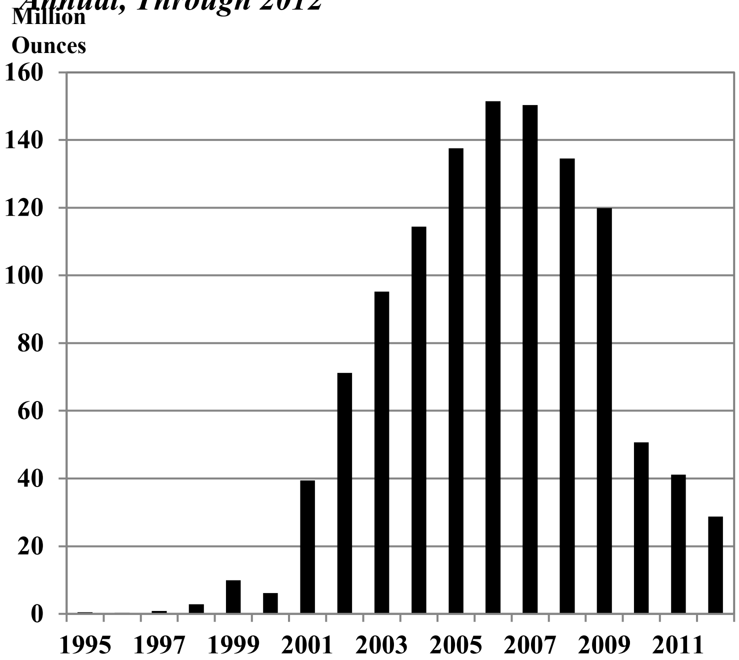
Chinese re-exports of refined silver mis-identified

Chinese Gross Exports of Silver and Silver Products
Annual, Through 2012



Analysts spotted large Chinese silver exports in the 2000s and guessed they must have been central bank inventory sales.

CPM Group worked with a major copper producer and the PBOC on a system to allow Chinese base metals smelters to bid effectively for precious metals-rich overseas concentrates, allowing us to properly identify the surge starting in 2001 in Chinese silver exports as re-exports from imported concentrates.

The result: Another billion ounces of misidentified and double-counted supply by others…
and investment demand was over-estimated by a billion ounces since it was a calculated residual in their statistics.

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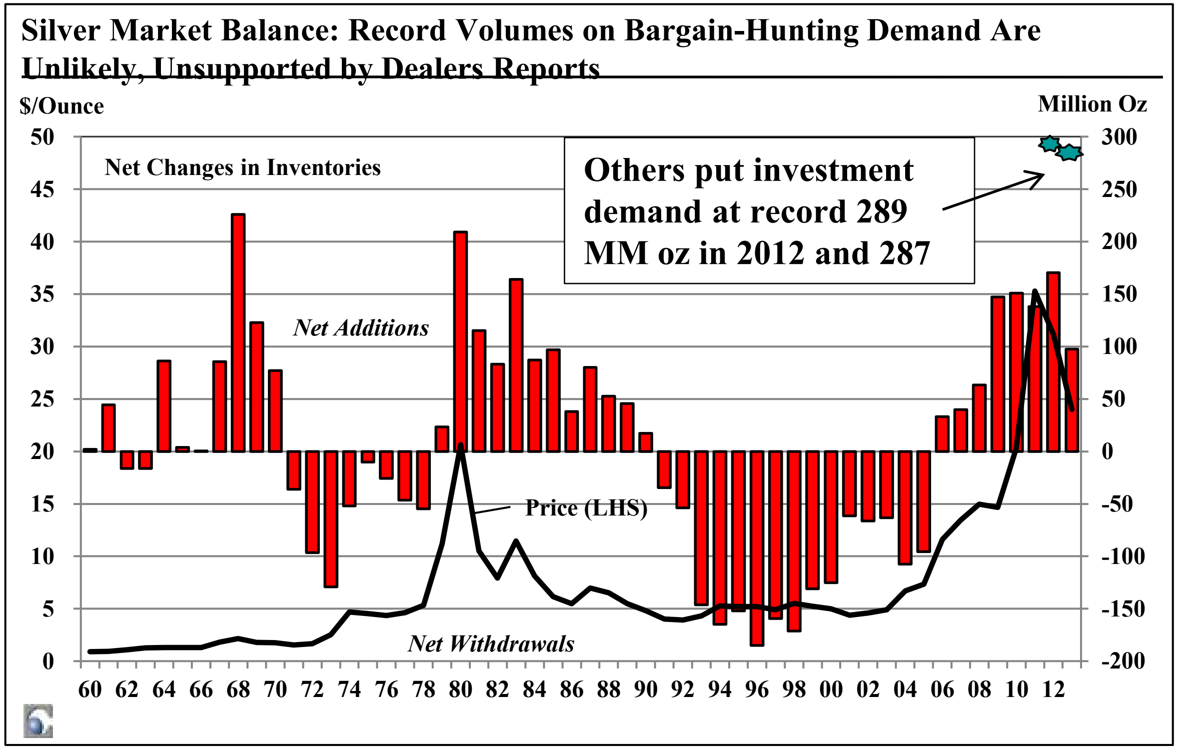
Investors Bought Enormous Sums Of Silver Yet Prices Plunged



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The Company You Keep

- **Focus on:**
  - **Justifiable Research Methodology**
  - **Do Projections Change as Information Changes?**
  - **Target Dates?**

  - **Are they perpetually bullish? Do they ever change their price outlook, predictions? Have they been wrong for years, decades?**
  - **Do they rely on nonsensical conspiracies and manipulations to explain why they have been wrong on prices for decades?**
  - **Are they self-assured that they know more about economics and finance than the hundreds of thousands of legitimate professionals in these industries, markets, and governments?**

Further Reading And Viewing

Further Reading And Viewing

CPM Group’s 2023 Gold Yearbook launch briefing, 28 March 2023
https://www.youtube.com/watch?v=RKKvN5BthpQ&t=17s

CPM Group’s 2023 Silver Yearbook launch brieing, 16 May 2023
https://www.youtube.com/watch?v=UQYhSIcpCq4&t=5s

Further Reading: Getting On The Right Side Of These Markets

On CPM's website's *Market Views* section there is a sub-section titled *The Importance Of Accurate Data*.

In that section there are three documents from 2003 and 2014. *(Right, this has been a topic for decades.)*

Myths and Errors in Precious Metals Markets, 2003

Get It Wrong, Get It Right, The Importance Of Being Accurate, 2014

Get It Wrong, Get It Right, The Importance Of Being Accurate (Excerpted), 2014

https://cpmgroup.com/the-importance-of-accurate-data/

Research-Driven Research and Consulting

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