

The Macroeconomics of Copper

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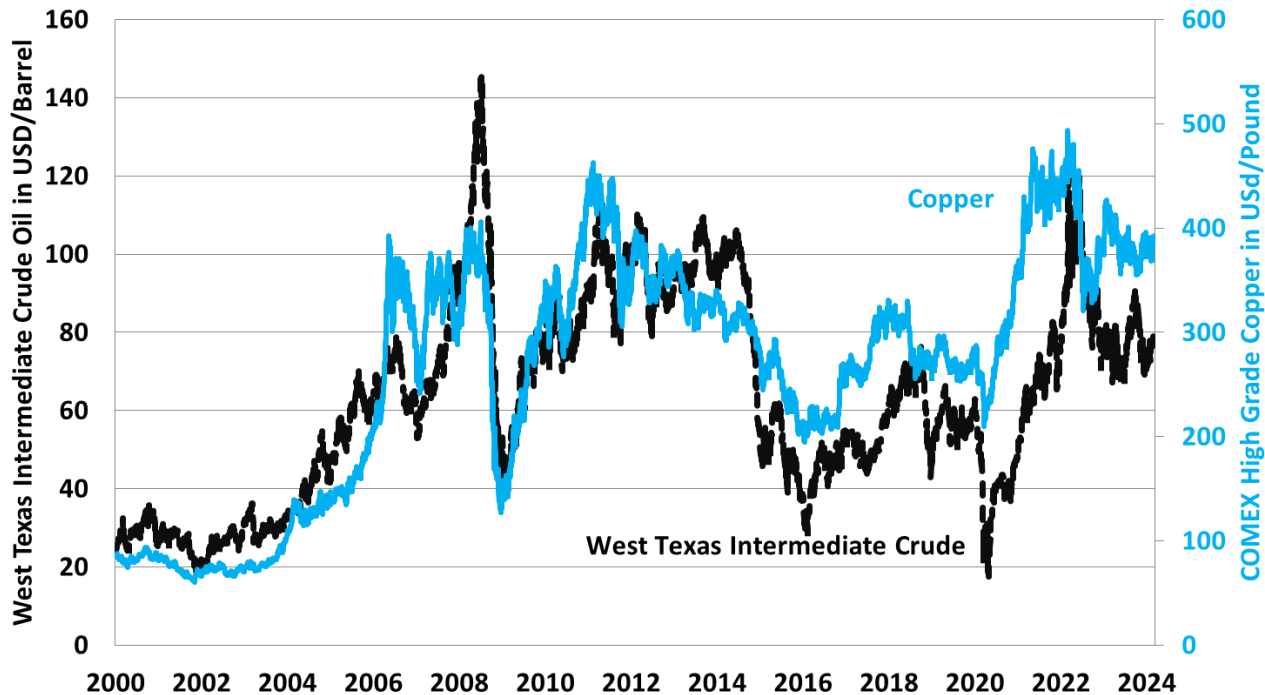
Macroeconomic Factors That Influence Copper Prices

- 1) **The Cost of Energy**
- 2) **The Chinese Economy**
- 3) **Stock Markets**
- 4) **The U.S. Economy**
- 5) **Housing/Construction**
- 6) **Other Economies**
- 7) **The Energy Transition**
- 8) **Metals Supply**

Copper and Energy Prices

Copper Prices Closely Track the Global Price of Crude Oil

Crude Oil and Copper



Source: Bloomberg Professional (CL1 and HG1)

Suez Canal's Traffic Has Reduced Sharply

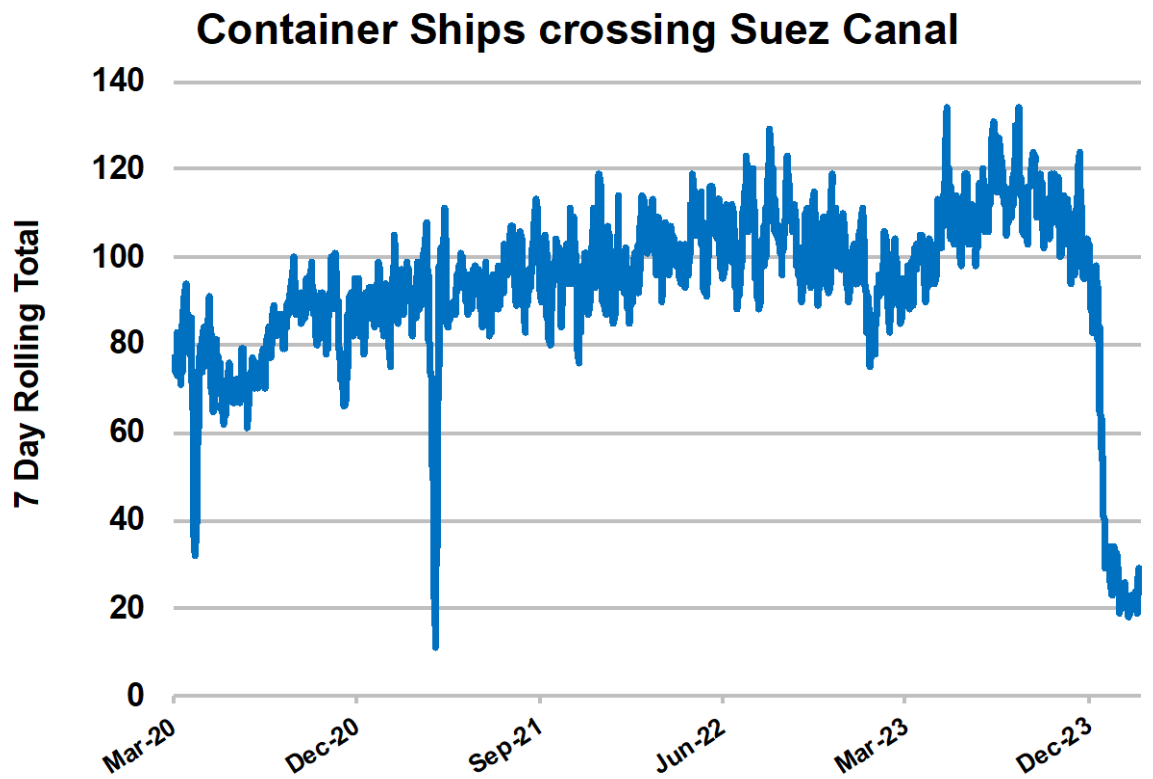
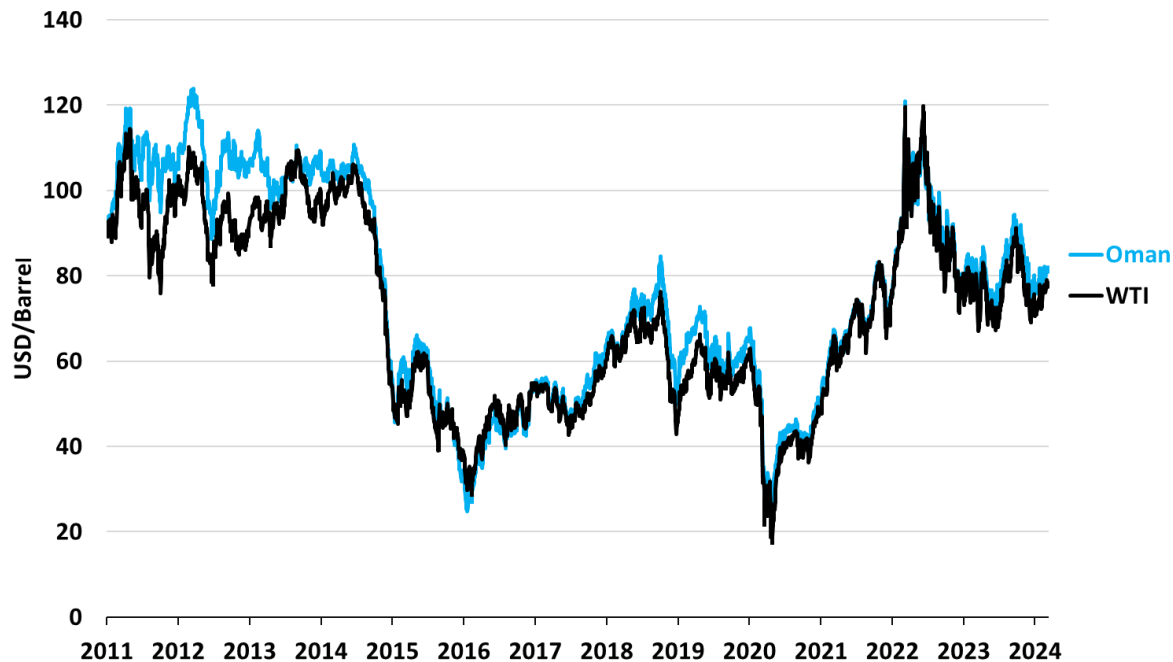


Chart Created by CME Group Economics.
Source: Bloomberg Professional (TRSNCTCT, TRSSCTCT)

OPEC has slashed production by 3.6 million per day, shipping through Suez Canal is down by 67% and Russia's still at war.

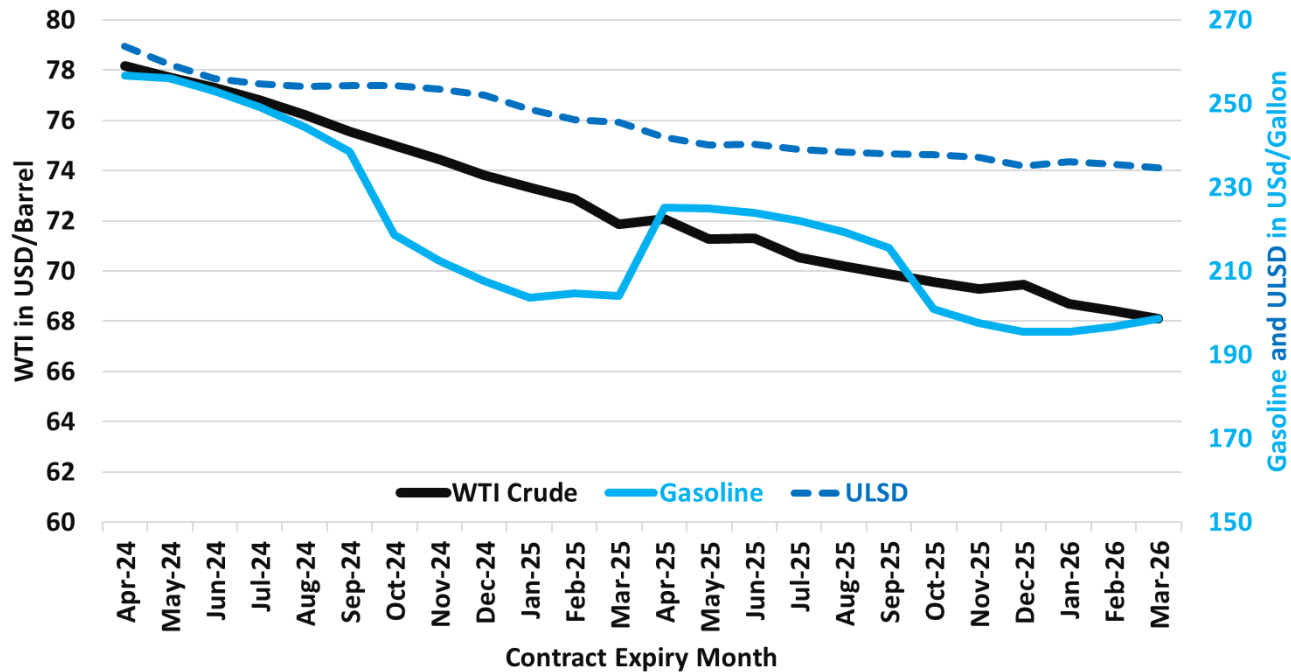
NYMEX WTI and DME Oman Crude Oil



Source: Bloomberg Professional (OQA2 and CL2)

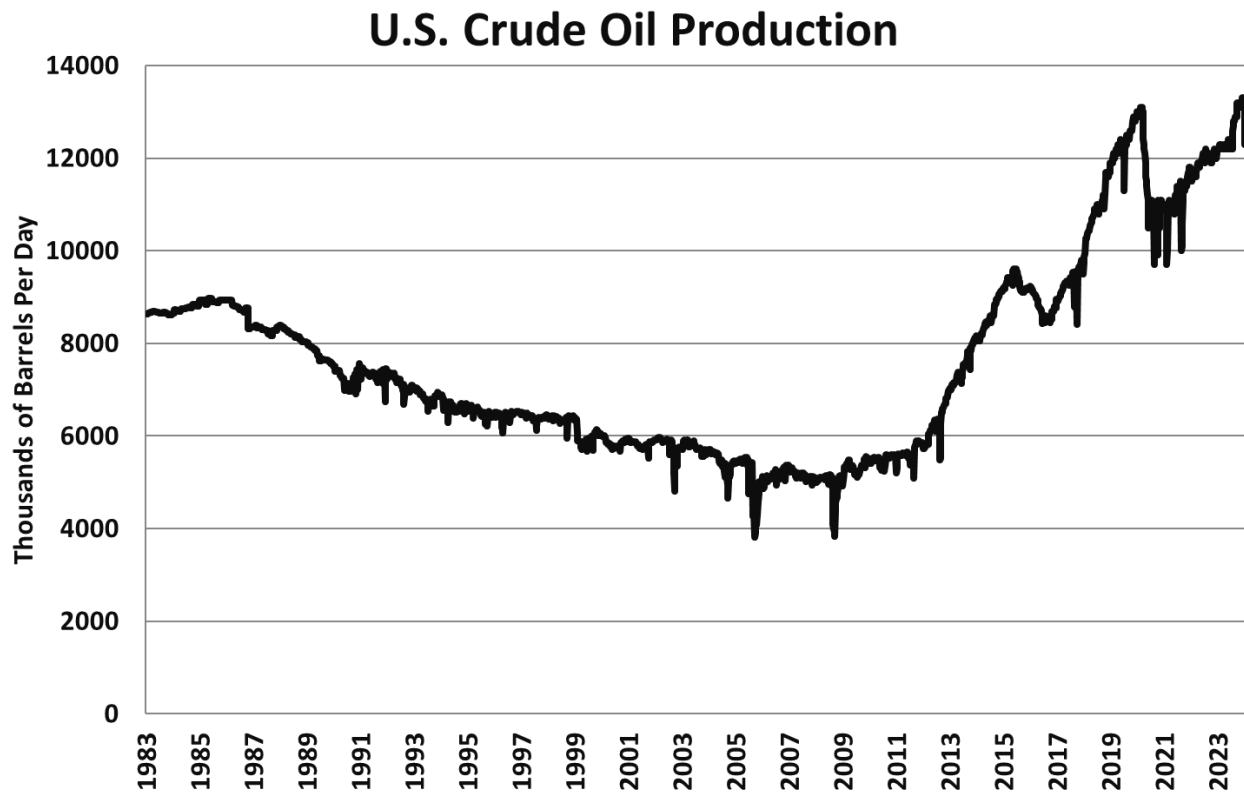
The Oil Curve Suggests Traders See Lower Prices Ahead.

Futures Curves: WTI Crude Oil, Gasoline and Ultra Low Sulfur Diesel (ULSD)



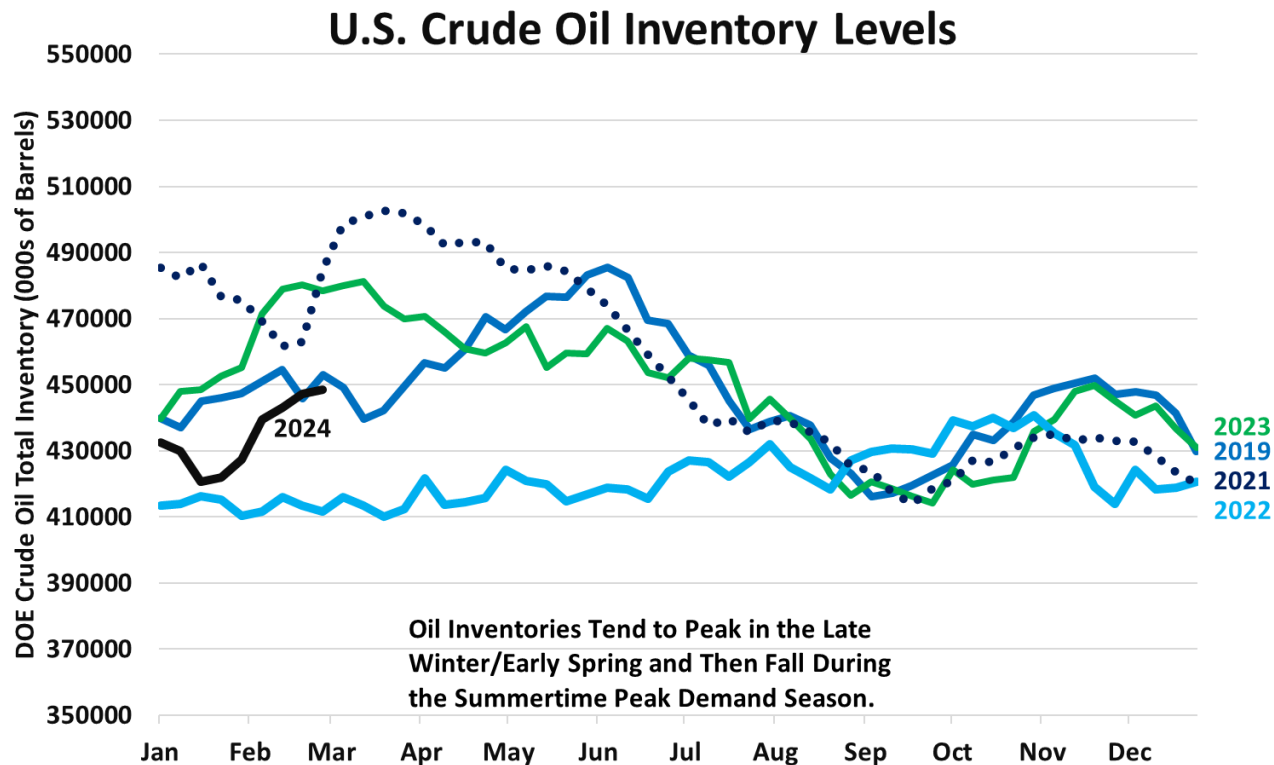
Source: Bloomberg Professional (CL1 ... CL24, XB1 ... XB24 and HO1 ... HO24)

U.S. Crude Producers Have Replaced 1/3 of What OPEC Cut.



Source: Bloomberg Professional, EIA (DOETCRUD)

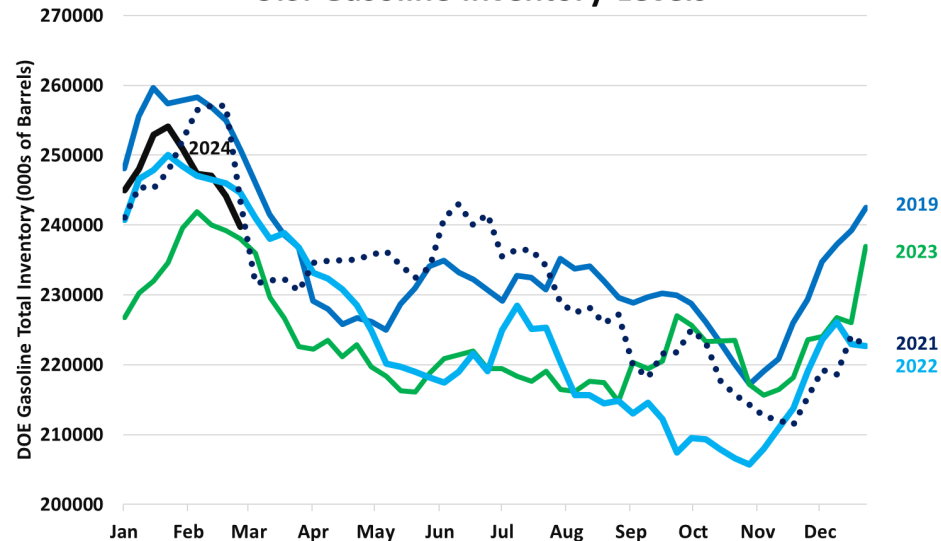
Crude Inventories Are Slightly on the Low Side



Source: Bloomberg Professional, DOESCRUD

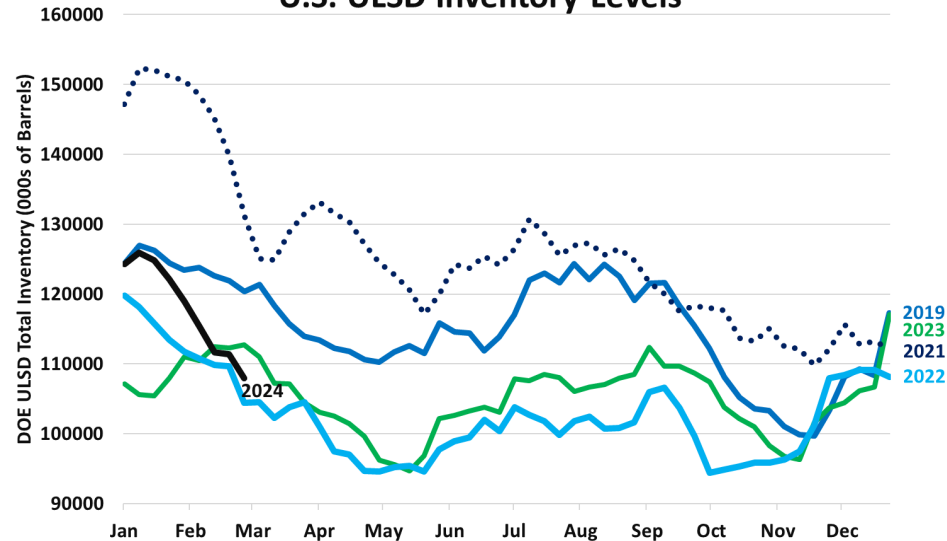
Product Inventories Are Slightly on the Low Side

U.S. Gasoline Inventory Levels



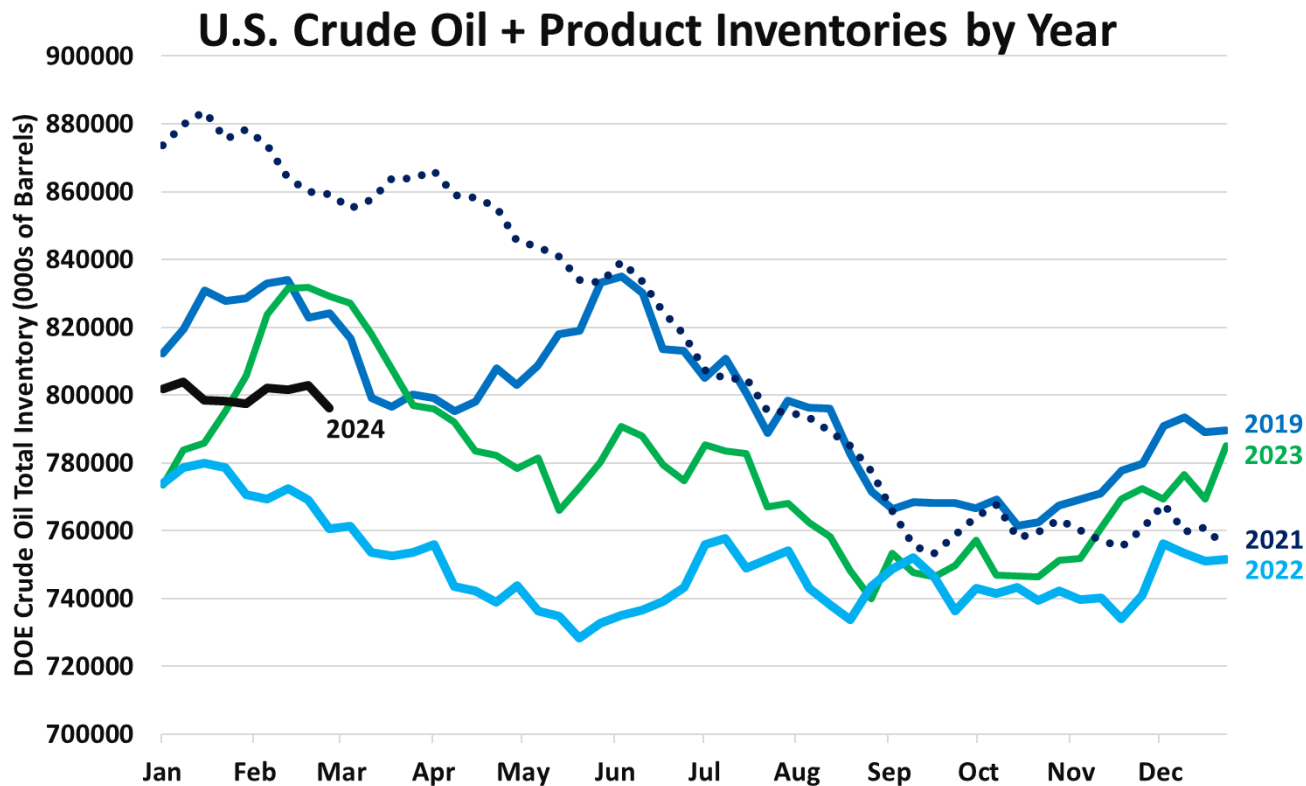
Source: Bloomberg Professional, DOESREFM

U.S. ULSD Inventory Levels



Source: Bloomberg Professional, DOESDL15

Overall Inventories Are a Bit Tight

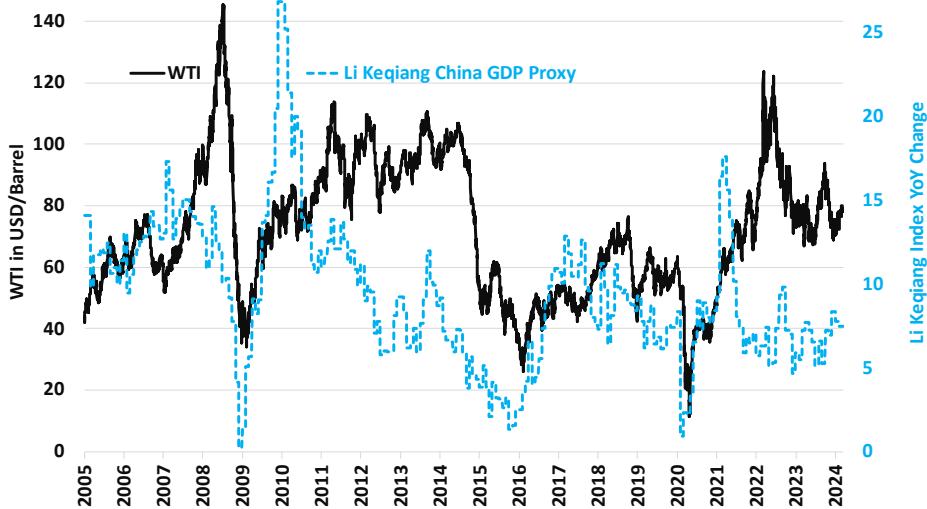


Source: Bloomberg Professional, DOESDL15

Copper and The Pace of Growth in China

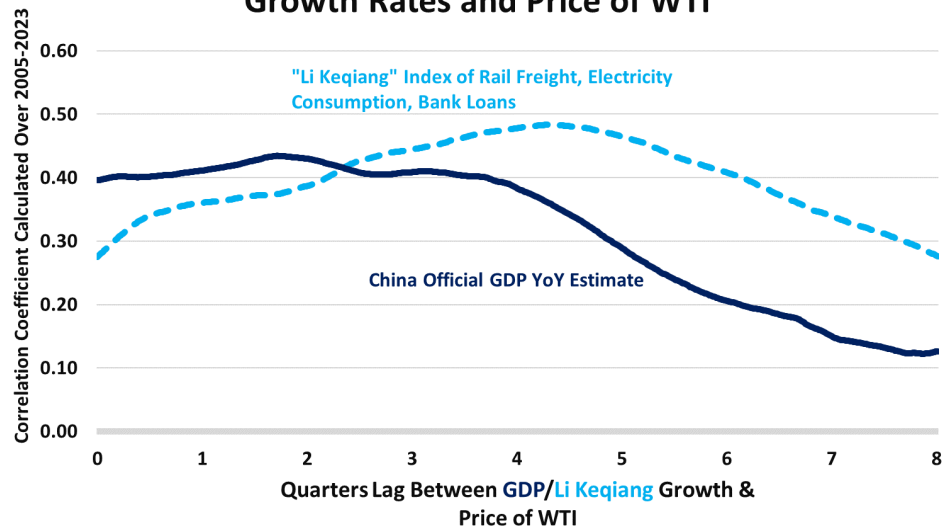
China's Pace of Economic Growth Influences Oil Prices With a Lag of About One Year

WTI and YoY Change in Li Keqiang Index



Source: Bloomberg Professional (CL1 rolled 10 days prior to expiry and [CLKQINDX](#))

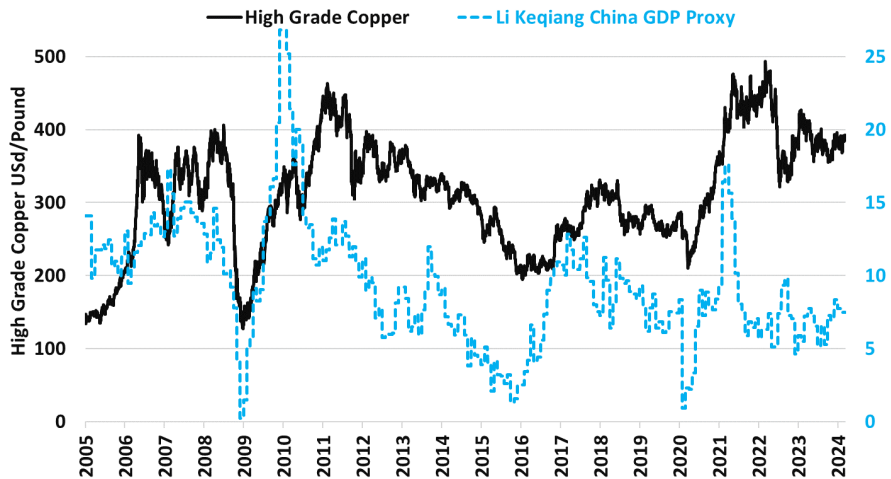
Correlation between GDP & The Li Keqiang Index Growth Rates and Price of WTI



Source: Bloomberg Professional (CL1, CNGDPYOY and [CLKQINDX](#)), CME Economic Research Calculations

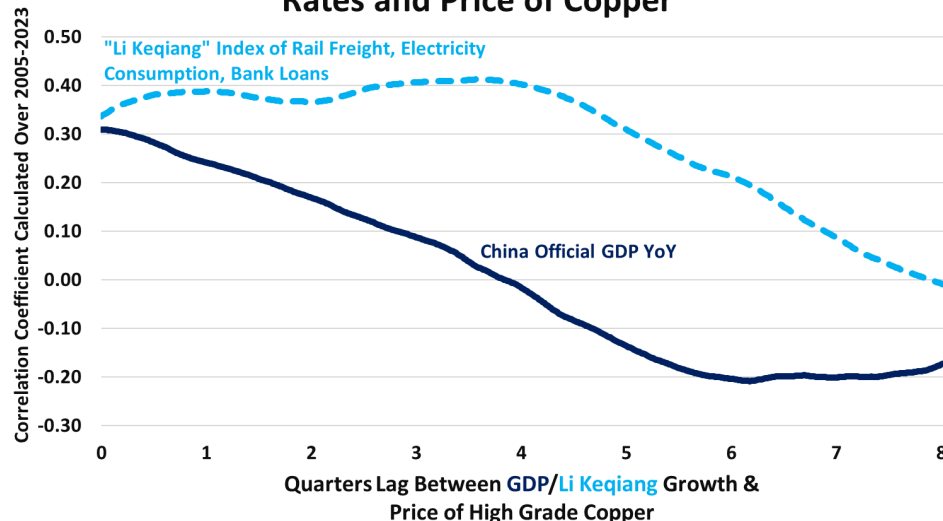
China's Pace of Economic Growth Influences Industrial Metals Prices With a Lag

High Grade Copper and YoY Change in Li Keqiang Index



Source: Bloomberg Professional (HG1 and CLKQINDX)

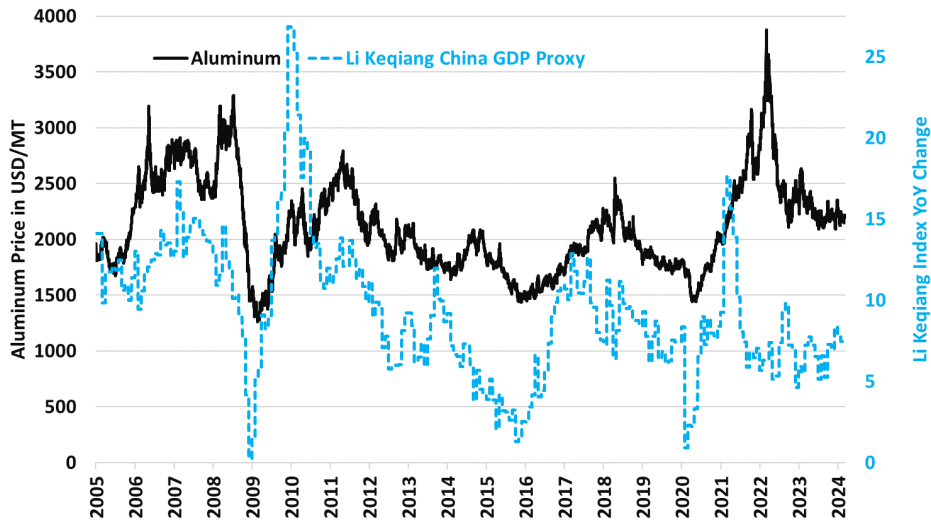
Correlation between GDP & "Li Keqiang" Growth Rates and Price of Copper



Source: Bloomberg Professional (HG1, CNGDPYOY and CLKQINDX)

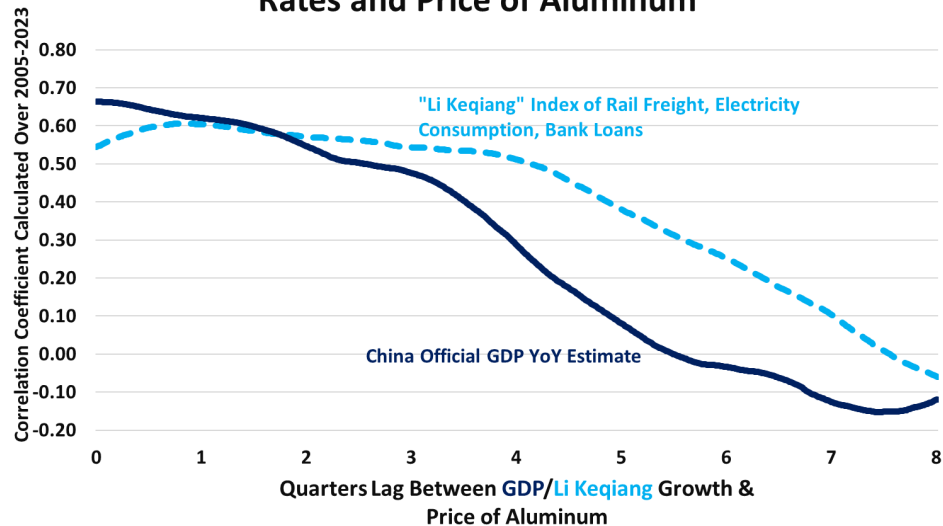
China's Pace of Economic Growth Influences Industrial Metals Prices With a Lag

Aluminum & YoY Change in Li Keqiang Index



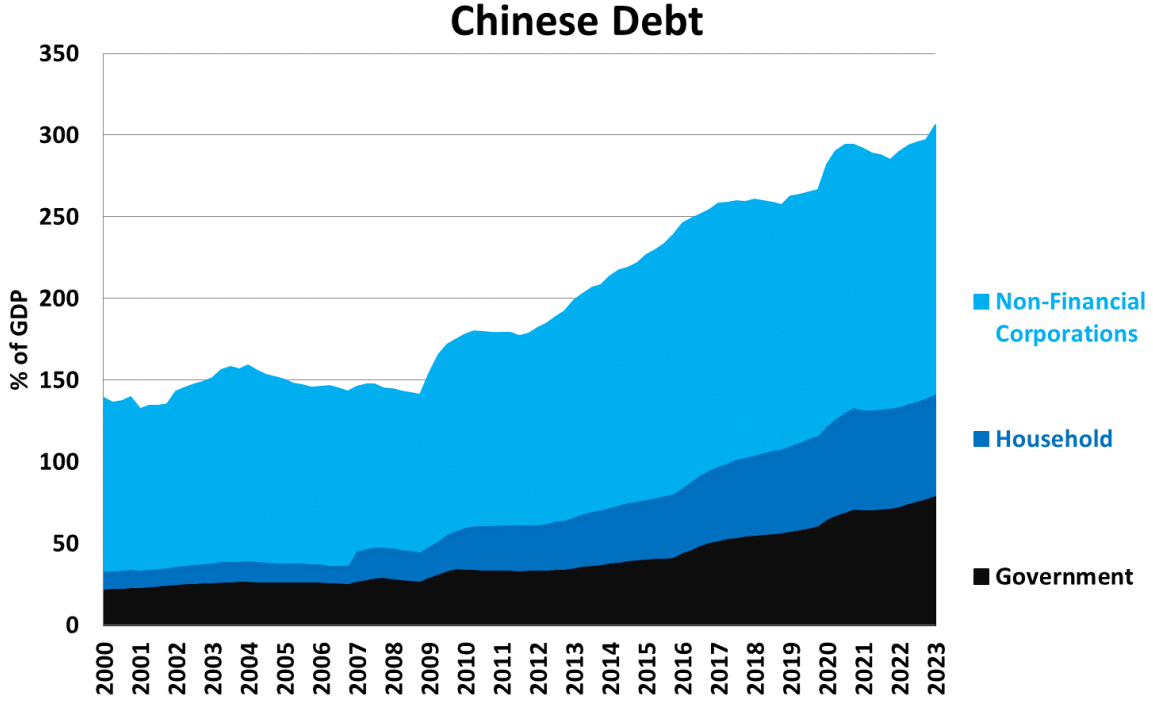
Source: Bloomberg Professional (LA1 and CLKQINDX)

Correlation between GDP & "Li Keqiang" Growth Rates and Price of Aluminum



Source: Bloomberg Professional (LA1, CNGDPYOY and CLKQINDX)

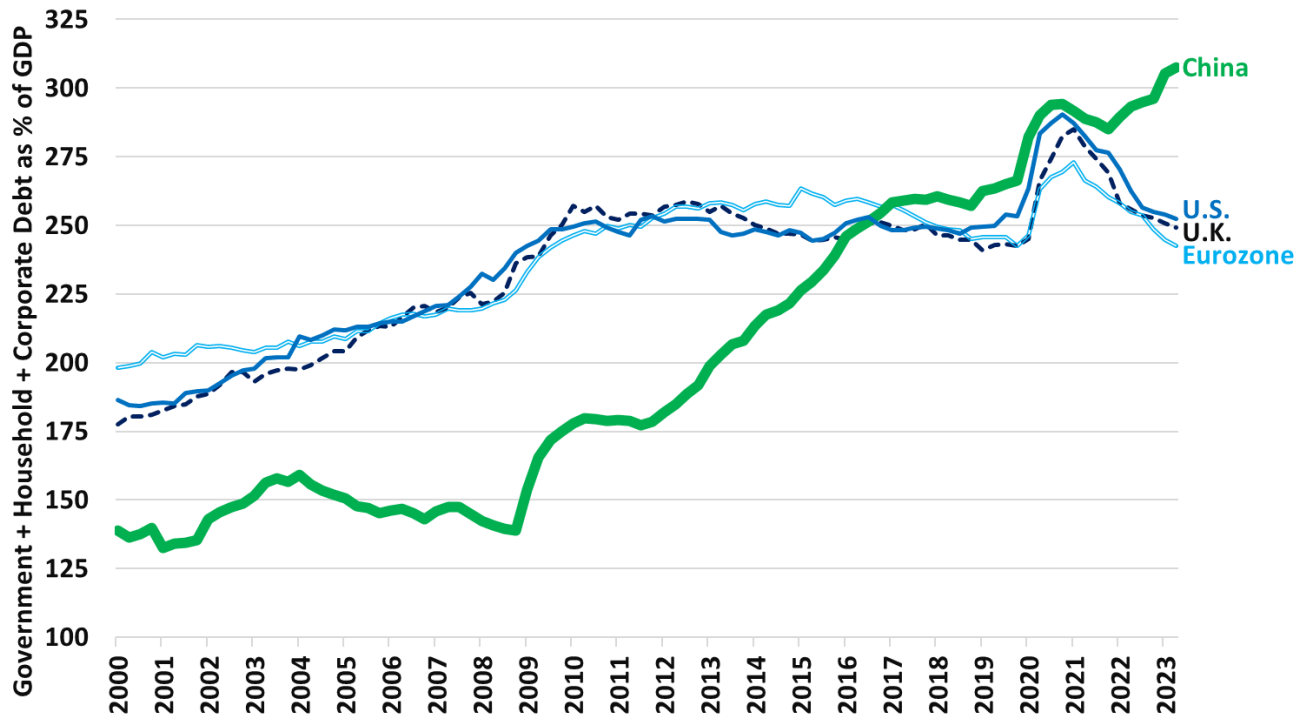
Since 2008, China's Debt Levels Have Soared and a Major Financial Crisis Has Begun.



Source: Bank for International Settlements (BIS), <http://www.bis.org/statistics/totcredit.htm>

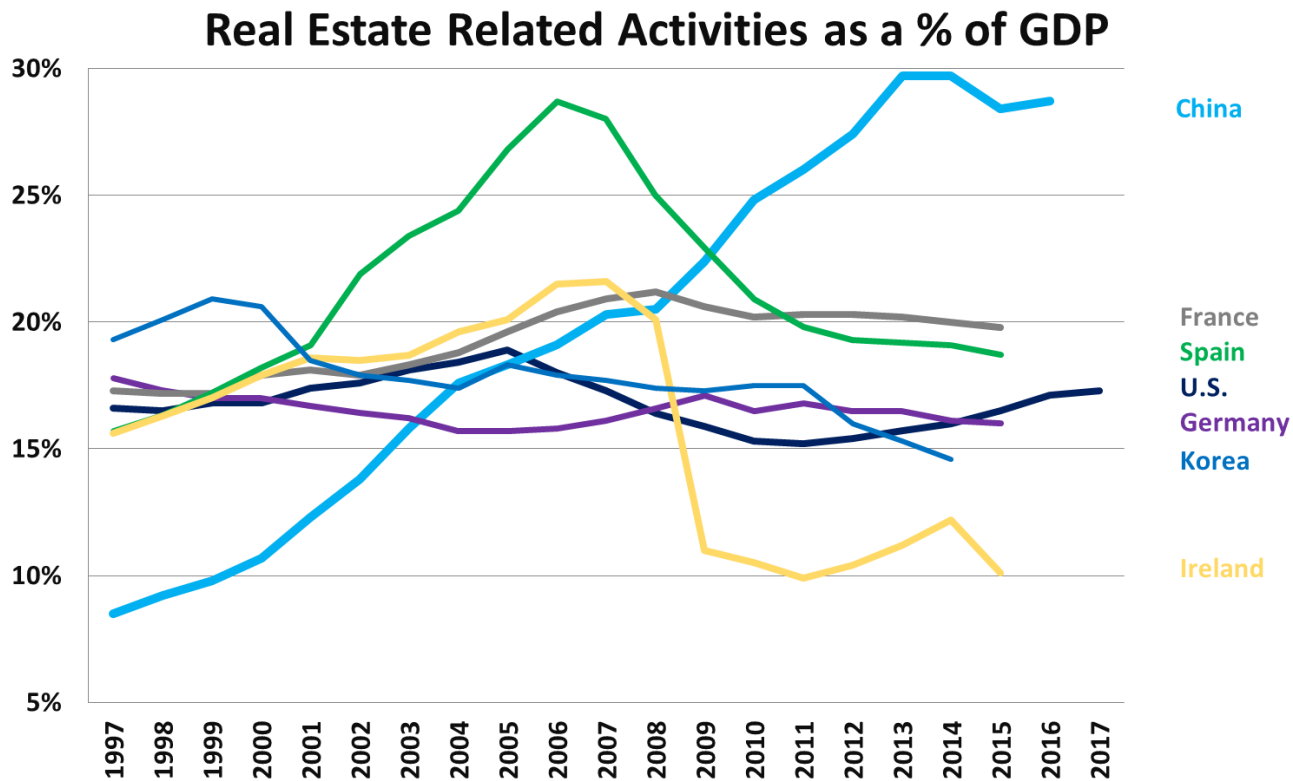
China's Debt Levels Have Surpassed Those of the U.S. & Europe

Public + Private Sector Debt to GDP Ratio



Source: Bank for International Settlements (BIS), <http://www.bis.org/statistics/totcredit.htm>

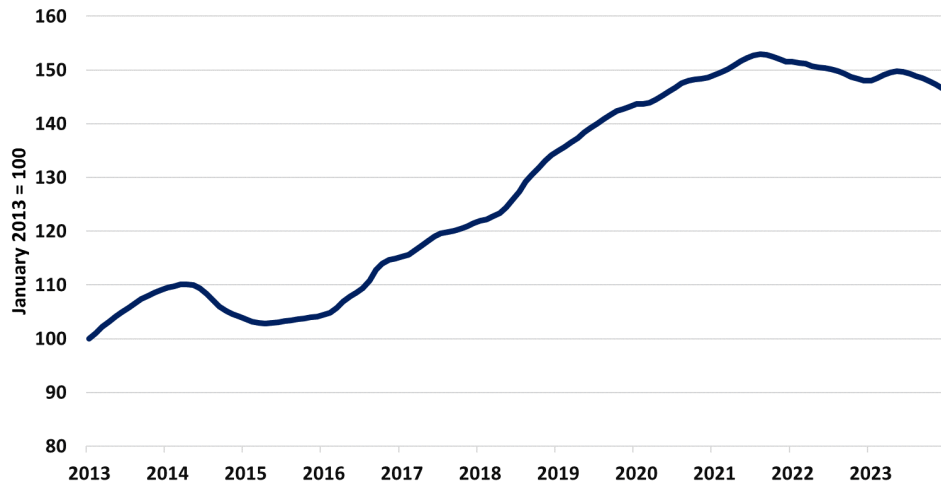
China's Debt Boom Fuelled a Massive Real Estate Bubble



Source: Rogoff and Yang, "China and the World Economy", Harvard University 2021

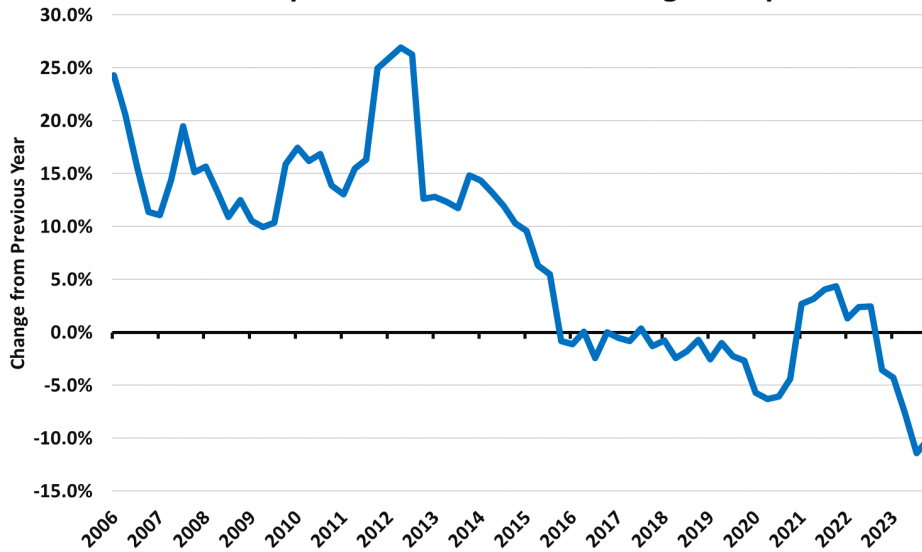
Residential property prices are also falling while construction activity is falling by more than 10% per year.

China 70 Cities Newly Built Commercial Residential Building Prices



Source: Bloomberg Professional, CHHEAVGM, CME Economic Research Calculations

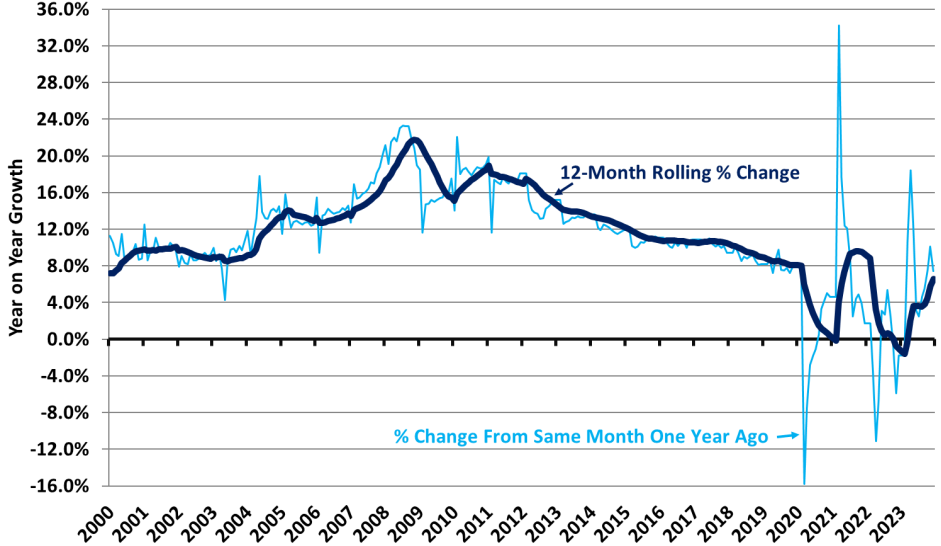
China Floor Space of Residential Buildings Completed



Source: Bloomberg Professional (CSTNRES), CME Economic Research Calculations

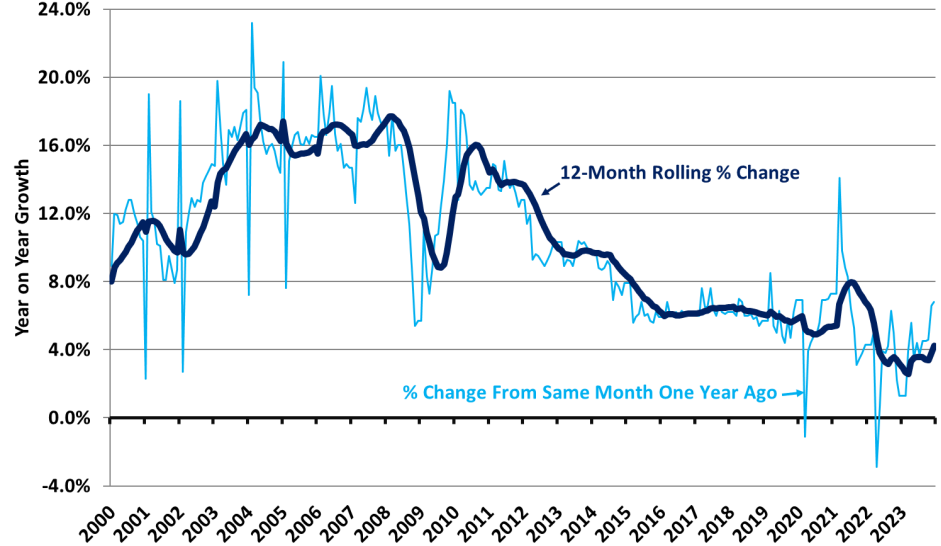
China's Retail Sales & Industrial Production Have Slowed

China: Retail Sales



Source: Bloomberg Professional, CNSRCYOY, CME Economic Research Calculations

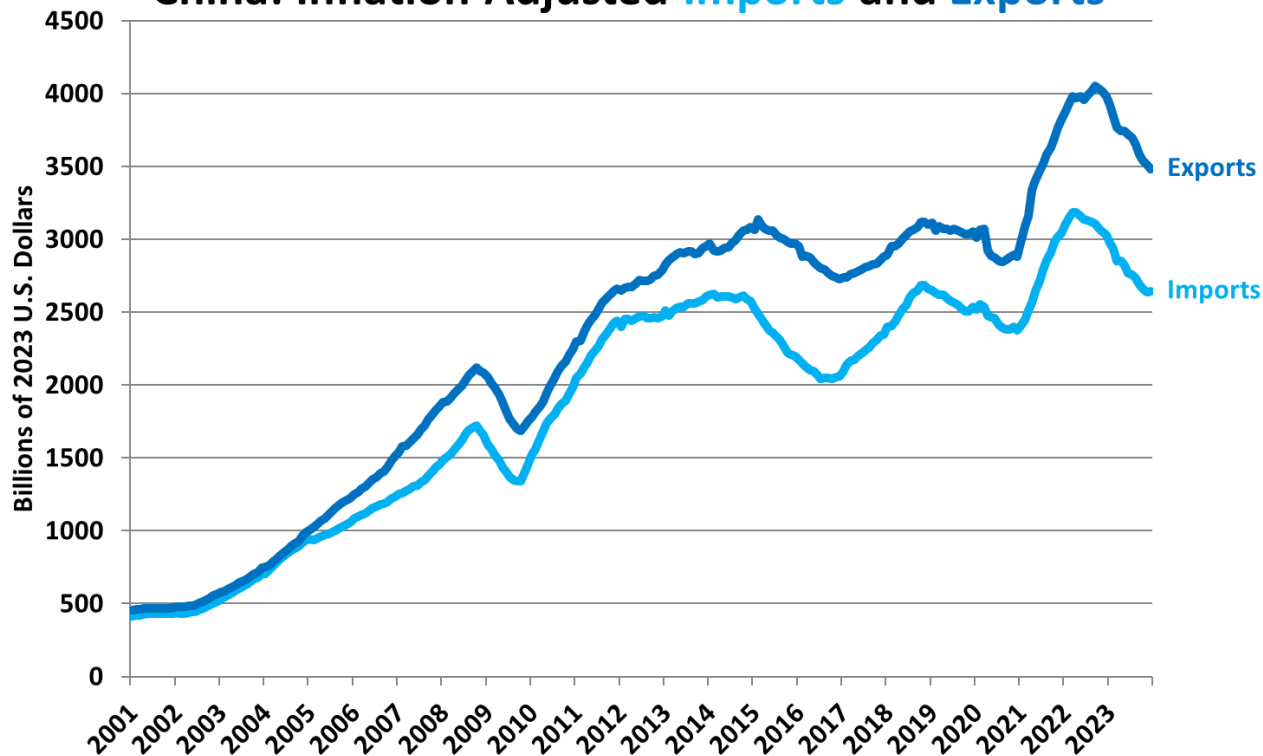
China: Industrial Production



Source: Bloomberg Professional, CNSRCYOY, CME Economic Research Calculations

China's Exports and Imports Are Also Falling

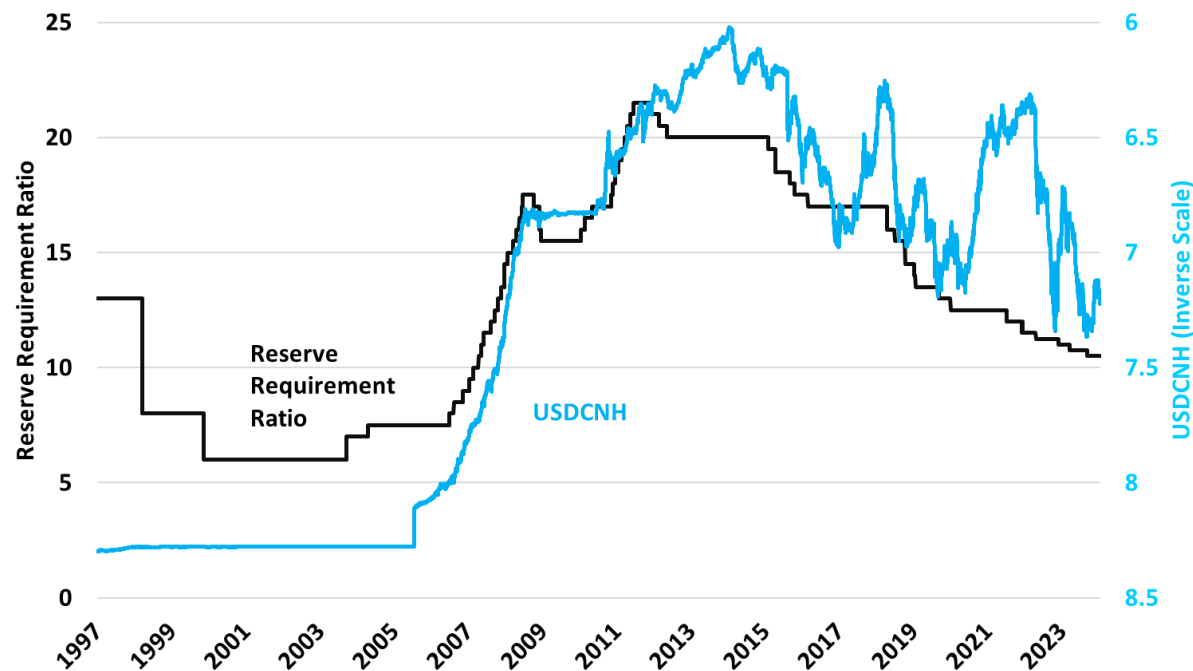
China: Inflation Adjusted Imports and Exports



Source: Bloomberg Professional, [CNFRIMP\\$](#) and [CNFREXP\\$](#), CPI INDX, CME Economic Research Calculations

Easy Monetary Policy and a Weaker Yuan May Help China to Counter Low Inflation and Slower Export Growth

Chinese Yuan and Monetary Policy

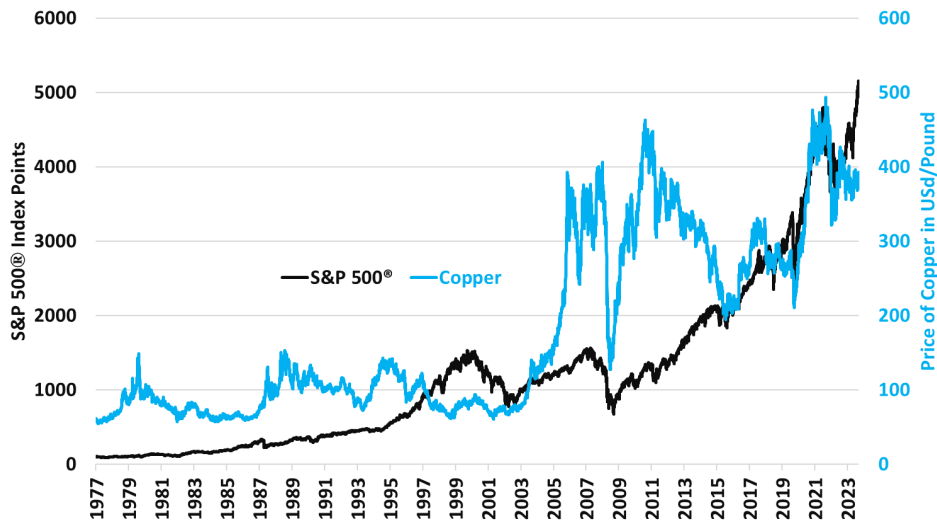


Source: Bloomberg Professional: (CHRRDEP, CNH and, pre-2011, CNY)

Copper and the Stock Market

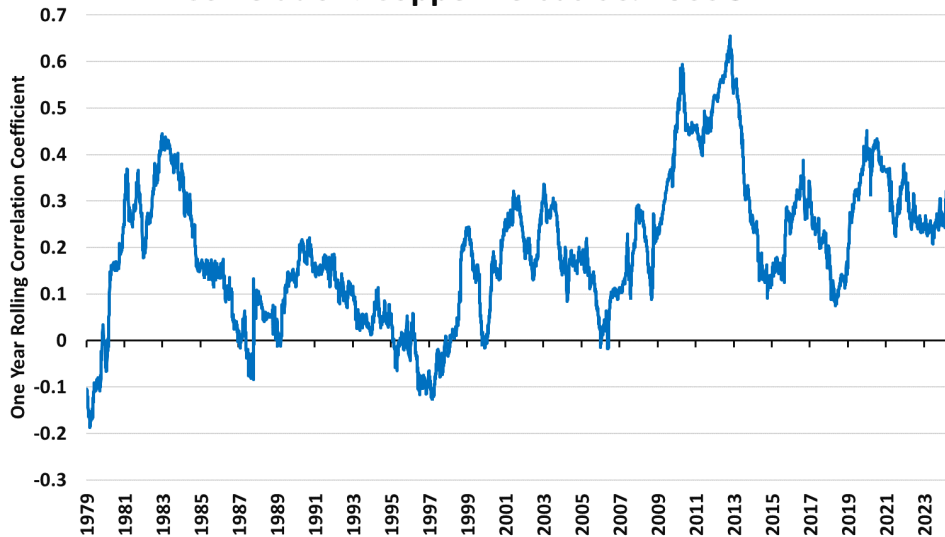
Copper versus the S&P 500: Positively Correlated Since 1999.

S&P 500® and Copper



Source: Bloomberg Professional (SPX and HG1)

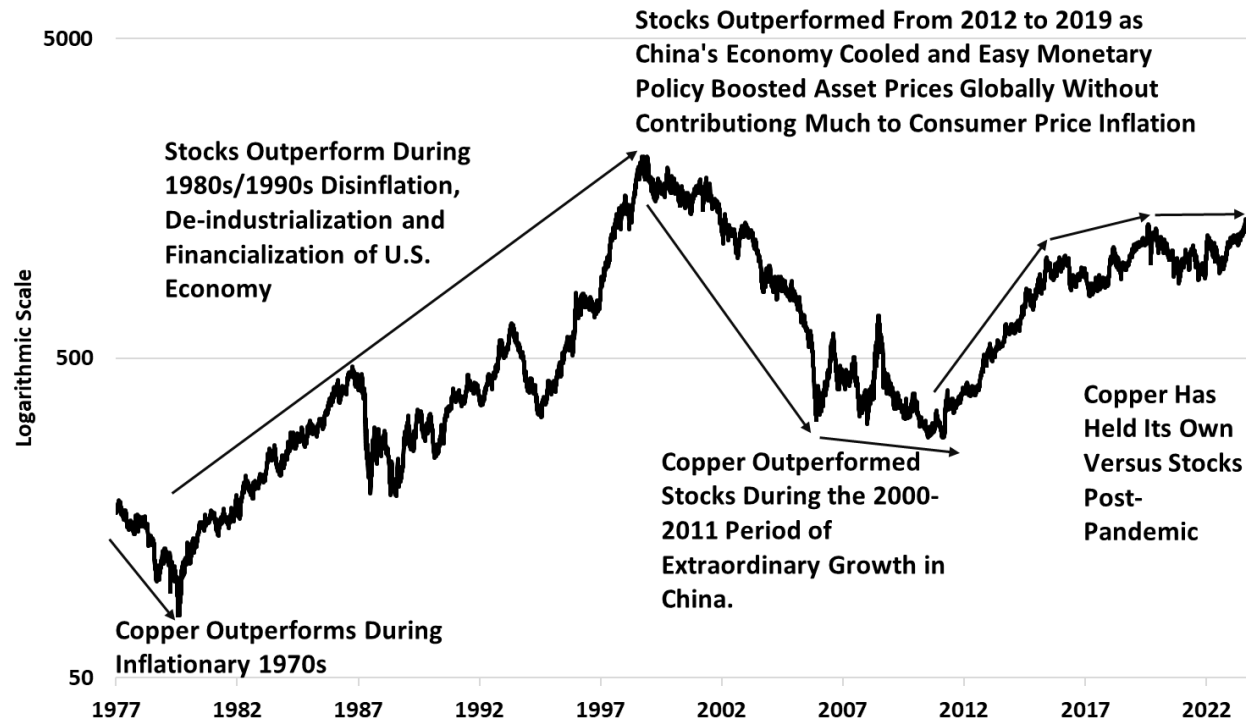
Correlation: Copper versus S&P 500®



Source: Bloomberg Professional (SPX and HG1)

How Many Pounds of Copper One Can Buy with S&P 500 Index Points.

S&P 500 / Copper Ratio



Source: Bloomberg Professional (SPX and HG1)

Are Metals About to Outperform Equities?

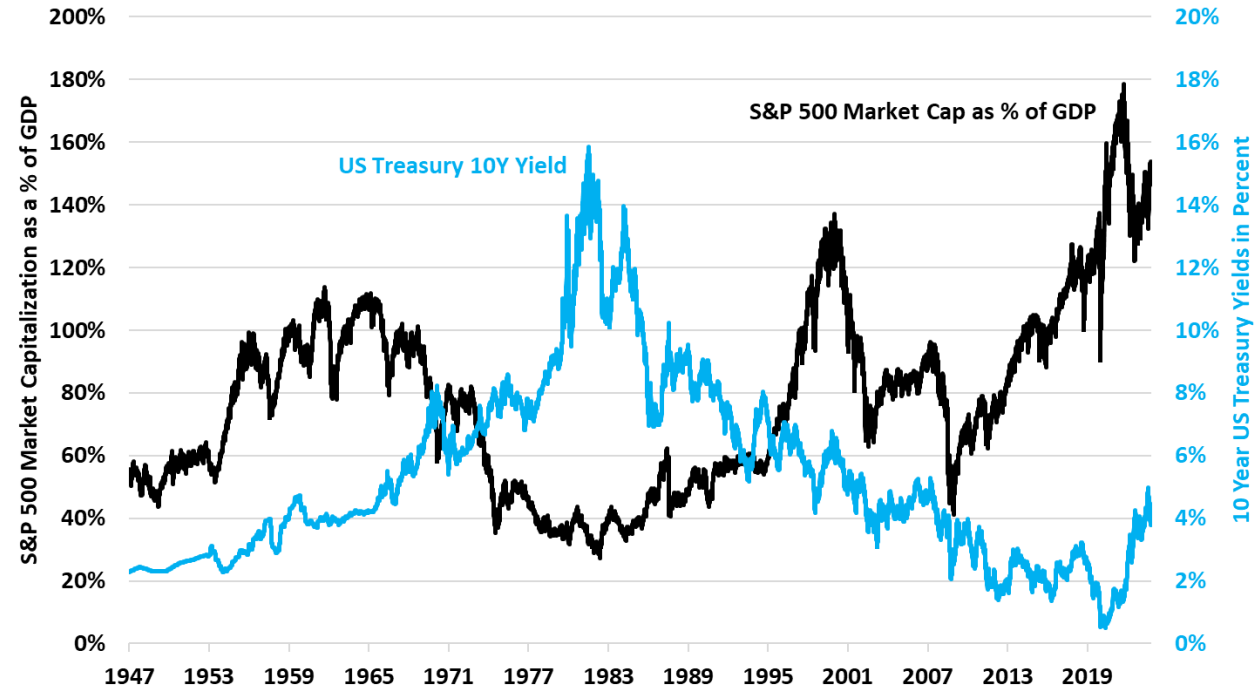
S&P 500 / Gold Ratio



Source: Bloomberg Professional (SPX and GOLDS)

U.S. Equities Look Possibly Overvalued.

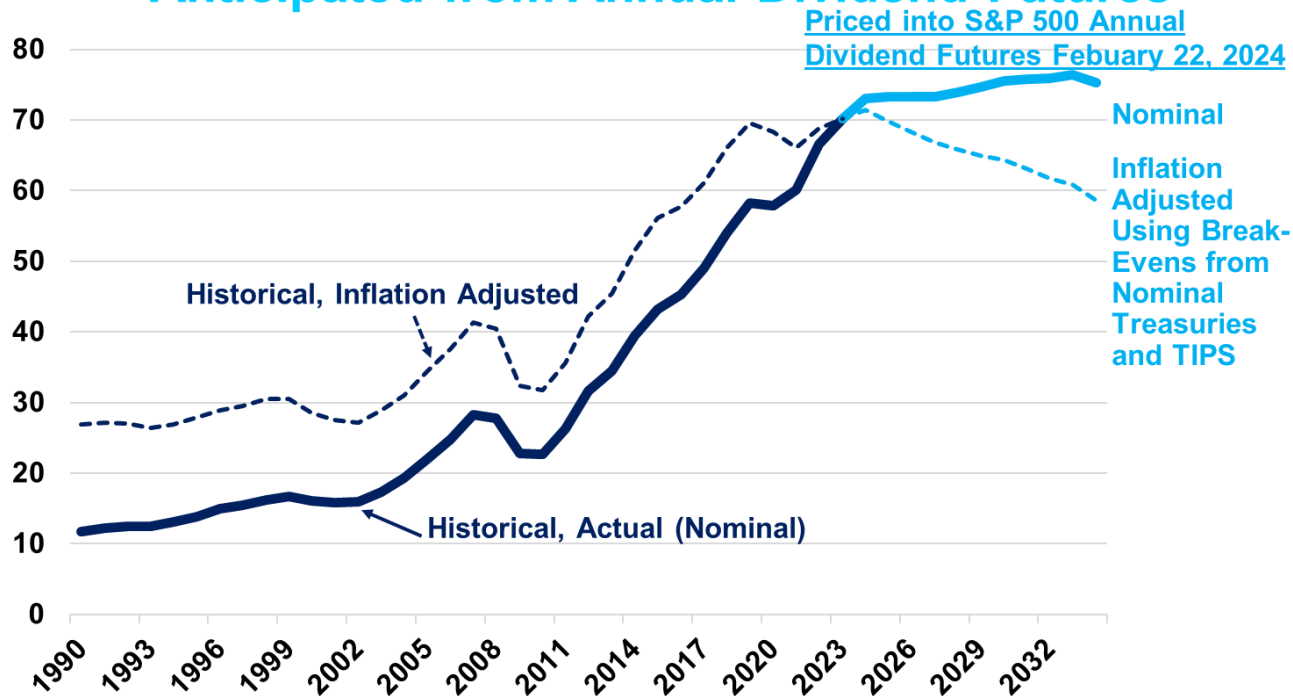
S&P 500[®] Market Cap / Nominal US GDP versus 10Y Treasuries



Source: Bloomberg Professional (SPX, GDP CUR\$, USGG10YR), www.multipl.com for bond yields pre-1962.

Dividend Futures Price Little Growth in Earnings in Next 10 Years

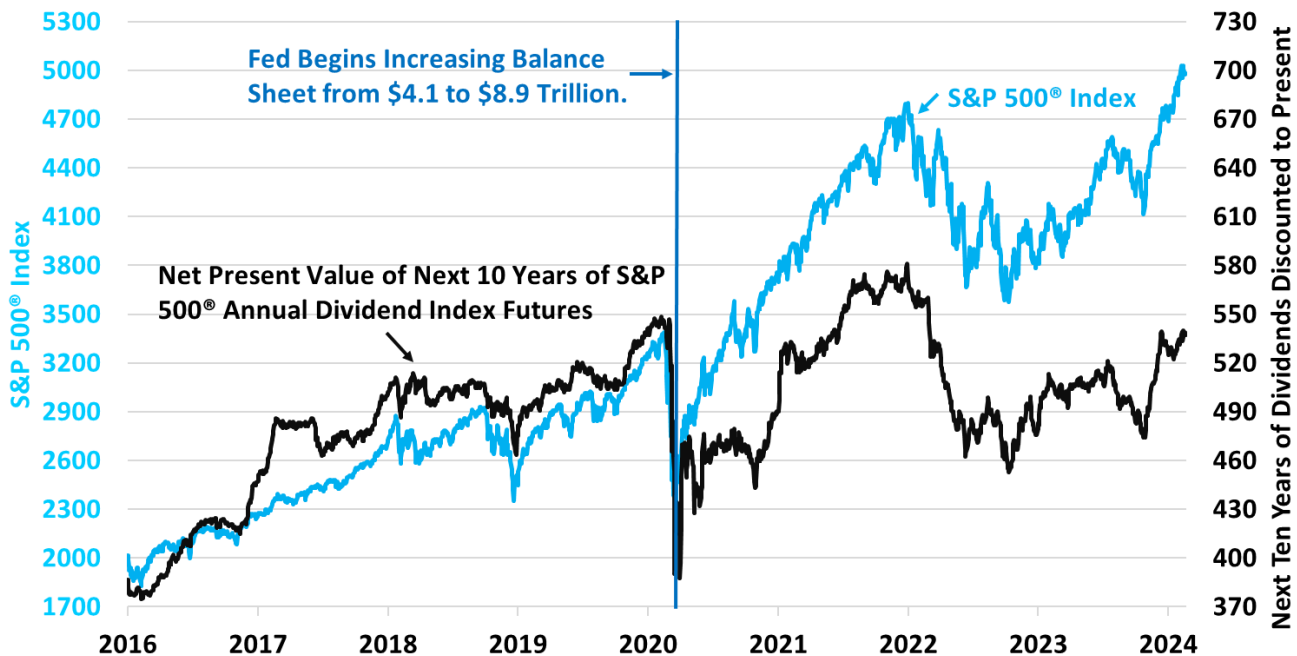
S&P 500 Dividend Points: Historical & Anticipated from Annual Dividend Futures



Source: Bloomberg Professional (SPXDIV, ASDZ3, ... ASDZ33)

Stocks Diverged From Fair Value After the Fed Began QE4.

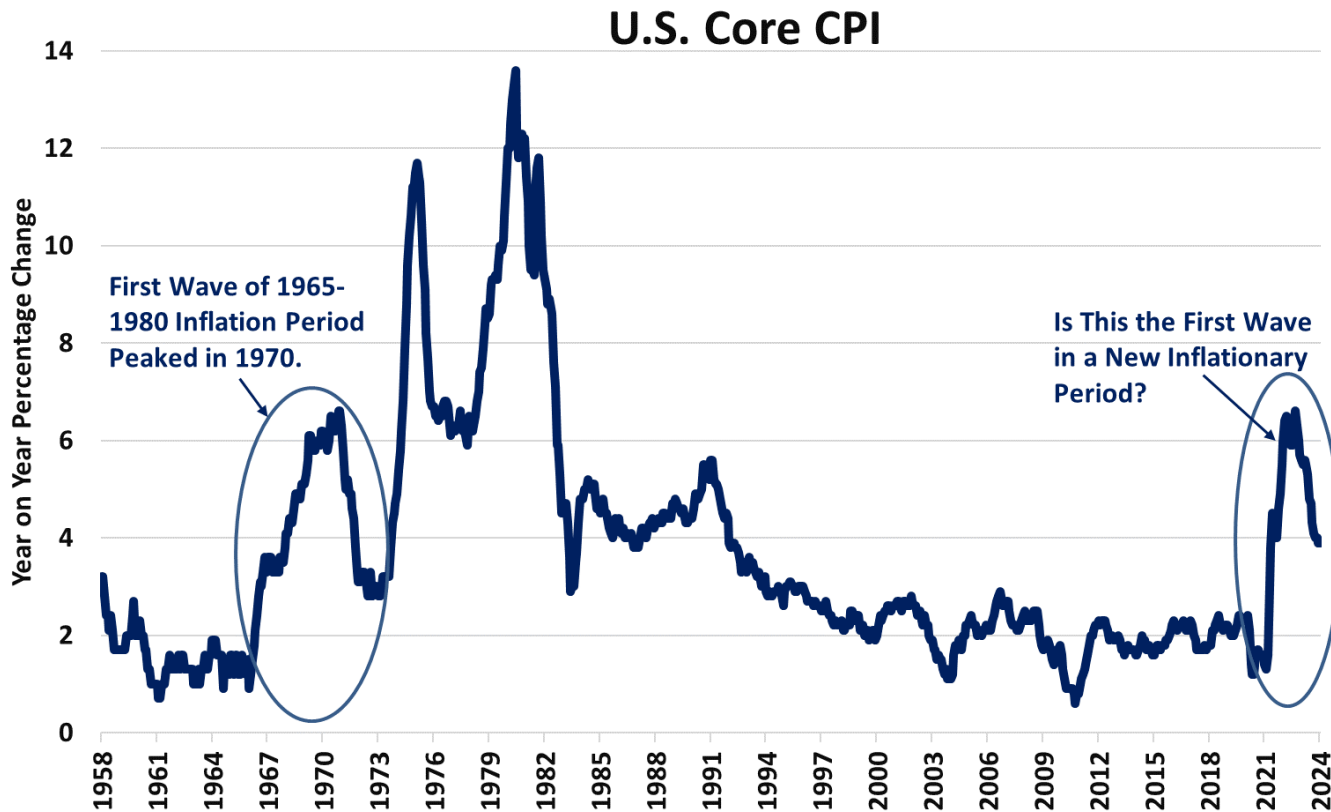
S&P 500® and Net Present Value of Next Ten Years' of Annual Dividend Index Futures



Source: Bloomberg Professional (SPX and ASDZ15-31, GB12, USGG2YR, USGG5YR, USGG10Y), CME Economic Research Calculations

Copper and The U.S. Economy and Other Economies

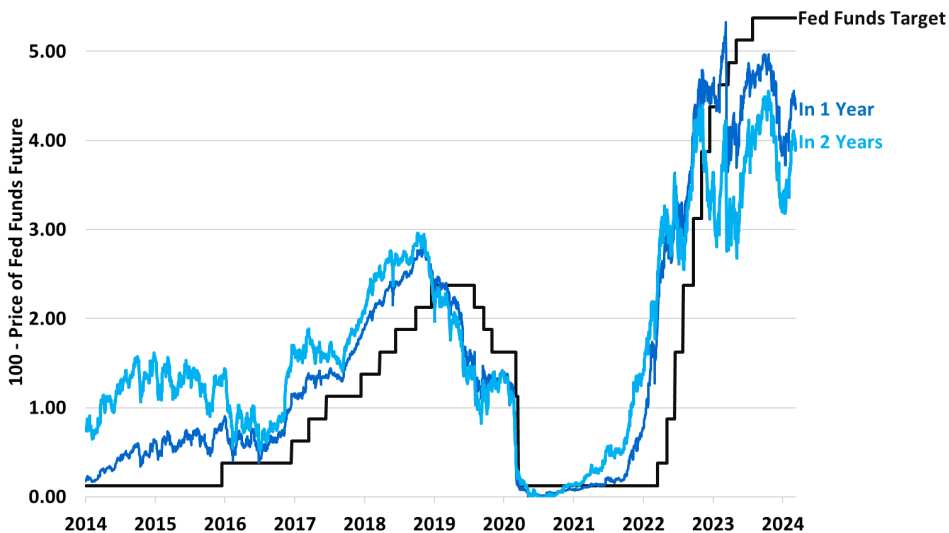
Is the U.S. Just in the First Wave of a Series of Inflation Waves?



Source: Bloomberg Professional (CPI XYOY)

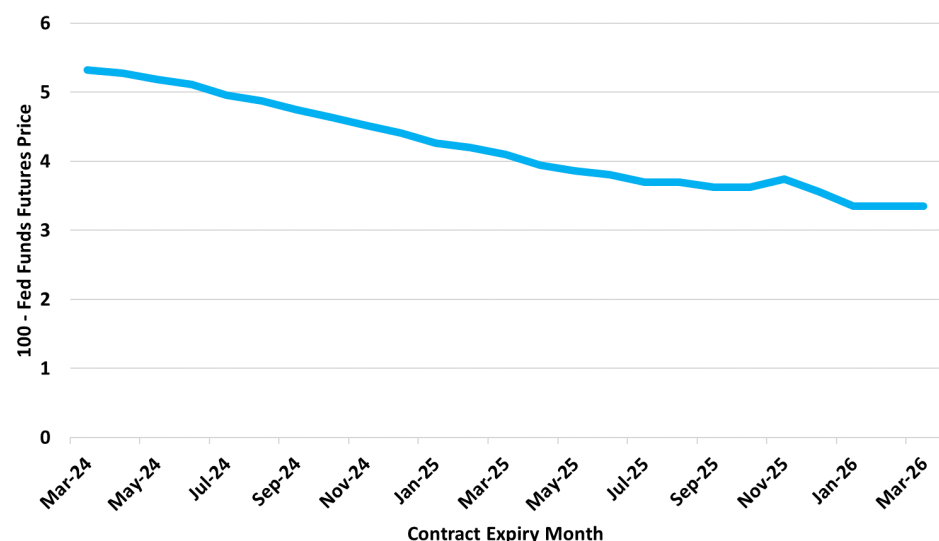
Fixed Income Markets See the Fed Cutting Rates By Around 150bps Over the Next Two Years.

Continuous Fed Funds Futures 1Y and 2Ys Out



Source: Bloomberg Professional (FDTRMID, FFZ15...FFZ25), CME Economic Research Calculations

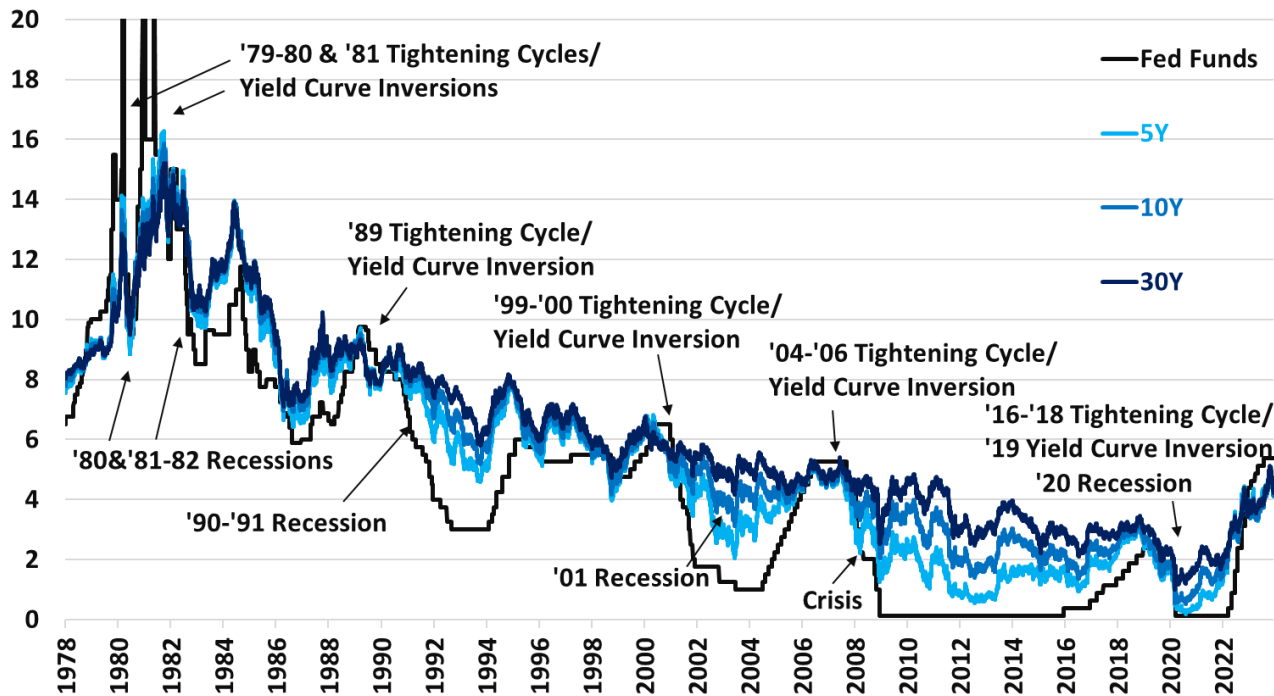
Fed Funds Future Curve as of March 11, 2024



Source: Bloomberg Professional (FF1 ... FF24)

U.S. Treasury Yields Have Plunged Way Below Fed Funds.

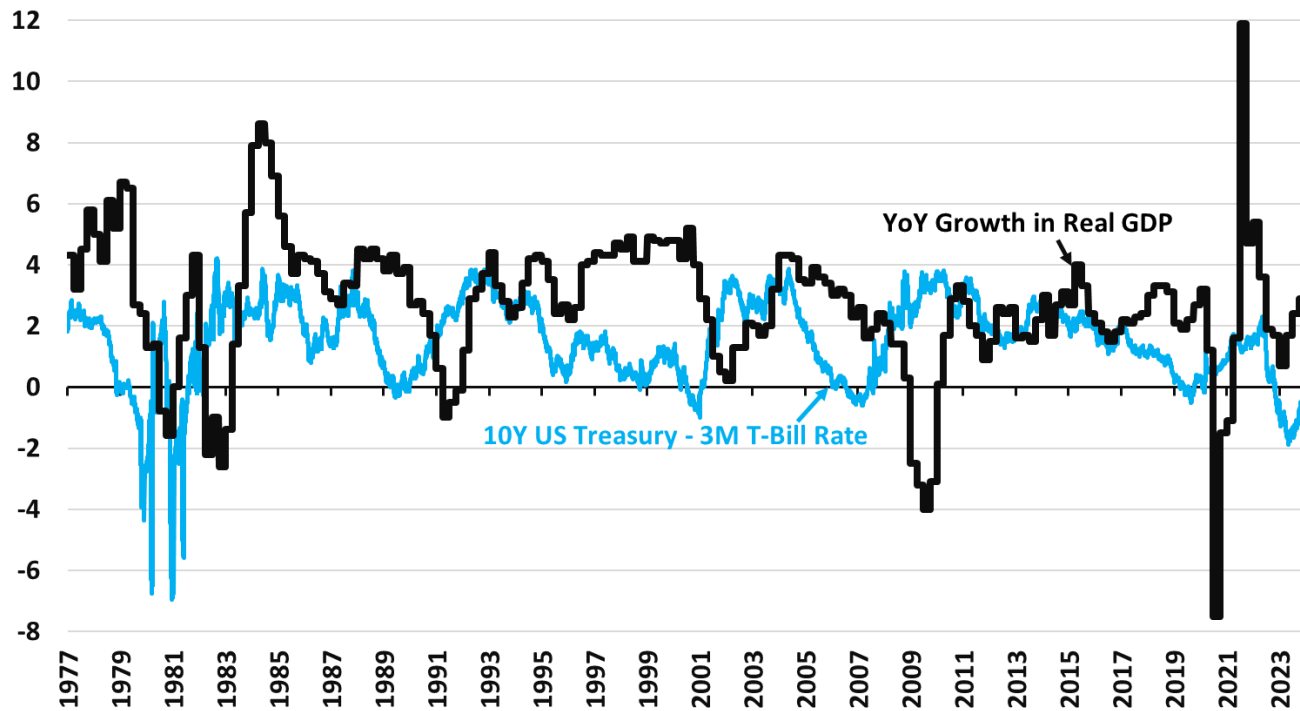
US: 3M, 5Y, 10Y and 30Y Yields



Source: Bloomberg Professional (GB3, USGG2Y, USGG5Y, USGG10Y and USGG30Y)

The Yield Curve Is Often a Great Indicator of the Economy 2Ys Ahead.

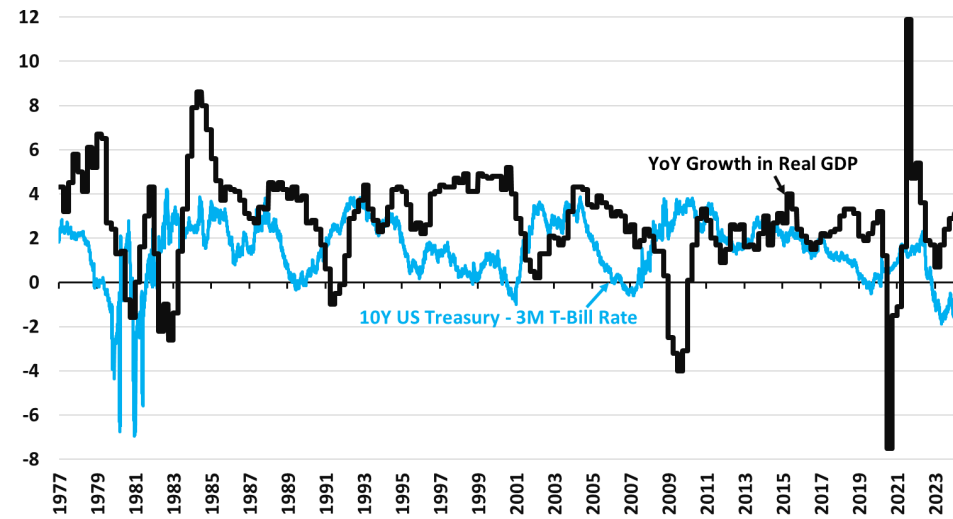
US Public Sector Yield Curve and GDP Growth



Source: Bloomberg Professional (GDP CYOY, USGG10YR and GB3)

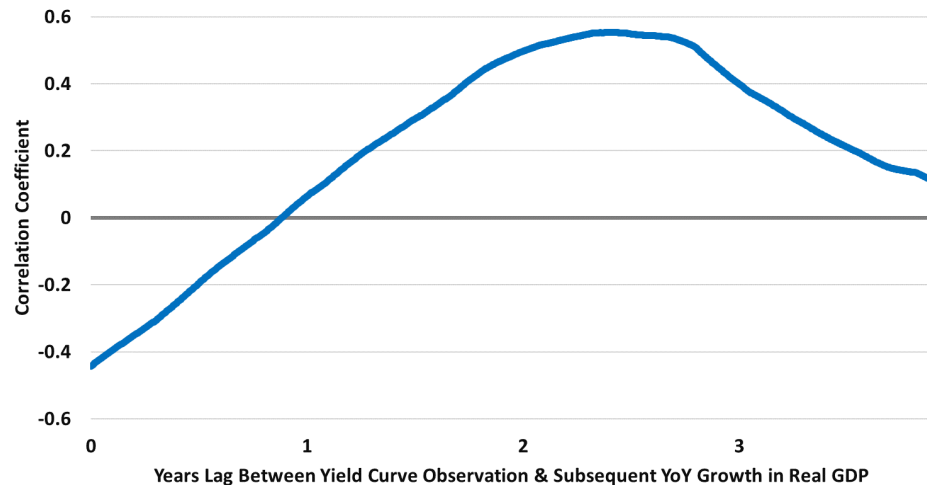
The Correlation Between Yield Curve Shape and Subsequent GDP Growth Peaks After a Lag of 2-3 Years.

US Public Sector Yield Curve and GDP Growth



Source: Bloomberg Professional (GDP CYOY, USGG10YR and GB3)

US Treasury Yield Curves & Correlation With Future GDP Growth 1999-2019



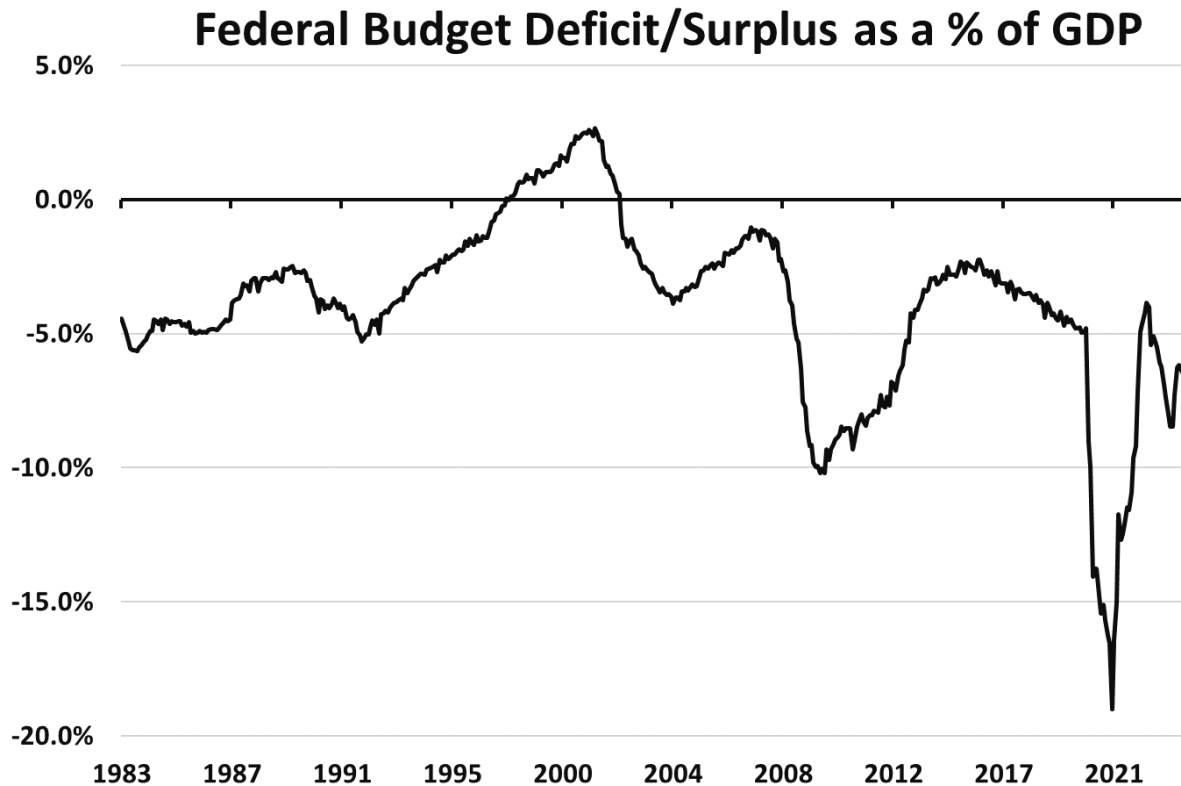
Source: Bloomberg Professional (GDP CYOY, USGG10YR and GB3)

Recessions, When the Happen, Have Begun 10-18 Months After the Fed's Last Rate Hike ... And After Yield Curve Inversions.

Monetary Policy Tightening Cycles and Subsequent Economic Downturns:				
Fed Rates Peaked in ...	Amount of Tightening (bps)	A Recession Began in...	Lag Time in # of Months	Yield Curve Inversion?
July 2023.	525	???	???	Yes
December 2018.	225	February 2020.	14	Yes
June 2006.	425	December 2007.	18	Yes
May 2000.	175	March 2001.	10	Yes
February 1995.	300	Soft Landing	N/A	No
February 1989.	388	July 1990.	17	Yes
August 1984.	325	Soft Landing	N/A	No

Source: Bloomberg Professional (FDTRMID), NBER Business Cycle Dating

The Federal Budget Deficit Is Still Running at 6.5% of GDP.

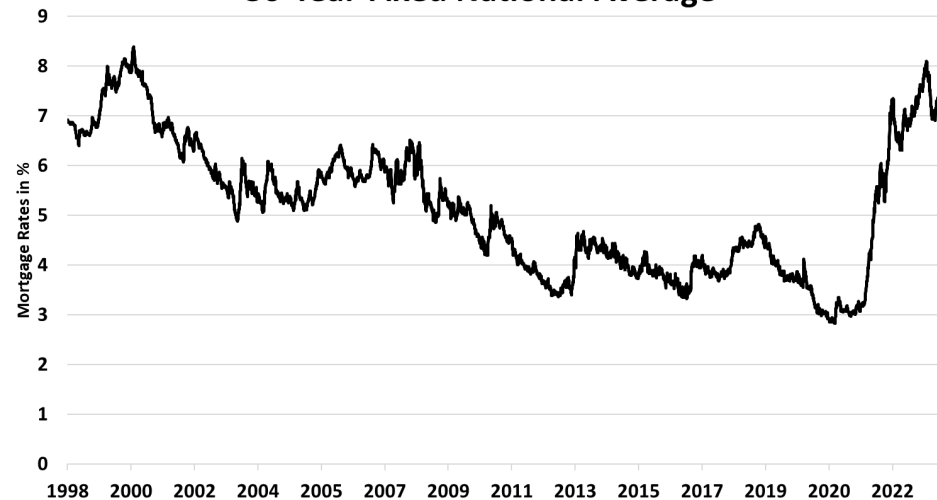


Source: Bloomberg Professional (FDDSSD and GDP CUR\$), CME Economic Research Calculations

Copper and The Housing Market

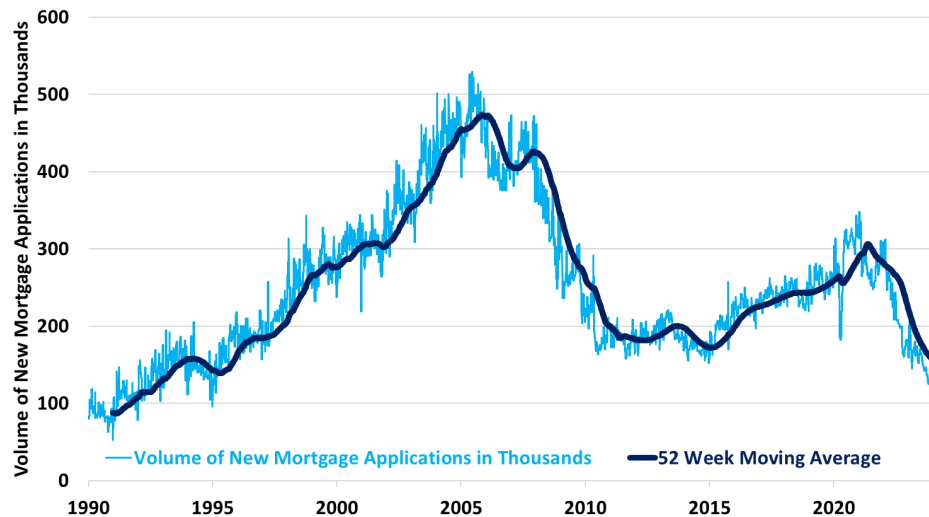
Tighter Monetary Policy Has Sent Mortgage Rates Soaring and the Number of Newly Issued Mortgages to a 29 Year Low.

Bankrate.com US Home Mortgage 30-Year Fixed National Average



Source: Bloomberg Professional (ILM3NAVG)

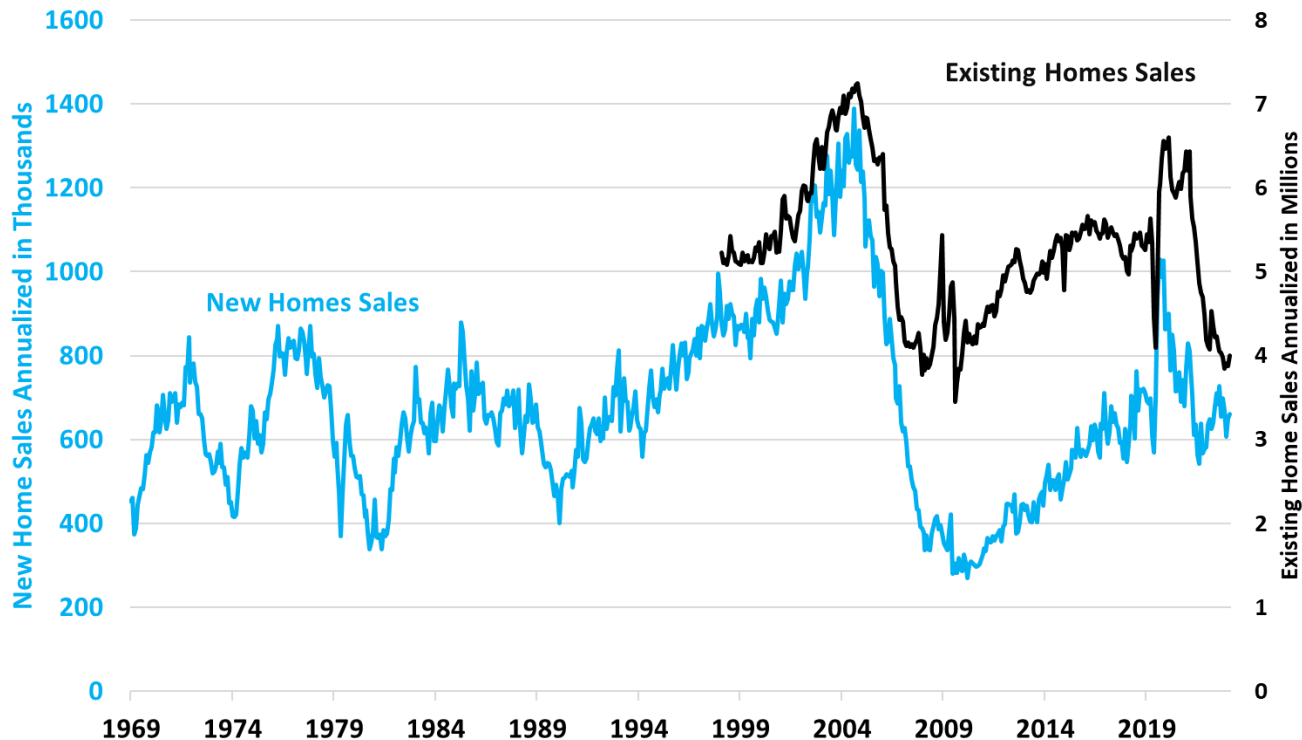
Mortgage Applications Still in the Doldrums



Source: Bloomberg, Mortgage Bankers Association (MBAVPRCH)

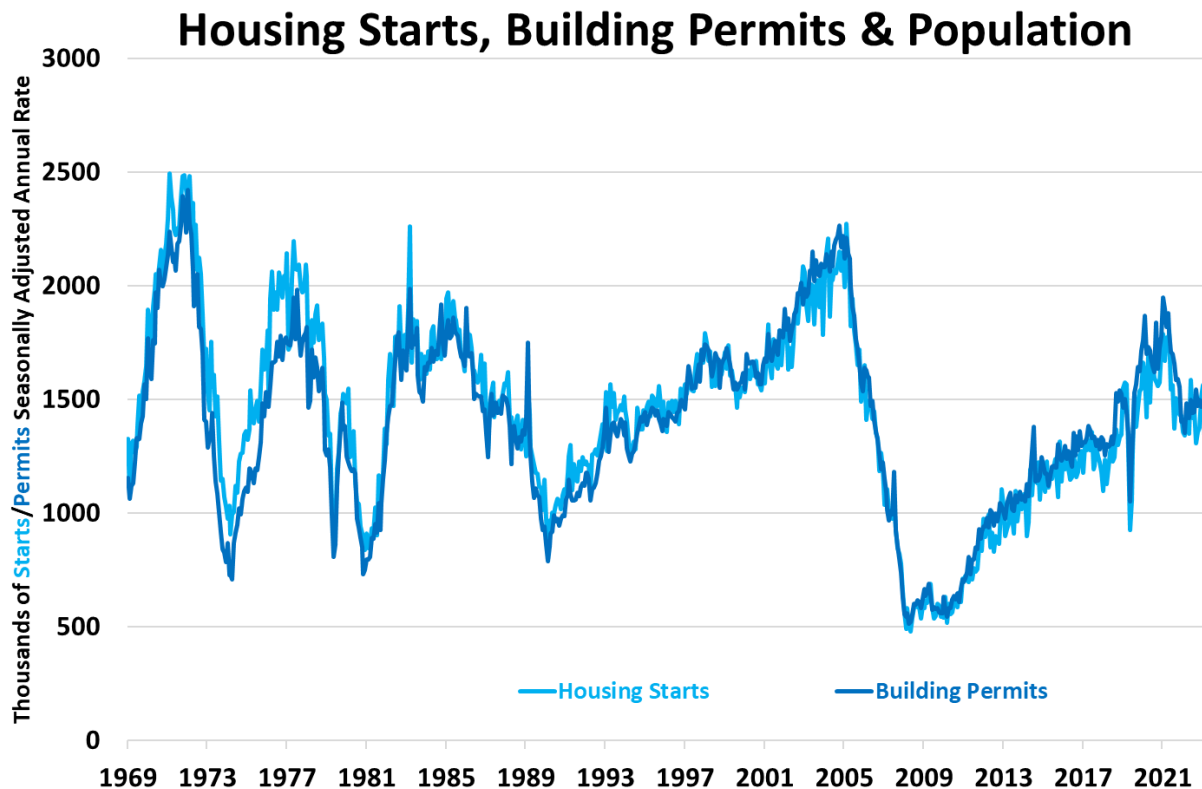
New and Existing Home Sales Have Fallen But It's Not Like 2006-2009.

New and Existing Home Sales



Source: Bloomberg Professional (NHSLTOT and ETSLTOTL)

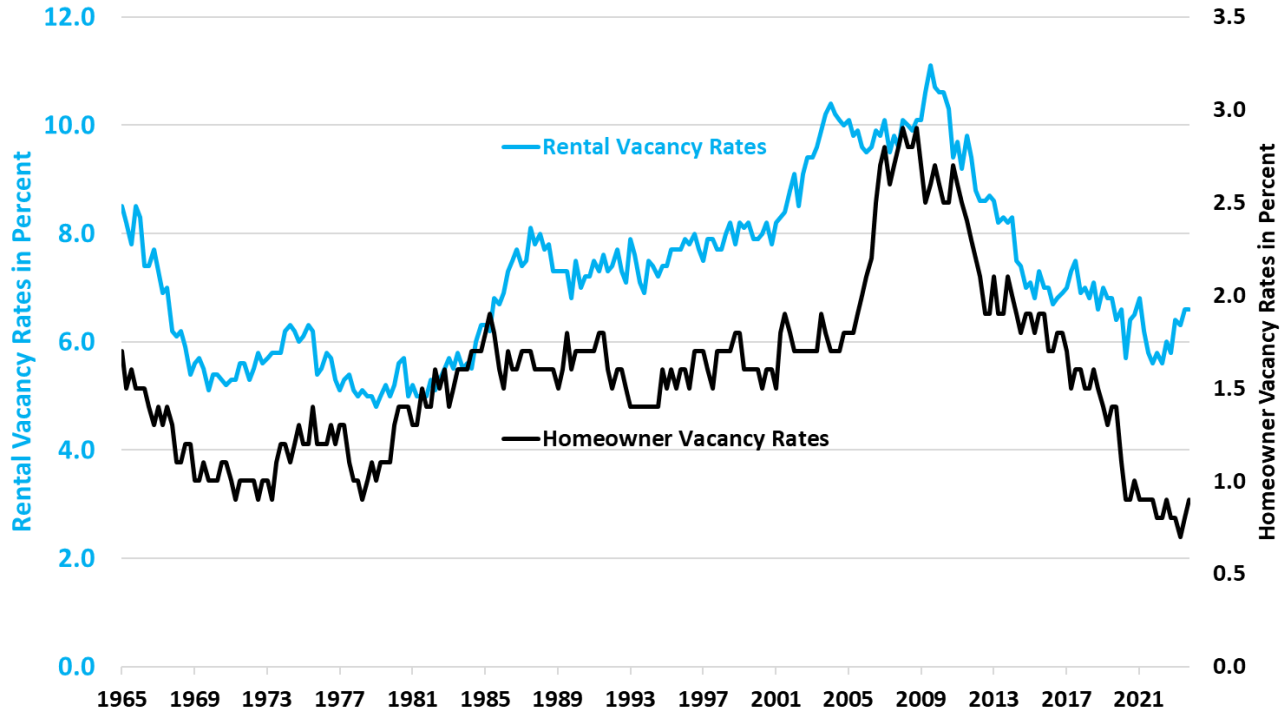
But Building Permits & Housing Starts Aren't That Bad...



Source: Bloomberg Professional (NHSPSTOT, NHSPATOT, USP TOT), US Census Bureau

Low Vacancy Rates Are Preventing a Collapse of Housing.

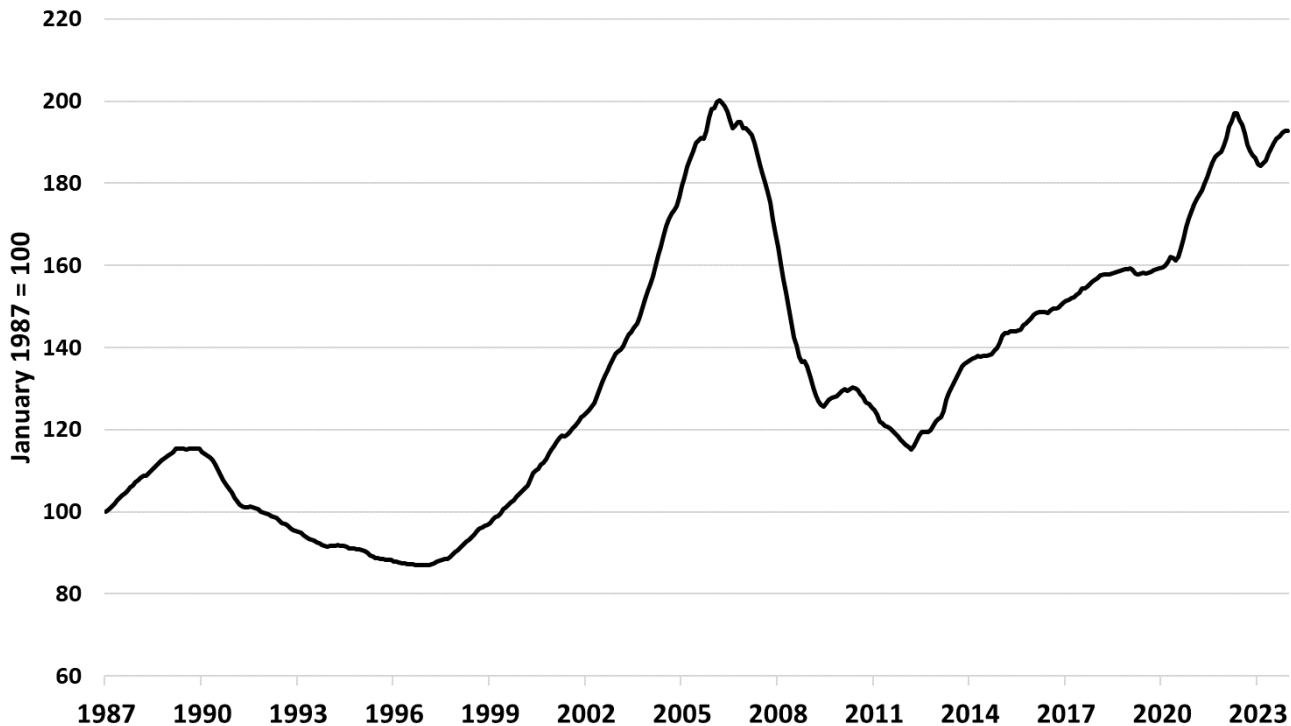
Vacancy Rates



Source: Census Bureau, Housing Vacancies and Home Ownership

Low Vacancy Rates Are Preventing a Collapse of Housing.

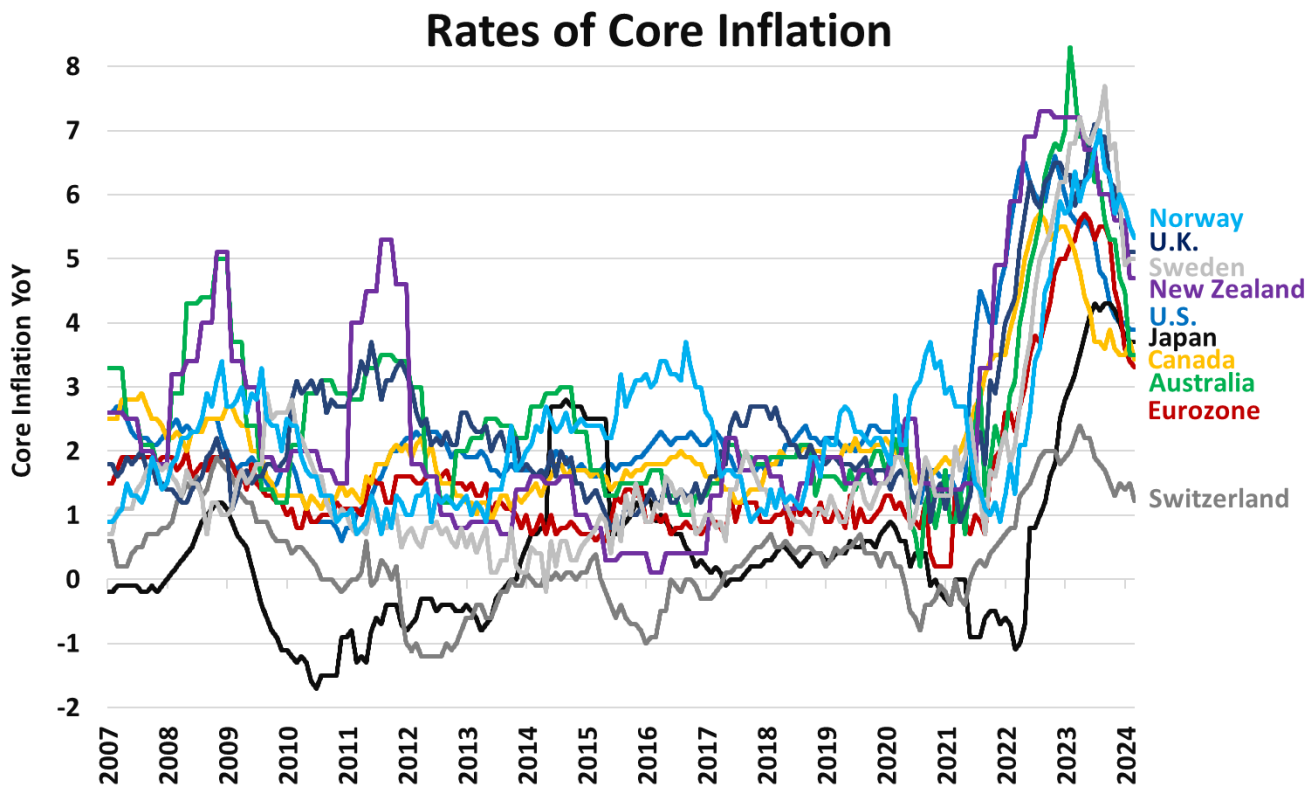
S&P Case-Shiller 10 City Index Adjusted for CPI



Source: Bloomberg Professional (SPCS10S and CPI INDX)

Copper and The Housing Market

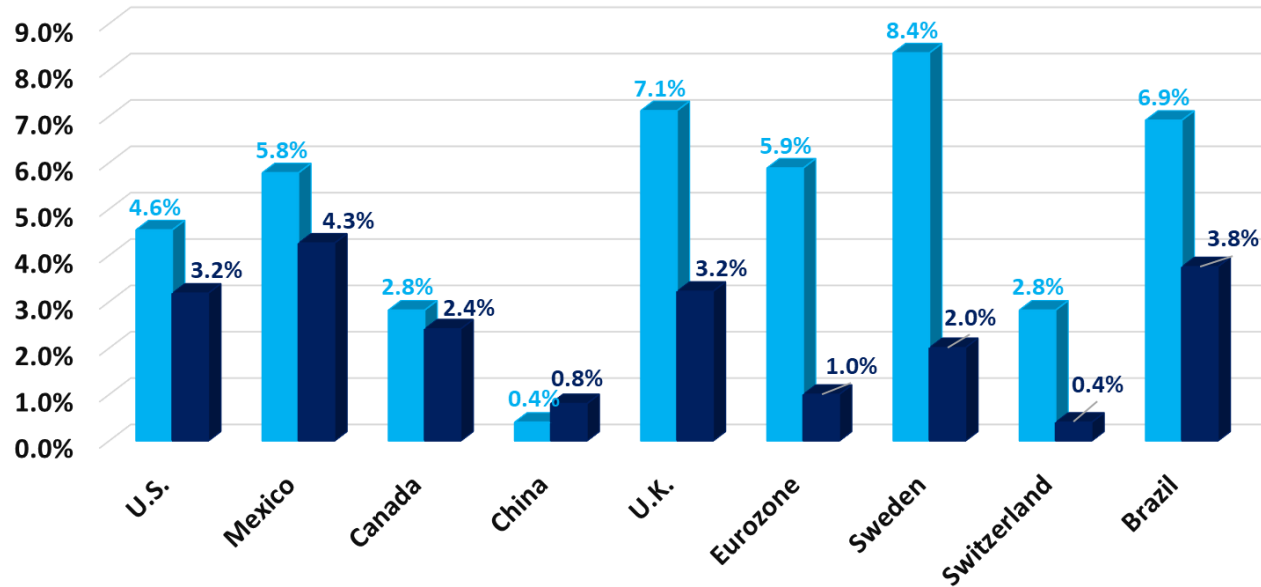
The Global Wave of Inflation Has Begun to Recede



Source: Bloomberg Professional (CPI XYOY, CACPTYOY, UKHCA9IC, CPIEXEMUY, JPCNEFEY, ACPMVLY, NOCPULLY, CPEXSEY, SZEXIYOY, NZCPIYOY)

Inflation Fell Rapidly in the Second Half of 2023

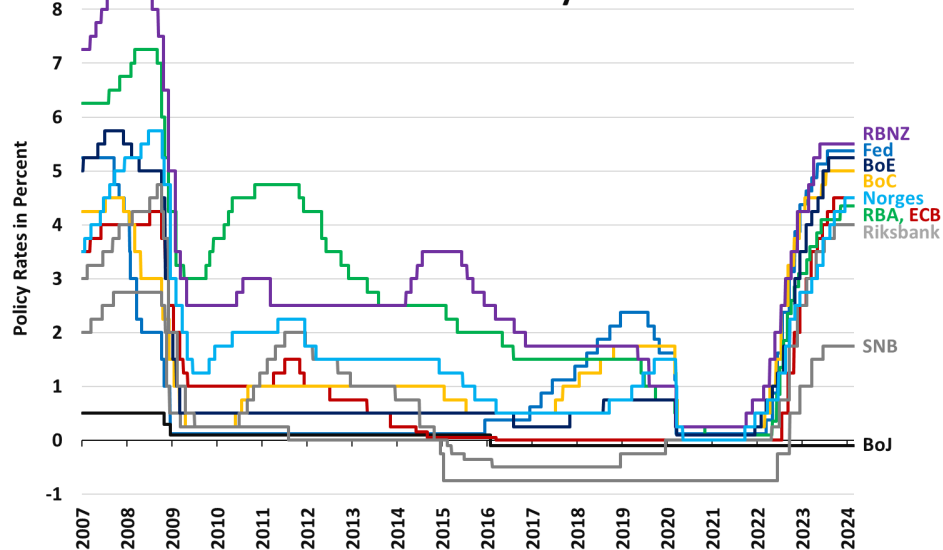
Core Inflation Annualized Change: 1st Half of 2023 and 2nd Half of 2023



Source: Bloomberg Professional (CPI XYOY, CACPTYOY, UKHCA9IC, CPIEXEMUY, JPCNEFEY, ACPMXVLY, NOCPULLY, CPEXSEYY, SZEXIYOY, NZCPIYOY)

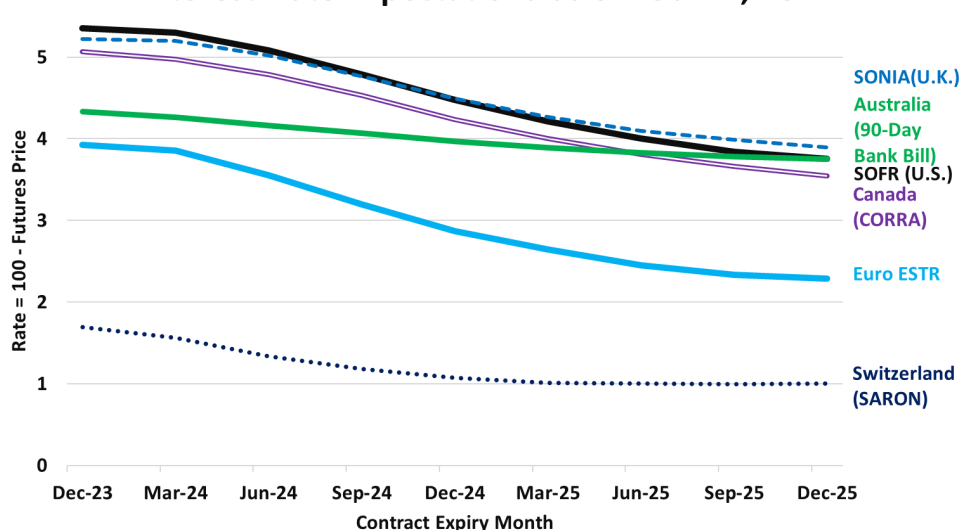
The World Has Been Through the Biggest Policy Tightening Since 1981 and Investors Expect Easing in 2024 and 2025.

Central Bank Policy Rates



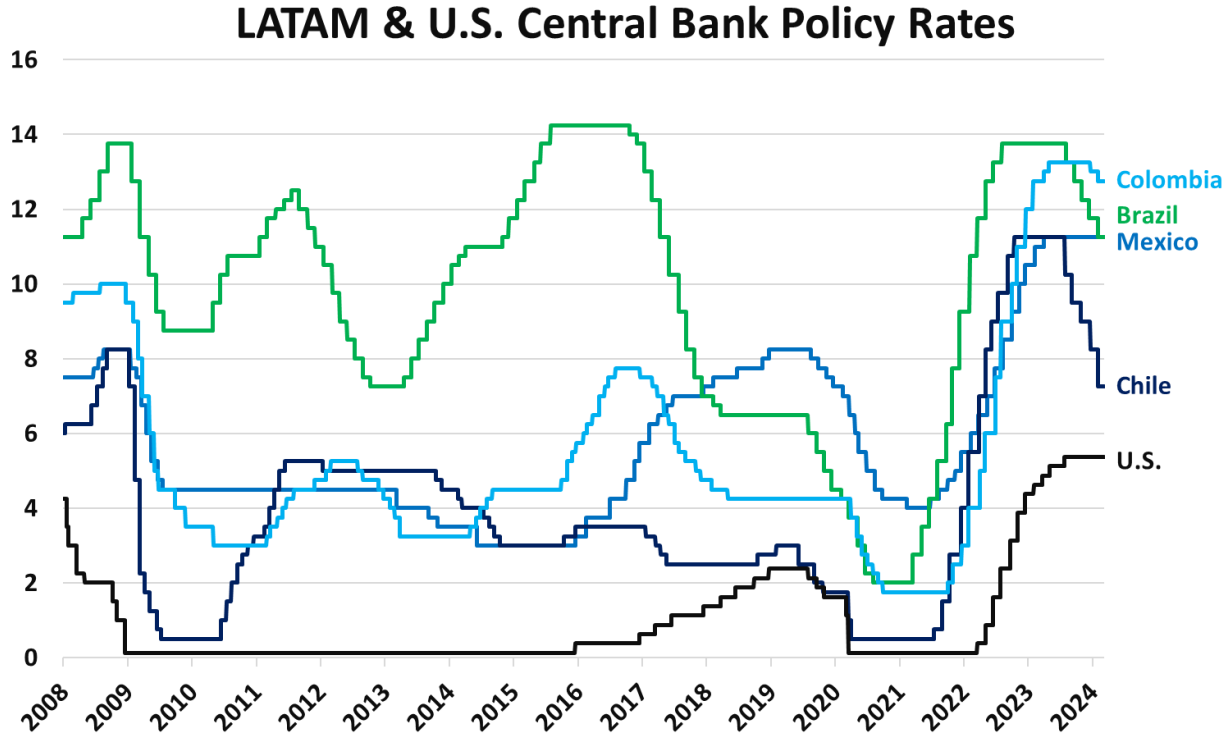
Source: Bloomberg Professional (FDTRMID, CBAROVER, UKBRBASE, EURR002W, BOJDPBAL, RBATCTR, NOBRDEP, SWRATEI, SZLTDEP, SZLTTR, NZOCR)

Interest Rate Expectations as of Feb. 22, 2024



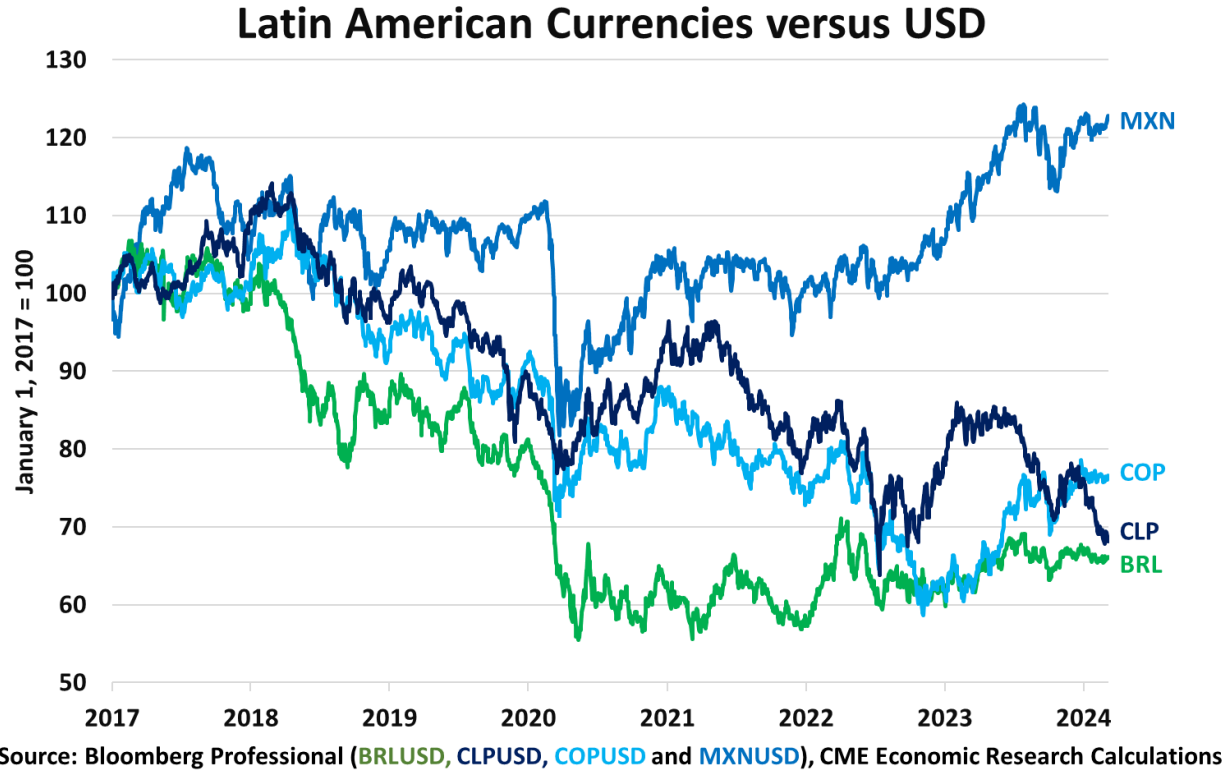
Source: Bloomberg Professional (KTR1 ... KTR9, SFR1 ... SFR9, SF1...SF19, IR1...IR9, SSV1...SSV9, COR1...COR9)

Despite a Reputation as a Left-Wing Populist, AMLO Never Interfered with Mexican Central Bank Independence.



Source: Bloomberg Professional (BZSTSETA, CHOVCHOV, CORRMIN, MXONBR, FDTRMID)

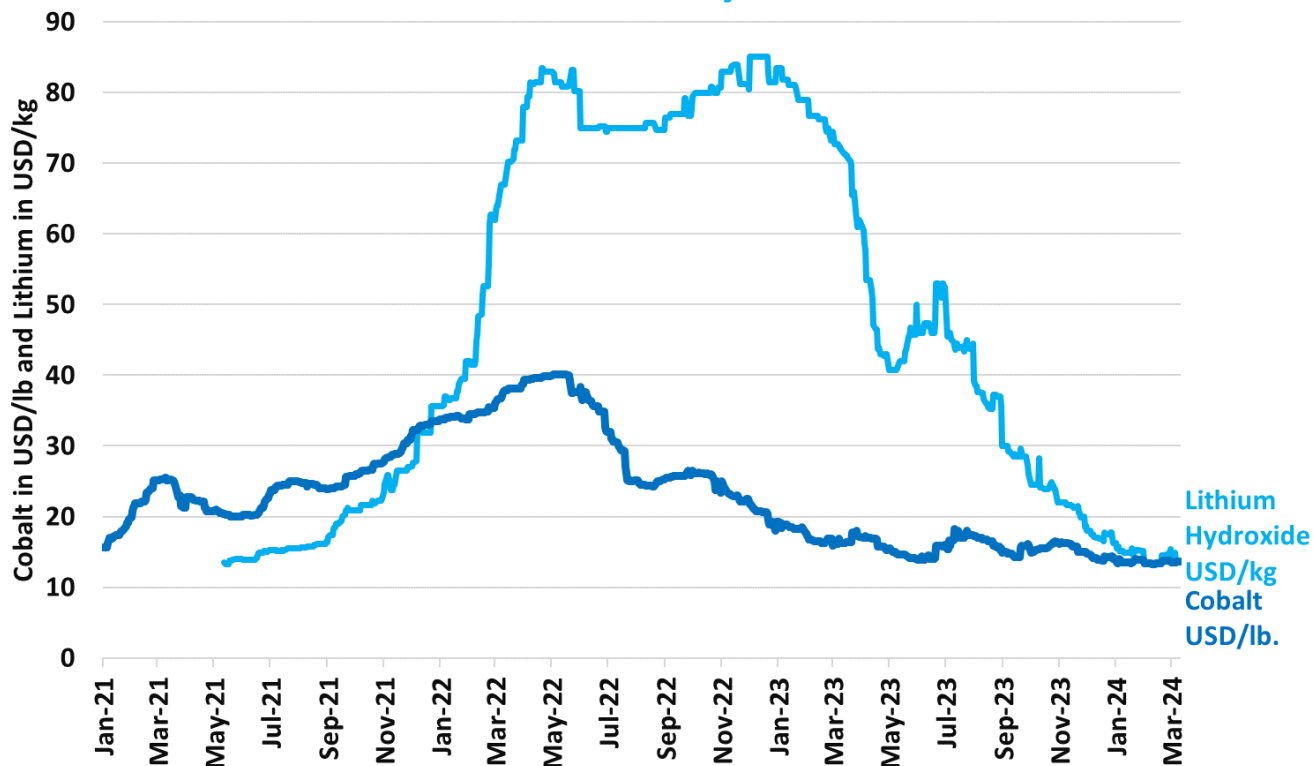
The Mexican Peso Has Benefitted From Strong Investment Flows to Become One of the World's Strongest Currencies.



Copper and The Energy Transition

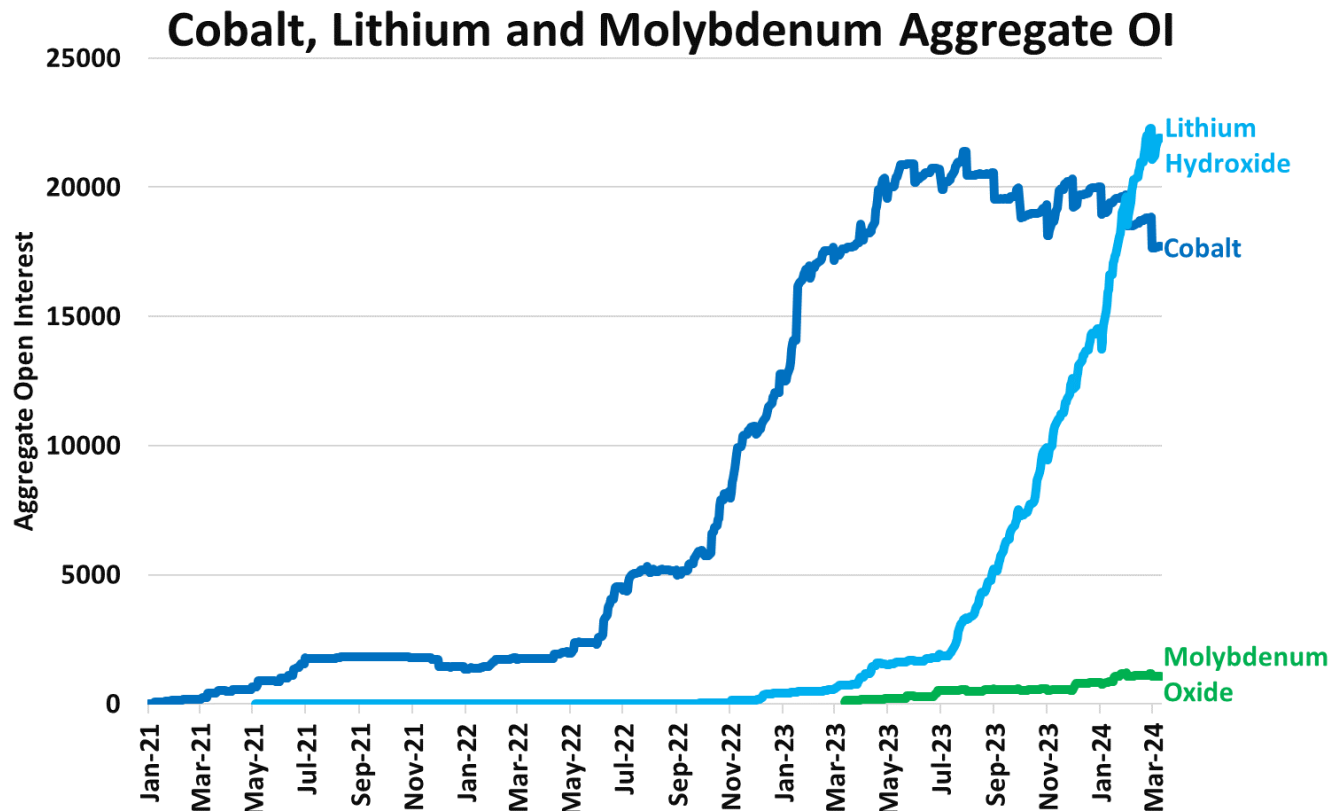
Battery Metals Prices Have Crashed.

Cobalt and Lithium Hydroxide Prices



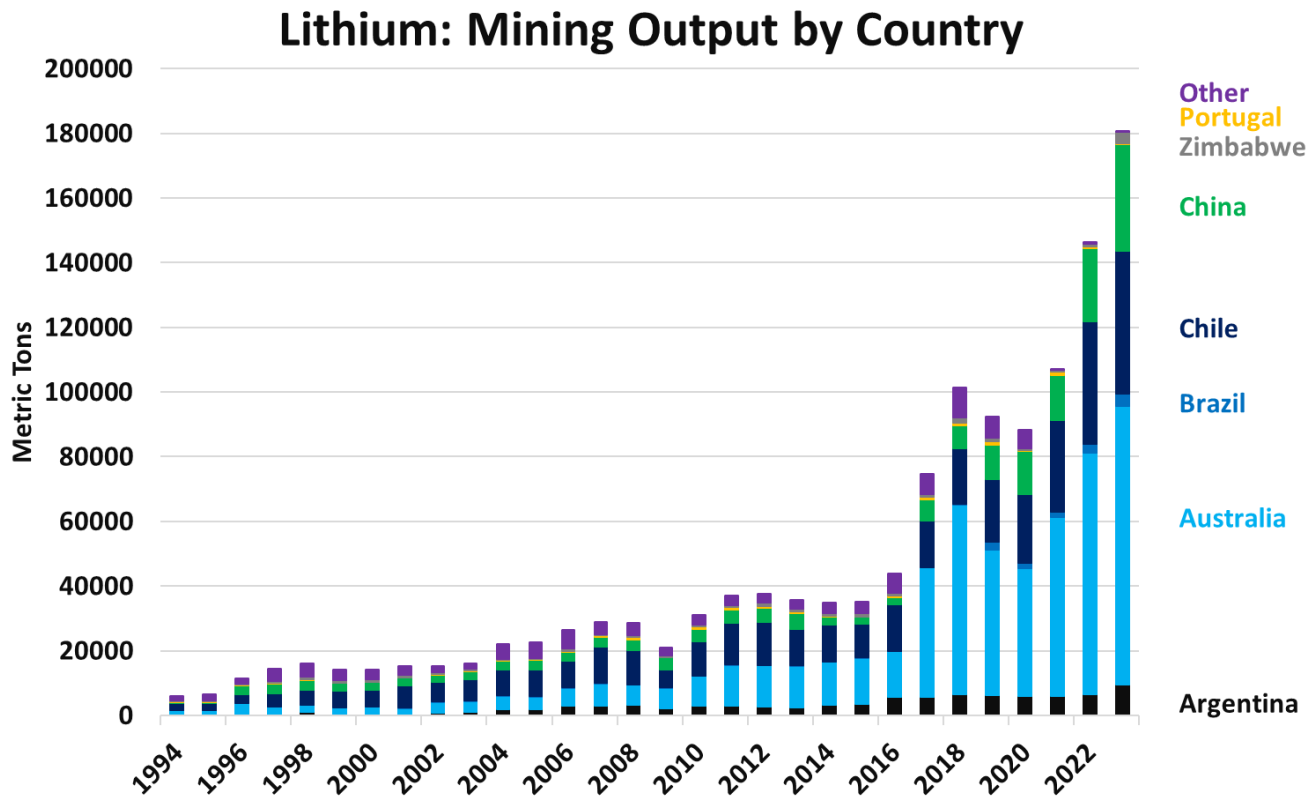
Source: Bloomberg (CVT1 and LFA1)

But Trading Activity Has Surged.



Source: Bloomberg (CVT1 and LFA1)

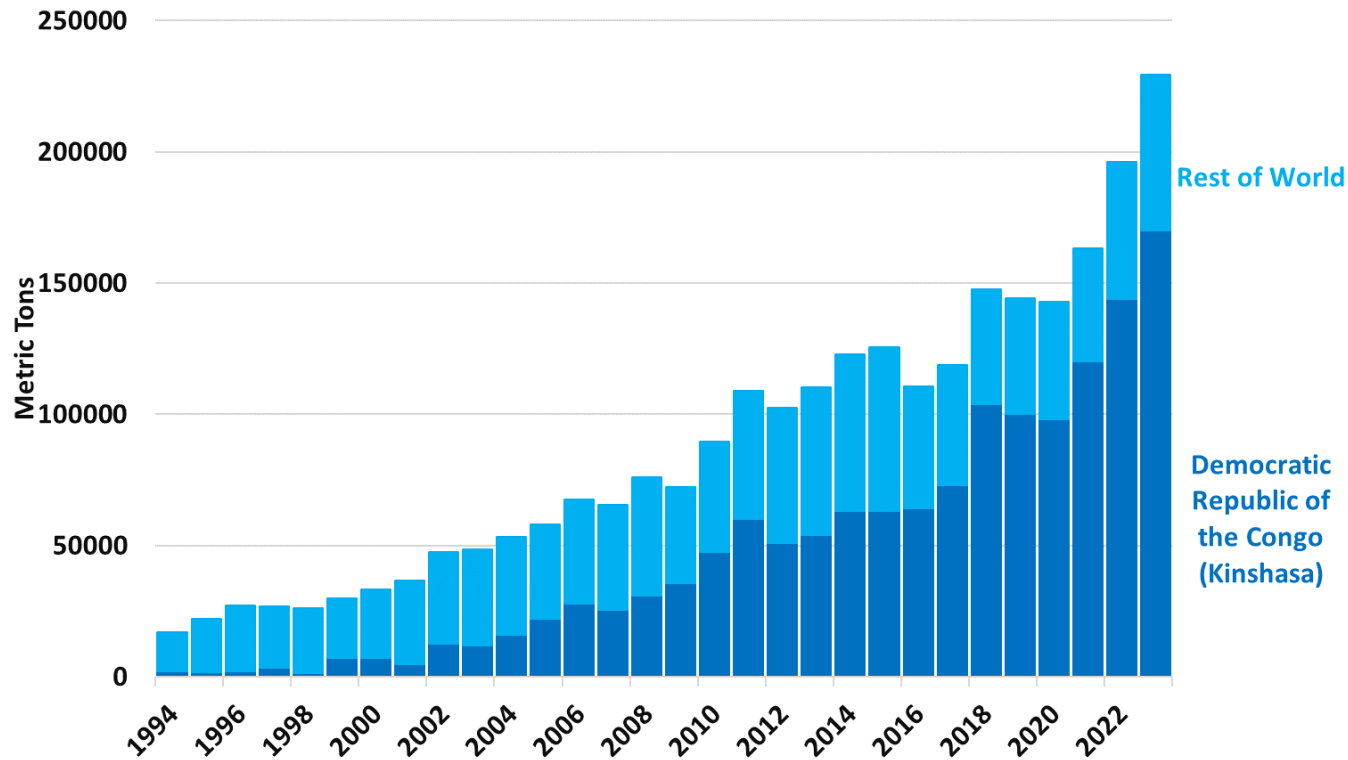
Lithium Mining Output Has Surged.



Source: U.S. Geological Survey, Lithium Statistics and Information, Annual Publications 2005-2023

Lithium Mining Output Has Surged.

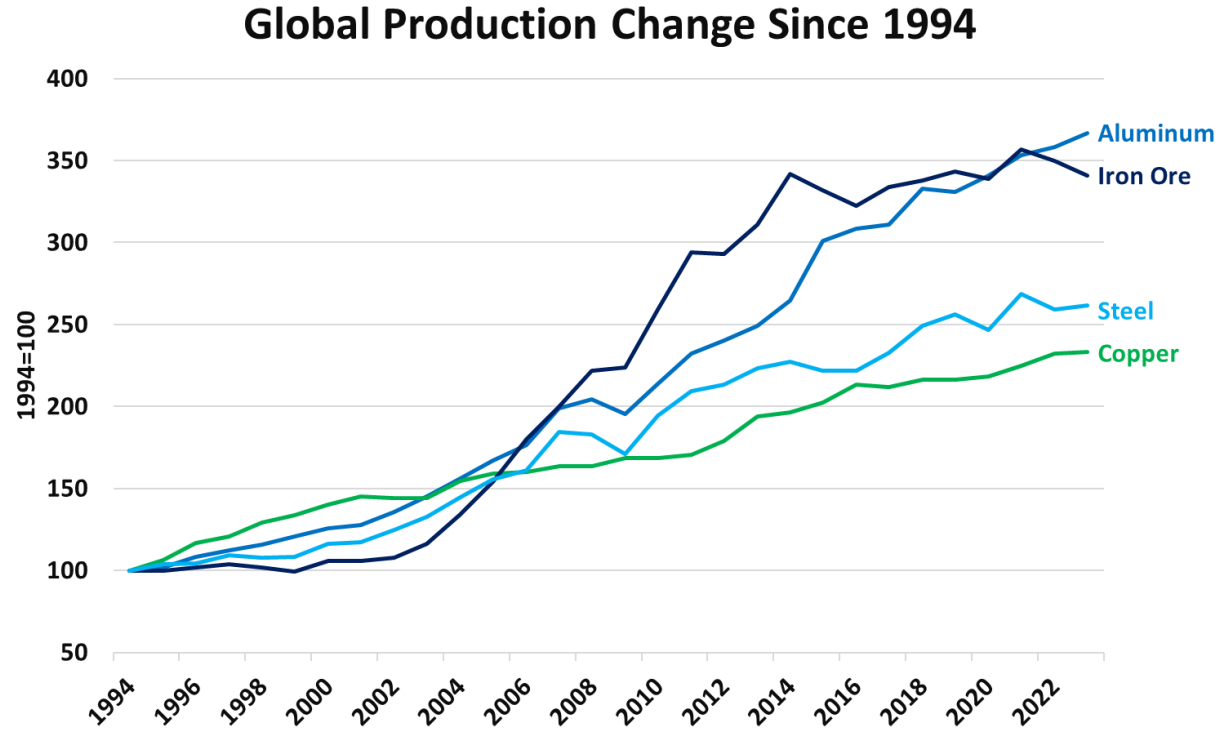
Cobalt: Mine Production



Source: U.S. Geological Survey, Cobalt Statistics and Information, Annual Publications 1994-2021

Copper Supply

Meanwhile Copper Supply Has Grown More Slowly Than Any Other Base or Industrial Metal.



Source: US Geological Survey, National Minerals Information Center, Mineral Commodity Summaries 1994-2020

