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Overweight

Neutral

Underweight

No Exposure

## EQUITIES

<b>US Large Cap</b>	We are overweight large-cap stocks, as they continue to represent clear market leadership. Specifically, the “Super-6” (Magnificent-7 minus Tesla) – companies heavily leveraged to the AI investment cycle – are still driving most of the market-cap-weighted S&P 500 Index’s return. Related, we still favor US stocks broadly, as the US economy and Dollar remain relatively strong, and the majority of AI capital expenditures are being made right here in the US.
<b>US Mid Cap</b>	We remain overweight mid-cap stocks, though they are trailing their large-cap brethren. While large-caps offer financial stability, those not directly exposed to AI are often mature companies exhibiting slow growth. Small-caps have historically offered faster growth but have recently struggled with higher interest rates. Mid-caps offer a nice balance between the two and continue to trade at a big discount to large-caps, having averaged a slight premium over the past 25 years.
<b>US Small Cap</b>	Small-caps are hurt by higher interest rates more than large- and mid-caps because they often seek more bank lending. This is why they suffered so much as interest rates rose to multi-decade highs. While they now trade at a big discount to large-caps, we remain underweight as they’ll need interest rates to come down a lot to durably outperform. We don’t currently see that happening, as we expect the US economy to remain strong and inflation sticky.
<b>Int’l Developed Large Cap</b>	Developed international equities appear attractive on a valuation basis, as they have for more than a decade. Structural weaknesses and an elusive recovery in China, however, has kept economic growth tepid across developed economies and our positioning at underweight. Persistent US Dollar strength also remains a headwind for US investors trying to capitalize on the attractive valuations overseas. A durable uptick in Chinese economic growth and/or US Dollar weakness would improve the outlook for international allocations materially.
<b>Int’l Dev Small Cap</b>	We eliminated exposure to this asset class in the summer of 2022. Smaller international companies are more susceptible to the economic and geopolitical instability impacting Europe and other international economies.
<b>Emerging Markets (EM)</b>	Broad EM equity exposure hasn’t made sense for some time, leaving us at underweight. Historically the largest weight in the index (20%), China’s economy has for years been slowing materially. China’s relationship with the US continues to deteriorate, even as US Dollar strength exerts an additional headwind for US investors. We recently added a 2% weight to India, based on economic growth, demographics, and the ongoing shift of global supply chains.

## FIXED INCOME

<b>US Treasuries</b>	Interest rates have risen across all maturities, making US Treasuries more attractive as a hedge against an economic downturn. We are maintaining our current exposure but would increase our allocation opportunistically and if needed.
<b>US TIPS</b>	We have maintained an allocation to short-term TIPS to hedge against higher, more persistent inflation. Inflation pressures are easing, but at a slower pace than the market expected. TIPS remain attractive as a diversifier and an inflation hedge, and we will remain invested until a better investment opportunity arises.
<b>US Securitized</b>	US securitized bonds offer attractive yields, limited interest rate risk, and stable cash flows backed by consumer-focused collateral. They also increase diversification with risk characteristics that differ from traditional corporate credit.
<b>US Corporates</b>	Resilient US economic growth has caused corporate yield spreads to tighten to modestly overvalued levels. Even so, nominal yields are attractive, and the incremental yield over comparable US Treasuries is additive to portfolio returns. We are selectively choosing the bonds of issuers that are well-equipped to handle any softening in the US economy.
<b>High Yield</b>	We currently have no exposure to the traditional, syndicated High Yield asset class. Within this sector, credit fundamentals remain solid, and funding conditions remain favorable for companies. Tight credit spreads, which are well below their long-term median values, have us waiting opportunistically for a chance to allocate here.
<b>Floating Rate</b>	Bank stress ramped up sharply in March 2023 and, given tightening financial conditions and banking sector issues, we eliminated our exposure to floating rate bank loans. We hold an allocation to investment grade floating rate notes for their ability to preserve principal in any interest rate environment.
<b>Emerging Markets</b>	With low growth and credit concerns outside the US, we continue to remain within the US for our fixed income exposure, as a defensive measure. US Dollar strength on rising interest rate differentials has supported this posture.
<b>Private Credit /Preferred Equity</b>	Private credit offers an attractive yield and benefits from major banks’ recent exit from various credit businesses. It maintains strong underlying issuer credit quality. We are using private credit for accredited clients and maintaining exposure to preferred stocks for clients that do not qualify for participation in the private credit fund we’re using.

## ALTERNATIVES

<b>Commodities</b>	2022’s elevated inflation made commodities look attractive as a hedge. The Fed’s success in bringing inflation back down via higher interest rates resulted in our elimination of our position in early 2024.
<b>Real Assets</b>	This asset class offers attractive yields after inflation relative to bonds. It also improves diversification in portfolios and will likely dampen volatility in an environment of rising interest rates and/or inflation.

The third quarter of 2024 saw robust performance across most major asset classes in the US, with stocks reaching all-time highs and bonds rallying as the Federal Reserve (“Fed”) began its long-awaited interest rate-cutting cycle.

US large-cap stocks, as measured by the S&P 500 Index, delivered strong returns in Q3, rising 5.9% and bringing year-to-date gains to 22.1%. This marked the index’s best performance through the first three quarters of a calendar year since 1997 and was its 16th-best since 1926, according to Ned Davis Research. The rally was broad-based, with ten out of eleven economic sectors finishing higher. Importantly, this is our largest and most-favored equity allocation at present, and one being driven by the build-out of Artificial Intelligence (AI).

Illustrating the distinct broadening of the rally in Q3, mid-cap and small-cap stocks outperformed their large-cap counterparts. The S&P MidCap 400 Index gained 6.9%, while the S&P SmallCap 600 Index soared an impressive 10.1%. This outperformance reflected a healthy rotation into previously underperforming market segments – although still left the small-cap and mid-cap cohorts trailing large caps on a year-to-date basis with returns of 13.5% and 9.3% respectively. For diversification and a better value proposition, we are currently recommending mid- and small-cap equity allocations of 10% and 2% of equity allocation respectively.

Value stocks staged a comeback in Q3, too, with the S&P 500 Value Index returning 9.1%, outpacing the S&P 500 Growth Index’s 3.7% gain. This shift was particularly notable as investors rotated away from mega-cap tech names (think Magnificent 7) that had led the market earlier in the year. Like mid and small caps, however, the big Q3 pop still left Value trailing Growth, returning only 15.4% vs. 28.1% for Growth on a year-to-date basis.

Finally, international stocks also joined the catch-up parade, and like other year-to-date laggards, beat US equities in Q3. Developed market equities, as measured by the MSCI EAFE Index, rose 7.4%, while emerging market stocks delivered a

slightly better 8.9%, both benefiting from a weaker US dollar. Much like our US mid- and small-cap diversification recommendation, we’re suggesting 19% of equity allocation be allocated to international equities, with 17% in developed- and 2% in emerging-market equities.

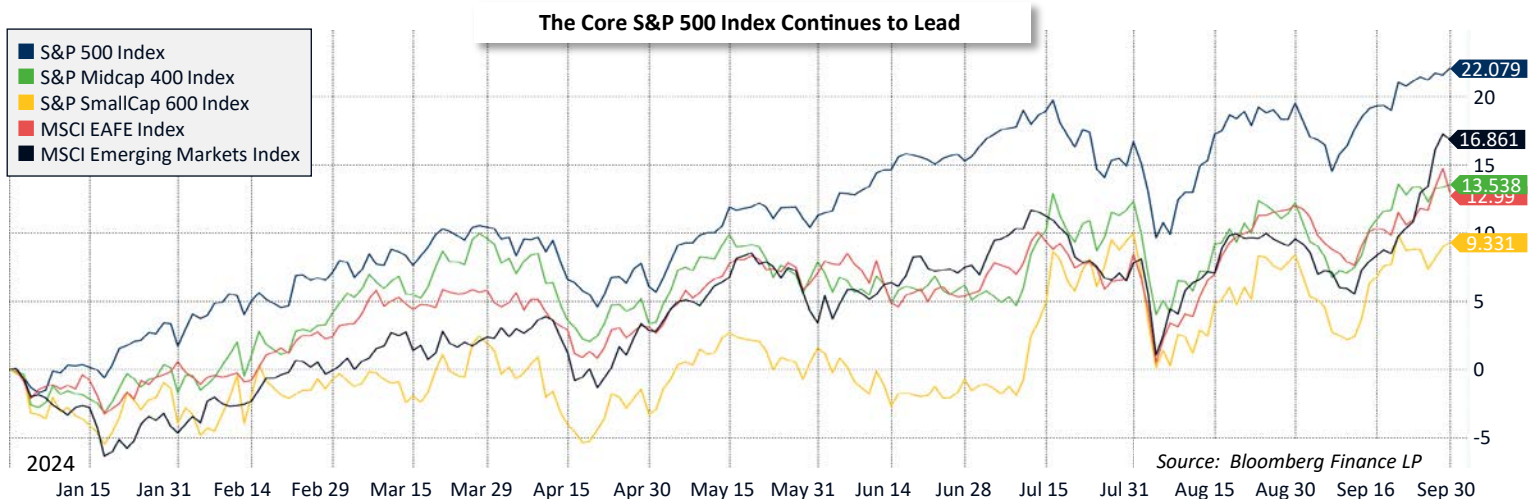
Fixed income was positively correlated with equities in Q3, albeit with somewhat more tepid returns. The rally was widespread across sectors, led by credit, as confidence that inflation was headed for 2% grew and as the Fed cut interest rates for the first time since 2020. As a result, the Bloomberg Intermediate US Government/Credit Index gained 4.2% for the quarter, bringing its year-to-date return to 4.7%. Yields on the 10-year Treasury note fell from 4.5% at the beginning of July to 3.8% by the end of September and the yield curve began to normalize, with the 10-year / 2-year Treasury spread turning positive after a record 26 months of inversion.

In alternative investments, our real estate and real assets (farmland, timberland etc.) allocations registered 2.9% and 3% total returns in Q3 respectively, reasonable but trailing the fixed income market, from which the allocations were sourced.

From here, the S&P 500’s \$8 trillion rally in 2024 will likely be tested by a tricky earnings season, war in the Middle East and the US Presidential election. Though we remain steadfastly bullish on equities long-term, seasonality, investor complacency, and above-average valuations all suggest that periodic downside volatility should be expected.

Importantly, however, any near-term weakness in equities should be bought, as we continue to believe equities will be the highest returning asset class in the forward twelve months, with high-single-digit returns vs. bonds (mid-single digits) and cash (low-single digits).

With downside risks to the economy now mitigated by the Fed’s nascent rate-cutting cycle, our confidence has increased that the cycle will be extended. Remember, it’s a bull market until proven otherwise. ■



Global equity markets continued to appreciate in the third quarter, although the underlying drivers of market performance shifted significantly. The S&P 500, the most followed stock market benchmark in the US, returned 5.9% in the quarter and brought returns in the first nine months of the year to 22.1%. While the S&P 500 fared well in the quarter, its returns were eclipsed by almost every other segment of the stock market for the first time in years. While there are a number of reasons for the shift in leadership in the past quarter, we believe that this is a positive development for equity markets overall.

The optimistic outlook for equities that we initially laid out in our January 2024 Market Outlook was built upon an expectation that equity returns would follow earnings growth; namely, by accelerating and broadening out across sectors and market segments beyond the large technology companies that had been leading the market. Earnings have come through as expected with overall S&P 500 earnings growth accelerating from negative territory a year ago to a double-digit pace today. While the initial stages of earnings acceleration were driven by the beneficiaries of a massive wave of investment in AI, nine of eleven economic sectors defined by Standard & Poor’s posted positive earnings growth last quarter, with six of those outpacing the earnings growth of the overall market. This diversification in earnings growth reduces the dependency on a single sector and provides a more balanced and resilient market.

While we have been expecting the rest of the market to catch-up to the narrow set of market leaders of the past few years, this happened with surprising speed and scope this past quarter. You can see from the chart below that on a trailing 10-year basis (the gray bars, arrayed from highest 10-year returns to lowest 10-year returns), the S&P 500 (e.g., large US stocks) have had the highest returns. However, in the third quarter (the blue bars), other areas of the market outpaced the S&P 500. This has partly been a result of earnings acceleration broadening out, and it has also been a result of some nascent skepticism of AI.

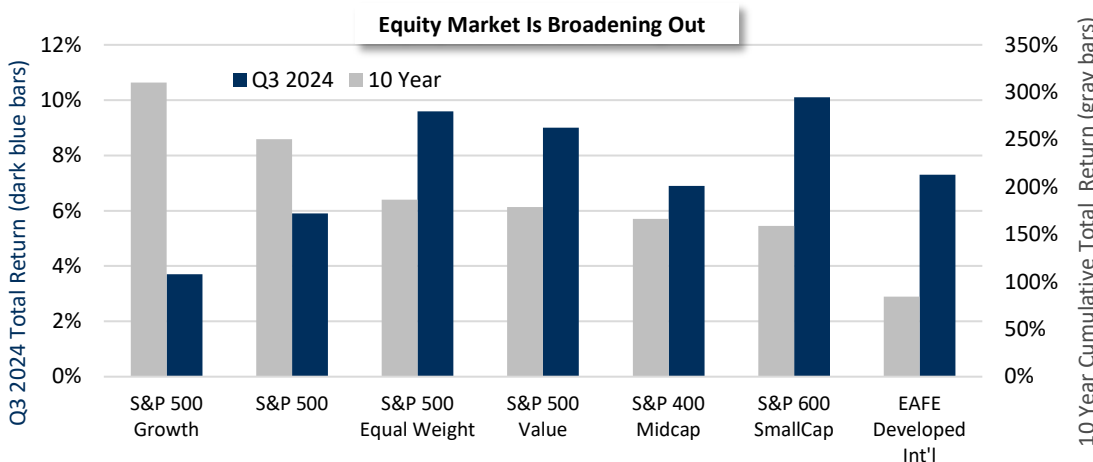
The AI investment cycle remains a significant earnings driver,

although the pace of growth of investment in this area appears to be moderating from the frenzied level of the past year. This is not necessarily detrimental to the overall market. As the initial buildout leads to more accessible AI tools, less investment may be required for companies to integrate AI to enhance efficiency, reduce costs, and drive innovation. As the technology matures, its impact on productivity and profitability is likely to become more pronounced, further strengthening the equity markets. Despite the positive trends in both short-term and long-term corporate profits, valuations in the equity markets remain reasonable outside of some of the trendiest areas. This is encouraging for investors, as it suggests that stock returns may continue to follow earnings growth.

In terms of risk factors, the global economic environment has remained relatively benign as noted on page 3 and provided a stable foundation for equity markets. The Fed has adopted a proactive approach, taking decisive action to reduce interest rates to balance inflation and labor market risks. This has resulted in an improved monetary policy outlook, which is crucial for bolstering investor confidence. While our base case remains the elusive “soft landing” where the Fed sustains economic growth without overheating or overly cooling the economy, this is a delicate balancing act. If it cuts rates too quickly, it risks unleashing pent-up demand for large purchases that are typically financed (homes, cars, etc.), and if it moves too slowly it is possible that the current slowdown in economic activity will become a self-reinforcing downturn resulting in an economic recession. While stocks could prove vulnerable if economic growth deteriorates, volatility could also increase as a result of an unstable geopolitical environment and the upcoming elections.

As we consider the outlook from here, the shift in the underlying drivers of stock market returns in the past quarter looks like the beginning of a durable trend rather than a one-off exception to ongoing dominance of global equity markets by large-cap US growth stocks. The equity markets appear poised for continued progress, driven by a benign economic backdrop, proactive monetary policy, diversified earnings growth,

reasonable valuations, and ongoing AI investments. Nevertheless, investors should be prepared for short-term volatility resulting from shifting monetary policy, geopolitical uncertainties, and the presidential election cycle. To navigate this environment, we remain diversified and overweight equities, with a bias towards larger, high-quality names in the United States. ■



Within fixed income markets, we continue to see more positive than negative signs. Some notable positive signs include easing monetary policy via rate cuts, the changing slope of the yield curve, and a flood of bond issuance from both corporate and municipal issuers.

A widely anticipated Federal Funds rate cut drove market yields lower and helped normalize the shape of the yield curve in the third quarter. The 0.50% reduction brings the short-term rate to a range of 4.75% to 5.0%. After spending the last couple of years singularly focused on inflation, the Fed’s mindset has shifted to supporting the economy now that inflation is on a downward trajectory. By and large, the US economy remains sound, yet there are signs of deterioration in US labor markets that the Fed is looking to forestall. Most recent adjustments to the Fed Funds rate have occurred in 0.25% increments, so the market viewed the 0.50% cut as a forceful commitment to keep the economy on solid footing. In Fed Chair Jerome Powell’s words, “Overall, the economy is in solid shape; we intend to use our tools to keep it there.” Some effects of lower rates are immediately positive as reduced borrowing costs increase the flow of capital to companies and consumers. A prime example is home-refinancing applications, which have almost tripled since early July, albeit from a low level. An improvement in both consumer and corporate sentiment is a less tangible effect, but a powerful one nonetheless, and should lead to increased spending and investment.

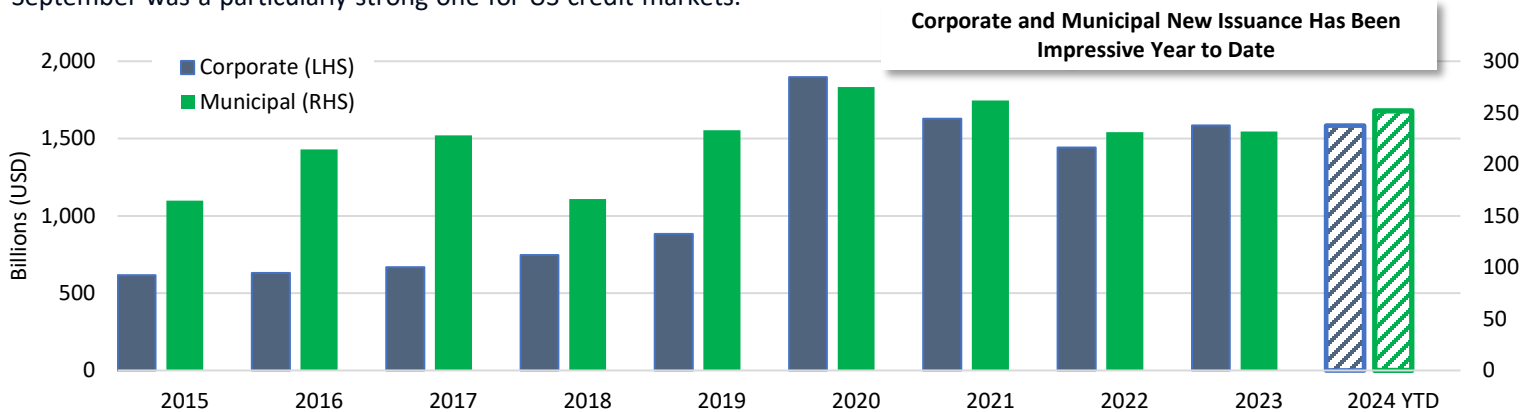
Another notable development has been the changing shape of the yield curve. After more than two years of being “inverted,” with short-term rates higher than longer-term rates, the shape of the curve has normalized and is now modestly upward-sloping. While an inverted yield curve is generally seen as a negative omen, an upward-sloping yield curve is a positive sign, signifying a positive trajectory for economic growth. The municipal and corporate bond curves are also upward-sloping, which means that buying longer maturity bonds earns an investor additional yield.

Bond issuance was unusually high in the third quarter as credit conditions remained favorable and issuers looked to resolve any funding needs prior to the election. The month of September was a particularly strong one for US credit markets.

Over \$170 billion of investment-grade corporate bonds were issued in September, which is a record. Despite the large issuance size, bond deals were oversubscribed by 5.4 times, meaning \$170 billion worth of bonds received \$918 billion worth of orders from investors. If you include all issuance globally, more than 1,226 issuers sold over \$600 billion bonds in the month (source: Bloomberg), which is the most for a September in more than two decades. Year-to-date issuance is already higher than the full year 2022 and 2023, and 2024 is on pace to be the highest issuance year ever. Completed bond deals means companies have locked in borrowing rates and, in many cases, pre-funded upcoming bond maturities. Broadly, robust bond issuance is a good sign for the continued health of company balance sheets and a positive signal from credit markets.

There are certainly potential risks on the horizon that we are monitoring. For one, the election could be disruptive to interest rate markets if deficit concerns take hold again. Moody’s, the only major rating agency that maintains the US credit rating at AAA, spoke out in September about deficit concerns. They [stated](#) that “debt dynamics (are) increasingly unsustainable and inconsistent with a AAA rating if no policy actions are taken to course correct.” Another risk is an unexpected increase in inflation that changes the market narrative. Commodity prices have been sharply rising and core services and shelter inflation has stayed stubbornly high. The dockworkers’ strike looks resolved for the time being, but it broadly shows that labor’s bargaining power is real: this could lead to further inflationary pressures.

Within portfolios we have been maintaining an average duration of 3.5 to 4 years (neutral to the benchmark), since we have little conviction about the direction of the next big move in interest rates. We continue to favor the corporate and municipal bond sectors given the health of their cash flows and balance sheets. Our allocation to short-duration Treasury Inflation Protected Securities (TIPS) should help cushion any unexpected uptick in inflation. Attractive interest rate levels are helping fixed income securities make a meaningful contribution to portfolio returns, and we expect this to continue. ■



In Q3 2024, global equity markets demonstrated remarkable resilience, with the MSCI ACWI Index climbing 6.7%. However, market volatility spiked in early August as Japanese and global equity markets experienced a sharp downturn following the Bank of Japan's unexpected 0.25% interest rate hike and weaker-than-expected US July job numbers. Despite the shock, the Bank of Japan's swift action to then pause rate hikes, coupled with rate cuts from other major economies, restored investor confidence, leading to a rapid recovery in global equities in September.

A key highlight of the quarter was the outperformance of international equity markets compared to US equities, reversing a trend that began in 2023. The MSCI World ex-US Index rose by 7.8%, surpassing the S&P 500's 5.9% gain. Developed markets advanced 7.4%, buoyed by strong earnings expectations in Europe and Japan. Emerging markets rallied 8.9%, driven by a surge in Chinese equities following the announcement of a major stimulus package. These results highlight the increasing opportunities in markets outside the US, where growth potential remains robust.

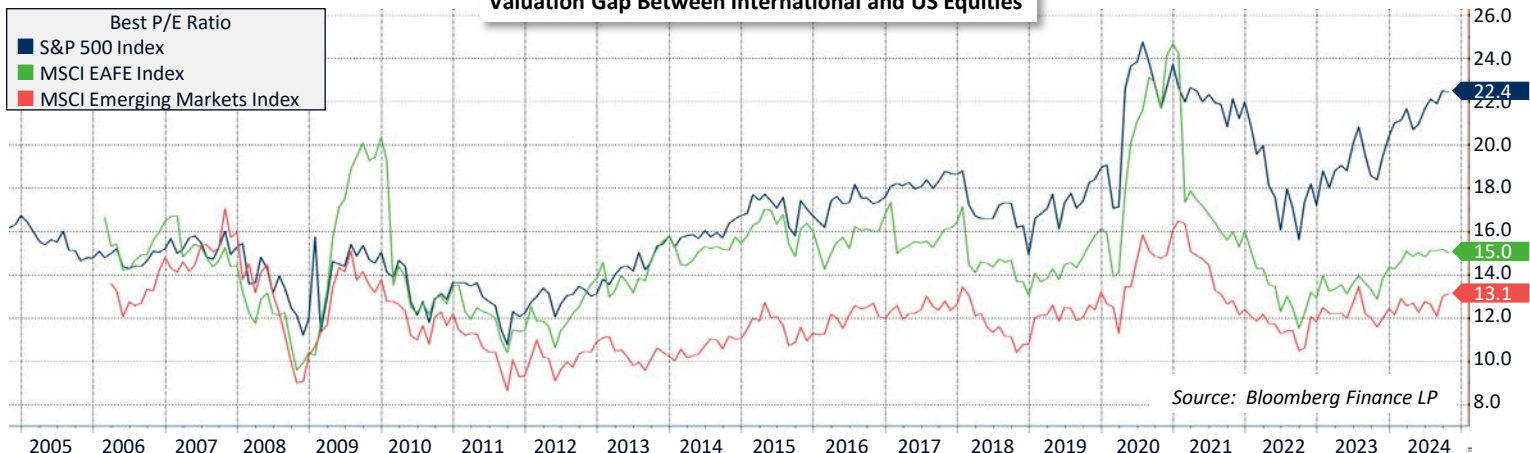
Looking ahead to Q4, international markets appear well-positioned for further gains. Developed markets are benefiting from continuing economic improvement, rising corporate earnings, and ongoing support from central banks. The European Central Bank and the Bank of England are expected to follow the Fed's recent 0.50% rate cut, potentially injecting additional liquidity into markets. While challenges persist in the Eurozone, such as the contracting manufacturing PMI at 44.8, there are reasons for optimism. We anticipate a gradual recovery in the Eurozone, driven by rising global trade and improving consumer spending. Japan also shows promise, with the newly elected government advocating for continued monetary easing and proposing policies to stimulate consumer spending. Corporate earnings in international developed markets are expected to grow, with Bloomberg projecting a 4.7% increase in FY2024, accelerating to 6.3% in FY2025. We believe the UK, Germany, and Japan are likely to lead earnings growth as their economies recover.

Emerging markets have consistently outperformed both developed international markets and US equities over the past two quarters. India was the standout in Q2, while China's rebound drove Q3 gains. Although inflation remains high and monetary policies are still relatively tight, the Fed's recent rate cut could prompt similar moves in emerging markets, further boosting corporate earnings growth in the region. Bloomberg estimates that emerging market earnings will rise by 13.5% in FY2024 and accelerate to 15.6% growth in FY2025. India continues to be a standout, benefiting from strong economic growth, rising foreign investment, and favorable demographics. China's outlook is more complicated. The country's unprecedented stimulus measures fueled a sharp stock market rally, with the CSI Index surging 25% in five days. Despite this, China's long-term structural issues—such as an oversupplied real estate market and an aging population—call for a cautious approach to Chinese equities.

One of the most significant market dynamics over the past two decades has been the widening valuation gap between international and US equities as shown in the chart below. According to JP Morgan, international stocks are now trading at a 36% discount to their US counterparts. While US markets have commanded a premium due to strong earnings growth—particularly in the tech sector—this gap may narrow as international equity markets continue to recover. Nevertheless, risks remain, including geopolitical tensions in the Middle East and the potential for tariff escalations following the US presidential election, which could introduce further market volatility for international equity markets.

As we move into Q4, we believe that a diversified approach focusing on high-quality, attractively valued companies with improving fundamentals is essential for navigating these uncertain times. With central banks remaining supportive and economic recovery gaining momentum, international equities present promising opportunities, though investors should remain vigilant of potential risks on the horizon. ■

Valuation Gap Between International and US Equities



The substantial rise in short-term interest rates that began in March of 2022 had a meaningful impact across private markets, because most private market strategies utilize some degree of leverage. When interest rates increase, this can create issues for owners to make higher interest payments, to refinance their existing debt at maturity, and/or to sell at a valuation that a third party is willing to bear. Consequently, private asset values were negatively impacted from early 2022 to mid-2024 as valuations adjusted to the higher interest rate environment. It has been well-publicized that commercial real estate valuations declined by roughly 20% during this period due to rising capitalization rates (“cap rates”), even though fundamentals were robust across most commercial real estate market segments (excluding the office segment). In the third quarter, this interest rate-driven adjustment largely ended, as September’s interest rate cut stabilized valuations. This environment should allow fundamentals to be the primary driver of investment performance going forward, and we highlight the conditions in the real estate and renewable infrastructure markets in greater detail below.

**REAL ESTATE**

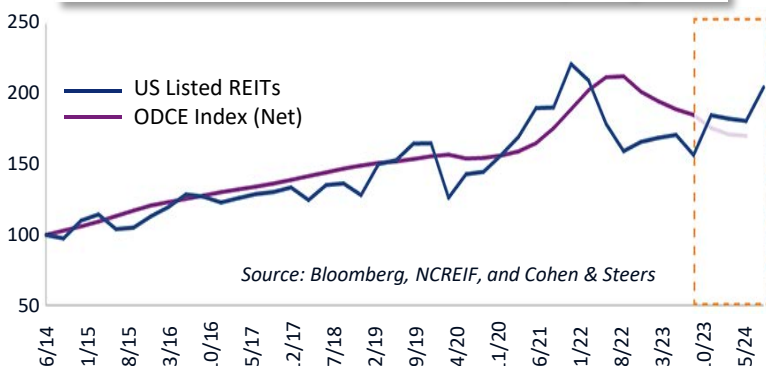
For context on private real estate, investors first look to publicly listed real estate. While valuations diverged in 2022, they converged in 2023 and 2024 YTD as public sentiment increased from the trough and private marks declined to better reflect prevailing cap rates. The chart below shows returns of public REITs and institutional private REITs (Open End Diversified Core Equity or ODCE funds). Occupancy and rent trends have remained positive, outside of commercial office and malls, which are likely to remain challenged for the foreseeable future. While the multi-family market dealt with flat rental growth over the last twelve months, occupancy for institutional owners has remained high at 90-95%+, indicating a healthy market. Three-month multi-family construction starts have declined 42% from peak in November 2022 to June 2024, implying that future supply is likely to be below demand. This will allow owners to more aggressively increase rents going forward. Other notable sectors include industrial, where rent growth and occupancy have remained robust and construction

starts have declined by 72% from peak, and datacenters, which remain a hot growth sector with projected rent growth of 17% in 2024. While returns for core real estate remain muted year-to-date at low to mid-single digits through 3Q24, expectations are for increasingly positive performance in 2024 given the absence of interest rate headwinds and further improvement in 2025 given supply/demand dynamics.

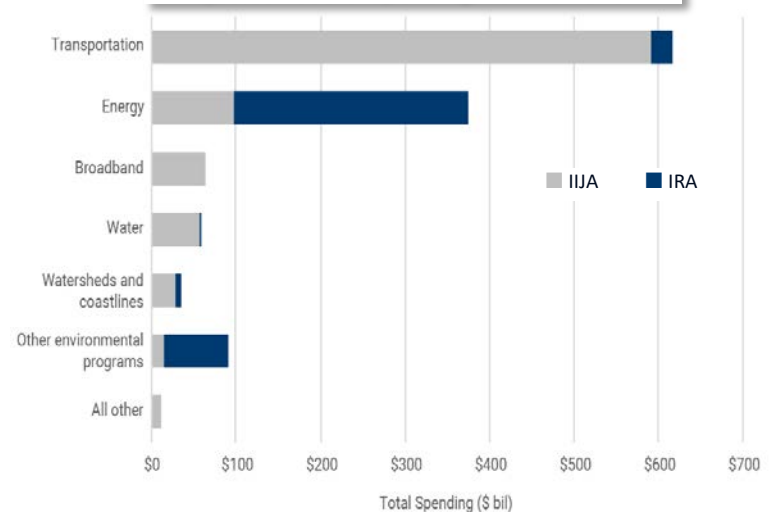
**RENEWABLE INFRASTRUCTURE**

Renewable infrastructure has enjoyed considerable tailwinds over the last several years, with substantial capital earmarked in the \$1.2 trillion Infrastructure Investment & Jobs Act (IIJA - 2021) and the \$900 billion Inflation Reduction Act (IRA – 2022), both of which included substantial spending and tax incentives for the development of clean energy. Renewables currently make up 35% of the energy mix in the US and EU, up from ~20% in 2015, and spending on renewables is expected to double by 2030. Developers and utilities are increasingly relying on public-private partnerships to provide capital for development and ownership of these projects. The energy needs of AI further support renewable infrastructure development in the US for the medium-to-long term. These assets typically benefit from exceptionally long useful lives (30-40 years) and long-term power purchase agreements (15+ years) that provide consistency of returns for investors. Returns in core infrastructure have outperformed core real estate year-to-date, generating mid-to-high single digits, despite dealing with the same pressures from interest rates from 2022 to mid-2024. With massive capital needs and strong fundamental drivers in place, performance is expected to further improve in 2024 and into 2025. ■

**Listed REIT Returns Indicate Private CRE May Trough Soon**



**Projected Federal Spending from IIJA and IRA**



Note: Projected spending includes advance appropriations, budget impacts of IRA tax credits as estimated by CBO, and a small number of authorized programs  
 Source: Brookings analysis of Infrastructure Investment and Jobs Act, Inflation Reduction Act, and CBO Data

The tension is palpable. Are large tech companies and their cloud/AI spending compounding climate change, or are they part of the solution? Investors are increasingly asking this question. Picking up from our newsletter last quarter on powering GenAI, this quarter we are digging deeper into corporate climate targets and the mechanisms used to drive change.

Over the last few months, the four large “hyperscalers” ([Amazon](#), [Microsoft](#), [Google](#), and [Meta](#) – major cloud & AI leaders) all released environmental sustainability reports covering the most recent fiscal year for each. A review of these environmental reports shows that the goalposts have not changed – all four maintained their commitments to decarbonization. Microsoft, Google, and Meta target “net-zero” CO<sub>2</sub>e emissions by 2030, while Amazon targets 2040, all four are ahead of the *Paris Agreement* target of 2050.

These targets cover all company emissions, including “Scope 3,” or value chain emissions. All four hyperscalers note that embodied emissions (from cement, steel, tech hardware, etc.) in new data center construction represent a challenge as they scale cloud and AI-related infrastructure. While aggregate CO<sub>2</sub>e emissions for this group are up 25% from 2020, the one-year change in 2023 showed a slight decrease, and carbon intensity (emissions divided by revenue) is falling across the group.

Action to date and plans for the future involve a number of factors that can be quite different across these hyperscalers including approaches to procuring clean energy, the use of carbon offsets, plans for direct carbon removal, and approaches to supply chain decarbonization, among others. Both Amazon

and Meta have done more to lower emissions recently through lower carbon construction sourcing, and in Amazon’s case, insourcing and electrifying their transportation fleet. Both companies reported lower Scope 3 and overall emissions in 2023. Microsoft and Google have both heavily ramped up spending on AI-related infrastructure, driving increased Scope 3 and overall emissions in 2023 compared to 2022. While Amazon and Meta appear to be making more progress, transition plans at Microsoft and Google are more ambitious, involving more direct use of clean energy hourly matching of supply with demand.

The approach to clean energy procurement is important to consider over the coming years. As discussed last quarter, the upward pressure from embodied emissions associated with data center construction should begin to ease as focus turns from building infrastructure to running infrastructure. As data centers are completed and utilized, the carbon profile shifts from embodied resources to long-term power demand for direct operation. The hyperscalers see this growing direct power demand coming and are working to address it.

There are a few ways companies can procure clean energy, with the most common including building on-site generation (solar panels on a roof), buying renewable energy credits (RECs), and entering into power purchase agreements (PPAs). The large hyperscalers all engage in some combination of these approaches. The intensity of data center power demand makes on-site renewable energy generation at best a minor factor, leaving the heavy lifting to RECs and PPAs.

CONTINUED

TERMS

CO <sub>2</sub> e	Carbon dioxide equivalent is a metric that captures the global warming potential (GWP) of seven main greenhouse gasses (GHG) normalized to the GWP of carbon dioxide
Electricity generating capacity	Measures of the maximum amount of electricity a generating plant can supply at a point in time. 1 kilowatt (1kW) = 1,000 watts (W)   1 megawatt (MW) = 1,000 kW   1 gigawatt (GW) = 1,000 MW <i>Note: A 100 MW natural gas-generating plant operating at the US average capacity factor of 57% would produce roughly 500,000 MWh of electricity in one year (100 MW x 8760 hours/yr x 57%)</i>
Electricity usage	Measures of electricity supplied over one hour. 1kWh = 1,000 watt-hours   1MWh = 1,000 kWh   1GWh = 1,000 MWh <i>Note: According to the US Energy Information Administration, the average American home uses roughly 10.8 MWh of electricity per year</i>
Generative AI (GenAI)	A type of artificial intelligence capable of generating content such as text, images, video, code, and more, based on user prompts
Hyperscaler	The largest cloud providers delivering services like storage, computing, networking, and other outsourced infrastructure, software, and platform services at extreme scale to enterprise customers
Scope 1	Direct GHG emissions from owned or controlled sources (e.g., running a boiler in an owned property to produce heat or electricity)
Scope 2	Indirect GHG emissions from purchased energy or electricity (e.g., turning on the lights in an owned office building that is connected to the grid)
Scope 3	Value chain GHG emissions from all of the suppliers' allocation of GHG emissions considered inputs to a company and GHG emissions from customers' utilization of products or services

Both RECs and PPAs support clean energy development, though otherwise they are quite different. RECs represent the environmental benefits of 1 megawatt hour (MWh) of renewable energy generation. Corporations that mention the use of RECs in sustainability reports are typically referring to unbundled RECs, meaning the environmental attributes are separated from the physical power generated and delivered. This creates flexibility as companies can buy RECs to match all or part of their annual electricity demand regardless of where or when the power is produced. PPAs, on the other hand, are long-term contracts that are typically 10-20 years, in which a company agrees to buy the power output of a renewable energy project at a predetermined price through the grid, thereby taking power and environmental attributes. This means the renewable asset is a new additional source of power on the grid the company is drawing from. The economic benefits of both RECs and PPAs are meaningful, though PPAs are more direct and long-term in nature, enabling financing of renewable energy projects, commonly referred to as “making a project bankable.” This additionality is increasingly a sought-after attribute by corporations focused on environmental sustainability as it directly finances decarbonization and creates a more tangible tie to the renewable power supply.

The four hyperscalers have made extensive use of RECs to support operational carbon neutrality claims through annual matching. All four also note in their environmental reports that RECs are transitional tools as they move toward direct procurement through PPAs. Actions speak louder than words, and here the actions are significant. As illustrated in the chart below, the four hyperscalers are the largest corporate PPA counterparties, representing about one-third of all PPA deals annually by capacity. Over the last three full years, the hyperscalers represented on average 42% of all PPA deals. Year-to-date 2024, the PPA market is up 33% over the same period in 2023. These PPAs represent clean power the hyperscalers will

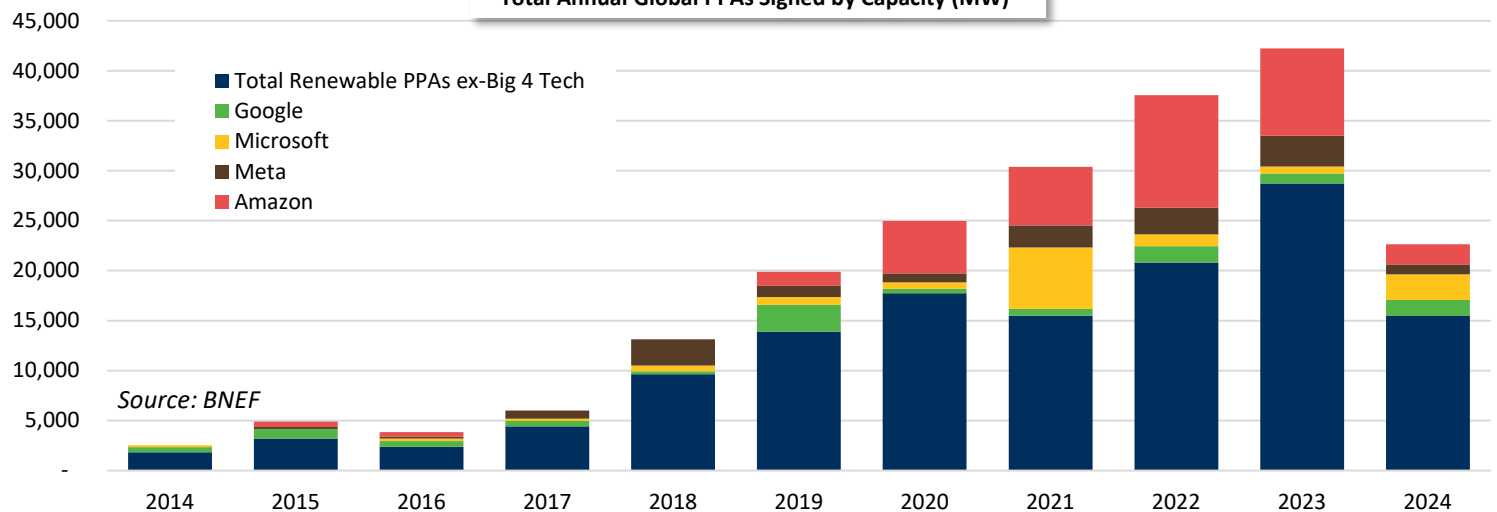
begin to take delivery of over the next few years, lining up with expected higher levels of direct data center demand.

The market for PPAs should continue to grow as the US and the world more broadly electrify, driving demand and thus pricing in a supply-constrained power market. The fixed price PPAs corporations sign for renewable energy look increasingly attractive as market prices rise. Additionally, project economics are improving as component costs fall with scale and as interest rates normalize.

Recently, the PPA market has experienced a series of large, announced deals across a broad range of clean energy generating assets. These include a [deal](#) Amazon struck with Talen Energy in March for a data center with PPA connected to an operating nuclear plant, deals Microsoft made with [Brookfield](#) in May and [Global Infrastructure Partners](#) in August related to future multi-gigawatt (GW) renewable and storage development, a Google [deal](#) in June for a geothermal PPA, and most recently, the Microsoft [deal](#) with Constellation Energy to restart one of the Three Mile Island nuclear units.

These and other PPAs for renewables plus storage, geothermal, and nuclear represent a path toward more direct clean energy procurement for hyperscalers. Both Microsoft and Google target 24/7 matching of clean energy supply to demand as part of their 2030 net-zero targets. Hourly direct matching goes a step beyond the traditional PPA to ensure the clean energy is not just hitting the grid but doing so where and when the demand occurs. This is additionality and accountability at its best and a clear trend in the corporate clean energy procurement market. We expect to see more direct deals like the selection described above as a growing number of corporations participate based on attractive project economics, power price certainty, and enhanced credibility of net-zero targets. To answer the question posed at the outset, we believe it is increasingly clear that hyperscalers are part of the solution over a multi-year horizon. ■

Total Annual Global PPAs Signed by Capacity (MW)



Source: BNEF



		Last 3 Months	Last 12 Months*	20-Year Annual Return**
	S&P 500 ( <i>Large US Companies</i> )	5.89%	36.35%	10.70%
	S&P 400 ( <i>Mid-size US Companies</i> )	6.94%	26.76%	10.28%
US Equities	S&P 600 ( <i>Small US Companies</i> )	10.11%	25.76%	9.65%
	Russell 3000 ( <i>All US Companies</i> )	6.23%	35.18%	10.59%
	Dow Jones US Real Estate Index	17.08%	34.17%	7.53%
	MSCI World Index ex US ( <i>Developed Markets</i> )	7.84%	25.64%	6.62%
International Equities	MSCI EAFE ( <i>Developed Markets</i> )	7.35%	25.45%	6.60%
	MSCI Emerging Markets ( <i>Emerging Markets</i> )	8.88%	26.54%	7.67%
	MSCI World ex US Small Cap ( <i>Developed Markets Small Companies</i> )	10.56%	23.97%	7.37%
	Bloomberg Intermediate US Government/Credit TR	4.17%	9.45%	3.00%
	Bloomberg US Corporate High Yield Total Return	5.28%	15.74%	6.67%
	Bloomberg Intermediate Corporate Total Return	4.66%	11.90%	3.92%
	Bloomberg US Intermediate Treasury TR	3.97%	8.35%	2.59%
Fixed Income	Bloomberg US Treasury Inflation Notes TR	4.12%	9.79%	3.58%
	Bloomberg US MBS Index Total Return Value Unhedged	5.53%	12.32%	3.04%
	Bloomberg Global Aggregate ex USD 10% Issuer Capped (Hedged)	8.08%	13.26%	2.20%
	J.P. Morgan Emerging Market Bond Index Global Core	0.30%	9.02%	5.90%
	Bloomberg Capital 5-Year Municipal Bond	3.04%	7.56%	2.91%
Inflation	US CPI Urban Consumers ex Food and Energy NSA***	0.44%	3.20%	2.46%
Treasury Bill	US 3-Month Treasury Bill Index	1.43%	5.56%	1.66%

Source: Bloomberg Capital Markets

\* Includes dividends for equity indices

\*\* Annualized

\*\*\* CPI data for time periods is date ended 8/31/2024

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