APOLLO

Beyond Beta: How to Use Alternatives to Replace Public Equity

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KEY TAKEAWAYS

- A series of secular changes affecting public equity markets and a surge in inflation have accentuated some of the vulnerabilities of public equities as an asset class. Public equity markets are becoming more concentrated and less viable as a source of alpha. The asset class is also susceptible to inflation and subject to high levels of volatility.
- In crafting this paper, we asked the question: Can we build a portfolio able to keep the positive traits of public equity—namely relatively high returns—while mitigating its unwanted vulnerabilities?
- In a word: Yes. Our work shows that replacing some public equity allocations with a portfolio consisting of private equity, private debt, and real assets can deliver potential returns on par with or above those of public stocks, while reducing volatility, providing enhanced protection against inflation, and expanding the investable universe.
- Building and maintaining this type of alternatives portfolio is a complex and demanding task. Investors will have to contend with new challenges, such as liquidity and vintage risks, manager selection and access, and cashflow management.
- Asset managers are offering new solutions that aim to mitigate the challenges and simplify the process of investing in alternatives. These solutions can make it practical for both institutional and individual investors to enhance potential risk-adjusted portfolio returns by replacing some of their public equity allocations with alternatives.

Introduction

Secular changes affecting public equity markets and a surge in inflation have accentuated some of the vulnerabilities of public equities as an asset class. Public equity markets are becoming more concentrated, reducing both the opportunity set for investors and diversification levels within investment portfolios. Inflation and higher discount rates have eroded real returns on public equity allocations recently. All these developments are occurring against the backdrop of consistent underperformance by active equity managers, especially in the large-cap space.[1]

None of these changes have shaken investors' confidence in the ability of public equities to deliver core benefits like enhanced liquidity and positive returns over full market cycles. However, we at Apollo are increasingly concerned about how those returns will be achieved, and how smooth or bumpy a ride it will be to capture them. Volatility can—as shown in our previous paper[2]—play a large detrimental role in the terminal value of investors' portfolios.

As a long-time private-market investor, this discussion is of great importance to us. In this paper, we look at how public equity markets are changing, how those changes could be affecting the portfolios of investors who allocate sizable portions of their assets to the asset class, and whether private markets can provide alternative approaches with the potential to enhance results. Specifically, we set out to determine if there is a solution that could be used to mitigate the heightened volatility and other vulnerabilities of public equity while maintaining potential returns on par with (or above) public stocks.

In this paper, we explore how a carefully constructed portfolio of alternatives can replicate the return profile of the S&P 500 Index at lower levels of volatility and modest correlation.

We started by establishing the criteria a solution would have to meet to serve as a viable alternative to public equity exposures. At a minimum, the solution would have to deliver the levels of returns investors have come to expect from their public equity allocations. To serve as a portfolio enhancement, the solution would also have to possess a set of desired traits, including volatility dampening, protection against inflation, and an expanded investable universe that increases the opportunity set and diversification potential for investors.

The findings of our work suggest that such a solution is possible. Replacing public equity exposures—either in small or large parts—with a purpose-built alternatives solution has the potential to enhance long-term risk-adjusted returns of a diversified portfolio by mitigating the unwanted vulnerabilities of public equities. To illustrate it, we dedicate a full section of this paper to what such a portfolio of alternatives could look like, exploring its individual components and their correlation to inflation and to public equities, and examining several scenarios showing how the portfolio could be deployed alongside public equity beta in a traditional strategic asset allocation of 60% public stocks and 40% public bonds (a.k.a., the 60/40 model).

We then discuss implementing this type of solution in practice. Constructing and managing this type of alternatives portfolio involves a focused, multi-year effort. As part of that effort, creating a target asset-deployment plan, finding, selecting, and accessing the right managers, and managing and matching cashflows to cover capital calls and deployments (among other actions) will be important. All of these tasks will need to be accomplished while contending with a new set of risks, including liquidity risk, vintage risk, and others. Further, some of the underlying strategies that work best to achieve these results might require private investments that are still not easily available to many investors.

Despite the complexity of creating and maintaining this type of alternatives portfolio, today's asset management industry offers accessible vehicles that can simplify the process of deploying alternatives. By outsourcing some of the most complex aspects of the investment process, we believe these solutions are creating new opportunities for both institutional and individual investors to enhance long-term risk-adjusted return potential by replacing some of their public equity allocations with alternatives.

[1] S&P Global's SPIVA U.S. Scorecard 2022. Available at: https://www.spglobal.com/spdji/en/documents/spiva/spiva-us-year-end-2022.pdf

[2] O'Mara, Matt. "How Alternatives Can Address Your 60/40 Portfolio Blues," June 2022. Available at: https://apolloacademy.com/how-alternatives-can-address-your-60-40-portfolio-blues/

Public equities have benefits, but its vulnerabilities can be damaging

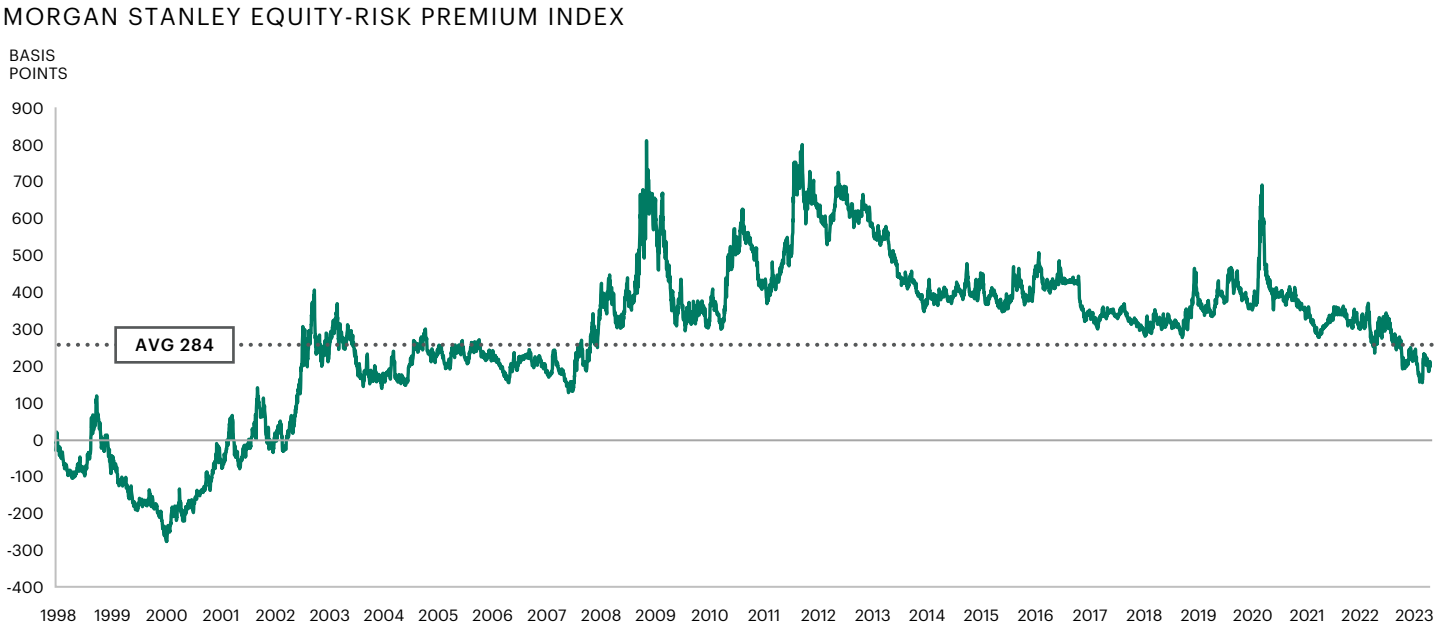
Public equities play an essential role in institutional and retail investment portfolios. Investors of all types devote significant portions of portfolio assets to equities because they deliver a set of valuable benefits that have traditionally been difficult to obtain from other asset classes and strategies. Specifically, investors rely on equities as a source of deep and dependable liquidity and strong long-term investment returns relative to other public asset classes.

For example, US equities as measured by the S&P 500 Index have delivered an annualized rate of return of 8.4% since the Global Financial Crisis (GFC) in 2008. That number compares to a total annualized return of just 2.6% in the same period for US bonds, as gauged by the Bloomberg Aggregate Bond Index. This long-term outperformance of equities over bonds is known as the "equity-risk premium" (ERP), or the excess returns of stocks over the risk-free rate that investors can expect to achieve by owning equities. The ERP is widely perceived as a strong factor encouraging investors to maintain long-term equity exposures in their portfolios. **Exhibit 1** depicts the value of the ERP over the past 25 years, a period in which it has averaged 284 basis points, or 2.84%.

Large public equity allocations have served as a counterweight to bonds in 60/40 portfolios for at least the last 70 years. The popularity of the standard 60/40 allocation model is driven, in large part, by the fact that public equities have had a low to negative correlation to bonds for most of this century. The shift back into an environment of positive correlations between the two asset classes took its toll on investors during the downturn of 2022, challenging the 60/40 model and the role of public equity allocations in investment portfolios more generally.

Additionally, secular changes taking place in public equity markets have prompted many investors to ask if there is a way for investors to capture the benefits provided by public stocks while minimizing some increasingly problematic characteristics, namely a decline in the number of publicly traded companies, increased market concentration, the gradual erosion of opportunities for alpha, vulnerability to inflation, and relatively high levels of volatility.

Exhibit 1: US stocks tend to earn a strong equity-risk premium over the risk-free rate



Morgan Stanley Equity Risk Premium (MSRPSPX) shows a market-based measure of equity-risk premium for the S&P 500, where equity-risk premium is calculated as the spread (in basis points) between the index's next 12-month consensus earnings yield and the 10-year Treasury yield. Sector level data has not been adjusted for GICS reclassifications.

Source: Bloomberg, Apollo Chief Economist; as of April 2023.

A shrinking investable universe

At the most basic level, fewer companies are now listed in the US public equity market. A long-term decline in the number of publicly traded companies has dramatically reduced the opportunity set for investors. In 1996, there were more than 8,000 publicly traded companies in the United States. By the start of 2020, that number had dropped to less than 4,300 (**Exhibit 2**).

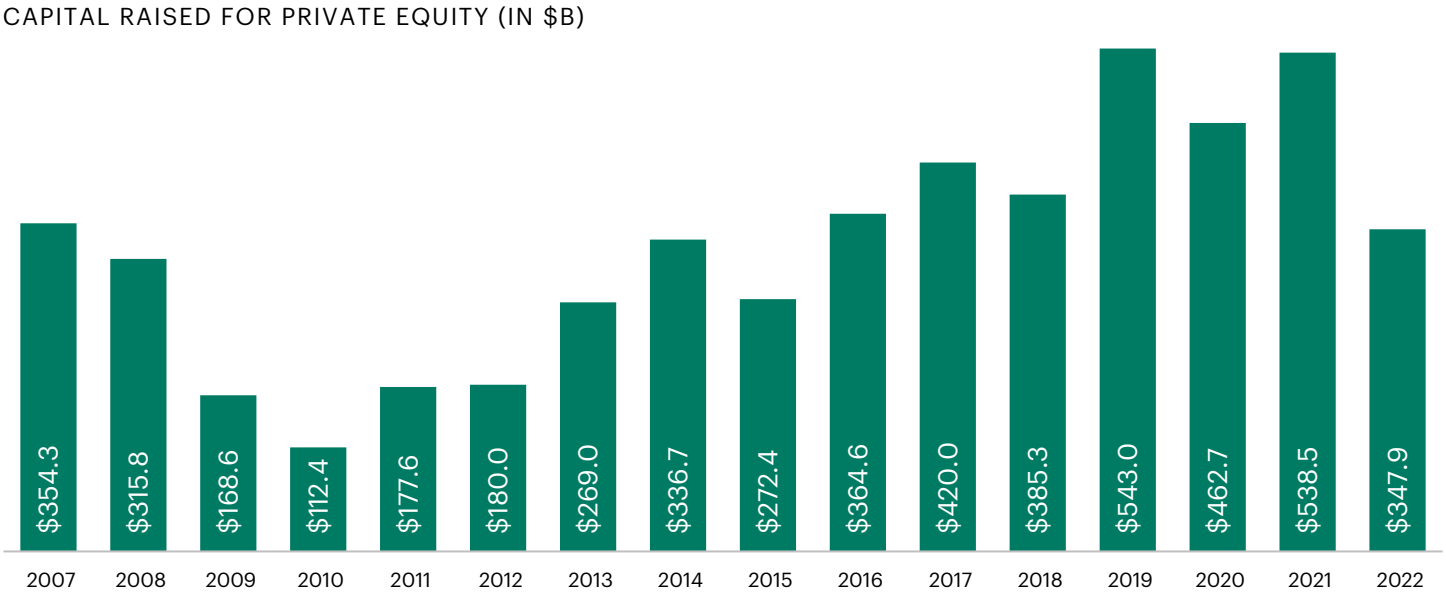
The decline in the number of publicly listed US companies has been driven in large part by mergers and acquisitions. At the same time, changes in the funding and regulatory environment have prompted some early-stage companies to hold off their initial public offerings and stay private for longer.

This shrinkage trend is unlikely to reverse course soon. To the contrary, a boom in private equity fundraising could contribute to additional attrition in the number of public companies and allow private companies to stay private for longer (**Exhibit 3**).

Exhibit 2: Investment universe in public equities is diminishing

Source: Bloomberg; accessed July 2022.

Exhibit 3: Money raised for private equity investments is on the rise...



Source: Pitchbook. Annual data 2007-2022.

The massive amounts of capital raised by private equity firms in recent years has left the industry well stocked with dry powder (i.e., money raised and yet to be invested) that could be used to fuel a sharp increase in the number of "take-private" transactions (**Exhibit 4**).

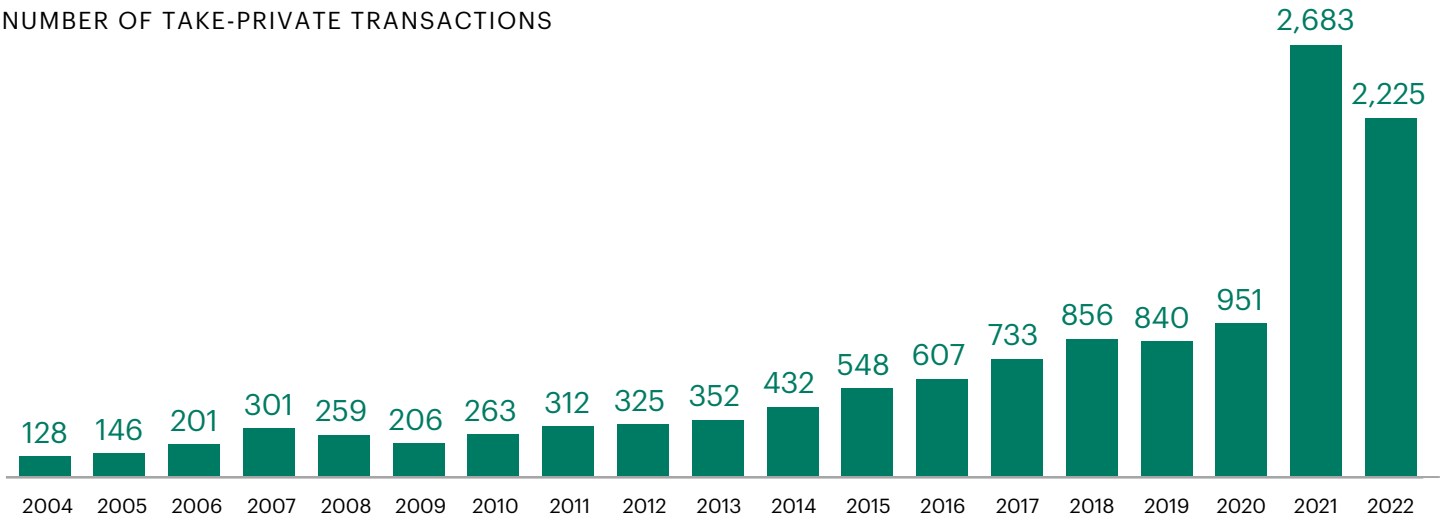
Within the reduced universe of public companies, market capitalization has become increasingly concentrated. As of March 2023, the 500 companies in the S&P 500 Index accounted for 82% of the total US equity market capitalization. Making matters worse, the five biggest companies in the S&P 500 (Apple, Microsoft, Alphabet, Amazon, and NVIDIA) represented close to a quarter of that index's overall market cap (**Exhibit 5**).

Is there alpha left in public equity markets?

The shrinking universe of public companies and increased market-cap concentration have contributed to perhaps the most important and fundamental change in public equity markets: the transition of public equities from a source of potential alpha to almost exclusively a source of beta.

Exhibit 4: ...allowing for a sharp increase in take-private deals

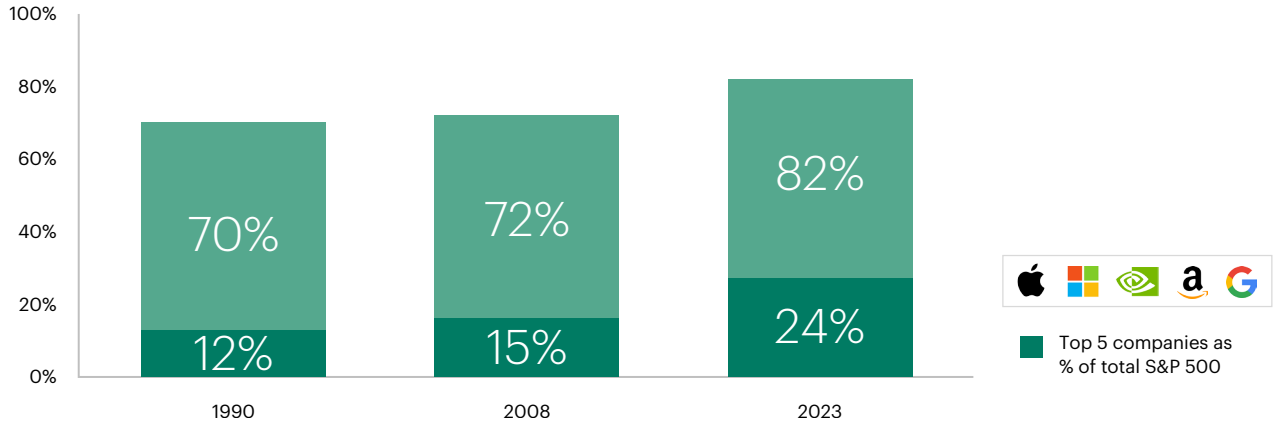
NUMBER OF TAKE-PRIVATE TRANSACTIONS



Source: Pitchbook. Annual data 2004-2022.

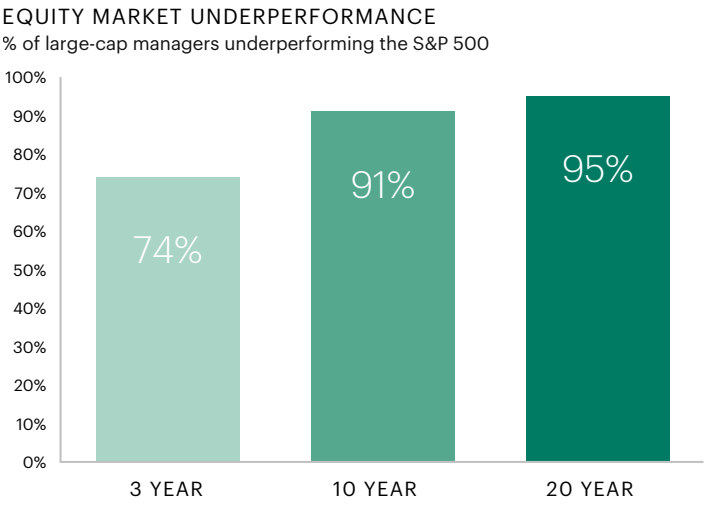
Exhibit 5: Public equity market cap has become increasingly concentrated

COMPANIES IN THE S&P 500 AS A PERCENTAGE OF TOTAL US EQUITIES MARKET



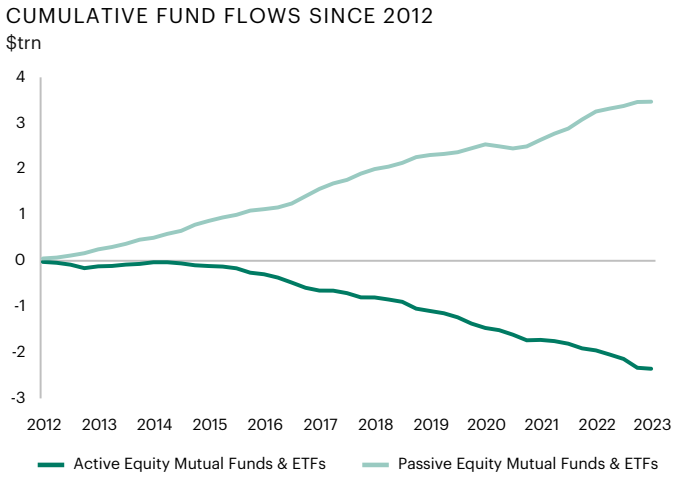
Sources: Bloomberg, Apollo Chief Economist; as of March 2023.
Company names and logos are trademarks of their respective holders.

Exhibit 6: Public equities have become beta...



Source: S&P Global's SPIVA U.S. Scorecard 2022.

Exhibit 7: ...Leading to a wholesale rotation from active to passive strategies



Source: Bloomberg, Apollo Chief Economist; as of March 31, 2023.

In the 20-year period leading up to 2022, 95% of active equity managers underperformed the S&P 500 benchmark (**Exhibit 6**). That consistent underperformance has convinced many investors that there is no longer a meaningful opportunity to harvest excess returns in the public market, leading to a massive flight of capital from active into passive vehicles (**Exhibit 7**). In fact, the growth of passive investing has worked as a reinforcing mechanism: The more "indexed" the public markets become, the more "crowded" the trade becomes, as more and more people invest in fewer, similar assets.

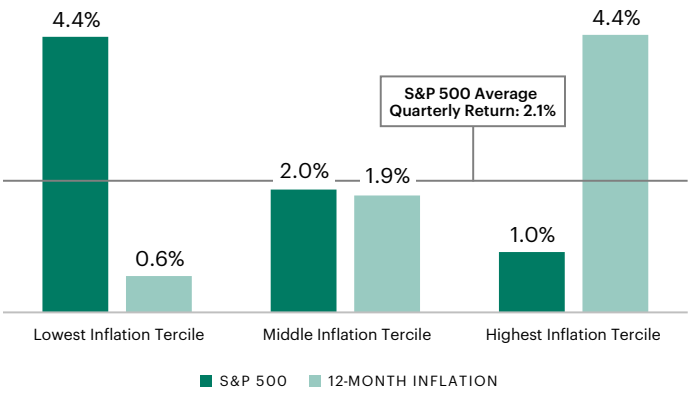
Inflation vulnerability

The past 24 months provided investors with a stark reminder of another problematic trait of public equities: They are long-duration assets whose value can decline during times of inflation and rising interest rates. Due to the negative correlation between public equities and inflation, the S&P 500 has posted its highest historic returns in periods of low inflation and its lowest returns when inflation was at its highest levels (**Exhibit 8**). Stocks with lower dividend yields have demonstrated particular sensitivity to rising rates and inflation.

An increasingly bumpy ride

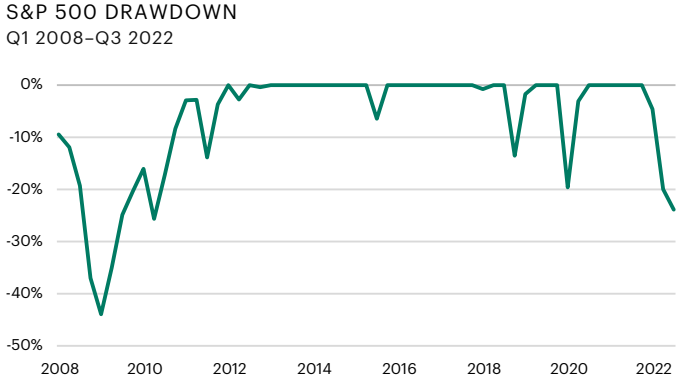
All the factors discussed in this section have contributed to relatively high levels of volatility for public equities. Although the asset class has historically delivered high long-term returns, achieving those returns has been a bumpy ride for investors. As illustrated in **Exhibit 9**, in the past 15 years alone the S&P 500 has experienced four significant drawdowns, including the 44% decline in the Global Financial Crisis in 2009. High levels of volatility have serious implications to terminal values, asset-liability management programs, and the psychological ability of investors to maintain their strategic asset allocation in times of stress.

Exhibit 8: Public equities are vulnerable to high and rising inflation



Source: Bloomberg, US Bureau of Labor Statistics (for US Consumer Price Index, CPI); Q1 2008-Q3 2022.

Exhibit 9: Public equity vulnerabilities have led to high levels of volatility



Source: Bloomberg; Q1 2008-Q3 2022.

Thinking beyond public equity beta

These meaningful vulnerabilities in public equity markets have prompted many investors to wonder if it is possible to maintain the positive traits associated with public stock ownership while mitigating some of the increasingly prominent downsides associated with that exposure. In other words, is there an alternative solution that could serve the role traditionally played by public stocks while eliminating or minimizing some of the asset classes' most problematic features?

That's the question we set out to answer. To do so, we established a set of expectations an alternative solution would have to meet in order to serve as a replacement to public equity exposure. An effective alternative would be required to:

1. Deliver returns on par with or in excess of public equities;
2. Generate those returns at lower levels of volatility;
3. Provide enhanced protection against inflation; and
4. Expand the investable universe to increase opportunities for investors.

Our work shows that such a solution does exist. Investors can achieve the same return profile of public equities with a properly constructed portfolio of alternatives, but with significant enhancements in risk mitigation. The remainder of this section details our thought process for developing this solution.

Addressing key vulnerabilities of public equities: inflation and interest-rate risks

We believe that a portfolio of alternatives can, at a high confidence level, produce sustainable public equity-like returns while mitigating key vulnerabilities of public equities, namely a shrinking investable universe and high susceptibility to rising inflation and interest rates.

Within alternative asset classes, investors can choose from a huge range of strategies and approaches. From that broad universe of options, we explore three general categories of alternatives that could fit our parameters: private equity, private debt, and real assets (including infrastructure, real estate, and natural resources).

Let's start our review with **private equity**. The asset class offers access to a vastly expanded universe of investable companies. For example: US public equity markets contain about 2,600 companies with revenues of $100 million or more. By comparison, there are roughly 17,500 US private companies of that level of revenue—**a seven times multiple**. Undoubtably, private equity, especially today, offers a much broader opportunity set than its corresponding public market.[3]

When we looked at **private debt**, we also detected pinpointed traits that could help us achieve our desired objectives. First, private credit can produce steady income, which helps cushion volatility in times of market stress. More importantly, coupons on private loans are floating, meaning they follow market interest rates. When market rates rise, the coupons paid on private debt also rise.

We then turned to **real assets**, where we zoomed in on the ability of the asset class to generate strong income, which, more importantly, can increase during times of rising inflation due to the nature of its underlying pricing contracts. Specifically, we looked at three distinct sub-categories of real assets, namely private infrastructure, real estate, and natural resources.

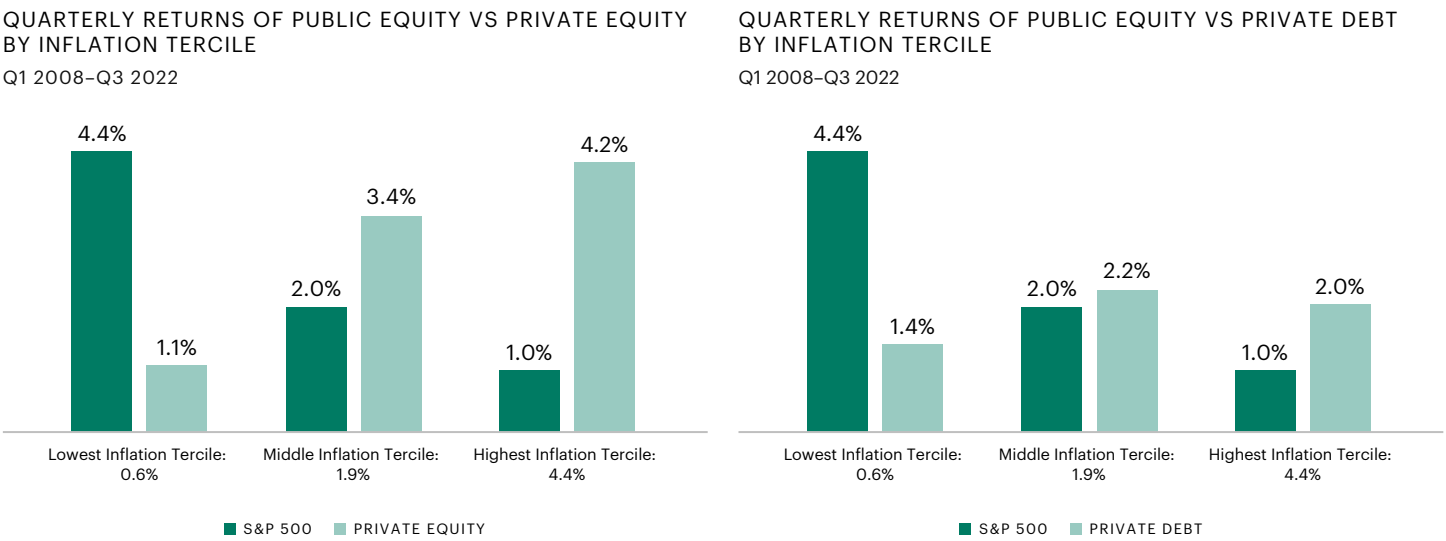
Having identified these three asset classes as viable candidates for our public equity-replacement portfolio, we wanted to explore their performance in distinct inflation regimes. Remember, public equity's vulnerability to inflation was an important trait we were seeking to mitigate or, to the largest possible extent, eliminate from our equity-replacement solution.

[3] Source: Marquette Associates, Capital IQ; accessed July 2022. Available at: https://www.marquetteassociates.com/wp-content/uploads/2021/05/Can-Private-Equity-Outperformance-Persist.pdf

As illustrated in **Exhibit 10**, **private equity** can outperform public equity in times of moderate and high inflation. Specifically, the asset class, as measured by the Preqin Private Equity Index, delivered 320 basis points of outperformance during the highest inflation period and beat the S&P 500 by 140 basis points when inflation was closer to the Federal Reserve's target of 2%. Similarly, **private debt**, as measured by the Preqin Private Debt Index, showed competitive returns against public equity during times of moderate and high inflation scenarios.

Our work on **real assets** is shown on **Exhibit 11** (next page). Our objective here was to understand how each of the underlying components of the real assets bucket—private infrastructure, real estate, and natural resources—performed as inflation regimes shifted. As illustrated, all three asset classes followed a similar pattern of delivering strong downside protection in times of rising inflation.

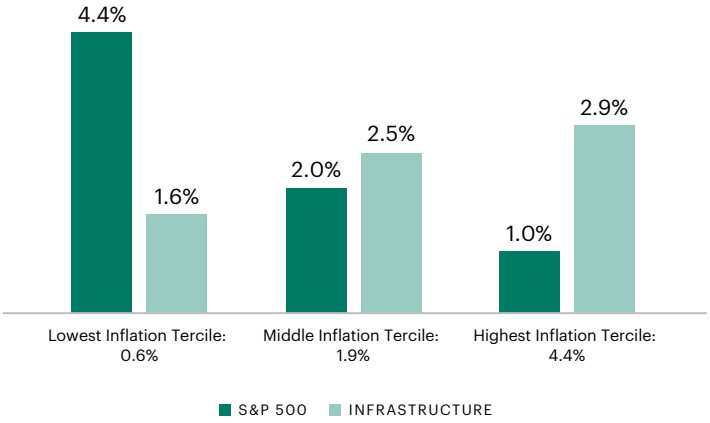
Exhibit 10: Private equity and private debt can outperform US equities in times of inflation



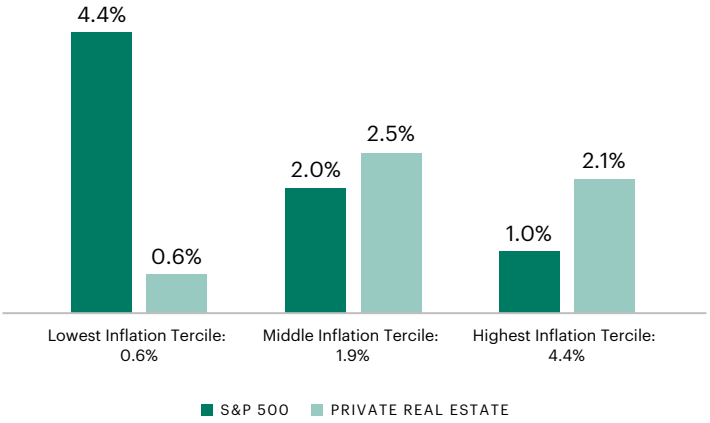
Source: Bloomberg, US Bureau of Labor Statistics (for US Consumer Price Index, CPI), Preqin Private Equity, Preqin Private Debt; Q1 2008-Q3 2022.

Exhibit 11: A mixed portfolio of real assets delivers strongest returns in inflationary periods

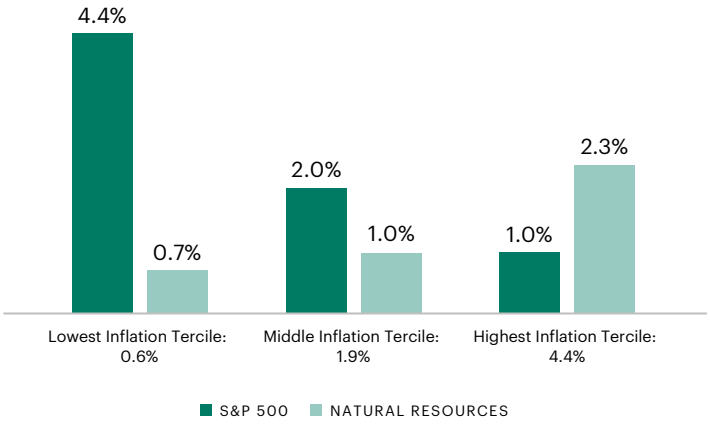
QUARTERLY RETURNS OF PUBLIC EQUITY VS INFRASTRUCTURE BY INFLATION TERCILE
Q1 2008–Q3 2022



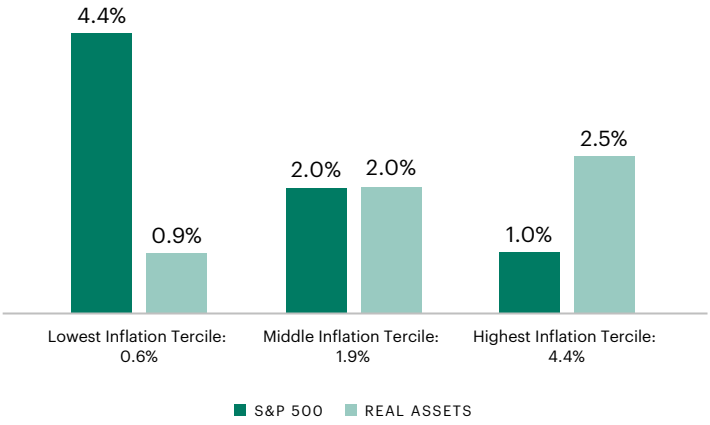
QUARTERLY RETURNS OF PUBLIC EQUITY VS PRIVATE REAL ESTATE BY INFLATION TERCILE
Q1 2008–Q3 2022



QUARTERLY RETURNS OF PUBLIC EQUITY VS NATURAL RESOURCES BY INFLATION TERCILE
Q1 2008–Q3 2022



QUARTERLY RETURNS OF PUBLIC EQUITY VS REAL ASSETS BY INFLATION TERCILE
Q1 2008–Q3 2022



Source: Bloomberg, US Bureau of Labor Statistics (for US Consumer Price Index, CPI), Preqin Natural Resources, Preqin Infrastructure, NCREIF NPI. Real assets portfolio represented by three indices equally weighted: Preqin Natural Resources, Preqin Infrastructure, NCREIF NPI; Q1 2008-Q3 2022.

Putting it all together and deploying in a 60/40 portfolio

We wanted to conclude our work by combining all three asset classes. For illustrative purposes, we established a simple, non-optimized, asset-allocation rule for the public equity-replacement portfolio, breaking exposures into 50% private equity, 25% private debt, and 25% real assets. For the real-assets bucket—as previously shown—we used an equally weighted combination of private infrastructure, private real estate, and private natural resources, based on index-level data.

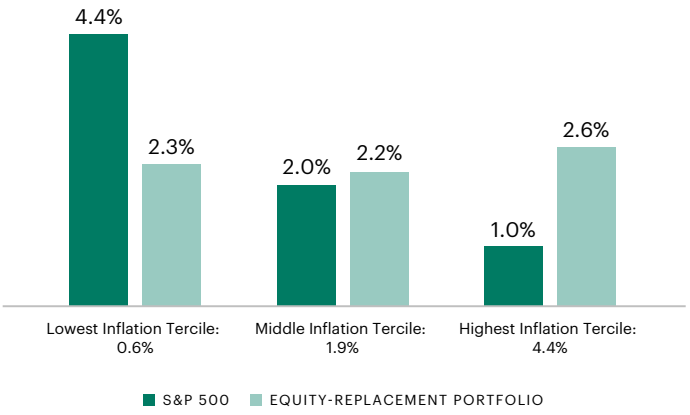
Our work suggested that these three strategies—working in aggregate—were the most likely to meet our established criteria for the public equity-replacement portfolio: comparable returns to public equity, expanded investable universe, lower volatility, and inflation protection. As we will illustrate, the potential key benefit of investing in private equity is that returns have historically exceeded the returns to public equity while broadening the investment universe. But, while most private capital funds typically offer reduced or little income in the first few years of life, private equity's income profile is oftentimes extended to the first three to six years of a fund's life. Mixing the higher income potential of private debt and real asset strategies can reduce the lower initial income of private equity. Finally, a diversified real assets strategy has historically offered substantial inflation protection that can offset the negative inflation exposure found elsewhere in the portfolio.

In this light, we first looked at how the public equity-replacement portfolio behaved in different inflation environments. As illustrated on **Exhibit 12**, the portfolio displayed virtually no correlation to inflation, performing equally well across all three regimes (low, moderate, and high).

Next, we looked at how overall performance of individual asset classes stacked against public equities. **Exhibit 13** shows how the individual components compare to public equities in terms of returns, volatility, inflation protection, and correlation.

Exhibit 12: The public equity-replacement portfolio can have less return volatility across inflation scenarios relative to the S&P 500

QUARTERLY RETURNS OF PUBLIC EQUITY VS EQUITY-REPLACEMENT PORTFOLIO BY INFLATION TERCILE
Q1 2008–Q3 2022



Source: Bloomberg, US Bureau of Labor Statistics (for US Consumer Price Index, CPI), Preqin Private Equity, Preqin Private Debt. Real assets equally weight three indices: Preqin Natural Resources, Preqin Infrastructure, and NCREIF NPI. Public equity-replacement portfolio is 50% Private Equity, 25% Private Debt, 25% Real Assets; Q1 2008-Q3 2022.

Exhibit 13: Historical performance of individual components of the public equity-replacement portfolio

JANUARY 2008–SEPTEMBER 2022 (QUARTERLY)	S&P 500 Index	Preqin Private Equity	Preqin Private Debt	Real Assets
Annual Return	8.4%	11.6%	7.3%	6.5%
Standard Deviation	17.8%	9.1%	8.0%	6.0%
Drawdown	-43.9%	-26.6%	-25.6%	-20.4%
Correlation to S&P 500	1.00	0.79	0.80	0.33
Correlation to Inflation	-0.24	-0.07	-0.12	0.56

Source: Bloomberg, Preqin, US Bureau of Labor Statistics (for US Consumer Price Index, CPI); Q1 2008-Q3 2022. Investments include S&P 500 equity index, Preqin Private Equity Index, Preqin Private Debt Index; real assets represented by three indices equally weighted: Preqin Natural Resources, Preqin Infrastructure, NCREIF NPI. **Past performance not necessarily indicative of future results.**

We then examined the overall relative performance of the public equity-replacement portfolio. We measured the returns of the portfolio on a both quarterly rebalanced and fully illiquid basis to see if rebalancing would have a meaningful impact on results. It didn't, as shown in **Exhibit 14**. For the purposes of this paper, we will utilize the results of the fully illiquid (non-rebalanced) alternatives portfolio. This fully illiquid portfolio matches the liquidity experience that investors have had in alternative strategies. However, it must be noted that new semi-liquid strategies that are becoming increasingly available to both institutional and individual investors allow for periodic rebalancing.

From the period of January 2008 to September 2022, the illiquid equity-replacement portfolio outperformed the public equity allocation, generating annual returns of 9.4% versus 8.4% for the S&P 500. It achieved those returns at significantly lower levels of volatility, with a standard deviation of 8.2% versus the daunting 17.8% for public equities. The portfolio also demonstrated no overall correlation to inflation, as well as a more modest correlation to public equities.

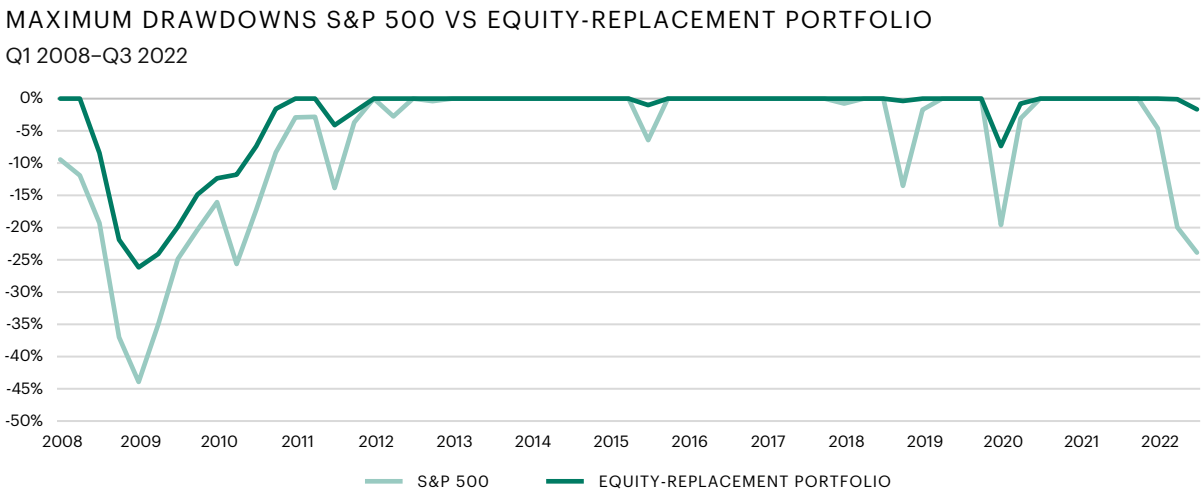
Finally, the equity-replacement portfolio delivered better relative downside protection throughout the analyzed period, limiting its maximum drawdown to 26.2%, versus the 43.9% drawdown experienced by the S&P 500 during the GFC. To further illustrate that potential, we juxtaposed the performance of the public-equity replacement portfolio and the S&P 500, measured on a total return basis (**Exhibit 15**).

Exhibit 14: Equity-replacement portfolio vs S&P 500: Stronger returns, dramatically lower volatility

JANUARY 2008–SEPTEMBER 2022 (QUARTERLY)	S&P 500 Index	Public Equity-Replacement Portfolio Rebalanced	Public Equity-Replacement Portfolio Illiquid
Annual Return	8.4%	9.5%	9.4%
Standard Deviation	17.8%	7.2%	8.2%
Drawdown	-43.9%	-22.5%	-26.2%
Correlation to S&P 500	1.00	0.79	0.79
Correlation to Inflation	-0.24	0.04	0.00

Source: Bloomberg, Preqin, US Bureau of Labor Statistics (for US Consumer Price Index, CPI); Q1 2008-Q3 2022. Investments include S&P 500 equity Index, Preqin Private Equity Index, Preqin Private Debt Index; real assets represented by three indices equally weighted: Preqin Natural Resources, Preqin Infrastructure, NCREIF NPI. Public equity-replacement portfolio is 50% Private Equity, 25% Private Debt, 25% Real Assets; Q1 2008-Q3 2022. "Rebalanced portfolio" was rebalanced on a quarterly basis. "Illiquid portfolio" was not rebalanced. **Past performance not necessarily indicative of future results.**

Exhibit 15: The public equity-replacement portfolio historically experienced lower drawdowns than the S&P 500



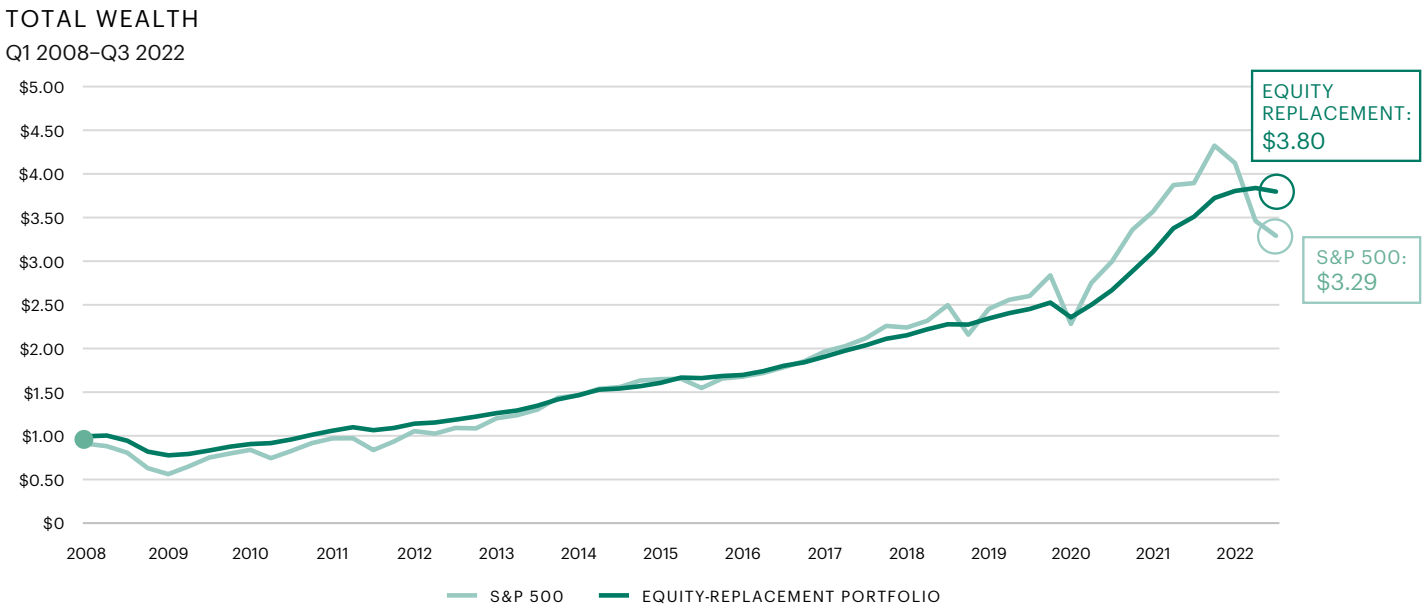
Source: Bloomberg, Preqin. Investments include S&P 500 equity Index, Preqin Private Equity Index, Preqin Private Debt Index; real assets represented by three indices equally weighted: Preqin Natural Resources, Preqin Infrastructure, and NCREIF NPI. Public equity-replacement portfolio is 50% Private Equity, 25% Private Debt, 25% Real Assets, not rebalanced; Q1 2008-Q3 2022. **Past performance not necessarily indicative of future results.**

As shown, the alternatives portfolio outperformed public stocks during the recessionary period triggered by the Global Financial Crisis and provided equivalent returns in the recovery period that followed. It underperformed in times of very low inflation and ultra-low interest rates—which is in line with our expectations, since those are periods, as shown previously in the paper, when public stocks tend to perform best from a historical perspective. However, the alternatives portfolio started showing its volatility-dampening power as the regime switched from an environment of low interest rates and inflation to a period of rising inflation and tightening monetary policy.

Ultimately, the replacement portfolio exceeded the public equity allocation in terms of returns over the period (**Exhibit 16**), with its lower volatility levels contributing to a higher terminal value. For every dollar invested in the S&P 500 in 2008, an investor would have $3.29 at the end of the 15-year period we analyzed. For every dollar invested in the equity replacement portfolio, an investor would have $3.80, representing a meaningful 16% outperformance. The chart also shows that, due to the increased volatility of the S&P 500, investors experience several periods of out- and underperformance relative to the replacement portfolio along the way, making successfully investing in public equities much more dependent on accurate market timing. In contrast, the replacement portfolio plots a smoother, more predictable return path, arguably making entry points more friendly to investors seeking to deploy capital into alternatives.

Also, a word on liquidity. Private markets invest, by nature, in illiquid assets, and it is important to consider the impact of illiquidity on outcomes for investors. After all, liquidity is one of the primary benefits investors derive from their public equity allocations. In our view, investors tend to overvalue the importance of liquidity in portfolios, a behavior that, as shown in this paper, translates into higher overall portfolio volatility. Most of the time, the assets of institutions and individuals saving for retirement represent long-term investments, meaning the need for liquidity is highly diminished. Under such circumstances, trading volatility risk for illiquidity risk might be beneficial.

Exhibit 16: The public equity-replacement portfolio can improve terminal wealth at substantially lower volatility



Source: Bloomberg, Preqin. Investments include S&P 500 equity Index, Preqin Private Equity Index, Preqin Private Debt Index; real assets represented by three indices equally weighted: Preqin Natural Resources, Preqin Infrastructure, NCREIF NPI. Public equity-replacement portfolio is 50% Private Equity, 25% Private Debt, 25% Real Assets, not rebalanced; Q1 2008-Q3 2022. **Past performance not necessarily indicative of future results.**

Finally, we wanted to see how the public-equity replacement portfolio would perform when added to a traditional 60/40 allocation. For illustrative purposes, we created several allocation scenarios to understand the impact that deploying the solution would have on overall performance. As shown in **Exhibit 17**, the addition of even a relatively small allocation can have a significant positive impact. Shifting just 1/6 of the public equity allocation to the equity replacement portfolio results in a modest increase in annual returns from 6.5% to 6.6%. But it lowers standard deviation by a substantial 120 basis points, improving both the Sharpe Ratio and the Sortino Ratio—a measure of portfolio efficiency that emphasizes the impact of negative standard deviation.

Replacing incremental amounts of public equity with the equity-replacement portfolio can result in further increases in return potential and even lower levels of volatility. Replacing half of the public equity allocation (30/30/40) gave another slight increase to annual returns while delivering a substantial 340 basis-point reduction in volatility.

Exhibit 18 illustrates that replacing a portion of the public equity allocation with the alternative solution outlined in this paper can sharply enhance the risk-adjusted returns of a traditional 60/40 portfolio of public stock and bonds.

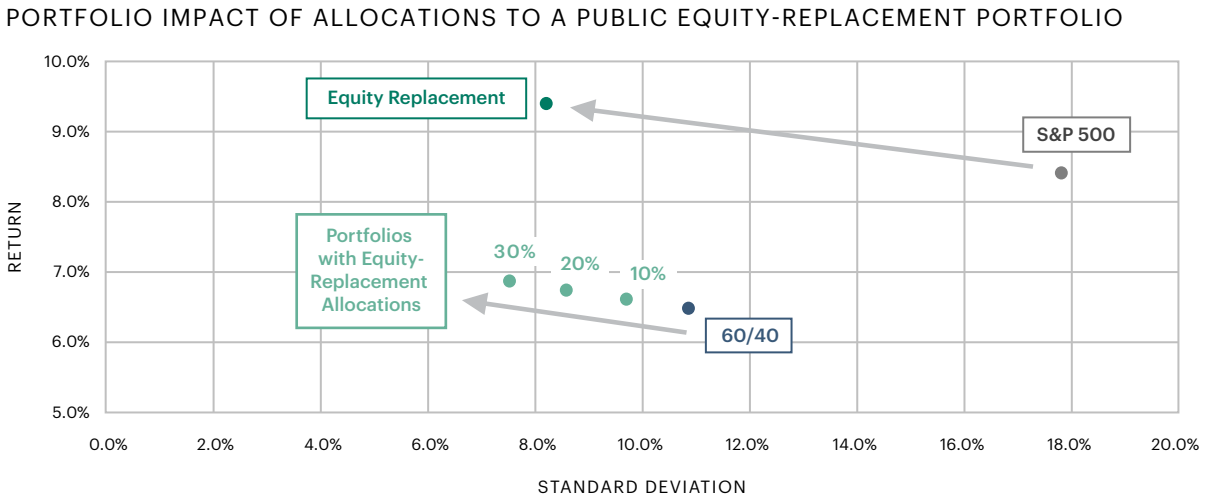
Exhibit 17: Deploying the replacement portfolio—how much public equity to swap?

				PORTFOLIOS WITH ADDED PUBLIC EQUITY-REPLACEMENT ALLOCATIONS		
				Equity Replacement / S&P 500 / Bonds		
JANUARY 2008–SEPTEMBER 2022 (QUARTERLY)	S&P 500 Index	Public Equity-Replacement	60/40 Total Return	10/50/40	20/40/40	30/30/40
Annual Return	8.4%	9.4%	6.5%	6.6%	6.7%	6.9%
Standard Deviation	17.8%	8.2%	10.9%	9.7%	8.6%	7.5%
Sharpe Ratio	0.42	1.03	0.51	0.59	0.68	0.79
Sortino Ratio	0.57	0.88	0.76	0.88	1.03	1.19

The Sharpe ratio divides a portfolio's excess returns by its standard deviation to assess risk-adjusted performance. The Sortino ratio differs from the Sharpe ratio in that it only considers the standard deviation of the downside risk, rather than that of the entire (upside + downside) risk (Investopedia).

Source: Bloomberg, Preqin. Investments include S&P 500 equity Index (total return) for stocks, Bloomberg US Aggregate Total Return Value Unhedged USD and bonds/fixed income, Preqin Private Equity, and Preqin Private Debt. Real assets equally weight three indices: Preqin Natural Resources, Preqin Infrastructure, NCREIF NPI. Public equity-replacement portfolio is 50% Private Equity, 25% Private Debt, 25% Real Assets. 60/40 Portfolio is 60% Stocks, 40% Bonds; Q1 2008-Q3 2022. "Illiquid portfolio" was not rebalanced. **Past performance not necessarily indicative of future results.**

Exhibit 18: Risk-return impact of allocating to a public equity-replacement portfolio is positive and meaningful



Source: Bloomberg, Preqin. Investments include S&P 500 equity Index (total return) for stocks, Bloomberg US Aggregate Total Return Value Unhedged USD and bonds/fixed income, Preqin Private Equity, and Preqin Private Debt. Real assets equally weight three indices: Preqin Natural Resources, Preqin Infrastructure, NCREIF NPI. Public equity-replacement portfolio is 50% Private Equity, 25% Private Debt, 25% Real Assets. 60/40 Portfolio is 60% Stocks, 40% Bonds; Q1 2008-Q3 2022. "Illiquid portfolio" was not rebalanced. **Past performance not necessarily indicative of future results.**

From theory to practice: What to consider when deploying a public equity-replacement portfolio?

The work presented in the paper demonstrates that an appropriately structured portfolio of alternatives can serve as an effective public equity-replacement solution within both institutional and individual portfolios. However, building and maintaining this type of portfolio of alternatives admittedly adds a high level of complexity. It requires familiarity and knowledge in several areas that might be new for some investors.

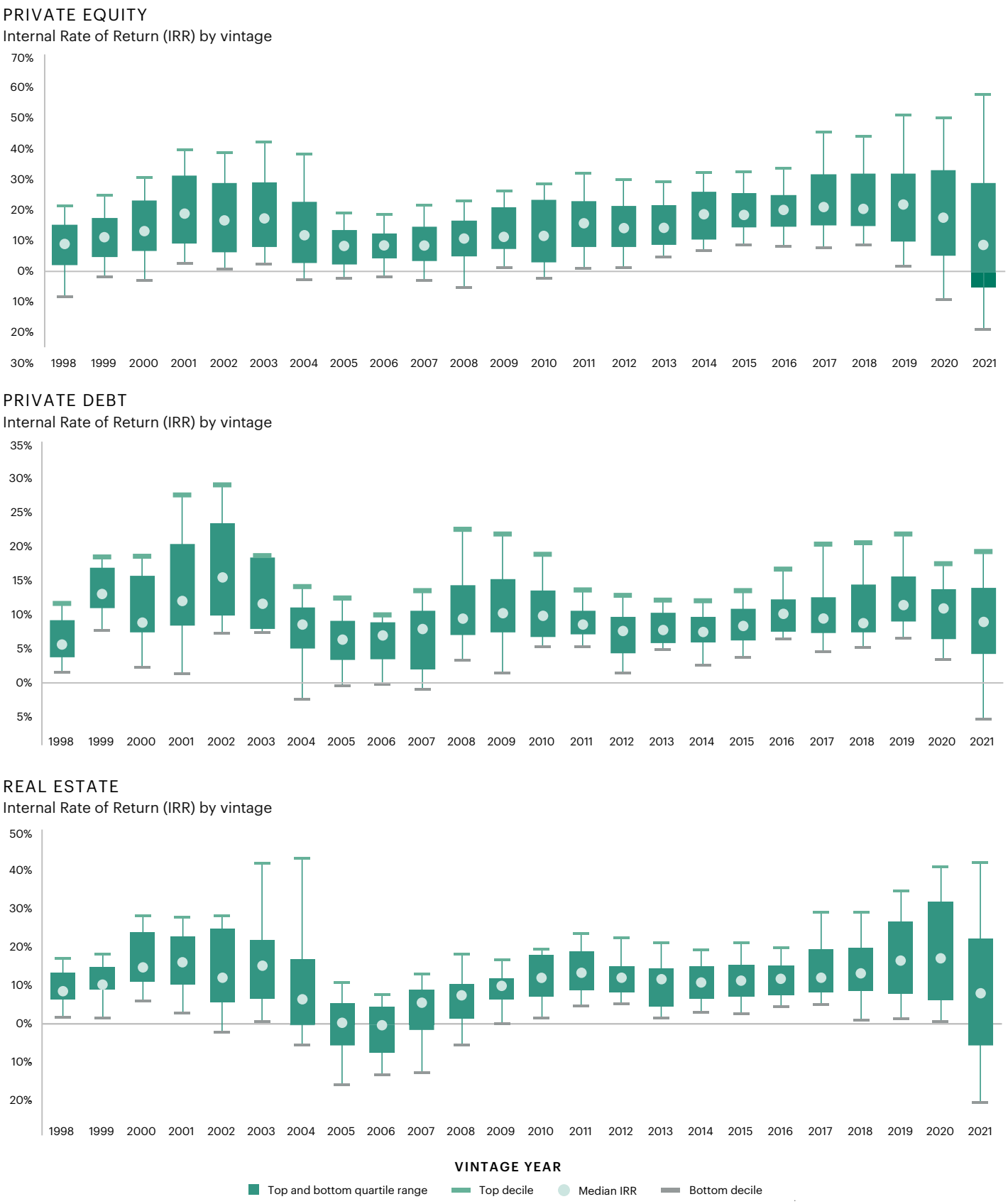
First, private markets are not as readily accessible as public equities. We used publicly available indices in this paper to outline the characteristics of an equity-replacement portfolio, but it is not possible to invest directly in private-market indices or index funds. Instead, investors will have to construct their own portfolios.

That being said, we believe it is important to first choose the right mix of alternative assets, as well as the right risks to take within each asset class. For example, should the infrastructure allocation include brownfield or greenfield investments? Should the real estate allocation be composed of core, value added, or opportunistic assets? Or a mix of all three?

Then, investors must find and hire individual managers for each strategy. This is no simple task. The dispersion of returns in private markets is wide, making manager selection a complicated and critical function that will have a significant impact on results. Furthermore, not all investors will be able to access every manager in each strategy—managers only raise capital for certain strategies every few years, some are closed to new investors, while others have high minimum investment sizes that shut out non-institutional investors. Investing in alternatives will also expose investors and portfolios to vintage risk, or year-to-year variation in fund performance that causes returns for investors to fluctuate based on the start date of their investments. **Exhibit 19** (next page) illustrates the extent of return dispersion by manager and vintage year in private equity, private debt, and real estate.

> A structured portfolio of alternatives can serve as a public equity-replacement solution. But building and maintaining this type of portfolio adds complexity.

Exhibit 19: Significant return dispersion in alternative strategies

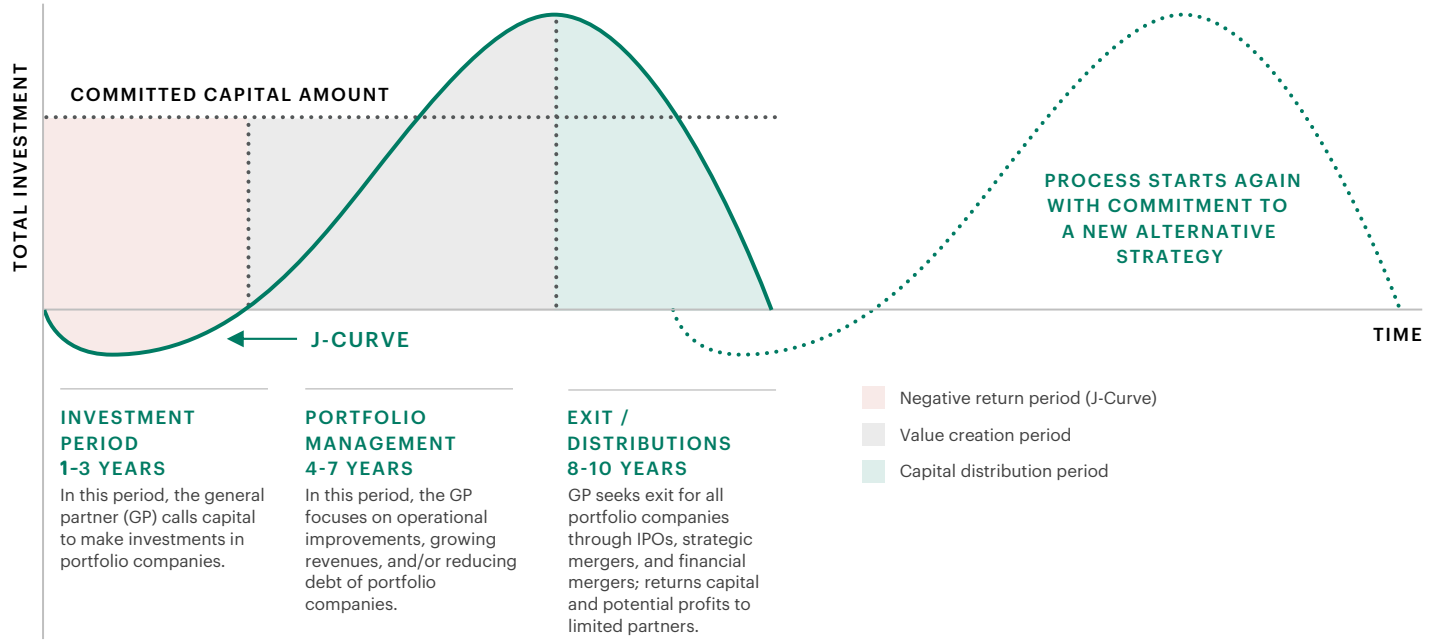


Source: Pitchbook Benchmarks. Data as of September 2022. **Past performance not necessarily indicative of future results.**

Once an investor has selected an alternative strategy, the process of actually implementing the investment and deploying capital will also be more complex than it is in public equities and another traditional asset classes. **Exhibit 20** illustrates the typical lifecycle of a private equity investment. Because investors in a private equity fund commit capital that is called by the manager over time, it can often take in excess of three years for the investor to fully deploy the committed amount. In the earliest years of the investment (typically about years one through three) cashflows and returns for the investor will likely be negative due to management fees, capital calls, and the fact that the bulk of their committed funds have not yet been invested. This period is often referred to as the J-curve.

It is only in the next phase of the investment (typically about years four through seven) that cashflows and returns will likely turn positive as the manager calls and deploys capital and works to create value in portfolio companies. After the final distribution phase in roughly years eight through 10, the investment ends. At that point, the investor will have to begin the process again with new alternatives strategies.

Exhibit 20: Understanding how to manage a commitment to an alternative strategy

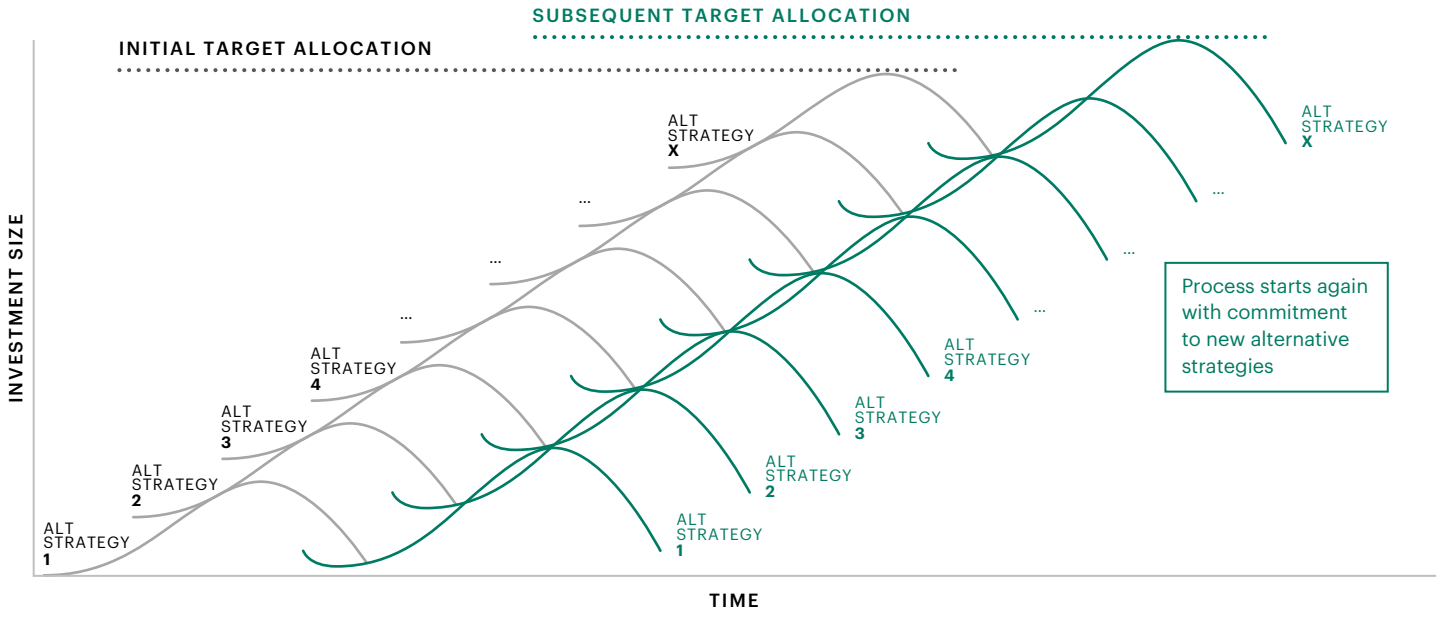


Source: Apollo analysts. For illustrative purposes only.

Of course, a diversified portfolio of alternatives will include multiple managers, meaning the investor will have to navigate this process simultaneously for potentially many different strategies (**Exhibit 21**). This cycle of capital commitments, capital calls, and distributions for a portfolio of investments requires an ongoing process of active cashflow management.

As part of that process, investors must retain sufficient liquidity to support the capital commitment schedule. Holding meaningful amounts of capital in cash or money market funds, however, can lower overall expected returns, a phenomenon known as "cash drag." As shown in **Exhibit 22**, the impact of that cash drag can be significant. For example: We estimate that for a portfolio with an expected internal rate of return of 20%, cash drag can reduce expected returns by 5% or more.

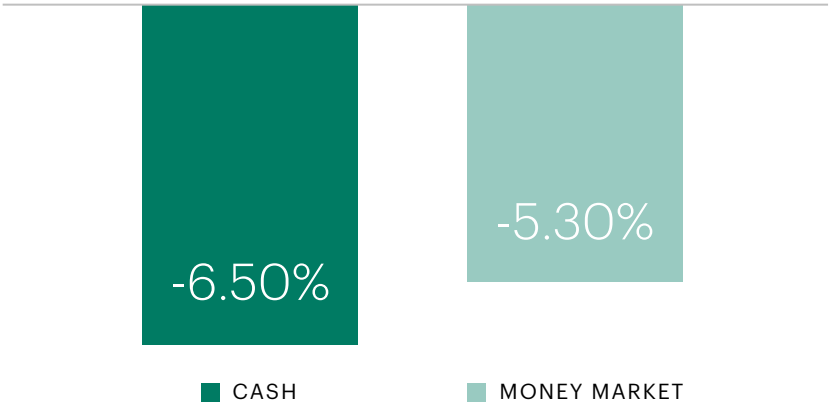
Exhibit 21: Managing multiple private-market investments at the same time creates cashflow challenges



Source: Apollo analysts. For illustrative purposes only.

Exhibit 22: Cash management: Non-deployed committed capital can be a drag on returns

CASH DRAG EXAMPLE OF AN EXPECTED INTERNAL RATE OF RETURN (IRR) OF 20%



Source: Apollo analysts.

The illustrative example in the chart makes the following assumptions: Committed capital is held in either cash (no interest) or a money market fund earning 4.5% a year until called; capital is called linearly over three years, with 90% called during the hypothetical investment's lifetime; net annual returns of 20%; investment has total life span of eight years.

Complex, yes, but well worth the effort

Despite the challenges associated with building and maintaining an alternatives portfolio, the potential enhancements provided by an equity-replacement portfolio—namely better downside protection, inflation hedging traits, lower volatility, and higher terminal values—can be well worth the effort.

Additionally, Apollo and some of its industry peers have been developing solutions that can simplify the process of investing in these types of solutions by minimizing challenges of multi-manager selection, allowing for investments in fully deployed portfolios, and providing easier management of cashflows and committed capital.

These solutions can also allow exposure to a variety of direct investments that might normally be out of reach for most investors. We believe that direct ownership can be beneficial to a public-equity replacement portfolio, specifically in terms of inflation protection and cashflow generation in times of economic distress.

Conclusion

We believe that a carefully constructed portfolio of alternative strategies can deliver the return outcomes traditionally expected from public equity exposures, while providing additional benefits including volatility dampening, protection against inflation, and an expanded investable universe that includes private markets.

Although building and managing a diversified portfolio of alternatives introduces a set of new risks and challenges, there are solutions that can simplify the investment process. Given the increasing availability of these solutions, we believe both institutional and individual investors have the opportunity to enhance long-term risk adjusted portfolio returns by implementing an alternatives-based public equity-replacement strategy.

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