Goldman Sachs | Asset Management

Summer 2022
Issue No. 3

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A different lens for portfolio construction

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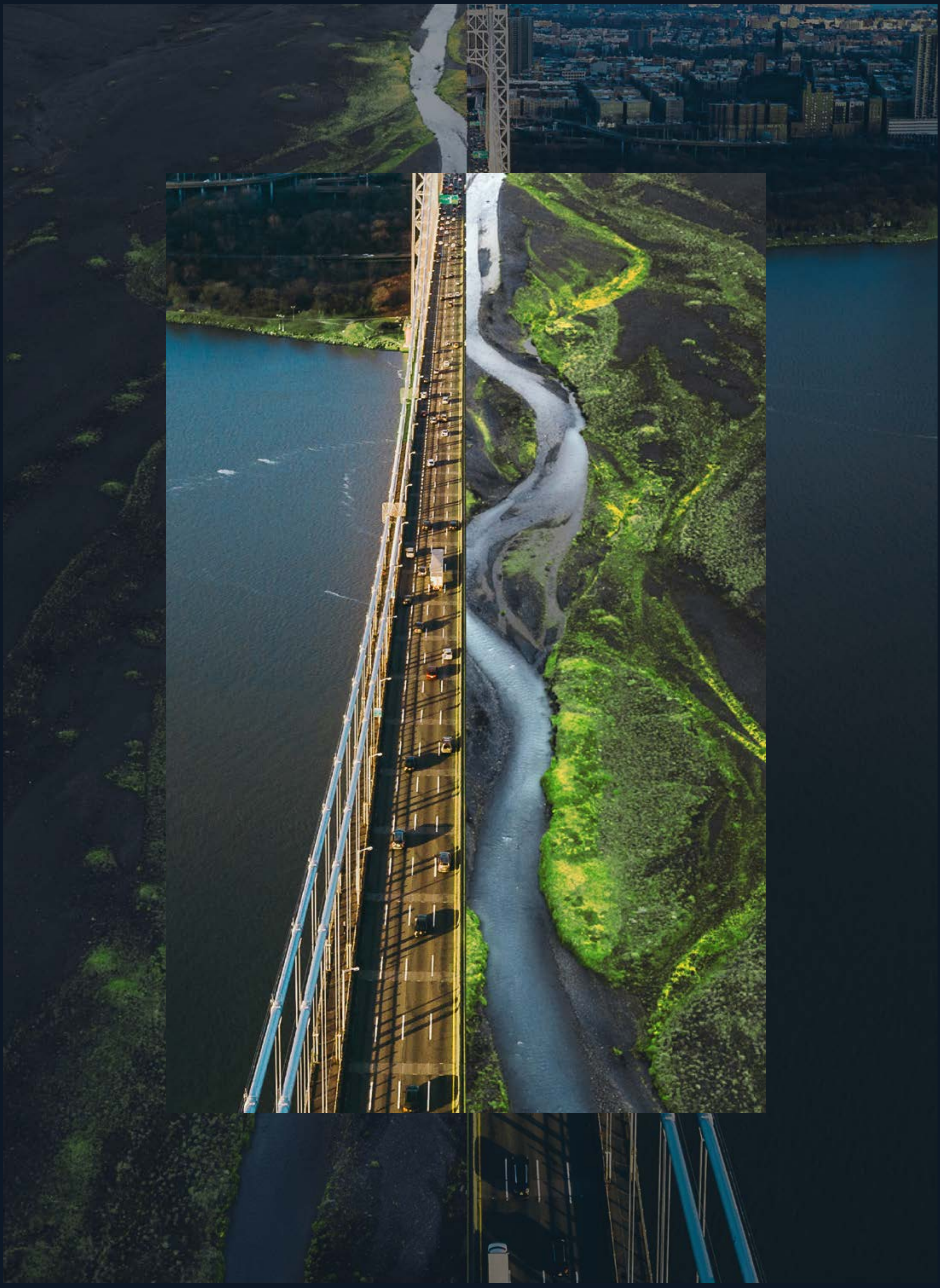

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PERSPECTIVES AT A TIME OF INFLECTION

Investors today are facing several inflection points—a shifting macro-economic landscape, new geopolitical interconnections, accelerations in the adoption of new technologies, heightened sensitivity to sustainability, convergence and innovation in markets—all confronting their portfolios and people at the same time. After experiencing years of accommodative fiscal and monetary policy, investors now face an unfamiliar environment, where traditional approaches and conventional pattern recognition may be of limited value.

At the same time, amidst these challenges and a widening dispersion of investment outcomes, investors sense that this new environment creates new opportunities, in a world re-shaped by several "once in a lifetime" events. These are the moments where investors need perspectives of expansive breadth and unusual depth, triangulating across public and private markets, spanning all geographies, and imagining an array of scenarios extending long into the future.

Welcome to the summer edition of the *Goldman Sachs Asset Management Perspectives*, our quarterly compilation of insights from our more than 6,000 investment and client solutions professionals working across 60 offices around the world. In this edition, we explore how inflation is shaping investment opportunities, examine new tools for evaluating portfolios, and share ideas on manager selection. We also look at technological disruption, particularly in the context of digital infrastructure, life sciences, cyber security, and recent developments in growth equity investing. And we consider how markets are evolving over near-term horizons and across longer-term trends to better frame how investors are preparing for tomorrow.

At Goldman Sachs Asset Management, we capitalize on our global resources and unique position at the center of the world's capital markets to serve our clients. We connect the private markets and public markets, empowering our investment teams to share and debate macro-economic perspectives, and together reflect on future themes and trends. We use the breadth and depth of our alternatives and traditional investment strategies, complemented by the scale of our operating capabilities, to design a wide array of effective customized solutions.

We're excited to bring these insights and solutions to you. We look forward to continuing our discussions, and we're grateful for the opportunity to work with you. ■

Julian & Luke

Julian Salisbury
Global Co-Head of Goldman Sachs Asset Management

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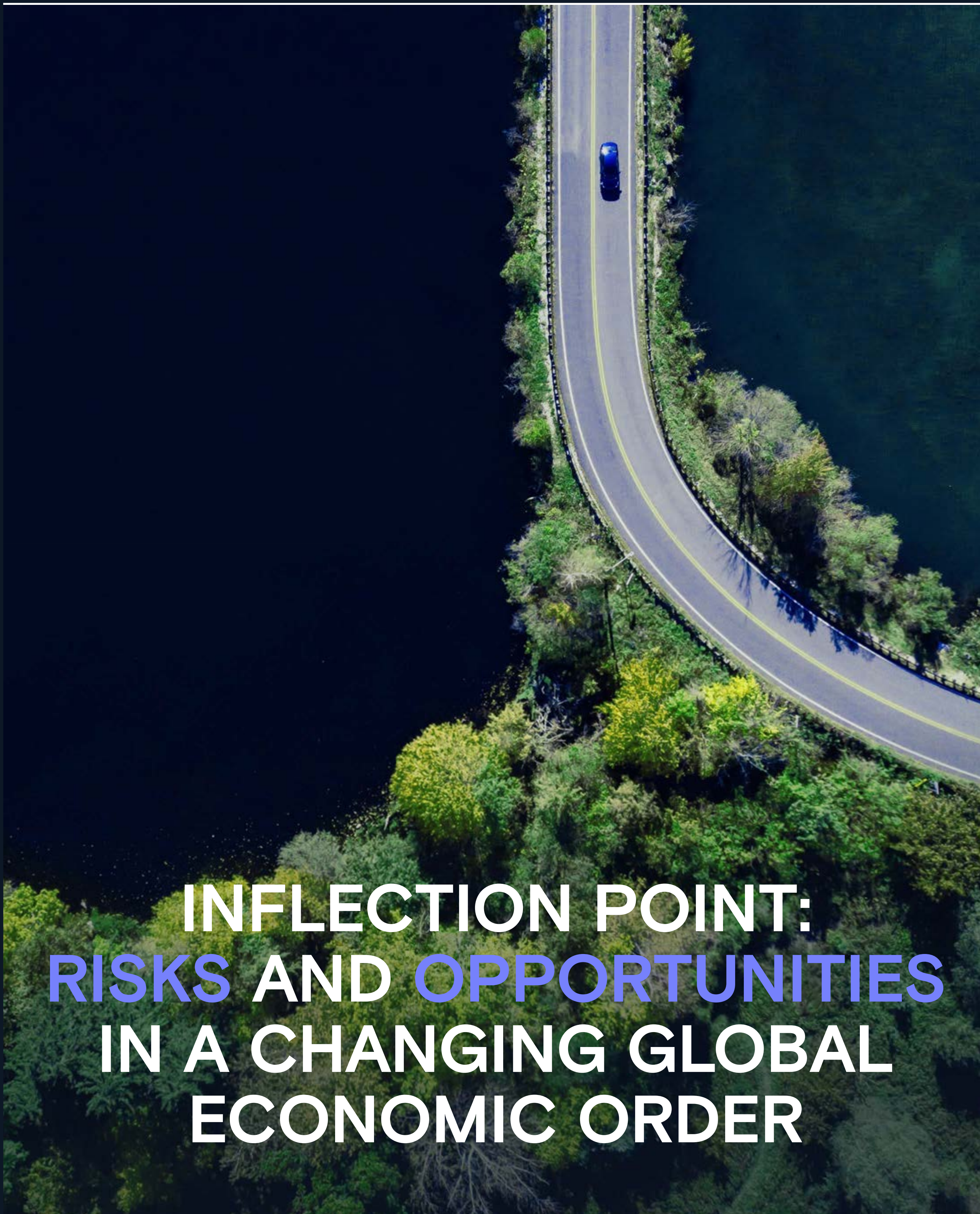


INFLECTION POINT: RISKS AND OPPORTUNITIES IN A CHANGING GLOBAL ECONOMIC ORDER

Maria Vassalou is Co-Chief Investment Officer of Multi-Asset Solutions at Goldman Sachs Asset Management

The last several decades have been good ones for most investors. Robust economic growth, relative geopolitical stability, persistently low inflation and interest rates, and supportive global central banks have translated to strong portfolio performance with relatively low volatility.

KEY TAKEAWAYS

- Macroeconomic conditions are changing: Interest rates and inflation are rising. Attractively priced assets are scarce. And growing geopolitical unrest is making the world less stable.
- Navigating this new reality, defined in part by deglobalization, will create risks and opportunities and calls for an active investment approach that combines public and private assets.
- Investors should prepare to lean into long-term economic transformation, embrace regional diversity and play defense creatively.

Today, the world is at an inflection point. The COVID-19 pandemic accelerated digitization across many industries, disrupted supply chains, and helped spark demographic shifts as remote work became the norm for many professionals. Interest rates are rising to combat persistent inflation while economies look to secure supply chains and reverse decades of globalization. Elevated sensitivity to climate issues is spurring investment in decarbonization and sustainability, while geopolitical instability has roiled energy markets and increased overall uncertainty. These issues are creating market conditions and demanding policy prescriptions that many of today's market participants—managers, traders and even most policymakers—have little experience with, and are provoking questions about what the world will look like in the decades to come.

While supply disruptions should ease as COVID-19-related restrictions and shortages fade out and the war in Ukraine ultimately reaches resolution, these pressures of digitization, deglobalization, demographic shifts, decarbonization, and geopolitical destabilization are likely to endure for some period of time, leading to a rise in dispersion across various dimensions and changing the outlook for investors. In this new environment, the portfolio construction playbook that worked so well in recent decades may be less effective going forward, forcing a re-think in approach. We believe active management and a dynamic approach to portfolio construction that combines public and private assets may help provide improved performance resilience as markets face these disruptions that are likely to have profound effects on the world economy.

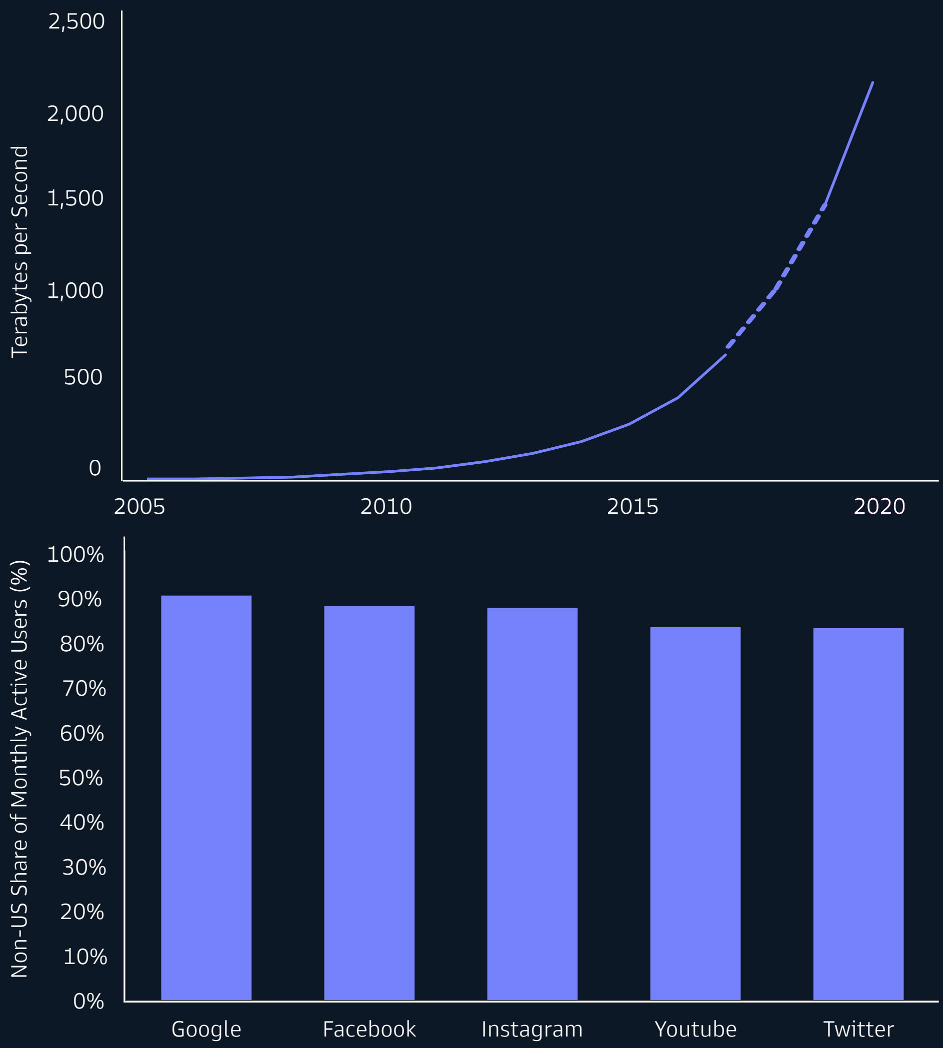
TIME TO ADAPT

In our view, the following important structural developments will spark profound changes to the global economy with the potential to alter the trajectory of countries, companies and the way we invest. Some are likely to keep prices higher than they have been in recent decades whereas others will have deflationary effects. All will generate uncertainty and have the potential to contribute to an elevated level of market volatility.

Deglobalization: A partial shift away from a world in which goods, people, capital and ideas flow freely across borders began before the pandemic hit, with populist movements from both sides of the political spectrum rising and countries turning inward, embracing inflationary policies such as tariffs over free trade and restrictions on immigration. The U.S. and Europe have in recent years sought to restrict foreign investments, particularly from China, that target the acquisition of technology companies deemed important to national security. The pandemic accelerated some of these trends and started new ones. For example, supply disruptions are beginning to encourage companies to source materials locally when possible and governments are looking for ways to support production of more goods domestically to improve their country's economic resilience. It may sometimes be possible to divert production locally at a similar cost. Other times, it will not.

Digitization: While flows of goods, capital and people have slowed, trade in digital services is still on the rise, a trend that may counter any inflationary pressures resulting from the deglobalization process. Exports of computers and communication services have risen significantly since the early 1990s, and cross-border internet bandwidth has grown 115 times larger since 2008. As our colleagues at Goldman Sachs Global Investment Research put it recently, globalization may be slowing in tangible areas but accelerating in intangibles.[1] In the U.S., remote working has saved workers time that would otherwise have been spent commuting but can now be channeled into more productive activities that can elongate the natural economic cycle and lead to a decreasing inflation environment. Other developments that may contribute to lower inflation going forward are the advance of telemedicine and other digitalized healthcare, as well as digital commerce and the rise of financial technology. Widespread digitization of business, the rise of e-commerce and the automation of factories, are likely to serve as deflationary forces in the long run, with benefits accruing to firms able to adopt and adapt quickly to the new paradigm.

Explosive Growth of Cross-Border Data Flows; Global Digital Platforms



Source: Telegeography, McKinsey, SensorTower, Goldman Sachs Global Investment Research.
The user shares are as of March 2022 for all services except for Google (June-August 2018 data).

> Whereas globalization tended to reduce prices for goods and labor as capital flowed to the lowest-cost producers, a partial unwind would likely increase them, leading to potentially higher medium-term inflation than pre-2020.

Decarbonization: The move toward green energy is important for the health of the planet, and we expect efforts to move away from fossil fuels to accelerate. But the process may also lead to higher inflation—at least in the short run. Sustainable energy production still only represents a fraction of total demand, and bringing additional sources online will take time and significant amounts of increasingly expensive metals and minerals. Of course, the need to invest in green energy infrastructure should also be good for future economic growth and may present attractive investment opportunities. The shift to more sustainable forms of energy will also take time to play out. Europe, for instance, has a strong incentive to accelerate construction of renewable power sources, including wind, solar and even green hydrogen, but the transition will not happen overnight. And it may run into geopolitical roadblocks. For instance, a shift to more electric power will significantly alter the commodity landscape and increase the importance of a handful of countries rich in copper, nickel and lithium. Some of the critical minerals for electric vehicles and electric vehicle batteries are concentrated in countries with unstable political regimes and suspect human rights records.

Destabilization of the geopolitical order: Economic and political alliances rarely changed much in the era of globalization. They look like they are changing now. A world that divides into blocs—for example, the U.S., Europe, Japan and other developed countries on one side and Russia, China, India and major oil producers on the other—is likely to be one in which inflation runs hotter than it has in the past. Examples already exist: the war in Ukraine and sweeping sanctions on Russia by the countries in one bloc have reduced the supply of energy and other commodities, including metals, salts, food, and fertilizer, potentially leading to food shortages in developing countries. Taking commodity supplies out of the market over prolonged periods of time suggest that some of the temporary components of inflation will become more persistent. New alliances may also create a more uncertain environment that weighs on consumer and corporate confidence and possibly changes governments' fiscal spending priorities. Examples may include increases in defense spending or more support for domestic industries. This might result in higher taxes and more government borrowing, potentially swelling government debt levels in some countries and pushing interest rates higher.

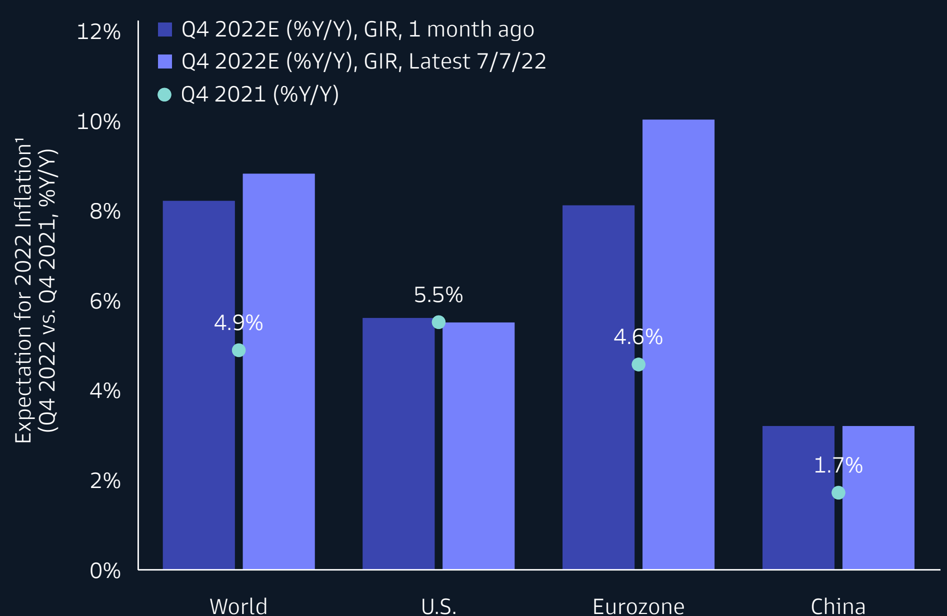
Demographics: Labor force participation rates have been declining in developed countries for some time as their populations age, but the trend picked up steam during the pandemic as layoffs rose and many workers chose not to return to the labor force as emergency stimulus payments temporarily supported their earnings and health and childcare concerns made the return to work more challenging. The evolving demographics and the increased ability to work remotely may change consumption patterns with more people moving to more affordable second-tier towns and away from high priced and overpopulated big cities. The importance of Millennial consumers—the majority of whom live in emerging-market economies—is also affecting consumption patterns, with more of it moving online.

IMPLICATIONS AND THE NEW INVESTMENT PLAYBOOK

Any of these inflection points and the uncertainty they bring could lead to a structural repricing of risk across asset classes. For now, corporate earnings expectations are holding up. But as inflation continues to run high and real wages struggle to keep pace, some companies are already struggling to pass on cost increases to consumers, which may result in a reset of corporate profitability with negative implications for equity prices.

Elevated inflation uncertainty due to the drivers outlined above leads to elevated monetary policy uncertainty, and possibly once again to reduced potency of central bank policy as it relates to achieving their inflation targeting and anchoring inflation expectations around 2%. The Federal Reserve and other central banks were able to support risk assets since the 2008 Global Financial Crisis by providing ample liquidity and engineering financial repression on the back of an inflation rate that nevertheless continued to run persistently below the 2% target rate. Their task now is far more complicated as some of the forces that keep inflation elevated today—supply disruptions and soaring energy and other commodity prices—are beyond policymakers' control. Yet their credibility depends on their ability to re-anchor inflation expectations, and doing that with aggressive monetary tightening runs the risk of plunging the economy into recession and reducing the attractiveness of risk assets.

Inflation Likely to Stay Elevated in 2022



Source: Multi Asset Solutions Goldman Sachs, Global Investment Research Goldman Sachs, and Bloomberg. As of July 7, 2022. The economic and market forecasts presented herein have been generated by Goldman Sachs Asset Management for informational purposes as of the date of this publication. They are based on proprietary models and there can be no assurance that the forecasts will be achieved.

LEANING INTO THE SILVER LININGS

As the environment and conditions around us change, we need to change our investment approach with them. What is important in this process is also to recognize that where there is change and upheaval, there are opportunities.

Deglobalization, for instance, will likely widen the gap between winners and losers, which can create opportunities for active investment managers. Every cloud comes with a silver lining, and we can certainly see several in the current environment.

Free Trade or Optimal Trade?: A hallmark of globalization in recent decades has been the embrace of unfettered free trade. It is, however, now widely accepted that globalization has not spread its benefits equally when it comes to individuals or economies. Side effects have included rising income and wealth inequality, a hollowing out of the middle class and the compartmentalization of production and global supply chains resulting in reduced levels of productivity and innovation. A side effect of this process has been the increased specialization of economies which in turn made them less resilient to economic shocks. Overconcentration in one industry can hurt a country's industrial diversity, making it less able to withstand external shocks and weather recessions. During the Global Financial Crisis, the U.S. bounced back more quickly than the euro area, thanks in large part to a more diversified economy. If a partial rollback of globalization helps shift the focus from unfettered free trade to optimal trade, we believe we may see some long-term benefits, as more economic and industrial diversity may contribute to more robust economic growth and stability over time. When the next shock comes, more economically diverse countries should be in a better position to absorb it.[2]

Deglobalizing the Supply Chain: Globalization has also created an increasingly global supply chain, often with each individual component of a good produced in different countries around the world. A shift toward greater domestic production and more localized supply chains may well raise prices in the short to medium run, not least because it would take time for countries that previously relied on low-cost countries for key parts of the production process to build their own cost-efficient production capabilities to replace them. But this process may also bring out synergies as a shared pool of labor and technology can foster further innovation. For instance, skilled labor with technological expertise in one industry may be able to apply its knowledge to another industry within the same economy. Such boosts in innovation and productivity are hard to achieve when production is spread out across the globe. Technological innovation may also spill over into other industries, something that is less common in highly specialized economies. Another potential benefit may be a partial rollback in the level of global income inequality that has grown with globalization. While automated labor will not disappear, a less globalized supply chain would likely raise demand for domestic labor, particularly in developed countries that have relied heavily on lower-cost emerging market labor. In the short term, this too would put upward pressure on prices. In the longer run, it may help to raise living standards more broadly, with a corresponding increase in economic growth. Even the supply chain for microchips and semiconductors—crucial components of key technologies for nations around the world—may eventually see some supply chain diversification, though this process may be lengthy and substitutions may in some cases turn out to be imperfect.

The Rise of Tier 2 Cities: Even before the pandemic began, businesses were actively relocating to Tier 2 cities with lower taxes, more affordable real estate and, for employees, the opportunity to strike a better work-life balance. Today, with part- or full-time remote work becoming mainstream, many of these cities are likely to thrive, which may lead to investment opportunities in real estate, including new multi- and single-family dwellings and infrastructure.

A PUBLIC-PRIVATE APPROACH

Investors may be able to capitalize on trends like these by embracing a holistic strategic view that looks for opportunities across markets, matches resources and goals and, when appropriate, uses a thematic rather than an asset class-specific lens. We believe some of the trends that markets face, such as a partial pullback from globalization and a shift toward green energy, may best be accessed through private alternatives, such as private equity, infrastructure and real estate—both residential and commercial. Others, such as the growth of the financial technology industry, the digitization of healthcare and other sectors and the growing corporate and investor focus on sustainability suggest opportunities for public equity strategies that look beyond benchmarks to find companies in tune with key secular growth trends. Combining private and public assets can also allow investors to take potential advantage of differentials in valuation, growth opportunities and access. Blending the two tends to create complementary exposures and may give investors more opportunities to add value by exploiting short-term pricing dislocations.

We believe it may be helpful to think about portfolio construction in the context of a few broad investment themes and their associated risks, as specific asset allocation decisions will vary widely, depending on investment goals, resources, organizational restrictions and other factors. In our view, thinking in themes rather than asset classes may help guide investors' optimal blend of exposures needed to better achieve their return and risk objectives.

Lean into Long-Term Economic Transformation: Companies—both public and private—that focus on new and transformative technologies, research and industries may help to forever change the path of economic growth and how it is distributed. They may also afford investors opportunities to gain exposure to a potential "new economy" and a more diversified stream of returns, including through early-stage and venture capital investments.

Embrace Regional Diversification: A changing global economy will affect different countries and regions in different ways. The U.S., for example, has been a major beneficiary of globalization, with U.S. assets outperforming in recent years. That outperformance may well persist. But a sustained reversal of globalization would create segmentation across capital markets and likely increase the benefits of regional diversification. Some regional distinctions may be harder to tease out, especially in emerging markets, underscoring the importance of partnering with diverse managers that have a presence on the ground in multiple locations around the world and a strong understanding of how regional politics and markets work.

Factor in Structural Limitations and Resource Constraints: Every investor is different. A large corporate pension fund's asset allocation process will differ materially from that of a foundation, insurance company or venture capital firm. For organizations with a lengthy and complex process, acting quickly is not always possible. For these investors, creating a dedicated "opportunistic" sleeve in their overall allocation may help them act more quickly when markets are volatile and opportunities short-lived. Others may want to revisit some aspects of the overall approval process. For those that cannot execute their own opportunistic trades, it may make sense to outsource that function.

Play Defense Creatively: It may be time to reimagine the way we think about the defensive component of overall asset allocation. The need to dedicate a portion of any portfolio to defensive assets or strategies won't change. But in today's changing and challenging investment environment, where low inflation, falling interest rates, unfettered free trade and geopolitical stability are no longer the norm, the type of assets or strategies investors use to play defense might. Defensive sectors today, for example, may be categorized as domestic-facing and relatively more insulated from global supply chain disruptions as well as cost input and labor inflation.

We believe doing these things effectively amid a changing investment landscape and the repricing of investment risk will require an active investment strategy as well as a holistic approach that sees public and private assets as complementary components in a well-diversified portfolio. We believe this approach affords investors the best opportunity to capitalize on innovation, increase risk-adjusted return potential and navigate portfolios through future storms. ■

Sources:

1. Goldman Sachs Global Investment Research. Global Economics Comment: Is the World Deglobalizing, Slowbalizing or Newbalizing? As of April 18, 2022.
2. Ramey, G., and V. Ramey, 1995, "Cross-Country Evidence on the Link between Volatility and Growth", American Economic Review, 85, 1138-1151, and Shediac, R., C. Haddad, and S. Ghazaly, 2011, "Resilient, Stable, Sustainable: The Benefits of Economic Diversification", Strategy&, Formerly Booz & Company.

PREPARING FOR THE RISING TIDE OF RATES

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KEY TAKEAWAYS

- Buyout activity has risen to record levels, with transactions increasingly backed by leveraged loans that feature floating rates.
- As the interest expense rises on floating-rate debt, it represents additional income and an inflation hedge for creditors but an increased cost to the underlying company at a time when input prices are rising.
- In aggregate, sponsor-backed companies are well positioned to absorb the impact of rising rates; however, investors should understand how to assess potential areas of weakness within their portfolio.

Buyout activity has reached unprecedented levels in recent years, due in large part to relatively cheap and readily available debt financing. High leverage levels have been manageable with rates at historically low levels, but many buyouts are backed by floating-rate leveraged loans, with investors opting for the flexibility that private credit can offer compared to traditional debt products—a trend that was on display during the disruptions of the pandemic. At the same time, many investors have been drawn to private credit in a search for yield while interest rates were at historically low levels.

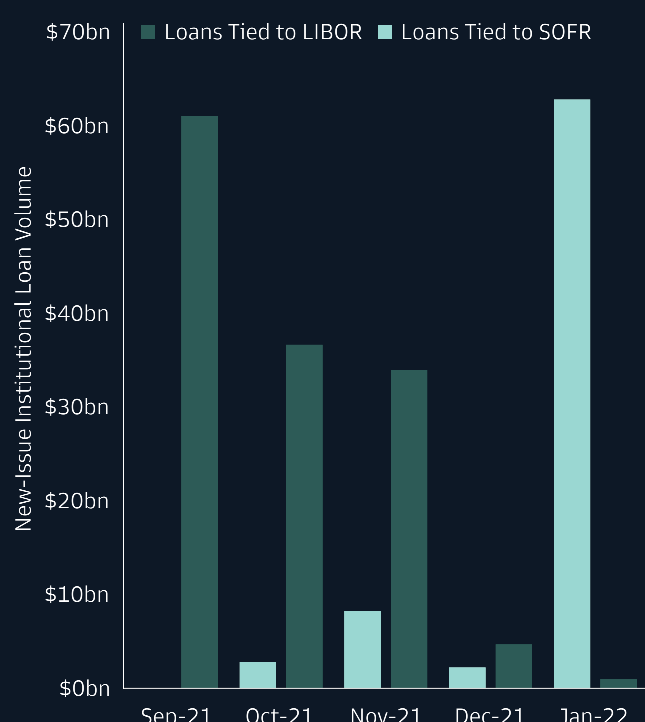
As rates have begun to rise, investors and borrowers have new factors to consider stemming from the floating rates associated with most private debt products. While floating rates provide additional income for investors, they also represent an increased cost to the underlying company at a time when input prices are rising, with inflation and rates inherently interlinked.

How are leveraged loans priced?

Floating rates are established using a reference rate plus a spread. Reference rates are repriced at a regular interval, often including a floor, then added to the pre-determined spread to calculate interest payments. Spreads have ranged from 400-500bps over the last decade for leveraged loans backing buyouts, with narrower spreads for larger deals.

The London Interbank Offered Rate (LIBOR) historically has been the reference rate of choice, but a high-profile scandal has prompted a wide-scale shift to an alternative. New leveraged loans were prohibited from using LIBOR as of year-end 2021, but outstanding loans are allowed to maintain LIBOR references until June 2023. While there are several reference rates to choose from, the Secured Overnight Financing Rate (SOFR) has become the preferred metric, commanding 98% market share in January 2022, as the market made a rapid regulatory-induced move from LIBOR. SOFR is reported on a daily basis, with the rate compounded to calculate one or three-month Term SOFR, which is used to price loans. While the market remains fundamentally unchanged, the shift has required some changes. For example, most loans now include a credit spread adjustment because SOFR is a risk-free rate, unlike LIBOR.

Almost All New Loans Reference SOFR



Source: Leveraged Commentary & Data (LCD). Data excludes add-ons. Data through January 31, 2022.

CURRENT ENVIRONMENT

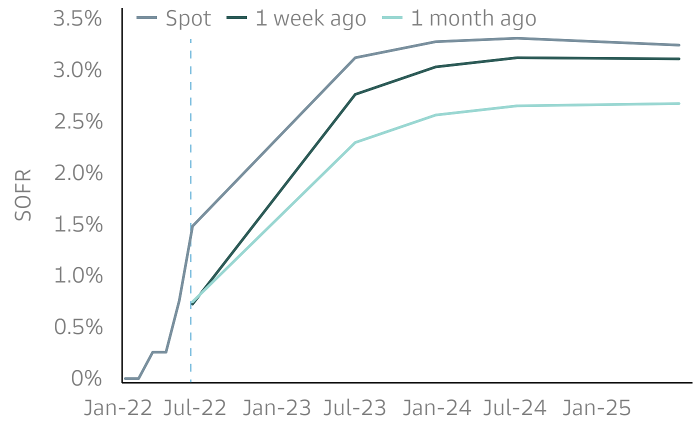
The daily SOFR rate—now the main reference rate for leveraged loans—surged in mid-March when the Federal Reserve raised rates for the first time since 2008. While the move from 5bps to about 30bps is relatively large, the rate remains low on an absolute basis—particularly when compared to the spread component of leveraged loans.[1] But the expectation is that rates will continue to rise from here, with the market pricing in SOFR to reach a range of 3-3.5% in the coming years.[2] The rise in rates comes as debt used in buyouts has risen to historically high levels, at 6x EBITDA,[3] leading some market commentators to draw parallels to the buyout boom and bust of the mid-2000s. While certain metrics today appear similar to that period, there are fundamental differences and, in aggregate, companies are well positioned to absorb the impact of rising rates for several reasons.

First, although debt levels in buyouts may be elevated, so are equity cushions. For new deals, equity has represented roughly 45% of the purchase price in recent years, compared to about 30% in 2007. With valuations at historically high levels, the equity cushion serves as a buffer to lenders if asset prices fall. Companies with high-yield debt—an imperfect proxy for the leveraged loan market—have fortified their balance sheets during the favorable environment of recent years, with cash-to-asset ratios at decade highs. Furthermore, private equity sponsors have a record amount of capital to deploy, serving as a ballast to invest more equity if needed to secure additional credit financing. This assumed funding and liquidity backdrop is one potential reason why sponsored bonds have tended to outperform in periods of weaker macro risk appetite.[4]

Second, virtually every leveraged loan borrower took advantage of low rates in recent years and refinanced. As a result, no leveraged loans are maturing in 2022, and the amount coming due in 2023 has fallen by about three-quarters since the start of 2021. While more difficult to quantify, a subset of firms will have utilized interest rate hedging to mitigate rising rates. Additionally, many borrowers also likely took advantage of attractive swap rates over the last year to term out a significant portion of their floating-rate debt. Refinancings are still feasible in today's market with spreads remaining relatively low, but they have started inching up and historically have widened during periods of financial stress, such as 2009.

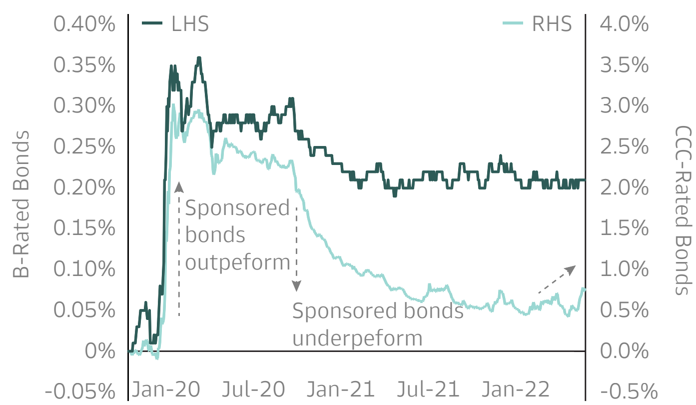
Lastly, thanks to strong balance sheets, equity cushions, and recent refinancings, default rates are at historically low levels. While defaults are somewhat backward-looking, distress ratios—a more forward-looking indicator—also remain muted. Even if the economy slows, it's likely that defaults will remain relatively low in the near term.[5]

Reference Rates Have Increased Sharply in 2022 and Are Expected to Rise Further



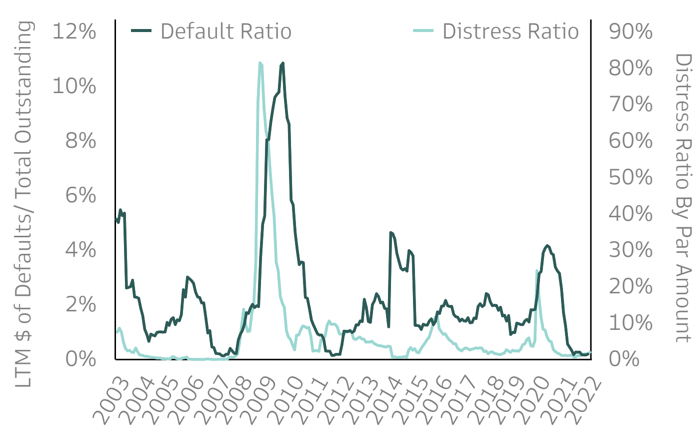
Source: Goldman Sachs Marquee. As of June 17, 2022.

The Backstop Provided by Private Equity Sponsors



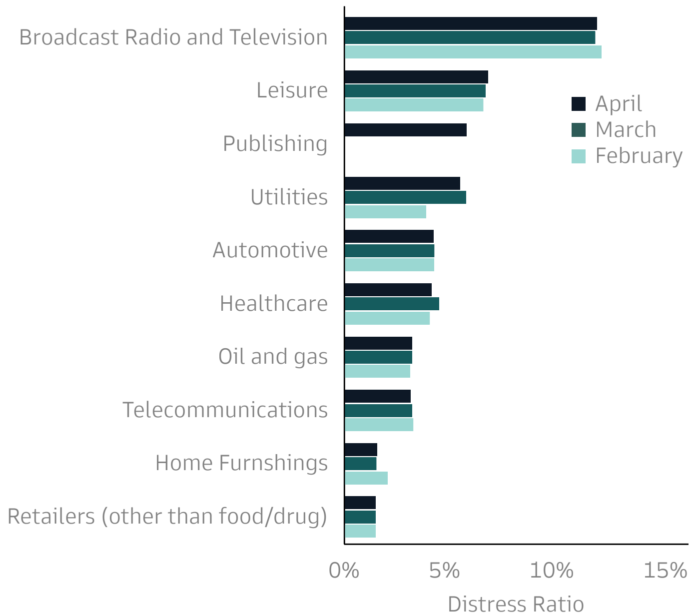
Source: iBoxx, Goldman Sachs Global Investment Research. Returns are rates-hedged. As of June 17, 2022.

The Distress Ratio Continues To Hover Around 2.5% As The U.S. Default Rate Remains Low



Source: Leveraged Commentary & Data (LCD). As of June 17, 2022.

Unlike Prior Downturns, Distress Is Likely to Come from Non-Commodity Sectors



Source: Leveraged Commentary & Data (LCD); S&P/LSTA Leveraged Loan Index. Represents sectors with an index share of 1% or higher. As of May 2022.

RISING RATE STRESS TEST

While significant near-term stress seems unlikely, if the economic slowdown worsens or extends for a meaningful period of time, certain companies will inevitably encounter struggles. Rising raw material costs and labor rates have already translated into higher prices for consumers and are starting to impact profitability, particularly in companies with high energy or transportation expenses. Rate increases are now also putting pressure on margins with higher interest expense. For companies with relatively high debt loads, investors are paying close attention to the interest coverage ratio (EBITDA / interest expense) as a key metric to evaluate repayment ability.

Companies' ability to pass along the increased interest expense to customers to balance the increasing denominator is always limited, but that is particularly the case in the current environment as inflationary pressures have already driven up labor and material costs. Firms can bolster EBITDA by introducing new products and services with more attractive margins—a challenge in an inflationary environment. As a result, the only mitigation available to management teams facing cash flow challenges will be to find cost reduction elsewhere.

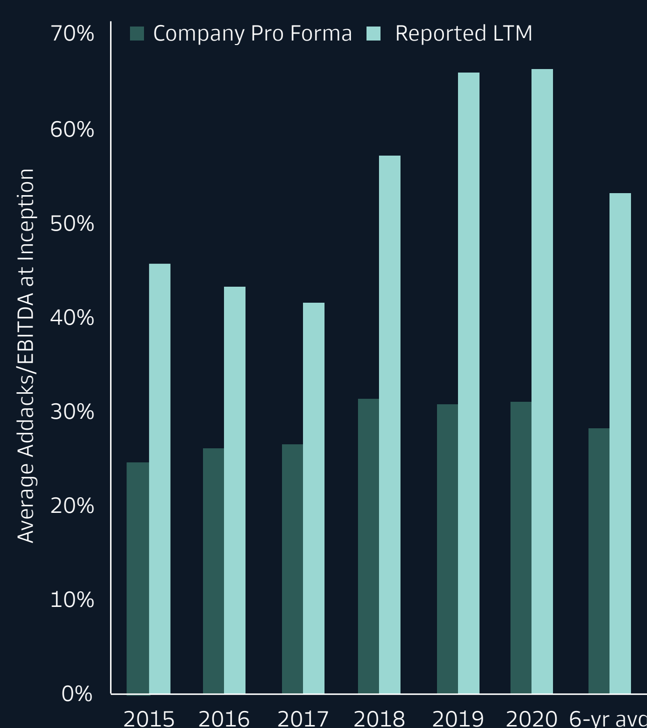
EBITDA Addbacks

EBITDA is the preferred metric for pricing buyouts and gauging a company's cash flow available to repay debt, but the metric is susceptible to subjectivity. Addbacks are expenses that are explicitly removed from the financials, with certain add-backs easily categorized as one-time costs (e.g., transaction costs), while others (e.g., nonrecurring operating) are less tangible. The purpose of add-backs is to provide a more accurate view of the assets, typical operations, but this also opens an opportunity for misleading accounting practices.

An analysis by S&P Global Market Intelligence, which provides data on the debt market, found that "marketing EBITDA (including addbacks) generally does not provide a realistic indication of future EBITDA and that companies also consistently overestimate debt repayment."[6] These findings have real implications for investors, as EBITDA often serves as the basis for calculations of leverage and financial health.

The plurality of addbacks in recent years have come from expected cost savings, which may be particularly hard to achieve amidst heightened inflation. As a result, firms that have historically relied on margin expansion, rather than top-line growth, to drive returns may encounter challenges in the current environment.

EBITDA Addbacks Have Risen in Recent Years



Source: S&P Global Market Intelligence. As of February 8, 2022.

Stress in prior cycles has generally been concentrated in commodity sectors like energy, but the macro backdrop makes that less likely today. The companies currently showing the most weakness are in legacy sectors like broadcasting and publishing, which face long-term structural challenges. Debt loads are currently higher for technology buyouts, at 7x compared to 6x for the broader market, and that segment now accounts for a record-high 37% of the buyout market.[7] Higher growth prospects for technology can justify higher valuations and leverage, particularly for companies with strong cash-flow profiles through contracted revenue. Regardless of the sector, however, differentiation has been on the rise between firms as the operating environment has grown more challenging. Proactive management teams have already taken steps to prepare for headwinds, while weaker operators will face mounting challenges to cash flows and operations.

Technology has been a major theme in the buyout space, not only as an investment, but also as a means of enhancing existing manual processes and inefficient models. The pandemic has accelerated this phenomenon in noticeable ways, including telehealth, remote work, and contactless ordering and checkout. Technology is also being deployed to streamline back-office operations across industries including logistics and finance. The combination of multiple inflationary pressures will likely spur further focus on the implementation of deflationary technology solutions, and may in fact change the calculus around the capital investments required today.

Rising Rates Have an Immediate Impact on Company Financials

	Old Regime	New Regime	Annotations
Company Value - At Acquisition	$100.00	$100.00	Using aggregate industry statistics, we generate a generic profile for a buyout deal
EBITDA Multiple	11.0x	11.0x	
EBITDA	$9.09	$9.09	
Leverage Used (%)	52%	52%	The amount of leverage remains unchanged as rates rise
Leverage Used ($)	$52.00	$52.00	
Interest/ Reference Rate	0.50%	3%	The reference rate is expected to rise from historically low levels
Spread to Rate	4.25%	4.25%	While the reference rate (e.g., SOFR) may change, the spread remains constant for the loan
Interest Expense (Annual)	$2.47	$3.77	The interest expense increases as the reference rate rises
Tax Rate	21%	21%	
Taxes ($)	$1.39	$1.12	Higher interest expense reduces the tax burden
Interest Coverage	3.7x	2.4x	Higher interest expense results in a lower interest coverage ratio and earnings. In this example, capex is assumed to equity depreciation. High-margin businesses with the ability to expand capex are well positioned to outperform.
Earnings	$5.23	$4.20	
Earnings decline		-19.6%	

Effects of Different Interest Rate Levels

Interest/ Reference Rate	Interest Coverage	Earnings decline
2.0%	2.8x	-12%
2.5%	2.6x	-16%
3.0%	2.4x	-20%
3.5%	2.3x	-24%

Source: Goldman Sachs Asset Management. For illustrative purposes only.

Companies can work to control interest expenses by refinancing or issuing new equity, but that takes time. As rates rise, it has an immediate impact on the interest coverage ratio of every company regardless of the underlying operations.

On the other side of the equation, once the loan terms are locked, the interest expense is dictated by how market forces move the reference rate. Companies can work to control interest expenses by refinancing or issuing new equity, but that takes time. As rates rise, it has an immediate impact on the interest coverage ratio of every company regardless of the underlying operations. Some back-of-the-envelope math, based on aggregate industry data, illustrates the potential impact of rising rates on interest coverage ratios and earnings.

Interest coverage ratios currently are strong on an aggregate basis, with the average above 5.5x heading into 2022. Loans backing leveraged buyouts have lower interest coverage at 3.7x, but that is historically high for the cohort. Using that as a baseline, the illustrative example shows that interest coverage ratios remain above 2x even if rates rise to 3.5%, which is possible given current forecasts.

While these data points can be reassuring, investors need to look beyond headline figures to understand how their portfolio holdings are positioned. The bottom quartile currently has interest coverage of about 1.6x; historically, this is a strong figure from the bottom tier of companies, but these businesses have little wiggle room as markets shift. Indeed, the results from the above scenario analysis are much different if a starting interest coverage ratio of 1.5x is used. In this case, earnings turn negative and the interest coverage ratio drops below 1x as rates rise from 2.5% to 3.0%.

In addition to being a helpful metric to gauge a company's ability to repay debt, the interest coverage ratio can be included as a covenant on a loan. Covenants in general have become much less common, with cov-lite loans now representing nearly 90% of the market. Under cov-lite loans, lenders still have recourse when borrowers encounter difficulties—but only when the issuer takes certain corporate actions (e.g., new debt issuance, acquisition, dividend payment). Knowing where loans sit in the capital stack is also important, as the proportion of first lien loans has risen in recent years, leaving less of a buffer for subordinated debt.[8]

Dispersion in performance is likely to rise as weaker operators encounter cashflow challenges and refinancing deadlines.

During the pandemic, lenders showed a high degree of flexibility by granting covenant relief on an unprecedented number of loans in 2020, which has led borrowers to turn to the strategy in 2022 as market volatility has risen and stalled the public high-yield market. Many private lenders have yet to experience a more severe or prolonged downturn that creates real stress in the market, however. As a result, many private credit firms may find they lack the expertise and resources to manage through a complicated workout or bankruptcy process.

THE BOTTOM LINE FOR INVESTORS

Buyout activity and sponsor-backed companies appear to be in good health, but all else equal, rising rates detract from earnings, which impacts valuations—even in private markets where mark-to-market moves are slow. Portfolios need to be analyzed at the company level to understand exposures to specific sectors, regions, client bases, and other factors that can lead to relative strength and weakness. To gather a full picture, investors should understand how General Partners are calculating leverage and assessing risk at both the asset and fund level.

On EBITDA addbacks, certain aspects of underwriting and valuation can be somewhat subjective. Investors should understand the assumptions that are being made when loans are underwritten and added to portfolios, particularly as the macroeconomic environment presents more headwinds and uncertainty. Dispersion in performance is likely to rise as weaker operators encounter cashflow challenges and refinancing deadlines. The most challenged companies will be those with little short-term pricing power that are facing a crunch from aggressive coverage ratios and too much reliance on addbacks, while being saddled with too much debt. Across private market strategies, leverage is increasingly being embedded at the fund level via capital call lines and NAV facilities.

Despite market conditions, buyout activity has remained at elevated levels. And while traditional debt capital markets have dried up amidst heavy investor outflows, private credit managers have a record amount of dry powder to deploy. Private equity managers have proven their ability to move nimbly to pivot companies and effect changes as market conditions change, while private credit offers flexibility and the customization needed amidst uncertainty. Going forward, success in the buyout market will stem from a foundation of thoughtful underwriting that considered the potential for both higher rates and lower growth, an ability to navigate potential periods of difficulty, and the nimbleness to pivot and adapt businesses to take advantage of technological advancements to drive both top-line revenue and bottom-line profitability. ■

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THE ECONOMY, INVESTING AND SUSTAINABILITY:

A DISCUSSION WITH DAVID SOLOMON

& VALENTIJN VAN NIEUWENHUIJZEN

David Solomon, Chairman and CEO of Goldman Sachs, recently sat down with Valentijn van Nieuwenhuijzen, CIO of NN Investment Partners and global head of Sustainability for Public Investing at Goldman Sachs Asset Management. Their conversation covered a range of topics, from the state of the global economy, recession risks and the geopolitical landscape, to the growing importance of sustainable investing and the background of Goldman Sachs' acquisition of NN IP.

(This is an edited transcript of episode 88 of the Market Talk podcast June 15, 2022. In case of discrepancies between the podcast and the transcript, the spoken word prevails.)

David Solomon
Chairman and CEO of Goldman Sachs

David is Chairman and Chief Executive Officer and a member of the Board of Directors of The Goldman Sachs Group, Inc.

Previously, he was President and Chief Operating Officer and prior to that, he served as Co-Head of the Investment Banking Division from 2006 to 2016. Before that, David was Global Head of the Financing Group, which includes all capital markets and derivative products for the firm's corporate clients. He joined Goldman Sachs as a partner in 1999.

Prior to joining the firm, David held leadership roles at Irving Trust Company, Drexel Burnham and Bear Stearns.

David is chairman of the Board of Trustees of Hamilton College and serves on the board of The Robin Hood Foundation. He also serves on the Board of Trustees of New York-Presbyterian Hospital.

David earned a BA in Political Science from Hamilton College.

Valentijn van Nieuwenhuijzen
CIO of NN IP and Global head of Sustainability for Public Investing at Goldman Sachs Asset Management.

Valentijn van Nieuwenhuijzen is the Chief Investment Officer for NN Investment Partners and Global head of Sustainability for Public Investing at Goldman Sachs Asset Management.

Prior to becoming CIO, Valentijn held the role of Chief Strategist and Head of Multi-Asset from 2013 to 2017 and from 2010 to 2013 he was Head of Strategy within Multi-Asset. He is a key spokesperson for the company and appears frequently at client events and in the media.

Valentijn earned a MSc in Economics from the University of Amsterdam.

Valentijn van Nieuwenhuijzen: One of the key aspects of your role as the leader of Goldman Sachs is to be very close to clients. If you speak to clients right now, in this environment, what is the temperature? What are the key topics that they talk about and what are you telling them?

David Solomon: The biggest focus, as you would expect, is on the economic environment with a particular focus on inflation, the journey out of the pandemic and how that journey is affecting economic growth and activity. There's a lot of debate around monetary policy and how that will affect the demand side of the equation and the demand side of economic activity. And there's also a lot of discussion about supply chains and the disruptions on the supply side of the economy and how that's going to get resolved. I would say that broad topic is the number one focus when you're out talking to clients, whether it's CEOs or it's CIOs or it's institutions broadly or individuals. Certainly, given what's going on in Ukraine and what's going on in the relationship between China and the West, there's also a lot of focus on geopolitics and the impact of geopolitics. Those would be the big picture macro topics that are getting an awful lot of attention.

van Nieuwenhuijzen: A lot of clients are still looking for guidance, are still looking for what's going to happen in the next 12 to 18 months ahead. What are you telling these clients? Is it even possible to give them clear guidance in the current environment?

Solomon: Well, there's a lot of uncertainty and I don't think we're in a position to tell them what's going to happen. But I think we can empathize with the fact that there's a lot of uncertainty out there. We try to talk about things that we're thinking about. We're a big manager of risk. We're a big manager of assets. And when you have an environment where uncertainty increases given what's going on in the macro environment, you have to be thinking about your risk appetite differently.

People may need to expect that the world is going to be more volatile, and it's going to be more difficult to make returns on assets than what we've experienced when monetary policy was easy. We're tightening monetary policy. That's going to have an impact on asset prices. It's going to have an impact on demand. So, I think you have to be prepared for that volatility and the impact of that volatility. I'm not going to predict any outcome, but certainly we're going to operate with tighter economic conditions and that will have some very direct and predictable consequences.

van Nieuwenhuijzen: Europe's been very close to the latest tension with the war in Ukraine. What's your thinking about the European continent and how to look at that in terms of its prospects? Is it part of the broader uncertainty that we just discussed, or are there some specific European elements that need to be taken into account?

Solomon: Europe is a big part of the global economy, and the E.U. is going to continue to be a big part of the global economy. I think there's no question that the war in Ukraine is forcing a rethink on certain foreign policy positions that a variety of E.U. countries have taken, whether it's around security, energy supply, or food supply. And so, I think that certainly there's a re-sort of the geopolitical landscape that's forcing Europe to think more carefully now. By the way, it's forcing the U.S. to think more carefully about a variety of things, too. But it's just closer to home and a little bit more amplified in Europe, particularly given Europe's dependency on energy from Russia.

Big picture: the E.U. will continue to be a very, very important part of the global economy. But there's a greater chance of economic headwinds slowing down economic activity in Europe in the near term than there is in the U.S., for example. And so I think we've got to watch that very carefully. I think the chance of a recession in Europe is higher than the chance of a recession in the U.S.. I can't predict what that percentage change is, but given everything that's going on I think there are headwinds to growth here that are a little bit more pronounced than in the U.S., though there are headwinds to growth in the U.S. too.

van Nieuwenhuijzen: So, on Europe and the probability of an economic slowdown, can you elaborate a bit more on what you think really drives that? There are clearly some risks on the horizon, but why is Europe in a more fragile position, in your opinion, than the U.S.?

Solomon: The big thing that I think increases the probability of a recession in Europe is the shifts that are going on with respect to energy supply. Europe is, as we all know, very dependent on Russian energy. Given the war in Ukraine, there's a rethink of all of that and that's going to create disruption. And it's also very inflationary, as it also pushes prices up and it affects the demand side. I'm not predicting that it absolutely will happen. It's just that energy pressure, which is such an important part of affecting the demand side, is just more acutely disrupted here because of the proximity to the conflict in Russia and Ukraine.

van Nieuwenhuijzen: Looking further ahead, beyond the near-term challenges, where do you see some opportunities and what excites you from a business perspective?

Solomon: At Goldman Sachs, we continue to invest in and strengthen our businesses, and we feel good about the progress we're making. Asset management is one area where we see real opportunity to grow, and that's one of the reasons why having NN IP become part of Goldman Sachs is something we're very excited about. Across Goldman Sachs we're set on growing the firm and diversifying the durability of our revenue base. We're excited about the opportunity we see in front of us, and we will keep our clients' interests front and center as we move forward. There's a lot going on in the world, but ultimately we take a long-term approach to growing and strengthening the firm.

van Nieuwenhuijzen: Sustainability is a massive opportunity and is something that really excites us at NN IP. It's one of the transformational forces that we see running through the investment industry and more broadly it's shaping the economic evolution. What are the next steps in the investment industry's sustainability journey?

Solomon: We're seeking to integrate sustainability principles into how we operate and invest and, in line with our values, offering a wider range of solutions to help clients meet their sustainability requirements and address their unique needs. At Goldman Sachs, we're very focused on the allocation of capital to accelerate a climate transition, but we're also concentrating on investments that spur economic growth and benefit societies more broadly to ensure a just transition. For example, we've launched a program in the United States called One Million Black Women which aims to improve the economic prospects and opportunity set for black women through USD$10bn of investment committed over a decade. Both Goldman Sachs and NN IP have really interesting sustainability initiatives and we can now connect and create other new opportunities together. It's a great example of one plus one being worth more than two.

van Nieuwenhuijzen: Something that is really inspiring is hearing you talk about how to develop the organization and how to develop the people in the organization. You emphasize the importance of being authentic and following your passion. And being very visible as the CEO of Goldman Sachs, it is very visible that you also have a passion for music. A lot of people might wonder how you can even find the time for that.

Solomon: I've always loved music and it's one of my passions. Having things that you're interested in and want to invest your heart and brain in, I think, makes you a more interesting person and keeps you stimulated. I believe it's important that you find ways to do that throughout the journey of your life. I've learnt that there are times when you can follow your passions more, there are times when you can do it less—that journey evolves. But you should always hold the things dear that are important to you and find ways to participate, to access them. There are different ways that you can make that happen, and it's important to figure out on your own what works for you. ■

THE NEW MACRO REALITIES FOR REAL ESTATE:

HOW INFLATION, RATES AND RECESSION PRESENT NEW RISKS AND OPPORTUNITIES

Nora Creedon is a Portfolio Manager and Client Strategist for Real Estate investing at Goldman Sachs

KEY TAKEAWAYS

- The rising-tide-for-all environment in real estate seems to have ended, likely to be followed by a period of more uncertainty and dispersion.
- Real estate has historically provided a strong inflation hedge, but the corollary of increasing rates and the looming threat of a recession represent counterbalancing concerns.
- Structural changes are leading to shifts in demand for different types of real estate, putting a premium on assets with inelastic demand. In a quickly changing macro environment, real estate investors need to focus on diversification and understanding a portfolio's underlying drivers of return and sources of risk.

Traditional wisdom suggests inflation can be a friend to real estate. Simply stated, rents re-price and existing assets appreciate in value as construction costs rise. But on the heels of one of the most rapid increases in inflation in 40 years, the theory of real estate as an inflation hedge is being put to the test. In response to inflationary pressure, interest rates have moved steeply off the post-pandemic lows in many markets, which is less friendly to real estate. Surging inflation has led central banks towards more aggressive tightening, particularly in the U.S. and Europe, which could potentially trigger a recession or at least an economic slowdown. Asian markets may benefit from a more dovish interest rate environment, but the region will contend with other macroeconomic risks. After more than a decade of abundantly available capital, declining interest rates, and improving cash flows for almost all property types around the world, fear of a changing macro environment is palpable. Global listed real estate share prices have declined nearly 20% this year,[1] and transaction activity in many private markets has taken a pause.

We believe a new investment regime for real estate has begun. The rising-tide-for-all environment seems to have ended, likely to be followed by a period of more uncertainty and dispersion. Real estate returns over the next decade will likely become more dispersed, which should also offer more alpha opportunities globally. Three debates are forming the new "IRRs of real estate": how will higher inflation impact different sectors of real estate, what happens as interest rates rise, and how will real estate perform in a recession?

Historical analyses of sector performance in different inflationary environments, interest rate regimes, or recessionary periods of the past may be of limited use in predicting the future. Technology, demographic change and sustainability are secular shifts that are altering the fate of real estate. Many pandemic-induced changes in the work environment have proven to be enduring, although preferences are diverging in different parts of the world. Lastly, the path of interest rates in each developed economy is unique. The end result: variance in real estate performance is likely to become even more pronounced in the years to come.

In our view, real estate is positioned to play an even more important role in client portfolios in the midst of the evolving macro conditions, given the ability of many types of property to weather a softer economy and provide a hedge against inflation. Even with broad tailwinds, we believe investors still have the ability to be on the right side of the secular trends in technology, demographics and sustainability as international dynamics will differ vastly. In short, the choppier waters ahead call for a more nuanced strategy that, if executed properly, can potentially result in more alpha-based returns.

THE NEW "IRR" REALITIES: INFLATION, RATES, RECESSION

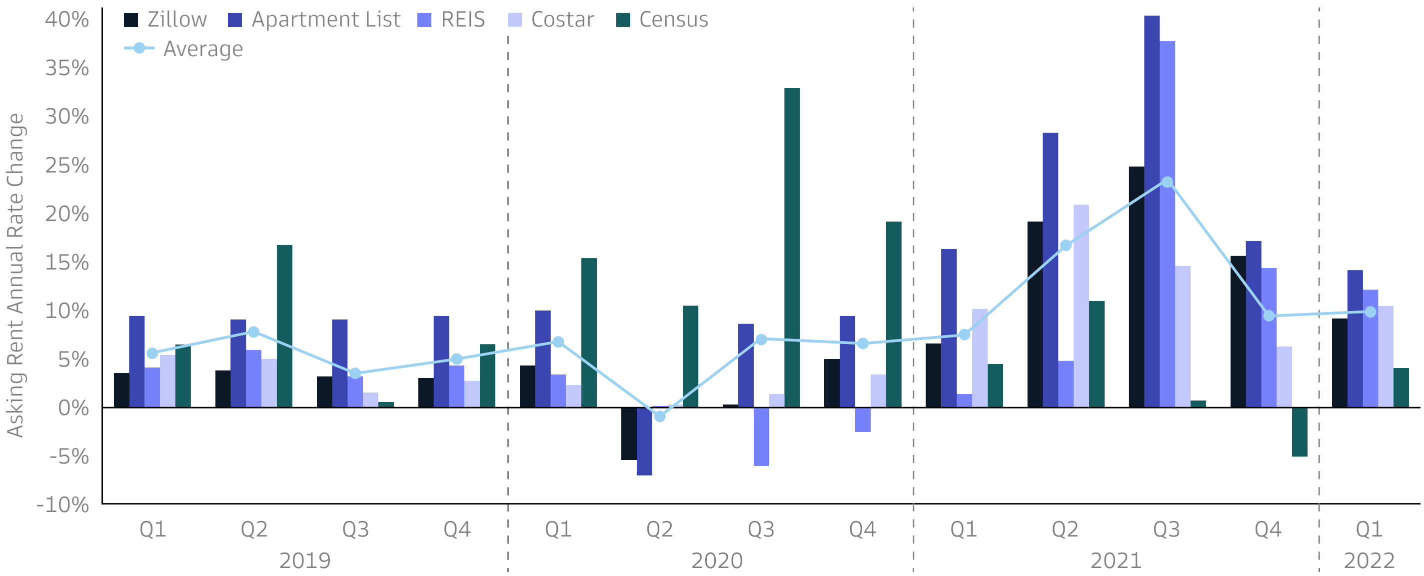
Inflation

Real estate has historically provided a strong inflation hedge. Key to this is the ability for landlords to re-price rents upward. Higher construction and materials costs theoretically increase the replacement cost of existing assets while also restricting new supply, which tends to keep rents high. Additionally, real estate is generally financed with debt, which means owners can use inflated dollars in the future to pay off today's liabilities.

While history can be a helpful guide, inflation comes in many forms. Some inflationary pressures, such as the food and energy price shocks stemming from the war in Ukraine and lockdowns in China may prove shorter-lived. But from a certain vantage point, it can seem that inflation is surging due to multiple long-term drivers—including extended expansionary monetary policy during the pandemic and possibly the early stages of deglobalization—which may not be resolved so quickly. Many economists thus far have taken a more sanguine view, focusing on the deceleration in sequential measures of core personal consumption expenditure (PCE) inflation, but acknowledge that pockets of inflation will likely persist. To better assess the potential effects of inflation, real estate investors should focus on three specific components: rents, labor rates and materials.

The first consideration is the impact on income from changes in commercial rents and shelter rates. Unlike a bond with a fixed coupon, many forms of real estate can experience a relatively quick re-pricing of rents to lift cash flows alongside inflation. The shorter the lease duration, the more quickly rents can be repriced. Multifamily leases average under a year, and prices have been climbing steadily since inflation took hold. Initially driven by a rebound from pandemic-level rent cuts, the sustained increase in housing costs now reflects a significant supply/demand imbalance. Surging home prices and higher

Multifamily Rents Have Risen Sharply Alongside Broader Inflation



Source: Zillow, Apartment List, REIS, Costar, Department of Commerce, Goldman Sachs. As of March 30, 2022.

mortgage rates have combined to make home ownership more difficult, creating a particularly attractive backdrop for multifamily rental investing. Asking rents have decelerated from the peak in mid-year 2021, but remain significantly higher than pre-COVID-19.

Other short-duration areas include self-storage, where leases can reprice on a monthly basis, and hotels, which benefit from rents that literally reprice every night. Industrial assets have longer leases but are experiencing strong demand; the largest public company in the space believes there is a 50% upward mark to market in its global portfolio.[2]

The second inflation area of focus is labor rates, which impact both the cost to develop new assets and ongoing operational expenses. In the U.S., the current gap between available jobs and workers is the widest in postwar history and is likely to keep upward pressure on wages. In any industry, higher wages typically translate to margin compression, and indeed we are observing forward earnings estimates being reduced for many equity sectors. In real estate, however, several asset types operate with relatively light labor requirements, and owners are increasingly attempting to automate or use technology for labor-intensive roles. For example, many landlords are permanently transitioning to features that were introduced during the pandemic, such as "contactless" check-in at hotels and self-guided apartment tours. As markets remain tight, real estate is relatively better positioned to maintain margins as labor and other variable operating costs remain low. There may even be a real estate opportunity to service less-built markets that are benefiting from increasing wages.

The third key inflation component is the cost of construction materials, with many categories surging to records in 2021 amid supply chain issues and increased demand. Higher costs can be offset with higher rents in some cases, while other projects simply fail to make sense on paper. Historically, higher development costs have served to support real estate values, as replacement costs increase and additional supply is averted. But real estate investors need to monitor key materials markets closely, as shifts may require new assumptions for development. If globalization trends do indeed reverse, it could lead to structurally higher material costs for the foreseeable future. While a headwind to new construction efforts, this could present promising opportunities in industrial development as more manufacturing is brought back on-shore.

Despite generally favorable positioning, higher inflation is not a universal "buy" signal for real estate. The biggest and most obvious risk is in long-term leases with low fixed-rate increases or, even worse, no rental rate increases. These features were acceptable when inflation was mild and Treasury yields were depressed, but they pose a threat in the current environment. Rents in office markets may keep pace with inflation, but that often comes with commensurately high capital expenditures and tenant improvement dollars, which means less of a net inflation hedge to owners. We have seen remarkably strong hotel rates in leisure and resort properties, but today there are more governors on pricing power than ever before as travelers benefit from real-time pricing data and rebooking options, as well as alternative options like Airbnb that didn't previously exist. Hotels also carry some of the higher labor cost components among real estate asset classes, which again blunts the bottom line to owners.

Certain long-term leased assets or labor-intensive leisure properties may still perform well despite the challenging backdrop. Newly developed office buildings with top-of-the-line sustainability features are still highly sought after in markets where work-from-home is less attractive. A recovering hotel asset in a market serving consumers looking to spend their higher wages, with proactive management installing labor-saving robotics where possible, could benefit from changing market dynamics. And if structured without any exposure to rising expenses, a triple net leased asset (i.e., where the tenant pays all expenses including tax and maintenance) to the right credit could be an opportunity. In addition to differentiation between asset types, financing costs around the globe are diverging, which is further impacting returns from similar assets. The overriding theme is dispersion, with a heightened importance for the specific characteristics and operating performance of each asset.

With many economists expecting the peak of inflation to be near, the subsequent deceleration is anticipated to be led by core goods (e.g., used cars, electronic equipment) while housing costs are expected to remain elevated. This could be considered a "Goldilocks" scenario for real estate—headline inflation that moderates enough to slow interest rate increases but suggests pricing power for real estate assets.

Core PCE Inflation Is Expected to Decline by the End of 2022

			GS Forecasts					
	May 2022		End 2022		End 2023		End 2024	
	Weight	YoY	YoY	Contribution to Change	YoY	Contribution to Change	YoY	Contribution to Change
Core PCE	**100.0**	**4.7**	**4.2**	**-0.5**	**2.5**	**-2.1**	**2.3**	**-2.4**
Core Goods	**27.6**	**5.5**	**2.6**	**-0.8**	**-1.6**	**-1.7**	**-0.6**	**-1.5**
New Vehicles	2.7	13.1	7.7	-0.1	-2.0	**-0.3**	-1.2	**-0.3**
Used Vehicles	1.6	10.5	-7.0	-0.3	-17.0	**-0.3**	-5.8	**-0.2**
Household Appliances	0.5	10.0	2.9	0.0	0.4	**0.0**	-1.6	**-0.1**
Video, Audio, Computers	2.3	-3.2	-5.3	0.0	-5.2	**0.0**	-6.5	**-0.1**
Recreational Vehicles	0.7	3.2	3.2	0.0	1.1	**0.0**	1.1	**0.0**
Jewelry, Watches	0.9	-1.5	-0.9	0.0	0.8	**0.0**	1.1	**0.0**
Clothing & Footwear	3.3	5.2	3.3	-0.1	0.3	**-0.2**	0.3	**-0.2**
Pharma & Medical	4.2	2.4	3.4	0.0	-0.2	**-0.1**	1.2	**0.0**
Pets Products	0.6	8.3	8.0	0.0	3.3	**0.0**	2.4	**0.0**
Expenditures Abroad	0.1	0.2	-2.2	0.0	-2.3	**0.0**	-1.5	**0.0**
Residual Core Good	10.6	6.5	4.1	-0.3	-0.4	**-0.6**	0.0	**-0.6**
Core Services	**72.4**	**4.4**	**4.7**	**0.2**	**3.9**	**-0.4**	**3.3**	**-0.8**
Housing	17.0	5.1	5.9	0.2	4.4	**-0.1**	3.7	**-0.2**
Ground Transportation	0.3	-0.3	3.4	0.0	2.4	**0.0**	2.5	**0.0**
Air Transportation	0.9	32.5	26.2	-0.1	0.1	**-0.3**	-0.4	**-0.3**
Food Services & Accommodation	8.0	7.8	6.4	-0.1	4.4	**-0.3**	3.4	**-0.3**
Financial Services & Insurance	8.8	0.6	1.4	0.1	3.5	**0.3**	3.4	**0.3**
Medical Services	17.8	1.9	1.7	0.0	3.1	**0.2**	2.8	**0.2**
Foreign Travel	1.1	8.9	11.7	0.0	3.6	**-0.1**	3.2	**-0.1**
Residual Core Services	18.5	5.4	6.0	0.1	4.4	**-0.2**	3.6	**-0.4**

Source: Goldman Sachs Global Investment Research, as of May 2022. The range of colors represent the dispersion between the numbers. The economic and market forecasts presented herein are for informational purposes as of the date of this publication. There can be no assurance that the forecasts will be achieved. Please see additional disclosures at the end of this publication.

This could be considered a "Goldilocks" scenario for real estate—headline inflation that moderates enough to slow interest rate increases but suggests pricing power for real estate assets.

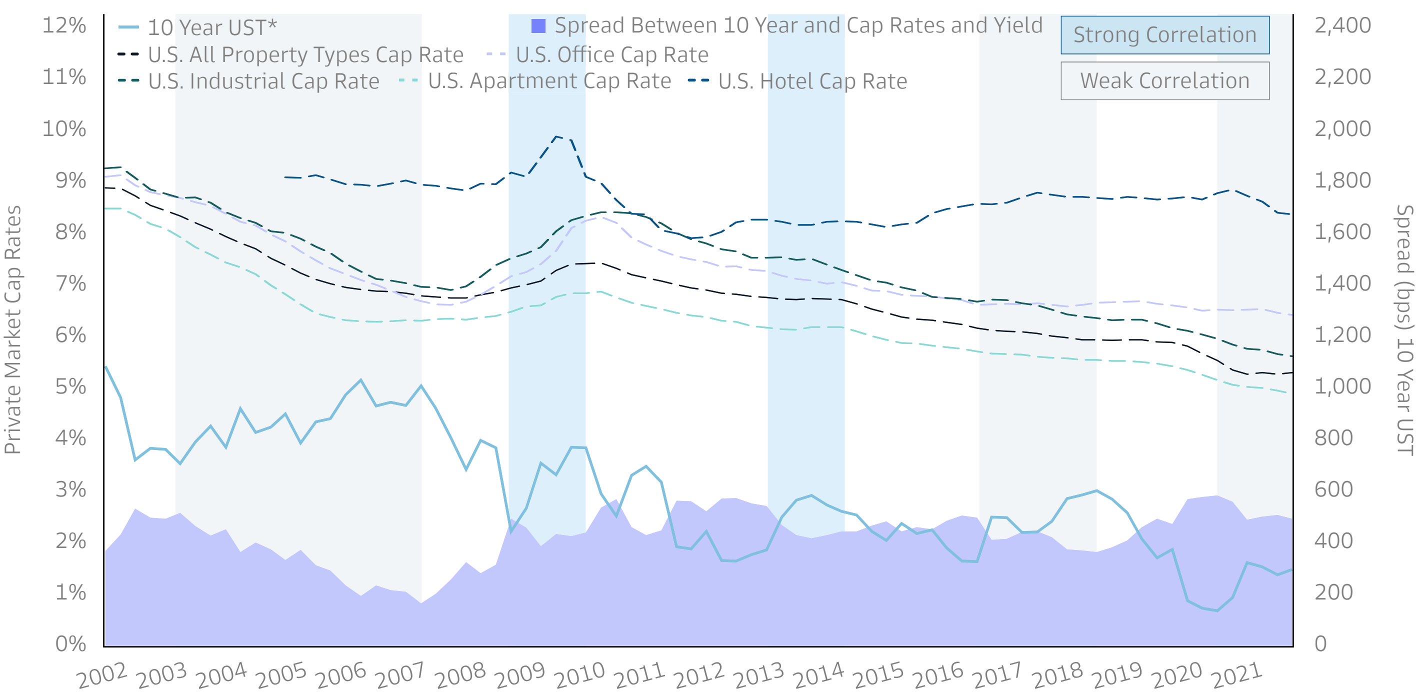
Interest Rates

The breakout in inflation has been met with a steep rise in interest rates in the U.S. as the Federal Reserve (Fed) attempts to rein in prices. The yield on 10-year Treasuries has more than doubled during 2022 to approximately 3% today; U.K. and German 10-year bonds have also moved dramatically higher, albeit at lower nominal levels. This "risk-free" rate is a key component in the discount rate that is theoretically used to price all assets, including real estate. Real estate valuations are often quoted in cap rates, or the yield at the time of property purchase, which can be compared to yields on bonds. As a result, many investors assume that cap rates must increase with interest rates (therefore decreasing real estate values), but the data tell a different story.

In the U.S. some periods of Fed tightening over the last 20 years experienced cap rate expansion while others saw compression. Clearly the growth outlook plays a major role, but capitalization rates are influenced by foreign capital flows as well. Furthermore, real estate performance at the subsector level has diverged more than ever today, with different asset types having fundamentally different growth prospects. Even as interest rates increase, for example, residential and industrial real estate could see valuations expand due to structural tailwinds. The asset's lease duration is another key factor, as the ability to increase cash flows can mitigate the potential negative impact of rising rates on cap rates. Real estate owners can also leverage other tools, such as technology and investment capital, that can have a meaningful impact on the cash flow outcomes of a property.

The most direct impact of rising rates will be to increase borrowing costs, which have already increased across the board in recent months. All else equal, this will have a negative impact on gross returns—a stark reversal from the strong performance tailwind from low rates since the financial crisis. But as discussed above, we see no basis for moving cap rates at a fixed spread to Treasuries, and we believe increased performance dispersion is likely among asset types, sectors and geographies as the risk-free rate moves higher. We also note that large pools of capital raised for private real estate ("dry powder") have supported real estate valuations over the last several years—a dynamic that may continue if investors reallocate some capital out of fixed income and cash in the coming years.

The Relationship Between Cap Rates and Interest Rates Is Inconsistent



Source: Goldman Sachs Global Investment Research. RCA. Greenstreet. PERE.
* Quarterly 10-year treasury data provided in this publication represent the rate at the end of each quarter. Prior to 7/13/2013, the quarterly data was calculated by using the arithmetic average of the official daily rates. As of December 31, 2021.

Recession

The final macro reality to contend with today is the increase in recession risks. While the near-term likelihood of a recession in the U.S. remains low given robust labor conditions, market-implied risks have been on the rise. As a result, investors need to incorporate recessionary conditions into the downside scenario when underwriting new investments. Mapping to historical recessions is an easy enough exercise; digging more thoughtfully into how the triggers of this hypothetical recession would play out in real estate is more challenging. For example, multifamily and hospitality are often assumed to be outperformers in an inflationary environment—but that does not hold true in a recession where job losses and spending restrictions become important factors. Conversely, long-term leased assets to good credits (which would fare worse in an inflationary environment) are likely to perform best in a recession.

One area we expect could perform relatively well are assets in supply-constrained markets with demand that is not economically sensitive—in other words, assets with inelastic demand that likely will have some pricing power. One such market could be life sciences real estate. In aggregate, the entire life sciences real estate market in the U.S. is still only around 100mm square feet, and while there are 10,000 known diseases, only 500 are currently being medically treated, according to the largest public company in the space. Research and development investment into disease treatment has historically been fairly insulated from the economic cycle. Residential housing has also historically proven fairly defensive, with relatively short and shallow economic downturns. Time will tell what particular challenges the next recession will hold, but it is likely several forms of real estate will prove resilient.

Future Implications

Real estate as an asset class has many attractive features in a higher inflationary environment, but the corollary of increasing rates and the looming threat of a recession represent counterbalancing concerns. These macro factors define the new "IRR" factors in real estate, and we don't expect history to be a perfect guide. These three macro factors will have implications for one another—with higher inflation and rates triggering recession signals, and conversely increasing recession signals potentially stemming rate hikes. But slowing growth does not equate to economic contraction, and many global economies remain incredibly resilient underneath all the macro risks. More than any other time in the last decade, we believe investors need a nuanced real estate strategy to position themselves for more alpha opportunities as dispersion increases. While inflation can be a friend to real estate, the best friend to a real estate portfolio is balance—for bolstering the ability to outperform regardless of the macroeconomic environment. ■

Sources:

1. Refinitiv, May 21, 2022.
2. Prologis Q1 2022 earnings call.

DRIVERS WANTED: SOURCES OF RETURN IN ALTERNATIVE INVESTMENTS

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KEY TAKEAWAYS

- Alternative investment strategies can provide access to differentiated sources of return, which can be broadly considered in two categories—alternative beta factors and alpha sources from manager skill.
- These distinct return drivers, rather than a single "illiquidity premium," may explain the historical performance of private markets strategies.
- Viewing hedge fund strategies through the lens of their underlying return drivers can help tailor portfolio construction for specific portfolio solutions.

Portfolio construction strategies and techniques are becoming increasingly sophisticated. Asset owners and managers are seeking to better understand the specific return drivers and exposures of their investments, an approach that can help define each investment's strategic portfolio role and positioning across different market regimes. Alternative investments in particular—private market and hedge fund strategies—can benefit from a more comprehensive understanding of their underlying return drivers. Each of these asset classes encompasses a wide variety of strategies, with exposures to different return drivers. Some of these return drivers can also be accessed in traditional equity and fixed income markets; others may be structurally unique to alternatives. Looking beyond the asset class label, therefore, can enable better differentiation and portfolio positioning. For instance, one portfolio construction approach could be to emphasize alternative strategies that offer exposure to the most diversifying return sources relative to the portfolio's traditional assets. Another approach might focus on strategies with the greatest potential return impact given the investment organization's resources and available opportunities. Consideration can also be given to return drivers that may be especially valuable in particular market regimes.

PRIVATE MARKETS

A growing body of research has shown that private market strategies have historically outperformed public assets over a variety of time frames—and not simply due to differences in leverage, sector or style composition compared to the most applicable public benchmarks.[1] Top-performing managers have generated outperformance meaningfully higher than the industry in aggregate.[2]

Headlines often attribute this outperformance to an illiquidity premium. We believe, however, that this outperformance is the result of exposure to a set of distinct differentiated return drivers. These can be considered in two categories: alternative beta factors and alpha sources. Alternative beta factors are systematic exposures to compensated risk in areas of the market with low or no correlation with broad market direction. Alphas are skill-based, situation-specific, and highly dependent on the skillset of the investment manager. These exposures can drive returns and provide diversification to traditional public equity and credit return drivers.

Traditional Beta Exposures in Private Markets

Before delving further into the diversifying sources of return, it is important to acknowledge that private market strategies have beta exposures to traditional market factors as well—corporate and real asset equity and credit. Strategies vary in their degree of sensitivity to these factors, and in the efficiency with which they can gain exposures to them, compared to public market strategies. For instance, both private and public equity strategies offer exposure to corporate equity beta, but this exposure is more efficiently accessible in public markets—deployment is immediate, monitoring costs are generally low, and effective exposure is readily available via low-cost ETFs. On the other hand, real asset equity beta may be targeted more effectively in private assets, as public real asset securities are dominated by broad equity beta. For instance, since U.S. REITs became a component of the S&P 500 Index, they have had a correlation of 0.70 to that index. This is double their pre-inclusion correlation of 0.36,[3] suggesting that a meaningful idiosyncratic risk and return component has been subsumed by the market dynamics of managers with broad public equity mandates investing in, and managing, their REIT exposures similarly to other equities in their portfolios, and mindful of tracking error to the broad market index.

Accessing Diversifying Sources of Return

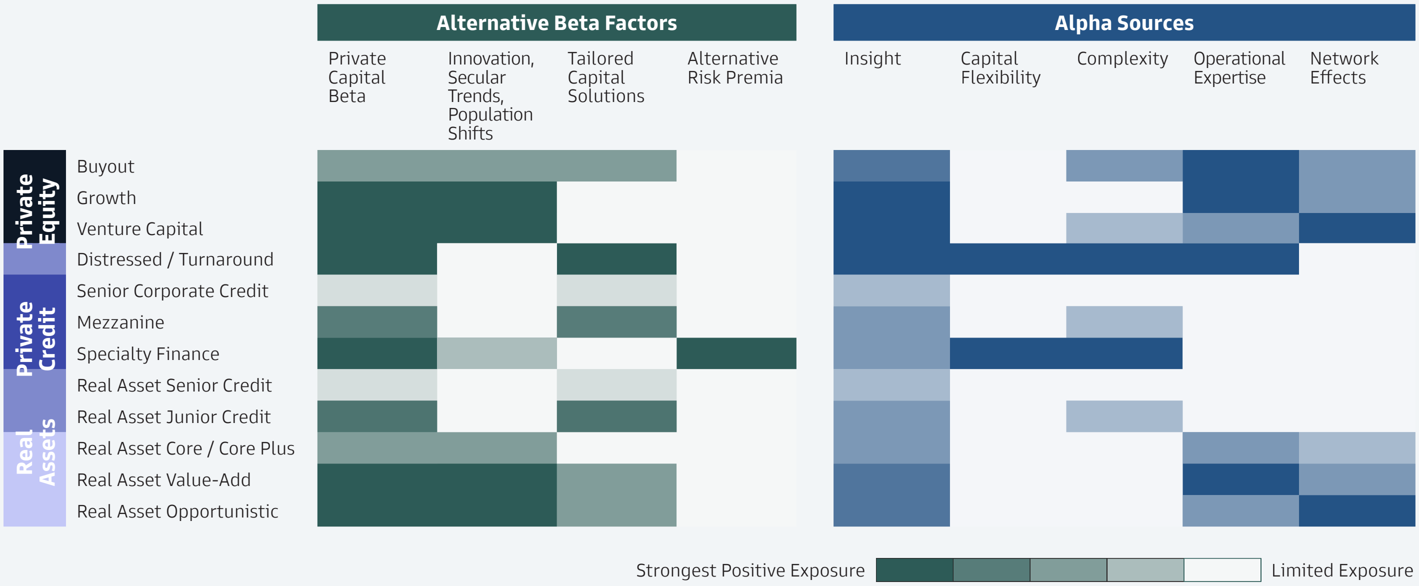
These alternative beta factors and alpha sources are not found uniformly across individual strategies. Some—such as structural supply/demand imbalances that affect the cost and availability of financing—permeate the broad set of private markets strategies, albeit to different degrees. Others are generally limited to a smaller subset of strategies.

PRIVATE MARKETS DIVERSIFYING SOURCES OF RETURN—A FRAMEWORK

Alternative **Beta** Factors	Private Capital Beta	Capitalizing on structural imbalances between the supply and demand of capital. Imbalances can arise from an outright scarcity of public capital—for instance, for early-stage companies—or from a preference for private financing. Companies may prefer private capital, despite its higher cost relative to public capital, because it has lower indirect (e.g., administrative and regulatory) costs and because it provides greater certainty of execution and visibility into pricing. The former may help explain why companies have been choosing to stay private for longer over the past two decades,[4] while the latter can help explain why companies are increasingly turning to private lenders.
	Innovation, Secular Trends, Population Shifts	Investing in companies and assets that capitalize on long-term themes, trends, sectors, and demographic shifts. While typically associated with venture and growth strategies, this beta features more broadly. Examples include buyout strategies backing mature companies adapting to increasingly technology-enabled paradigms, and real asset strategies providing real estate and essential services for the economy of the future.
	Tailored Capital Solutions	Optimizing capital structures and specific risk-return parameters, aided by the structural advantages of a simplified structure with a single, or few, owners or lenders. For example, credit solutions are often tailored to the particulars of the borrower's situation and may be structured to feature both downside mitigation and upside participation provisions.
	Alternative Risk Premia	Deriving value from exposure to risk premia with little or no sensitivity to overall market direction. For instance, specialty finance strategies are leveraging data science to underwrite an increasingly broad and complex set of credits, from railcars and shipping containers to intellectual property like media content and pharmaceutical royalties.

Alpha Sources	Insight	Sourcing, identifying, and executing on individual investments that outperform the broader universe. While present across strategies, this alpha may be particularly important for strategies with the greatest idiosyncratic component of returns. Venture capital and distressed are two examples.
	Capital Flexibility	Pivoting opportunistically and quickly providing capital solutions in times of dislocation or of temporary asymmetries in supply and demand. Turnaround and opportunistic strategies are classic examples of this alpha source.
	Complexity	Evaluating, structuring, and realizing value from complex, idiosyncratic situations, or from assets with specialty or complex underlying collateral. An example is a building construction loan featuring provisions around delayed draws, interest reserves, interest rate caps, and other terms.
	Operational Expertise	Accelerating value creation of portfolio assets via initiatives to drive sales growth, operations efficiency, and other aspects. This alpha source is becoming an increasingly prominent part of return generation—a recent study has found that revenue growth, rather than the effect of leverage relative to public markets, has been the largest driver of value creation of post-2008 private equity funds.[5]
	Network Effects	Leveraging the investor's network of relationships with other investors, companies, and value-add operators to source opportunities and create value for portfolio companies and assets. This skill is particularly prominent among venture capital and growth equity investors, who leverage networks of both investors and operational and talent experts—and among value-add and opportunistic real asset investors, who partner with operating and construction organizations for asset development.

Private Strategies Have Different Amounts of Exposure to Potential Alternative Beta Factors and Alpha Sources



Source: Goldman Sachs Asset Management. For illustrative purposes only.

Exposure to some sources can be obtained in both public and private strategies, but may find different expressions between the two. For instance, all active strategies have the potential to generate alpha from insight, but private equity strategies have an expanded set of opportunities to choose from, as the universe of private companies has expanded while the universe of public companies has contracted over the past two decades.[6] Similarly, companies capitalizing on innovation are found in both public and private markets, but those in the earliest, most innovative, highest-growth phases of their trajectory are almost exclusively privately funded.

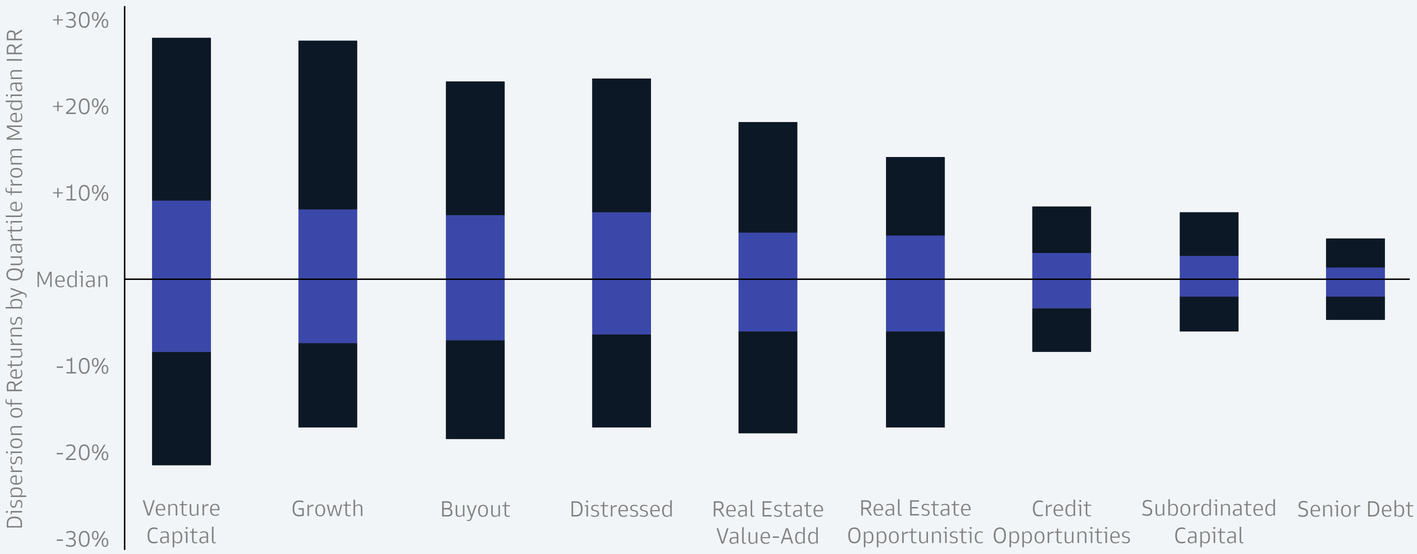
Other exposures may be structurally particular to, or significantly more effective in, private markets. This is particularly the case among factors that rely on control over the investment—such as tailored capital solutions and operational expertise. Sourcing is also a bigger component to alpha generation in private markets, as by definition private opportunities are not easily visible to all. And the type of complexity undertaken by certain private situations may far exceed the amount that public market investors would be comfortable with.

The excess return potential for a given strategy is not simply a function of the sum of its factor exposures. Exposures differ by the magnitude of their potential returns, the size of the opportunity, and the consistency with which they may be available across the market cycle. Certain sources of return may be more valuable in specific environments. Some of this may be intuitive. For instance, alternative risk premia become more valuable when correlations between traditional equity and credit exposures rise. Capital flexibility and operational expertise become more critical levers of value creation and potentially a stabilizing force in regimes of greater stress and market volatility. Other dynamics may be under-appreciated. For instance, private capital beta may offer investors a steadier way to navigate an uncertain market environment. Recent research has found that private equity owners' support of portfolio companies through downturns translates into lower costs of distress.[7] If a company does encounter distress, a single lender should be better positioned to work alongside the company's owners to effect efficient modifications and work-outs, compared to a broader syndicate of lenders with potentially competing interests. In addition, periods of market volatility make the certainty of execution associated with private capital more valuable to companies seeking financing—which can translate into a greater premium in the cost of capital.

The excess return potential of exposures to these return drivers also varies greatly across managers within each strategy. Historical dispersion across funds in a given strategy offers guidance as to the impact these sources may have. A corollary is that manager selection and access to superior managers are critical factors in private markets portfolio construction—and can influence the set of strategies the investor may choose to focus on.

Exposures differ by the magnitude of their potential returns, the size of the opportunity, and the consistency with which they may be available across the market cycle.

Historical Private Markets Strategies Returns Dispersion Can Offer Guidance as to the Impact of Return Drivers



Source: Cambridge Associates, as of Q4 2021. Net of Fee Returns. For each strategy, represents the average of the dispersion across funds of vintage years 2000-2017. 2018-2021 vintage funds are considered too young to have meaningful performance due to the effect of the performance J-curve. **Past performance does not guarantee future results, which may vary.**

Finally, the impact of some of these sources may vary by the vehicles in which these strategies are accessed. For instance, funds of funds managers can generate returns in excess of those from the median single-fund manager, with the best performing constituent funds bringing up the average across investments. However, funds of funds may not outperform the highest-performing single-fund managers: diversification across multiple underlying funds helps mitigate downside risk at the expense of diluting the upside impact of top-performing portfolio constituents. Secondary vehicles may offer their own exposures to a number of diversifying sources of return, above those offered by the underlying investments, as secondary firms have evolved to become providers not just of liquidity but of bespoke capital solutions to fund managers and investors. Complexity and tailored capital solutions are two such return drivers.

HEDGE FUNDS

Similar to private markets, a carefully constructed skill-based hedge fund portfolio may introduce particular, uncorrelated sources of return to an asset owner's portfolio. And like private markets, hedge fund returns can be separated into distinct components: beta exposure to traditional and alternative risk factors, and alpha generated from manager skill. Alpha—skill-based returns—are the returns generated in excess of what is expected given the risks taken to generate them.[8] While not associated with any common risk factors, hedge fund alpha can be segmented based on the approaches used to generate it. This byproduct of manager skill is generally viewed as the most desirable component of a hedge fund manager's return, and with the recent elevated levels of market volatility and higher correlations of stocks and bonds[9]—two fundamental building blocks of most allocators' portfolios—we believe that increasing exposure to idiosyncratic, or skill-based, returns can address some of the biggest challenges hedge fund investors face today.

What Hedge Funds Seek to Capitalize On

The hedge fund universe encompasses a plethora of investing strategies, focused on a wide range of asset classes and individual securities. Some funds take directional bets in their portfolios, albeit with lower exposure to traditional betas than is the case in traditional equity and credit vehicles. Other funds pursue market-neutral strategies, which focus on pure alpha generation.

However, a common theme across these strategies is capitalizing on changes and inefficiencies in the market environment. If financial markets were perfectly efficient and evolved in an efficient way, divergence in market prices would not lead to the emergence of opportunities with abnormally high risk-adjusted returns. In reality a changing economic environment and the reaction of market participants to these changes can move prices away from efficient levels, creating temporary potential profit opportunities. History has shown this process is not simultaneous and may evolve slowly until prices converge to efficiency.[10] Markets display varying degrees of efficiency at different points in time, making for constantly-changing opportunity sets. The more uncertainty and the greater the dispersion of potential outcomes, the greater the potential opportunity to capitalize. When these opportunities do arise, competition for idiosyncratic returns can be fierce.

Role of Hedge Funds in a Portfolio

We do not view hedge funds as a monolithic asset class with one specific role in every investor's portfolio. Rather, we consider skill-based returns as components for developing solutions for different portfolio

HEDGE FUNDS DIVERSIFYING SOURCES OF RETURN—A FRAMEWORK

Alternative Beta Factors	Uncertainty Beta	Capitalizing on dispersion created from uncertainty in the path forward. Uncertainty can lead to risk being mispriced or conflicting outcomes being priced in within different markets at the same time. For instance, if the stock market is pricing in a higher terminal Federal Funds rate than the bond market, a directional manager who believes that the stock market is too pessimistic can increase equity exposure and realize value if the risk premium declines.
	Mosaic Beta	Generating insights on cross-asset connections, so as to express a theme through multiple angles. For example, a macro manager can express a view on structurally rising energy prices by going long energy futures, an alternative energy ETF, and the currencies of oil-producing countries while shorting a basket of the highest energy-consuming corporations and currencies of oil-importing countries.
	Alternative Risk Premia	Deriving value from exposure to risk premia with little or no sensitivity to the direction of overall markets. For example, a carry trade can borrow in the lower-yielding Japanese yen to invest in the higher-yielding U.S. dollar to take advantage of currency yield differentials. A cross-sectional momentum trade may capitalize on technical factors to go long recent outperformers and short underperformers. The ability to implement these strategies with derivatives enables a different risk/return profile than a traditional long-based trading strategy, further decreasing correlations to directional exposures.
	Liquidity	Taking advantage of price differentials across assets with differing liquidity profiles, and of evolving liquidity costs in changing market conditions; having the flexibility to pursue longer-term situations unhampered by constraints around providing daily liquidity. A distressed manager could capture a premium from holding a stressed investment for the length of the restructuring process, during which the security is largely illiquid, with few investors willing or able to take on the associated risk. Key to garnering the benefit of illiquidity is ensuring that the investment structure of the fund corresponds to the time horizon of the opportunity set.

Alpha Sources	Insight	Identifying and profiting from arbitrage opportunities in asset classes, sectors, or individual securities. This requires an understanding of how economics and markets may evolve and the ability to make correct judgments based on this information. For instance, a relative value manager can posit that recent divergence between the prices of two similar stocks was an overreaction that decoupled prices from fundamental value. Shorting the recent outperformer and going long its peer would be a bet on the prices re-converging. Conversely, a merger arbitrage manager, believing that regulators will reject an announced merger on anti-trust grounds and cause the prices of the underlying companies to diverge to pre-announcement levels, can short the target and go long the acquirer.
	Complexity and Innovation	Investing in situations too complex for many market participants to properly evaluate or implement, or seeing a different, innovative approach for value realization. For instance, volatility arbitrage strategies aim to capitalize on the mispricing of volatility via trades across multiple derivatives, controlling for directional price movements and the rates of change in price movements of the underlying security. Innovation can also take the form of an activist investor advocating for a different path to value creation, and engaging in potentially complex initiatives to execute on this path.
	Capital Flexibility	Pivoting opportunistically across asset classes and opportunities, and varying the portfolio's net exposure. An example is an event-driven manager pivoting between merger arbitrage in an environment of robust corporate consolidation activity and special situations / event-driven opportunities in an economic downturn. This alpha can enhance returns while helping limit a fund's correlation to any specific risk premia over longer time horizons.

needs. The role for hedge funds will likely vary by asset owner, based on a portfolio's current exposures, desired outcomes, and changing market conditions. With over 8,000[11] different hedge funds in the market today pursuing a wide variety of strategies, identifying the desired mix of funds calls for a systematic approach. The first step could be to identify elevated risk factors, or potential shortcomings in an asset owner's portfolio. The portfolio's historical returns can be decomposed to identify major market risks. Then, a range of exposures and sensitivities to fundamental market and hedge fund factors can be assessed including equity prices, implied volatility, interest rates, credit spreads, commodity prices and foreign exchange levels. Understanding changes in return drivers and the portfolio's risk profile can help assess the evolution of portfolio risk, and what opportunities can be complementary to the portfolio's profile and objectives.

There is a multitude of use cases for including a well-designed portfolio of skill-based returns, particular to each investor's situation. Three use cases below reflect common issues facing investors in today's environment.

In an environment in which traditional fixed income and equities are positively correlated, where can an investor find attractive sources of uncorrelated returns? A diversified portfolio of low correlation strategies with skill-based managers who have little or no direct structural exposure to equity markets can help offset elevated beta risk. Lower direct equity exposures may create a return profile with lower expected correlation to equity returns. These portfolios typically have more exposure to relative value, market neutral and tactical trading strategies.[12]

If a portfolio's projected returns are below the stated return objective, can returns be enhanced without increasing equity beta? For investors facing a potential return shortfall with limited flexibility with their risk budget, the focus can be on absolute return solutions whose primary goal is generating higher alpha. Such an investor may consider hedge fund managers who invest with a medium-term time horizon and are relatively agnostic to strategy styles or asset classes, allowing for an expansive opportunity set.

Are there ways for an investor with a mid-duration time horizon to be opportunistic? An investor can consider opportunistic exposures in portfolios focused on concentrated investments in a single theme undertaken in partnership with an external manager. Often, these opportunities are tied to specific catalysts that will take a 2–5-year investment horizon to fully materialize. They tend to be highest on the risk/return spectrum of hedge fund strategies.

Identifying and Accessing Manager Skill

Hedge funds have many tools to seek to magnify their excess risk-adjusted returns—utilizing shorting and leverage to increase or reduce risk exposures, taking diversified or concentrated positions, and investing in a manner unconstrained by benchmarking considerations. However, these tools also

Top Asset Owner Challenges and Potential Hedge Fund Solutions in the Current Market Environment

Asset Owner Challenge	Potential Solution	Types of Strategies Used	Strategy Characteristics
Finding attractive sources of uncorrelated returns	Low Correlation Portfolio Strategy	Tactical Trading Market Neutral Relative Value	Little or no direct structural exposure to equity markets
Enhancing returns without increasing equity beta	Absolute Return Unconstrained	Strategy Agnostic Beta Agnostic	Alpha oriented with absolute return focus
Being opportunistic given a mid-duration time horizon	Hedge Fund Co-investments	Dislocation Trading Opportunistic Financings Skill-based Complex Solutions	Idiosyncratic and tied to certain catalysts, exploiting inefficiencies in a 2-5 year investment horizon

Source: Goldman Sachs Asset Management, June 2022. For discussion purposes only.

magnify the potential dispersion of returns, making true manager skill all the more critical to find.

While time series analysis provides a historical quantitative assessment of a manager's ability to generate skill-based returns, it is more critical to assess a manger's ability to generate persistent alpha in the future. We believe a manager's forward alpha prospects are more dependent on their analytical capabilities and process, their behavior and incentives, and the organizational and cultural values than on historical performance, making track record an important, but incomplete, input into the evaluation process.

Since investment risks are multi-faceted, our experience has shown that skill-based active management works best in an environment of fewer constraints, and is best implemented with a diversified set of managers capitalizing on a combination of different sources of skill. Portfolios diversified in this manner tend to demonstrate both more attractive correlation dynamics and better downside mitigation through various market cycles. As such, a well-crafted, diversified portfolio that prioritizes skill-based investment strategies should enhance risk-adjusted returns and may ultimately improve the long-term consistency of an asset owner's performance.

IMPLICATIONS FOR PORTFOLIO CONSTRUCTION

Alternatives—private market and hedge fund investments—comprise myriad strategies that can play different roles in portfolios. But these strategies have two features in common. First, they offer diversification to traditional public equity and fixed income instruments, complementing traditional investments via differentiated sources of return. Second, their nature and structure make them ill-suited to traditional mean-variance optimization approaches. As such, considering these strategies through the lens of underlying return drivers can be informative. Admittedly, not all of the return drivers noted in this paper can be quantified. As such, this framework is not a replacement for a more robust optimization approach. Rather, it can be an additional lens through which to view these asset classes, a tool to complement the investor's existing portfolio construction process for creating diversified portfolios of traditional and alternative investments. ■

Sources:

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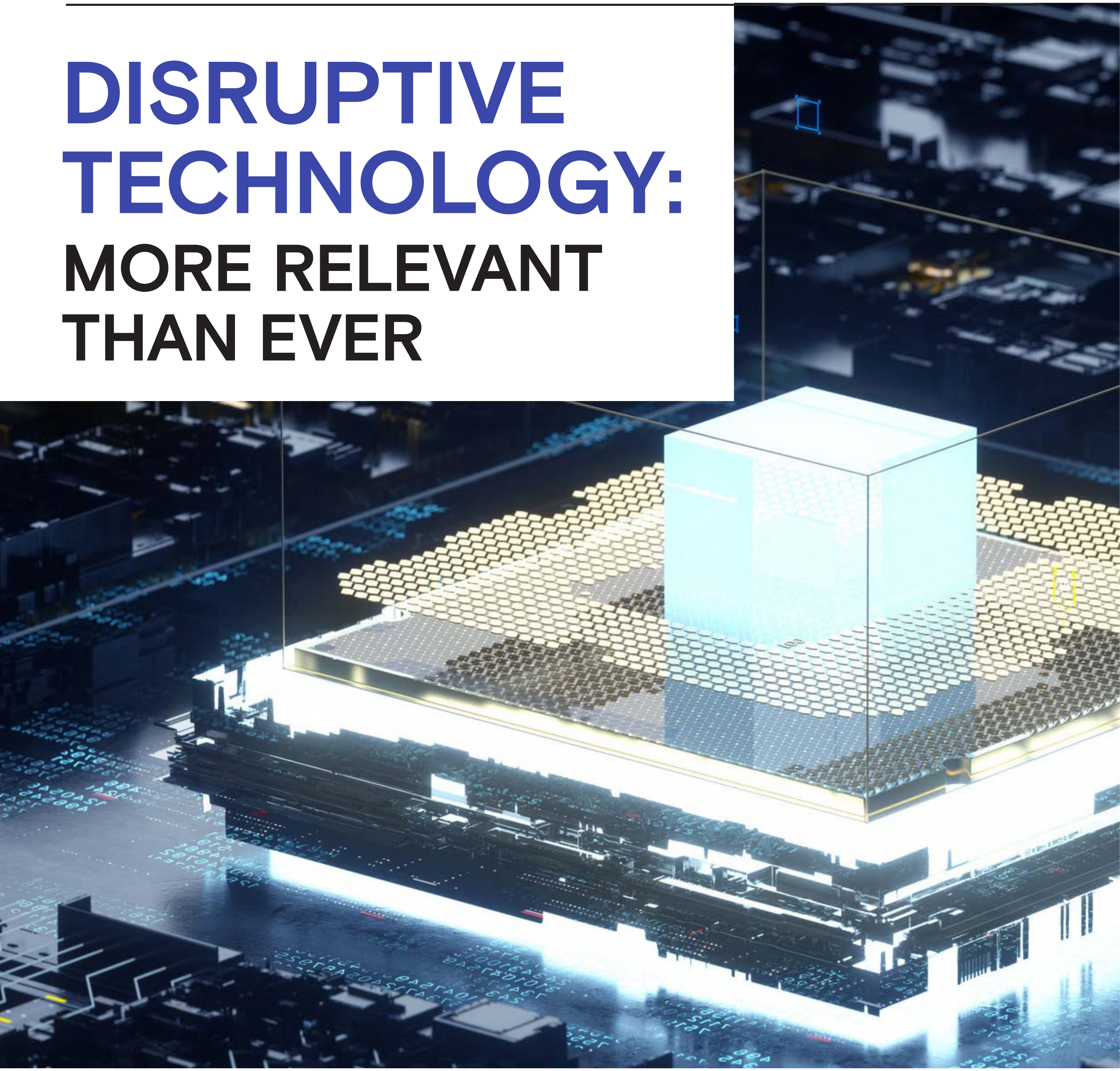
DISRUPTIVE TECHNOLOGY: MORE RELEVANT THAN EVER



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KEY TAKEAWAYS

- Inflation encourages businesses to invest in technology because it helps them to do more with less and identify solutions to bottlenecks and inefficiencies.
- Tech companies offering innovative products tend to exert considerable pricing power, allowing them to pass on input costs to customers.
- Active management is critical in this environment, as increased volatility and uncertainty are likely to drive greater stock-level dispersion moving forward.

In mid-November 2021, the equity market began to pull back, driven initially by concerns about rising interest rates and higher inflation. To date, technology equities have experienced the sharpest correction, given their relatively greater sensitivity to interest rates and starting point of elevated valuations: the price-to-next twelve months earnings ratio of tech equities is down 30% from its peak in September 2020.[1] We see this correction as macro-driven and largely indiscriminate: tech fundamentals remain strong, and we believe select tech companies are well-positioned to outperform in an inflationary environment.

Since the sell-off began in mid-November, the broad equity market has fallen by 20%,[2] and tech equities have experienced the most severe sell-off, pulling back by 30%.[3]

Tech equities have experienced the deepest sell-off largely because they have the highest anticipated growth rates and derive the majority of their value from cash flows extending far into the future. When the market anticipates higher rates, it applies a higher discount rate to those future cash flows, lowering their present value.

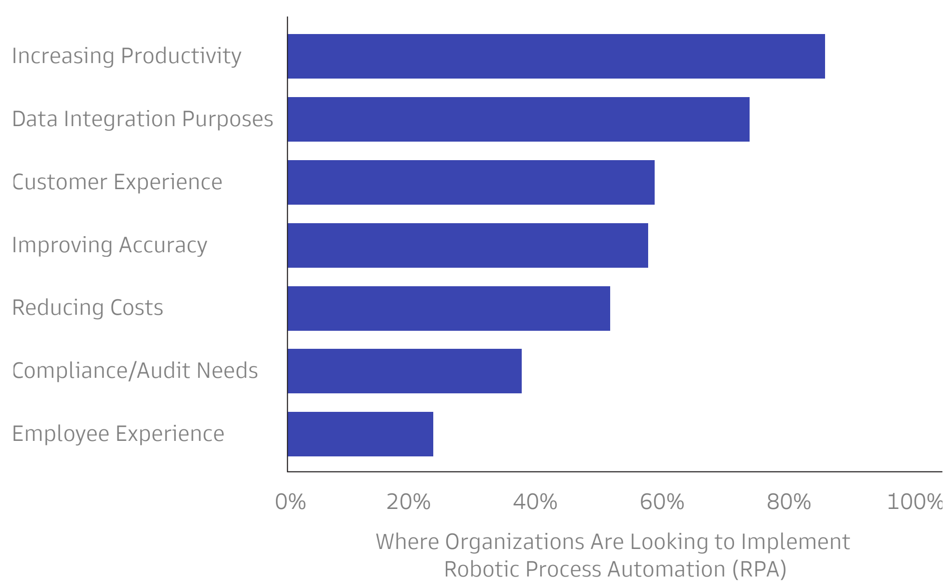
Companies are now adjusting to an environment where capital is not free, inflation is elevated and persistent, and investor appetite is transitioning from growth at any price to growth at near term profitability. At the same time, the global economy is undergoing widespread, inescapable digital transformation that is changing how corporations operate and invest to advance their business goals.

We believe that demand for innovative technology is not cyclical but rather is deeply secular, and that businesses, bolstered by their strong balance sheets, will continue to invest in the technologies that help them maximize efficiency. As Microsoft CEO Satya Nadella explained on a recent earnings call, "I have not seen this level of demand for automation technology to improve productivity, because in an inflationary environment, the only deflationary force is software. [...] As a percentage of GDP, tech spend is, on a secular basis by the end of the decade, going to double."[4]

Inflation Encourages Businesses to Invest in Technology

We believe that, as we shift to the public cloud and transition toward software-as-a-service (SaaS) models, technology companies will help other businesses improve operational efficiency, identify bottlenecks, and predict dislocations before they occur. Morgan Stanley's latest CIO Survey found that, on average, CIOs expected their technology budgets to grow by 4.5% in 2022, notably higher than the 10-year average of 4.1%.[5] Software upgrades are expected to drive this increased spending, with cloud computing, cybersecurity, and digital transformation at the top of CIO priority lists. The MIT Center for Information Systems Research (CISR), meanwhile, recently found that companies that complete their digital transformations tend to see margins 16% higher than their industry average, bolstering the case for prioritizing this spending.[6]

Productivity Is the Main Motivation for Robotic Process Automation (RPA)



Source: Cowen Research RPA Survey, April 2021. For illustrative purposes only.

One potential solution for companies is increased investment in automation software. As labor costs increase, companies will look for ways to automate the simplest, most repetitive tasks using technologies such as robotic process automation (RPA). RPA can free up employees to focus on higher value-add tasks, resulting in increased labor productivity and lower overall costs. For example, attended and unattended robots may help save thousands of manual hours by reducing the time needed to collect, process, and analyze data, thereby driving millions in savings in operating expenses.

The current inflationary environment has proven especially challenging for small- and medium-sized enterprises (SMEs), as they often lack the time, budget, and technical teams to connect to their customers, increase their office productivity, and drive revenue expansion. Cloud-based marketing and sales solutions can provide clear visibility to SMEs across the customer journey and highlight tangible catalysts to business growth. We believe these solutions can quickly increase SMEs' traffic and contract value and decrease customer churn.

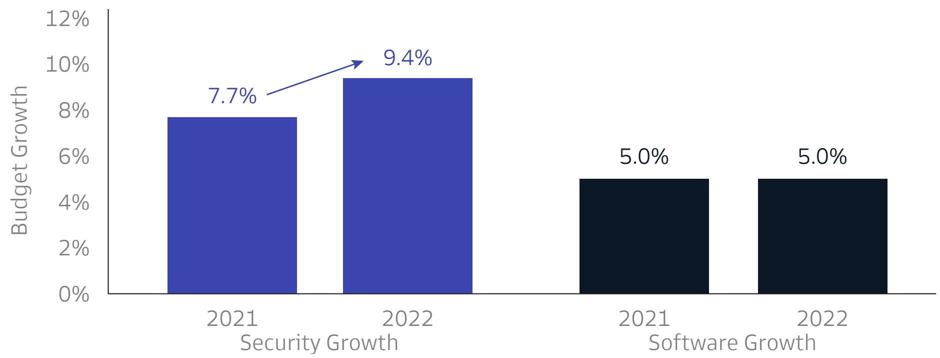
Selected Tech Equities Have Pricing Power

Demand for truly innovative products and services is often less discretionary, and therefore more inelastic, than it is for traditional goods and services. Cybersecurity solutions are a key example. To avoid the devastating financial and reputational impacts of cyberattacks, companies are increasingly relying on advanced solutions to secure their data. And companies are proactively seeking innovative security products: one such example is a new technology that resolves cyberattacks in real time, across network, endpoint, and cloud. The company that developed this product has been able to pass on cost increases to its end customers—while continuing to see accelerating demand—due to the quality of its innovation.

Having innovative products can help companies justify higher prices and establish pricing power. This robust pricing power can also be seen among semiconductor equipment manufacturers: the "picks and shovels" companies developing the infrastructure required to create the chips that power cloud migration, vehicle electrification, automation, intelligent agribusiness, and the buildout of renewable energy infrastructure—all of which we believe are in the very early innings of growth. Despite input cost increases, leading semiconductor companies have seen accelerating—and even record-level—gross margins.

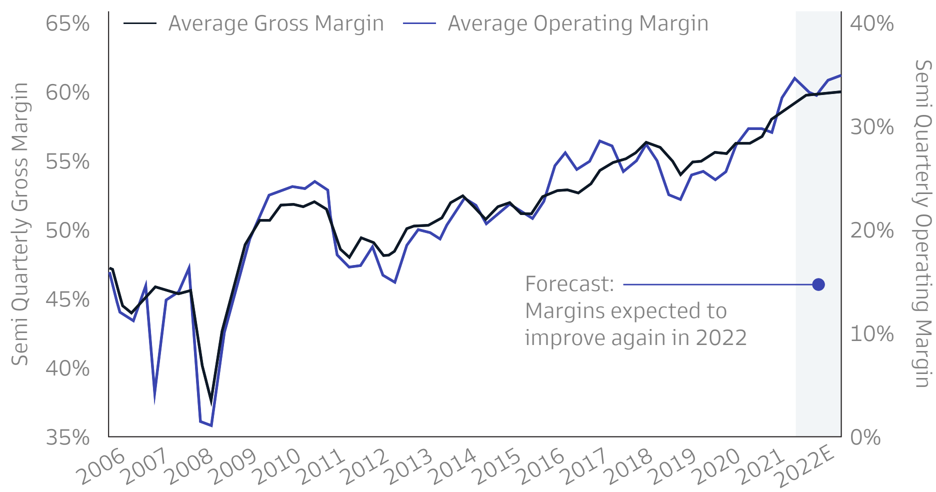
These companies have been able to pass on cost increases to their customers for innovative products. The need for more chips (per car, per data center, etc.) and more innovation is insatiable, and we believe that the semiconductor companies providing differentiated value to their customers will see sustained demand as the world continues to digitize.

Security Budgets Are Primed to Rise



Source: Morgan Stanley's January 2022 CIO Survey, For illustrative purposes only.

Semiconductor Margins Are Expected to Continue Widening



Source: FactSet and Jefferies Research, May 2022.

THE CASE FOR AN ACTIVE APPROACH TO TECH INVESTING

We believe the market has underestimated the tailwinds that a new inflationary regime will provide to select technology companies—those that either help other companies mitigate the effects of rising costs or have pricing power due to the quality of their innovation. This underestimation can be partly explained by how traditional accounting methods do not fully capture the value of intangible investments—those made not in physical assets such as factories but in intangible ones such as software. Research and development—the engine of innovation—is expensed instead of capitalized, and there is virtually no accounting disclosure of the quality of a given company's R&D.[7] But long-term-focused active, fundamental investors can take a deep dive into the quality of tech companies' innovation and invest selectively in those that have the potential to win over the long term.

Investing in Tech in the Public Versus the Private Markets

Whereas investing in private markets offers access to more nascent technological innovations—which often create entirely new markets, as we highlighted in the last edition of *Perspectives*—investing in public equities offers complementary exposure to technological innovation in areas with higher capital intensity, more extensive regulation, and less binary risk. For example, public-market investors can gain targeted exposure to a capital intensive part of the tech universe—semiconductor capital equipment companies, which we believe will potentially benefit from broad-based moves to reshore semi supply chains and intensifying competition between the key leading-edge players. Investors can also gain exposure to towers—subject to far-reaching telecommunications regulation and primarily accessible to investors through publicly-traded REITs[8]—which we believe may also potentially benefit from our increased reliance on data infrastructure. In software, private companies tend to be subject to more binary risk than we see in the public market. By the time most tech companies come to the public market, they have validated their product-market fit, and much of the business model and technical risk has by extension been reduced —meaning that the investment decision centers around which companies will gain share. We believe that, for these key reasons, investing in public tech equities provides investors complementary exposure to private market innovation.

A Selective, Well-Balanced Approach to Investing in Public Tech Companies

While uncertainty and the resulting market volatility are likely to persist for some time, one thing is for sure: uncertainty and volatility drive increased differentiation between stocks, making active management critical. We believe the current environment also heightens the need for active managers to: 1) be selective, using a disciplined, fundamental approach; and 2) build well-balanced portfolios aligned with durable, secular growth themes. This means investing in businesses with robust balance sheets, high profit margins, strong free cash flow, and low leverage, which we believe are best positioned to withstand higher rates and rising costs. In addition to being selective at the stock level, we believe it is increasingly important to invest globally and across market capitalizations. A balanced approach to investing in tech innovation means investing in both high-growth software companies and semiconductor capital equipment companies, traditionally considered to be more value-oriented stocks within the technology universe.

Looking Forward

History suggests that investing in technological innovation and disruption can be a winning strategy. Over the last 10 years, the companies we define as disruptors have outperformed those that are vulnerable to being disrupted by 411%.[9] 52% of the companies that were part of the S&P 500 30 years ago no longer exist, either due to obsolescence or being acquired.[10] At present, we believe that over 70% of the companies in the S&P 500 could be at risk of being disrupted, creating potential opportunities for innovative enterprises to generate meaningful value over the long term. It is therefore critically important for investors to look beyond market-capitalization-weighted benchmarks, which allocate too much capital to the past winners and potentially leave investors underexposed to the winners of the future.

Investors should consider leaning into long-term secular growth themes such as digitization and tech-enabled consumption to invest in the most innovative technology companies, no matter their size or country of origin. Going forward, we believe that tech fundamentals will remain robust—against a backdrop of strong corporate and consumer balance sheets—and that demand will continue to grow as the world continues to digitize. In a world where growth is increasingly scarce, we believe that the tech companies whose growth is fueled by anticipating and responding to the challenges other companies across sectors are facing will be the most valuable, and over the long term will be priced accordingly by the public market. Investors can position themselves on the right side of disruption by investing in the technology leaders of tomorrow. ■

Sources:

1. Bloomberg, FactSet, as of June 30-31, 2022. All returns are net.
2. Bloomberg as of June 30, 2022. All returns are net. Broad equity market represented by the MSCI All Country World Index (ACWI).
3. Bloomberg as of June 30, 2022. All returns are net. Tech equities represented by the MSCI ACWI Select Information Technology + Communication Services + Internet & Direct Marketing Retail Index. Pull back: November 15, 2021 through June 30, 2022.
4. Microsoft 3Q 2022 Earnings Call, April 26, 2022.
5. Morgan Stanley Research, As of January 2022.
6. GHD, "Realising the Value of Digital Transformation".
7. Sparkline Capital, As of April 2022.
8. 95% of international towers are owned by three tower-focused public real estate investment trusts. Cowen, Communications Infrastructure: Towers – Chart of the Week, June 3, 2022.
9. Goldman Sachs Asset Management, as of June 30, 2022.
10. Hexagon AB, October 2021.

Insights On:

DIGITAL INFRASTRUCTURE

Leonard Seevers is on the Corporate Equity and Infrastructure Investment teams at Goldman Sachs Asset Management

Alejandro Batista is on the Infrastructure Investment team at Goldman Sachs Asset Management

How is the world of infrastructure changing?

The overarching theme is a more nuanced approach to what constitutes infrastructure. It is our observation that investors are considering risk profiles and asset class dynamics rather than checklists of characteristics. And with that, we believe the aperture broadens. Digital assets—fiber, towers, and data centers—have become fully accepted as infrastructure, while half a decade ago they were largely considered private equity assets. The change has come about as digital connectivity has become an essential service, and as investors examine fundamentals through a more analytical lens. For instance, infrastructure's resilience and revenue stability have traditionally been achieved via long-term contracts with large credit-worthy counterparts. Fiber-to-the-home, on the other hand, features monthly contracts with thousands of individual clients of varying credit quality, and account-level churn runs at 1-2% per month.[1] But the vast majority of that churn comes from people moving, while the fiber subscription usually transfers from the home's prior tenant to the new one. Normalizing for that, home level churn is in line with other resilient, stable infrastructure businesses. Another aspect that we believe makes fiber a resilient business is the underlying physics. There's no faster or more efficient transmission mechanism than light over glass, so we believe it's not vulnerable to technological obsolescence.

What are the implications of these changes for investors?

There is now greater overlap between the types of investors pursuing certain assets. Towers and data centers, for instance, are also the purview of real estate strategies, while some equity investors continue to pursue fiber. These dynamics, plus strong inflows into digital strategies, mean greater competition and a more challenging investment landscape. The potential implications are three-fold.

First, investors must be strategic in setting their fund size to reflect their investment focus. Today, smaller fiber assets trade at more attractive valuations, considering they require less expansion to achieve attractive risk-adjusted returns than large, scaled companies—but there is a limited amount of these assets located in attractive markets with a favorable competitive landscape. Fund size should align with the manager's ability to invest, in order to avoid pressure to pursue large, highly-competitive targets for the sake of deploying capital.

The second implication is an increased focus on operational improvements. With infrastructure encompassing increasingly complex businesses, the operating platform, team, and culture increasingly become differentiators. An investor's operating skill and experience in adding value to the portfolio assets can make or break an investment.

Finally, creativity and a broader scope can help investors identify overlooked opportunities. For example, we're seeing escalating demand for digital systems buildout—companies that lay and connect fiber. The construction process is commoditized, but splicing together strings of fiber is a highly specialized skillset. Companies skilled in this are seeing tremendous opportunities and improving economics. From a risk and return standpoint, these opportunities are the purview of private equity rather than infrastructure—but an organization that can invest across the spectrum of asset classes may be better positioned to capitalize on such opportunities.

Where does connectivity go next as we move from 4G to 5G, and beyond?

Every new generation of connectivity introduces the same question: what to do with the extra speed and bandwidth. Historically, use cases have followed the buildout of technological capabilities. With the transition from 3G to 4G mobile, a big use case was mobile video. With 5G it might be autonomous vehicles, which need very high levels of bandwidth to process all the data to ensure driver safety. Or it may be augmented or virtual reality. Augmented reality enables easier access to information—for instance, glasses that tell you the price of everything you walk by in a store, or the name of everybody at a gathering. Virtual reality substitutes the analog world with a digital environment that enhances social interaction or replaces less-than-satisfying aspects of physical reality. This could mean a virtual meeting that feels like being in a room with people—or, if combined with a sensory dimension, feeling a virtual touch. The make-or-break factor will be the interface execution, which is where things can get really interesting. ■

Source:

1. Public company filings. As of March 31, 2022.

LIFE SCIENCES:
ENTERING A GOLDEN ERA OF INNOVATION

Amit Sinha is Head of Life Sciences Investing at Goldman Sachs Asset Management

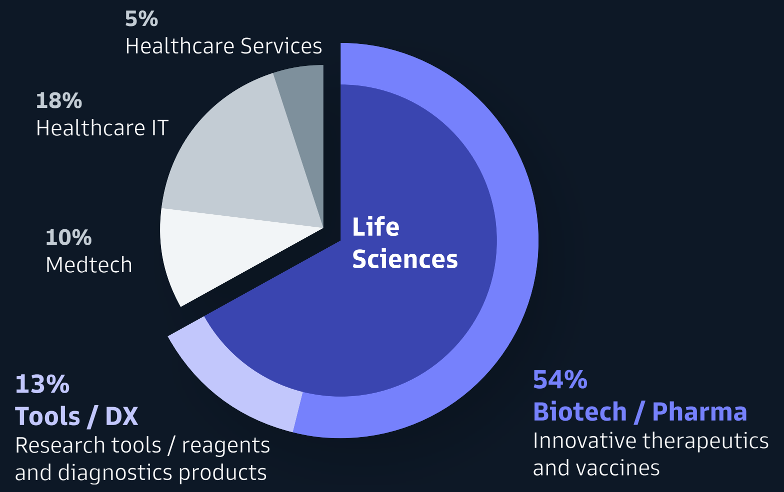
Josh Richardson, M.D. is a member of the Life Sciences Investing team at Goldman Sachs Asset Management

Kevin Xu is a member of the Life Sciences Investing team at Goldman Sachs Asset Management

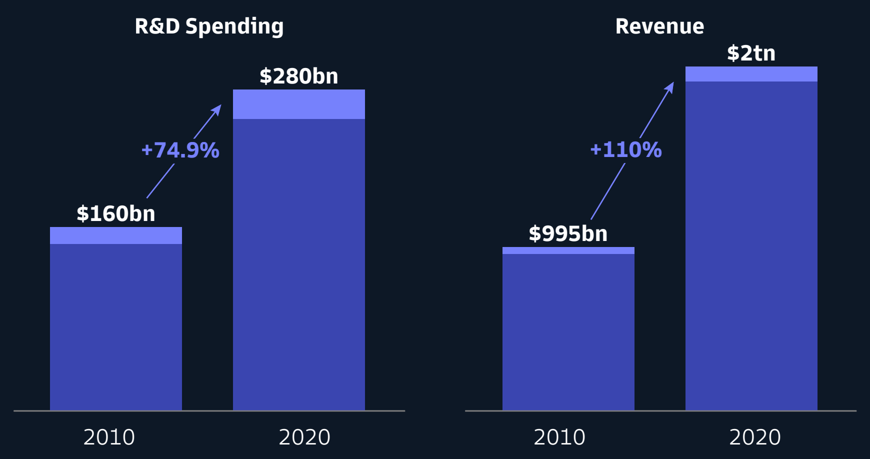
KEY TAKEAWAYS

- Life Sciences is currently the largest sector within the healthcare industry and has continued to expand rapidly, with heightened demand for therapeutics driven by aging demographics and the rising prevalence of chronic disease.
- Breakthroughs across scientific disciplines have enabled new therapeutic candidates to be developed more quickly, efficiently and precisely. Innovation is increasingly occurring at small biotech startups rather than large pharma companies.
- As drug development evolves, we believe new approaches to financing and capital formation will be needed. The scalability of modern discovery platforms may allow for greater opportunity, but also requires significantly more capital.

Life Sciences Comprises the Majority of Healthcare Venture Funding



Life Sciences Has Grown to a $2tn+ Market



Source: PitchBook. As of December 31, 2021. Statista. As of February 28, 2021. Grand View Research. As of March 1, 2022.

Healthcare is an integral part of the global economy that impacts every individual. The largest segment of the healthcare sector is Life Sciences (LS), which applies the study of living organisms and life processes towards the development of novel medicines and related technologies. The COVID-19 pandemic highlighted the importance and impact of the innovation and structural changes that are driving LS growth globally. We believe the current landscape provides opportunities to drive research forward in critical LS areas and explore new avenues for streamlining drug development and approval processes.

In our view, the foundation for LS innovation is supported by several key drivers, underpinned by decades of strong investment from both the private and public sectors. Tailwinds from sustained growth in funding and research are leading to a proliferation of scientific publications and new patents, with breakthroughs across disciplines including genetics, immunology, and cell biology. In parallel, technological advancements, such as the use of artificial intelligence (AI), are leading to faster drug development timelines and the creation of more personalized therapeutics. Advancements in the understanding of disease and a convergence of innovation across many scientific disciplines are enabling the development of new drug platforms that create novel ways to treat disease and solve patients' unmet needs. Separately, regulatory bodies are creating policies to better leverage new technology and create new approval pathways, with a concerted effort in many geographies to support domestic LS innovation and development.

As the drug development process is evolving so are company formation timelines, creating a need for new financing models and capital solutions. In the next decade, 15 of the top-selling drugs in 2020 will lose patent exclusivity, resulting in a loss of $100bn+ in sales for large pharma companies.[1] As such, large pharma is reevaluating its long-standing strategy of developing most drugs in-house, and increasingly looking to smaller biotech companies as a way to acquire innovative drugs to replenish pipelines. However, small biotechs often have limited access to financing to efficiently progress through clinical trials while remaining private and independent. Going forward, we believe the next decade will see an acceleration of some of the critical trends that have shaped pharma strategies and pipelines historically. This will create challenges for incumbents, but opportunities for innovative new companies and technologies to come to the forefront.

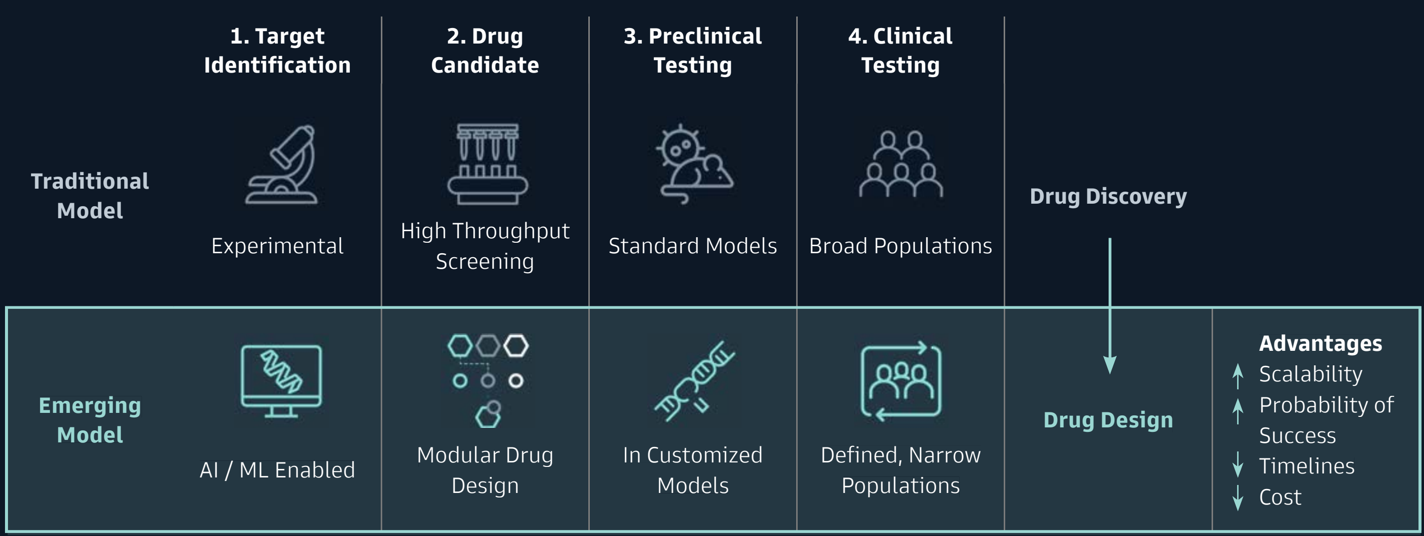
Accelerating Life Sciences Product Development

Drug development is the most resource- and time-intensive segment of LS, historically requiring about 9 years (Investigational New Drug to approval) and $1-2bn to advance a single drug to approval.[2] These long development timelines are the result of a traditionally rigid regulatory structure that was developed to ensure the safety and efficacy of products for human use. The drug development process continues to benefit from advancements in tools, diagnostics, technology, and regulation. As a result, we expect timelines to compress and the process to become more cost-efficient in the coming years.

New applications of AI and machine learning (ML), adaptation of modular drug design, and improvements in clinical trial design and operations are creating a paradigm shift from a traditional model of drug discovery to an emerging model of rational drug design. This more engineering-based approach to drug development is enabling faster scalability, increased probability of success, accelerated timelines, and reduced cost.

Improved computing power and advancements in AI/ML techniques have made it possible to glean insights from an exponentially growing set of healthcare data. As techniques become more sophisticated, AI/ML has the potential to increase efficiency and reduce costs at many stages of drug development. One recent application is protein structure prediction, which is expected to have groundbreaking implications for science and medicine given the pivotal role that protein structure has for enabling drug discovery efforts and the arduous experimental approaches that are often needed to obtain protein structure.[3] Many other examples of the value of AI/ML in drug discovery continue to emerge,

Innovation is Unlocking an Emerging Model for Drug Development



Validated Platform + Modular Design = Rapid Product Cycles

Source: Goldman Sachs Asset Management. For illustrative purposes only.

with novel insights being derived for faster target identification and prioritization, more accurate identification of disease-relevant phenotypes, streamlined compound design and optimization, and precise predictions from high content imaging and digital pathology.

Companies engage a broad system of stakeholders that changes over the course of development—ranging from academic and research organizations in early development, to regulatory bodies and payers (i.e., insurers) that play a critical role in the approval and commercialization of drugs. To that end, advancements in the drug development process are complemented by an evolving regulatory environment, which is enabling greater flexibility. Recent regulatory modifications have more clearly defined situations where the clinical development process can be modified to better meet patient needs, ethical considerations, or specific requirements of the disease or drug modality. In the U.S., which produces the most biotech patents worldwide, the FDA has introduced new policies that are providing support for access to innovation and novel therapies.[4] The result has been that annual FDA approvals doubled in the decade from 2010 to 2020.[5] Similar initiatives are being undertaken by regulators in other regions, including the EMA (Europe) and NHMP (China).

Advancements in the drug development process are complemented by an evolving regulatory environment, which is enabling greater flexibility.

REGULATORY FLEXIBILITY IN CLINICAL TRIAL DESIGN...

- **Breakthrough designation**, **priority review**, and **accelerated approval pathway** to reduce approval timelines for drugs addressing unmet needs
- **Concurrent clinical trials / adaptive design** to modify trial timelines
- **Real-world evidence (RWE)** to reduce trial costs and time

Example
Oncology products approved using the accelerated approval pathway are brought to market 4.7 years faster than traditionally approved oncology therapies.[4]

...MORE CUSTOMIZED APPROACHES ARE ACCELERATING DRUG DEVELOPMENT

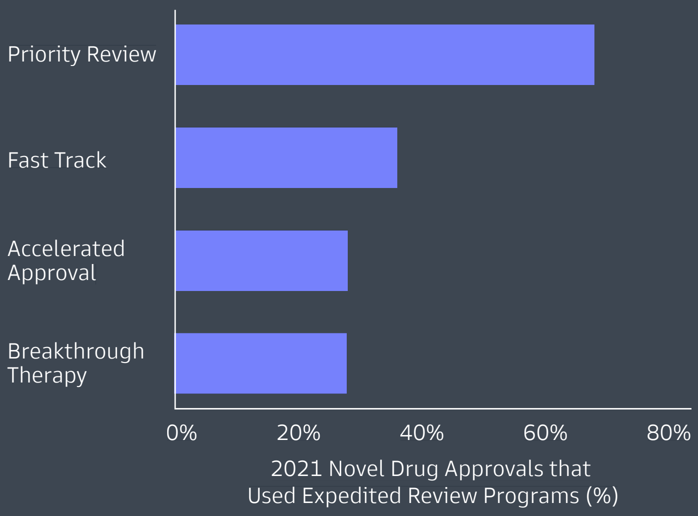
Priority Review
Designation for drugs that show significant improvements in safety or efficacy; directs FDA resources to shorten decision timeline to 6 months

Fast Track
Process designed to facilitate development, expedite review of drugs to treat conditions with an unmet medical need, to get drugs to patients faster

Accelerated Approval
For drugs that require an extended period to measure intended effects, approval can be granted based on surrogate endpoints in some cases

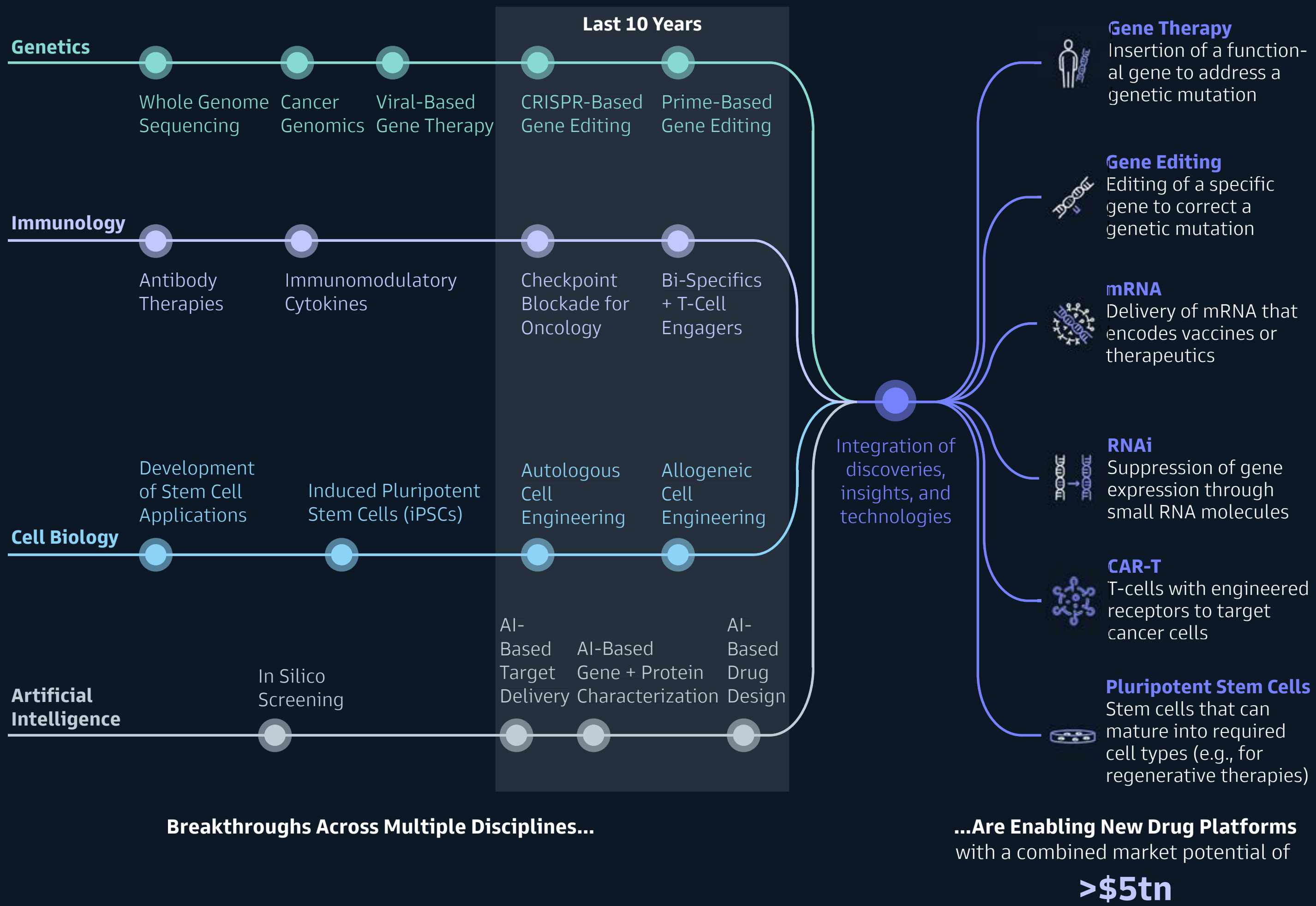
Breakthrough Therapy
Ability to gain approval based on preliminary clinical evidence if data indicates drug may provide substantial improvement over available therapy

Use of Policies in Novel Drug Development



Source: U.S. Food and Drug Administration. As of December 31, 2021.

The Convergence of Breakthroughs is Creating New Drug Development Platforms with Robust Potential



Source: Goldman Sachs Asset Management. FDA (FDA Policies, Use of Policies).For illustrative purposes only.

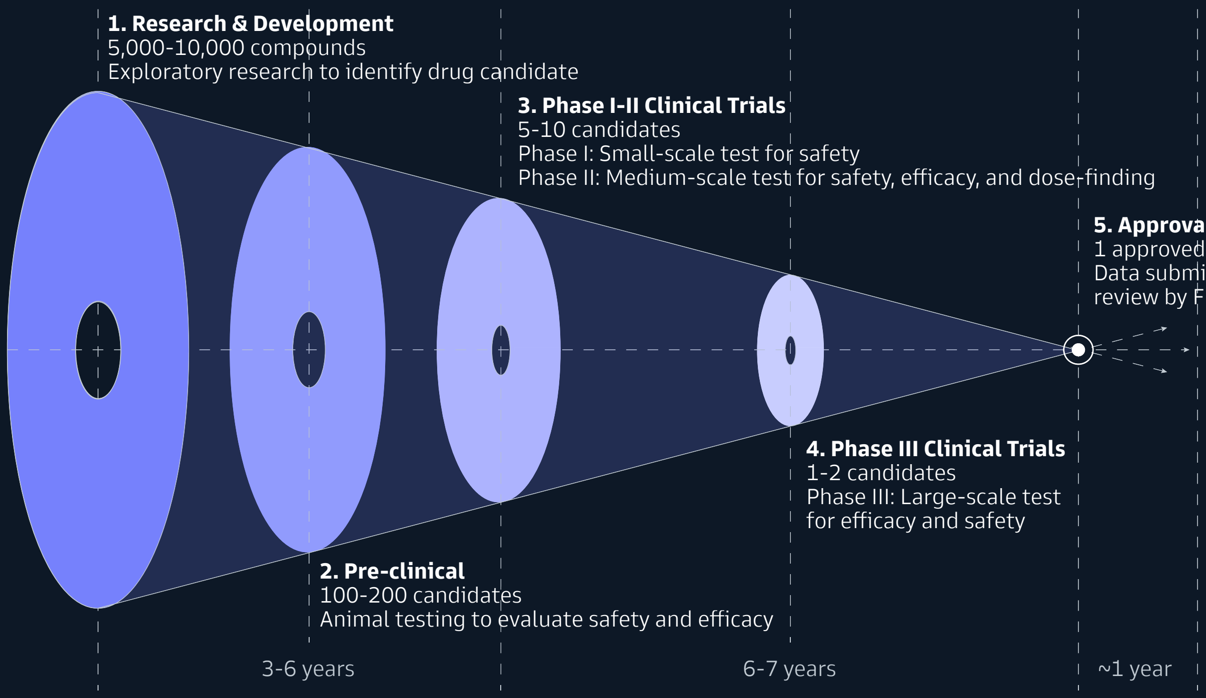
Innovations in the Science of Life Sciences

Drug development is becoming increasingly interdisciplinary, with breakthroughs across key disciplines such as genetics, immunology, cell biology, and AI converging to create new modalities and drug platforms. Over the last ten years, the emergence of CRISPR-based gene editing has created an ability to precisely edit and manipulate genes, to correct genetic mutations, potentially treating genetic diseases at the source. A greater understanding of immunology has enabled more targeted therapies that use a patient's own immune system to fight disease. Immune checkpoint inhibitors (i.e., drugs that block signals used by cancer cells to evade the immune system, allowing the body to recognize and kill cancer cells) are now widely used to treat a range of cancers. Engineered immunotherapies created with bi-specific antibodies and T-cell engagers (i.e., modalities that direct the immune system to target and kill cancer cells) are creating more targeted cancer therapies that greatly increase the standard of care over traditional chemotherapy and radiation approaches. Advancements in cell biology offer a complex, context-dependent ability to treat disease, with potential applications in regenerative medicine. The rapid growth in AI capabilities provide a powerful tool, not only for improved computational screening, but also for the identification of novel targets and design of new drugs. Collectively, the integration of discoveries, insights, and technologies across disciplines yields a more targeted, innovative, and effective way to treat disease through new drug platforms.

Structural Changes Lead to New Opportunities

Scientific breakthroughs and improved regulatory frameworks are leading to structural changes that are shifting how LS innovation takes place. The evolution of life sciences startups can often mirror the

Illustrative Drug Development Process



Source: Goldman Sachs Asset Management. For illustrative purposes only.

drug development process, with companies experiencing different risks, opportunities, and financing needs as they reach new milestones and phases of development. As drug development processes evolve, the timeline of company formation and maturation is shifting too.

Smaller biotechs are often more specialized, agile, and closer to key sources of innovation (e.g., universities) than large pharma, making them better suited to advance novel therapies from concept to clinical trials. The cost of launching an LS startup and developing new IP has fallen as technology and processes have improved—similar to how cloud computing, no-code programs, and SaaS products have reduced the cost to launch a tech startup. While it is now cheaper to launch a new company and establish an initial proof of concept, it is more capital-intensive than ever to navigate clinical trial design and operations, as well as the ever-changing regulatory approval process.

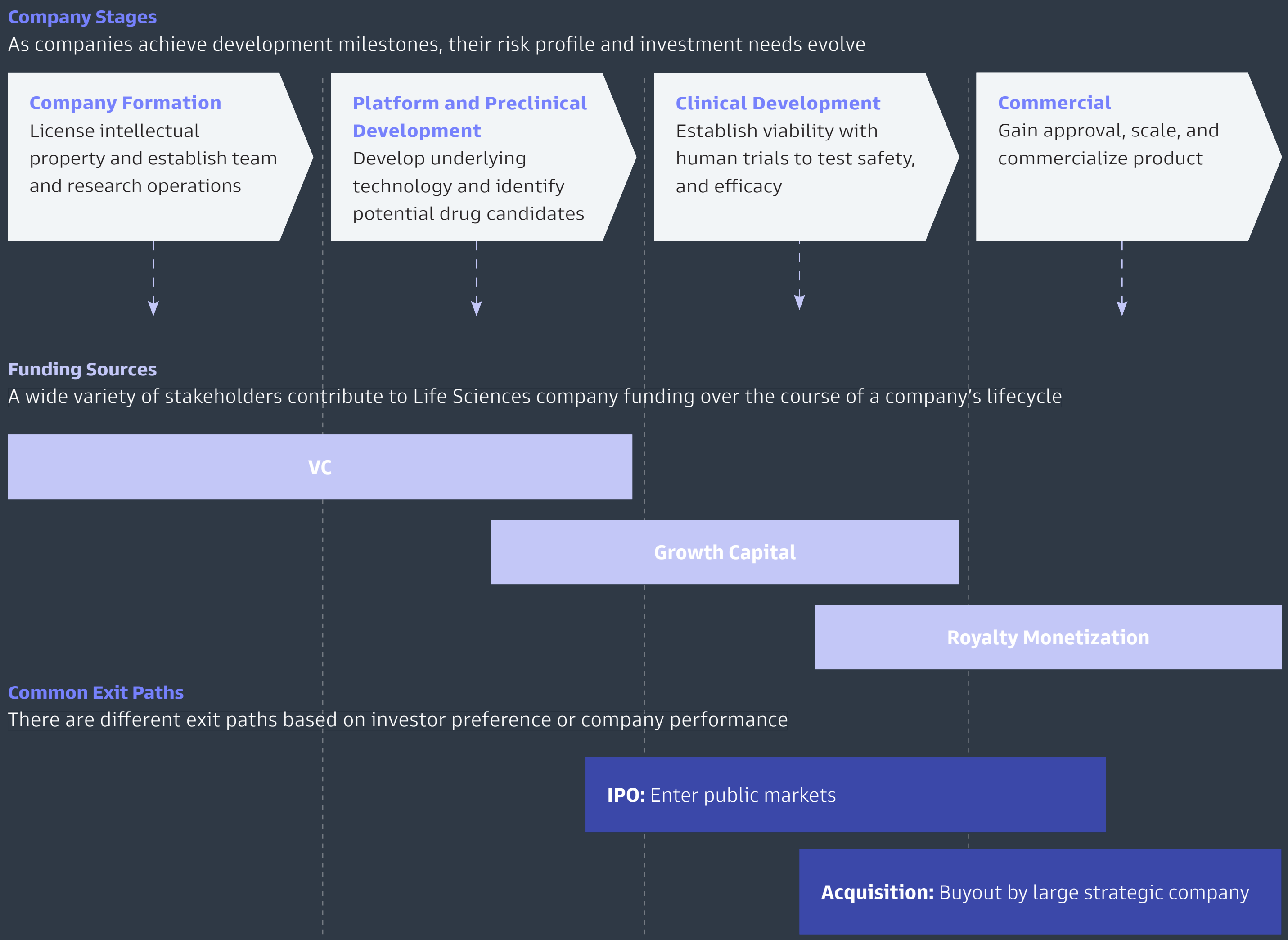
Traditional financing models for LS have not yet adapted to the changing landscape. Not only have the number of LS startups increased, but the shift to more platform-based companies has resulted in increased capital requirements beyond the capacity of traditional sources. LS companies in the early research stage rely heavily on government or philanthropic capital that is generally not seeking a financial return (e.g., grants) to help establish a viable idea. The falling costs of launching a startup enable this initial funding to take a company further than before. Early-stage LS venture firms have been integral in supporting company formation around early ideas, with annual investment more than tripling to $18bn in the decade through 2020.[6] Traditionally, LS venture firms funded companies for long periods through initial clinical trials when scientific and clinical risk remained high. However, while upfront costs have gone down, longer term capital requirements have intensified. Simultaneously, VC financing has been insufficient to meet the needs of LS startups. As a result, we believe that private growth capital provides a unique solution to companies that have a different growth curve.

Drug development at small companies is often facilitated through partnerships with large pharma companies, whose operational capabilities are more conducive to clinical trials, drug manufacturing, and distribution rather than drug development. The more recent focus of developing platform technologies with non-binary outcomes, as opposed to single assets, also means that biotech companies can produce diversified product lines while scaling more quickly than in the past. Large pharma companies, who are increasingly facing loss of exclusivity on top-selling drugs, look to these products developed by smaller companies to replenish existing and future drug pipelines.

The Growth Gap

For companies that choose to remain independent, the increased capital needs of clinical development have led them to go public earlier in their development. Between 2014 and 2021, the percentage of biotech companies going public in pre-clinical or phase 1 stage surged from 12% to 59%.[7] While biotech/pharma companies account

Lifecycle of Life Sciences Companies is Tied to Drug Development Stages



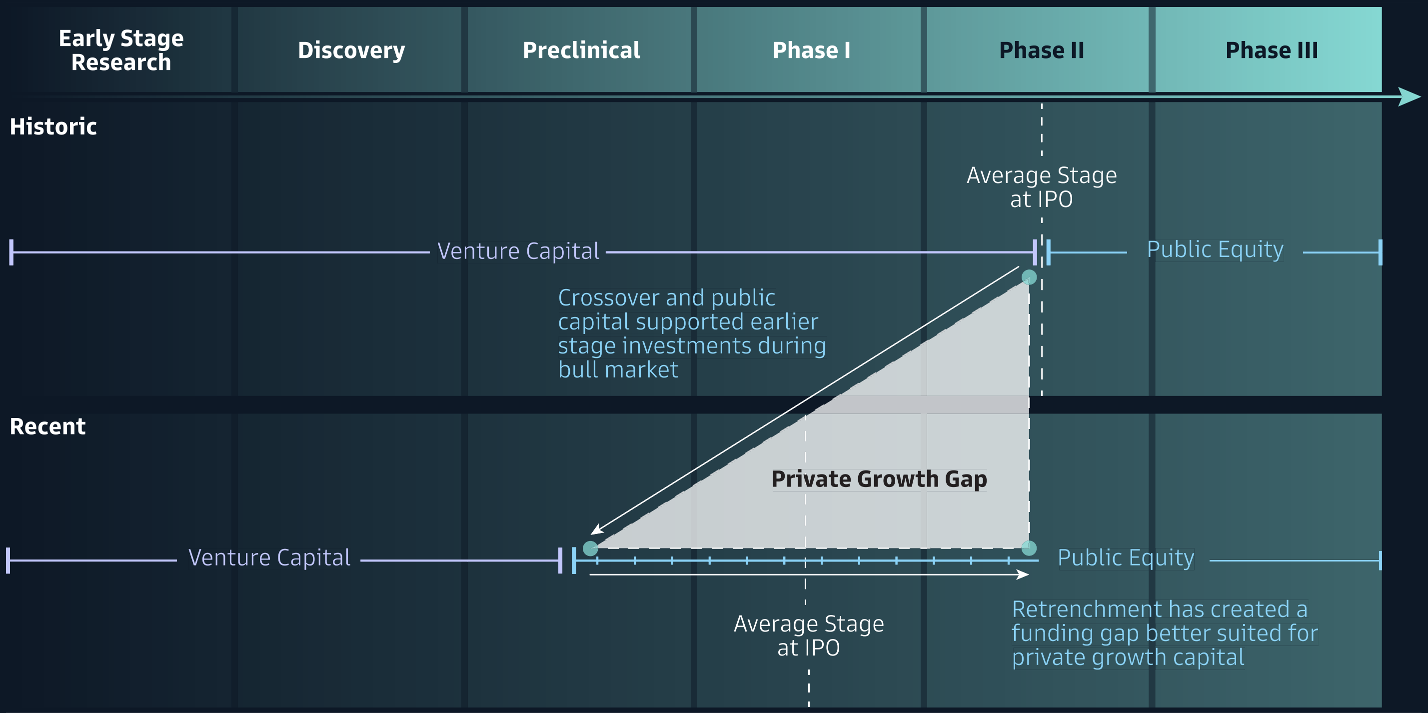
Source: Goldman Sachs Asset Management. For illustrative purposes only

for less than 10% of VC deals annually, the industry has consistently accounted for at least 25% of VC-backed IPOs, reflecting the need for companies to tap public markets.[8]

Many LS companies today still have high levels of scientific, clinical and regulatory risk at the time of IPO, often with binary options for success. This risk can be difficult to price in public markets, with many investors preferring opportunities at the late-clinical or commercial phase when scientific and regulatory risk has largely been minimized. To that end, the median returns 12-months post IPO declined from 59% in 2014 to -11% in 2020/21. Additionally, the daily volatility of public markets can lead LS companies to trade with broad market conditions, rather than based on the development of the underlying technology. These issues are particularly pertinent when additional financing is needed to support further clinical development, as is often the case for many early-stage companies entering public markets today. As a result, public markets

As the drug discovery and development process is evolving, so are company formation timelines, creating a need for new financing models and capital solutions.

Private Growth Capital Gap & Drug Development Life Cycle



Source: Goldman Sachs Asset Management. For illustrative purposes only.

are often a sub-optimal financing option for financing throughout clinical trials.

Traditional VCs continue to support robust idea and company formation; however, these companies require substantial capital beyond this stage to fund definitive experiments to de-risk and scale the platform and develop associated therapeutics. With the increasing number of companies being formed and decreasing ability to access public equity capital, we expect this to result in an opportunity set of high quality private companies that require private capital to scale.

A New Era Ahead

As macro-trends drive demand for better healthcare, we believe that innovations in tools, technologies, and processes for treating disease, combined with a supportive regulatory environment, has created a golden age for LS that will enable faster, better innovation globally. While significant advancements have been made in recent years, we believe we are still in the early stages of a multi-decade era of unprecedented growth. As funding for research, a growing workforce, and better global drug development infrastructure continues to enable greater supply of novel ideas, new financing models will be needed to support company formation and development. This is presenting an opportunity for private market investors with the requisite expertise and network to capitalize on a timely opportunity to advance the future of healthcare innovation through investment in LS. ■

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GROWING CYBER THREATS TO SUPPLY CHAINS AND THE POTENTIAL SOLUTIONS

Fortress Information Security is a supply chain cybersecurity provider that helps secure 40% of the U.S. power grid and critical assets, as well as enterprises in other sectors such as aerospace and defense, manufacturing, telecoms, pharmaceuticals, transportation and insurance. We spoke with Betsy Soehren-Jones, Fortress COO, to discuss the growing cyber threats to supply chains and the potential solutions required in order to protect key industries.

Betsy Soehren-Jones
COO of Fortress Information Security

As Chief Operating Officer, Soehren-Jones is responsible for Fortress' HR, Marketing, Public Policy, Sales, and Strategy organizations serving the Critical Infrastructure, Manufacturing, and Department of Defense business lines.

Essential industries are facing more cybersecurity threats emanating from the supply chains that underlie them. As a result, companies on the frontline of critical infrastructure need better data and analytics to understand threats and tools to defend themselves. Why are supply chain cyberattacks a growing trend within cybersecurity?

Betsy Soehren-Jones: Modern, efficient supply chains can create vast economic and social benefits, but they also bring risks. Organizations can sometimes lose control of the software and physical components for the products they provide. This results in increased vulnerability to network intrusions, hacks, and more sophisticated cyberattacks, which puts information, critical infrastructure, and global supply chains at risk. Industries that make up the critical infrastructure sector—electric, oil and gas, waste and water—are more desirable targets. Although many companies in those sectors have robust security and can keep out potential enemies, doing so becomes more difficult when your enemies look like friends. That's why third parties, usually vendors, are so at risk.

Where are the biggest vulnerabilities in critical infrastructure?

Soehren-Jones: The private sector owns or runs about 85% of U.S. critical infrastructure. Many large corporations and government entities have done an excellent job of protecting themselves from direct cyberattacks. However, there are thousands of small and medium-sized enterprises that support the large organizations that manage critical infrastructure. These smaller companies supply products or components as complex as nuclear power generators or mundane as air conditioning systems. Yet, they have access to large critical infrastructure entities even if it is just via the accounting system to submit bills and receive invoice payments. In many cases, these supply chain partners have limited cyber defenses and offer back doors for hackers, criminals, and even nation-states to launch attacks against our nation's critical assets. These partners are the first place that threat actors look when trying to find a backdoor. They usually don't have security like a Fortune 500 company because they can't afford it. Why break in through the front door where all the security is when you can find an unguarded door in the back?

How can these smaller businesses make strategic investments for their future operations?

Soehren-Jones: It starts with visibility. Small businesses need to understand where all the building blocks for their products—both from a hardware and a software perspective—come from. Once they have a full blueprint of the foundational components that comprise their solutions, companies can determine risks. Second, it requires industry collaboration. Large businesses share many of the same suppliers. For example, in the energy sector, utilities all work with many of the same several hundred vendors. These organizations must share information, data, and analysis about potential threats and risks they have identified to enable proactive cybersecurity programs. Fortress has a central repository of information—the Asset to Vendor (A2V) Marketplace—that enables asset owners and suppliers to minimize the time and cost to process and assess the impact of cyber threats. Our A2V Library is a unique community for information sharing and collaboration, providing clients with access to more than 40,000 vendors and millions of assets. Going forward, we plan to develop this offering for all critical infrastructure sectors, providing a comprehensive set of tools to overcome supply chain security and compliance challenges associated with third-party risk management, all while reducing costs.

> Effective compliance can be time-consuming and costly for companies without a partner that understands both the threat and regulatory environment.

How are public and private sector stakeholders addressing national security issues stemming from supply chain vulnerabilities?

Soehren-Jones: As critical industries increasingly face cybersecurity threats directed toward the supply chains that underlie them, all corners of the federal government and private sector have quickly recognized that securing critical supply chains is a national security issue. In the past few years, authorities such as the Cybersecurity and Infrastructure Security Agency (CISA) and the North American Electric Reliability Corporation (NERC) have released supply chain cybersecurity guidelines. However, companies are dealing with enormous regulatory burdens. U.S. lawmakers and regulators have implemented and are continuing to conceive new supply chain risk management rules that have and will impose very complex requirements for all government suppliers/contractors/grantees. Effective compliance can be time-consuming and costly for companies without a partner that understands both the threat and regulatory environment.

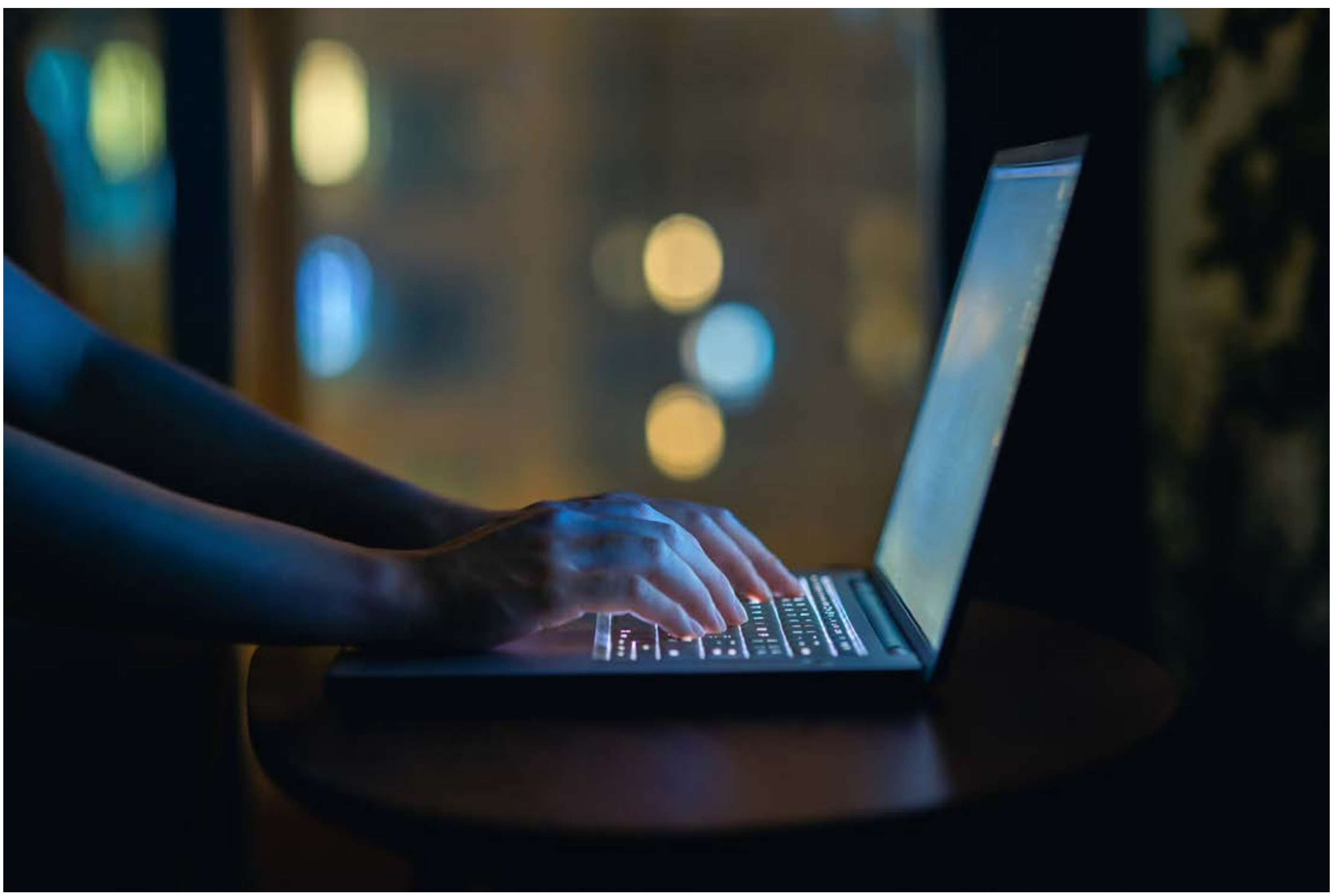
How does Fortress help organizations fight back and find ways to establish effective control and oversight of their supply chains?

Soehren-Jones: Fortress enables companies to assess, mitigate, and remediate risks associated with vendors, assets, and software in their supply chains. The company's solution was co-developed with leading electric utilities and has since grown into a consortium tool for the U.S. electric utility industry led by leading anchor customers, comprising five of North America's ten largest investor-owned utilities. We believe the business is positioned to replicate its success in the utility sector across all critical industries including oil and gas, transportation, waste and wastewater, financial services, and healthcare. Our platform is a software solution that automates supply chain management functions including risk assessments, workflows, data processing and analytics, continuous monitoring and regulatory reporting. By doing so, we enable government and business leaders to tackle the significant challenge of securing products and solutions built with thousands of components manufactured by companies across dozens of countries.

As critical industries increasingly face cybersecurity threats directed toward the supply chains that underlie them, all corners of the federal government and private sector have quickly recognized that securing critical supply chains is a national security issue.

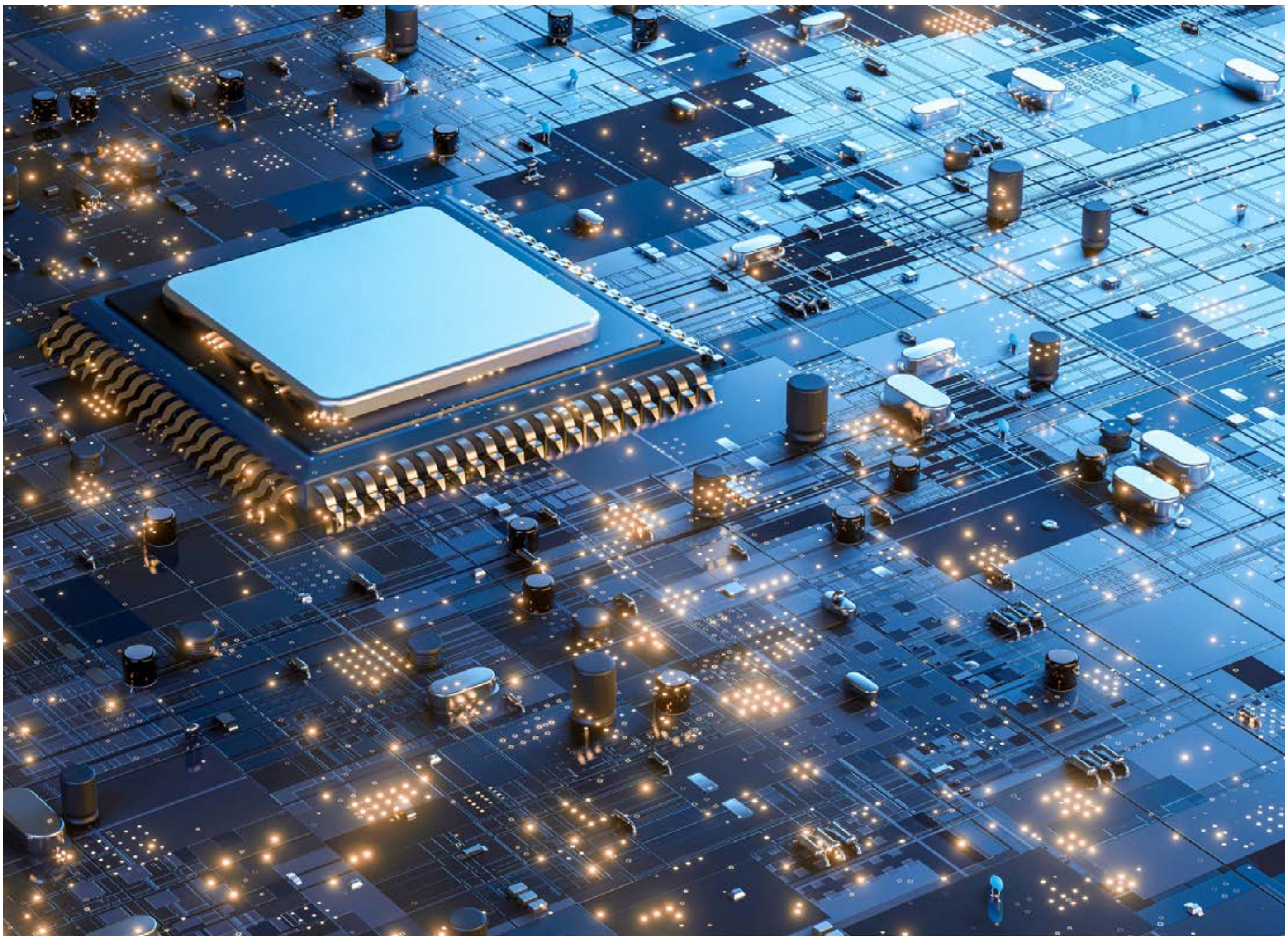
How do you see the cybersecurity industry evolving from here? What risks are on the horizon and how can organizations best prepare for, respond to, and recover from the next line of attacks?

Soehren-Jones: The most recent CISA budget cited the need to protect critical software through enhanced security measures as one of the four core reasons for an FY 2023 budget increase of more than $500mm. The spending package represents the growing efforts to address the spate of cyberattacks on key organizations and industries. Looking ahead, we believe critical infrastructure providers and policymakers must outline specific standards that enable developing and reviewing a Software Bill of Materials (SBOM)—a formal, machine-readable inventory of software components and dependencies—to minimize cyber risk among complex supply chains. While many standards and guidelines require varying levels of software security, we believe Fortress is uniquely positioned to work with industry and government to implement a practical standard for preparing and analyzing SBOMs to meet today's critical infrastructure cybersecurity threats. ■



STAYING AHEAD OF THE DIGITAL CURVE

Investing in technology can provide a first-mover advantage in private markets and has the potential to transform the investment life cycle.



Darren Cohen is Global Co-Head of Growth Equity at Goldman Sachs Asset Management

Luke Flemmer is Head of Digital Strategy for Alternatives at Goldman Sachs Asset Management

How have you seen the use of technology change in private equity in recent years?

Darren Cohen: Every public asset class—equities, credit, rates, FX—has gone through a similar transformation from manual, bi-lateral workflows to data-intensive, highly-automated digital markets with nuanced microstructures. As those markets digitized, early investments in technology platforms and data analytics enabled first movers to get ahead of the curve and capture disproportionate economics and market share. Those who were late to evolve and adapt suffered as competitive dynamics changed and the market structure shifted.

Luke Flemmer: We are starting to see a real bifurcation in the market. Some private market firms were ahead of the curve investing in fundamental data requirements and systematizing processes. Now these firms can operate at scale and have surplus capacity to invest in more advanced technologies that are leading to exponential gains.

Those that haven't made investments are now playing catchup, spending most of their budgets to get basic data hygiene in place as the amount of available information proliferates. It is very similar to the dynamic we saw over the last ten years in the public markets, where some banks had made foundational investments that allowed them to really scale digital and analytics capabilities, while others were just feeding the maintenance of legacy systems and operations.

Where in the investment lifecycle are you seeing technology be most impactful?

Cohen: We have seen some of the biggest changes in deal sourcing and underwriting, initially in growth and venture, but increasingly in the other asset classes too. Our teams now have access to valuable datasets that provide insights into private company funding rounds, recruiting trends, market shares, and client reviews.

We are also able to augment these insights with our proprietary research, data, and networks to further optimize our sourcing strategy, as well as enhance our underwriting diligence. By applying this bottoms-up approach, we can build an incredible mosaic of data that helps our investing teams identify emerging category leaders early and integrate data-driven insights into our investment process.

Flemmer: As we engage with companies, we are capturing more data than ever before across the full life cycle of the investment process. And that is not just the deals we have completed, but also the ones we have passed on. We have proven the commercial impact of applying these technologies and workflows across our teams, and are now really scaling their application. Richer company and sector models not only support greater efficiency in our traditional investing processes, but also create opportunities for new methods of sourcing, underwriting, and value creation.

Technology is allowing investors to source and underwrite pools of risk that historically could not scale.

How is technology being used to open new markets?

Flemmer: Technology is allowing investors to source and underwrite pools of risk that historically could not scale. By being able to dynamically match businesses and consumers with different sources of financing, you can generate a more attractive risk-adjusted return for investors while also offering a lower cost of capital. We are seeing this happen in straightforward, standardized products like mortgages and auto loans, but activity is expanding into more opaque areas of the market.

Cohen: Consumer lending platforms are a prime example. Underwriting unsecured individual borrowers used to be nearly impossible at scale, but with rich datasets available today and sophisticated credit matching platforms, massive markets are being created. Similar innovations are taking place across various aspects of corporate and asset-backed lending too. This is particularly powerful as the market structure of private asset classes changes. These emerging and scaled lending marketplaces are increasingly effective at matching funding with risk, enabling capital to flow seamlessly between borrowers and lenders. This has created an opportunity to underwrite and access a diverse array of risk exposure that historically would have been challenging to access efficiently and at scale.

How is technology being used to assess and manage risk?

Cohen: Risk management is predicated on data, and it is clear to me that we can reap huge benefits as we start to capture more data across our portfolio companies. When that is done at scale across a large portfolio, it leads to a deeper understanding of broad economic developments, as well as valuation and operational benchmarks across sectors and geographies. Now, when a major event unfolds, we can quickly assess the potential impacts across the portfolio using data that is updated in real time, rather than parsing stale reports and memos. This also makes us better in all types of scenario modeling, including forecasting funding and liquidity needs.

Flemmer: For capital allocators, it is now easier to understand exposures across different private market asset classes and strategies. Only a few years ago, many investors were still thinking about asset allocation in broad buckets, without necessarily considering the various layers of exposures within specific strategies. By capturing detailed constituent-level data, we are able to conduct factor analyses that were previously only possible for liquid public positions.

How are better analytics changing the investment process?

Cohen: As analytics improve, it allows investors to assess risks along new dimensions. Rather than taking the typical top-down approach to asset allocation, investors will be able to construct a portfolio at an atomic level that provides more granularity and flexibility to tailor their specific risk exposures. And all of this can be delivered digitally. Using advanced analytics, we can pinpoint where a portfolio is lacking—whether it's a diversification risk, liquidity need, or ESG requirement. Technology and data can then be leveraged to deliver dynamic products that address the investor's unique objectives.

Flemmer: One of the biggest challenges lies with how less-liquid products are sold, traded, and executed, which remains a very manual process. This is an area where blockchain technologies have attracted interest, as they potentially offer a different model for syndication, subscription and secondary liquidity.

Do you think blockchain is being actively adopted and integrated into the traditional financial ecosystem?

Flemmer: I think there are two things happening, which are somewhat symmetrical. There is a migration of traditional financial ecosystem assets and trading infrastructure into the crypto world, like new currencies and asset types, and the re-implementation of traditional trading platforms, derivatives, etc., into an at least nominally decentralized architecture. Conversely, there is the importing of crypto paradigms and technology into traditional financial arenas, primarily through the use of blockchains as the canonical shared record and tokens representing traditional financial claims.

> As analytics improve, investors will be able to construct a portfolio at an atomic level that provides more granularity and flexibility to tailor their specific risk exposures.

There has definitely been some hesitation to adopt blockchain technology broadly, partially because the technology is still so new, but perhaps more fundamentally because of the challenges it creates with the centralized authority model, which is still very much the one that our industry understands and trusts, for good reason.

Where I can see it being disruptive in the shorter term is because a crypto asset such as a non-fungible token is not only a representation of value or ownership, but it is also a computer program, meaning that it can impose additional features and behaviors on how it can be used and transferred. For example, rules around secondary trading can be programmed to restrict when the asset can be sold or to provide a royalty to the initial issuer. These features provide, at least in theory, more protection and consistency while also allowing for new workflows that could fundamentally change certain business processes, such as distribution and secondary trading.

> There is no doubt that blockchain is where significant talent is concentrating, so it seems almost inevitable that interesting solutions will be built—but it will take time.

Cohen: I think blockchain and digital assets have tremendous potential long term but will not directly reshape financial market infrastructure in the short term, given the regulatory uncertainty and the complexity of integrating these technologies.

Early in my career, we invested in several industry-leading trading platforms that ultimately supported the electronification of equities and fixed income. It would typically take the leadership teams three to five years to reach a minimal level of critical mass, and five to 10 years to achieve real scale. For digital assets, we would expect the innovation cycle to accelerate given the massive levels of funding and focus, as well as the pace of technology adoption.

However, in many areas of our business, I believe we will find more straightforward applications of technology that enable us to solve specific problems and address the inefficiency in the industry.

Areas with the most promise, such as automating fund distributions, would be incredibly powerful but cannot be solved easily due to lingering issues around data standardization and reporting requirements. We think blockchain technology has promise and we follow it closely, but we have not seen a material impact in private markets so far.

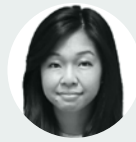
Flemmer: It is difficult to predict the timeline for development and adoption of blockchain technology, but the scale of investment and concentration of phenomenally talented engineers is noteworthy. Due to the intrinsic complexity of the space, the barriers to entry are high, and deep expertise is needed to build anything meaningful. There is no doubt that this is where significant talent is concentrating, so it seems almost inevitable that interesting solutions will be built—but it will take time. ■

This interview was originally published April 1, 2022 in PEI.

Insights On:

ROBOTICS IN ECOMMERCE

Yu Itoki is on the West Street Global Growth team at Goldman Sachs Asset Management



Hikari Hasegawa is on the West Street Global Growth team at Goldman Sachs Asset Management

How is robotics automation a differentiated way to capitalize on the growing demand for ecommerce?

There are multiple ways to capitalize on the growing demand for ecommerce; real estate investors building warehouses and logistics centers is one common path. Robotics accesses it from a different angle—addressing supply chain bottlenecks in fulfillment centers, where individual orders get assembled and shipped to the consumer. The picking process is time-consuming and labor-intensive, requiring a great deal of movement between different parts of the warehouse. Robots can introduce greater efficiency to the process as they travel between picking zones to collect various items while warehouse workers stay at their designated picking zones and manage the robots. This also can convert warehouse jobs into higher-skilled roles, make them safer, and, according to worker accounts, more engaging and less repetitive.

Building a new robotics-enabled fulfillment center is a straightforward task, but there's limited land for new builds, especially in a country like Japan. Because of this, retrofitting existing properties is often more practical—but much more challenging. Each center is designed differently and requires a custom solution. These solutions are available, but most of them require stopping the assembly line to install the technology. This creates a drag on productivity, as centers are often running 24/7 to keep up with the high demand. Technology that can retrofit the assembly line without disturbing the operation is therefore a very attractive proposition. Today, there are few solutions that offer this capability, and the scope of opportunity for them is vast, in our view.

Japan has historically been a leader in electronics and robotics. What factors have contributed to this?

Many people in Japan train as engineers, which is an important factor. But the Japanese government's policies supporting digital transformation and automation have been critical as well. In large part these policies stem from demographic realities—a declining and aging population portend a structural labor shortage. To address it, the government has introduced policies to facilitate productivity growth and improve working conditions, especially for physical labor. Large subsidies have gone towards supporting startups that create effective high-tech solutions. Robotics and automation have certainly benefitted, but there are other interesting areas of focus as well. For example, we're starting to see solutions that use artificial intelligence to supplement knowledge-based work.

Long-term trends portend resilient demand for warehouse automation and logistics, in our view.

How do recent stock market dynamics, which have pressured technology-focused stocks, affect your assessment of the opportunity set?

Technology-focused stocks have certainly traded down since their November 2021 highs, but in private markets we focus on the long-term. Long-term trends—increasing demand for both ecommerce solutions and productivity solutions as numerous countries face similar demographic challenges as Japan—portend resilient demand for warehouse automation and logistics, in our opinion. We find ourselves in a more challenging, uncertain macroeconomic environment, but believe that products catering to basic human needs are more resilient in a downturn. In a recession, people will cut their discretionary spending, but largely maintain spending on non-discretionary items. We believe technology that helps warehouses expedite delivery of basic items, like food and toiletries, should prove more resilient. This may be why we haven't seen the same valuation compression in this space as we've seen in some other technology sectors. ■

BEYOND THE HEADLINE: EXAMINING RECENT DISPERSION IN GROWTH EQUITY

Darren Cohen is Global Co-Head of Growth Equity at Goldman Sachs Asset Management

Juliana Hadas focuses on portfolio solutions for Alternatives Capital Markets & Strategy at Goldman Sachs Asset Management

KEY TAKEAWAYS

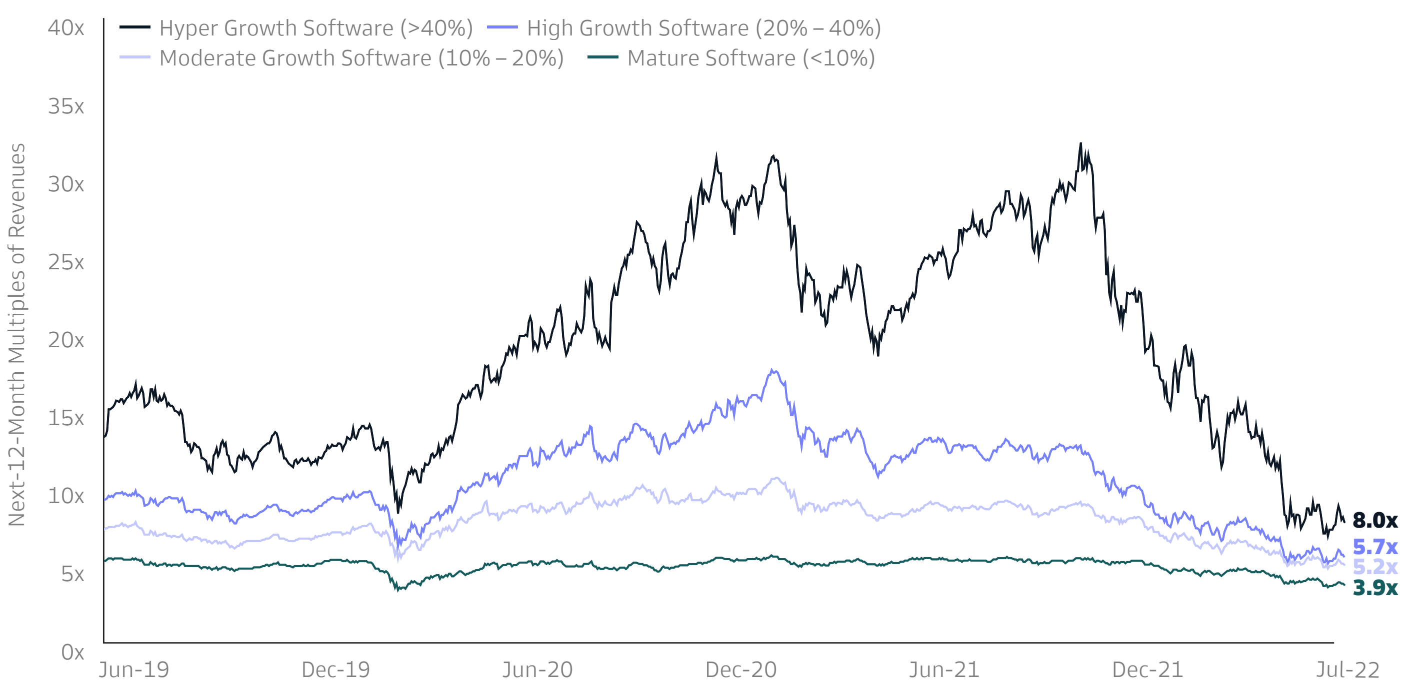
- We believe market volatility should create significant fund performance dispersion.
- The re-calibration of public market multiples should eventually reset private market valuations.
- We believe that companies with strong fundamentals, sound valuations, and resilient end-markets should outperform.

SETTING THE STAGE

The COVID-19 pandemic pulled forward demand for technology, accelerating both the trajectories of and investor interest in technology-enabled growth companies. This led to a massive valuation re-rating, especially among the fastest-growing companies. From a nadir in Q1 2020 to November 2021, publicly listed hyper-growth[1] software companies, for instance, saw multiple expansion of over 3 times, from 10.7x to 33.7x.

But in November 2021, investor sentiment turned dramatically, a culmination of concerns over macroeconomic headwinds and the prospect of rising interest rates. Public growth equities have since given back gains of the prior 18-24 months, the NASDAQ composite is down 31% since its November highs, and the Russell 2000 Growth Index is down 37% as of the end of June.[2] However, headline figures disguise significant dispersion across individual names and sectors. Just like in the prior regime, changing investor sentiment has had its most profound impact on the fastest-growing companies. Hyper-growth software companies have seen their valuations decline by three-quarters from their November highs to the end of June 2022, to an average valuation of 8.0x next-twelve-month revenues. This is below the range seen in 2015-2020. Companies with more moderate growth, on the other hand, experienced valuation re-ratings on a significantly smaller scale, both upwards and, subsequently, downwards.

Valuation Re-Ratings in Public Markets Have Varied Widely Across Companies



Source: Guggenheim Securities; Company filings and FactSet as of June 30, 2022.
Note: Growth buckets defined based on CY21 revenue growth rate. Hyper Growth Software (>40%) includes ASAN, BIGC, BILL, BRZE,CFLT, CRWD, DARK, DCBO, DDOG, DOCU, ESTC, FIVN, FRSH, GTLB, HCP, HUBS, IOT, KNBE, LAW, MDB, MNDY, NET, OKTA, PATH, PLTR, S, SHOP, SMAR, SNOW, SPT, TTD, TWLO, U, USER, XM, ZI, ZM, ZS. High Growth Software (20% –40%) includes ADBE, AI, ALRM, AMZN, ANET, API, APPN, AVLR, BL, BLZE, BSY, BTRS, CDAY, CNSWF, COUP, CRM, CXM, DCT, DOCN, DOMO, DSGX, DT, EVBG, FORG, FROG, FSLY, FTNT, INST, INTU, JAMF, KLTR, LPSN, LRN, MNDT, NCNO, NOW, PANW, PAYC, PCOR, PCTY, PD, PING, PLAN, PRGS, PSTG, QTWO, RNG, RPD, SAIL, SPSC, SQSP, SUMO, TEAM, TENB, TWOU, VEEV, VRNS, WIX, WK, XRO, ZEN. Moderate Growth Software (10% –20%) includes ADSK, ALTR, ANSS, APPF, AVGO, AZPN, BASE, BOX, CDNS, DBX, DELL, ECOM, EGAN, ETWO, EVCM, GOOGL, INTA, KXSCF, MANH, MIME, MODN, MSFT, MSP, NABL, NEWR, NICE, NTNX, PEGA, PTC, QLYS, RDWR, SNPS, SPLK, SUSE,TYL, VERX, WDAY, YEXT, ZUO. Mature Growth Software (<10%) includes AKAM, ALMFF, AVV, AYX, BLKB, BNFT, CHKP, CSCO, CTXS, CVLT, CYBR, DSY, FFIV, GWRE, HPE, IBM, INFA, MCRO, NLOK, NTAP, NTCT, ORCL, OSPN, OTEX, PRO, SAP, SCWX, SGE, SWI, TDC, UPLD, VMW, VRNT, VRSN.

PRIVATE MARKET DYNAMICS

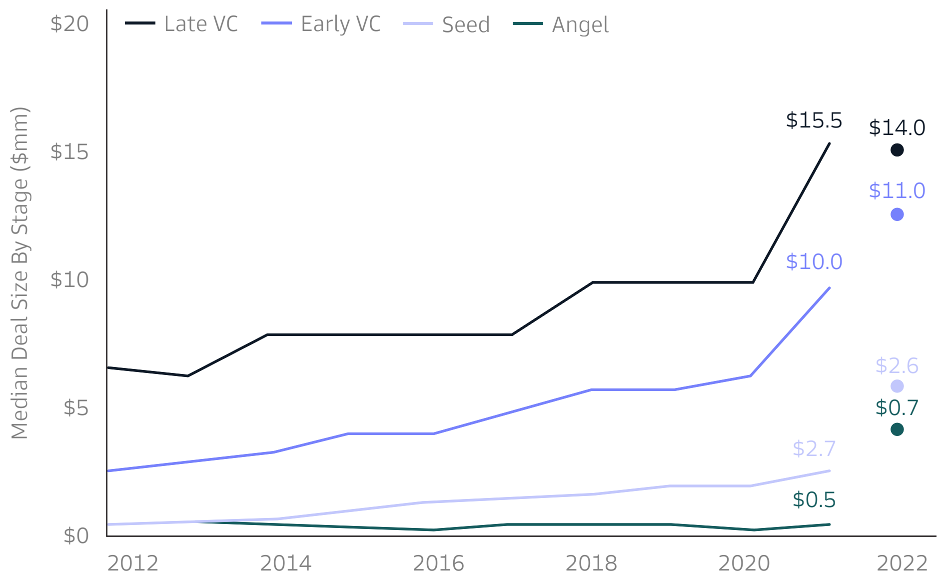
Some of the public market dynamics have begun to impact private market strategies as well. Q4 2021 performance was flat for the median venture and growth equity manager.[3] However, the full impact of changing sentiment on growth equity and venture capital-backed companies will likely take several quarters to be determined, due to the lagging and smoothing inherent in private market valuations and reporting.

In the meantime, a number of metrics offer clues to evolving investor sentiment in private markets. In late-stage venture capital, the median deal size declined in Q1 2022. Deal counts and median valuations continued to trend up, but these figures include deals agreed to in Q4 2021 and announced in 2022. In growth equity, both the deal count and the average deal size declined in Q1 (-18% and -14%, respectively)—although these figures still represent some of the highest on record.[4] After peaking in 2021, private market funding, average deal sizes, and valuations are set to decline.

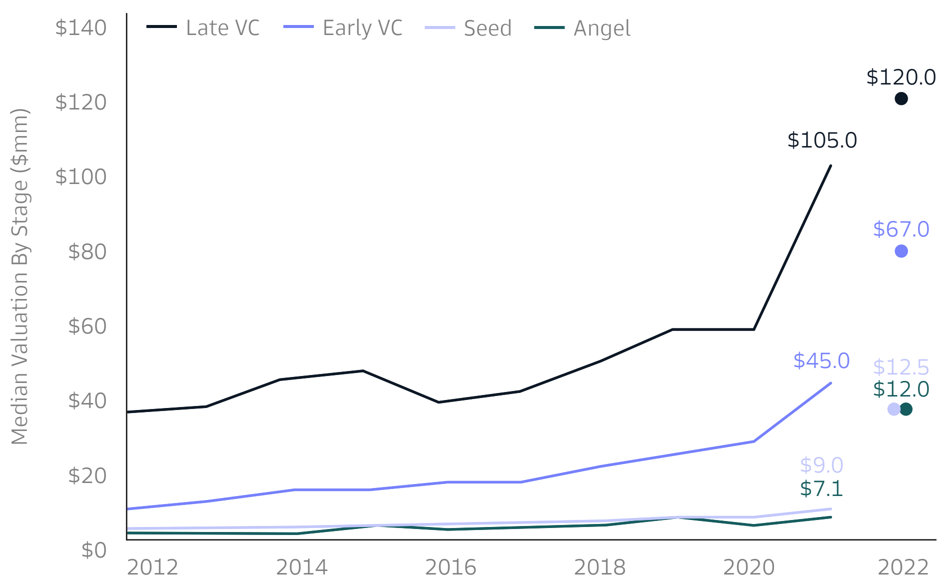
The average late-stage venture deal size was in line with the top-quartile deal, while the average valuation has exceeded the top-quartile figure.

As is the case in public markets, however, headline figures disguise dispersion underneath. Industry-wide statistics have been driven by the largest deals—so much so that the average reported late-stage venture deal size was in line with the top-quartile deal, while the average reported valuation has exceeded the top-quartile figure. And it's the largest deals that have seen the largest impact in Q1 2022—while the median late-stage VC valuation increased in Q1, the largest deals saw lower valuations.[5]

Late-Stage Deal Sizes Have Fallen from Record Levels

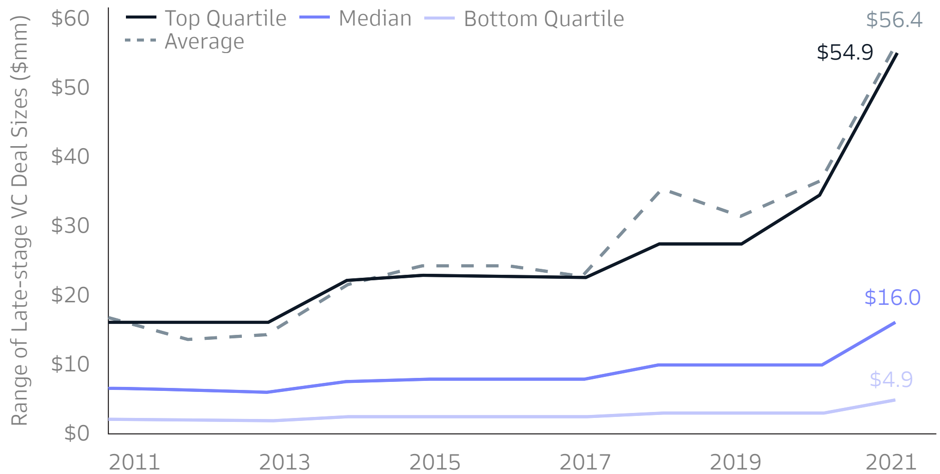


Late-Stage Valuations Have Continued to Climb



Source: Pitchbook, NVCA Venture Monitor. As of March 31, 2022.

Average Late-Stage VC Deal Size Has Been in Line with the Top Quartile Deal



Source: Pitchbook / Geography: U.S. As of December 31, 2021.

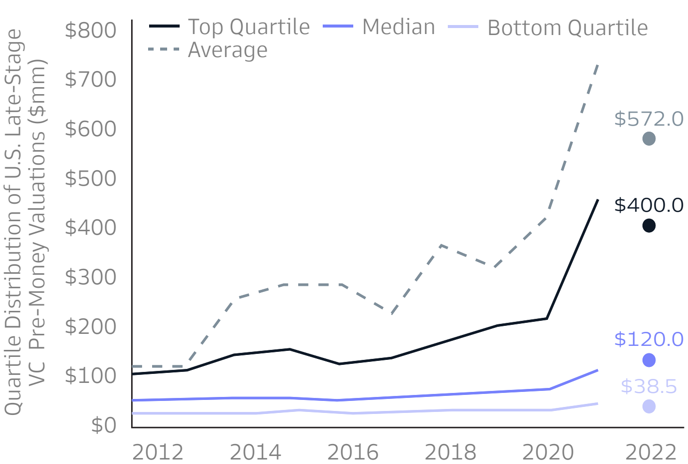
Also in line with public market dynamics, 2021 serves as a particularly challenging comparison, having brought significant deviation from long-term trends in venture capital and growth equity markets. Deal activity, deal sizes, valuations, valuation step-ups, and the number of mega-deals all grew sharply last year.

Some of this deviation reflected public market valuation dynamics. Another important factor was the influence of non-traditional investors—corporate venture arms, crossover investors, buyout investors expanding into the venture and growth equity space, and others. Non-traditional investors participated in 78% of total U.S. venture capital deal value in 2021 and were especially active in the late-stage market.[6] Now, some of them—especially crossover firms—are starting to retreat, particularly from the late-stage segment of the market.

Ironically, the large amount of capital raised in 2021 may have near-term mitigating implications for private equity marks. GPs are typically less likely to change marks on deals less than a year old, so to the extent that a meaningful proportion of marks is based on transactions completed within the past year, markdowns may be shallower than would have been the case had portfolios been older, on average. Robust fundraising may also mean that down-valuation rounds remain limited in the near term. Many companies are now well capitalized; some have sufficient runway to fund operations for as long as several years without needing to return to capital markets, especially if that means accepting a down round. Other companies may avoid the appearance of down rounds by structuring terms with greater protections for new investors (e.g., greater liquidation preferences, ratchet provisions, convertible structures) while nominally maintaining a flat valuation. Structured equity transactions are likely to increase significantly in volume and capital committed, as management teams try to avoid the negative optics of a down round and the related negative implications for employee morale, retention, and recruiting. In the battle for talent, those companies that did not optimize for maximizing valuation at the top of the cycle should benefit, as they continue to fund in-line with or at a premium to their last round.

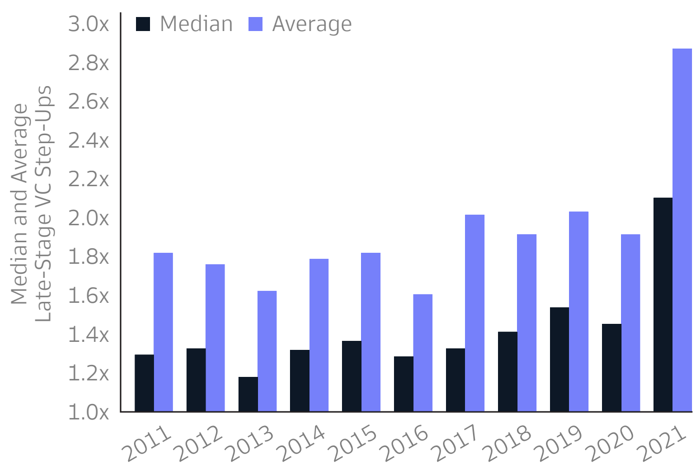
However, a prolonged period of macroeconomic challenges and uncertainty would mean that an adjustment is merely postponed, rather than avoided. As such, investors should look beyond the upcoming quarters and evaluate what these dynamics mean for their portfolios in the long run.

Average Late-Stage VC Pre-Money Valuation Has Been Above That of the Top Quartile Deal



Source: Pitchbook, NVCA Venture Monitor. As of March 31, 2022.

Late-Stage Valuation Step-Ups Increased Sharply in 2021



Source: Pitchbook / Geography: U.S. As of December 31, 2021.

INVESTMENT IMPLICATIONS

With the extremes of 2021 in the rearview mirror, today's investments are being made at valuations that appear more reasonable, relative to both historical levels and companies' underlying fundamentals. Many growth equity-stage companies have sound business models with compelling unit economics, in our view, and are scaling quickly and efficiently. The broader theme of digital transformation of the economy and society should have multiple more years to play out. However, given the multiple macroeconomic headwinds and great uncertainty in the near-to medium-term, we expect dispersion to increase across company, sector, and fund performance going forward.

In certain sectors, demand may prove more resilient than in others. For instance, software has become so deeply embedded in consumers' lives and companies' operations that customer retention should hold up better than in past recessions. Demand from new clients is generally more elastic (with an attendant impact on revenue growth), but certain areas (such as cybersecurity, supply chain solutions, and workflow automation) are seeing structurally-driven demand that may have less cyclical sensitivity. The end customer matters too. Companies catering to large, established companies are better positioned to retain their customers and revenues through a prolonged downturn than are companies catering primarily to smaller, emerging companies that may themselves be less resilient.

Operational and financial discipline, including cash management, should also become an increasingly important differentiator. The funding market will likely be more challenging going forward, especially as some of the players that drove the high velocity of 2021 (e.g., crossover funds) have pulled back. As a result, companies without scalable, sustainable business models and sufficient cash to finance operations through a downturn may fail more often. Stronger companies, on the other hand, should do well and grow into their 2021 valuations over time. (For instance, a company funded at 20x revenues experiencing 60% annual revenue growth would have an implied valuation of 12.5x revenues one year hence). Hyper growth companies remain actively pursued and may continue to raise capital at healthy premiums.

Fund performance dispersion will be a function of both differences in the outcomes of underlying portfolio companies and of the timing and discipline of capital deployment. In aggregate, funds deploying the majority of their capital in more disciplined environments may fare better than those that deploy significant capital in more exuberant markets. Funds that maintain valuation discipline through exuberant markets should be well positioned to outperform their peers.

Examining the health of underlying portfolio companies, the consistency of focus and discipline of investment strategy of GPs, and the pace of capital deployment are all important as asset owners assess the state of their venture and growth equity portfolios and plan for the future. ■

Sources:

1. Defined as companies with annual revenue growth >40%.
2. GS Marquee, as of the close of June 30, 2022.
3. Cambridge Associates, as of May 19, 2022.
4. Pitchbook, as of March 31, 2022. Deal counts in late-stage venture include both recorded deals and estimated deals, based on historical patterns of deals reported with a lag beyond the data release period.
5. PitchBook, as of March 31, 2022.
6. PitchBook, as of March 31, 2022.

FUNDRAISING FRENZY:

NAVIGATING PRIVATE MARKET MANAGER SELECTION

Amy Jupe is Global Co-Head of Private Equity Manager Selection at Goldman Sachs Asset Management.

KEY TAKEAWAYS

- Established GPs are raising new funds at an accelerated pace, with the average time between funds falling below three years for the first time in a decade.
- With a record number of funds in market and an uncertain macro backdrop, LPs have a multitude of factors to consider as they manage their private market portfolio.
- Today's market presents numerous challenges to navigate, but it also creates opportunities for LPs that have in-house expertise, operational capacity, and capital flexibility.

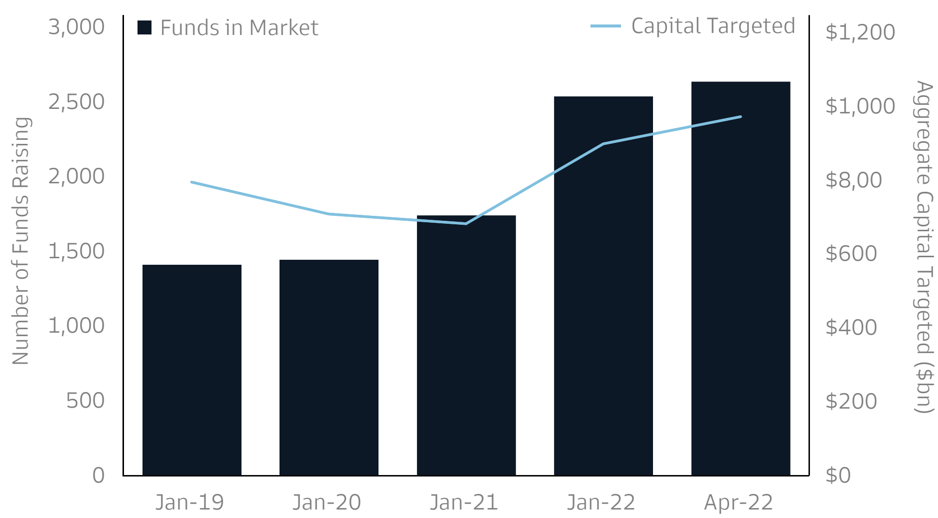
It is difficult to overstate the growth of private markets in recent years. Annual fundraising has exceeded $1tn every year since 2016, pushing dry powder to an all-time high. As 2021 came to a close, sentiment around private markets was overwhelmingly positive. In addition to strong paper gains amidst rising valuations, funds distributed cash back to investors at record levels, thanks to favorable capital market conditions. Appetite for new strategies remained high, as a prolonged shift in asset allocation away from traditional strategies and towards private markets—driven by strong historical returns—was further supported by record-low interest rates.

While distributions reached record levels in 2021, so did the pace of capital deployment. With pent-up demand following the pandemic-induced slowdown, general partners (GPs) have been taking advantage of favorable conditions to deploy more rapidly, leading them to return to market more quickly to raise their next flagship fund. Furthermore, many are expanding into new strategies and/or launching specialized funds focused on specific sectors and segments of the market. Today, established GPs are raising new funds at an accelerated pace, with the average time between funds falling below three years for the first time in a decade.[1]

These compressed fundraising timelines have put pressure on limited partners (LPs). In 2022, a record number of new private market funds are seeking capital.[2] Some LPs are finding themselves at the upper end of their allocation limits for the first time in years, or in the position of having exhausted their annual commitment budgets in only the first quarter. Recent drawdowns in public markets are also raising concerns about the denominator effect—where a decline in the total size of a portfolio (i.e. the denominator) causes the private market allocation to grow as a percentage of the portfolio. At the same time, many LPs are facing substantial mark-ups in their private market portfolio, resulting in a numerator effect that has pushed some LPs to the top of—or in some cases over—their allocation targets.

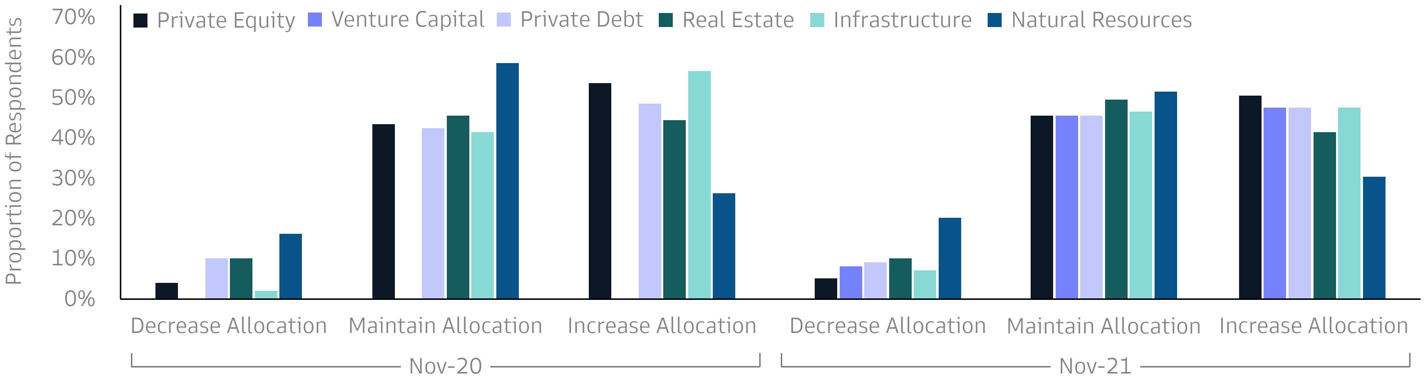
As private market allocations swell, some LPs are turning to the secondary market to trim their holdings and ensure they can allocate to new funds. Many LPs face resource challenges and time constraints as they attempt to assess all of their re-up commitments—let alone new opportunities. While many LPs find themselves at or near allocation limits, others are still in the process of ramping up their private market programs and striving to hit allocation targets that have been increased in recent years. In today's

A Record Number of Private Equity Funds Are Seeking Commitments



Source: Preqin. As of April 30, 2022.

Investors Continue to Increase Private Market Allocations



Source: Preqin investor surveys, conducted in November 2020 and November 2021

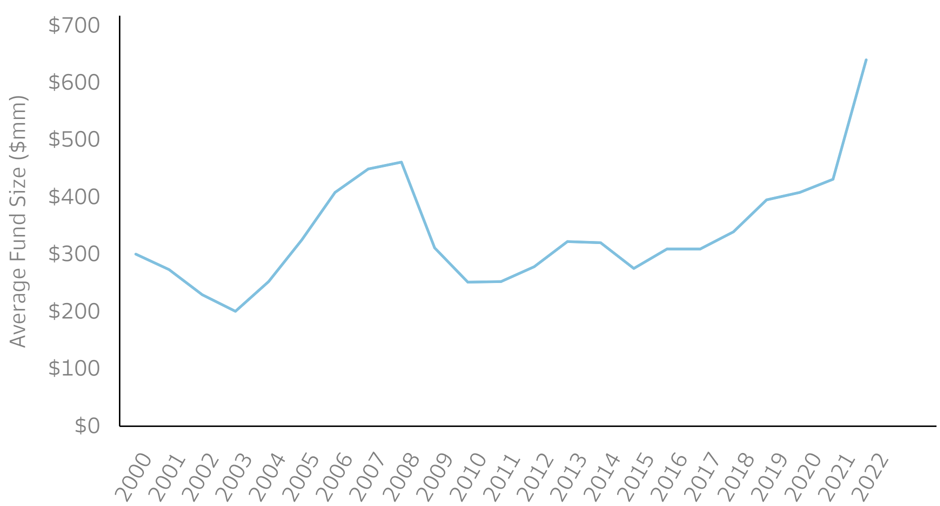
crowded market, capital availability can be an advantage for LPs, as can internal resources to efficiently conduct due diligence. Regardless of their current positioning, LPs need to be cognizant of market dynamics as they develop their commitment planning and consider the terms presented by both established and emerging GPs. There is never a single playbook in private markets, but that is particularly the case today.

NEW DYNAMICS IN THE FUNDRAISING MARKET

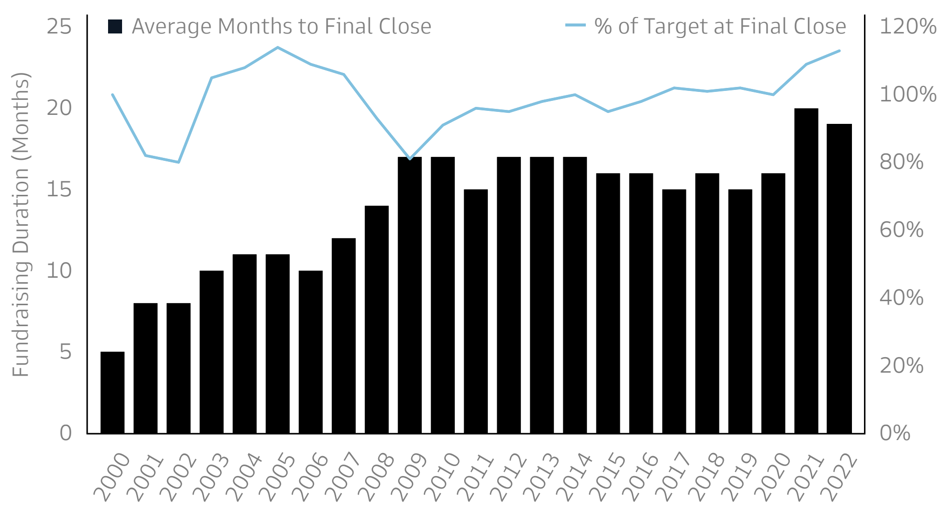
Funds took longer to reach a final close in 2021 due to the challenges of the pandemic, with the average time to close a private capital fund rising to 19 months, after being 16 months or less each year since 2015. That trend has continued early in 2022. In addition to the pandemic impeding due diligence processes, a prolonged shift towards larger fund sizes is also playing a role. Not only are fund sizes trending larger, but the average fund that closed in 2021 reached 109% of its target. That momentum has also continued in 2022, with the average fund closing at 118% of target.[3]

Even as funds grow larger, the time between fundraises has fallen to less than three years for the first time in a decade. As some GPs raise larger funds and in quicker succession, the pace of capital deployment is top of mind. Capital call rates for post-2017 vintages are faster than for funds raised earlier in the decade, which is

The Average Fund Size Has Hit an All-Time High



Funds Are Eclipsing Fund Targets but Taking Longer to Close



Source: Preqin. As of May 13, 2022.

Private Market Funds Have Been Resilient in Market Downturns

Max Drawdowns During Market Downturns

	Venture	Growth	Buyout	Senior Debt	Subordinated	Credit Opps	Distressed	Real Estate	Infrastructure
Dot-com	-69%	-37%	-21%	-15%	-15%	-7%	-7%	N/M	-29%
GFC	-19%	-27%	-33%	-53%	-7%	-33%	-26%	-48%	-26%
COVID-19	-3%	-6%	-10%	-6%	-5%	-12%	-12%	-7%	-4%

Source: Fund strategies are defined and classified by Cambridge Associates. As of December 31, 2021. Max drawdown represents the peak-to-trough aggregate performance for the respective strategy during the designated period. Dot-com era is 2000-2003; GFC is 2008-2009; COVID-19 is Q1 2020.

perpetuating a cycle of quick fundraises. Combined, these trends underscore the bifurcation that has been increasing in the market for some time: top tier GPs have been able to raise capital seemingly at will, often in short order, while sub-par and average GPs are spending longer in market.

Most investors continue to have high expectations for the private markets, with a survey in March 2022 showing that institutional investors expect private equity and real assets to deliver the best risk-adjusted returns over the next 12 months across all asset classes.[4] But investors need to be especially diligent in the current environment, as significant markups have been made to private market portfolios in tandem with the post-pandemic run-up in private markets. Given the shorter time in between fundraises, LPs have less progress to evaluate when a GP returns to market, necessitating greater reliance on unrealized returns.

Regardless of the market backdrop, research has found that a "current fund's performance rank is at its peak when the GP is fundraising for a follow-on fund" for two reasons that are pertinent in today's market. First is that "GPs appear to fundraise on the heels of good exits," and private market GPs have set records in recent years. The second is that "low reputation GPs appear to upwardly manage valuations at the time of fundraising."[5]

NAVIGATING THE MARKET

With a record number of funds in market, shifting valuations in public and private markets, and an uncertain macro backdrop, LPs have a multitude of factors to consider as they manage their private market portfolio. The current environment and market dynamics certainly need to be considered, but private market investing is inherently a long-term endeavor that requires a mindset that looks beyond today's challenges and considers what decisions can be made today to set a better path for the future.

Top tier GPs are able to raise capital seemingly at will, often in short order, while sub-par and average GPs are spending longer in market.

Make a Roadmap

Commitment pacing and cashflow modeling is the foundation of private market investing and needs to be revisited at a regular cadence to ensure investments being made today match the intended trajectory of the allocation for years into the future. Some LPs today are finding that the prior commitment schedule may be too aggressive and that less capital is available than previously thought for new and re-up commitments. In these situations, rather than reducing GP relationships, some LPs have been opting to write smaller checks to maintain exposure to top tier funds and not risk losing access to the next vintage. As these adjustments are made, LPs need to assess vintage year diversification to ensure the portfolio is not overexposed to a particular part of the cycle.

With GPs largely dictating when new funds come to market and how much capacity is available, LPs can often feel powerless in controlling the fundraising calendar. While certain aspects will always be out of their control, LPs can be proactive with their existing GPs by discussing expectations for when new funds will come to market. In the current environment, LPs in some situations have been encouraging GPs to delay fundraises given the surfeit of vehicles in market and the desire to maintain vintage year diversification.

Go Line by Line

LPs need to take a fundamental approach to underwriting both new and existing GPs. Re-upping with existing GPs tends to be where LPs start, and that is particularly true today; more than half of investors are prioritizing existing relationships in 2022, up from only 10% a year ago. However, a bottoms-up analysis is needed to understand the performance of each fund in the portfolio with new underwriting for each fund, regardless of how well the manager is known. Evidence for performance persistence is lacking in buyouts, with a recent study showing that "for post-2000 buyouts, the conventional wisdom to invest in previously top quartile funds does not hold."[6] While there is evidence of persistence in VC, the people within the organization are the crucial component, with researchers finding that "the partner's human capital is two to five times more important than the VC firm's organizational capital in explaining performance."[7] To that end, evaluating the specific people responsible for sourcing, leading, and managing individual investments is essential to understanding how to attribute performance within a firm.

Not only does the GP need to be high quality, but so does the specific investment strategy. Today, the market has largely bifurcated between large, multi-strategy GPs with significant scale and smaller boutiques that focus on narrower ranges or even a single area, increasingly defined by both a geographic and sector/industry specialization. For established GPs, investors should evaluate how returns were generated in the past—leverage, multiple expansion, operational improvements, or inorganic growth—and whether the same playbook is viable going forward. Particularly for new GPs or those launching funds in new niches, the manager should be able to demonstrate why they are particularly qualified to source deals and generate differentiated performance around a targeted, well-articulated strategy.

For established GPs, recent activity should be compared to both prior funds and the purported strategy for the new fund to identify style drift—whether in terms of deal size, industry, region, or structure. Private equity activity is increasingly moving into technology, for example, which could leave investors with more exposure to the space than they expect. Many funds that purport to be "global" are heavily tilted towards developed markets (or even a single large country like the U.S.), while regional funds are often tilted towards specific countries.

LPs should be cognizant of their competitive advantages as they vie with other capital allocators.

Investors should also be aware of changes in capital deployment, as a quicker investment pace can lead to more exposure to certain market environments and lessen the benefits of vintage year diversification. Many GPs are also leveraged at the fund level, which represents an added expense and can change the profile of the fund. Additionally, successful GPs often aggressively increase the target size for subsequent funds, which can not only cause a shift in strategy and position concentration but also alter incentives.

Understand the Fine Print

In today's market, as many GPs are taking longer to close funds and dealing with heightened competition, LPs may be in a relatively better position to negotiate than in recent years. But even if GPs are unwilling to budge on headline terms, LPs need to read the fine print and ensure there is alignment in the mechanics of the fund operations. Additionally, LPs may be able to negotiate additional benefits, such as co-investment opportunities, that may not be codified in legal documents but hold material value.

Even when resources are stretched thin and deadlines loom, a thorough review of the legal documentation is required. Headline fees and terms remain little changed from historic levels, but LPs need to look beyond the management fee and hurdle to understand how fees are being calculated and expenses are accounted for. Some GPs may charge administrative fees outside of the management fee, creating additional costs that are difficult for LPs to detect. Some funds implement contractually modified or reduced fiduciary duties into fund documentation, which can lead to implicit costs.

Know Thyself

Much of the discussion in private markets centers on the aptitude and resources of the GP, but LPs should also be cognizant of their capabilities as they vie with other capital allocators. One thing that many LPs have in common is a relative lack of internal resources to execute on the ambitions of their private markets program. This can be particularly problematic during co-investments, where detailed diligence is required under an expedited timeframe. LPs should focus their efforts where they have differentiated skill, while forging strategic partnerships or outsourcing certain elements of the portfolio to maximize impact and scale.

Today's market presents numerous challenges to navigate, but it also creates opportunities for LPs that have the in-house expertise, operational capacity, and capital flexibility to execute. LPs faced with allocation limitations need to find creative ways to allow for flexibility in their private market program to ensure decisions made today set the correct path for the future. For LPs that are under-allocated and able to make new commitments, now may be an opportunity to access GPs that otherwise may be capacity-constrained and forge new relations with the leading managers of tomorrow. ■

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THE ENERGY TRANSITION TRINITY

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KEY TAKEAWAYS

- New geopolitical and energy market realities have accelerated the quest for long-term affordable, clean and secure energy—the energy transition trinity.
- From a public markets investment perspective, we expect both traditional and alternative energy providers to benefit in a sustained environment of high fossil fuel prices, rapid deployment of clean technology, and the reshoring of energy supply.
- To make the energy transition possible, we believe the world needs to see continued action from policymakers along with significant capital investment in underinvested areas of decarbonization.

There's little doubt that our fight against climate change has driven remarkable shifts in technological development, regulations, consumer preferences and investor sentiment as we transition to a low-carbon economy. More recently, however, new geopolitical and energy market realities have emerged. The Russia-Ukraine conflict, while deeply upsetting on a human level, has sent fossil fuel prices even higher, led to the temporary emergency re-introduction of dormant fossil fuel infrastructure in parts of Europe, and highlighted the dangers of over-reliance on any single country as an energy supplier. These factors have only intensified the quest for long-term affordable, clean and secure energy—what we think of as the energy transition trinity. Achieving this trinity is a herculean task, and it won't happen overnight. To get there, we believe continued policy action is needed to mitigate and adapt to climate change, build support for what will be a difficult and costly transition and incentivize significant capital in underinvested areas of clean energy value chains.

ENERGY SECTOR TRENDS

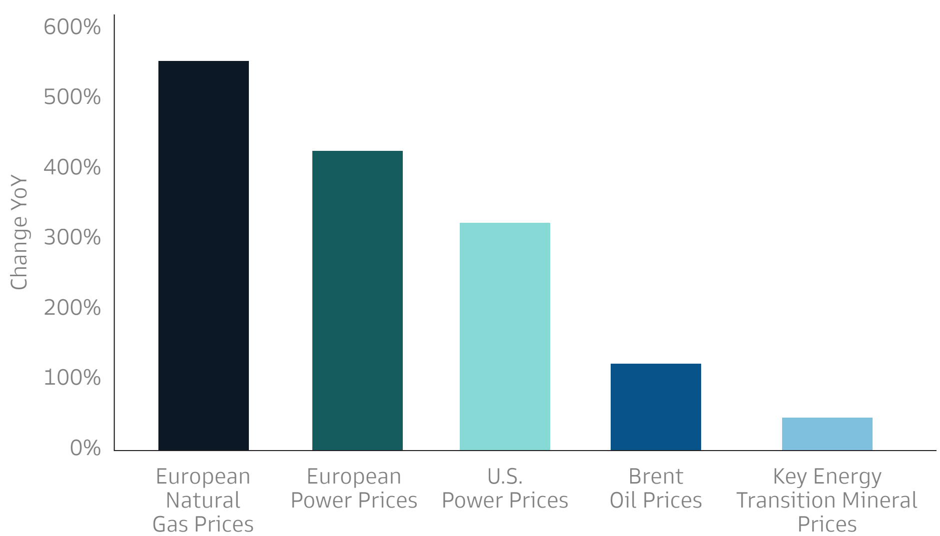
Before we consider what might be required to make the trinity possible, we need to put the current energy market environment into context and examine the major trends in motion: high fossil fuel prices, the accelerated rollout of cheap, clean technology and the reshoring of energy. Each trend has an impact on the world's journey towards affordable, clean and secure energy and, as investors in public markets, we believe they could prove to be long-lasting themes benefiting both traditional and alternative energy providers.

Trend 1: Sustained High Fossil Fuel Prices

Major energy benchmarks are up between 50% and 550% since 2020. Natural gas prices are higher due to faster demand recovery coming out of COVID-19 as well as tight gas fundamentals driven by supply outages in the global gas value chain and years of underinvestment. Europe is relatively worse off than the U.S. due to the region's dependence on Russian gas and having less storage of gas needed for winter months.

In deregulated or liberalized power markets like the U.S. and Europe, natural gas sets power prices which is why we see high prices for electricity. Brent crude, the global oil benchmark, has increased for similar reasons of strong demand recovery and tight supply. Prices of minerals like copper, nickel, cobalt and aluminum—key inputs for renewables, power grids and electric vehicles—are also up because of pandemic-related capacity outages, supply chain bottlenecks and higher transport costs. For prices to ease, markets would need to see either demand destruction or new supply. And while we do see some new supply coming on for energy transition minerals, we believe it's likely that fossil fuel prices will remain elevated as most producers have investors looking for return of capital and/or have logistical constraints. Barring more stringent government policies, the more likely case for fossil fuel demand destruction would be due to continued high prices as opposed to a switch to greener alternatives.

Oil & Gas and Power Prices Have Seen a Dramatic Increase Since The End of 2020



Source: Goldman Sachs Asset Management and Bloomberg. Data as of June 30, 2022. European natural gas prices: Generic 1st TTF Natural Gas Base Load Monthly Futures. European Power Prices: Germany Power Baseload Forward Year 1. U.S. Power Prices: PJM Western Hub Day Ahead LMP 24HR Average. Key Energy Transition Minerals: reflect an average price return of Nickel, Cobalt, Copper, and Aluminum; excludes lithium due to data availability. All prices denominated in U.S. dollar.

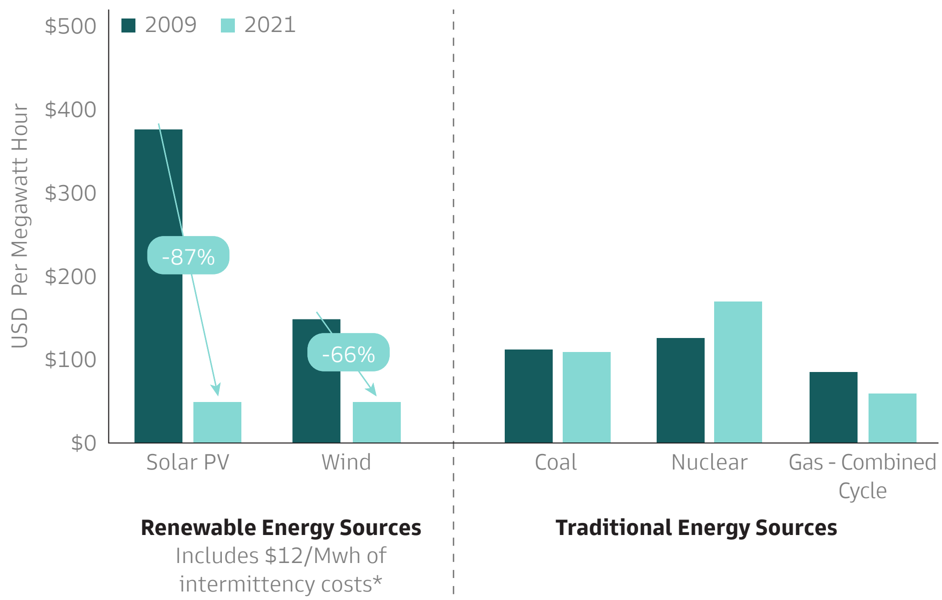
Trend 2: Rapid Deployment of Cheap, Clean Tech

Higher fossil fuel prices serve as a signal that can speed up the transition to green energy. While we believe it's well understood that the cost of new build renewables is cheaper than new build energy sources (see chart on upper-right), what we think is less appreciated is that even with the cost inflation we've seen in 2022, the spread between new build renewables and existing electricity prices is wide. For example, when we look at the blended solar and wind pricing in Europe, it's 65% cheaper than current electricity prices (see chart on bottom-left). This demonstrates that in spite of inflation, converting to renewable electricity is still "in the money," especially given the rally in gas and power prices. In fact, many clean energy companies are now saying that global renewables development is a seller's market, a trend we think will continue given the massive renewable buildout needed over the next few decades.

The transition, however, isn't just about solar and wind. It requires a step change in investment and deployment of clean technologies. Traditional energy companies will likely play a major role, since they have decades of experience in research and development and managing capital intensive projects, and also benefit from improving balance sheets with rising levels of free cash flow available to invest. Over the last three years, about $1tn per year has been spent on the transition across public and private markets. But to get to net zero by 2050, we would need to see a significant increase in investment to about $4tn[1] per year on power generation, energy efficiency, renewable fuel switching and carbon capture (see chart on next page).

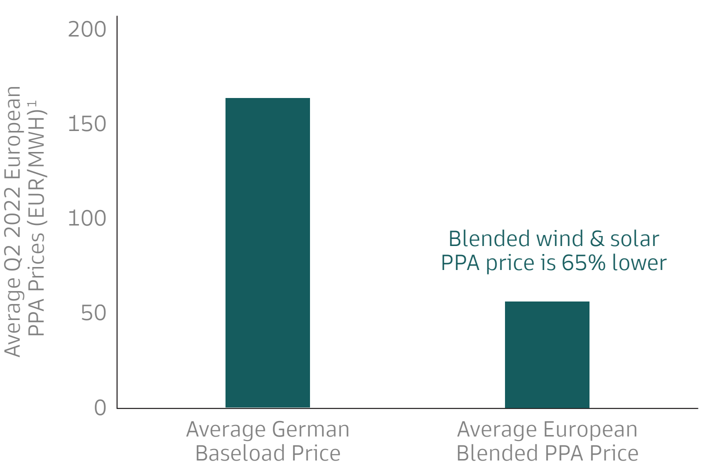
The transition, however, isn't just about solar and wind. It requires a step change in investment and deployment of clean technologies.

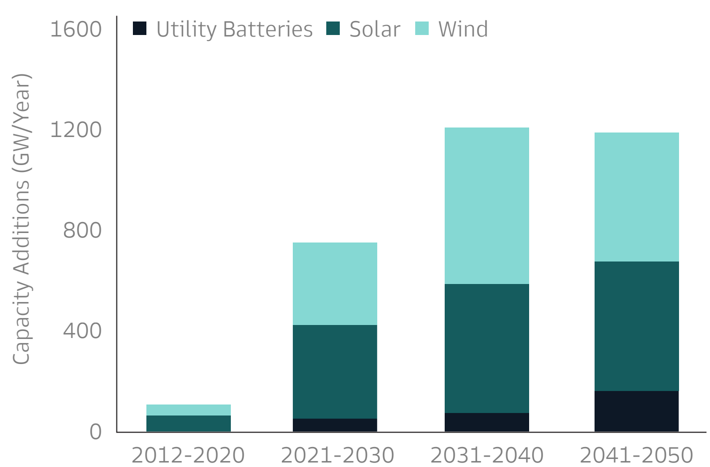
Renewables Are Now Cheaper Than Traditional Energy Sources



Sources: Goldman Sachs Asset Management, Bloomberg, and Lazard. Latest full year data as of June 30, 2022. *German baseload 1 year forward prices as of Q1 2022. **Past performance does not guarantee future results, which may vary.**

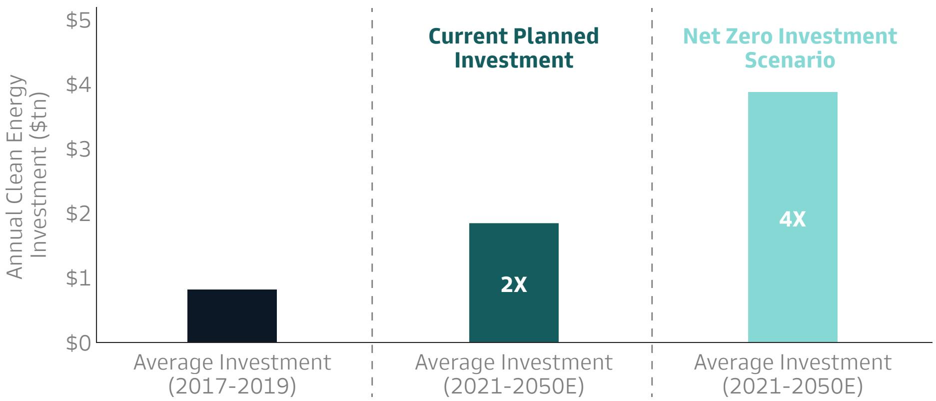
Pricing Power Driven By Security, Costs, and Clean Mandates





Sources: Goldman Sachs Asset Management, BloombergNEF, and LevelTen Energy. Latest data available as of June 30, 2022. PPA: power purchase agreements. A power purchase agreement, or electricity power agreement, is a contract between two parties, one which generates electricity and one which is looking to purchase electricity. 1. German baseload 1 year forward prices as of Q1 2022. **Past performance does not guarantee future results, which may vary.**

Around $4tn of Clean Energy Investment Is Needed Globally Per Year to Reach Net Zero



Source: Goldman Sachs Asset Management and IRENA. Data as of December 31, 2021. The economic and market forecasts presented herein are for informational purposes as of the date of this presentation. There can be no assurance that the forecasts will be achieved. Please see additional disclosures at the end of this presentation.

Trend 3: Reshoring of Energy

Energy is now a security issue for many nations and some of the world's largest economies have a short- to medium-term focus on "reshoring" energy supply (i.e., away from Russian gas and coal supplies). In Europe, for example, the REPowerEU plan outlines steps to reduce Europe's dependency on Russian fossil fuels which in the near term is about diversification of fossil fuel supply along with a focus on deploying clean technologies and reducing consumption longer term. More broadly, most major economies are aiming to accelerate their transition not just with more solar and wind, but also carbon capture for hard-to-abate emissions as well as backup power technologies like nuclear, renewable natural gas, batteries and hydrogen. One challenge in shifting to renewables, however, is the concentration of critically-needed minerals in select countries—a problem that could mean the world is exchanging the reliance on petro-states for electro-states, which is likely to occur unless we have scalable technologies that rely on more abundant elements. In the battery space, this would mean minerals like iron or manganese displacing lithium, nickel and cobalt.

MAKING THE ENERGY TRINITY POSSIBLE

While we are seeing some progress towards achieving the climate goals and targets set by various countries, we think the transition is still in the early stages of multi-decade change given the sheer scope of entirely rebuilding the world's energy systems and creating the infrastructure to support it. As the energy transition progresses, we believe both additional policy action and capital is needed across the traditional and clean energy value chains.

Climate Leadership—It's Now or Never

The quest for long-term affordable, secure and clean energy starts with action from policymakers. We're seeing steps in the right direction with growing global political consensus on the importance of reaching net zero, though it's worth highlighting that China and India—who collectively account for about one third of global emissions—have net zero targets that extend beyond 2050. Targets need to be followed up with implementation plans or legislative mandates at the country or corporate level, and should signal that if heavy industries don't transition to a low-carbon economy they'll be left out of the marketplace. Moreover, from a scientific perspective, the latest assessment report from the United Nations' Intergovernmental Panel on Climate Change (IPCC) states that it's "now or never" to act in order to limit the world's warming to 1.5°C and hit peak emissions by 2025. While this may be unlikely, especially given that China is targeting peak emissions in 2030, it's an alarm bell.

The forecasts imply that world leaders and policymakers need to ramp up credible step-by-step plans to reach their net zero goals to build confidence among investors, industry, citizens and other countries. The task will be difficult and costly, but necessary. In our view, it would be desirable for policymakers to have a clear focus on lowering green premiums—the additional cost of choosing a clean technology over one that emits a greater amount of greenhouse gases— so decarbonization technologies can gain scale. We've already seen this play out with mature renewable technologies like wind and solar, but we believe more government incentives and mandates are needed to jumpstart momentum in newer solutions and technologies.

We believe green hydrogen and carbon capture are two areas in most need of continued action from policymakers. In the U.S., for example, the 45Q tax credit is the main policy driving the adoption of carbon capture, with plans to increase the tax credit from the current $50 per ton of carbon dioxide captured to $85 per ton.[2] There are also plans for a separate green hydrogen tax credit. Although governments will have to be mindful of "greenflation"—the sharp rise in the price of materials and minerals used in the creation of renewable technologies—we believe policy action and financing from both governments and capital market participants is essential. We also expect regulatory efforts that seek to incorporate sustainability metrics in financial markets—such as those made by the E.U. Sustainable Finance Disclosure Regulation (SFDR) and the E.U. Taxonomy as well as U.S. Securities and Exchange Commission (SEC) proposals—to increasingly have an impact on capital allocation.

Energy Policy Responses in Light of Russia-Ukraine Conflict

European Union

- Paradigm shift to energy autonomy focused on ending fossil fuel imports and increasing solar + wind and heat pump deployment.
- Short-term "all of the above" strategy to curb energy crisis with coal, nuclear and non-Russian gas (targeting 2/3rd) reduction by YE22), which currently accounts for 39% of E.U. gas supply.*
- Long-term focus on accelerating, renewables, hydrogen and power market reform.

United States

- Although the U.S. is not a major Russian energy importer, focus is supplying the E.U. with U.S. gas and reshoring renewable manufacturing.
- "Securing a Made in America Supply Chain for Critical Minerals" that are an essential part of the energy transition.
- Although time is running out ahead of a September 30, 2022 reconciliation deadline, focus remains on the potential passage of climate-related provisions in the Build Back Better Act.

China

- Given coal and natural gas shortages in 2021, China is boosting domestic natural gas and coal production.
- New coal mines and plants have been approved by the state planner with a goal to boost domestic production capacity by 300mm tons annually and build a 620mm ton stockpile.*
- Still remains committed to 2060 net zero target, 1200 GW of renewables + peak emissions by 2030 and renewable manufacturing leadership.*

Source: Goldman Sachs Asset Management, Bloomberg, Energy Information Administration (EIA). Data as of June 30, 2022.
*Inevitable Policy Response: Quarterly Forecast Tracker Q1 2022—Update of global energy/land policy and technology developments. The economic and market forecasts presented herein are for informational purposes as of the date of this presentation. There can be no assurance that the forecasts will be achieved. **Past performance does not guarantee future results, which may vary.**

Where Is Capital Being Committed?

Across public markets, we see notable energy transition investments being made, including equity financing of climate tech (i.e., green innovation), growing sustainable fixed income issuance and efforts by traditional energy providers to diversify their business models and decarbonize.

In 2021, two-thirds ($111bn) of all climate-tech investment came from public equity markets, driven by a strong pipeline of initial public offerings (IPOs), according to BloombergNEF. Wind and solar construction and energy equipment were the most popular companies for public equity investors, particularly IPOs and secondary offerings. Across private markets, climate-tech startups raised $53.7bn.[3] Firms building electric vehicles, electric airplanes, e-scooters and batteries have been popular with both public and private investors lately, as companies look to raise large amounts to build manufacturing hubs. Looking further ahead, we believe clean energy companies, backup power technologies (natural gas, nuclear, batteries, hydrogen, etc.) and non-Russian commodity suppliers could emerge as the long-term energy transition winners across public equity markets.

It's also worth highlighting then that the world's 40 largest oil and gas producers and refiners spent $21bn on clean energy in 2021, a record year and a jump of 53% from 2020. Wind and solar make up the majority of spending for oil and gas companies, but investment has diversified across new technologies such as energy storage and hydrogen in recent years. Many traditional energy providers are also striving to cut their own emissions in more innovative ways by using technology to reduce methane emissions, for example. Ultimately, unless there are significant shifts in current government policies and breakthroughs in clean energy technologies, from a public markets perspective we believe both traditional and clean energy sectors will need to coexist for multiple decades before the world can rely fully on alternative sources of energy and, as such, the traditional fossil fuel value chain should be decarbonized as much as possible.

In the fixed income world, a deepening pool of sustainable bond issuance—both corporate and sovereign—is allowing investors to direct capital towards energy transition, and we expect this pattern to persist. Green bonds have become the most popular variety of sustainable debt, and issuance of green bonds doubled in 2021 to land at $621bn. Europe is still the most prolific market of all for green bond issuance, but Asia grew the fastest as entities there went from issuing just 14% of the green bond market in 2020 to 24% in 2021. As the move towards affordable, clean and secure energy progresses, we believe well-balanced fixed income portfolios need to take into consideration left-tail downside risks related to the energy transition and climate events—for example, a country's emissions gap at the sovereign level—while also identifying right-tail investment opportunities in companies and countries that are well positioned for the transition.

Where Is Capital Needed?

Most public and private capital has fed into renewables and transport over the last decade, resulting in underinvestment in key areas including energy security, carbon removal technology, and end-of-life waste management. Importantly, we believe each industry could still benefit from capex spend on decarbonization, reshoring, and supply chain simplification.

For countries to ensure energy security and successfully reshore energy supply—providing an uninterrupted availability of energy sources at an affordable price—and decarbonize power markets, we believe two key technologies will likely contribute to solving the energy storage challenge: utility-scale batteries and hydrogen. Each can have a complementary role, with batteries addressing intermittency and hydrogen addressing seasonality. While batteries, super-capacitors and compressed air can also support balancing, they lack the power capacity or the storage timespan needed to address seasonal imbalances. Hydrogen could therefore eventually emerge as the preferred solution for long-term energy storage required to balance the seasonal variation of power generation demand.[4] But until the relevant energy storage infrastructure (networks and smart grids) and technologies (utility-scale batteries and hydrogen) are ready to support an increasingly electrified energy economy, both natural gas and nuclear power have a significant role to play to enable a smooth energy transition.

We also see underinvestment in technologies designed to reduce emissions in hard-to-abate sectors, such as cement and steel production. Despite the momentum we saw in 2021 as more carbon capture and storage projects were announced than ever before, last year did not see a rise in investment. Total carbon capture and storage funding is sensitive to large projects being financed, and BloombergNEF didn't record any investments larger than $1bn.[3] However, we see select examples of carbon capture technology providers working with factories to develop full-scale carbon capture, conditioning, compression, heat integration and storage facilities, dramatically reducing emissions from industrial plants around the world. Some are using thermocatalytic processes, reacting the CO_2 with hydrogen to make synthetic liquid fuels; others are offering carbon capture as a service using water and solvent as agents. But ultimately, we need to see more of this. Eventually we expect carbon capture costs to decline and believe that the sector will grow into a major global industry, playing an important role to reach net zero by 2050.

Another area in need of capital is recycling waste from end-of-life solar panels and batteries. Solar panels typically last no longer than 30 years before heading to landfill. But new efforts to recycle panels could reduce both the amount of waste produced and new material mined. This also applies to batteries, as battery energy storage systems require a thorough disassembly of the battery packs to extract the valuable materials (e.g., cobalt, nickel, lithium and manganese) from the cathode. These materials are not as easy to extract as the large metal plate in a lead-acid battery, and utility-sized battery storage units are large. Wind energy is also difficult—turbines are enormous and require logistical feats just to transport them to and from the installation site. Landfilling renewables removes valuable materials from the ecosystem, so we expect companies that can solve this challenge will benefit.

Finally, we believe the magnitude of demand for raw materials is underappreciated and the supply chain scale-up required to meet energy transition goals is greater than many people comprehend. For example, demand for lithium, nickel, manganese, cobalt and graphite—ingredients in lithium-ion batteries—may grow by as much as 10x in the next decade. An added layer of complexity is the location of the raw materials and the broader supply chain. Today, many of these raw materials are mined in places that may not be reliable sources for North American and European manufacturers in the long term. We think manufacturers on these two continents will push to localize, increase control of their supply chains and make batteries from alternative, more abundant minerals where possible.

We regard energy security, carbon removal technology and end-of-life waste management as underinvested areas of the value chain.

LOOKING AHEAD

Delivering energy that's not only cheaper and cleaner but also more secure is a monumental challenge, but achieving this energy trinity is at the heart of the solution to climate change. To get there, we believe we need to see continued action from policymakers and incentives from governments that help scale up investments and innovation in areas ranging from energy security and carbon removal technology to end-of-life waste management. We expect the coming decades to be a period of ingenuity in the energy sector, which will offer a wide spectrum of potential opportunities to investors. While numerous ideas will inevitably fail, other groundbreaking technologies may offer significant investor upside. The economics have to work and policymakers will have to agree on a path to execution. Ultimately, the journey towards achieving the energy trinity will require discipline, patience and foresight—all hallmarks of astute investing. ■

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Goldman Sachs Asset Management leverages the resources of Goldman Sachs & Co. LLC subject to legal, internal and regulatory restrictions.
Evidence from Buyout and Venture Capital Funds, November 2020.

EUROPE: RECOVERING INTO A NEW REGIME

Samuel Finkelstein is the CIO of Fixed Income and Liquidity Solutions at Goldman Sachs Asset Management

Gurpreet Gill is a Macro Strategist on the Fixed Income and Liquidity Solutions team at Goldman Sachs Asset Management

KEY TAKEAWAYS

- With inflation running at a 40-year high, monetary policy in Europe has entered a new era of positive rates which may attract flows into euro area fixed income.
- Forecasting where euro area growth, inflation and rates will settle, though, remains difficult in the face of shifting policy priorities and interrelated structural forces, including aging demographics, changing migration patterns, digitization and higher energy prices.
- We expect gradual normalization of euro area monetary policy and a reorienting of fiscal policy aimed at charting a greener and more equitable path to growth.

A TURN OF EVENTS

As recently as a year before the pandemic, there was a growing concern among policymakers and investors around the "Japanification" of Europe—a new version of Japan's lost decade of low rates, low inflation and low growth. Despite years of ultra-accommodative monetary policy, euro area annual headline and core inflation averaged just 1.3% and 1.1% between 2009 and 2019. Core inflation missed the 2% goalpost for the entire period.[1] The shortfall was attributed to global factors as well as European-specific ones such as free movement of labor and fiscal conservatism.

Three years later, headline inflation is running at the highest level in 40 years and core inflation has reached its highest point. A similarly sharp shift in the monetary policy outlook has followed. In late 2019, the European Central Bank (ECB) had dropped its policy rate deeper into negative territory with no end to quantitative easing (QE) in sight, and it extended the program's time horizon as recently as 2021. Today, the ECB has ended QE and exited the negative interest rate policy that was adopted in 2014.[2]

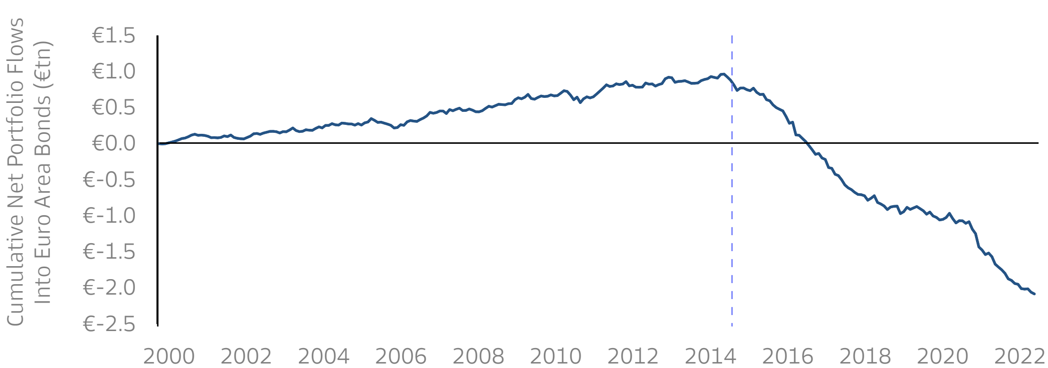
Lifting interest rates out of negative territory is a momentous event for European fixed income markets, with implications for local and global investors. Together with structural reform, positive rates may reverse the outflows that European fixed income has experienced over the last eight years. But to value long term bonds and determine strategic asset allocations, investors need an idea of where European growth, inflation and rates will settle in the years to come. And that's not easily answered given the uncertainties created by major geopolitical events like Brexit, the pandemic, and war in Ukraine, as well as a cross-current of five key interrelated structural forces.

Force 1: Aging Demographics and Migration Flows

Structural unemployment has been a long-standing feature of the euro area labor market. With an abundant supply of migrant labor from Eastern European countries, wage growth has been tepid. During the pandemic, short-term work schemes limited the rise in unemployment. Now, a dynamic recovery has pushed the euro area unemployment rate to an all-time low and lifted labor force participation to a record high, while key measures of wage growth—such as compensation per employee and the labour cost index—accelerated to decade highs in the first quarter of this year.

Two key structural factors may limit the extent to which the labor market deviates from the current cyclical tightness. First, Europe's age pyramid is inverting due to consistently low birth rates and higher life expectancy. As the baby-boom generation retires in the coming decades, the pool of available workers will shrink, potentially creating an upward impetus for wages, a key determinant of medium-term inflation outcomes.

Higher Rates and Structural Reform May Reverse the Trend of Net Fixed Income Outflows



The introduction of negative rates in June 2014 led to an exodus from European fixed income. From 2000 through 2014, cumulative net inflows into Euro area fixed income assets totaled €1.0tn; since that time, cumulative net outflows have totaled €2.9tn, or 23% of Euro area GDP.

Source: Haver Analytics, Goldman Sachs Global Investment Research. As of May 2022. Gross domestic product (GDP).

Second, firmer wage growth in Eastern European economies may moderate migration flows into the euro area in the coming years. Ten years ago, a Romanian worker looking for employment in the manufacturing sector could increase earnings tenfold by migrating to Germany.[3] At the end of 2021, that wage advantage had more than halved. Given Germany's economic prominence in the euro area, higher German wages, due to fewer migrant workers, could propel the broader region into a higher-wage environment.

That said, we believe there are several offsetting considerations. Aging demographics can also promote disinflation through higher savings and the downtrend in labor union membership that has contributed to muted wage growth is unlikely to reverse course. In addition, flexible work arrangements adopted during the pandemic may be disinflationary insofar as they expand labor force participation and boost productivity through reduced time and costs on commuting. Finally, over the longer term, legal migration pathways for refugees—from Ukraine and other countries—into the workforce could help to counter the economic impacts of aging populations.

Force 2: Accounting for Housing

The European inflation index's housing weight—7%—is among the lowest across advanced economies and four times lower than that in the U.S. To better reflect the living cost of euro area households, the ECB said last year that the inflation measurement will be updated to include owner-occupied housing costs. Estimates suggest this will lift annual core inflation by 0.10% to 0.15% each year.[4] Due to the cyclical nature of housing costs, housing's entry into inflation statistics may speed up the responsiveness of inflation to the output gap, particularly core inflation.

However, it may take a decade before the change is made. There is also considerable uncertainty around medium-term housing demand and supply dynamics. In our view, housing's inclusion into inflation statistics is likely to be a secondary consideration for the long-term inflation outlook relative to other key structural factors.

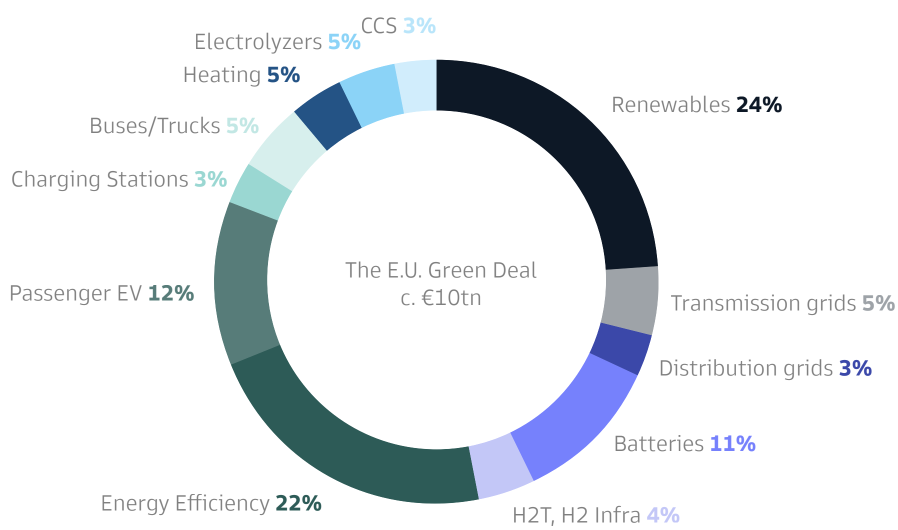
Force 3: A New Era of Energy Inflation

Developed market central banks typically look through supply shocks, such as higher energy prices, as their direct effect on inflation is assumed to be temporary. When the ECB departed from this playbook in 2008 and 2011, its rate hikes proved ineffective. But today, the rising presence of physical and transition climate risks and a surge in green investment suggests the conventional view may need updating. ECB Governing Board member Isabel Schnabel has highlighted three elements of energy related inflation until Europe achieves affordable, clean and secure energy:

1. **Fossilflation:** or higher fossil fuel prices, is a function of high demand and undersupply in fossil fuels due to years of underinvestment and war-related supply disruptions. The decarbonization agenda will preserve tight financing conditions for hydrocarbons, reducing supply and lifting prices.
2. **Climateflation:** the costs incurred from climate events including food inflation which are expected to become more frequent and severe.
3. **Greenflation:** has both a micro and macro element. At a micro level, greening the economy may push up prices for certain metals and minerals. At a macro level, the European Green Deal,[5] the NextGenerationEU (NGEU) pandemic recovery package and the REPowerEU plan seek to boost energy security and advance the energy transition. The surge in climate-related investment may add up to a sizable 9% of euro area GDP, averaging almost 1% of GDP per year during 2021-2030. This green investment has potential to lift aggregate demand and in turn inflation.

The inflation impact of green investment spending is complex and uncertain. It could be lessened if producers and consumers swiftly switch to green alternatives in response to policy incentives or higher prices. A boost to potential growth could also temper the inflationary impact. Overall, we see scope for higher energy-related inflation until carbonomics prevails, with technological innovation and the benefits of scale helping to flatten the decarbonization cost curve for clean technologies across almost all sectors.

A Green Investment Surge Could Lift the Level of Real GDP in Europe by About 2% In the Mid-2020s



Source: Goldman Sachs Global Investment Research European Economics Analyst, "The Costs and Opportunities of Climate Change." As of May 10, 2022. Carbon Capture Storage (CSS)

Force 4: A Digital Tipping Point

Though Europe has historically lagged North America and Asia in the digitization of its economy, digital transition now appears to be a key European policy priority that will complement its energy transition. Policymakers are also focused on the concept of digital sovereignty—the ability to control the new digital technologies and their societal effects.[6]

At least 20% of the NGEU recovery fund will be spent on the digital transition, including expansion of broadband services alongside reskilling and upskilling of the workforce. Digital priorities coupled with green investments may improve economic outcomes in Europe along three dimensions: capital accumulation, employment expansion and productivity growth. We think the digital tipping point has potential to help Europe avoid climate tipping points, while potentially improving growth and taming inflation.

Force 5: Shifting Policy Priorities

The pandemic and the war in Ukraine have further entrenched green and digital ambitions in Europe. Conflict in the region has also led to a reset in foreign and security policy. Both shocks have already pushed policy boundaries into new realms. Extensive ECB bond buying has enlarged the central bank's footprint in Italy's bond market from 19% pre-pandemic to more than 33% today,[7] leading to concerns about and fiscal dominance.

Looking ahead, we think inflation concerns due to policy actions may be calmed by a return to fiscal discipline and hawkish ECB policy, with the central bank adopting a "whatever it takes" tone on bringing inflation back to target at its July 2022 meeting. Importantly, though, fragmentation of the currency union remains a chronic issue that has been concealed by years of monetary stimulus. A rise in debt-servicing costs could interfere with the ECB's rate-hiking path and put concerns about debt sustainability back into focus, particularly for high-debt member states such as Greece, Italy, Portugal and Spain.

But it is in times of crisis that the ECB expands its toolbox and governments achieve fiscal coordination. The NGEU Recovery Fund provides a precedent for a Europe-wide fiscal response that can be used again during a future crisis,[8] and the new Transmission Protection Instrument (TPI) could be a powerful tool in anchoring sovereign bond yields in Europe. That said, limited clarity on the conditions under which the TPI would be activated will likely preserve the risk of volatility in European bond markets, particularly during times of high political uncertainty. All told, we expect a gradual normalization of monetary policy in the euro area, which should help safeguard against fragmentation risk. We are also encouraged that the goal of E.U. fiscal policy, rather than simply seeking a cyclical boost to demand, has turned more structural in nature: to chart a greener, more equitable and digitized path to growth.

RECOVERING INTO A NEW REGIME

A key question for investors is whether 2022 will mark a pivot point for European inflation, monetary policy and fixed income assets. We see three plausible scenarios:

1. **Reflation reset.** Prolonged loose fiscal policies may dampen the impact on the economy from rising rates, allowing the labor market to tighten further and wage growth to pick up. Combined with a shrinking workforce, we would expect this to lead to higher inflation and rates.

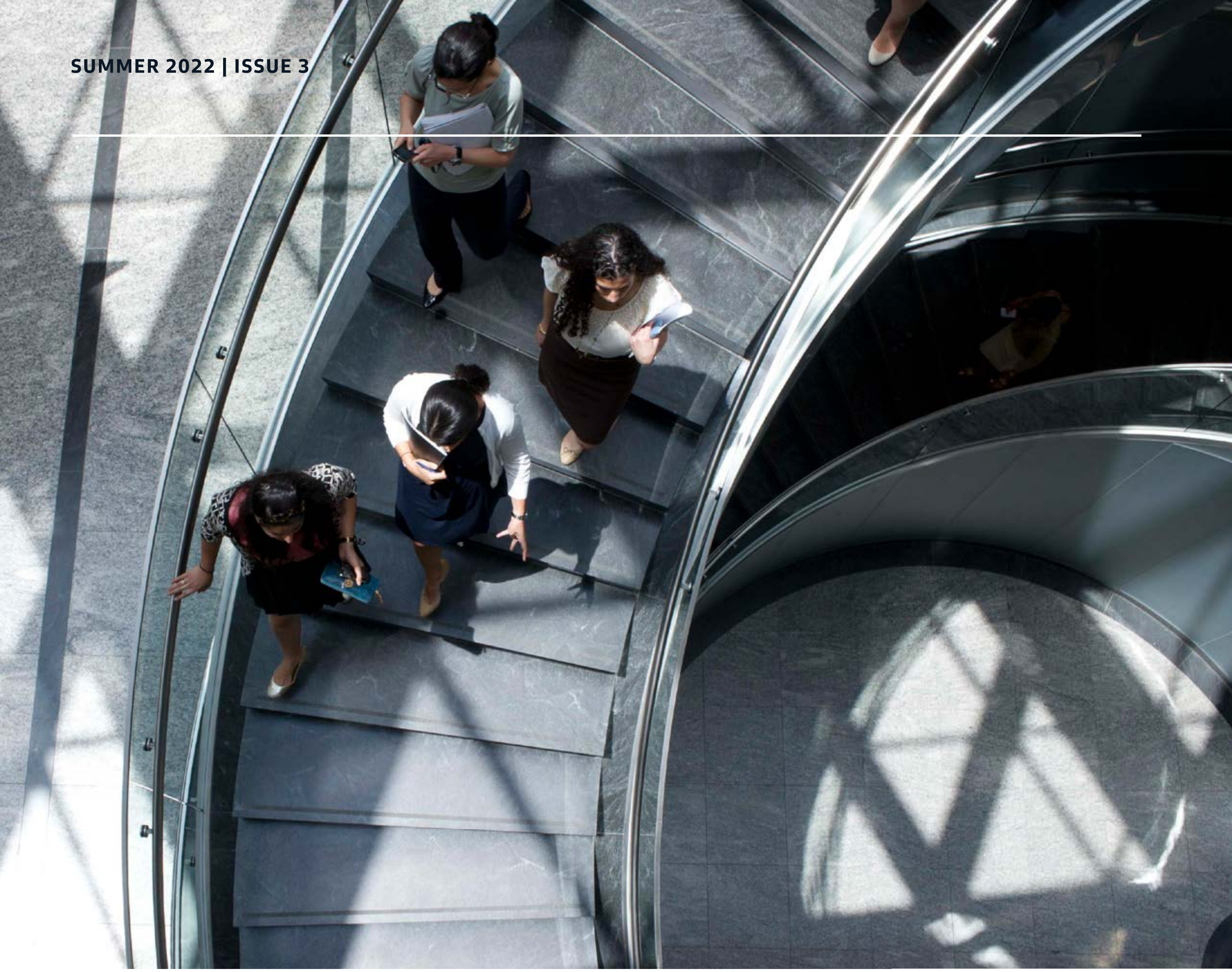
2. **New normal.** Europe may return to fiscal discipline as the impact of pandemic— and war-related supply shocks subside. Flexible work and reskilling could improve in labor force participation, keeping wage growth in check. But elements of energy inflation may persist, with both rates and inflation settling above pre-pandemic levels.

3. **Lowflation reprise.** Excessive monetary tightening may cause growth and inflation to plunge, leading the ECB to embrace a low rate policy. But absent material downside inflation risks, we don't expect negative rates to return.

In our view, the path likely runs between the "reflation reset" and "lowflation reprise" scenarios, with Europe entering a "new normal" of moderately higher inflation and interest rates relative to the last cycle. The move into a positive rate environment may attract more fixed income capital flows, supporting the euro over time[9] and sponsoring a steeper European yield curve that would be supportive for the banking sector. The end of QE could also lead to greater differentiation in corporate bond performance, creating security selection opportunities for active managers. There is also potential for higher rates to attract interest from income-oriented investors, while structural reform focused on energy transition and digitization may offer attractive bottom-up corporate bond opportunities. Overall, we believe the recovery of Europe into a new regime has potential to stem—or even reverse—the trend of net fixed income outflows observed since 2014, but we'll continue to observe if we are braced for a higher nominal growth and real rate environment. ■

Sources:

1. Macrobond, Goldman Sachs Asset Management.
2. Although active QE has ended, the ECB will still be buying bonds as part of its reinvestment schedule which will be flexible in nature. It has also unveiled a new Transmission Protection Instrument (TPI) to address sovereign bond market stress.
3. Eurostat. Based on hourly labor costs in euros.
4. Goldman Sachs Global Investment Research, "European Daily: Q&A — ECB Strategy Review and Owner-Occupied Housing." As of July 13, 2021.
5. The European Green Deal is a set of policy initiatives by the European Commission with the aim of reducing greenhouse gas emissions by at least 55% versus 1990 levels by 2030 and reaching net zero emissions by 2050.
6. As defined by the European Council on Foreign Relations.
7. Macrobond, Goldman Sachs Asset Management. Based on ECB holdings as a proportion of outstanding Italian government debt in February 2020 and March 2022.
8. This is because the Recovery Fund has set a legal precedent for using Article 122 of the Treaty on the Functioning of the European Union to issue debt for redistributive (grant) purposes.
9. The euro also benefits from a healthy euro area current account position.



THE MARCH OF THE WOMEN: INCREASING DIVERSITY IN ASSET MANAGEMENT

Candice Tse is the Global Head of the Strategic Advisory Solutions in the Global Client Business at Goldman Sachs Asset Management

Wendy Lin is a Senior Market Strategist, Strategic Advisory Solutions in the Global Client Business at Goldman Sachs Asset Management

KEY TAKEAWAYS

- Women are underrepresented in the asset management industry despite making up 50% of the world's population and controlling more than one-third of household wealth.
- Just 11% of public fund managers in the U.S. were women in 2020, a percentage that has held constant for the last decade. There is significant room for improvement elsewhere in the industry as well, including at alternatives managers, public pension plans and consultants.
- Adding diversity to management teams brings new perspectives and can result in better decision making, improved deal sourcing, more ability to attract and retain talent and better investment performance.

Women make up 50% of the world's population[1], earn more than $20tn every year,[2] and control over one-third of total household wealth.[3] Yet a gender gap continues to exist, especially with respect to finances. Women's representation in the asset management industry in particular lags behind the rest of financial services.[4]

Diversification doesn't just apply to allocating across different asset classes and managers to reduce volatility and improve risk-adjusted returns. It also applies to the teams managing money and allocating assets, and diverse teams can lead to better outcomes. More perspectives and backgrounds can drive higher-quality decision making, improved deal sourcing, and better ability to attract and retain talent, helping to drive business longevity and investment performance. Given the potential benefits, there are common approaches and deliberate efforts that investors and asset allocators can make to improve representation of women in investing.

Public Markets

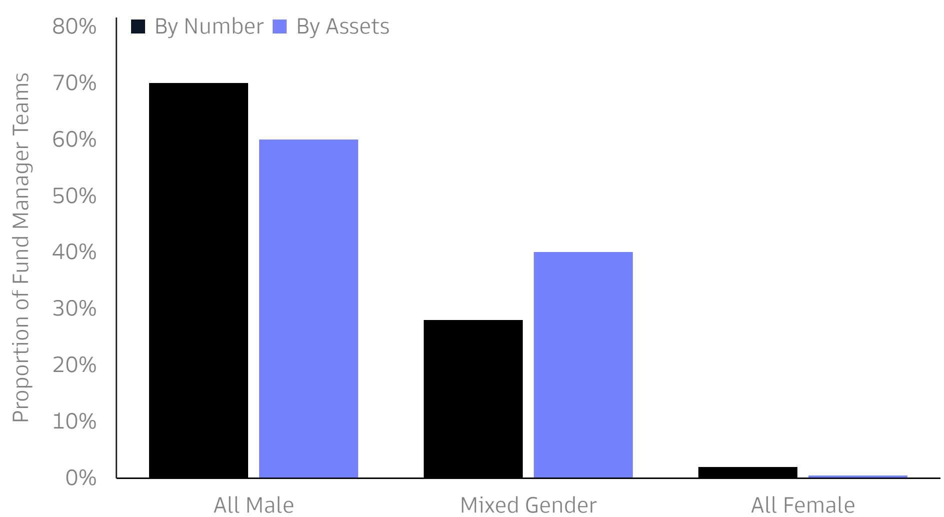
U.S. public markets, both equity and fixed income, are among the largest in the world at $52tn and $46tn, respectively.[5] Public market investors have the potential to influence a significant amount of capital.

Unfortunately, in 2020 just 11% of public fund managers in the U.S. were women—a percentage that has remained roughly constant over the last decade, according to Morningstar.[6] The absolute number of managers has increased but has not kept pace with the growing industry.

Despite increased focus in recent years, even mixed-gender teams are still the minority today. Diverse investment teams represented 28% of funds and nearly 40% of assets under management in 2020. By comparison, all-men teams accounted for 70% of funds and nearly 60% of assets while all-women teams represented less than 2% of teams and 1% of assets. The status quo suggests that without intentional practices to address structural barriers or implicit biases, the industry will continue to skew toward men.

Female fund managers have appeared to thrive in more nascent markets over the past 20 years where niche opportunities meant smaller presence from mainstream investment management players and more opportunities for new, diverse ideas. In 2000, at the onset of index and exchange traded fund (ETF) investing, women accounted for nearly 20% of U.S. passive fund managers. As the market has matured, women now represent approximately 13% of passive fund managers. Today, female fund managers

Women Are Underrepresented in Fund Management



Source: Morningstar, Inc. and Goldman Sachs Asset Management. As of December 2020. For illustrative purposes only.

are still better represented in emergent fund markets such as China, where women accounted for more than 28% of managers in 2020—twice the global average.[5]

We have seen a similar pattern across industries: better representation in smaller, newer markets and at smaller, newer firms. Seeing women contribute in these spaces is encouraging, but we believe keeping them as industries grow to scale is critical.

Diverse teams may have access to differentiated deal pipelines, recognize new business initiatives, or create relationships with a broader group of founders.

In an industry that is so familiar with benchmarks, we think that a benchmark approach to diversity can help. Setting clear goals and measuring and reporting against them may improve accountability. For example, ensuring that applicant pools are diverse across all roles, diversifying leadership positions across experiences, and translating diversity mandates into cultural inclusivity may help.

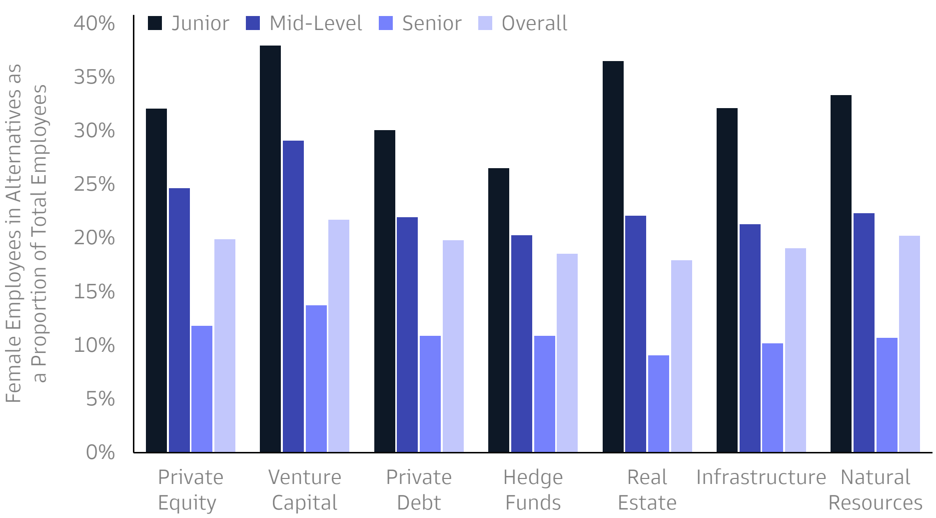
Alternatives Investors

According to Preqin data, women represented just over 20% of employees working in alternative assets in 2020. Across individual geographies, asset classes, job functions, and seniority levels, the gender gap becomes even greater.[7]

And women's participation declines significantly as their careers progress, with women accounting for 12% of senior roles compared to 24% at the mid-level and 32% in junior positions. Research by McKinsey suggests that attrition itself is not to blame—women leave roles at roughly the same rates as men.[8] However, women are promoted at lower rates than men.[8] So while we believe recruiting junior women into alternatives is important, creating an intentional structure around training, promotion, and retention is the key to improving senior representation in the future.

The solution for each firm may differ based on circumstances, but in surveying many of our industry peers in alternatives we found a few common practices. The Goldman Sachs Asset Management Alternatives Investment Manager and Selection (AIMS) team collected responses from 550 long-only, hedge fund, private equity, and real estate investment management firms in which our clients are invested. Most have a written policy on equal employment opportunity (EEO) or diversity, equity, and inclusion (DEI) and conduct periodic reviews

Female Representation in Alternatives Asset Management is Particularly Weak in Senior Roles

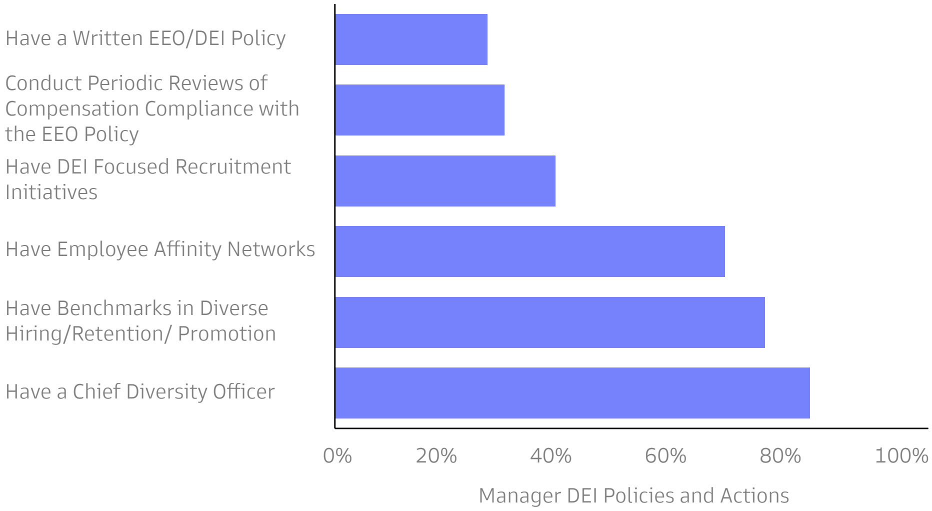


Source: Preqin Pro and Goldman Sachs Asset Management. As of December 2020. For illustrative purposes only.

"Diversity and inclusion is not just an issue of equity, it's an alpha issue as well, for us and for our clients. In investing, especially human-driven fundamental investing, which is what we do every day, you seek to create an edge by having a unique perspective relative to the market. One of the ways to cultivate that variant perspective is to bring in people with different perspectives and backgrounds so that our collective understanding is better informed and less biased. Recognizing this competitive advantage, we have built a team where over 50% of our $350bn+ in Assets Under Supervision is led or co-led by women portfolio managers, much higher than the industry average".[7]

Katie Koch
Chief Investment Officer of Public Equity at Goldman Sachs Asset Management

Many Firms are Embracing Diversity, Equity, and Inclusion



Source: Goldman Sachs Asset Management 2021 AIMS Diversity Survey. As of December 31, 2021. For illustrative purposes only.

of compliance with that policy. Many also have DEI-focused recruitment initiatives, but fewer have specific benchmarks for diverse hiring, retention, or promotion.

Alongside the survey, many managers emphasized the importance of diversity and inclusion to their firm culture and recognize how it can help them drive commercial success. For example, diverse teams may have access to differentiated deal pipelines, recognize new business initiatives, or create relationships with a broader group of founders. Additionally, we think that proactive DEI practices can help asset managers recruit, promote, and retain more women, making progress on female representation in the investment world.

DIVERSITY THROUGH ASSET ALLOCATORS

Diversity has also become top of mind for asset allocators, though progress has been more localized at the plan sponsor or institutional level. Moving the needle on diversity typically comes through two approaches: manager diversity and allocation diversity. For asset allocators, the former addresses diversity within the workplace while the latter focuses on promoting diversity through investments. We believe inclusive representation starts with having good data, but so far data remains scarce on both ends. Efforts to normalize diversity reporting similar to financial reporting may drive transparency and create opportunities for women, diverse, and emerging managers.

Public Plans

Only 26 of the 195 listed public defined benefit plans have declared an explicit policy encouraging the hiring of women, minority, disabled or veteran investment professionals. On allocation diversity, only 11 plan sponsors publicly reported the amount of assets invested with diverse managers as of February 2021.[9] Reporting also varied across public plans, with some plans producing regular diversity report cards to evaluate or monitor commitment to inclusion while others remained opaque.

To be fair, public plans can be subject to state statutory requirements that specify that fiduciaries must act prudently and for the exclusive purpose of providing benefits, which can limit the use of non-financial factors in decision-making.[10] As a result, many plans have sought different ways to incorporate diversity into investments. Some may lean on emerging and diverse manager programs as a solution or pair them with dedicated asset allocation carve-out mandates and

“In private markets there have been large rivers of capital chasing the same opportunities for many years. Diversity to us is about finding differentiated opportunities or contrarian ideas, and we believe those come from all sorts of individuals and backgrounds. We believe there needs to be more capital on both sides of the table to move the needle, so we started Launch with GS where we seek to work with both underrepresented investors and founders. We are excited because we have never seen more investment opportunities than we do now in 2022. In 2018 when we first started Launch with GS, we often got the question from stakeholders, “Is there enough opportunity to deploy capital in this area?” Now we believe we can definitively say yes, with the data to support.”

Suzanne Gauron
Global Head of Private Equity Strategies and Launch with GS at Goldman Sachs Asset Management

Considerations for Asset Management

The gender gap in asset management is a result of decades of structural and cultural issues. Influential stakeholders including asset managers and allocators, as well as senior leadership and human resource departments should be at the forefront of improving diversity by adopting an **ACT NOW** framework:

Adopt a written DEI policy in seeking to build accountability.

A formal DEI policy is essential in providing a commitment and framework to foster a culture of diversity, equity, and inclusion within organizations. Comprehensive DEI policies and practices should include diverse and equitable talent acquisition, retention, and promotion procedures, serving as the bedrock to build accountability and create an inclusive culture.

Cultivate a supportive culture with strong apprenticeship, allyship, and sponsorship.

Once a written DEI policy is in place, actions should bring the policies into the workplace and portfolios in ways that can be reviewed, improved, and replicated in the future. Here at Goldman Sachs, we have set aspirational goals for women to represent 50% of analysts, 50% of associates, and 40% of vice presidents by 2025. At a senior level, we are measuring and reporting on women's representation in managing director and partner classes. While there is still more to be done, we have found these goals help to keep us accountable. We also have a women's network for women in asset management, and men are welcome to be sponsors and allies in the network.

Tap into differentiated recruiting pools, then train, retain, and promote diverse talent.

A focus on attracting women at the junior level and beyond will ensure companies maintain a more diverse workforce and leadership pipeline, but it will likely require changes to human resource strategies. Firms should consider new recruiting pools, including students with non-business majors, professionals with tangential yet practical experience, and women returning to the workforce. Educating women on the industry, the various roles, and how to build a meaningful career in asset management is important. Firms can also work to eliminate bias in reviews, promotions, and compensation by using clear metrics and transparent processes.

Normalize diversity reporting standards and commit to regular reporting in industry databases.

In an industry that revolves around benchmarks, we think that normalizing public diversity reporting is imperative. By creating a standardized database of measures, stakeholders can keep track of progress and managers can learn from each other's best practices. Firms can also continue to raise awareness by publishing reports examining the state of diversity across the industry.

Outline diversity criteria in investing, and set medium- and long-term target goals.

Still, each firm will likely have its own diversity criteria in its own investment process. For example, a money market manager may transact with diverse-owned brokers, while a growth equity firm may invest in women-led companies, and an endowment CIO may seek out diverse-owned or diverse-led firms. Support functions, such as marketing, investor relations, and technology, should also feature diversity.

Work with external organizations to help eliminate familiarity barriers and review progress toward diversity goals.

Finally, this is not a solo endeavor. Asset managers can work together, engage with their network of consultants and partners, and leverage lessons learned from other industries. Closing the gender gap will ultimately be a group effort. Fortunately, we believe the outcomes should grow the pie to benefit everyone.

diligence processes considering diversity as a criterion for evaluating investment partners. We found that some public plans have also supported diversity efforts through dedicated partnerships with diverse-owned and led brokerages.

Still, relative to their peers, public plans are ahead of the curve on women's representation, as illustrated in the exhibit below. This may be due to a different set of motivations for public plans, like a commitment to advancing minority- and women-owned businesses that reflects existing affirmative action policies for awarding government contracts. Also, the recent spotlight on gender equality may have reignited a public focus on improving diversity.

"Clients are better served by more diverse managers. In fact, analysis has shown that women historically outperformed men on a risk-adjusted return basis.[19] Still, the industry doesn't always follow through on pledges to invest in diversity by hiring more women. I am proud to be part of a firm that lives by its word and demonstrates in practice its commitment to high performing women managers and a diverse workforce in general."

Maria Vassalou
Co-CIO Multi-Asset Solutions at Goldman Sachs Asset Management

Even so, there is still work to be done. While women's representation at public plans is above average, it is still far from parity. Expanding the pipeline for diverse managers is important, in our view. Public plans typically use consultants and multi-manager funds to access diverse managers. But by outsourcing, allocators are relieved of having to conduct due diligence of individual managers.

Consultants have deep networks across investment managers but their breadth of coverage may have the unintended consequence of keeping lesser-known players out of the big league. Moreover, consolidation in the consultant universe alongside the growth of asset managers means fewer consultants are responsible for evaluating a growing pool of competitive information. Consultants may award mandates to incumbent asset management firms due to their familiarity with these firms and access to performance records. But these large firms often lack diversity. We think asset allocators should consider opportunities outside these networks.

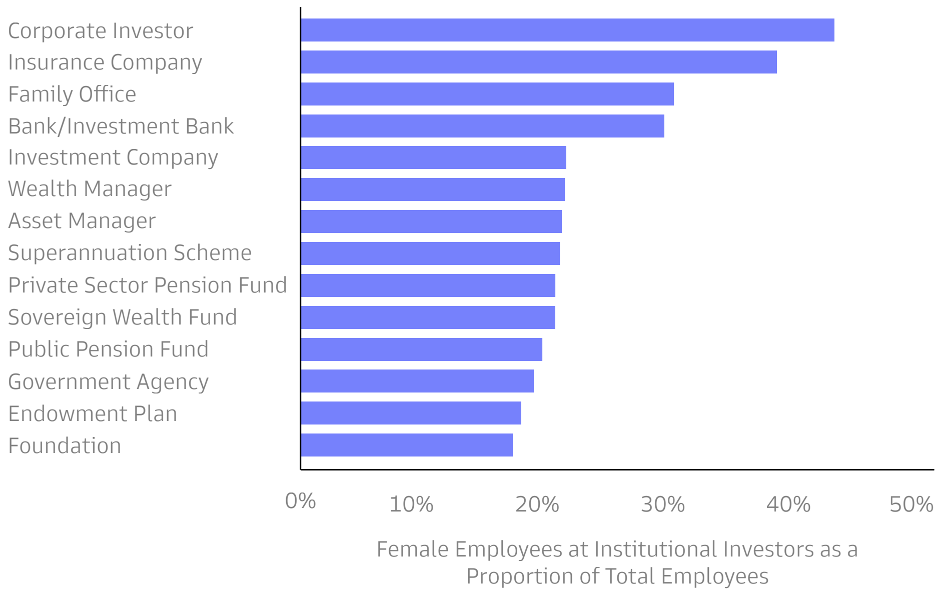
Investment Consultants

According to a 2020 Annual Investment Consultant Survey of 16 firms on their diversity efforts in-house and on behalf of clients, 23% of firm owners are women, while 39% of women hold senior management positions. While firm ownership remained dominated by white men, the study found that diversity within senior management has started to improve.

We think this is an important metric to watch as a more gender-balanced research staff wielding decision-making power may broaden female inclusion through manager selection. Still, the forward pipeline to inclusivity can be improved. Across the 16 firms, 14 of them have established guidelines on diversity hiring practices. Yet only five firms have a written policy to interview one or more woman candidate for every available position.[11]

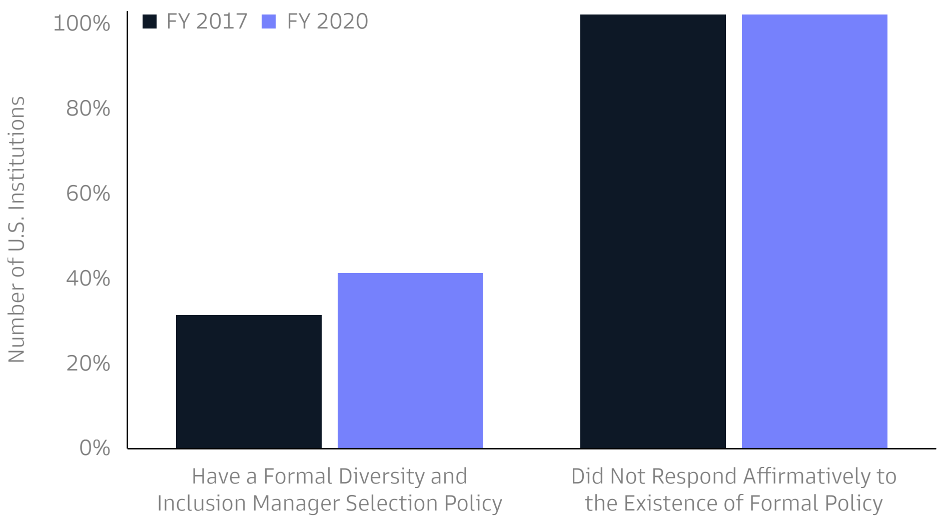
We see areas of improvement for the investment manager review process, too. While the majority of surveyed investment consultants have diverse manager programs in place, less than a third of them have explicit rules requiring a qualified diverse-owned firm to be interviewed for asset manager openings. Moreover, only three consultants actively

Women Are Underrepresented Across Institutional Investors



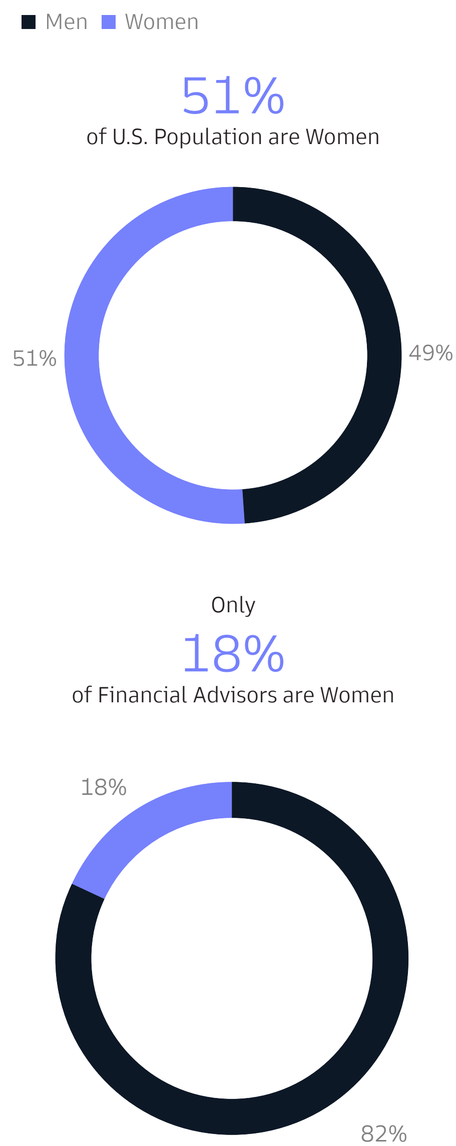
Source: Preqin Pro and Goldman Sachs Asset Management. As of December 2020. For illustrative purposes only.

Endowments and Foundations Have Room for Improvement



Source: NACUBO-TIAA, "Study of Endowments," 2018 and 2021. The number of institutions that did not respond affirmatively to the existence of a formal policy is based on institutions with endowments $1bn or greater in size as of the respective fiscal year (FY) end. For illustrative purposes only.

Imbalances in Gender Diversity Are Acute in Wealth Management



Source: Cerulli Associates and Goldman Sachs Asset Management. As of December 2020. For illustrative purposes only.

track incoming inquiries from investment firms, diverse, or otherwise.

Endowments & Foundations

The endowment universe also has significant potential to make a positive impact on equality measures. The market value of the endowment funds of colleges and universities in the U.S. totals more than $648bn,[13] and the size and the perpetual investment horizon of the assets may amplify the long run impact that capital can have. Unfortunately, there is significant room to improve investments in diversity. According to the 2021 National Association of College and University Business Officers (NACUBO)-TIAA annual survey, only 6%, or approximately 42 of the 705 U.S. institutions in the study acknowledged a formal policy addressing diversity, and none of the 104 institutions with endowments greater than $1bn acknowledged such a policy.[14] Of those with a formal policy, larger endowments were significantly more likely to have diverse managers in their portfolios relative to smaller counterparts, potentially due to differences in resources needed to conduct due diligence and source investments.

Foundations are another potentially powerful asset allocator that have often led the charge in investing with diverse-owned firms to secure strong returns, identify new opportunities, and engage with diverse and interconnected communities. Looking at some of the largest U.S. foundations in the U.S., 16.6% of assets (or $1 in every $6) are invested in diverse-owned funds in 2021, up 1.1 percentage point from 2020 when considering the amount of analyzed AUM. The greatest growth was observed in investments directed towards minority-owned firms, while the percentage of investments placed with female-owned firms remained constant at 9.8%.[14]

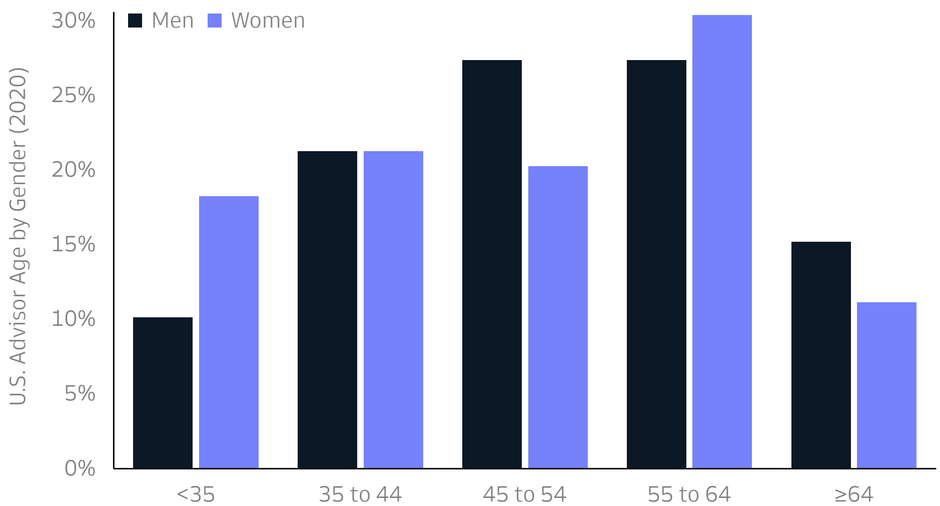
Financial Advisors

Wealth management has long been a male-dominated industry. Over the years, various asset managers and professional organizations have recognized this issue and launched initiatives to improve the balance and yet in 2021 only 18% of financial advisors were women, a mere 2.4 percentage-point increase from 2015.[15] Female representation further decreases at the top. Only 11 of the Barron's top 100 financial advisors were women and only 16% of top 100 registered investment advisors (RIA) firms' executives were women in 2021.[16]

Some of the obstacles that female financial advisors face include pipeline challenges, insufficient mentoring opportunities, work-life balance, and implicit bias. In addition to the recruitment process headwinds, many firms still struggle with retention and career progression. In fact, when analyzing the average U.S. advisor by gender, the ages 45 to 54 represented the cohort with the largest difference in male and female advisor population. In their prime career years, many women also have to balance caregiving and household activities. Without structural support and

> Our clients are becoming more diverse and they want those who manage their investments to have diverse backgrounds and perspectives, too. In asset management, I think meeting diversity goals requires us to think differently about hiring. We don't always need someone with a specific background. Give me technically proficient good communicators and I can train them."
>
> **Whitney Watson**
> Global Head of Fixed Income Portfolio Management, Construction & Risk, at Goldman Sachs Asset Management

Women Are Underrepresented During Peak Earning Years



Source: Cerulli Associates and Goldman Sachs Asset Management. As of December 2020. For illustrative purposes only.

clear opportunities in the workplace, female advisors may opt to change tracks.[17]

Starting with recruitment, wealth management firms can attract students and young professionals to the industry while making women leaders more visible to broad audiences. Firms can adopt new definitions of job descriptions based on skills and interests rather than labels, for example "relationship manager" as opposed to "financial advisor."[18] For employees, we believe firms should recognize that work-life balance is not just a women's issue, and that offering flexibility and parental benefits can be helpful for all employees. Finally, sponsoring affinity networks that promote inclusivity, enhance leadership skills, and build professional confidence may elevate retention. The gender gap in asset management is the result of decades of structural and cultural issues. Influential stakeholders, including asset managers and allocators, as well as senior leadership and human resource departments, should be at the forefront of improving diversity, starting today. ■

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PUBLIC DEFINED BENEFIT PLANS — INVESTING IN A NEW ERA

U.S. public defined benefit plans had benefited from the strong performance of risk assets, such as public and private equity and real estate, over the past several years. In 2021, many of them reached their highest funded status since before the global financial crisis in 2008. The market drawdowns in 2022 have erased much of that improvement, potentially leading some to question whether they may have been able to take steps within their portfolios to protect some of those gains. We spoke to Michael Moran to get some observations and approaches for sponsors navigating this environment.

Michael Moran, CFA
Pension Strategist, Goldman Sachs Asset Management

Michael is a pension strategist in the Client Solutions group of Goldman Sachs Asset Management where he produces original thought leadership on issues pertaining to defined benefit and defined contribution plans. In this role, he consults with clients on a wide range of topics related to asset allocation, pension risk management and the impact of regulatory and financial reporting changes.

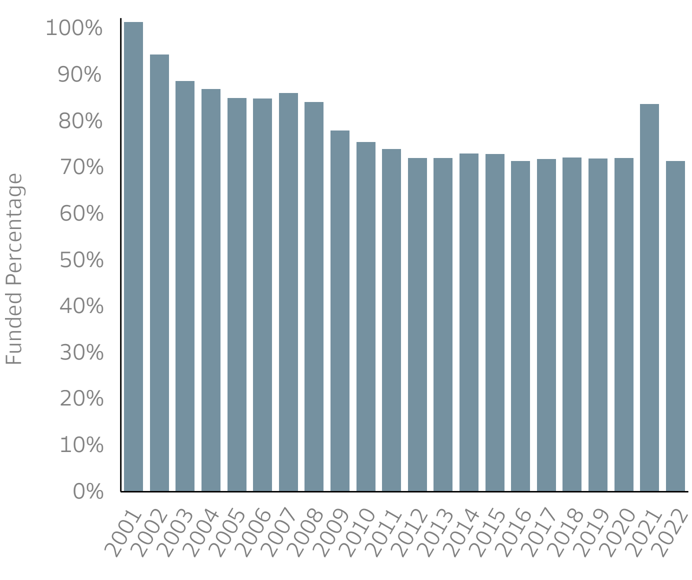
What is the state of U.S. public defined benefit plans' portfolios today?

Michael Moran: Public defined benefit (DB) pension plans, like all institutional investors, benefited from an environment of rising values for growth assets such as public equities, private equity and real estate in recent years. This had helped to bolster the total assets for these plans and led to a notable step-up in funded levels (the ratio of plan assets to liabilities). After languishing below 80% for much of the past decade, the aggregate funded status of the U.S. public pension system reached 87% as of the end of 2021, its highest level since before the global financial crisis. An 80% funded status is a key level often referenced for being well-funded, so moving above that mark was a significant accomplishment for the industry, as well as for many individual plans. However, given the recent equity market pullback, the aggregate funded status, by our estimate, has fallen back down to around 71% as of the end of the second quarter of 2022.

Should public pension plans consider different strategies when they experience a rise in funded ratios, such as when they move above that critical 80% threshold?

Moran: Public defined benefit pension plans are long-term investors, especially since many are open and their participants are accruing new benefits each year. Nonetheless, when they experience a rise in funded status they may want to consider employing some different strategies in order to protect some of those gains. Like many defined benefit systems around the world, the U.S. public pension system has seen its fair share of funded status volatility over the past several decades. At the close of the last century, public DB plans were collectively overfunded, due in no small part to the equity bull market of the 1990s. Between the tech bubble burst of the early 2000s and the global financial crisis in 2008, the aggregate funded level fell to the low 70%s. It dipped further into the mid-60%s during the height of the COVID-19 crisis in early 2020. Drawdowns like those make it hard to recover to previous funded levels, as the smaller asset base must work harder to erase the larger deficits. Avoiding large drawdowns is a way to ensure the sustainability of any plan.

Public Pension Funded Ratios Given Back Their Gains from 2021



Source: Goldman Sachs Asset Management; Center for Retirement Research at Boston College Public Plan Database. All funded percentages as of June 30th of indicated years. The 2022 figure is a Goldman Sachs Asset Management estimate.

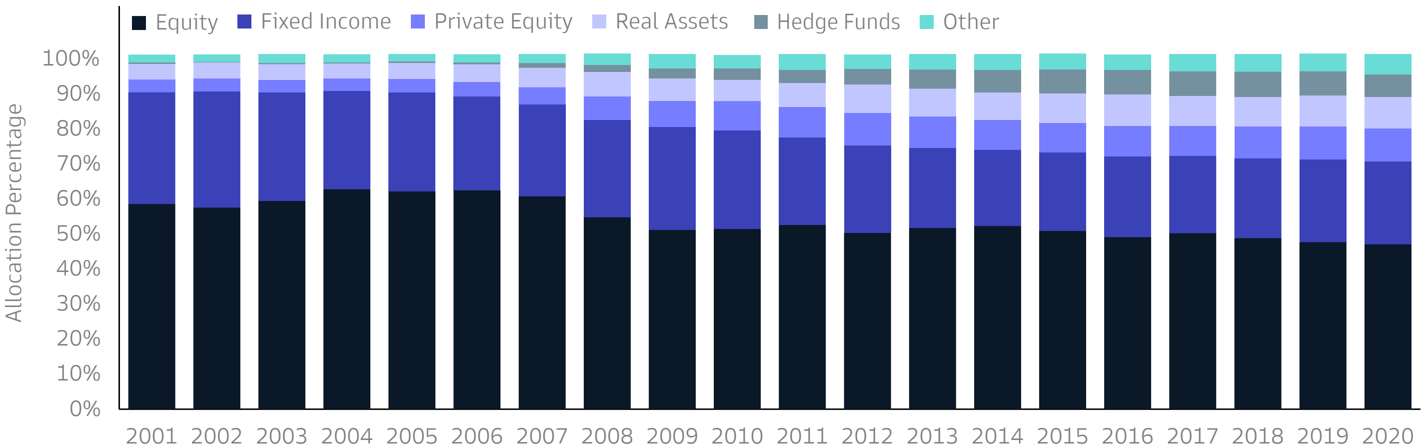
Of course achieving this has become more challenging—not only because of the recent equity market pullback, but also because of broader structural market factors that have left many portfolios more concentrated and with the balance of risk exposure to the downside. Correlations across major asset classes have picked up, exacerbated by greater speed and magnitude of equity market drawdowns in recent years. The long-relied-upon negative stock/bond correlation turned positive in 2022. Public equity indices have become more concentrated in the largest names. The top five holdings in the Russell 1000 Growth Index represented nearly 40% of the index at the end of 2021, four of them technology companies in essence if not in sector classification. For context, the top five holdings represented less than 25% of the index for much of the last two decades and never crossed the 30% level during the peak of the dot-com bubble. Fixed income markets are vulnerable to rising rates and have their own concentration issue, with the top three sectors (banking, consumer non-cyclical and technology) within the Bloomberg Corporate Index representing 47% of the total index market value as of March 31, 2021.[1]

Would a liability immunization via fixed income be an effective de-risking strategy for public plans?

Moran: In the corporate defined benefit pension world, many plans have implemented such strategies. But that would not seem to be an option for public DB plans for two key reasons. The first is that, unlike corporate plans, public plans do not value their liabilities based on fixed income yields. Rather, they generally use the plan's long-term expected return on plan assets (EROA) assumption as the discounting mechanism. That means their liabilities do not rise and fall with yields, so increasing the fixed income allocation does not necessarily reduce funded status volatility. Just the opposite in fact—increasing the fixed income allocation at the expense of equities would likely result in a lower EROA assumption, which would increase the value of liabilities and lower the plan's funded status.

The second difference between corporate and public plans is in their growth rates. Many corporate plans have pursued fixed income immunization strategies since, in some cases, they no longer provide a DB benefit to current or future employees. Public plans, on the other hand, are still open and accruing new benefits for participants, with obligations typically linked to annual cost of living adjustments. Between the accretion of the liability each year based on the discounting factor and new benefits earned by current employees, annual liability growth for some plans can approach 10%. In today's environment, low-yielding fixed income may not provide enough return to the overall portfolio in order to reach its desired return expectation.

Asset Allocation Has Shifted for Public DB Plans in Recent Years



Source: Goldman Sachs Asset Management; Center for Retirement Research at Boston College Public Plan Database.

It is not surprising, therefore, that these sponsors' aggregate allocation to fixed income has steadily decreased over the past two decades. While higher yields seen in 2022 may increase the attractiveness of fixed income to some public DB plans, we would not anticipate them notably increasing the allocation to this asset class as a way to reduce risk from an asset liability matching perspective as their corporate DB brethren have been doing.

In today's environment, low-yielding fixed income may not provide enough return to the overall portfolio in order to reach its desired return expectation.

What approaches should public plan sponsors consider in navigating the next investment cycle?

Moran: We suggest plans establish or augment positions in diversifying strategies that may be underrepresented in their portfolios. Private equity and credit strategies can offer structural sources of return uncorrelated to broad equity and credit markets. Real assets, such as real estate and infrastructure, can offer both differentiated sources of return and sensitivity to inflation. Accessing these investments in private markets may bring greater diversification benefits than doing so in public markets, since REITs and infrastructure stocks have high correlations to broad equity markets. Commodities offer less-correlated returns and inflation sensitivity as well. Many hedge fund strategies can provide diversification too—particularly ones that focus on risk premia outside traditional equity and credit exposures, such as trend following and macro.

Another source of diversifying returns is manager alpha. Our market strategists anticipate that the coming investment cycle will see less overall market direction and more idiosyncratic return across individual niches and opportunities ("fat and flat"). This portends a more favorable environment for alpha generation among skilled managers in both public and private markets. One way to capitalize on active manager skill is to embrace more flexible mandates. In traditional asset classes, that may mean investing in managers who have the flexibility to deviate more from their benchmarks. In alternative asset classes, that may mean investing in strategies that allow the managers to pursue opportunities across a range of markets and trading strategies or ones that focus explicitly on alpha generation, such as market neutral hedge fund strategies or opportunistic private markets strategies. This approach makes manager selection all the more critical, in our view. ■

Source:

1. Bloomberg, FactSet, Russell as of March 31, 2021

GLOSSARY

Alpha refers to returns in excess of the benchmark return.

Asset allocator refers to an investment professional responsible for managing assets across a portfolio.

Beta refers to the tendency of a security's returns to respond to swings in the markets.

Beta Agnostic describes funds that are not managed to a particular beta level.

Bps refers to basis points or 1/100th of 1%.

Buyout is an investment transaction by which the ownership equity of a company or a majority share of the stock of the company is acquired.

Correlation is a statistic that measures the degree to which two securities move in relation to each other.

Co-investment portfolio comprise direct investment positions made alongside a General Partners (GP).

Default ratio means an amount (expressed as a percentage) equal to (i) the sum of (A) the aggregate Outstanding Balance.

Dislocation trading describes market activity in securities where the price is disconnected from the fundamentals.

Distressed ratio is the proportion of speculative-grade issues with option-adjusted composite spreads of more than 1,000 bps relative to U.S. Treasuries.

Distressed securities are financial instruments issued by a company that is near or currently going through bankruptcy.

Diversification refers to allocating capital in a way that seeks to reduce exposure to any one asset or risk.

Dovish refers to more accommodative monetary policy, the opposite of Hawkish.

Drawdown is an investment's peak to trough decline.

EBITDA refers to Earnings Before Interest, Taxes, Depreciation and Amortization.

Event driven manager trade around major corporate events, including mergers, regulations, and earnings announcements.

GDP refers to Gross Domestic Product.

Growth (growth equity) investing is a style of investment strategy that is focused on capital appreciation.

Infrastructure assets refer to long-lived structures that support essential services such as utilities, telecommunications, or bridges.

IRR is the discount rate that makes the net present value of all future cash flows zero.

LTM refers to Last Twelve Months.

Market-neutral strategies maintain zero net exposure to the market, seeking to achieve gains regardless of market conditions.

Mark to Market is an accounting practice that involves adjusting the value of an asset to reflect its value as determined by current market conditions.

Max drawdown is the peak-to-trough decline of an investment during a specific period.

NASDAQ Composite is a market capitalization-weighted index of more than 3,700 stocks listed on the Nasdaq stock exchange.

Opportunistic Financings typically include bespoke terms to meet specific needs occur during times of corporate or economic stress.

PCE refers to Personal Consumption Expenditures.

Private asset refers to an equity or debt investment that is not accessible via public markets, including private equity, private credit, and real estate.

Private credit refers to non-bank lending that is not issued or traded in public markets.

Private equity (PE) refers to investments in the equity or debt of companies that are either not listed on public exchanges or are taken private shortly after they are acquired.

Private real estate engages in direct or indirect involvement acquiring and financing real estate properties for current income or long-term capital appreciation.

Public real estate or real estate investment trust (REIT) refers to a publicly traded company that owns, operates, or finances income-producing properties.

Real assets describes investments into physical structures and commodities, including infrastructure and energy.

Relative value managers seek to exploit temporary differences in the prices of related securities.

Right side of disruption refers to companies that in our view are aligned with key secular growth trends and/or are creating new innovative solutions.

Risk-adjusted returns a calculation of the potential profit from an investment that takes into account the degree of risk accepted in order to achieve it.

Risk assets are those with a high degree of risk and volatility, such as such as equities, high-yield credit, commodities and currencies.

Risk premia refers to the amount by which the return of a risky asset is expected to outperform the known return on a risk-free asset.

Russell 2000 Growth Index is an unmanaged index of common stock prices that measures the performance of those Russell 2000 companies with higher price-to-book ratios and higher forecasted growth values.

S&P 500 Index is the Standard & Poor's 500 Composite Stock Prices Index of 500 stocks, an unmanaged index of common stock prices.

Secondary vehicles acquire stakes in existing private equity funds.

Senior debt is debt and obligations which are prioritized for repayment in the case of bankruptcy, typically collateralized by assets.

Strategy agnostic describes managers or funds that to not pursue a specific strategy.

Subordinated debt is unsecured debt that ranks below other, more senior loans or securities with respect to claims on assets or earnings, typically riskier for the bond holder.

Tactical trading involves short-term investment decisions based on anticipated near-term price movements in a security or market sector.

Tracking error is the standard deviation of the excess returns of an investment relative to a benchmark.

Venture capital is capital invested in a project in which there is a substantial element of risk, typically because the project is new or expanding.

RISK CONSIDERATIONS

All investing is subject to risk, including the possible loss of the money you invest.

Equity securities are more volatile than bonds and subject to greater risks. Dividends are not guaranteed and a company's future ability to pay dividends may be limited.

Investments in fixed income securities are subject to the risks associated with debt securities including credit and interest rate risk.

Investments in foreign securities entail special risks such as currency, political, economic, and market risks. These risks are heightened in emerging markets.

Investments in commodities may be affected by changes in overall market movements, commodity index volatility, changes in interest rates or factors affecting a particular industry or commodity.

High-yield, lower-rated securities involve greater price volatility and present greater credit risks than higher-rated fixed income securities.

The currency market affords investors a substantial degree of leverage. This leverage presents the potential for substantial profits but also entails a high degree of risk including the risk that losses may be similarly substantial. Such transactions are considered suitable only for investors who are experienced in transactions of that kind. Currency fluctuations will also affect the value of an investment.

Private equity investments are speculative, highly illiquid, involve a high degree of risk, have high fees and expenses that could reduce returns, and subject to the possibility of partial or total loss of fund capital; they are, therefore, intended for experienced and sophisticated long-term investors who can accept such risks.

Alternative investments are suitable only for sophisticated investors for whom such investments do not constitute a complete investment program and who fully understand and are willing to assume the risks involved in Alternative Investments. Alternative Investments by their nature, involve a substantial degree of risk, including the risk of total loss of an investor's capital.

The value of securities issued by technology and technology-related companies may be adversely affected by intense market volatility, aggressive competition and pricing, consumer preferences, short product cycles, lack of commercial success for new products, product obsolescence or incompatibility, government regulation and excessive investor optimism or pessimism, among other factors.

Real estate investments are speculative and illiquid, involve a high degree of risk and have high fees and expenses that could reduce returns. These risks include, but are not limited to, fluctuations in the real estate markets, the financial conditions of tenants, changes in building, environmental, zoning and other laws, changes in real property tax rates or the assessed values of Partnership Investments, changes in interest rates and the availability or terms of debt financing, changes in operating costs, risks due to dependence on cash flow, environmental liabilities, uninsured casualties, unavailability of or increased cost of certain types of insurance coverage, fluctuations in energy prices, and other factors, such as an outbreak or escalation of major hostilities, declarations of war, terrorist actions or other substantial national or international calamities or emergencies. The possibility of partial or total loss of an investment vehicle's capital exists, and prospective investors should not invest unless they can readily bear the consequences of such loss.

Further, some real estate investments may require development or redevelopment, which carries additional risks relating to the availability and timely receipt of zoning and other regulatory approvals, the cost and timely completion of construction, and the availability of permanent financing on favorable terms. Real estate investments will be highly illiquid and will not have market quotations. As a result, the valuation of real estate investments involves uncertainty and may be based on assumptions. Accordingly, there can be no assurance that the appraised value of a real estate investment will be accurate or further, that the appraised value would in fact be realized on the eventual disposition of such investment. In addition, real estate assets may be highly leveraged, which leverage could have significant adverse consequences to the assets and therefore an investment vehicle. In particular, an investment vehicle will lose its investment in a leveraged asset more quickly than a non-leveraged asset if the asset declines in value. You should understand fully the risks associated with the use of leverage before making an investment in a real estate investment vehicle.

Investments in real estate companies, including REITs or similar structures are subject to volatility and additional risk, including loss in value due to poor management, lowered credit ratings and other factors.

Hedge funds and other private investment funds (collectively, "Alternative Investments") are subject to less regulation than other types of pooled investment vehicles such as mutual funds. Alternative Investments may impose significant fees, including incentive fees that are based upon a percentage of the realized and unrealized gains and an individual's net returns may differ significantly from actual returns. Such fees may offset all or a significant portion of such Alternative Investment's trading profits. Alternative Investments are not required to provide periodic pricing or valuation information. Investors may have limited rights with respect to their investments, including limited voting rights and participation in the management of such Alternative Investments.

Alternative Investments often engage in leverage and other investment practices that are extremely speculative and involve a high degree of risk. Such practices may increase the volatility of performance and the risk of investment loss, **including the loss of the entire amount that is invested**. There may be conflicts of interest relating to the Alternative Investment and its service providers, including Goldman Sachs and its affiliates. Similarly, interests in an Alternative Investment are highly illiquid and generally are not transferable without the consent of the sponsor, and applicable securities and tax laws will limit transfers.

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