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4Q2021 Review

"The markets look a lot less efficient from the banks of the Hudson than they do from the banks of the Charles."

- Fischer Black

"How about from the banks of the Potomac?"

- Blake Anderson, Mesirow Capital Markets and Investment Banking

Fischer Black, having made the journey between two distinct worlds, from MIT to Goldman Sachs, neatly summed up the difference between economic forecast models and the cold reality of hard market data.

Just before 8:30 EST on the morning of December 3, 2021, 75 eminent economists polled by Bloomberg looked closely at their data screens as they waited anxiously for the Bureau of Labor Statistics ("BLS") release of change in US non-farm payroll data. Most of them had been speaking and writing with confidence about their forecasts for the prior week, while their teams continually updated and massaged their econometric models. The lowest forecast in the group was + 375,000 jobs. The highest was + 800,000.

At 8:30, the BLS posted + 210,000 and sent treasury bond yields temporarily soaring. That Friday morning was a very bad day to be an eminent and highly compensated Wall Street economist.

The most accurate forecast (the lowest) was off by 2.3 standard deviations. The highest was off by 8.3 standard deviations. Like weathermen and political pollsters, most of them will keep their jobs, as perhaps they should. The Fed imposed an extraordinary increase in the degree of uncertainty on forecasters and traders by their opacity, the inevitable consequence of their move to a subjective interest rate standard; how could we expect otherwise?

After all, on August 27, 2020, The Federal Reserve Board made the job of economic forecasting infinitely harder when they decoupled their rate actions from the prior "clear" two percent target and gave themselves license to impose their judgment upon the data.



S&P 500

QTD: 11.02%; YTD: 28.68%

T 10 returns

QTD: 0.30%; YTD: -3.51%

Muni AAA Index

QTD: 1.91%; YTD: 2.00%

US\$ Index

QTD: 1.53%; YTD: 6.37%

FED Balance sheet¹

\$8,757,460MM

"In order to anchor longer-term inflation expectations at this level, the Committee seeks to achieve inflation that averages 2 percent over time, and therefore judges that, following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time."

 Board of Governors of the Federal Reserve System's Statement on Longer-Run Goals and Monetary Policy Strategy, as amended effective August 27, 2020²

In the absence of clarity, now that they are subjectively decoupled from inflation data, investors have been trying to see through the fog and divine the Federal Reserve Board's next move as inflation data grows warmer. In their blindness, traders cry, "you can't fight the Fed" and cling to a risk-on momentum trade on rates, as fiscal stimulus and quantitative easing swell the Fed balance sheet.

Throughout December 2021, capital markets traders have absorbed employment and inflation data that would have outright panicked the "bond vigilantes" a generation ago. Through it all, traders have been quieted by the dulcet tones of Fed Chairman Powell as he whispered the magic word over and over: "transitory." Once the Chairman's re-appointment was formally announced by the White House on November 22nd, he coyly shed his dove costume and renounced the magic word eight days later in congressional testimony, saying that this word "transitory" should be "retired." To be clear, we believe the Fed is more anxious to retire the word than its Chairman.

In effect, Powell left the markets to consider two questions: 1) how to understand scorching hot 6+% inflationary data and infer his next rate move without the aid of magic words or clear signals derived from data and 2) how to comprehend efficient market theory as understood on the banks of the Potomac.

Regular readers of our Capital Markets Brief will know that we generally begin and end our discussion of market conditions with the questions of **balance**.

- Are markets pricing risk and reward fairly?
- Are policy makers' responses to market conditions balanced and proportionate?

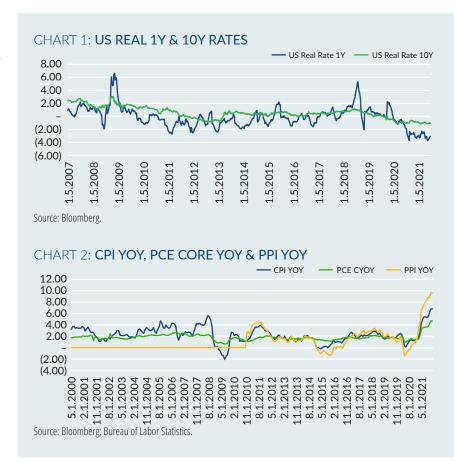
We believe that Chart 1 clearly describes a rates market out of sustainable balance as real interest rates move further into record negative territory³, currently at -306 bp.

We have been calling out the risks associated with the central bank-driven global liquidity bubble for many months. As of December 22nd, the Fed Balance Sheet has swollen to \$8.757 trillion⁴.

We will review more asset inflation data below. But, simply put, record negative rates on this scale are likely not sustainable. Currency traders, equity short-sellers, arbs, commodity speculators or bond vigilantes risen from the dead will eventually take the other side of a rates market wherein the vast majority of government debt instruments are priced to a deeply negative cost of carry.

At current levels, inflation is the primary driver of negative real rates, although low absolute rates and a flat yield curve compound the effect.

Although our Capital Markets Brief is focused on 4Q2021, the first two trading days of 2022 suggest that our concerns about the potential for increased volatility in the context of a rising steepener are justified. As we publish this piece, the T10 is pushing toward 170bp and the T30 has risen nearly 20bp in 1.5 days of New Year trading.



The latest CPI post at 6.8%⁵ YOY and PPI at 9.6%⁵ (7.7% ex food and energy) would awaken any bond bear under normal conditions as Chart 2 illustrates. Do experienced traders believe that this hot PPI number will not wash through the supply chain and push through future CPI data?

Now that we have dispensed with the term "transitory" to describe hot inflation, perhaps we can tune out the market gurus who advise investors to "look past" difficult data. Investors should stay grounded in fact and manage risk/reward decisions with balanced professional care.

Central banks across the developed world have coordinated the creation of this asset bubble, but on December 16th, central bankers appeared to cease coordinating their effort to manage the deflation of it. In an apparent decoupling, the Bank of England ("BoE") tightened 25bp, while the European Central Bank ("ECB") sent a strong signal that they would be standing pat and maintaining their dovish policies; both in response to the US Fed's Solomonic message of the day before.

Chart 3 below confirms that the US Federal Reserve has been an enthusiastic cheerleader for the easy money policy regime. Just look at M2 and the current Fed balance sheet as illustrated in Chart 4 at \$8.75T.

CHART 3: US FUNDING RATES (%) & M2 (BN)

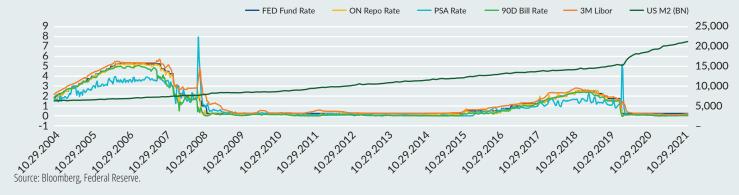
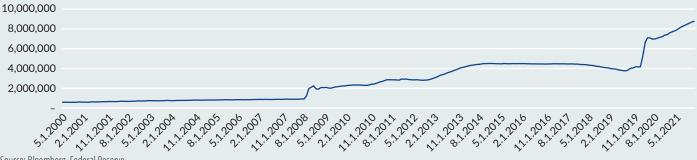


CHART 4: FED BALANCE SHEET (MM)



Source: Bloomberg, Federal Reserve.

Perhaps our country's unhappy status as the world's largest debtor nation (the US was the world's largest creditor as recently as 1982) is a rationale for depressing the borrowing cost of dollar denominated money to historically low levels. If Fed Governors believe they are doing US taxpayers a favor, perhaps they should revisit their first two critical duties, as published on the St. Louis Fed website:

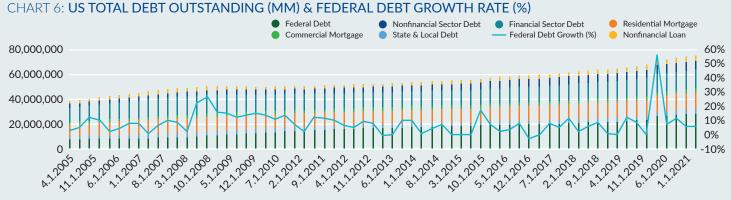
Mission

The Federal Reserve promotes a healthy economy and financial stability. We do this by:

- Pursuing maximum employment, **stable** prices, and moderate long-term interest rates in the U.S. economy
- Promoting the **stability** of the financial system and **seeking to minimize and contain systemic risks** through active monitoring and engagement

CHART 5: US FEDERAL DEBT / GDP (L) & ANNUAL DEBT GROWTH RATE (R)





Source: Federal Reserve.

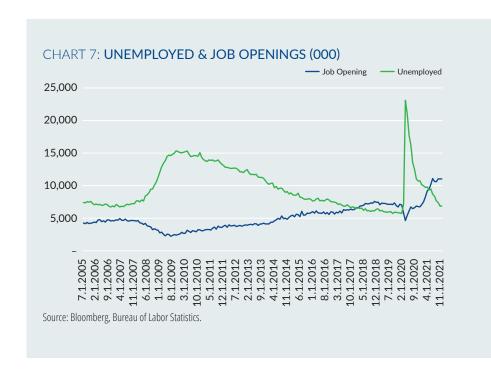
The profligate expansion of liquidity and credit during the last three market crises has driven US Federal Debt to levels not seen since World War II. However, unlike the resulting post-war Pax-Americana, this debt burden has NOT bought the US global economic hegemony. Since 1986, US fiscal indiscipline has made the United States the debtor to the world and more beholden to our global economic (and military) competitors than we care to acknowledge.

The employment gap, 11,000,000 unfilled jobs (Chart 7), has affected every facet of American life during 2021. Every service consumer has felt it, in restaurant waits, hotel service declines, home goods backorders and especially in the hiring of skilled tradesmen for any kind of construction or repair project.

In past Capital Market Briefs, we have reviewed factors including: the education driven jobs/skill mismatch; government disincentives to work; the aging of the "skilled" blue-collar workforce (truckers, iron workers, masons, electricians, etc.).

These labor disruptions materially affect the US economy and will undoubtedly apply inflationary pressure on the labor market.

But, in addition, consider systemic distortions wrought by COVID-19. Women are returning to the workforce at a much slower rate than men. Baby boomers are choosing retirement over work in increasing numbers. Will these groups change



consumption patterns to match their drop-out from the work force? There are approximately 5,000,000 fewer previously employed workers who have withdrawn from the working economy. So, while nominal unemployment is low at 4.2%, the US economy will require a substantial gain in labor productivity or face continuing upward pressure on wages to maintain economic output.

During the pandemic, consumption has measurably shifted towards goods from services (Chart 8). By November 30, 2021, the percentage of consumer spending on goods had reached 34.95%, up from 30.9% at December 31, 2019. This is an enormous shift in a \$23 trillion dollar economy. Is this a temporary phenomenon? Or are consumer products markets going to face a fundamental economic dislocation as potent as Amazon's disruption of retail?

Are labor and service markets undergoing a fundamental change? If the employment gap is now an embedded systemic (partial) effect of COVID-19, it is difficult not to see this as inflationary.

CHART 8: CONSUMER SPENDING IN GOODS & SERVICES (%)



CHART 9: REAL WEEKLY EARNINGS (AVERAGE OF 82-84=100)



Source: Bloomberg, Bureau of Labor Statistics.



Chart 9 describing the decline in real weekly earnings since December 31, 2020 bears watching, especially by politicians. Real wages are falling in the face of inflation. Workers are feeling this at the grocery store and the gas pump. How much do wages need to increase to reverse this trend? Is there a forecastable productivity boost on the horizon to soften the inflationary impact of the inevitable labor market response?

Two other potential macro-economic shifts require consideration.

Beyond the most obvious sectors, computer chips and pharmaceuticals, some redomestication of the global supply chain for goods looks both probable and necessary; this will likely be inflationary on the margin.

Another broad trend we will continue to review for signs of acceleration is regional migration; call it what you will: north to south, blue state to red state, or snowbelt to sunbelt. Embedded within this migratory trend is an implied bias toward suburbanization versus center-city living. The data signals on this in Charts 10 and 11 are early, but they imply serious potential impacts on capital flows, employment, economic growth, state and local government fiscal condition and, ultimately, political capital migration as well.

Chart 12, which graphs the Fed "dots," looked different after the December 15th Governor's meeting than it did in our 3Q2021 Capital Markets Brief. The Fed Governors, having observed the economy's response to both fiscal and monetary over-stimulus, have belatedly begun to move. The "taper" will happen sooner and more aggressively (\$30M p/m), though we note that effectively this will constitute **net additional quantitative easing** and an expanding Federal Reserve balance sheet through March of 2022.

Additionally, the Governors are signaling three tightening moves next year.

While these are moves in the right direction, the US Federal Reserve has not managed a "hot" inflation market since the 1980s, and it has not ever attempted to apply the required policy management tools in the context of a global "cloud economy," much less in the midst of a pandemic.

The Fed has created a remarkably difficult challenge for itself: deflate a global liquidity bubble and stabilize price and labor markets while prices are soaring and unemployment is at 4.2%.

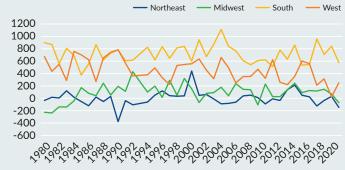
Obviously, this understates the Fed's remarkably difficult task. We will follow and report on their progress as if our future security depends on it, because it really does.

CHART 10: **NET MIGRATION OUT OF CITIES INTO SUBURBS ('000)**



Source: US Census Bureau.

CHART 11: MIGRATION BETWEEN REGIONS



Source: US Census Bureau.

CHART 12: IMPLIED FED FUNDS TARGET RATE

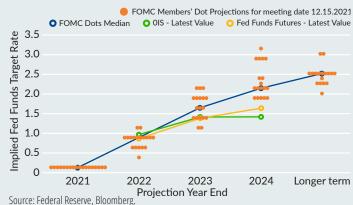


CHART 13: US TREASURY ACTIVES CURVE

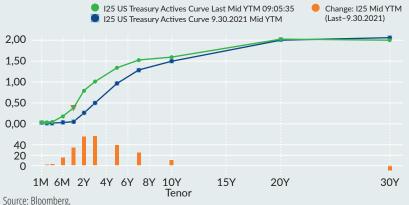
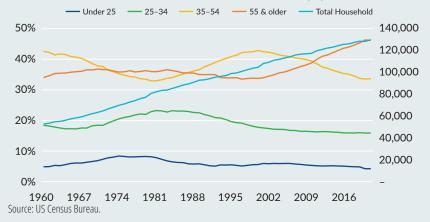
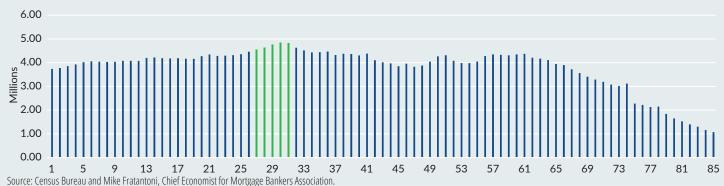


CHART 14: TOTAL HOUSEHOLD & AGE GROUPS (%)



As the Treasury yield curves (Chart 13) describe, the curve flattened over 4Q2021 as the markets attempted to manage the mixed signals coming from central banks (recognizing that the curve steepened YTD by 40bp at the 30 year tenor). We have discussed the US Federal Reserve opacity. which cleared slightly on December 15th with an information release on the more aggressive taper schedule. Meanwhile on December 16th, the BoE tightened 25bp on the same day the ECB stood pat. It's no wonder that capital markets traders lack directional conviction. The rise in volatility in the Treasury market during this flattening is a reflection of investor uncertainty. As mentioned above, the decoupling of leading central bank policies further distorts market signals and increases the uncertainty faced by fixed income market participants hoping for a wellcoordinated and "soft" transition to a tightening interest rate regime.

CHART 15: POPULATION BY AGE





Source: Bloomberg, Bureau of Labor Statistics.





Source: Bloomberg, Bureau of Labor Statistics.

A key economic variable going forward is household formation and the socioeconomic behavior of millennials. The millennial cohort has deferred many traditional life stages, having been graduated into the workforce in a period of economic distress while carrying unprecedented student loan debt. Now this cohort is staring down the barrel of the asset inflation bubble as they contemplate the "starter" real estate market. This unfortunate demographic is the age cohort most likely to feel the impact of the US asset bubble most acutely as they were born onto the wrong side of several critical macro trends (Charts 14 and 15). The largest cohort, 4.7M millennials, are going to be 30 next year.

If a picture is worth a thousand words, Charts 16 and 17 of CPI and PPI respectively require no further comment.

CHART 18: FOOD, OIL, NATURAL GAS & USED CAR PRICES

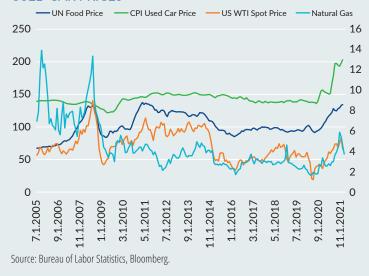
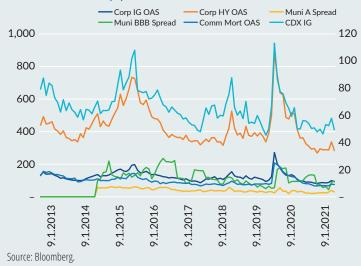


CHART 19: CASH BOND CREDIT SPREADS (L) & CDX IG SPREAD (R)





In the data posted in Chart 18, and in our prior Capital Markets Briefs, we have called out emerging inflation data. Data that the Fed chose to "look past" until December 15th.

Another inflation concern we are following is in the healthcare sector. Not surprisingly, the COVID-19 pandemic has created substantial wage pressure across the healthcare sector in both professional and labor classes. Increased caseloads, ICU admissions, staff burnout and vaccination policy staff resignations are driving an emerging spike in wages.

The P&L burden on hospitals is unlikely to be evenly distributed, as smaller and less wellresourced stand-alone facilities will likely face additional staffing pressure.

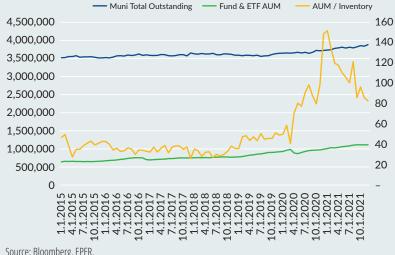
We will monitor this emerging trend as the data becomes available.

We will also track the interplay between drug prices, newly available COVID-19 therapeutics from Pfizer and Merck (among others) and rising COVID-related inpatient admissions, especially in ICU beds. If these orally administered therapeutics are as effective as the preliminary data from Pfizer indicate, it will be a game-changer within healthcare and across the broader economy.

CHART 20: TREASURY, MMD 10Y YIELD (L) & MUNI / TREASURY RATIO 10Y(R)



CHART 21: MUNICIPAL TOTAL OUTSTANDING, FUND & ETF AUM (L) & AUM / INVENTORY (R)



Source: Bloomberg, EPFR.

Chart 19 continues to reinforce two of our themes: 1) the lack of relative value within the fixed income universe and 2) the market paradox presented by extended equity valuations and a rates market priced for a recession scenario. Why are fixed income credit buyers ignoring this paradox? If the structure of interest rates implies recession, why buy credit risk so expensively (cheap to the borrower)?

The municipal market has given up a degree of its overvaluation relative to US Treasuries over 4Q2021, while remaining relatively tranquil by comparison. Ratios by tenor are 68% at 10 years and 78% at 30 years as we write at year-end. While cash flow into mutual funds and ETFs has remained positive for more than 19 months, the rate of flows has slowed as the curve has flattened and retail investors come to terms with yields offering significantly negative after-tax returns. It is likely that memories of the March 2020 back-up have dimmed the luster of munis as a safe haven asset class in the minds of conservative investors. Again, we note that credit spreads remain tight.

CHART 22: **DEALER INVENTORY (L) & AUM / TOTAL MUNI OUTSTANDING (R)**



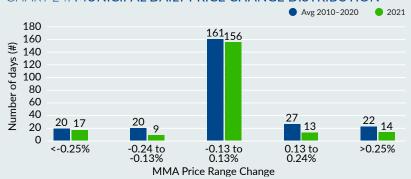
Source: Bloomberg, EPFR, Federal Reserve.

CHART 23: EPFR MONTHLY FLOWS (MM)



Source: EPFR.

CHART 24: MUNICIPAL DAILY PRICE CHANGE DISTRIBUTION



Source: MMA Advisor October 2021.



Every quarter, we call out the imbalance between the growth of municipal assets under professional management and the relative size of institutional broker ("Street") liquidity. With a ratio of 83X dealer inventory (which we use as a rough proxy for dealer capital) the imbalance between "buy-side" and "sell-side" capital stands out (Chart 21). As always, we remind readers that most open end mutual funds and ETFs are "short" a daily put; an embedded liquidity risk that dealers are very unlikely to have the capital to fund.

Mutual fund flows remain positive, but they are slowing as described in Chart 23. Municipals are a retail investor-driven market and although valuations have cheapened, they are still rich to long-term averages when compared to a US Treasury curve.

A striking difference between municipal and Treasury markets is daily volatility. Professional municipal portfolio managers and traders battle daily with the basis risk between the two markets as they attempt to hedge duration. The Federal Reserve's opacity regarding their inflation and tapering signals has injected market volatility born of uncertainty into the rates market, driving frequent large daily swings. The relatively muted price movements in the municipal market on more than half the trading days of the average year, as described in Chart 24, give professional tax-exempt managers fits if they try to maintain a cross-market hedge on an efficient cost basis.

Conclusion

The questions we originally framed in the 1Q2021 Capital Markets Brief are still relevant:

Are the pandemic impact and response evenly distributed?

No. In spite of 50,000,000 recorded US cases of COVID-19 and more than 800,000 subsequent deaths, we continue to escape the worst of it. Having the resources to provide the US population with 240,320,000 vaccinations (a one-dose rate of 72.9%; fully vaccinated at 61.2%) has greatly softened the impact of the virus, as fantastically painful as these losses have been. We have the discomfort of knowing that much of our pandemic suffering is self-inflicted, as significant cohorts of the population refuse the vaccines that are freely available. The new oral therapeutics will be a game-changer, reducing hospitalizations, economic disruptions, and general suffering in the **developed world**.

That said, the disparity between the developed and undeveloped worlds continues to grow. As vaccine production and distribution have ramped up, the developed world is trending toward third doses and vaccine mandates. The Pfizer oral therapeutic is expected to cost approximately \$550 per dose in the US. There are proposals by the drug companies to waive or reduce licensing fees in the less developed world, but we are far from an effective and balanced global response to COVID-19 and its growing number of variants. The political consequences of this social and public health dysfunction are still to be played out.

Are markets working to price risk efficiently?

The concerns we have raised in previous Capital Markets Briefs are still very real. Credit remains inefficiently priced. Volatility in the rates markets is rising. Liquidity measures, asset prices, employment data, yield curve twists and supply chain inflation suggest that the markets are struggling to understand the coordinated misjudgments and (related) opacity of central bankers. Market signals are very mixed, and volatility can be expected to increase as risk is repriced.

Are central bank and government policy responses balanced and proportionate?

As we write, the US government debt ceiling has been raised in a highly contentious and partisan exercise and government spending is funded, as "funded" is understood in Washington.

The "bipartisan" infrastructure bill passed, adding \$579 to \$1.2T (depending on who is doing the counting) of fiscal stimulus.

The \$1.7T Build Back Better bill (priced by the Penn-Wharton model at \$4.6T) remains hostage to very well-founded fears of stimulating additional inflation pressure. Senator Manchin's "firm" no on December 19th temporarily roiled equity markets but will likely relieve some fiscally driven inflationary pressure, at least until senate leaders review their parliamentary tactics in the new year.

This does not include the continued accommodation by the Federal Reserve, which will continue to provide **net additional market liquidity** by sustaining its QE exercise through March 2022, in spite of announcing a reduction of \$30B per month on December 15th.



Are the impacts of these policy responses creating market distortions or masking unrealized risk?

In a word, yes. We are operating in a "risk-on" world. The asset bubble continues to expand as the liquidity bubble grows.

As we wrote last quarter, in this environment, mindful investors will make value-based, data-driven decisions. They will balance historic reward expectations against the current risk climate, hoping that the Fed drains excess liquidity from the markets deftly. But wise investors will be prepared for the human error and the human emotional over-responses that inevitably follow, and they will price the risk they accept accordingly.

Why are markets so careless of the conspicuous asset inflation that the Fed liquidity bubble encouraged?

The US Federal Reserve Board and all classes of investors are trying desperately to identify economic signals, especially related to inflation, that have been obscured or muted by the scale of the global liquidity bubble and the asset inflation bubble it created. Volatility is rising in a reflection of market uncertainty and lack of conviction.

Central bankers appear, however reluctantly, to be slowly recognizing that an easy policy overshoot is in play. Experienced professional investors have a well-founded fundamental fear of "fighting the Fed."

The risk-on momentum trade is still rolling. But when the Fed is acknowledged to be struggling to find a solution to containing and reversing the policy error that they attempted to "ride," at least through the Chairman's re-appointment announcement, experienced market participants are likely more confused and wary than careless.

Where are we in this most unconventional political and business/economic/Fed cycle?

If we focus strictly on the data that the Federal Reserve has been wishing away during 4Q2021, we are in an inflationary environment that does not appear to be transitory.

The CPI post of 6.8% was followed four days later by a PPI post of 9.6%. It is reasonable to believe that producer price pressures and continuing supply chain disruptions will flow through to future CPI data. We are currently in a systemically inflationary environment.

The number of ships anchored off US west coast ports and the number of days wait for container ships to enter the Port of LA continued to rise through the 4Q2021.

Energy markets remain strong and gas inventories in Europe are well below season averages (see Russia/Ukraine below).

Labor markets are sending a confusing signal. Unemployment is 4.2%, but that number is posted in the context of 5,000,000 workers having checked out of the labor force. The education and skills deficit that constrains employment and personal productivity remains a long-term national problem.

G7 central bankers decoupled policy in mid-December in the face of inflationary pressures. While they neatly coordinated policy in the early days of the pandemic, they seem to be moving apart in pursuit of perceived national self-interest. Thus, the difficulty of deftly draining the liquidity/asset bubble created during the pandemic has intensified.

Markets are desperately looking for clear signals while trying simultaneously not to fight central bankers. With central bank policies beginning to diverge, clarity will be hard to come by. Expect increased volatility in most markets.

Both equity and bond markets appear to be very fully valued.





The S&P 500 P/E ratio is 26.22, suggesting an equity market responding to a strong underlying economy. Tech stocks have been volatile as investors try to properly discount the impact of rising rates.

Commodity markets have generally been strong, led by energy prices that reflect rising global demand.

Currency markets will likely begin to reflect the central bank policy divergence we have discussed. There was an immediate market response to the BoE tightening announcement on December 16th. It moderated the next day, but currency markets may ultimately apply their real-time pressure to central bank deliberations and policy.

Real estate generally soars, if somewhat unevenly, enjoying a tailwind from pandemic-driven shifts in demand, low interest rates and (likely) an increasing portfolio role as a hard-asset inflationary hedge. There may be some additional froth in real estate as rising interest rates can signal a stampede to lock-in attractive financing.

If you have read this far, you know that capital markets are very much in play. Policy makers are no longer aligned, other markets are pricing in strong economic and wage growth while rates markets are still priced for moderate inflation and diminishing economic growth levels.

All that said, the capital markets are also pricing in a number of non-quantifiable macro risks.

The COVID-19 pandemic rages on with new strains emerging and global public health responses extremely uneven.

Geo-politics hang over the rates markets:

Russia's pressure on Ukraine is a particularly ugly hot spot (read about Czech and Polish border provocations as described in WS Churchill's History of WWII if you feel sanguine about Eastern Europe). In a theme that applies equally to China, a weakening oligarchy is significantly more dangerous and unpredictable than a rising power. Putin's heavy-handed energy policy and his need to create external threats in Ukraine, other "pan-Slavic" nations and the Baltic states reveals the weakness of an exhausted regime beset by a badly mismanaged pandemic response and an aging and unproductive population. Germany's complicity with Gaz-Prom's artificial European inventory shortfall and Nord-Stream 2 weakens Western clarity and resolve. Bondholders are not illogically fearful of "shorting" US Treasuries.

China's hegemonic pressure on Taiwan and Hong Kong, and their militarization of the South China Sea, is another example of a regime under pressure. Facing a collapsing real estate and construction bubble, severe supply chain disruptions, severe fiscal strains on local government units and the potential "deglobalization" of their trading partners, China has become more autocratic and aggressive in 2021. A number of leading political economists believe that maintaining a stable 6.5% GDP growth rate is essential to sustain population quiescence and political stability. If the 30% of GDP that is represented by real estate and construction further restrains economic opportunity for newly arrived internal migrants in search of urban employment and shelter, we may see the regime needing to take a harder line internally and renewing its search for external enemies.

Meanwhile, Iran, Syria, North Korea, and Venezuela simmer uneasily. It is no wonder that capital markets investors are tempted, like the Fed, to ignore the economic fundamentals, ride the risk-on credit and rates trends and avoid ending up on the wrong side of a geopolitically driven "flight to quality" into US Treasuries.

That said, in every one of these markets, an investor's primary risk is lack of clarity. It is impossible for a central bank to develop a balanced national economic/monetary policy if it is detached from its own data. It is impossible for experienced investors to develop a sound and balanced portfolio strategy in the absence of market confidence in Federal Reserve policy and rigor.

We are living and investing in a complex world. Expect our lives and our investment challenges in 2022 to reflect that complexity. Experienced investors will pursue a balanced and data-driven path through the market turbulence that may lie ahead. But bear in mind, both of the statements to the right are **true**.

As investors, we have two distinct choices; to accept fate or to believe in probability and manage our responsibilities and risks accordingly. "The last sequence of throws of the dice conveys absolutely no information about what the next throw will bring. Card, coins dice and roulette wheels have no memory"

- Peter L Bernstein, Against The Gods: The Remarkable Story of Risk, 1996

"Fear of harm ought to be proportional not merely to the gravity of the harm, but also to the probability of the event"

- Antione Arnauld, Logic, or the Art of Thinking, 1662



About Mesirow

Mesirow is an independent, employee-owned financial services firm founded in 1937. Headquartered in Chicago, with offices around the world, we serve clients through a personal, custom approach to reaching financial goals and acting as a force for social good. With capabilities spanning Global Investment Management, Capital Markets & Investment Banking, and Advisory Services, we invest in what matters: our clients, our communities and our culture. To learn more, visit mesirow.com and follow us on LinkedIn.

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The S&P 500 Index is a stock market index tracking the stock performance of 500 of the largest companies listed on stock exchanges in the United States and constructed to provide a comprehensive and unbiased barometer of the U.S. equity market.

The U.S. dollar index (USDX) is a measure of the value of the U.S. dollar relative to the value of a basket of currencies of the majority of the U.S.'s most significant trading partners.

The credit default swap index (CDX) is a financial instrument composed of a set of credit securities issued by North American or emerging market companies. Currently, the CDX contains 125 issuers and is broken down by two different types of credits: investment grade (IG) and high yield (HY).

A proprietary yield curve Municipal Market Data (MMD) AAA Curve provides the offer-side of AAA-rated state general obligation bonds (GO). The MMD analyst team determines the inclusion of bonds. The MMD AAA curve represents the MMD analyst team's opinion of AAA valuation, based on an institutional block size of \$2 million-plus market activity in both the primary and secondary municipal bond market.

A collateralized loan obligation (CLO) is a single security backed by a pool of debt.

An exchange traded fund (ETF) is a type of security that tracks an index, sector, commodity, or other asset, but which can be purchased or sold on a stock exchange the same as a regular stock.

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