PGIM

2023 BEST IDEAS

LOOKING BEYOND THE UNCERTAINTY

CONTENTS

INTRODUCTION

After not one, not two, but three consecutive tumultuous years for financial markets, investors might be ready for a break from volatility in 2023.

They're not likely to get it.

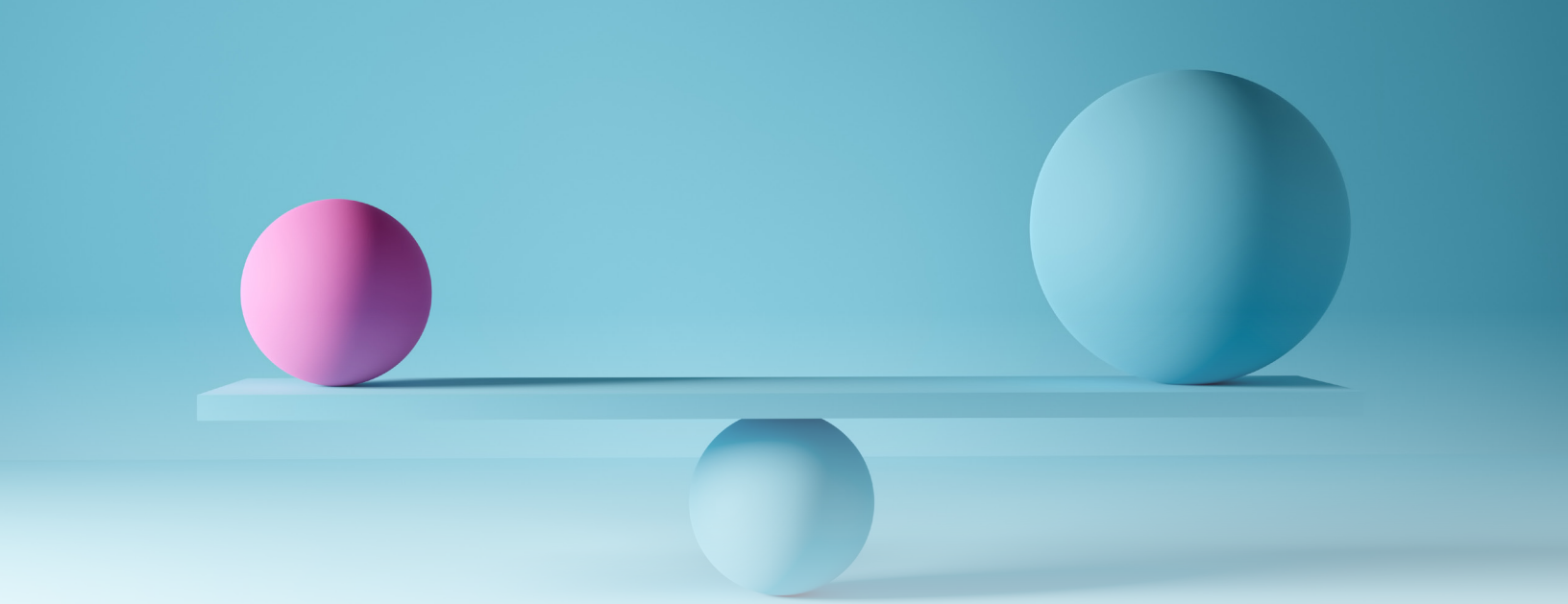
Over the past three years, markets have essentially plowed through three different cycles: in 2020 it was the COVID-driven selloff, in 2021 the market's recovery supported by dramatic fiscal and monetary stimulus, and last year brought on the aftermath of all of that, ushering in higher inflation and escalating interest rates. And just beneath those macro surfaces lies a host of other hurdles: the war in Ukraine, the crypto implosion, China's ongoing battle to contain COVID-19, unresolved supply chain issues, and, of course, whether the US and other major economies enter a recession this year.

For investors who have seen pretty much everything over this three-year span, it's hard to imagine yet another major, unforeseen shock to the system. What's more likely this year is simply old-fashioned uncertainty brought on by the economic environment and the Federal Reserve's decision-making process. Ongoing monetary tightening by central banks and persistently high inflation have increased the odds of a global recession, and major central banks are unlikely to pivot until there are very clear signs that inflation is sustainably slowing towards their targets.

The alternate view is that the current economic backdrop remains solid enough for the Fed to tighten conditions without pushing the economy into recession as inflation eases in the next two years. The US is heading into 2023 on a firmer economic footing than Europe, thanks in large part to the still-strong labor market. It nevertheless has to contend not only with the ongoing monetary tightening and elevated inflation, but also negative wealth effects and a correcting real estate sector.

Given these complex layers of challenges, it's never been more important for investors to take a long-term view of their portfolios. It's impossible to reliably time markets in any economic environment, but volatility can unlock opportunities by creating attractive entry points at reasonable prices. And it's precisely in that kind of environment where global, nimble active management can distinguish itself.

At PGIM, our focus has always been on the long-term trends that can help lead to unique and untapped investment opportunities for our clients. The investment ideas offered in our fourth annual Best Ideas report reflect the global footprint of our businesses, the deep asset-class specialization of our boutiques, and the informed convictions of our portfolio managers who partner with investors every day around the world. While no such investment ideas can serve as a panacea for the uncertainty that is sure to befuddle financial markets in 2023, ever-changing markets remain an ocean of vast possibilities. PGIM's Best Ideas highlight a host of areas where we believe investors will find promising opportunities.



JENNISON ASSOCIATES

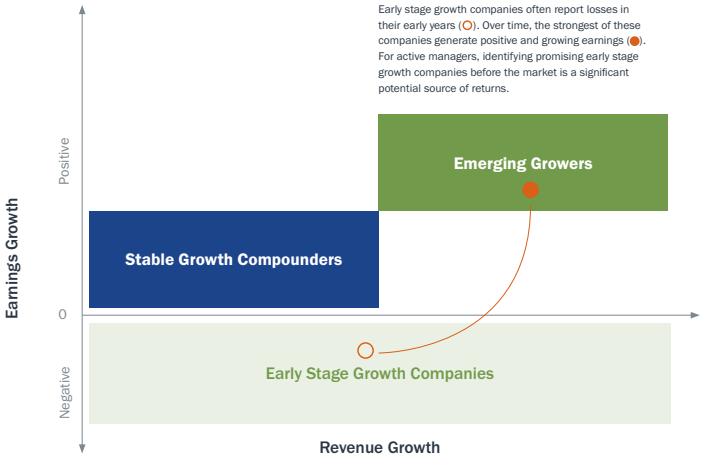
TWO SHADES OF GROWTH FOR AN UNCERTAIN MARKET

Today's markets are among the most challenging we have seen in several decades, and the lack of visibility, contradictory indicators, and macroeconomic pressures have investors on edge. Global equities declined into a bear market in 2022, with growth stocks among the worst performers. In the coming year, we believe the Federal Reserve will ease, and potentially end, its tightening cycle as the economy slows, and in this environment, we believe companies with reliable growth and exposure to secular themes have a long-term advantage.

Recognizing the key differences among these growth companies is helpful to better understand their behavior in different market cycles. In our experience, they can be divided into two broad groups, which we call emerging growers and stable growth compounders. Both groups have compelling long-term return potential, but they also have distinct risk and return profiles.

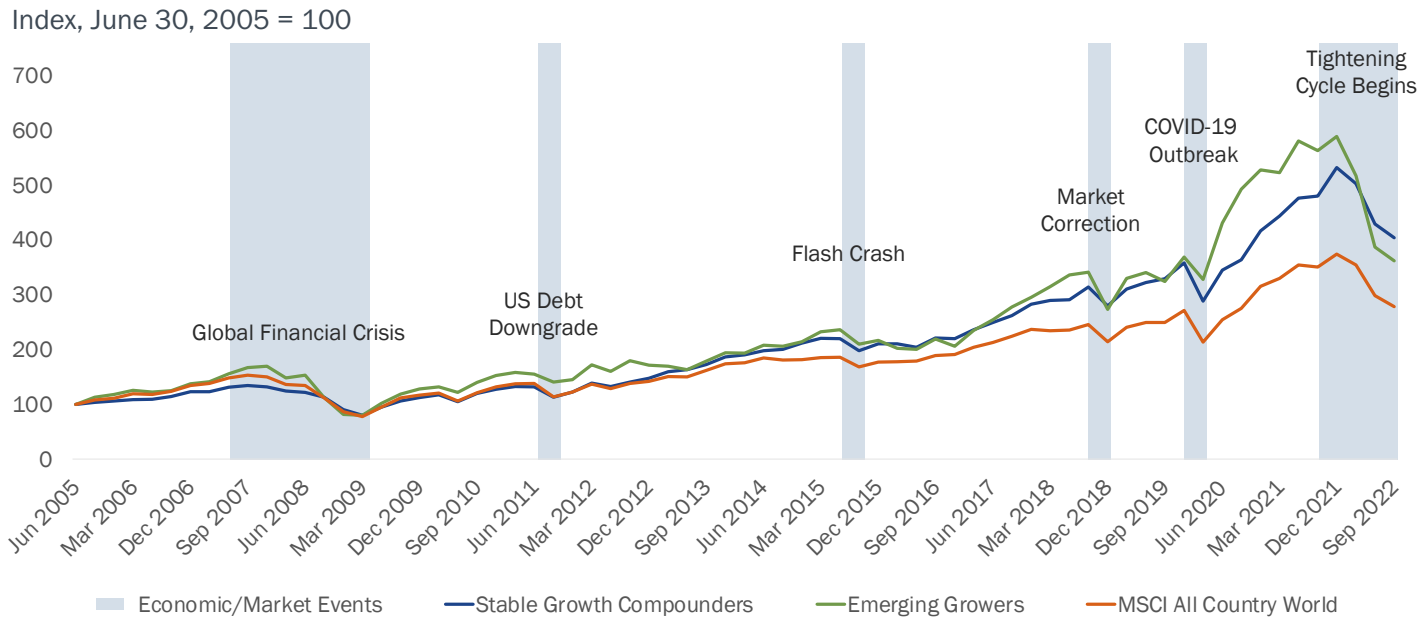
Emerging growers are young disruptors, in a new or developing industry, and offer significant upside potential. They reinvest their cash flow into sales, marketing, research, product development, and achieving scale, while reporting relatively low—or no—profits. Stable growth compounders, on the other hand, also offer upside potential, but they have a history of profitability and established drivers of growth. They are often former emerging growers that have matured into large companies. They can maintain their competitive position through continued innovation and expansion into new markets or by leveraging an established business that cannot be easily replicated by competitors.

Emerging Growers Generally Have More Growth Potential Than Stable Growth Compounders



For illustrative purposes only.
Source: Jennison

Emerging Growers and Stable Growth Compounders Have Outpaced The Index Since 2005



Data from June 30, 2005, through September 30, 2022. Calculated quarterly. Past performance does not guarantee future results.
Source: FactSet, Jennison

Both emerging growers and stable growth compounders have outperformed the MSCI ACWI for most of the past two decades.* The groups' performance, however, has diverged at several points, especially over the last few years. Both benefited from the surge in technology adoption during pandemic-related shutdowns, but emerging growers were much more exposed to the Fed's tightening cycle and rising interest rates. The selloff has lowered valuations for growth companies, offering potential opportunities because many of them continue to deliver steady growth.

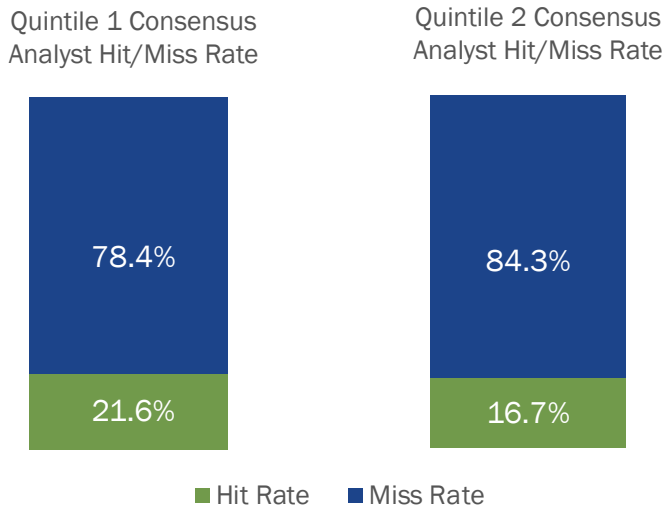
Finding these opportunities is extremely difficult. Most companies fail to live up to consensus growth expectations; in fact, consensus earnings growth forecasts have typically been either too optimistic or too pessimistic. Skilled and experienced investors with a bottom-up fundamental approach, however, can improve forecasting, which can add significantly to long-term returns.

Another potential boost to performance comes from secular growth themes, which can provide significant tailwinds to well-managed companies. Over the next several years, we see several potential themes in areas such as emerging markets fintech, electric vehicles, luxury, and healthcare.

Businesses, organizations, and individuals throughout emerging markets are seeking more convenient and affordable financial services, offering a significant **fintech**

It's Difficult To Identify Top Performers In Advance

Consensus earnings estimates of MSCI ACWI companies in the top quintiles of earnings growth (1 and 2) compared to realized earnings growth five years later. Companies that remained in the quintiles after five years were "hits;" those that dropped out were "misses."



Data based on rolling 5-year returns for periods from 12/31/92 to 12/31/21. Average median annualized returns of stocks over rolling five-year periods, ranked by 5-year historical earnings growth quintiles (1=highest, 5=lowest). Quintiles are rebalanced quarterly. Past performance does not guarantee future results.
Source: Jennison, FactSet.

* We calculated each group's performance compared to the MSCI ACWI from June 2005 through September 2022. For this analysis we used company data going to back to 2005, the first year in our view with enough data to ensure thorough and meaningful analysis. In addition, we sought 17 years of data (versus a more standardized 15-year period) to have enough context to account for the Global Financial Crisis in 2008–2009.

opportunity in emerging markets. China was a powerful example of this trend, and we believe the potential for cashless payments, credit expansion, and digital banking services is enormous in other Asian and Latin American emerging markets. Investors, however, should be aware of idiosyncratic risks, including each country's regulatory environment. Sudden, unexpected changes to regulations can negate long-term company plans, undermine competitive advantages, and make it virtually impossible for investors to model earnings and revenue growth.

> *Growth companies that offer differentiated products and services that create real value for society will continue to prosper.*

After decades of development and promise, **electric vehicles** have captured the public imagination, forced strategic pivots from global auto companies, and laid the foundation for a full self-driving future. We believe the leading electric-vehicle players will redefine the relationship between carmakers and consumers, transforming the auto industry. The opportunity is also not limited to vehicles—the disruption includes batteries, the battery supply chain, and alternative sources of electricity generation.

In the **luxury** segment, many top brands have seen strong demand despite rising economic uncertainty. They continue to benefit from their positioning with consumers and the power of their operational and financial models. Moreover, demand for luxury goods has diversified. Today's luxury consumers are younger—millennials and Gen Z account for a majority of purchases—and more American men have come to appreciate luxury and the top brands, which has helped drive growth.

In **healthcare**, companies are improving their ability to diagnose, monitor, and treat diseases with personalized therapeutics. We believe the current wave of innovation—especially for select companies with access to patient data—is on a trajectory similar to that seen in the information technology sector from 2010 to 2020.

The markets in 2023 will likely remain highly uncertain, but we maintain a long-term perspective. Growth companies that offer differentiated products and services that create real value for society will continue to prosper. We believe investors who understand the differences among growth companies, rely on bottom-up, fundamental investment approaches, and have exposure to secular growth themes are more likely to find opportunities. This is challenging, but history demonstrates that it is achievable and, above all, rewarding.

PGIM FIXED INCOME

OPPORTUNITIES IN EUROPEAN INVESTMENT-GRADE DEBT

The repricing of financial markets in 2022 led to short-term pain for fixed-income investors. However, with most of the selloff now potentially in the rear-view mirror, a reallocation back into bond markets is approaching as rates begin to peak. European investment-grade credit spreads in particular are starting to look attractive in the medium term, as new opportunities emerge from recent volatility and the sector's increased credit dispersion.

The European IG market, like the broader credit market, is surrounded by uncertainty after a volatile year. Heightened geopolitical risks remain in place, as does persistent inflation. Europe continues to grapple with energy shocks that have limited progress in reducing supply-chain disruptions, creating stickier inflation. Slowing growth around the globe is thus forecast to be more pronounced in Europe. Stagflation appears to be the most likely scenario, with risks currently skewed toward weak growth coupled with elevated inflation. This raises the odds that rates will be higher for longer.

Yet spreads already reflect much of the perceived downside risk, and European corporates are showing signs of underlying strength. During previous market cycles, spreads have not spent much time at levels similar to today's before mean reverting and tightening. The European market's underperformance versus the US has left spreads in the former generally trading at more attractive levels. As volatility persists, the relative-value opportunities among European corporates are broadening.

> *As volatility persists, the relative-value opportunities among European corporates are broadening.*

Credit fundamentals are starting from a position of strength, giving European corporates some breathing room should inflation continue to rise and squeeze margins. Profit margins have widened, share buybacks remain subdued, and leverage ratios are recovering as EBITDA growth improves on a year-over-year basis, underpinned by the lifting of COVID-19 lockdowns in Europe. Looking at the global macroeconomic landscape, China's decision to scale back its lockdowns could offer a boost to European trade and the region's industrial sector. Final data for 2022 will likely show that full-year growth was solid, reflecting base effects and strong momentum in the first half of the year as economies reopened.

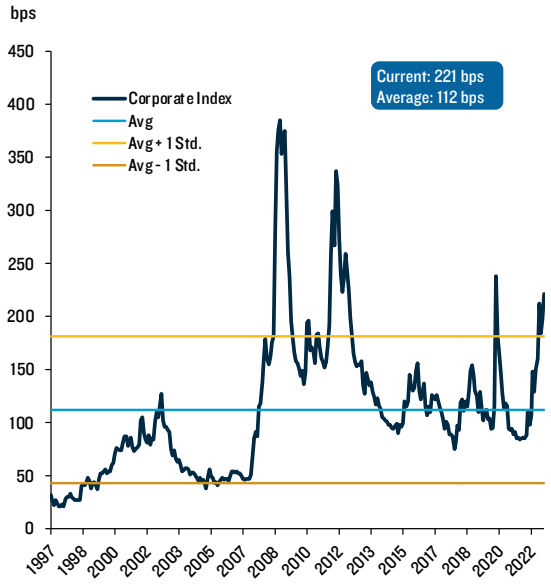
The outlook for 2023 is murkier, as global growth weakens and the ongoing Russia-Ukraine war contributes to higher commodity prices. As a result of Russia's invasion and its impact on manufacturing supply, the eurozone finds itself in a much tougher position than the US. Goods inflation in Europe is unlikely to cool and revert to more normal levels as soon as in the US, taking into consideration the state of supply chains in Europe and the impact of the energy crisis on the factory sector. Unemployment rates are historically very low but are forecast to worsen as the economy weakens.

Then there's the European Central Bank. The central bank's posture proved to be more hawkish than investors were anticipating in December, even as officials raised interest rates by an expected 50 basis points. ECB President Christine Lagarde sent a clear message to the market that more policy tightening is coming, including additional rate increases, despite the property sector already sending distress signals. Echoing messages from the Federal Reserve, the ECB has signaled that rates will ultimately need to rise to a higher level than investors had expected and remain restrictive for some time to bring inflation under control.

Investors should prepare for volatility as the winter gas crisis and the timing of the ECB's rate moves come into focus. The war in Ukraine, the energy crunch and the potential for new shocks mean that macro risks will remain elevated.

While investors no doubt face a tepid growth outlook in 2023 with earnings growth stalling, this environment is supportive of credit. We are nearing multi-generational highs in inflation and yields. Wherever rates peak, it will likely set the high-water mark for years — perhaps decades — to come. Globally, IG yields have already reached levels not seen in more than a decade.

Rating and Maturity Adjusted OAS Investment-Grade Index

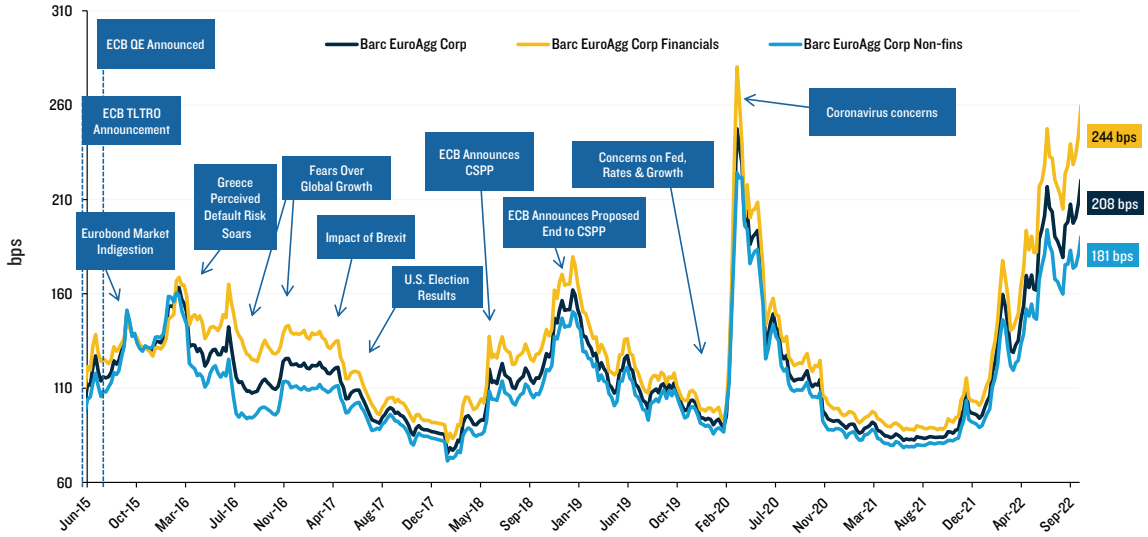


As of September 30, 2022. Source: ICE BofAML, PGIM Fixed Income and ICE Data Indices, LLC, used with permission. An investment cannot be made directly in an index.

While spreads for European high-yield debt and US corporates are still vulnerable in the short term, European corporate spreads have widened materially from tightened pre-pandemic levels, notably for IG. Spreads in European IG have recently moved closer to the wider levels seen early in the pandemic, a trend that emerged as spreads rallied in the fourth quarter of 2022, outperforming US IG.

Examining individual credits within the European IG sector, increased credit dispersion enhances the set of single-name alpha opportunities. We prefer financials, particularly banking, to compress into corporates, and utilities over lower beta industrials. We also see value in corporate hybrids, as well as select strong BBBs and non-CSPP eligible paper.

EUR IG Credit Spreads Not Far From the COVID-19 Wides: Euro OAS Financials vs. Non-Financials



As of September 30, 2022. Source: Bloomberg. Past performance is not a guarantee or a reliable indicator of future results. Please see the Notice for important disclosures. You cannot invest directly in an index.

PGIM PRIVATE CAPITAL

DIRECT LENDING AND THE SHIFT TO NON-SPONSORED DEAL FLOW

Traditional models of how companies raise capital have been substantially disrupted in recent years. The impact of the global financial crisis and the advent of enhanced rules and regulatory requirements lessened banks' ability (and willingness) to issue loans to small and mid-size companies, and the result has been a rapid ascent of direct lending.

Middle-market companies typically don't have access to the same depth of capital market solutions as do larger companies, and the GFC helped change the face of leveraged mid-market lending from one driven largely by banks to one that is now dominated by non-bank, institutional lenders. Those lenders have a longer-term, more asset-driven approach to underwriting risk, so the relative market share for direct lending and non-bank investors will likely increase over time, particularly if the economy continues to slow.

While many smaller companies have not yet utilized direct lending, when they do it's usually for a handful of purposes, including growth, recapitalizations, acquisitions, sponsored leveraged buyouts, and non-sponsored management buyouts. Sponsored can be a financial investor, commonly a private equity fund, while non-sponsored may be a family owner or management team.

Typically, the agenda of the company, the strategy, the timeline to achieve that strategy, and the financial leverage to help achieve it are driven by the ownership. Sponsored private equity funds have a more finite horizon with a return over a three- to five-year period, so financial leverage is important to generating return expectations over that period. Non-sponsored-owned companies, on the other hand, typically have a more permanent or longer-term horizon.

"Where I see a lot of opportunity is in the non-sponsored world, because as we head into a potential recession — or at least an economic slowdown — if the banks start getting tighter again you can find good opportunities calling on companies directly," said Dianna Carr-Coletta, Managing Director and Partner in PGIM Private Capital's Alternatives Direct Lending Group.

Of the hundreds of thousands of mid-market firms in the US and Europe, only a small portion are involved with private equity firms. The non-sponsored side makes up most of the

rest. While these smaller firms do potentially present some company and credit risks, direct lenders in this segment are able to be selective about the companies they lend to, and having an enduring track record with these businesses allows lenders to identify and mitigate those risks.

> *As we head into a potential recession – or at least an economic slowdown – if the banks start getting tighter again you can find good opportunities calling on companies directly.*
>
> **Dianna Carr-Coletta, Managing Director, PGIM Private Capital's Alternatives Direct Lending Group**

"The lower middle-market companies that aren't sponsor-owned have not accessed the direct-lending market to the same extent PE-sponsored firms have," Carr-Coletta said. "There are tons of these companies out there, and while most are being serviced by their banks, some may need to take on a capital project and lever up a bit more. For a firm like ours that has been talking to them for years through our regional office network, we may be able to help them and provide the capital their banks may no longer be able to provide."

Direct lenders with a willingness to build relationships with owners, understand their business strategy and carry out bespoke underwriting — with specialized covenants and custom terms — can create attractive debt solutions. Experienced teams with strong track records through multiple credit cycles can deliver more consistent investment performance. That's even more true should the economy experience the slowdown many are expecting. For borrowers who have seen their floating-rate interest rates move from the mid-7% range to above 10% – particularly those who may not have had a financial cushion to begin with – there will be pressure.

The investment philosophy of PGIM Private Capital, established nearly 100 years ago, is straightforward: it views its business through a long-term lens, leveraging its scale, relationships and experience while providing a consistent investment process.

"We tend to do well when there is a bit of disruption in the markets because we've been very consistent in our underwriting strategy and how much we will push when it comes to leverage," Carr-Coletta said. "There are others in the market that don't do that. And given the relationships we have with these companies, if they are going through a rough patch, we're at the table with them, working through the issues. That happened in 2008-2009, when companies couldn't find liquidity and we were there for them, and we may experience a similar environment if we enter a significant downturn in 2023."

PGIM REAL ESTATE

DATA CENTER DEMAND GROWTH LIKELY A LONG-TERM STORY

Data center demand has grown significantly in recent years, underpinned by a host of factors. When it comes to real estate, the information, communication and technology (ICT) sector is the underlying driver of demand for data centers — buildings designed specifically to house computer systems and network equipment to support digital information processing. Based on current structural trends and the latest available data, this sector will continue to grow significantly in the coming years.

Demand for data globally is likely only going to grow, and as we create more data, we'll need more processing power to meet this demand. To do this cost efficiently and in a more environmentally friendly manner, development of more modern hyperscale data center capacity is inevitable. And strong tenant demand forecasts for data centers comes from the vital role they play in a technology-driven world, and as such they are firmly entrenched as an integral part of corporate IT architecture.

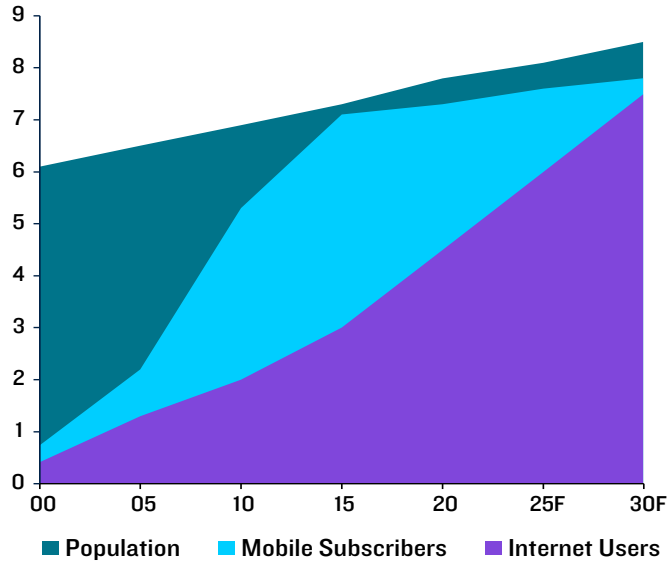
In particular, as more businesses embrace the public cloud to streamline this architecture and improve efficiency and security, they have gradually been migrating or integrating their IT infrastructures to incorporate the public cloud. As a result, the public cloud services market is forecast to grow globally by approximately 20% to reach almost $600 billion in 2023, and cloud data centers are expected to remain the main growth driver in data center IP traffic.

This demand for cloud data center capacity will be further increased by various underlying drivers as upstream IT demand broadens across industries, particularly among native technology companies. Despite the sharp declines in share prices of technology companies in recent months amid falling stock markets, many of these drivers — including e-commerce, artificial intelligence, and the metaverse — are expected to remain in place, driven by long-term needs.

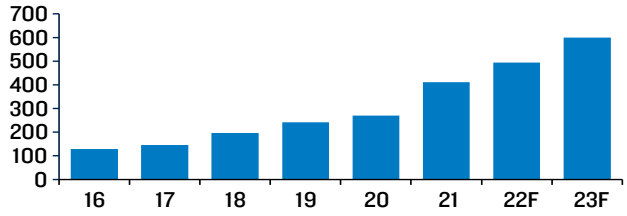
One consequence of this growth in demand is the rise in the need for hyperscale data centers — generally very large power capacity facilities catering primarily to the cloud service provider (ex. Google, Microsoft, AWS, Alibaba, Oracle, etc.). The number of facilities tracked by Synergy Research has grown at an average rate of 12% per year since 2018 and is expected to hit 1,000 globally by the end of 2024. The growth in hyperscale data centers also aligns well with PGIM's environmental, social and governance (ESG) stance. Hyperscale tenants and operators have voiced a strong commitment to a zero-carbon footprint and using renewable energy in the facilities in which they operate.

Estimating the Growth in Demand for Data Centers

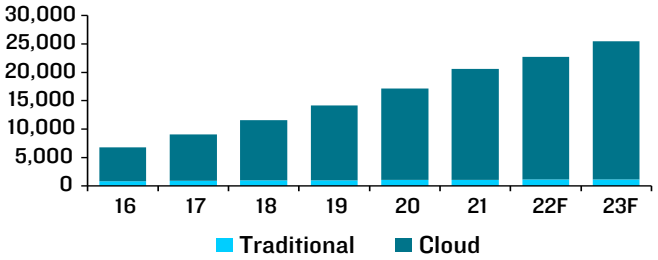
Global Population, Mobile Subscribers & Internet Users (US$ billion)



Global Public Cloud Spending (US$ billion)



Global Data Center IP Traffic (ExaBytes p.a.)



Sources: Oxford Economics, Cisco, Statista, PGIM Real Estate. As of November 2022.

Carbon emission in data processing is driven by the number of servers running and the total energy required to power and cool the servers. Customers would use fewer servers and less power by using cloud computing instead of operating their own enterprise solutions, so a shift from enterprise to cloud dramatically reduces carbon emissions. Data centers will have a crucial role to play in the most optimal utilization of resources and what is the most energy efficient way to meet future digital demands.

> *The number of hyperscale data centers tracked by Synergy Research has grown at an average rate of 12% per year since 2018 and is expected to hit 1,000 globally by the end of 2024.*

A Growing Global Need

Strong structural demand has been met with significant investment activity in the sector, in turn rapidly driving new supply. Data center supply rose 20% per year between 2016 and 2021, led by the APAC region, which saw supply grow 30% per year over the same period. Growth was particularly strong during 2018 and 2019, when development rose sharply as the region played catch-up to the more mature US market.

Looking ahead, global supply growth is expected to moderate to 13% per year over the next three years. The supply pipeline in APAC is also expected to moderate, though certain markets such as Sydney and Tokyo will remain focal points of capacity growth. Growth in Europe is expected to remain relatively stable at 15% per year. Recent development trends have seen strong activity in secondary markets outside the traditional four to five major data center markets in each region. These tend to be high population density markets, with less-developed data center infrastructure but better land and power availability, where cloud operators set up facilities to complement those in major metros nearby.

The global data center sector enjoyed a record year in 2021, with an average return of 15%, driven mainly by yield compression. This was in line with our expectations of tightening yields as risk premiums between data centers and other traditional commercial real estate sectors declined. Going forward, the returns outlook across the three major markets (US, Europe and APAC) tells a similar story — a softer near-term outlook to yields as the economic environment weakens before recovering ahead of expected improving economic fundamentals in 2024.

The similarities across the regions speak to the globally shared critical need for digital infrastructure. Globally,

as an unweighted average of the three markets, we see returns bouncing back in 2023 off an expected pickup in economic and transactions activity, hitting an unlevered return of around 7.5%. In terms of risks with construction costs, including those associated with environmental goals, potentially limiting supply by more than expected, global rental growth is likely to pick up by more than expected, driving returns higher.

Investor surveys tell us alternative real estate sectors, such as data centers, healthcare, cold storage and student living, have gradually become more mainstream. Today, almost a third of all investors are seeking investment exposure to the data center sector, compared to only 5% of institutional investors surveyed in 2018. Key drivers for this have been the attractive returns for new entrants alongside compressed yields in the more established commercial real estate sectors. But demand is also being driven by strong underlying structural needs. As with technology, data centers are "a need to have," and we expect demand to be resilient amid the current challenging economic conditions.

While the sector does face some challenges, it is hard to ignore the sheer speed at which technology and the need for data centers is being adopted. With data centers increasingly becoming critical infrastructure to keep economies working, we see investment returns rebounding in 2023 on a global basis — reflecting the global need and demonstrating the sector's resilience to short-term market forces.

PGIM QUANTITATIVE SOLUTIONS

MACRO UNCERTAINTY CALLS FOR AGILITY & DIVERSIFICATION

Global markets took a beating during most of 2022. Lingering supply chain issues, exacerbated by the war in Ukraine and pandemic-induced shutdowns in China, helped push global inflation significantly higher. As central banks tightened monetary policy in response, fears of recession gripped markets, with stocks, bonds and real estate assets declining sharply throughout most of the year. Meanwhile, commodities generally rallied, although returns were somewhat divergent.

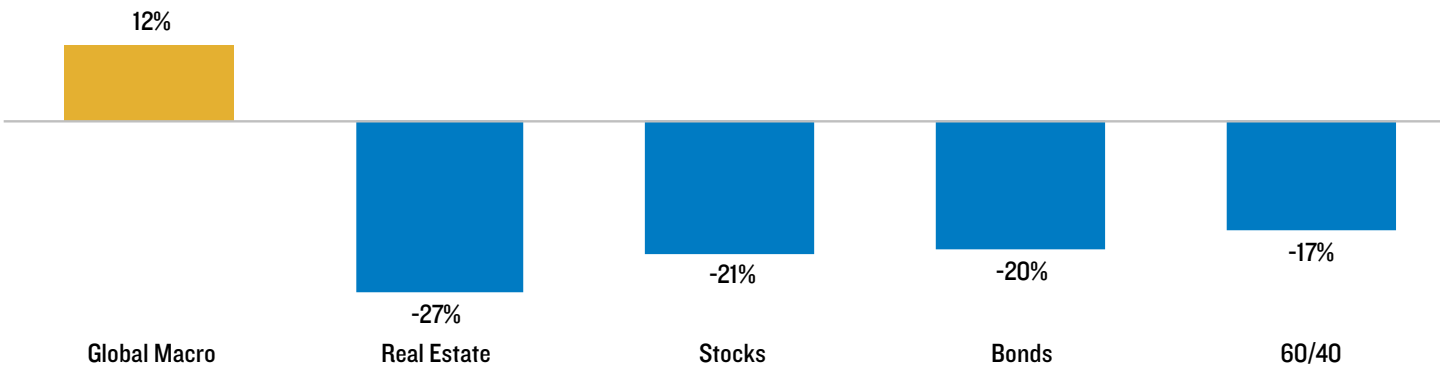
With central banks around the world enacting restrictive monetary policies to rein in inflation, we have highlighted four macroeconomic scenarios most likely to occur depending on future moves of the US Federal Reserve:

1. **A "soft landing":** The Fed's forecasts turn out to be broadly correct, with inflation gradually dropping back to target, but without unemployment rising substantially, and with a recession being avoided.
2. **Persistent inflation & recession:** Inflation turns out to be more stubborn than expected and the Fed is forced to tighten by more than is priced in and/or keep rates high for longer, thereby eventually precipitating a recession, perhaps in the second half of 2023.
3. **The Fed tolerates higher inflation:** The Fed tightens to bring inflation down from current levels but is unwilling to take risks with respect to a recession or financial stability, and so pauses before it has done enough to bring inflation down back to target. This might postpone a recession into 2024.
4. **A "hard landing":** The tightening in financial conditions that has already come about leads to a recession, and perhaps quite quickly (in the first half of 2023), and thus the Fed may end up tightening less than is currently priced in.

For much of 2022, investor expectations generally aligned with a greater likelihood of scenario two transpiring — i.e., persistent inflation followed by recession — in part because the extent of the rise in unemployment projected by the Fed had been associated with past recessions.

As other central banks signaled or slowed the pace of rate increases late in the year, investors turned bullish, anticipating that the Fed, too, would move to a less aggressive

Global Macro Outshines Amid Market Chaos



Source: Morningstar Direct, PGIM Wadhwani as of 10/31/2022. Global macro represented by Societe Generale Macro Trading Quant Index, Bonds represented by Bloomberg Global Aggregate Index, 60/40 represented by 60% S&P 500 and 40% Bloomberg U.S. Aggregate Bond Index, real estate represented FTSE EPRA NAREIT Global Index, stocks represented by MSCI All Country World Index. Past performance does not guarantee future results.

stance. Amid this backdrop, the probability of either a soft landing (scenario one) or the possibility that the Fed might be willing to implicitly accept a higher inflation target (scenario three) increased, and along with it, equity markets partially recovered prior losses. With the ECB and Fed sounding hawkish in December, investors might revisit their bullish stance.

> *An especially strong tactical case can be made to increase exposure to liquid alternatives under current conditions.*

Agile Diversification Remains A Priority

With headline inflation likely to have peaked (or to peak soon) in many countries, and central banks tightening at a slower pace, investor hopes of a "soft landing" in the US are likely to rise. On the other hand, a slowing global economy is likely to put downward pressure on earnings forecasts. The outlook for equity markets is therefore uncertain. As noted above, there are concerns that central banks might implicitly tolerate a higher rate of inflation, and this could undermine bonds.

It is therefore possible that the traditional 60/40 portfolio mode may continue to fare poorly. An agile global macro strategy can isolate diverse and less correlated sources of returns by factoring in regime shifts and profound changes in sentiment or expectations. The ability to go both long and short in various asset classes is an additional advantage, providing flexibility to react nimbly as conditions shift. Global macro delivered strong absolute returns and relative returns versus stocks, bonds and real estate this last year, making it an attractive portfolio diversifier and alternate return source through rising rates and inflation.

Traditional investors typically hold bonds as a hedge against their long equities positions. In some ways they stand to get hit twice if markets experience elements of stagflation. Consequently, strategies that hedge against tail risks, such as those that rely on identifying down trends in equity and fixed income markets and take advantage of these by shorting those assets, have shown themselves able to perform well when both equities and bonds are declining.

Liquid alternatives aim to provide uncorrelated sources of return from traditional long-only stock and bond approaches by employing shorting strategies to capitalize on falling prices and casting a wider net through investing in other asset classes. While liquid alternatives are typically a good strategic allocation for investors in any environment, an especially strong tactical case can be made to increase exposure to liquid alternatives under current conditions.

No investor is able to predict exactly when the next episode of sustained equity weakness will occur, so having some allocation to a macro tail-risk strategy can be prudent even in what appears to be "good times." Tail-risk strategies extract sources of returns from different underlying asset classes, giving them a diversifying aspect, as well as a hedging feature. We believe it's important to have such an allocation as it can change as the world changes, and that flexibility is what enables tail-risk protection at both the point of shock and on an ongoing basis.

montana capital partners

PROVIDING LIQUIDITY IN AN ILLIQUID MARKET

After years of rising stock markets, a trend even a global pandemic could not break, 2022 proved to be much choppier waters for public equity investors to navigate. A combination of rising inflation and interest rates, as well as geopolitical tensions around the globe, led to major corrections: on its worst day of the year, the S&P 500 was down over 25% YTD, while tech-savvy investors had to endure even stronger corrections.

At first glance, investors in private equity enjoyed a calmer sea. Due to limited disclosure requirements and lagged reporting, it is difficult to get a full picture. Nevertheless, most data points to small, if any, decreases in private equity portfolios so far. Through September, the Private Capital Quarterly Index from Preqin only decreased by 3% during 2022, and most investors, in particular institutional ones, that participated in mcp's Annual Investor Survey saw flat or even positive performance in 2022 when we asked them in Q3 2022.

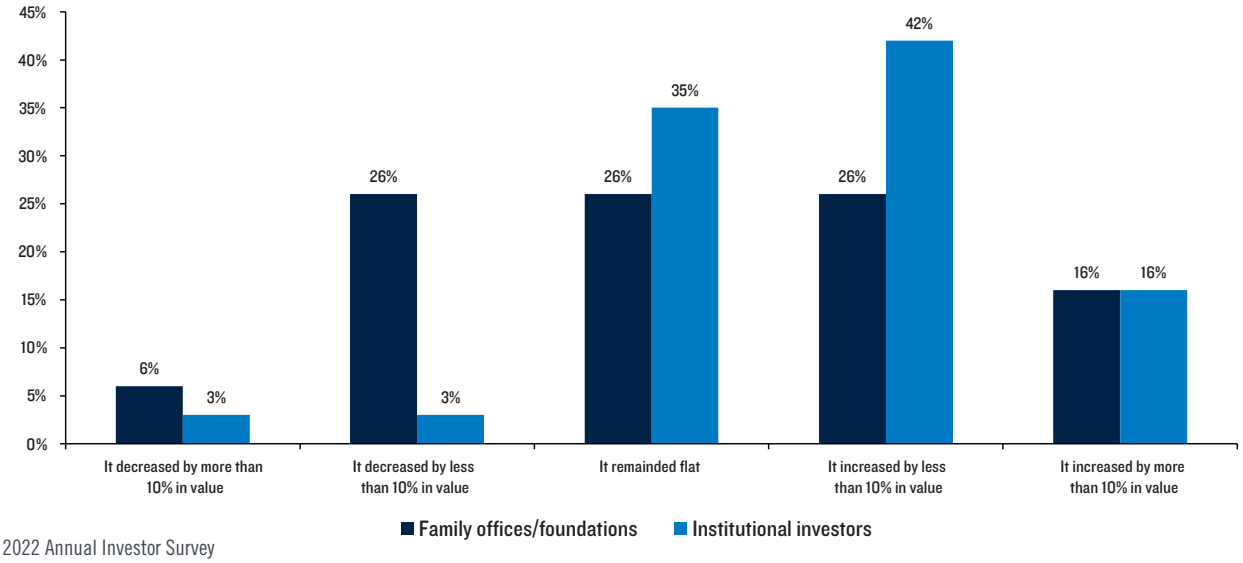
It seems buyers have their questions about these valuations, as exit activity has slowed substantially. According to a recent Bain study, global buyout-backed exit value declined 37% in the first six months of 2022 compared to the prior year. One important exit channel, IPOs, was essentially shut down, with a 73% decline year-over-year.

In summary, investors' private equity portfolios continue to be valued around record levels set at the end of 2021, while exit activity, arguably because of that, has considerably slowed down. In addition, other asset classes in their portfolio have seen larger corrections. As a result, private equity allocations have increased substantially for many investors, leading to pressure to reduce their private equity exposure.

> *In times of high demand for liquidity, secondaries offer access to high-quality funds at attractive entry prices.*

Fortunately, a flourishing secondary market has developed in recent decades that offers liquidity to this illiquid asset class and can help investors to release the pressure. Rather than waiting years for distributions from the underlying fund managers, investors can sell their positions within a few months to a secondary buyer. In addition to a straight sale, more customized solutions such as preferred equity, earn-out mechanisms, and deferred purchase price arrangements can be offered.

Responses To The Question "How Has Your Private Equity Portfolio Performed In 2022 To Date?" in MCP's 2022 Annual Investor Survey



Source: MCP 2022 Annual Investor Survey

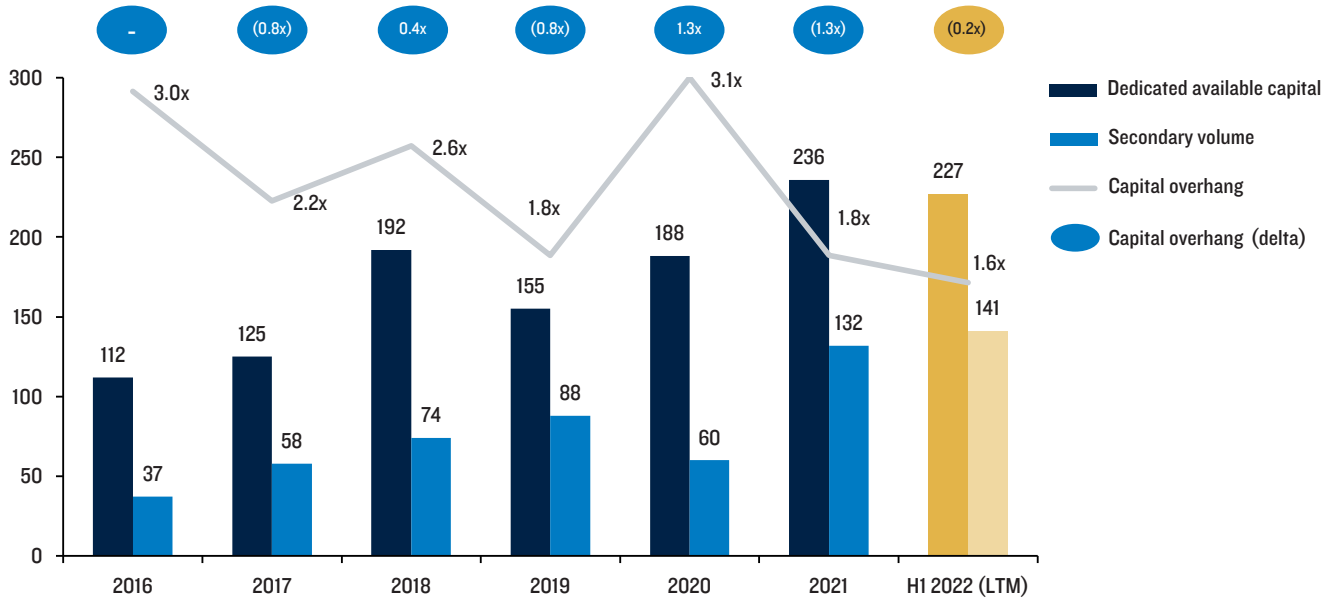
Providing liquidity to the illiquid private equity market also offers various benefits to secondary buyers and their investors. High diversification and J-Curve mitigation have always been key attractions for them. However, in times of high demand for liquidity, such as 2022 and likely the years to come, secondaries offer access to high-quality funds at attractive entry prices.

It is therefore not surprising that the strategy is sought after with investors in mcp's survey considering it the second-most attractive strategy, just after mid-market buyout, which always takes the top spot. As one investor put it: "We are increasingly thinking about a first-time allocation to secondaries, as pricing is becoming very attractive, and secondaries have historically had strong performance after a downturn."

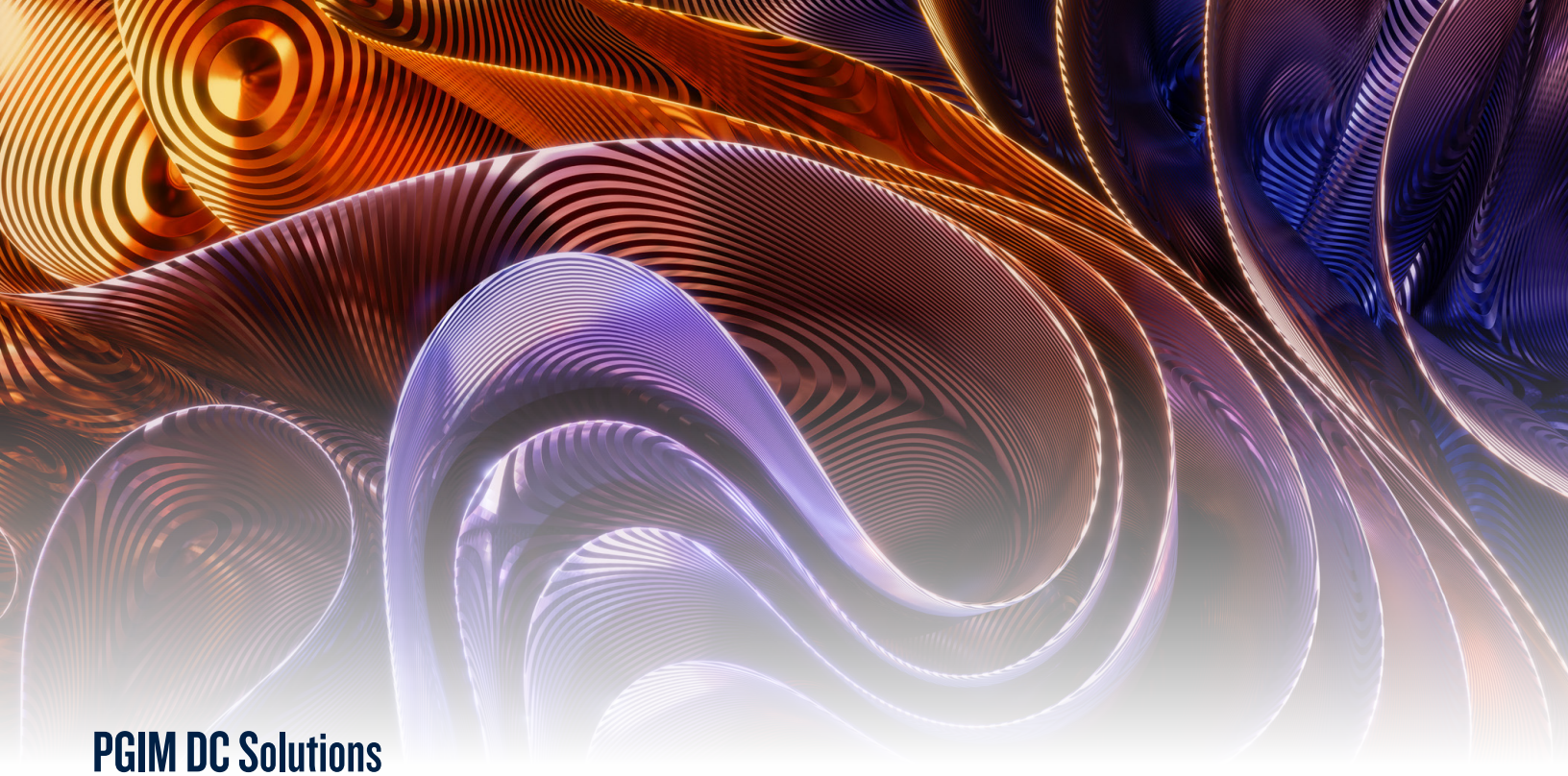
These favorable dynamics are further enhanced by the fact that the capital overhang multiple, i.e. the ratio of dedicated available capital to last-12-month (LTM) transaction volume, has come down substantially over the last years. As private equity saw record fundraising and deployment numbers the last couple of years, it is obvious that many of these assets will end up on the secondary market sooner or later.

In summary, a high demand for liquidity for a large amount of private equity assets, coupled with limited capital on the buy-side, represents in our opinion a compelling opportunity for investors.

Secondary Capital and Activity (USD bn)



Source: Jefferies 1H 2022 Global Secondary Market Review.



PGIM DC Solutions

SPENDING FLEXIBILITY AND OPTIMAL PORTFOLIO RISK LEVELS

Many of today's retirement strategies assume that the retirement income goal is fixed, or inflexible, rather than variable, or flexible, when modeling participant outcomes. This unrealistic assumption implies retirees have neither the desire nor the ability to change their spending over time.

In reality, most retirees can adjust their spending if they suspect their savings may not last throughout retirement. Alternatively, if markets do well, retirees can potentially spend more than originally planned. The flawed assumption that retirement spending is static has significant implications on a myriad of retirement decisions, particularly determining the optimal risk level for retirement income-generating portfolios.

Retirement Spending: Needs vs Wants

In our paper titled "Retirement Income Beliefs," we discussed the concept of breaking retiree spending into two categories: Needs and Wants.

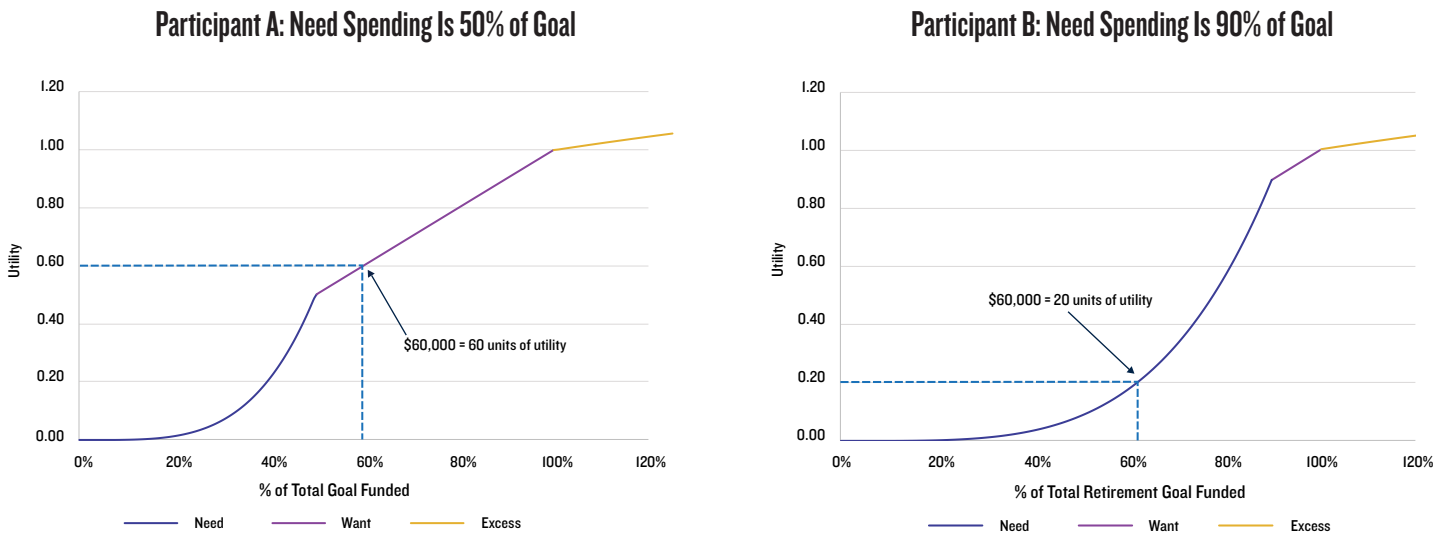
Needs Spending: These expenses are generally less flexible and tend to be recurring in nature. Retirees generally have less discretion over the level or frequency of these types of expenses.

Wants Spending: These expenses are generally more flexible and may be more irregular in nature. Retirees tend to have more discretion in both the level and frequency of these expenses.

> *By incorporating spending flexibility into retirement income models, our research shows a notable impact when determining the optimal portfolio risk level for individuals.*

Distinguishing between the required level of certainty for different types of spending has important implications when thinking about how to invest a retiree's assets. For example, a portfolio focused on Needs would likely have a greater focus on downside protection and inflation protection, while a portfolio focused on Wants would have more of a growth focus.

Exhibit 1: Utility of Income for Various Goal Funding and Needs Levels



Source: Blanchett and Stempien, 2022, "Spending Elasticity and Optimal Portfolio Risk Levels."

Measuring Outcomes

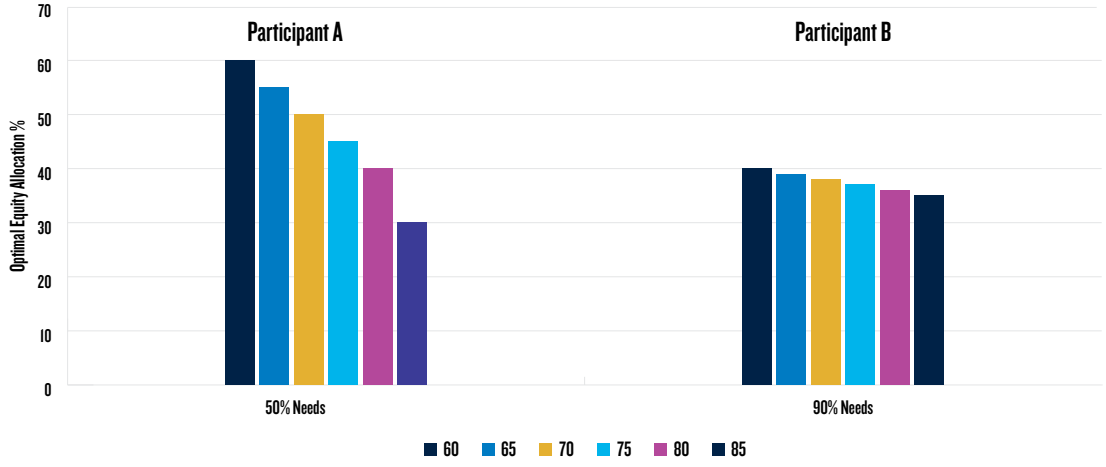
The probability of success is a widely used metric that measures the effectiveness of retirement income solutions and is very common in financial planning tools. We believe using a metric that focuses on goal completion can be more intuitive. For example, if a retiree had a target annual income goal of $100,000 for 30 years but were to fall $1,000 short in the final year of retirement, the outcome would be treated as a "failure" using traditional probability of success-related metrics, even though nearly 99.9% of the goal was achieved.

Additionally, we think it's important to incorporate retiree preferences, via a utility function, when estimating the respective goal completion metric. Utility is a way to measure how someone feels about achieving a given outcome, where the greater the utility, the greater the implied happiness.

While both participants in Exhibit 1 are achieving the same income level, the notably different levels of utility can have incredibly important implications for the optimal retirement income strategy. For example, Participant B would likely benefit more from allocating additional savings to guaranteed income than Participant A, in order to reduce the possibility of a shortfall and the significant penalty (i.e., disutility) associated with it.

Exhibit 2: Optimal Equity Allocation by Age and Needs Percentage for Participants A and B (from Exhibit 1)

Moderate Income Volatility Preference and Moderate Risk Tolerance



Source: Blanchett and Stempien, 2022, "Spending Elasticity and Optimal Portfolio Risk Levels."

Analysis of Optimal Portfolio Risk Levels

Using Monte Carlo analysis, we can determine the optimal portfolio risk levels (i.e., equity allocations) for retirees' retirement savings for different situations (i.e., savings levels, guaranteed income levels, retirement ages, and Needs percentages) and for different preferences.

Exhibit 2 demonstrates that while Participants A and B have the same level of retirement savings and the same target annual retirement income goal, there are significant differences in the optimal equity allocations, and glide paths, given their differing projected Needs spending. Participant A, who has more flexibility with retirement spending, can take on considerably more risk at younger ages than Participant B and should decrease the risk level of the portfolio considerably throughout retirement.

Overall, our analysis suggests that incorporating spending elasticity into the portfolio optimization process is likely to result in more aggressive portfolio risk levels for younger retirees and more conservative for older retirees, on average. Incorporating additional factors further customizes the optimal risk level.

Conclusion

Retirement is significantly more complex than assumed in most retirement income solutions available to DC participants today. A notable shortfall is the assumption that the retirement spending goal is inflexible, or more simply that a retiree is unable and unwilling to "change course" during retirement depending on how their situation evolves. By incorporating spending flexibility into retirement income models, our research shows a notable impact when determining the optimal portfolio risk level for individuals.

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