Market Commentary
July 2023

English Version

Quarterly Call
Q3 | 2023

- Macro & Market Forecast
- Private Investments: Panacea?
- Artificial Intelligence: Beyond Mega-Cap

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insigneo

Ahmed Riesgo
Chief Investment Officer
Insigneo

Executive Summary

The probability of a mild US recession over the next six months has fallen from 50% down to 40% due largely to a stabilization in the US banking sector, a still robust labor market, and a resilient US consumer.

US recession risk has receded in the near-term, but while the current picture looks rosy, the future still merits caution; the US economy is in much better shape than most professional economists and forecasters predicted it would be by this time.

Our US, Japanese, and global growth forecasts have edged up slightly, while Europe remains unchanged, and China's forecast comes in slightly below given some lost steam from the reopening and continued overhangs in the property market on the Mainland.

For much of the year, we resisted the Wall Street consensus and subsequent investor pessimism to be underweight equities versus our strategic asset allocation bands. Previously, we noted that "more defensive portfolio positioning will likely be necessary later this year." We retain that view today.

With valuation levels high on both an absolute and relative basis, we think US broad market equity upside is fairly limited from current levels. Although we could see the S&P 500 index temporarily trade up to the 4500s/4600s, due to momentum and for technical reasons, sustained upside for the US equity index is constrained by both high valuations and the prospects for interest rates to remain higher for longer.

At the same time, downside risk is fairly limited as well given the resiliency of the US economic growth landscape and the potential positive knock-on effects from the widespread adoption of large language models to enhance productivity and increase profitability.

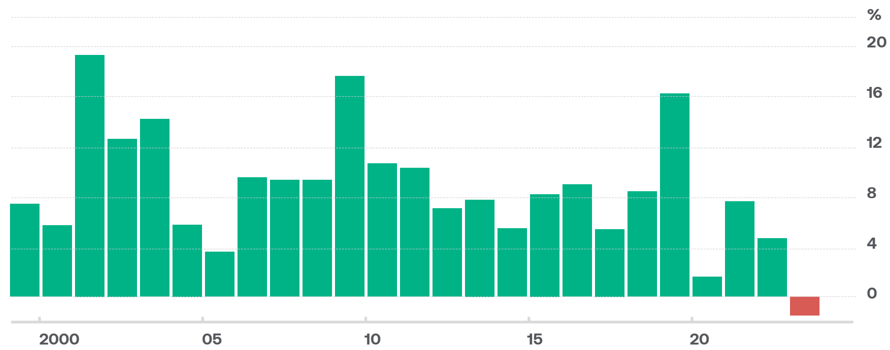
In Private Equity, we would recommend that investors underweight this asset class. Both the cost of capital and leverage levels are headwinds in this space; However, Private Credit is very appealing, in our view, and we recommend that investors overweigh this asset class.

As we enter the 3rd Quarter of the year, we are not far from where we expected to be, both in macroeconomic terms and with respect to markets. Our hypothesis of an "A-shaped" type of year where markets rallied during the first half of the year as economic growth remained stronger than the consensus expected, and then to be followed by a period of market weakness as economic growth (and inflation) faltered in an environment where the Fed could not aggressively cut rates is still very much in play. In fact, our year-end price target range of 4100 to 4300 on the S&P 500 is

For the First Time in History, Wall Street Consensus Expected the S&P 500 to Fall in 2023.

S&P 500 Projected Annual Change.

Source: Bloomberg Finance, BCA Research



unchanged from the beginning of the year back when the index was trading at around 3800 and most major Wall Street firms were calling for a major leg down in the market, falling even below the October 2022 low of 3577. This chart demonstrates that for the first time since Bloomberg has kept this data, Wall Street in aggregate expected the S&P 500 to fall this year. The most prevalent risk, in our view, right now is upside risk, as large-scale adoption of new technologies and a resilient consumer and labor force make a "soft landing" more possible now than it was at the beginning of the year. But that would be predicated on the Fed not making a policy mistake of overtightening in the face of rapidly declining inflation, a probability that has increased recently given economic strength but still should not be our base case.

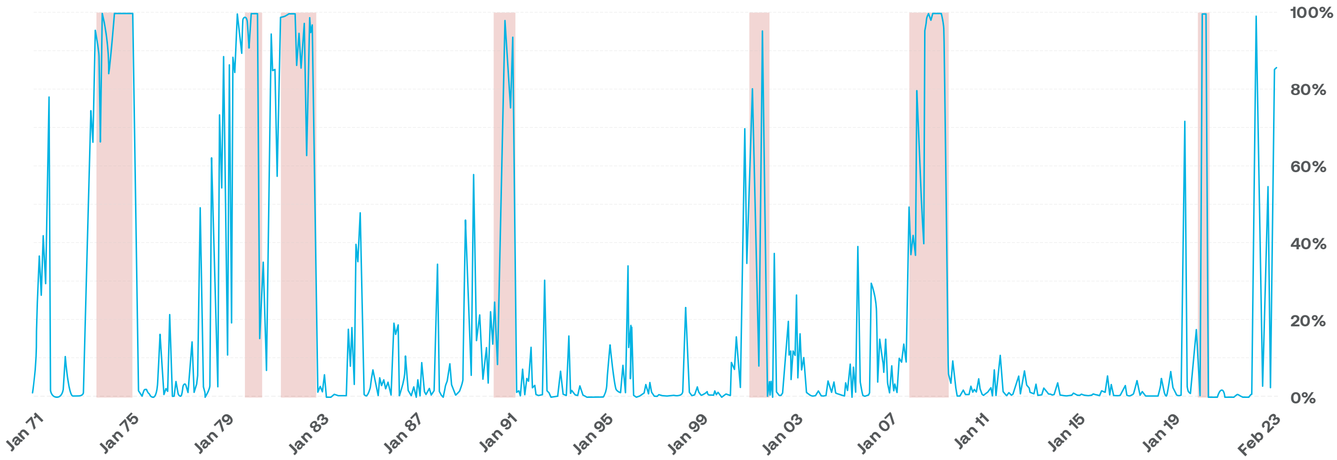
US recession risk has receded in the near-term, but while the current picture looks rosy, the future still merits caution. Our proprietary Insigneo-Forefront Recessionary Indicator is still pointing to elevated US recession risk over a 12-month horizon. And you can see in this graph that in the past, it has correlated with economic contractions going back to 1971. That said, that is just

Probability of a US Recession Usign our Probit Model

Source: Insigneo-Forefront Recessionary Indicator

Over the Next 6 Months: ~ 85% (Pseudo-R^2 = 54.91%) | Over the Next 12 Months: ~ 98% (Pseudo-R^2 = 55.78%)

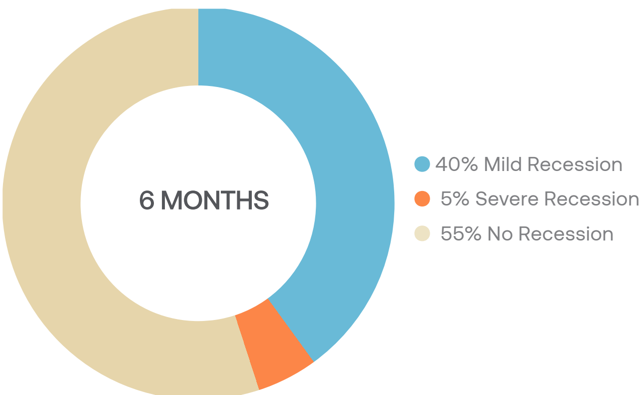
(Shaded Areas Represent NBER-designated Recessions)

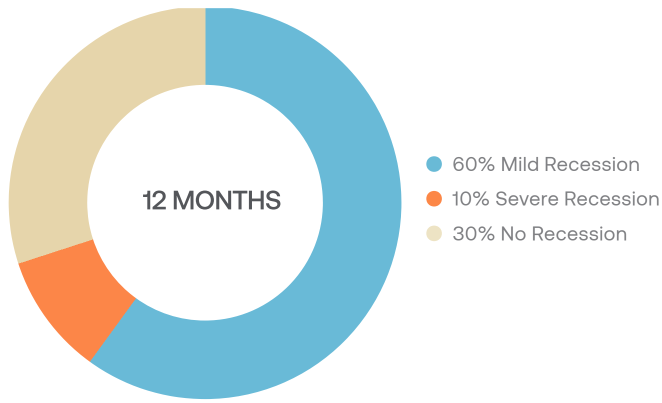


Subjective Recessionary Probabilities Over 2-Quarters & 4-Quarters Incorporating All Factors

(In our Decision Tree, a "Mild Recession" is defined as U-3 Unemployment Rate of 4% ≤ U3 ≤ 6%)

Source: Insigneo





one factor input into our overall assessment, albeit an important one. We use many other inputs as well to arrive at our overall subjective probability modeling framework. As the chart above demonstrates, according to our assessment, the probability of a mild US recession over the next six months has fallen from 50% down to 40% due largely to a stabilization in the US banking sector, a still robust labor market, and a resilient US consumer. In this scenario, we define a mild recession as one where the unemployment rate rises above 4% but remains below 6%. The chance of no recession has risen to 55%, where it is now our base case. However, over a longer time period, in this case 12 months, so by mid-2024, one can see that our subjective odds of a mild recession increase to 60% (base case), and the odds of severe recession go up as well to 10%. Concurrently, the probability of no recession falls to 30%. This means that investors will want to start reducing risk in their portfolios toward the end of this year. This next table summarizes our macroeconomic forecasts among the major economic blocks around the world and globally, as well.

To highlight, our US, Japanese, and global growth forecasts have edged up slightly, while Europe remains unchanged, and China's forecast comes in slightly below given some lost steam from the reopening and continued overhangs in the property market on the Mainland. It is worth noting, however, that, by some margin, China remains the primary driver of global growth this year. Despite this, market sentiment in China is very weak as geopolitical concerns, coupled with the doubts regarding the robustness of the

Insigneo Macroeconomic Scorecard & Forecasts

Strength in Services Offsetting Weakness in Manufacturing
Chinese Growth Moderately Lower, But Still Best Major Country Growth.

COUNTRY REGION	2023 ESTIMATE (from Q2)	2023 ESTIMATE (Q3 revision)
US	1.1%	1.4% ↑ (Δ=0.3%)
China	5.9%	5.5% ↓ (Δ=0.4%)
EU	0.3%	0.4% ↔ (Δ=0.1%)
Japan	1.1%	1.3% ↑ (Δ=0.2%)
World	2.4%	2.6% ↑ (Δ=0.2%)

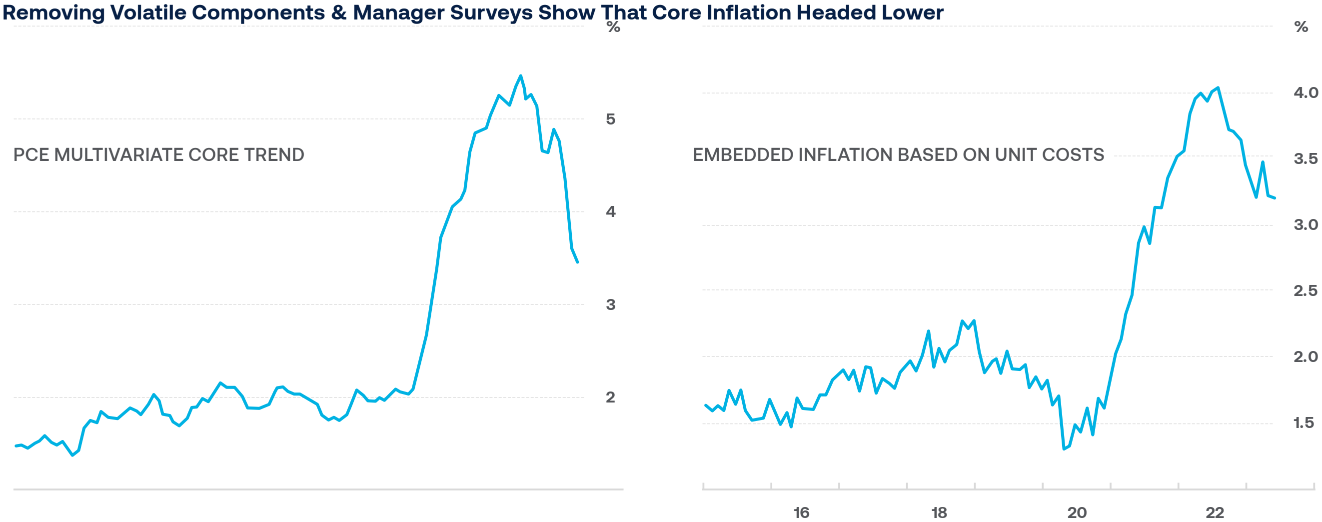
Source: Insigneo

country's short-term growth momentum, have affected investor sentiment and impacted investment flows, much of it moving to India. We think many of these concerns are misplaced in the short term as the macroeconomic fundamentals of the private sector there remain vibrant (outside of the property sector, of course) and valuations are very compelling. Although we harbor similar longer-term concerns and do believe that, overall, the Chinese equity market has become less attractive over the long run, we similarly think that the short-term concerns over growth have been overstated and overshot fundamentals. Moving away from China, Japan's upward GDP revision to 1.3%, which is far above its potential growth rate, has been chiefly driven by a more balanced consumption shift, a strong capex outlook, and improving inbound spending. Globally, although recent data, particularly weak manufacturing prints out of the developed world, suggest a slower and less robust global expansion in the near future, it is important to note that these disappointments do not indicate an immediate recession. While concerns about a decline in global industry and in Europe are present, they are balanced by the strength of the service sector and the resilience observed in the US and non-China Asia.

The latest data out of the US highlights the resiliency of the US economy, as consumer sentiment improves, and the housing market shows signs of a rebound. Before we turn our attention to the strength of the near-term economic picture in the US, let us first focus on the inflation picture because, despite what the naysayers are reporting, there is a clear disinflationary trend in place in this country, which supports the case that we are at or very near the end of the Fed tightening cycle. The charts below demonstrate that trend. On the left, we can observe PCE Multivariate Core that measures inflation's persistence in the 17 core sectors of the personal consumption expenditures, which is a closely watched measure by the Fed that clearly shows a persistent downward trend since late 2022. On the right, we can see embedded inflation based on input costs which is a manager survey of prices that go into production, and they are similarly in a definitive decline. Finally, the chart on the next page demonstrates that rent and shelter inflation, a key line item on

Clear Disinflation Trend is in Place

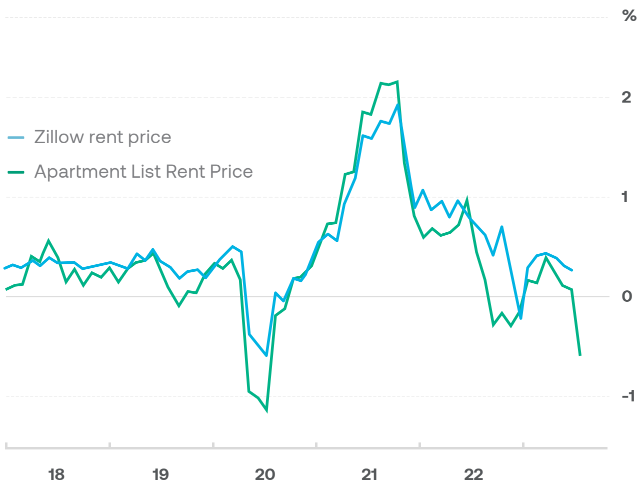
Removing Volatile Components & Manager Surveys Show That Core Inflation Headed Lower



Source: Federal Reserve Bank of New York Liberty Street Economics, Atlanta Fed Survey of Business Inflation Expectations, BCA Research

Rent & Shelter Inflation Should Also Keep Falling

Shown Seasonally Adjusted



Source: Zillow, Apartments List, BCA Research

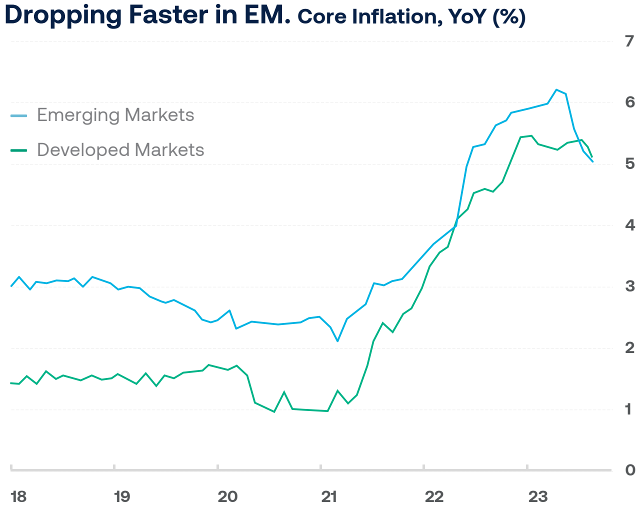
most people's monthly expenditures, is also sloping downward. Here we see real-time prices from Zillow and Apartments List reflecting falling prices for rent that should soon be reflected in the official government data.

This disinflation trend is prevalent, not just in the Developed world, but also in Emerging Markets. In fact, core inflation is dropping faster in the emerging markets than it is in the developed markets. The initial surge in inflation back in 2021 was sniffed out more quickly by emerging market central bankers than by their colleagues in the developed world. They did not think that inflation was transitory like their peers in the US and Europe and began their rate hiking cycles sooner. This means that in some places, like Hungary, the central bank has already cut rates and in other places, like Brazil, they will be doing so shortly. These countries have been fighting inflationary dragons since the 1990s, so they are better at it – they tightened policy quickly and aggressively. So, on the one hand, we see that inflation is falling, rightly signaling the end of tightening cycles in both the developed and emerging world.

Returning to the US, we also see that, in addition, the economy is in much better shape than most professional economists and forecasters predicted it would be by this time. This has rekindled the notion that a soft landing (i.e., no recession) driven by this "immaculate disinflation" may be achievable. Indeed, this notion has put a bottom under risk assets, apparently since October 2022, which is exactly the same day that US CPI peaked on a yearly basis. In other words, this rally has been driven not only by AI-mania (although that has certainly been a major component), but also partly, at least, by falling inflation and robust growth. This sturdy growth in the US rests on two pillars: the US consumer and the US housing market. In addition, the firmness in the US labor market continues to defy alternative measures of economic activity which are much weaker.

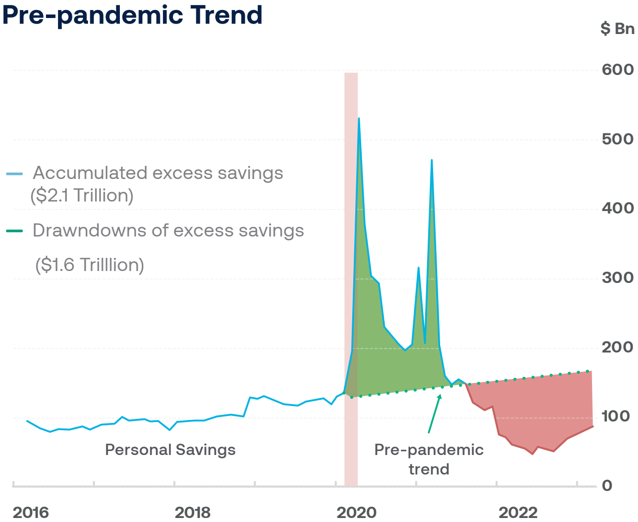
During the pandemic, US households accumulated savings at an unprecedented pace compared to previous recessions. The chart on the next page demonstrates that despite recent decreases in these savings, there is still a significant amount, approximately $500 billion according to the San Francisco

Core Inflation Headed Lower, But Dropping Faster in EM. **Core Inflation, YoY (%)**



Source: Refinitiv, Capital Economics

Aggregate US Personal Savings Versus Pre-pandemic Trend



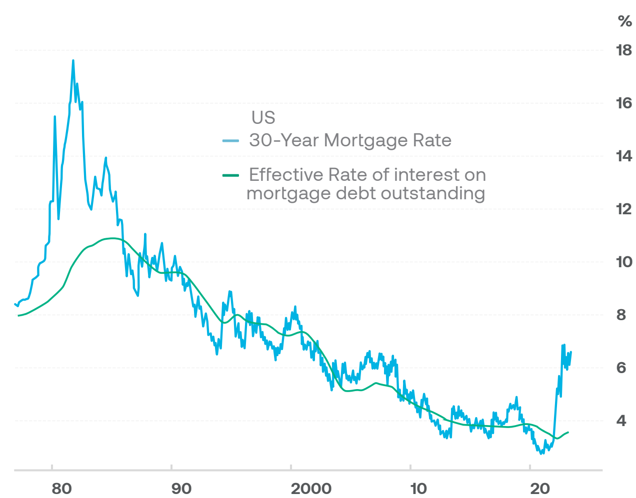
Source: San Francisco Fed, Bureau of Economic Analysis

Fed, remaining in the economy. While the distribution and deployment of these savings are uncertain, the data on household balances suggest that most income groups generally have more liquid funds available now than before the pandemic. Overall, it is expected that the accumulated excess savings will continue to support consumer spending at least until the fourth quarter of 2023, which, once again, comports nicely with our own recessionary forecasts of early to mid-2024 for the start.

In sum, the US consumer is still consuming and probably will be doing so until at least the end of this year. What about housing? Higher rates were supposed to kill the US housing market, yet housing prices in aggregate are basically flat in the country this year. Yes, it is true that 30-year mortgage rates are more than double where they were in early 2021, but, as this chart demonstrates, the 30-year effective rate on mortgage debt outstanding is still below pre-pandemic levels because most mortgage debt is fixed and anchored at these still low levels. Eventually, this effective rate will tick higher as older debt rolls over and newer debt gets financed at higher rates, but we are not there yet. Moreover, US housing resiliency is underpinned by more than a decade of under construction and low inventories. We still have a supply problem in the US. The graphs on next page depict the situation perfectly. On the left, we can clearly see that the number of "homes" in the country is one standard deviation below the median level it should be given the country's population and number of households. This graph represents data going back all the way to the 1950s. Since the real estate bubble burst in the late 2000s, we simply have not built the necessary number of residential structures necessary for the number of people that need them in this country. On the right, we can similarly see that the inventory of single-family housing in the nation is by far the lowest it has been in over 30 years.

Recent US economic resilience also implies that the forward path of Fed rate policy remains more salient than many expected a few months ago. At this point, the market has largely removed expectations for cuts in the Fed Funds rate this year and pushed it out to

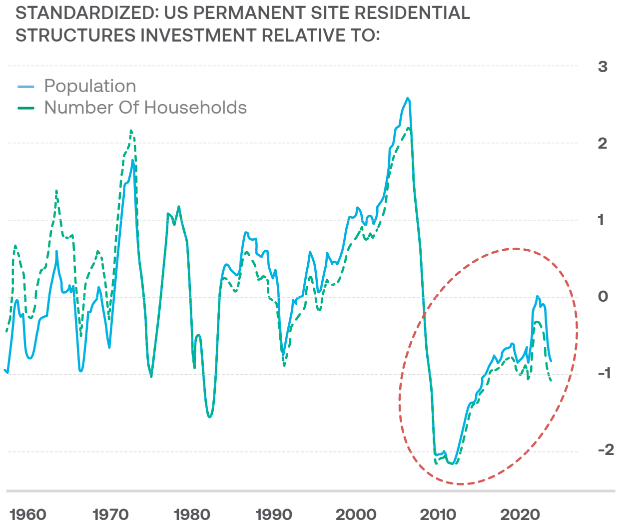
Despite What You Hear, Mortgage Costs Are Still Very Low. 30-Year Effective Rate of Interest on Mortgage Debt Outstanding is Still Below Pre-pandemic Levels.

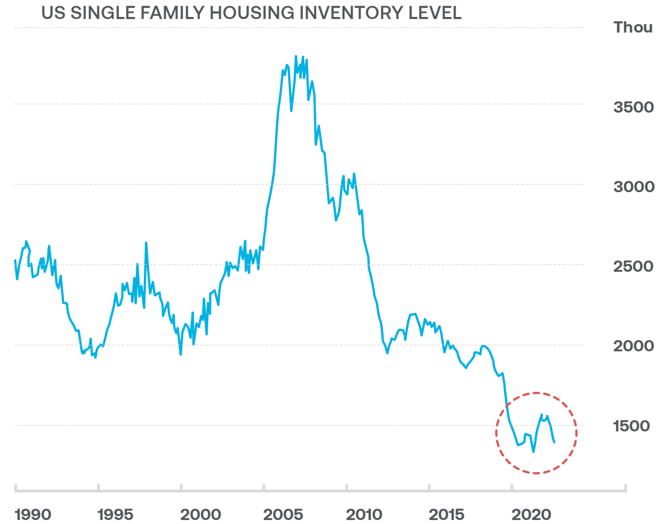


Source: Bureau of Economic Analysis, BCA Research

Over a Decade of Under-construction & Low Inventories Explain US Housing Market Resiliency

Source: BCA Research



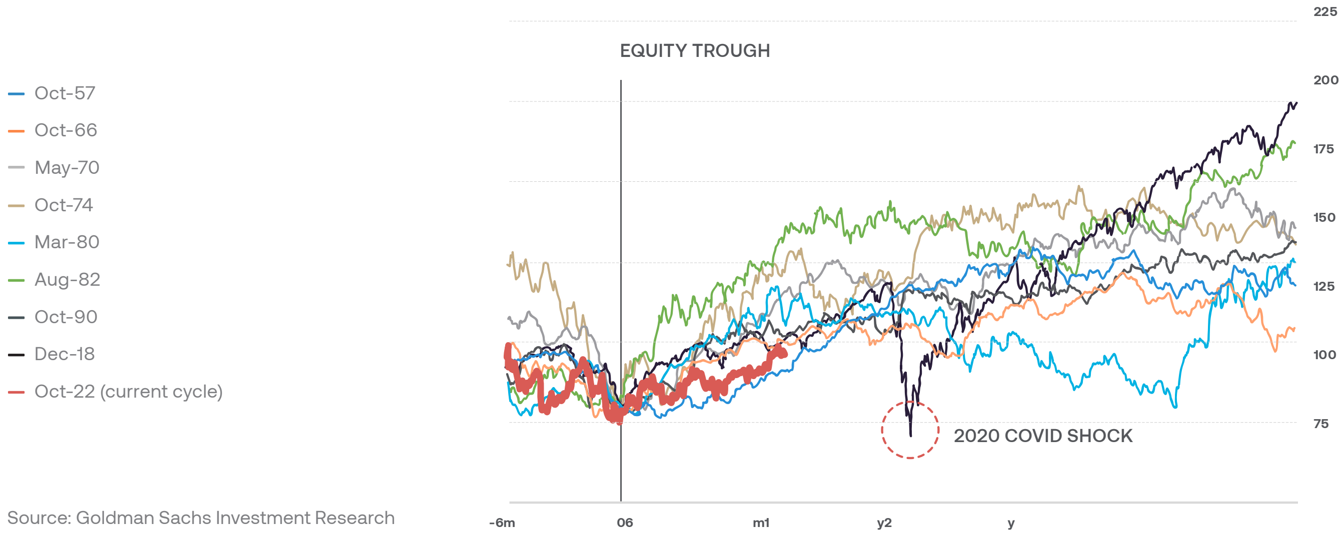


2024, in line with the Fed's stated preferences and our own economic timeline. In fact, the market is currently pricing in one more rate hike during the July meeting, and we agree that they will raise the rate then (even if they should not do so) and that will probably be the last hike.

So, what are the market implications of all of this? As we mentioned previously, for much of the year, we resisted the Wall Street consensus and subsequent investor pessimism to be underweight equities versus our strategic asset allocation bands. Previously, we noted that "more defensive portfolio positioning will likely be necessary later this year." We retain that view today. With valuation levels high on both an absolute and relative basis, we think US broad market equity upside is fairly limited from current levels. Although we could see the S&P 500 index temporarily trade up to the 4500s/4600s, due to momentum and for technical reasons, sustained upside for the US equity index is constrained by both high valuations and the prospects for interest rates to remain higher for longer. At the same time, downside risk is fairly limited as well given the resiliency of the US economic growth landscape and the potential positive knock-on effects from the widespread adoption of large language models to enhance productivity and increase profitability. Luckily, we have almost 60 years of history and data with respect to monetary policy driven drawdowns in markets to guide us. And they tell us that "double dips," or instances of revisiting or dropping below the low are exceedingly rare. In fact, as the chart on the following page demonstrates, this has only occurred once during that time period – the 2020 Covid shock market bottom that occurred more than a year after the 2018 Fed rate hiking induced correction. In other words, an exogenous shock of some sort is required to revisit that equity trough. In 2020, it was the pandemic. What could that look like today? Obviously, a candidate for such a shock would stem from an unexpected and sharp escalation of the Russia-Ukraine crisis, but that seems unlikely at this point. Another candidate would be another monetary policy shock – meaning that the Fed would have to begin a new and severe round of tightening, a renewed and material rate hiking cycle to trigger such a move down in our opinion. As we just demonstrated

Was the October 2022 Low the "Low"? Only if No More Shocks

Index, day of equity trough = 100



Source: Goldman Sachs Investment Research

before given the inflation dynamics, that is unlikely. It is far more likely that the Fed will, at worst, stay put – stay higher for longer rather than ratchet rates higher again given the disinflationary trend we highlighted. That being said, renewed hawkishness has led to renewed drawdowns over a longer period – which is precisely why we are retaining our year-end price targets on the index rather than expecting to touch the lows from 2022 again. One (or even two additional hikes from the Fed) would not constitute a tightening shock, in our opinion. Market pricing along the Fed Funds futures curve already reflects that risk to a certain degree.

— "renewed hawkishness has led to renewed drawdowns over a longer period – which is precisely why **we are retaining our year-end price targets on the index** rather than expecting to touch the lows from 2022 again."

For sure, renewed Fed hawkishness is a key risk to monitor for risk assets, but it should not be our base case given the growth/inflation landscape we just described. That bar is quite high, in our opinion. Another downside risk to monitor is the trajectory of corporate sales and earnings growth. So far, they have been unexpectedly solid this year, and that, surprisingly, may be a consequence of high inflation. As prices rise, companies tend to initially report more favorable numbers until their margins get squeezed by higher labor costs. With labor costs (+4.3%) now outpacing US CPI (+3%), it is only a matter of time before corporate margins contract.

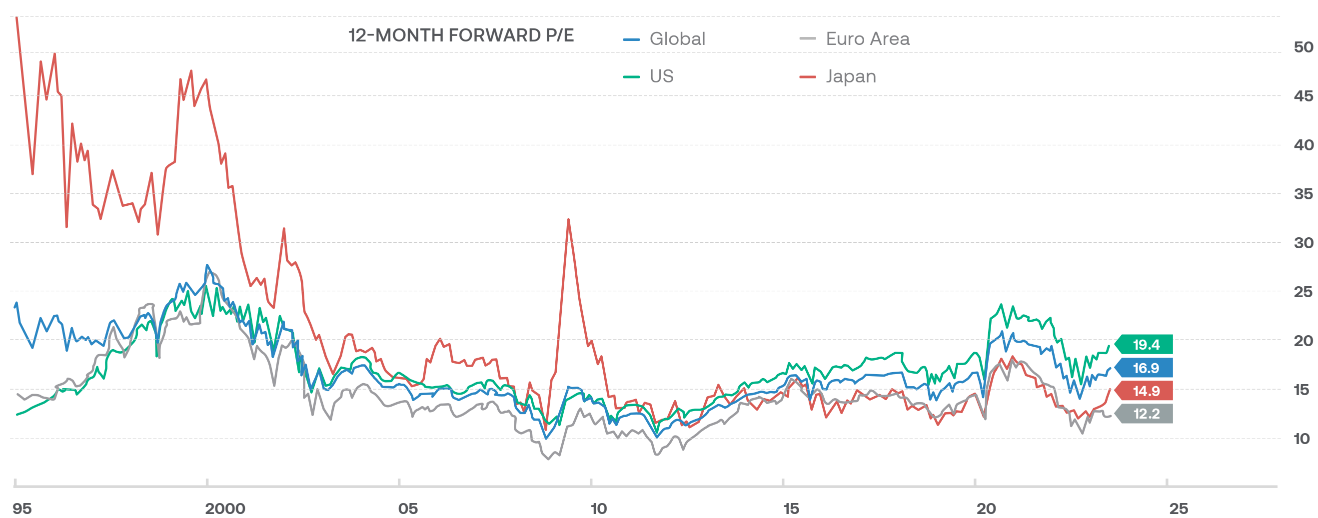
While the downside risk scenarios are fairly well understood (e.g., inflation reaccelerating, Fed policy mistake, a more severe recession, etc.), there is some considerable upside risk as well and it stems largely from an AI-driven productivity boom. So far, at least during the first half of the year, much of the gains in the S&P 500 have been driven by AI-linked stocks. In other words, the market breadth has been very narrow, and it argues for a reversal. That said, if investors begin to price productivity and profit boosts from AI, then the

S&P 500 could trade even higher from current levels, especially if market breadth expands beyond the AI-linked stocks. And while we agree that the long-term productivity and profit-boosting potential of AI is significant and should be expected, there is little evidence in the macroeconomic data that AI has lifted productivity growth yet. Investors may be getting ahead of themselves in pricing this in while ignoring the looming recessionary risks. So, while we do acknowledge that the upside risk is there, we think it is too early to start meaningfully pricing it into EPS estimates.

On the equity side, a rotation that makes sense today, given the current landscape, is to increase the exposure of higher-quality equities at the expense of more cyclical sectors like Value. Recall that Quality-factor investing emphasizes both a company's profitability, as measured by return on equity, and its financial leverage, as measured by its debt to capital ratios. In an environment of slowing growth and higher-for-longer rates, companies with high factor exposure to Quality should outperform. Apart from this slightly more defensive tilt, we also recommend maintaining an overweight allocation to non-US stocks, especially European and Japanese equities. As of late, both regions have experienced positive earnings and sales momentum. They are also still cheap relative to the US. As this chart demonstrates, Europe trades at only 12.2x forward earnings, while Japan trades at 14.9x – meanwhile, the US is expensive on both an absolute and relative basis at 19.4x. Beyond the developed world, we also continue to like certain emerging markets on a structural basis, longer-term, but tactically we would be neutral given the recessionary risks over the next 12 months. As mentioned previously, we think the geopolitically induced sell-off in China is overdone and we recommend that investors favor Chinese A-shares in a recovery scenario. Apart from China, a few markets really standout as appealing. These are Vietnam, South Korea, Mexico, Chile, and Peru. Indian equities have done very well this year, partly as an offramp for Chinese equity flows from US-based investors. Since late January, Indian stocks have outperformed their EM peers by 12% and global indices by 2%. Over the longer-term, we do think that the China to India rotation makes sense given the latter's less treacherous political environment, but tactically the rally is appearing long-in-the tooth.

US Equities Are Still Expensive Versus Peers on a Forward Earnings Basis

Source: Refinitiv, BCA Research



On the rate side, we envision a scenario where yields should fall modestly during the second half of the year, as we approach the recessionary cliff. We see the US 10-year trading between 3.25% and 3.5% by the end of the year and making a near-term low in 2024 at around 2.5% during a mild US recession before renewing its structural bear market trend of "higher highs and higher lows". Over the next few weeks or months, rates could either stagnate or even grind higher from here given the economic backdrop. At 4%, the US 10-year Treasury Note becomes incredibly attractive and we will look to add duration if it moves again in that direction. At 4.25%, we would be aggressive buyers of duration. The US Dollar remains in a structural bear market as well, and it is still overvalued by as much as 20% on a Purchasing Power Parity basis. We continue to fade rallies in the Greenback.

Private Investments: Panacea?

Investing in private investments has become a very salient topic in the world of finance these days as investors and asset allocators decide how to shield themselves from the tumultuous public markets of the last two years. Let me begin by stating what should be two fairly obvious observations. First, private investments are not a panacea asset class – they are a risk-laden, illiquid asset class suitable for highly sophisticated investors with no liquidity needs in the investable amounts. Many investors believe that they are not as volatile as public markets because they do not mark-to-market on a daily basis as their public counterparts do. They simply "appear" to be less volatile because of the infrequency and subjectivity of the valuation process. In that sense, though, they do provide one great benefit to investors – namely, that the infrequency of valuation tends to save investors from themselves. Because they do not see their valuations plummet as in the public markets in moments of panic and illiquidity, they are less likely to make irrational, emotion-riddled decisions like selling during these fear-induced selloffs. That being said, manager selection matters more in this asset class than it does in the public markets. This is a space where you really want to invest only in the top quartile managers, otherwise your returns will not be commensurate with the illiquidity premium. The juice is not worth the squeeze unless you are involved with the top managers.

The second point of emphasis should be that there has been a strategic push in the private investment world to open the asset class to a broader array of investors. To invite more retail and wealth management money into a space traditionally reserved for institutions, endowments, pensions, etc. Well, as with any market, the more money that pours in, the more eyeballs, and price discovery becomes increasingly harder. That means that, overall, ceteris paribus, one should expect investment returns to compress for investors as more money chases after deals. It does not mean that returns will not be attractive, they should still exceed public market returns on average, but the excess returns of the past are unlikely to be reproduced even among the best managers.

> — "private investments are not a panacea asset class – they are a **risk-laden, illiquid asset class** suitable for highly sophisticated investors with no liquidity needs..."

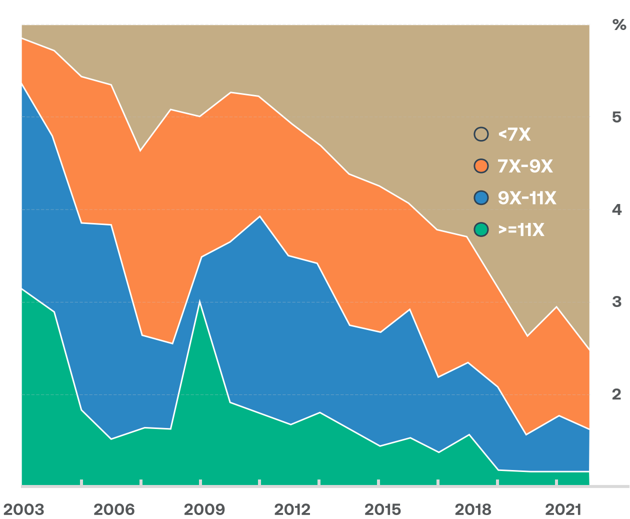
Well, now that I have sufficiently scared you about investing in the private world, let me reiterate that it still should be part of a sophisticated investor's portfolio, if it is suitable for them given the illiquidity. As I have mentioned on several previous occasions, we do not expect public market returns to be as robust as they were during the previous era of central bank quantitative easing. In effect, quantitative easing and central bank intervention/manipulation of interest rates do not produce investment returns, they merely pull future returns into the present, thereby lowering future returns in the process. So, if you want to maintain returns, you are going to have to be prepared to take on a greater amount of risk, whether that be in the public or private markets. As Thomas Sowell once famously quipped, “there are no solutions, there are only trade-offs.” With this mind, let us take a closer look at some of the opportunities and risks in private equity and private credit.

In Private Equity, we would recommend that investors underweight this asset class. Both the cost of capital and leverage levels are headwinds in this space. For example, in the Leverage Buyout market, Total Debt to EBITDA is currently at 6.9, this is the highest level it has been in over 20 years and significantly higher than the 5.5 average over that same time period. In fact, the percentage of deals that are over 7x multiples is 68% and the percentage of deals over 6x is 80%. Moreover, the interest coverage ratio is at 2.5x in this space, a 5-year high, despite interest rates been substantially higher than they have been during this same time period. Moreover, valuations in private equity are stretched across many metrics. On the left-hand side here we see that back in 2003, the share of LBO purchasing price multiples above 11x was less than 5%. Today, almost 70% of deals are closed at that multiple or higher. Returns from LBO managers cannot be as high when they are overpaying as much as they are today. On the right-hand side, we also see that the 1-year rolling average Enterprise Value-to-Revenue multiple in private equity today has decoupled from their public market counterparts. The Nasdaq Composite, Russell 2000, and Russell 3000 multiples have all come off their highs, but PE multiples have not. It is only a matter of time before they do, and we should begin to observe a downward conversion in this space as multiples catch up to where they should be historically in relation to their public market peers. In other words, expectations are elevated, but the macro environment has changed as the cost of capital has gone up, and that has yet to be reflected in private

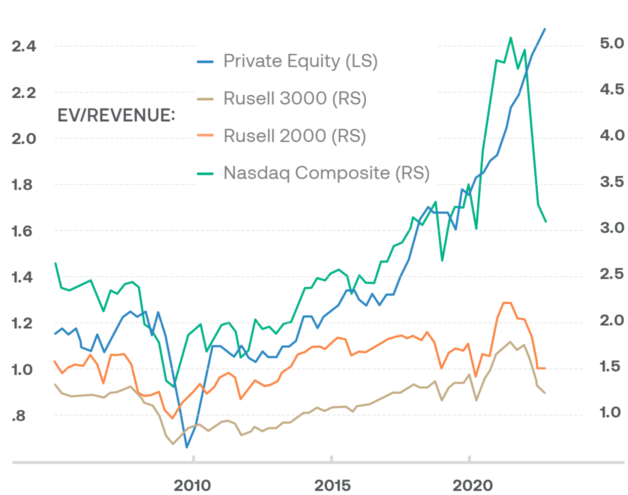
Private Equity Valuations Are Stretched & Expensive

Source: Refinitiv, BCA Research

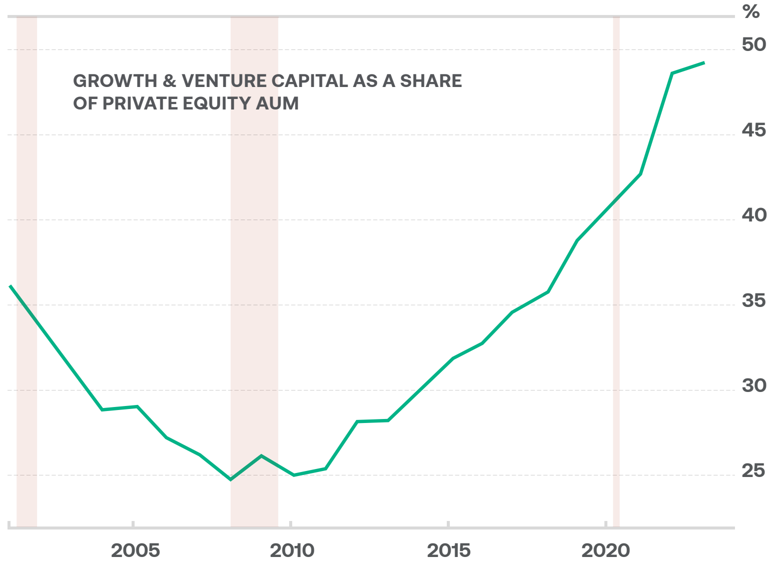
LARGE CORPORATE LBO PURCHASING PRICE MULTIPLES



EMBEDDED INFLATION BASED ON UNIT COSTS



Increased Competition For Growth & Venture Capital as Participants Pour in



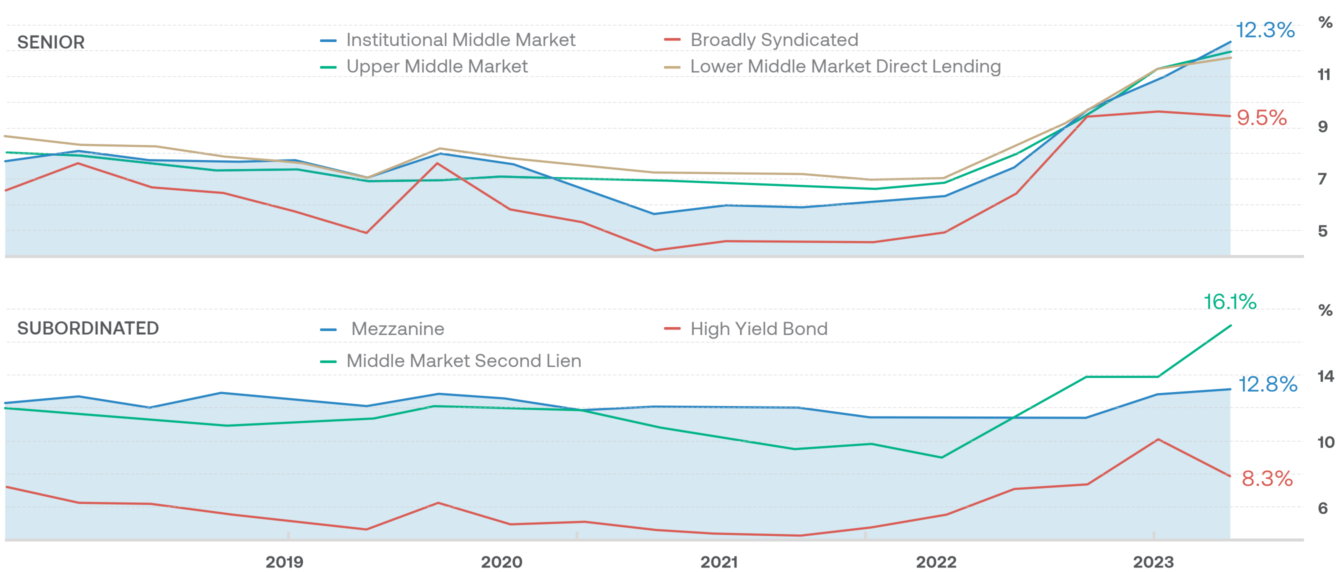
Source: Preqin Ltd, BCA Research

equity valuations. Finally, with so many new entrants into the space, competition risk is high. As this chart shows, Growth and Venture Capital together represented about 25% of AUMs during the GFC. Today, that figure is approaching 50%

So, that's the bad news, now time for some good news. Private Credit is very appealing, in our view, and we recommend that investors overweigh this asset class. For one thing, yields are now incredibly attractive. As this chart demonstrates, especially on the Senior side,

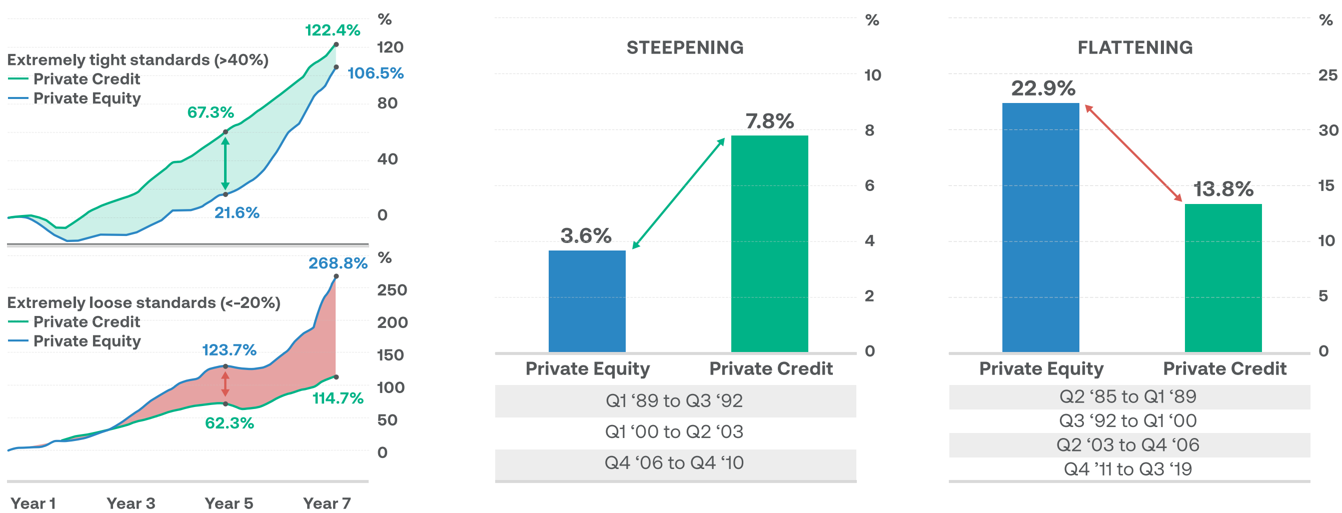
Private Credit Yields Are Attractive

Source: Refintiv, BCA Research



Macro Environment Favors Private Credit

Source: Burgiss, BCA Research



yields are higher than they have been in years. Middle Market direct lending loans are yielding around 12% and broadly syndicated loans are yielding 9.5%. Much of this is being driven by the fact that direct lending is stepping into the void left by smaller regional banks in the US that have pulled back after the mini-banking crisis of earlier this year. Even Mezzanine and Subordinated debt is trading at metrics that are attractive versus private equity itself, but with reduced risk. In addition, it appears that Distressed Debt and Special Situations Opportunities will be increasing over the next few quarters given the current environment. Overall, the macroeconomic landscape we described earlier tends to favor private credit over private equity. When lending standards are tight, as they currently are and we predict they will remain so for quite some time, private credit tends to outperform significantly, with the return dispersion peaking roughly on the 5th year of tight standards, as the chart on the top left shows. In a loose environment, conversely, private equity will do better. You will also notice in the middle chart above, that in previous historical periods where yield curves steepen, private credit outperforms quite significantly. Conversely, when curves are flattening, private equity tends to do much better. We think the next move in the yield curve will be a steepening one after it has been inverted for such an extended period of time. Needless to say, only further material hawkishness from the Fed would upend that view.

This table summarizes our views on the broad asset classes and some important sub asset types within them.

Recommended Allocation to Private Investments

ALTERNATIVES	-				+
PRIVATE EQUITY	○	●	○	○	○
Buyout	○	●	○	○	○
Growth Equity	●	○	○	○	○
Venture Capital	○	●	○	○	○
PRIVATE CREDIT	○	○	○	●	○
Senior Debt	○	○	○	●	○
Mezzanine Debt	○	○	○	●	○
Distressed & Special Situations	○	○	○	●	○

Mauricio Viaud
PM and Senior Investment Strategist
Insigneo

Artificial Intelligence: Beyond Mega-Cap

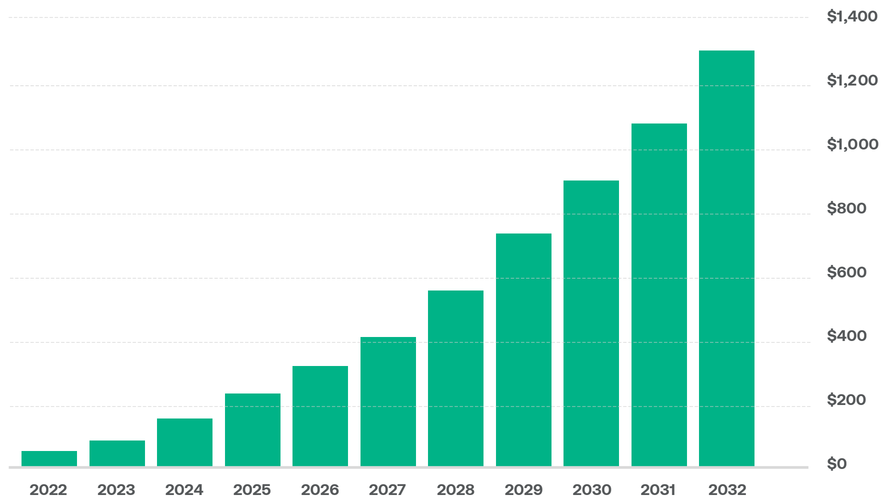
> **Executive Summary:** The mega-cap technology stocks that have led the current stock rally will undoubtedly be major beneficiaries of the AI trend. However, the benefits of this new technology will expand well beyond these companies.

During our last quarterly call, we said that dominant players in the AI industry like Microsoft, Alphabet, and Nvidia would be big beneficiaries of the development of this new technology. Boy, are we glad we said that! Since then, these stocks have led the markets higher. Now we have to look beyond mega-cap tech, towards which other companies could also be potential beneficiaries.

A year ago, artificial intelligence appeared to be a promising technology far in the future. Few people had heard of it, and even fewer had been exposed to it. Fast-froward a year, and artificial intelligence is something very real. Most of us have heard about AI by now. Whether we were introduced to it through the media, a friend, or even personal use of Chat GPT, we can all envision the revolutionary implications that artificial intelligence could have on our everyday lives. Much like with the birth of the internet, a nascent technology such as AI has created a large amount of appetite from investors looking to get exposure to what portends to be a promising bounty. As we can see on the chart on the next page, Bloomberg estimates that Generative AI could lead to approximately $1.3 trillion in revenues by 2032, spread across several technology industries including "hardware, software, services, ads, and gaming centers, growing at an annual compound rate of roughly 42%..." (Mandeep Singh, Nishant Chintala, and Anurag Rana, Bloomberg, 6/5/23). Investors have clearly expressed their views as to which companies would benefit from the AI boom. Stocks such as Microsoft (MSFT), Alphabet (GOOGL), Meta (META), Amazon (AMZN) and Nvidia (NVDA) have helped propel stock markets higher this year. But so far, the markets appear to be pricing in the idea that only a handful of large-cap technology stocks will be the big beneficiaries from the AI boom. Nvidia alone rose 190% in the first six months of this year, reaching a market cap slightly over $1 trillion. To put things in perspective, the market cap of Bitcoin is approximately $600 billion. Said another way, all the Bitcoin in the market would only purchase 60% of Nvidia. Using the same logic, considering that Microsoft's market cap is close to $2.5 trillion, the same amount of Bitcoin would only buy about a quarter of Microsoft.

There is little doubt that the dominant players in the AI space such as the companies mentioned above have a lot to gain. Companies engaged in the actual development of the technology will undoubtedly be big beneficiaries of its application. However, the markets

Projected Revenues for the Technology Sector from AI (in billions of USD)



Source: Bloomberg Intelligence, IDC, Insigneo, as of 6/1/23

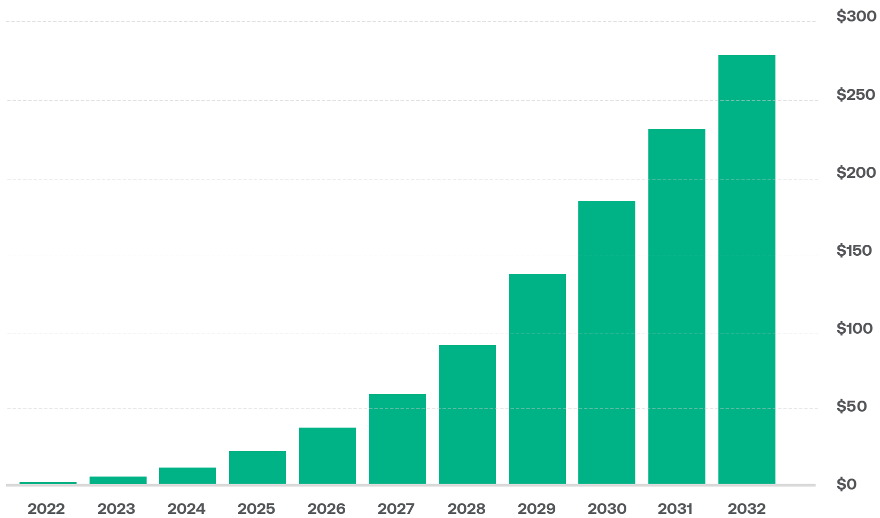
are almost behaving like these will be the only companies that will benefit. But what about the second-derivative companies, those beyond mega-cap tech? What about those companies that will be the users of AI or provide services ancillary to the technology?

Artificial intelligence networks can be operated on a large-scale basis, with networks running hyperscale models, or on a smaller scale basis running off cloud-based networks. Nvidia is the dominant player providing data processing equipment for large-scale models powering AI for big end users such as data centers. However, when it comes to cloud-based or ethernet networks, like the ones that will most likely be used to power AI in smaller units such as your smartphone, Nvidia has competition. Companies such as Broadcom (AVGO) and Cisco Systems (CSCO) also offer ethernet solutions that compete with Nvidia, and their stocks trade at less than half of the valuation of their larger rival. As we said before, we have no doubt that first movers like Nvidia will be winners in the AI era. However, let's remember that this company is predominantly a hardware manufacturer, making the equipment that enables AI. What about the companies that create and use software to power and benefit from artificial intelligence?

During a recent interview, Cathie Wood, manager of the famous ARK family of disruptive technology funds, stipulated that "…for every $1 of AI-related hardware that Nvidia sells, software firms will eventually generate $8 of revenue." (Cathie Wood, Bloomberg, 6/7/23). As we can see on the next chart, software spending on AI is expected to grow from approximately $5 billion to close to $280 billion by 2032. In fact, AI as a percentage of total software spending is expected to grow from less than 1% currently, to 12% or potentially higher over the next ten years. This increased level of spending on AI is expected to come from a number of industries, such as healthcare, cyber security, software development, robotics, and automation.

The healthcare industry is one that is set to potentially be revolutionized by the adoption of artificial intelligence. Robots might not replace doctors anytime soon, but they might help make their jobs easier. Overtime, AI is expected to simplify some tasks for clinicians, such as gathering patient information and providing diagnoses and recommendations for simple ailments. This could potentially decrease the need for patients

Projected Spending on AI Software (in billions of USD)



Source: Bloomberg Intelligence, IDC, Insigneo, as of 6/1/23

to visit medical clinics and emergency rooms, decreasing the load on the system and shortening appointment wait times. AI could also potentially affect pharmaceutical companies, taking on some of the simpler drug development and manufacturing processes.

Cyber security is another industry that will certainly be affected by artificial intelligence in more than one way. With new technologies come new groups of people trying to exploit them, so it is only a matter of time before hackers try to find ways to use AI for nefarious purposes. We are already hearing stories of AI being used to create fake pictures of events that did not happen or replicate human voices in an attempt to fool a person on the other end of a call. On one hand, artificial intelligence could fill the need for cybersecurity professionals, or at the very least, become an assistant, freeing them to do more specialized tasks. On the other hand, cyber security will be in high demand to protect the valuable networks and software required to operate this new technology. The global market for AI-related cyber security spending could surpass $100 billion over the next decade. Companies like Fortinet (FTNT), Palo Alto Networks (PANW), Okta (OKTA) and ZScaler (ZS) could be potential winners in this space over the long term.

Along the same lines, software development is likely to be simplified, with faster turn-around times, as artificial intelligence is used to read, write, and analyze code. Companies in data aggregation and analytics end markets such as Palantir Technologies (PLTR), Salesforce (CRM), and Snowflake (SNOW) are set to reap meaningful benefits, as they use AI to extract value out of raw data, along side their larger peers in the industry. In fact, symbiotic relationships are likely to flourish between many companies in this segment of the market.

The robotics, defense, and automation industries will also prove to be clear beneficiaries of artificial intelligence. We are already seeing defense companies such as Boeing (BA), Lockheed Martin (LMT), and Northrop Grumman (NOC) begin to test weapon systems based off their own drone platforms that could operate with artificial intelligence. These systems could potentially operate on their own, or at the very least provide a "virtual co-pilot" for the human in charge of the platform. Industrial companies such as Rockwell Automation (ROK), Johnson Controls (JCI), General Electric (GE), and Siemens (SIE GY) are already using artificial intelligence to promote machine learning and create tools and processes to exponentially boost production. The use of goods created by these companies permeates throughout a broad base of industries in the global economy, ranging from the processing of food and drinks to aircraft and auto manufacturing.

— "A myriad of factors, including **infrastructure and regulation could impact the adoption speed of AI**. Most regions in the world currently lack the proper infrastructure to maximize the benefits of this new technology. "

More broadly and perhaps most significantly, the exponential boost to global production capacity over the coming decades is set to have a meaningful impact on productivity growth across the world. Some estimate that the impact of artificial intelligence on global productivity will be akin to China's joining of the World Trade Organization in 2001 or the internet boom at the beginning of the millennium. These moves lowered labor costs and increased the interdependency of global manufacturing, eventually increasing productivity and driving overall prices lower. However, it took time for these dynamics to have a meaningful impact on global productivity. It is estimated that the internet boom took between 10-15 years to meaningfully increase per capita GDP in most countries around the globe. This is better than the 50+ years that it took the Industrial Revolution to achieve a similar outcome. It will most likely take the AI revolution considerably less time to achieve a meaningful, permanent move in global productivity. Some say that this number could be between 5-10 years, some say it could be less.

A myriad of factors, including infrastructure and regulation could impact the adoption speed of AI. Most regions in the world currently lack the proper infrastructure to maximize the benefits of this new technology. On the regulatory front, we are already seeing regulation take shape in Europe. Earlier this month, government officials in the United States debated the implications of AI on the global arena and how to regulate and mitigate some of its risks.

We have no doubt that artificial intelligence is here to stay and that it will have a meaningful impact on our lives, most likely in a shorter period than the internet boom did. It is important to keep in mind though, that however long it takes, it will probably not be overnight, as some in the market appear to believe. The mega-cap technology stocks that have led the current stock rally will undoubtedly be major beneficiaries of the AI trend. However, the benefits of this new technology will expand well beyond these companies. ■

House Views Matrix

	TACTICAL (UP TO 3 MONTHS)	CYCLICAL (UP TO 12 MONTHS)
US Equities[1]	NEUTRAL	UNDERWEIGHT
European Equities	OVERWEIGHT	OVERWEIGHT
Japanese Equities	OVERWEIGHT	OVERWEIGHT
Emerging Market Equities	NEUTRAL	OVERWEIGHT
Chinese Equities	OVERWEIGHT	NEUTRAL
US Treasuries[2]	NEUTRAL	OVERWEIGHT
Investment Grade Fixed Income	NEUTRAL	NEUTRAL
High Yield Fixed Income	NEUTRAL	UNDERWEIGHT
Emerging Market Sovereign	NEUTRAL	NEUTRAL
US Dollar	UNDERWEIGHT	NEUTRAL
Energy[3]	OVERWEIGHT	NEUTRAL
Precious Metals	UNDERWEIGHT	UNDERWEIGHT
Cash	NEUTRAL	OVERWEIGHT

[1] Relative to global equities in USD
[2] Relative to aggregate fixed income markets in USD
[3] Relative to an overall commodity allocation

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