Commodities in 2022: Risk Management Lessons from Russia-Ukraine, China, and the Dollar

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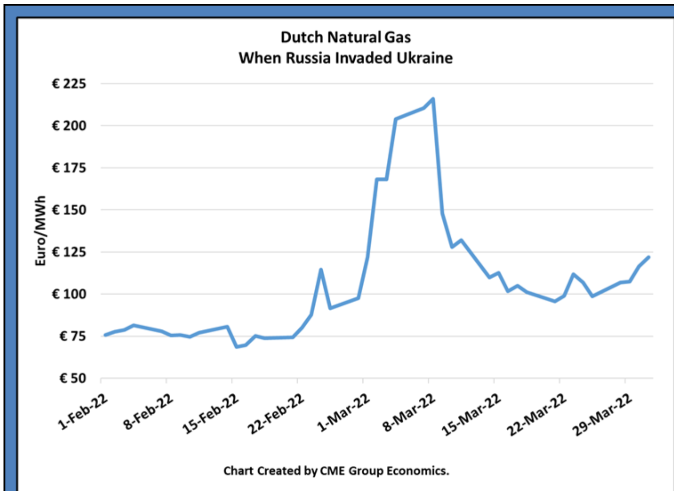
There were three major macro-forces influencing commodities during 2022, overwhelming myriad small factors, and providing a very interesting laboratory from which to draw some important macro-economic lessons about commodity risk management and price determination. The first half of 2022 saw many commodities hit their peak prices for the year due to the supply disruptions caused by the start of Russia-Ukraine War. The latter part of 2022 was a different story as weak economic activity in China and U.S. dollar appreciation created a downdraft for many commodities. Our analysis of commodities in 2022, sets the stage by first concisely identifying the three most significant macro-factors for the year. With the foundation set, we examine a selection of energy, metals, and agricultural products where we highlight both the similarities and the key differences in terms of how each commodity responded to our three major macro-factors. We close with some observations concerning the drivers of commodity super-cycles and the difficulties of risk management when uncertainty is elevated and risk is hard to quantify.

Macro-Factors

Russia-Ukraine War Supply Disruptions

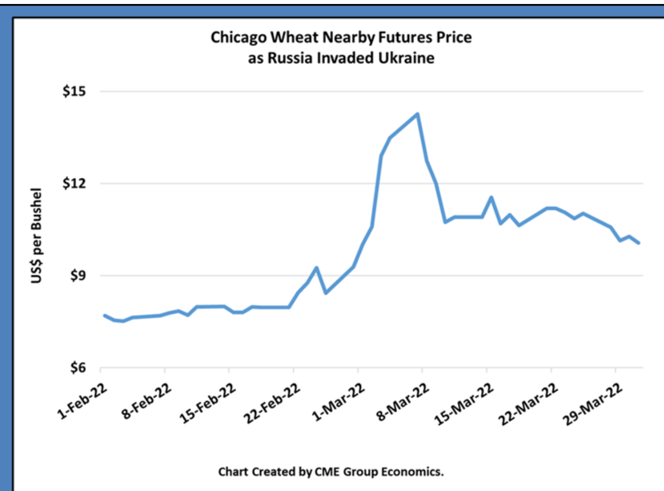
On February 24, 2022, Russia invaded Ukraine. Energy, metals, and agricultural markets were all affected to varying degrees; however, the biggest instantaneous impacts came in European natural gas and global wheat prices. While the Russian Government and many analysts initially expected a quick military victory, Ukrainian opposition was resilient, and Europe and the U.S. came together to provide considerable military assistance and strong economic sanctions on Russia.

Figure 1
Dutch Natural Gas



Source: Bloomberg Professional (TTFG1MON).

Figure 2
Wheat



Source: Bloomberg Professional (W).

As the war progressed, the market impacts of the European and U.S. constraints on Russian oil pushed up the price of oil in the first half of 2022. For its part, Russia curtailed and eventually shutdown the flow of natural gas to Europe. Turkey brokered an arrangement which allowed some Ukraine wheat and agricultural products to be shipped through the Black Sea to clients in the Mediterranean Sea regions, easing pressures on global wheat prices. When we examine the different commodity markets in the second section of this analysis, we will consider the Russia-Ukraine War as igniting severe supply-side disruptions.

China Demand Slowdown

The fast growth of China in the past 50 years has become a miracle in the global economy. Just like the former president Deng Xiaoping said: "White cat, black cat, who catches mouse is a good cat," China benefited a lot from its reform and opening policy. For the 1980s, 1990s, and first decade of the 2000s, the GDP growth rate of China averaged just fractionally above 10%, slowing only to just under 7% in the 2010s. But the most recent GDP data raises the concern of a slowing of the Chinese economy.

For the second quarter of 2022, China's real GDP was only 0.4% above the same period a year ago, making it the second lowest in 30 years. While the obvious reason was the reduced economic activities owing to the Covid-Zero policy, there were other critical short and long-run challenges as well.

For 2022, as many countries transitioned into a post-Covid reality, China remained in a Covid-Zero mode. The nationwide lockdowns and mandatory Covid tests slowed down factories' production and paused people's entertainment. In particular, the month-long lockdown of Shanghai early in 2022 stressed the global supply chain and reduced China's exports. U.S. and European countries, on the contrary, gradually moved into post-Covid activity patterns, which meant that the elevated demand of goods over the past two years because of COVID restrictions on dining, traveling and other entertainment decreased.

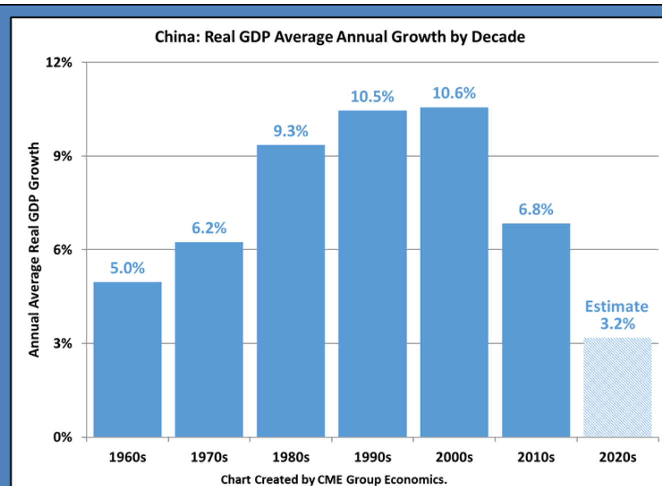
Besides the export challenge, the property debt burden remains a large drag on the Chinese economy. In 2022, many property owners began boycotting against real estate developers because of the long-lasting problem of unfinished buildings. While the owners have been paying loans, developers have been slowing and stopping their construction as a result of lacking necessary funds.

For the long-term, one challenge for the Chinese economy is the diminishing return problem. The primary monetary policy tool to stimulate the growth in China is to push new loans to the economy. Companies can benefit a lot from these loans, especially at early stages and during fast expansion. This tool worked extremely well in the infrastructure building period in the 1990s and into the early 2000s. But as the economy gets more industrialized, it does not produce as much growth as it once did. This is a common problem that happened to many economies in the past when transitioning from a manufacturing or export model to a more mature service economy model.

Figure 3
China Real GDP Quarterly

Source: Bloomberg Professional (CNGDPYOY).

Figure 4
China Real GDP by the Decades



Source: World Bank Real GDP Index from the Bloomberg Professional (WRGDCHIN). Estimates by CME Economics.

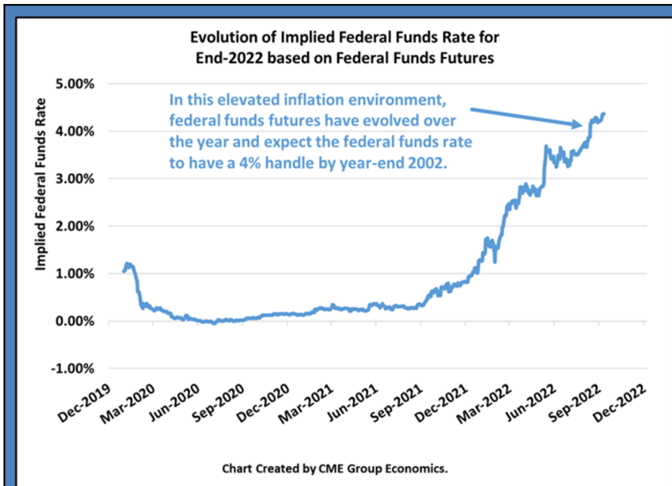
Another realistic challenge for the long term is demographics. The birth rate in China has gone down, although the stimulus from the two-child and the most recent three-child policy may incrementally raise the fertility in the future. Even so, the U.N. has predicted India will surpass China to become the most populated country in 2023 or 2024. In terms of growth implications, we observe that real GDP growth can be arithmetically decomposed into two parts: the growth of labor force and the growth of labor productivity. We note that the effort of transforming labor-intensity industry to knowledge/technology-intensity industry can incrementally help with the labor productivity.

In general, there are two ways to boost the labor force: increase total population or relocate unemployed people from rural to urban areas. The second approach reveals why China grew fast in the past decades albeit the one-child policy. In the 2020s, China's overall population is no longer growing, while the over-60 cohort is rapidly increasing its share of the total. (The official retirement age in China is 60/55 for male and 55/50 for female). What is more, the powerful rural-urban migration has also slowed down. With these factors, later in the 2020s, we might see much lower average real GDP growth comparing to the "golden age." That is, the lack of labor force growth and the headwinds of an aging population are likely to reduce China's economic growth in the 2020s to be more similar, if slightly higher, than mature western economies.

U.S. Dollar Strength

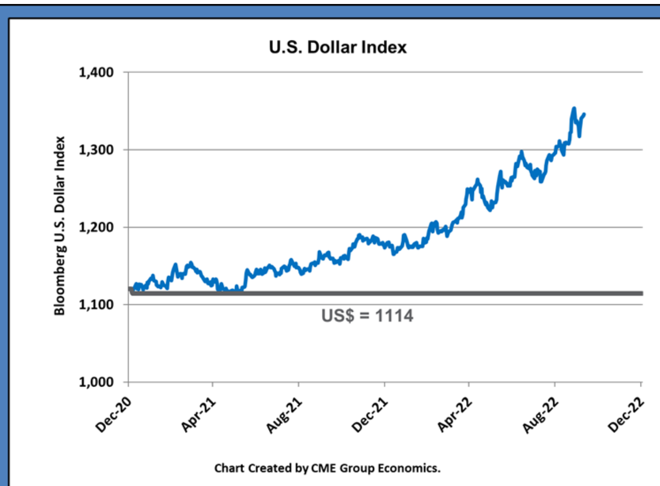
As U.S. inflation began moving higher in 2021, the policymakers' mantra was that the inflation was transitory and primarily related to supply-chain disruptions that would eventually be resolved. With inflation continuing to surge in 2022, the transitory debate was shelved in favor of a realization that the massive fiscal stimulus to support personal consumption during the worst of the pandemic job losses coupled with the financing of the fiscal stimulus through the Fed's asset purchases, created a demand-driven inflationary impulse on top of serious supply-chain challenges.

Figure 5
Federal Reserve Raises Rates



Source: Bloomberg Professional (FFF3).

Figure 6
U.S. Dollar



Source: Bloomberg Professional (BBDXY).

In early 2022, the Federal Reserve began to aggressively withdraw the considerable accommodation provided during the height of the pandemic. Not only did the Fed commence raising rates, but the Fed by June 2022 began reversing quantitative easing and shrinking its balance sheet as well. This withdrawal of accommodation put the Fed well ahead of fighting inflation compared to the European Central Bank (ECB) and the Bank of Japan (BoJ). The ECB did not even exit its negative rate policy until the summer of 2022. And the BoJ continued its zero-rate as well as its yield curve control policy through 2022. The yield curve control policy put a very low ceiling on the Japanese 10-Year Government Bond yields, in contrast to significant yield increases in U.S. Treasuries. The overall result was a persistently rising trend for the U.S. dollar again the euro, Japanese yen, and many other currencies, as reflected in the Bloomberg U.S. dollar index. Commodities are priced in U.S. dollars, so for 2022 the strong rising trend for the U.S. dollar was a serious demand-constraining headwind for commodities.

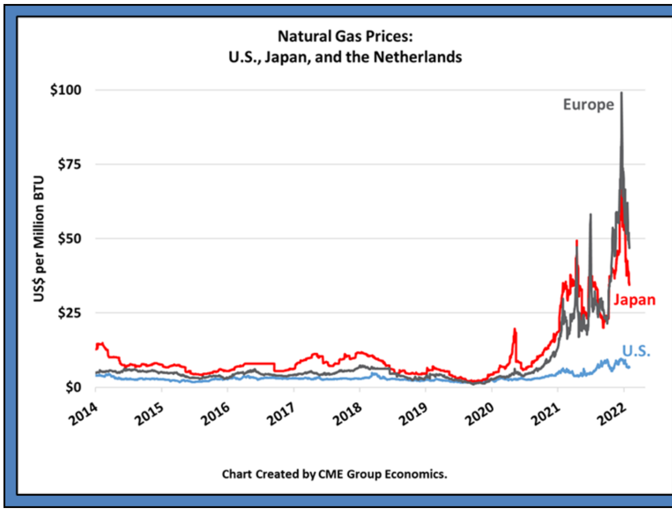
Commodity Analysis

Energy

For energy, the year 2022 was the story of two products – natural gas and crude oil.

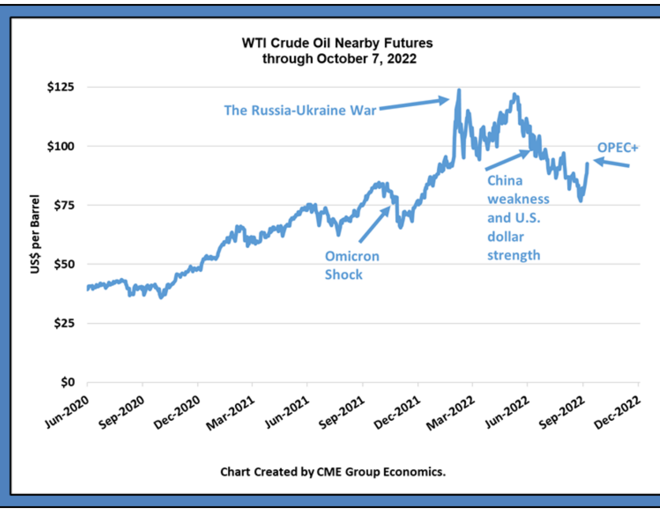
Natural gas prices had been increasing in Europe in 2021, reflecting reduced supply and increasing demand for natural gas to fuel electricity generation, as the continent reduced coal and uranium-powered electrical generation facilities. When Russia invaded Ukraine, it was clear that natural gas from Russia would be constrained, and eventually in 2022, shipments from Russia were cut to zero. To manage the loss of Russian natural gas, Europe imported more from the U.S. and from the Middle East. The ability of the U.S. to expand liquefied natural gas (LNG) to Europe, however, was severely constrained by infrastructure limitations. Qatar in the Middle East has been expanding its natural gas production capabilities, but much of the expansion is in the future and much of the current production was locked up in long-term contracts. Of course, in some case, the owners of the long-term contracts were able to re-sell and re-direct shipments to Europe. By September of 2022, it had become obvious that while Europe had done a much better job of building natural gas inventories in preparation for the winter heating season than many had anticipated, supply challenges would remain for a considerable time to come.

Figure 7
Natural Gas



Source: Bloomberg Professional (NG1, TTFG1MON, JKL1).

Figure 8
WTI Crude Oil



Source: Bloomberg Professional (CL1).

Crude oil had a strikingly different and more complex dynamic. The European Union, the U.K., and the U.S. moved immediately during the early stages of the war to aggressively impose economic sanctions on Russia, many of which were aimed at reducing Russia's oil revenues by constraining oil delivery to Europe. WTI crude's price peaked at $122/barrel on June 8, 2022, rising from the high $80s/barrel territory in January 2022. The peak price in June 2022 was approximately associated with market participants realizing that the point of current and future maximum oil sanctions had been reached.

The next developments in the oil price were driven by how the sanctions impacted the global flow of oil at the same time as demand challenges from China's economic deceleration and the broad-based appreciation of the U.S. dollar were having their effect. China and India began to import much larger quantities of crude oil from Russia at steep price discounts from 20% to 30%. The price competition from Russia as it sold more crude oil into the Chinese and Indian markets put downward pressure on global oil from the U.S. and Middle East. In Europe, the natural gas supply disruption worked to increase the demand for heating oil, which could be used to generate electricity. And in the U.S., export shipments of refined product increased.

As the sanctions were altering the market, so were the deteriorating economics in China and the impact from the strong dollar. China's Covid-Zero policy approach dramatically curtailed travel around the country, lowering demand for crude oil and refined products. On a global scale, with commodities priced in U.S. dollars, the strength of the currency worked to curtail demand, putting further downward pressure on oil prices. Early October 2022 saw OPEC+ vow to cut production to stem the slide in oil prices.

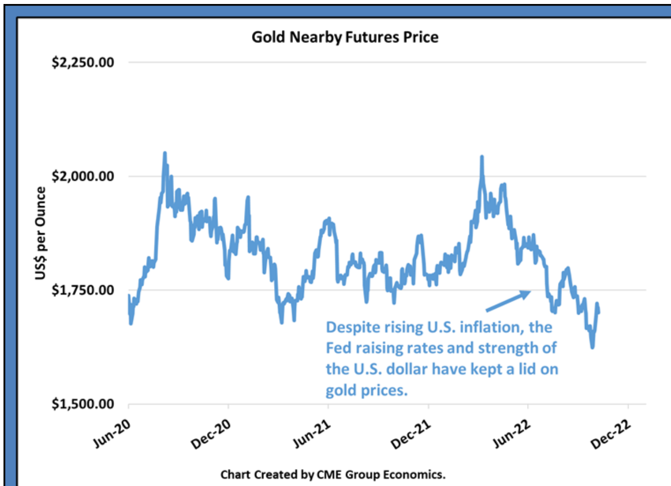
Metals

The narrative for gold in 2022 was not so much influenced by the Russia-Ukraine War, and only a little by the slowing economic conditions in China which dampened jewelry demand. For 2022, gold priced danced to the tune set by the appreciating U.S. dollar, driven by the Fed's withdrawal of accommodation, involving raising rates and shrinking its balance sheet.

Two features were in play. First, gold bears no interest, so gold as a store of value is disadvantaged to U.S. dollar cash when rates are rising.

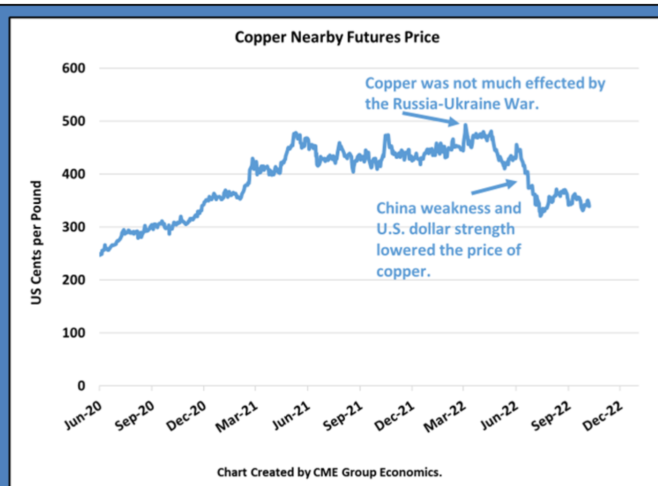
Second, and less well understood, is that gold is not so much a hedge against inflation as is commonly thought, as gold is a hedge against a depreciating U.S. dollar. The confusion stems from the 1970s, when the U.S. dollar was extremely weak coming off the breakdown of the Bretton Woods dollar standard of fixed exchange rates to the U.S. dollar, coupled with a decade of high and rising inflation. The inflation occurred in many countries around the world, not just the U.S., and from our perspective gold was not rising in price in the 1970s due to global inflation as it was serving as a hedge against a decade long slide in the value of U.S. dollar in which gold is priced.

Figure 9
Gold



Source: Bloomberg Professional (GC).

Figure 10
Copper



Source: Bloomberg Professional (HG).

Industrial metals, such as copper and aluminum were impacted jointly by the U.S. dollar strength and China economic weakness. For many commodities involved in country-wide infrastructure projects, China is the largest importer in the world. Weak economic demand from China in the second half of 2022, coupled with the strong U.S. dollar, hit many industrial metals very hard.

Agriculture

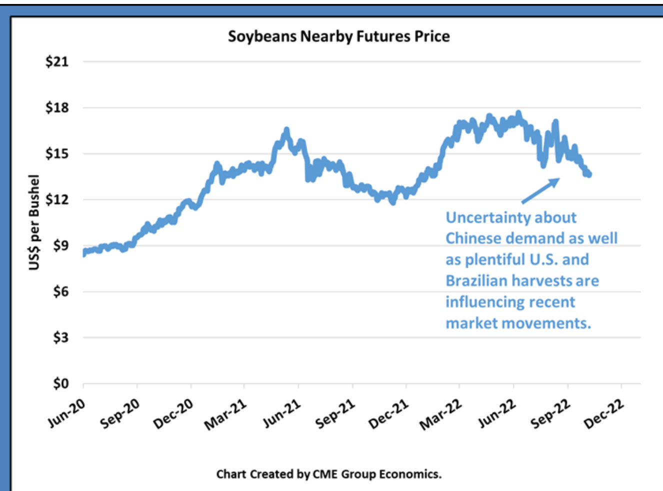
Wheat is grown in many countries all over the world, but Russia and Ukraine are major exporters. No surprise then that the Russia-Ukraine War hit wheat with a seismic surge. Wheat prices saw a decline once Turkey brokered a deal whereby Ukrainian wheat could be shipped through the Black Sea to European and African clients along the Mediterranean Sea.

Other agricultural products saw a steady lift for prices as the war started and these products substituted for wheat as a source of protein. The U.S. dollar's appreciation also took its toll on some agricultural products, but weather and the prospects for better-than-expected harvests in Brazil for corn and soybeans had an impact as well.

Figure 11
Wheat

Source: Bloomberg Professional (W).

Figure 12
Soybeans



Source: Bloomberg Professional (S).

Risk Management Lessons

Thoughts on the Next Commodity Super-Cycle

The last two major commodity super-cycles were the 1970s and the early 2000s. The 1970s was a decade both of inflation and a weak U.S. dollar. Elevated inflation occurred in many countries. Our interpretation is that the decade-long depreciation of the U.S. dollar was the primary driver. Given that commodities are priced in U.S. dollars, they can serve as an effective hedge. The early 2000s super-cycle was led by China's extraordinary double-digit growth as it invested heavily in infrastructure. What is of note, at least for 2022, was that both of these factors, the U.S. dollar and China, were headwinds for commodities, and not tailwinds. Any future commodity super-cycle will need a powerful driver, perhaps climate-change, perhaps India or other emerging market countries: only time will tell.

Risk vs. Uncertainty

The heighted volatility that the three major features of 2022 set in motion – the Russia-Ukraine War, China weakness, U.S. dollar strength – was reflected in a change in the nature of the way volatility was experienced. Volatility is typically measured as the day-to-day standard deviation of the percentage change in prices; that is, daily returns. As the three major factors collided in the markets, there were more days than previously with exceptionally wide intra-day price swings; that is, wider swings than would have typically been associated even with the elevated daily standard deviations. Also, there were an elevated number of large price gap days where the price made an abrupt, sharp move up or down, again in greater numbers than would have been suggested by the elevated daily standard deviations.

We interpret the changed nature of volatility using the classic distinction Professor Frank Knight (1885-1972) made back in the 1920s in his book, "Risk, Uncertainty, and Profit" (1921). In economics, "Knightian uncertainty" is risk that is extremely difficult to quantify while typical volatility is a risk around which we can utilize metrics, such as the standard deviation, among others. With a heightened sense of uncertainty during the year 2022, the changing nature of risk and volatility made sense, even if it also made risk management more difficult. Just because measuring something is difficult does not mean that one can avoid attempting to manage the risk.

Endnotes

Dr. Putnam is a regular contributor to the *GCARD*'s Economist's Edge section.

All examples in this report are hypothetical interpretations of situations and are used for explanation purposes only. The views in this report reflect solely those of the authors and not necessarily those of CME Group or its affiliated institutions. This report and the information herein should not be considered investment advice or the results of actual market experience.

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Dr. Bluford Putnam is Managing Director and Chief Economist of CME Group. As Chief Economist, Dr. Putnam is responsible for leading the economic analysis on global financial markets by identifying emerging trends, evaluating economic factors and forecasting their impact on CME Group and the company's business strategy. He also serves as CME Group's spokesperson on global economic conditions and manages external research initiatives.

Prior to joining CME Group, Dr. Putnam gained experience in the financial services industry with concentrations in central banking, investment research and portfolio management. He also has served as President of CDC Investment Management Corporation and was Managing Director and Chief Investment Officer for Equities and Asset Allocation at the Bankers Trust Company in New York. His background also includes economist positions with Kleinwort Benson, Ltd., Morgan Stanley & Company, Chase Manhattan Bank and the Federal Reserve Bank of New York. Dr. Putnam holds a Bachelor's degree from Florida Presbyterian College (later renamed Eckerd College) and a Ph.D. in Economics from Tulane University.

Dr. Putnam has authored five books on international finance, as well as many articles that have been published in academic journals, including the *American Economic Review*, *Journal of Finance*, and *Review of Financial Economics* among others. His latest book, Economics Gone Astray, is available from World Scientific (WS) Professional.

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Arthur Yu is a manager of Data Science in the Economics Department of the CME Group. He has a Master's in Analytics from the University of Chicago and is currently enrolled in the Master's in Computer and Information Technology program at the University of Pennsylvania.

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He is the champion of China's most famous Trivia Show, "Who is Still Standing?" in 2018 representing the University of Chicago.