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Private Equity as an Asset Class: A Medium-Term Outlook



Key Takeaways

1. Investing in private equity is generally motivated by two main factors: excess returns relative to public equities; and portfolio diversification.¹ Historically, **private equity has significantly outperformed investments in public equities.** Benchmarked against the Global Equity Markets Morningstar index, global buyout funds have generated an out-performance of **25%** during the vintage years 2000 – 2019. Further, private equity returns are imperfectly correlated with public market returns, implying that expected portfolio returns may be increased at a given level of risk or portfolio risk may be lowered at a given level of expected returns.

2. For an asset class to have a meaningful impact on risk-adjusted portfolio returns, the opportunity set must be large enough. While private equity is still a relatively young asset class, it has grown rapidly over time. In the past five years, almost 2,500 buyout partnerships were formed worldwide, which raised approximately \$2 trillion. During this period, venture capital and growth capital funds raised another \$1.1 trillion and \$700 billion, respectively. In mid-2023, private equity funds managed almost \$7.9 trillion worldwide. Their **assets under management (AUM) were nearly 1.5x larger than at the end of 2000.** The growth in the net asset value of private equity funds has outpaced the increase in the market capitalization of public markets as well as the growth in net assets of regulated open-end equity funds. While the number of private equity-backed companies has risen substantially, the number of publicly listed companies has declined in the United States and several other markets. In the United States, there are more than twice as many portfolio companies than publicly listed companies.

3. **Private equity-backed firms are generally small.** Mega buyouts with enterprise values of \$5 billion+ are relatively rare. By contrast, **public market indexes are increasingly concentrated.** In the U.S., the seven largest tech companies (“Magnificent Seven”) had a market capitalization of approximately \$13.6 trillion at the beginning of Q2 2024, representing 31% of the S&P 500’s market capitalization.

4. The evolution of private equity has coincided with a secular decline in long-term interest rates, which has arguably provided robust tailwinds. These tailwinds may fade as huge capital needs associated with the energy transition, large infrastructure investments and higher defense spending may lead to higher interest rates.

5. **We do not think that the partial reversal of falling interest rates will result in lower returns.** Despite the long-term decline in interest rates, leverage has played a declining role in buyout performance as value creation has switched from financial to operational and governance engineering. Recent research finds no evidence of negative trends in performance for any private equity strategy. Further, the same factors that might keep interest rates higher may bring about attractive investment opportunities. Although the number of portfolio companies has increased substantially, we believe that the demand for private equity and private credit remains strong. In the U.S., just 0.1% of companies are currently backed by buyout funds.

6. Traditionally, private equity’s investor base has comprised institutions with appropriate liability structures to commit capital with a long-term investment horizon, such as defined benefit (DB) pension plans, insurance companies, sovereign wealth funds, endowments, and foundations. Looking forward, we expect **individual investors to play an increasing role.** While ultra-high net worth individuals have allocated a rising share of the wealth to private equity and other forms of private capital through single- and multi-family offices, retail investors have had fewer options. However, with the proliferation of feeder funds, ever-green semi-liquid RIC and SICAV structures, fintech platforms, and the tokenization of assets playing an increasingly important role in intermediating retail capital, we believe that individual investors will become a major force on the supply side.

7. Under plausible assumptions, our illustrative medium-term scenario indicates that the share of individual investors in private equity AUM could quadruple between 2022 and 2030, potentially exceeding the share of life insurers and DB private pension plans. Led by individual investors, our medium-term scenario projects that private-equity **AUM could double from less than \$8 trillion in 2022 to approximately \$16 trillion in 2030.** Importantly, our medium-term scenario does not assume any significant allocations from defined contributions (DC) pension plans. In the United States, where DC plans, including 401(k) accounts, hold approximately \$10 trillion, recent decisions suggest that investments in illiquid assets could increase under certain conditions. While our assumptions may prove to be overly conservative, increased allocations from DC plans could result in the ultimate democratization of private equity and further enhance the availability of capital for private companies.

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1

Introduction

Private equity has been one of the fastest growing asset classes over the past four decades. Today, private equity funds manage assets totaling almost \$8 trillion.² While the number of listed companies has stagnated or even fallen in several major markets, the number of private equity-backed companies has continued to grow substantially. In the United States, there are more than 10,000 portfolio companies backed by buyout funds. Including investee companies backed by growth capital and venture capital, there are more than 33,000 businesses, which employ over 11 million people.³ In Europe, approximately 10.5 million people are employed by private equity-backed companies.⁴

What used to be a small cottage industry has morphed into a global business of more than 6,000 private equity firms. These firms have raised a large number of funds, intermediating capital across different strategies, sectors, deal sizes, and geographies. Limited Partners (LPs) in these funds have a wide choice to diversify their private equity portfolios, and a growing number of them co-invest alongside private equity funds or even invest directly in privately held companies.

For long-term investors, private equity has emerged as a core strategy. Initially considered as an alternative asset class, private equity has generally become an integral part of an investor's overall allocation to equities. While LPs' exposure to private equity varies considerably across different investor classes and even within individual classes, allocations have generally increased significantly over time. Depending on the liability structures and regulatory constraints, some LPs, especially those running family offices, endowments, and foundations, have allocated more capital to private equity than to listed companies. In managing their private equity portfolios, LPs have access to a secondary market, one of the most important innovations in private equity.

Arguably, the private equity industry would not have grown as rapidly as it did if net returns had not been consistently higher than in public markets. Investments in private equity are generally illiquid, notwithstanding the emergence of a secondary market. Investors require what has been labeled an illiquidity risk premium that compensates them for the inability to rebalance their overall portfolios continuously. There is ample research that finds that private equity has consistently outperformed public market indexes, and despite repeated claims that excess returns are diminishing as the private equity industry is becoming increasingly competitive, we find little evidence in support of this claim.

As we discuss in this paper, we believe that private equity has still substantial room to grow. From a capital deployment perspective, we note that the net asset value of private equity funds worldwide totals only around 5% of the global market capitalization of equity markets. In the United States, by far the largest market for private and public capital, approximately 0.1% of companies are backed by buyout funds. Most of the U.S. portfolio companies are small, employing on average fewer than 70 employees. While only a fraction of the total sample of companies shares the typical characteristics of portfolio companies that have the potential to generate excess returns, the sheer number of existing companies suggest that the overall investment universe is significantly larger than the amount of capital that has been deployed in the past. Most other countries are significantly less penetrated than the United States. Here, too, we believe there is considerable room for catch-up growth.

While we do not expect the growth of private equity to be constrained by the lack of attractive investment opportunities, from a capital supply perspective the question arises whether GPs are able to raise more capital from LPs. In this paper, we present a medium-term scenario where we consider different groups of investors. Under plausible assumptions about their average allocations to private equity and the expected increase in their AUM, we find that assets managed by private equity funds could double by 2030. Importantly, we expect significant shifts in the relative weights of different LP groups. More specifically, we believe that the share of individual investors will likely increase significantly over time as a growing number of vehicles to access the asset class becomes available to non-institutional investors.

The rest of this paper is organized as follows. Section 2 examines the performance of private equity relative to public markets and discusses concerns about the potential impact of higher interest rates. Section 3 juxtaposes the growth of private equity with developments in public markets. Section 4 discusses private equity's investor base and presents a medium-term scenario for the asset class. Section 5 finally concludes.

2

Buyouts in a New Interest Rate Regime

Persistent Outperformance Amid Robust AUM Growth

Private equity has been one of the fastest growing asset classes over the past few decades. In mid-2023, assets managed by private equity funds (Buyouts, Venture Capital, Growth Capital) totaled around \$7.9 trillion, 14.7 times more than at the end of 2000. Arguably, the key reason why LPs have meaningfully increased their allocations to private equity over time lies in the expected outperformance of the asset class. For the vintage years 2000 - 2019, global buyout funds have generated an average Public Market Equivalent (PME) of 1.25 vis-à-vis the Global Equity Markets Morningstar index – implying a cumulative return that was on average 25% higher than an investment in this benchmark would have achieved. In fact, over the past 20 years, there has been only one vintage year where global buyout funds

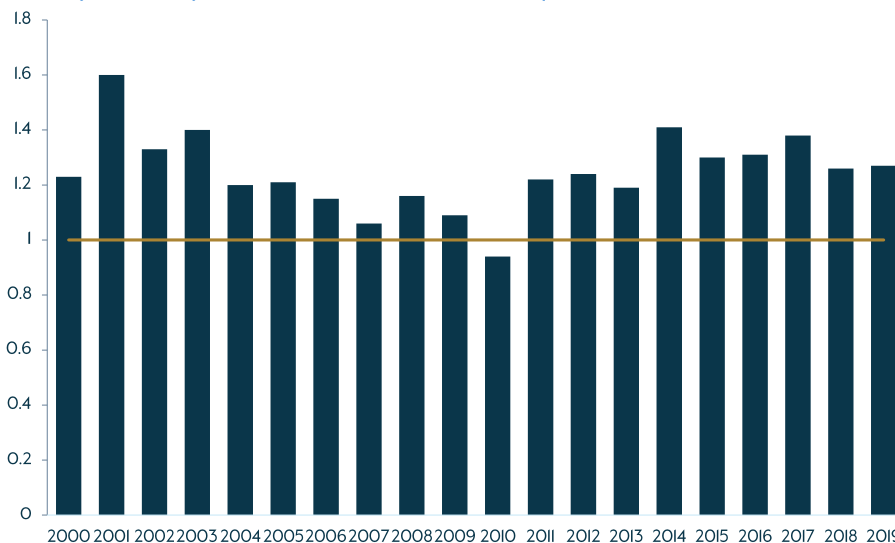
have generated moderately lower returns than global public equities (Figure 1).⁵ This vintage year was 2010 when public markets recovered strongly from one of the largest market corrections in history.

≈15x

Private Equity AUM Growth 2000 - 2022

Importantly, recent academic research finds no evidence of negative trends in private equity performance,⁶ and contrary to some claims,⁷ little suggests that public and private returns are converging. This is remarkable, given that the private equity landscape has become much more competitive, with the number of private equity firms having increased from less than one hundred to more than 6000 in just a few decades.

Figure 1. Global Buyouts: Kaplan-Schoar Public Market Equivalent, 2000 - 2019



Note: Values > 1 indicate outperformance relative to public equities, values < 1 indicate underperformance. Net global buyout performance compared to Global Equity Markets Morningstar index. Source: Pitchbook LCD. Accessed 4/9/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

Scaling Without Lowering Returns – Unlike in Public Markets

While private equity as an asset class has continued to outperform amid strong absolute and relative NAV growth, academic research finds similar evidence at the fund level. Although individual private equity funds have become substantially larger, there is little evidence that there are negative scale effects with respect to returns. In regressions examining fund performance using PME's, Harris et al. (2014), for instance, fail to find a significant relationship between fund size and buyout fund returns. While some studies even find a positive relationship, others report insignificant scale effects.⁸

25%

Average Cumulative Outperformance of Global Buyout Funds Against Public Benchmark, 2000 - 2019

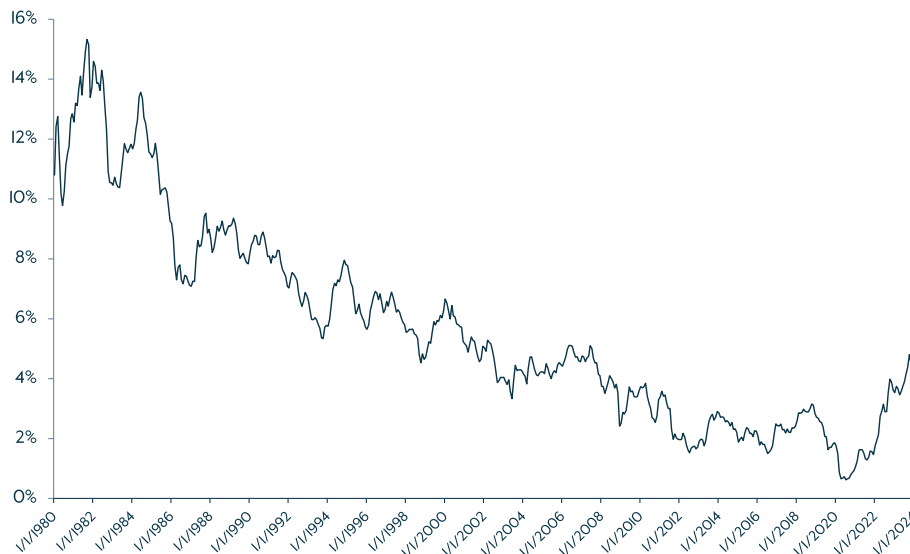
It is important to note, that this evidence is significantly different from public markets where declining returns to

scale are well-documented in public asset investment strategies such as mutual funds and hedge funds. For instance, Pastor et al. (2015) provides robust empirical validation of decreasing returns at the industry level by analyzing the interaction between skill and scale, strongly rejecting constant returns to scale in active management in favor of decreasing returns.⁹

Fading Tailwinds – Reason for Concern?

The rise of private equity as an asset class, which has been driven by persistent outperformance, has coincided with a secular decline in long-term interest rates (Figure 2). To the extent that the fall in interest rates has provided tailwinds for private equity investing and performance,¹⁰ the question arises as to whether private equity's growth trajectory can be sustained if these tailwinds fade. This question has come up in the context of aggressive monetary tightening to rein in inflation caused by COVID-related macroeconomic imbalances. However, the bigger issue is the medium- to long-term outlook for interest rates. There are huge investment needs due to an aging infrastructure and the energy transition, and with defense spending expected to rise amid substantial geopolitical tensions, the expected increase in the demand for capital could imply a turning point where private equity might operate in a new interest rate regime.

Figure 2.
United States: 10-Year UST Yield, 1980 - 2024



Source: FRED database. Accessed 4/9/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

To be sure, private equity is not immune to changes in financial market conditions and the broader investment environment. In periods of heightened risk premiums amid macroeconomic shocks and market dislocations, LBO volume has generally declined. This has been the case in the early 2000s amid the bursting of the dot.com bubble, during the GFC, and more recently, in the context of aggressive monetary tightening. Private equity returns have also been cyclical, albeit following differing dynamics. In fact, vintage year returns have been particularly strong in periods of dislocations when assets were bought at lower entry multiples, while sales and margins of portfolio companies benefited from the subsequent recovery in the business cycle (Figure 3).

Cyclical variations in deal activity and performance are likely to persist. However, we believe that the long-term growth trajectory of private equity investing will remain intact, even if interest rates remain higher than in previous years. There are several reasons for this.

First, although long-term interest rates have followed a downward trend since the early 1980s, leverage has played a diminishing role. As a result, equity contributions have followed a rising trend, subject to cyclical variations reflecting debt market conditions (Figure 4). In 2023, equity contributions in U.S. buyouts averaged 52%, up from approximately 10% in the late 1980s.

As we discussed in a recent White Paper, the secular decline in leverage and the rise in equity contributions reflects a fundamental shift in the private equity model over time.¹¹ Previously, buyouts had focused on the “problem” of agency costs of free cash flow, where large debt loads instilled discipline and returns varied in relation to the cost of that debt. However, following the paradigm shift, successful investors mainly focused on the exploitation of organic growth opportunities and commercialization of technology and intangible assets.

As Carl Ferenbach, one of the co-founders of Berkshire Partners, explains:

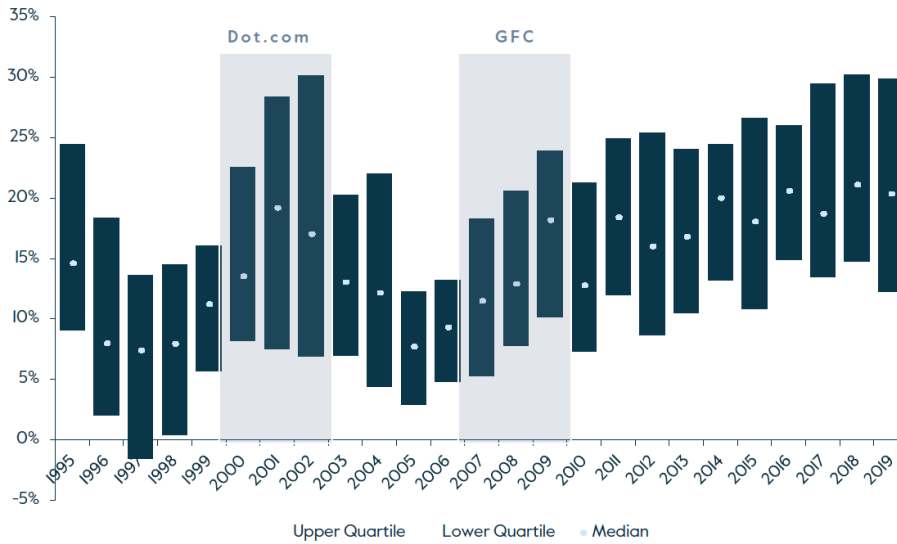
(In the 1980s), “we viewed most of the change in value as happening on the day you closed the deal; we created value mainly by changing the financial structure and managers’ incentives.” ... (However), “in the ’90s, we and most of the PE industry all started to move toward growth as part of the objective... And once we started to think about growth instead of just cash flow, we then had to think much more about strategy and management. We now had a business plan—one that included growth as well as efficiency—that we had to deliver on.”¹²

An important catalyst of this shift was the recession of the early 1990s in the United States, which led to a significant rise in defaults and higher risk premiums in the leveraged finance markets. We believe that this new emphasis on growth, while reducing the amount of leverage in PE’s portfolio companies, has opened the door to entire new industries, whose cash flows are less predictable but where faster earnings growth can be attained in expanding markets through strategic and operational improvements. In pursuing such opportunities, GPs have put substantial emphasis on strategic due diligence, analyzing the demand dynamics for the goods and services offered by the investment target; the company’s customers; the competitive landscape in which the investment target operates; the broader business environment (e.g., regulatory framework and technological trends); and the microeconomic drivers of generating profits. This assessment guides GPs’ investment decisions and helps them identify and design necessary operational and strategic measures. Implementing these measures require appropriate governance structures, which has been labeled “governance engineering.”¹³

Importantly, less leverage has not led to lower returns. Instead, the greater emphasis on operational and governance excellence has led to a profound shift in the relative weights of the underlying value drivers. In our co-investment portfolio, we find that deleveraging has played virtually no role in the best-performing transactions as free cash flow has been used to fuel growth rather than repay debt.¹⁴ Given these structural changes in value creation, we do not believe that higher interest rates necessarily undermine returns.

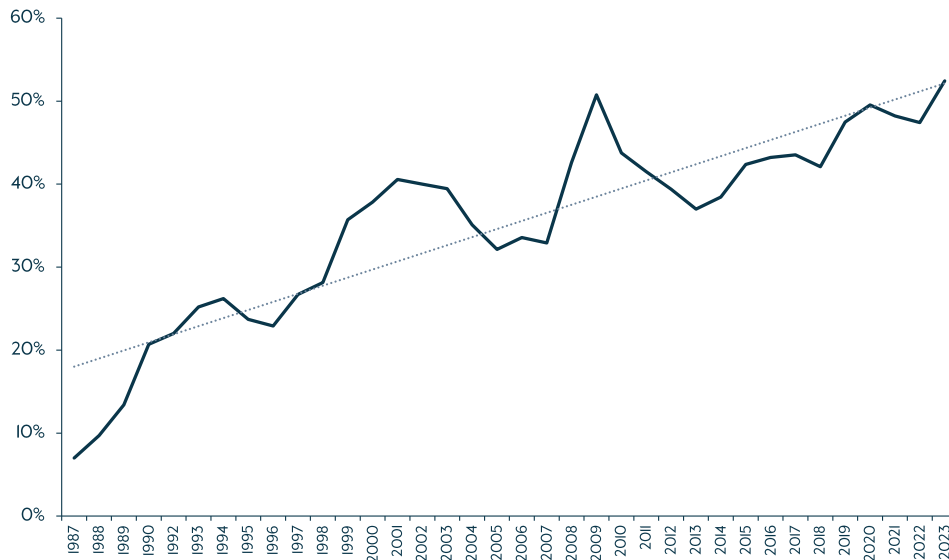
The second reason why we believe that private equity is less dependent on leverage is the availability of co-investment capital. While co-investments played a very limited role in the 1990s and even in the early 2000s, the co-investment market has expanded rapidly as LPs have focused on enhancing their net returns by averaging down the fees in their private equity programs. We estimate that co-investments have totaled more than \$100 billion annually in the past few years. From a GP perspective, co-investments have several important advantages as well. One is that they may pursue more and larger deals even in periods where debt financing is scarce. Thus, deal volume has become less sensitive to financial market conditions. Although buyout activity has moderated from their record levels in 2021 and the first half of 2022 as central banks have progressively tightened monetary policy, the adjustment has been considerably less compared to previous episodes of dislocations, especially the GFC.

Figure 3.
United States: Buyout Vintage Year Net IRRs



Source: Pitchbook. Accessed 4/7/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

Figure 4.
United States: Equity Contributions in Leveraged Buyouts, 1987 - 2023



Source: Pitchbook LCD. Accessed 4/9/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

Third, the leveraged finance market has been subject to substantial innovations. While leverage has traditionally relied on leveraged loans and high-yield bonds, direct lending has played an increasingly important role. With banks having significantly tightened their lending standards in a rising rate environment, direct lenders have helped fill the void. It is estimated that direct lending accounted for approximately 40% of leverage finance in the U.S. market in 2023, almost as much as institutional loans (45%) and far more than high-yield bonds (15%).¹⁵ To be sure, direct lenders tend to charge somewhat higher interest rates. However, there is much more certainty that a transaction gets closed in an environment of significant market uncertainty.

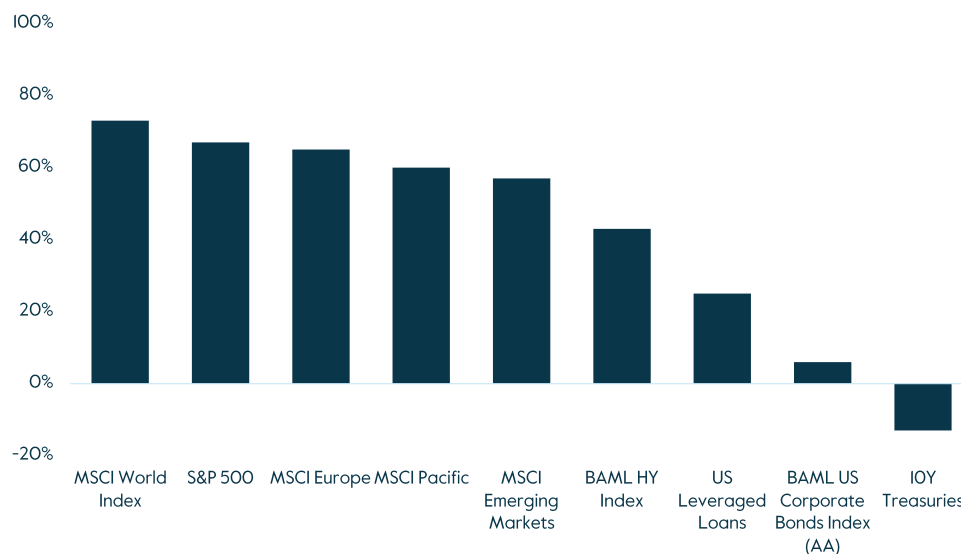
Finally, to the extent that interest rates remain higher because of larger capital needs related to infrastructure investments, the global energy transition, and increased defense spending, this creates investment opportunities for private capital. The public sector is unlikely to be able to fund the capital needs in these areas. PWC estimates that necessary investments in infrastructure alone will require almost \$4 trillion annually over the next decade.¹⁶ Meanwhile, the financial costs of meeting the United Nations' Sustainable Development Goals (SDGs) are estimated at \$5 trillion to \$7 trillion annually. Clearly, the private sector, and, more specifically, private equity and other forms of private capital,

will need to play a critical role, if these capital needs are to be met.

Potential Diversification Gains

While excess returns are arguably the main motivation for LPs to allocate capital to private equity, there are additional potential benefits to be had. Returns in private equity are found to be imperfectly correlated with public market returns, suggesting that portfolio returns might increase at a given level of risk by adding private equity, or that portfolio risk might be lowered at a given level of returns (Figure 5). For instance, we find a correlation between global buyout returns and the MSCI World Index of 73%; as far as the S&P 500 and the MSCI Europe indexes are concerned, the correlation coefficients are even lower (67% and 65%, respectively). Importantly, within private equity portfolio there is additional scope for diversification, with returns in different segments (e.g. buyouts versus venture capital) or strategies (primary funds, versus secondaries) following different dynamics.

Figure 5.
United States: Return Correlations Between Buyouts and Select Asset Classes



I-Quarter Pooled Horizon Net IRR Index Returns.
Source: Bloomberg, Pitchbook LCD. Accessed 4/9/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

3

Public Versus Private Markets

While we see little reason to expect higher interest rates to result in lower returns, an important question is whether the universe of investment targets is large enough to deploy a continuously increasing amount of capital without compromising performance. In 2019 – 2023, U.S. buyout funds acquired companies with a deal value of \$1.3 trillion, with buyouts in Europe, Asia, and the rest of the world adding another \$1.3 trillion, global deal volume amounted to \$2.6 trillion, or approximately \$520 billion per year in 2019 – 2023 (Figure 6).¹⁷ By comparison, global deal volume in the second half of the 1990s averaged less than \$60 billion per year, around one-tenth of today’s buyout activity. While investment activity has gained substantial momentum over the past few decades, the following analysis leads us to conclude that the demand for private capital – and hence the universe of investment opportunities – is likely to remain large.

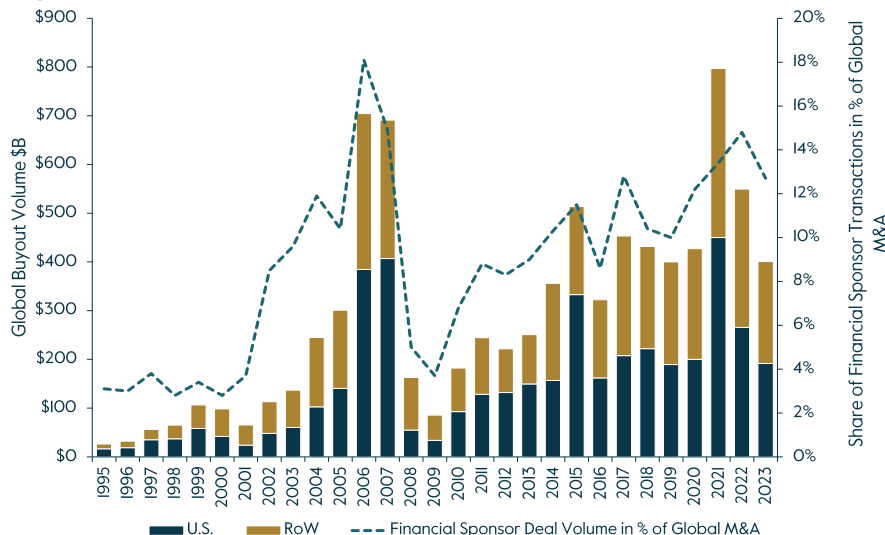
Private Equity Assets Outpace Public Market Capitalization

In addressing the question whether there remain a sufficient number of investment targets that share the typical characteristics of companies where buyouts can create sufficient value to meet financial sponsors’ return expectations, we start by juxtaposing private equity growth with public markets. In fact, we find that private equity as an asset class has grown significantly faster than public equities. In 2022, the net asset value of private equity funds (AUM minus unfunded commitments) totaled almost \$5.5 trillion worldwide, up from less than \$300 million in 2001, implying a CAGR of approximately 15.5%. During the same period, the market capitalization of global equity markets rose from around \$28 trillion to \$101 trillion, with a CAGR of approximately 6.3%.

15.5%

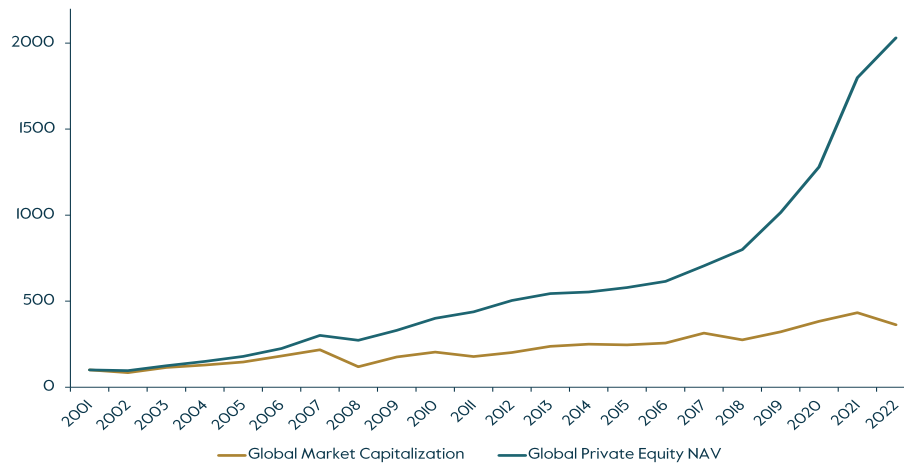
CAGR of NAV of Private Equity Assets, 2001 - 2022

Figure 6. Leveraged Buyout Volume Worldwide, 1995 - 2023 \$B



Source: Dealogic Accessed 3/4/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

Figure 7.
Global Market Capitalization versus Global Net Asset Value of Private Equity Funds, 2001 – 2022 (2001 = 100)



Source: SIFMA & Preqin. Accessed 3/4/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

In Figure 7, we index both time series to compare the growth dynamics over time. While private and public markets followed relatively similar trajectories prior to the GFC, private equity has shown explosive growth since 2010. The divergent trends reflect a significant increase in commitments that have allowed private equity funds to deploy more capital. At the same time, however, the unrealized value of the funds' underlying portfolio companies increased considerably faster than public market valuations, which is consistent with reported outperformance of private equity discussed in the next section.

2.1x

Growth Differential Between Private Equity Funds and Open-End Equity Funds

Substantial Growth Differential Between Private Equity Funds & Open-End Equity Funds

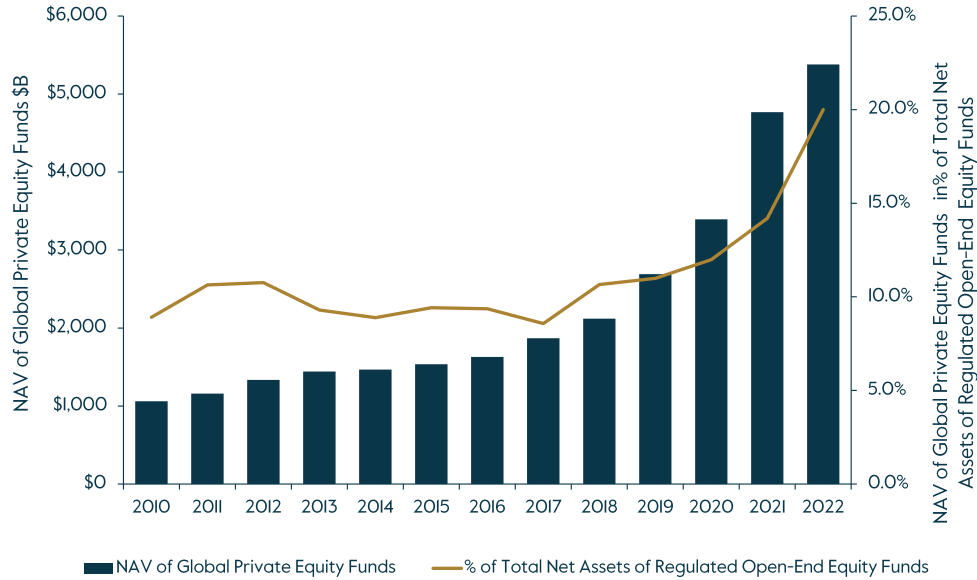
Another way to look at the relative growth of private versus public markets is to compare the NAV of private equity funds with the net assets of regulated open-end equity funds. These funds include mutual funds, exchange traded funds (ETFs) and institutional funds, investing in publicly traded

companies. Globally, their net assets stood at \$11.9 trillion at the end of 2010. This amount was more than 11x more than the NAV of private equity funds at that time (Figure 8). By the end of 2022, net assets of open-end funds had increased to \$26.9 trillion. However, the NAV of private equity funds rose much faster during this period, compressing the multiple to just 5x between open-end equity funds and private equity funds worldwide.

More PE-Backed Companies, Fewer Publicly Traded Companies

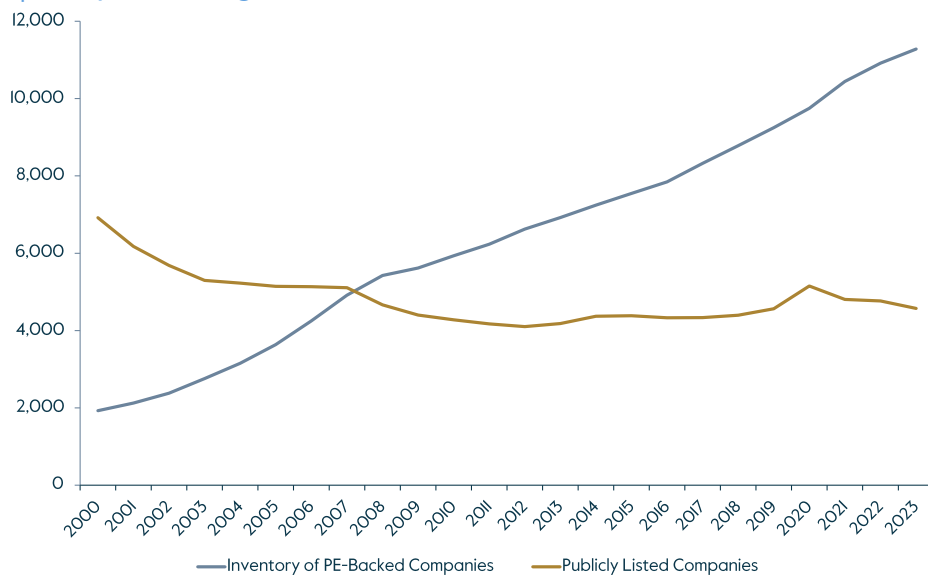
As larger commitments to private equity partnerships have enabled funds to acquire more assets, the inventory of portfolio companies has increased meaningfully. In the United States, approximately 1930 portfolio companies were owned by buyout funds in 2000. At that time, more than 6900 domestic companies were listed on U.S. stock exchanges. During the buyout boom in the mid-2000s, the inventory of private equity-backed companies more than doubled as funds had more capital to deploy. In public markets, however, the number of listed firms shrank amid de-listings due to increasingly stringent regulation or failures to comply with certain listing requirements.

Figure 8.
 Net Asset Value of Global Private Equity Funds versus Net Assets of Regulated Open-End Equity Funds



Source: SIFMA & Preqin. Accessed 3/4/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

Figure 9.
 United States: Inventory of Buyout-Backed Companies versus Publicly Listed Companies, 2000 - 2023



Source: Pitchbook. Accessed 3/9/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

2.5x

More Buyout-Backed Companies than Public Companies in the United States

Further, fewer companies decided to list on U.S. stock exchanges.¹⁸ While the increased regulatory burden of going public has probably played a critical role, improved access to private capital has been important, too. For a successful entrepreneur, an IPO used to be the sole exit route to diversify their net worth. However, with private capital becoming increasingly available, it has gradually displaced public listings as the preferred source of capital and liquidity for founders and management teams. With private capital potentially providing a more efficient mechanism to sell a stake in the business and gain a partner to facilitate next-stage growth, demand for private capital has grown commensurately with its supply, helping to explain continued outperformance.

Another factor were public-to-private transactions, with 342 publicly listed companies reported to be taken private by private equity funds between 2013 and 2023.¹⁹ Reflecting these divergent trends, by 2008 there were more private companies owned by private equity funds than publicly listed companies. Today, approximately 11,300 U.S. portfolio companies are backed by buyout capital compared to fewer than 4,600 listed companies (Figure 9).

Deal Values and the Distribution of Market Capitalization

Valuations of private equity-backed companies are generally not available. However, some data vendors do report deal values in LBOs when such transactions are announced or completed. Dealogic reports 2,581 announced LBOs in the U.S. market between 2020 and March 15, 2024.²⁰ Of these transactions, 413 include information about deal values, with a total deal volume of \$894 billion. The sample is likely biased towards larger transactions, which tend to be more visible. The 15 largest transactions are LBOs with a reported deal value of \$10 billion or more, totaling almost 25% of the overall deal volume during the sample period.²¹ With deal values of smaller deals more likely to be missing, the average deal size amounts to \$2.16B, while the median LBO in this sample is \$950 million.

Despite the sample bias towards larger transactions, and some high-profile multi-billion-dollar buyouts, we find that LBOs are relatively small compared to public companies. For instance, the average market capitalization of the

Russell 2000, a U.S. small-cap index, was approximately \$4.1 billion at the end of February 2024, with the capitalization of the median company in the index amounting to \$940 million (Table 2). By comparison, the Wilshire U.S. Small Cap Index had an average market capitalization of approximately \$7.8 billion, with the median company reported to have a market capitalization of \$3.7 billion. Meanwhile, the most comprehensive index, the Wilshire 5000 index, which includes 3,403 stocks, had an average and median market capitalization of \$594 billion and \$1.42 billion, respectively.

Table 2. Deal Value in U.S. Buyouts versus Market Capitalization of Selected Indexes

Deal Value/Market Capitalization	Average \$B	Median \$B
U.S. Buyouts (2020 – 2024)	2.16	0.950
S&P 500	89.26	33.710
Wilshire 5000	593.96	1.42
Wilshire 4500	7.09	0.93
Wilshire U.S. Large Cap	681.92	36.64
Wilshire U.S. Small Cap	7.83	3.71
Russell 2000	4.08	0.94
Russell 3000	693.99	2.20

Source: Dealogic, S&P Global, FTSE Russell, FT Wilshire. Market Capitalization as of 2/29/24.

Private Equity Focusing on Smaller Companies

Focusing on the number of employees of portfolio companies rather than deal values provides additional insights. Generally, sponsored acquisitions involve smaller companies. According to a recent study for the American Investment Council, 85% of the 18400 portfolio companies held by buyout and growth capital funds in the United States at the end of 2022 had fewer than 500 employees (Table 3).²² More than 60% of the portfolio companies had fewer than 100 employees. Conversely, only around 2% of the companies had more than 5000 employees. The median private equity backed business in the United States employed 69 employees in 2022.

Table 3. United States: Private Equity-Backed Companies versus Total Number of U.S. Businesses

Number of Employees	Private Equity-Backed Companies	Overall Number of U.S. Companies
<10	2,600	14,897,367
11-50	4,800	1,242,421
51-100	3,900	153,318
101-500	4,400	123,115
501-1000	1,000	19,218
1001-5000	1,300	18,415
5001+	400	5,666
Unrecorded		1,773,047
Total	18,400	18,232,567

Source: NAICS, EY, accessed 4/10/24.

Overall, only approximately 0.1% of U.S. businesses were owned by private equity funds at the end of 2022. While the number of private equity-backed companies has more than quintupled since the early 2000s, there are no signs of a possible shortage of companies in which private equity funds could invest. Of course, not all companies require capital or share the characteristics that would render them as potential LBO or growth capital targets. However, the sheer number of businesses in the United States suggests that there remains substantial potential for private equity to continue to play a growing role in providing capital to U.S. companies. While we expect allocations to private equity to continue to grow, with individual investors playing an increasingly important role, we do not think that the rise in available capital will lead to a disequilibrium, potentially undermining returns. While this “money-chasing-deals” phenomenon has been documented for the venture capital industry, we see little evidence of capital deployment constraints relative to expected inflows into private equity funds.²³ While the European and Asian markets are more heterogenous, similar observations apply.

4

The Growing Role of Individual Investors

Who Are the Ultimate Asset Owners?

Turning to the supply side, will investors continue to commit more capital to private equity? Today, the global investor base comprises almost 8400 institutions, with the majority based in North America (Table 4).²⁴ While Europe and Asia represent 23% and 13%, respectively, there is a rapidly growing LP base in the rest of the world as well, especially in the Middle East, but also in Latin America and Africa. The global investor base is highly diverse not only in terms of where LPs are based but also with respect to the different types of investors. These broad groups vary substantially regarding the amount of assets they own as well as the share they typically allocate to private equity. Even within each group of asset owners, there is a substantial variation across individual investors in terms of their target and actual exposure to private equity. However, many investors have already allocated a significant share of their capital to private equity, and although private equity has outperformed public benchmarks by a substantial margin, the specific liquidity and cash flow characteristics of private equity investing as well as regulatory constraints may limit additional allocations.

The future role of private equity will essentially depend on two factors – the growth of AUM of long-term investors and the share of AUM that is allocated to private equity. At the end of 2022, it is estimated that investors who may in principle invest in private equity owned assets valued at almost \$150 trillion worldwide (Figure 10). These investors held private equity assets of a bit more than \$7.7 trillion, implying an average allocation of approximately 5% to private equity. While there is very limited consistent information about allocations of individual investors, anecdotal evidence suggests there is substantial variation of allocations across different types of investors. At the one end of the spectrum are life insurance companies, which are constrained by their liability structure and are subject to stringent regulation. At the other end of the spectrum are endowments, foundations, and family offices that face fewer investment constraints and generally seek a comparatively higher exposure to private equity and other forms of private capital. In our experience, private equity allocations of 20% – 30% are not uncommon.

Table 4. Global Investor Base of Private Equity

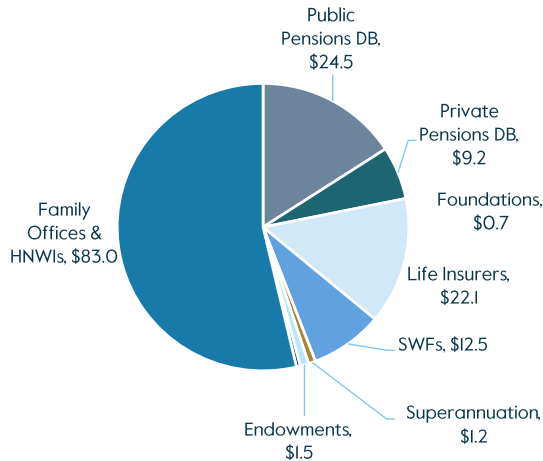
Investor Type	North America	Europe	Asia-Pacific	Rest of World	Total
Endowments	709	45	30	14	798
Family Offices - Single	526	505	384	290	1705
Family Offices - Multi	308	316	219	66	909
Foundations	1254	172	41	9	1476
Insurance Companies	248	227	208	44	727
Private Pension Plans	1062	399	88	123	1672
Public Pension Plans	548	248	39	125	960
Sovereign Wealth Funds	9	13	17	25	64
Superannuation Schemes	2	1	55	1	59
Total	4666	1926	1081	697	8370

Source: Preqin, accessed 4/10/24.

Family offices and High Net Worth Individuals (HNWIs) are found to own the largest amount of assets, totaling \$83 trillion in 2022 and accounting for approximately 55% of total AUM owned by long-term investors.²⁵ This group is highly diverse, ranging from “*Millionaires Next Door*” (owning assets between \$1 million to \$5 million) to “*Mid-Tier Millionaires*” (\$5 million – \$30 million) to “*Ultra-HNWIs*” (\$30+ million).

As far as “*Millionaires Next Door*” are concerned, their number is estimated at 19.524 million worldwide. With assets of at least \$1 million, these individuals qualify as “accredited investors” in the United States. Their status allows them to participate in certain offerings that are not registered with the U.S. Securities and Exchange Commission (SEC). “*Millionaires Next Door*” possess the highest share of wealth owned by HNWIs, amounting to almost \$36 trillion, or 43.3% of assets owned by HNWIs globally. We consider this group as retail investors, their access to private equity and other illiquid assets is generally limited to retail products. There is no information about their exposure to private capital, but we believe that it is still very small as the retail market has evolved only recently.

Figure 10. Global Investor Base, Assets Under Management End-2022, \$T



Source: Cap Gemini, OECD, Preqin, SIFMA, SWF Institute. For illustrative purposes only. Accessed 4/10/24.

In the middle of the global wealth pyramid, “Mid-Tier Millionaires” are estimated to own approximately \$18.8 trillion (22.7%). With assets of at least \$5 million, people that fall into this group generally enjoy “qualified purchaser” status in the United States. Qualified purchasers are able to participate in a broader range of investment opportunities than is open to accredited investors. Consisting of around 1.98 million individuals, “Mid-Tier Millionaires” are likely to be quite heterogenous. While the lower end of the spectrum, say \$5 million - \$10 million, could still be subsumed under retail investing, at the upper end there are likely to be individuals who may invest in illiquid assets via multi-family offices.

20+ Million

Potential Individual Investors Worldwide

Finally, the group of ultra-HNWs is equally diverse. With 210,000 people estimated to fall into this category, ultra-HNWs own assets totaling approximately \$28 trillion worldwide. This group includes 2540 people who are listed on Forbes’ global billionaires’ ranking.²⁶ As a group, ultra-HNWs are likely to have the greatest exposure to private capital. However, while some may invest in illiquids through the retail market, at the upper end this group includes single-

family offices with substantial allocations to private equity and similar asset classes. These single-family offices may be considered as institutional investors rather than retail investors.

Collectively, the three groups of HNWLs are estimated to have allocated 13% of their wealth to alternatives, implying an exposure of around \$10.8 trillion. However, this category is very broadly defined, encompassing not only illiquids but also hedge funds and digital assets. As far as illiquids are concerned, investments include commitments to private capital funds as well as co-investments and direct investments in privately held companies, real estate assets etc. We estimate that HNWLs’ exposure to private equity via fund structures accounted for approximately 20% of their total exposure to alternatives. Estimated at around \$2.2 trillion, this exposure represented around 29% of total AUM held by private equity funds worldwide.

A Medium-Term Scenario

In developing a medium-term exposure scenario, it is useful to reclassify the different groups of HNWLs. Specifically, we assume that 30% of those labeled as ultra-HNWs invest in private equity through single family offices. The remainder of ultra-HNWs are assumed to invest via multi-family offices. Additionally, we assume that the top-30% of those classified as “Mid-Tier Millionaires” seek exposure via multi-family offices as well. All others are assumed to be individual or retail investors.

As far as single-family offices are concerned, we assume that their average exposure to private equity funds averages 8% of their total assets, which are estimated at approximately \$8.5 trillion. This assumption takes into account that many single-family offices invest a significant share of their AUM in other illiquids and absolute return strategies and seek exposure to private equity not only via fund investments but also through direct and co-investments. Multi-family offices generally have comparatively lower exposure targets for private equity and other illiquids, and some of them have yet to invest in those asset classes. We assume that their exposure to private equity via fund structures averages 5% of their AUM. Finally, while retail investors account for the largest share of assets owned by HNWLs, their exposure to private equity is still far lower as investment opportunities in illiquids are far more limited.

While different sources report estimates of the total AUM of different classes of institutional investors, there is no consistent information about their individual asset allocation to different asset classes. From our conversations with LPs, we believe that the percentages shown in Table 5, column 2, are broadly representative, notwithstanding substantial variations across individual LPs in each class. Multiplying the assumed average allocations to private equity funds with the total AUM owned by each investor class implies a total

amount of approximately \$7.7 trillion, which is nearly the same as the AUM reported by private equity funds (\$7.85 trillion).²⁷

Looking forward, AUM growth of private equity funds will mainly depend on two variables – (i) the growth of total AUM by different LP classes, and (ii) the share each class will allocate on average to private equity funds. As far as HNWIs are concerned, we assume that their AUM continue to grow at a CAGR of 7% between 2024 and 2030, the same rate as in 2015 – 2023. While we assume AUM growth of 6% for SFWs, endowments and foundations, demographic factors, coupled with regulatory constraints, suggest somewhat lower average growth rates for public and private pensions (5%), life insurers (4%), and superannuation schemes (3%).

Average allocations to private equity by LP types may change for two reasons. First, because existing LPs decide to change their desired exposure, and second, because investors that had no exposure to private equity hitherto decide to include this asset class in their portfolio mix. As far as public and private pension funds, life insurers and superannuation schemes are concerned, most large

institutions have already invested in private equity. For these LP classes, we assume that they want to increase their average exposure to private equity by 1 percentage point relative to their current allocations by 2030. For instance, this would imply that private equity accounted for 9% of public pension funds' AUM in 2030. For SWFs (+1.5 percentage points) and endowments and foundations (+2 percentage points), somewhat higher growth targets are assumed.

Table 5.
Medium-Term Scenario of AUM Growth and Allocations to Private Equity

Institution	Total AUM 2022 (\$T)	Average Allocation to PE Funds 2022	Total PE Exposure 2022 (\$T)	Total AUM 2030 (\$T)	Average Allocation to PE Funds 2023	Total PE Exposure 2030 (\$T)
	(1)	(2)	(3)	(4)	(5)	(6)
Endowments	1.5	15.0%	0.2	2.3	17.0%	0.4
Family Offices - Single	8.5	8.0%	0.7	14.6	10.0%	1.5
Family Offices - Multi	25.4	5.0%	1.3	43.7	7.5%	3.3
Individual Investors	49.5	0.5%	0.2	84.9	2.5%	2.1
Foundations	0.7	14.0%	0.1	1.1	16.0%	0.2
Insurance Companies	22.1	3.5%	0.8	30.2	4.5%	1.4
DB Private Pension Plans	9.2	8.0%	0.7	13.6	9.0%	1.2
DB Public Pension Plans	24.5	8.0%	2.0	36.2	9.0%	3.3
Sovereign Wealth Funds	12.5	13.0%	1.6	19.9	14.5%	2.9
Superannuation Schemes	1.2	5.0%	0.1	1.6	6.0%	0.1
Total	154.9	5.0%	7.7	248.0	6.5%	16.2

Source: Alpinvest, OECD, SIFMA, SWF Institute, Preqin. Accessed 4/6/24. For illustrative purposes only.

HNWIs, including family offices, are not only asset owners whose AUM is expected to continue to grow faster than assets owned by institutional investors; many of them still seem to be under-allocated to illiquids. This applies especially to individual investors, whose assets generally fall into the categories of “Millionaire Next Door” (accredited investors, AUM up to \$5 million) and “Mid-Tier Millionaires” (qualified purchases, at least \$5 million and up to \$30 million). While the potential benefits of private equity investing – excess returns and portfolio diversification – apply to individual investors as well, many of them have been unable to access institutional quality private equity funds as minimum commitments generally start at \$2 million, often even higher. However, as the retail market continues to evolve and more retail products become available (including feeder funds, RICs, SICAFs, and fintech platforms), we expect retail investors to seek greater exposure to private equity and other illiquids. This process is likely to be gradual, with allocations to be increased on average by 2 percentage points by 2030. However, given the enormous wealth owned by individual investors, we believe that this LP class will play an increasingly important role as providers of private capital.

Under the assumptions outlined above, AUM of long-term investors could increase to \$248 trillion by the end of the scenario horizon. Given assumed allocations to private equity, AUM of private equity funds could rise to around \$16 trillion, implying an average allocation of 6.5%, up from 5% in

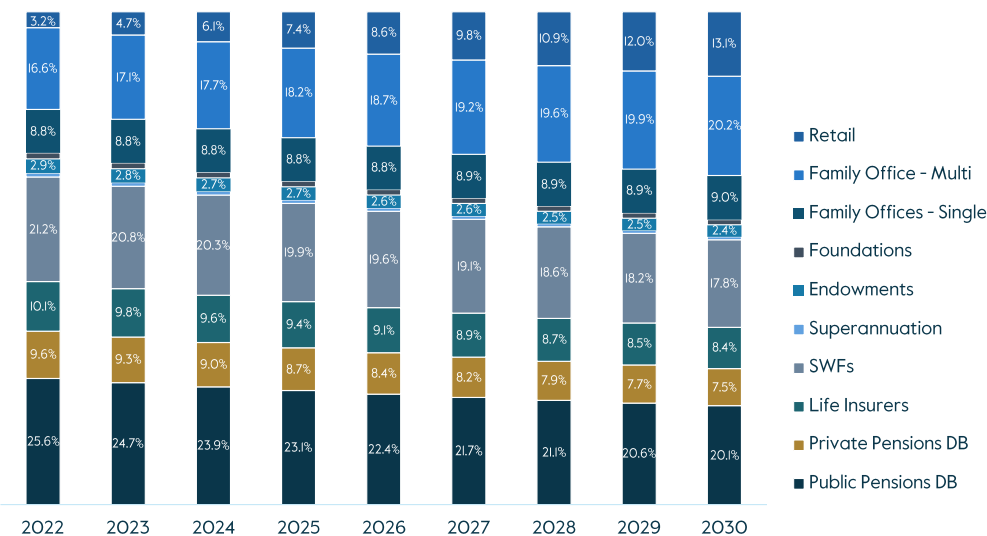
2022. The assumed increase in private equity AUM would imply a CAGR of 10.0% in the current decade, moderately less than in the 2000s (11.4%) and the 2010s (11.0%).

4.1x

Increase in Share of Individual Investors in Private Equity AUM, 2022 - 2030

Importantly, in this scenario, individual investors would own around 13% of AUM held by private equity funds, up from just 3% in 2022 (Figure 11). Additionally, multi-family offices and single-family offices would increase their respective shares as well, albeit to a lesser degree. By contrast, the share of institutional investors would shrink. While institutional investors worldwide accounted for more than 70% of the private equity market in 2022, their share could drop to around 58% by the end of the decade, with retail investors assumed to be the major driver of this substantial shift in private equity’s LP base.

Figure 11
Medium-Term Scenario of Relative Share of Investor Groups in Private Equity



Source: SIFMA, SWF Institute, Preqin. Accessed 3/9/24. For illustrative purposes only. There is no assurance that any trends shown will continue.

We want to stress that the outlook presented here is a scenario and not a forecast. Actual developments may turn out to be significantly different from this scenario, depending, among other things, on the growth of assets owned by different investor groups, the relative performance of different asset classes, risk-return preferences of investors, and hence asset allocations. That being said, we are confident that the retail market will gain considerable momentum in coming years.

5

Final Thoughts

In this paper, we have presented a medium-term scenario for private equity as an asset class. While private equity has been one of the fastest growing asset classes over the past few decades, we believe that there remains considerable growth potential in the future. Historically, private equity funds have outperformed public markets, and we see little evidence of converging returns. The universe of potential investment targets remains large, despite the significant increase in the number of portfolio companies over time. Financial assets owned by long-term investors are likely to continue to grow, and many LPs still seek to increase their exposure to private equity. Retail investors have very little, if any, exposure to private equity because of the general inaccessibility of this asset class for non-institutional investors. However, with important efforts underway to develop tools that open up private equity to retail investors, we anticipate significant inflows of capital in the future.

It is important to note that our medium-term scenario assumes that DC pension plans continue to refrain from investing in illiquid assets. In the United States, assets held in DC retirement accounts amounted to almost \$10 trillion in Q3 2023, of which approximately \$7 trillion were held in 401(k) accounts. While there is a secular shift from DB to DC plans, the latter, and especially 401(k) accounts, generally do not allocate capital to private equity and other illiquids.²⁸

However, this might change. Since 2020, the U.S. Department of Labor (DOL) has, in principle, paved the way for DC plans, including 401(k) accounts, to allocate capital to alternative asset classes. In an Information Letter issued on June 3, 2020, in response to an inquiry by private equity fund of funds managers, the DOL essentially opened the door for plan sponsors to invest in alternatives, including in private equity.²⁹ In 2021, the DOL clarified that

“a plan fiduciary would not, in the Department’s view, violate the fiduciary’s duties under section 403 and 404 of ERISA solely by reason of offering a professionally managed asset allocation fund with a PE component as a designated investment alternative subject to important conditions set forth in the letter. Rather, the Information Letter confirmed that, as with any plan investment, plan fiduciaries must determine that an investment that includes PE is, among other things, prudent and made solely in the interest of the plan’s participants and beneficiaries.”³⁰

Importantly, the letter provides DC plan providers an outline of how to avoid financial liability, a critical precondition for the wider adoption of private equity in DC plans as evidenced by a recent case brought against Intel.³¹ While the DOL does not specifically indemnify plan providers, it has been argued that with these guidelines there is now some method to avoid losing a litigation battle.³² This outline includes three critical components. First, a fiduciary must be convinced that adding a private equity component would provide a more diversified investment opportunity with an appropriate net return once considering risk and fees. Second, it must determine if an appropriate plan fiduciary with the required knowledge and skill to understand the private equity investment will manage the fund. Third, a fiduciary must ensure that the fund has limited exposure to PE and has established a method of responding to liquidity events.

Given its historical outperformance of private equity, adding private equity to the portfolio mix of DC plans could bring about important benefits for DC plan participants. Specifically, private equity may help improve the available Sharpe ratio for DC investments through increased returns, potentially enhanced by lower risk due to portfolio diversification.³³ Notwithstanding these important benefits, we believe that the inclusion of private equity will be gradual as DC plan sponsors develop investment strategies for illiquids that are in compliance with their overall fiduciary duties. However, given the sheer amount of assets held in DC accounts, even small allocation shifts into private equity could result in a material increase in the availability of capital for private investments, while fostering the democratization of finance.³⁴

¹ Diversification does not necessarily lower risk.

² Private equity funds defined as partnerships investing in leveraged buyouts and providing venture capital and growth capital. Excludes funds of funds and secondary funds. Preqin, accessed 4/11/24.

³ Pitchbook and American Investment Council, accessed 4/11/24.

⁴ Invest Europe, accessed 4/11/24.

⁵ A standard measure of excess returns in private equity is the Public Market Equivalent (PME), which allows a direct comparison of net returns in private equity with the performance of equally timed investments and divestments in public markets, with standard indexes, such as the S&P 500 or the MSCI World Index, serving as public benchmarks. There are various versions of the PME. The most widely used PME concept is the Kaplan-Schoar PME. It is calculated as the ratio of the sum of discounted distributions to the sum of discounted capital calls, where the discount rate is the total return on the relevant public equity benchmark from an arbitrary reference date to the date of the cash flow in question. A fund with a KS-PME greater than one outperformed the benchmark (net of fees); a fund with a KS-PME less than one underperformed. While the KS-PME is a cumulative measure, a closely related concept, the direct alpha method, annualizes the KS-PME. If the KS-PME is one, direct alpha is zero. Kaplan, S.N. & A. Schoar (2005). Private Equity Performance: Returns, Persistence, and Cash Flows, *Journal of Finance* 60, 1791 – 1823. Gredil, O., B.E. Griffiths & R. Stucke (2014). Benchmarking Private Equity: The Direct Alpha Method. **Past performance is not indicative of future results.**

⁶ Brown, G., E. Femand, W. Hu, R. Maxwell & W. Volckmann (2024). Scale, Scope, and Speed in Private Capital Funds. White Paper. Institute of Private Capital. March 2024. Accessed 4/2/24.

⁷ See, for example, Ilmanen, A, S. Chandra & N. McQuinn, 2019, Demystifying Illiquid Assets: Expected Returns for Private Equity, Working Paper, AQR.

⁸ Harris, R.S., T. Jenkinson & S.N. Kaplan (2014) Private Equity Performance: What Do We Know? *The Journal of Finance* 69, 1851–1882. For a review of the literature, see Brown, G., E. Femand, W. Hu, R. Maxwell & W. Volckmann (2024). Scale, Scope, and Speed in Private Capital Funds. White Paper. Institute of Private Capital. March 2024. Accessed 3/23/24.

⁹ In a theoretical contribution, Berk and Green (2004) demonstrate how new money rationally flowing into a successful fund can spread thin managerial talent, thereby driving the fund's returns down to average levels. An alternative explanation is provided by Pastor and Stambaugh (2012). Taking an industry-level perspective, they highlight an externality in which more money chasing more opportunities in the industry reduces mispricing. As a result, opportunities for any manager to find opportunities for excess returns become more elusive. Berk, J.B., & R.C. Green (2004). Mutual Fund Flows and Performance in Rational Markets. *Journal of Political Economy* 112, 1269–1295. Pastor, L., & R.F. Stambaugh (2012), On the Size of the Active Management Industry. *Journal of Political Economy* 120, 740–781. Pastor, L., R.F. Stambaugh & L.A. Taylor (2015). Scale and Skill in Active Management. *Journal of Financial Economics* 116, 23–45.

¹⁰ Ivashina, V. (2022). When the Tailwind Stops. *The Private*

Equity Industry in the New Interest Rate Environment. Centre for Economic Policy Research. CEPR Press.

¹¹ Alpinvest Partners (2021). From Financial to Operational Engineering: Organizational Aspects. White Paper. November 2021.

¹² Ferenbach, C. (2011). Morgan Stanley Roundtable on Private Equity. *Journal of Applied Corporate Finance*, Vol. 23 No. 4 (Fall 2011).

¹³ Kaplan, S.N. (2009). Leveraged Buyouts & Private Equity." *Journal of Economic Perspectives* 23 (1) 121–146.

¹⁴ Alpinvest Partners (2020). Home Runs in Private Equity Co-Investments. White Paper. June 2020.

¹⁵ Pitchbook LCD, accessed 3/12/24.

¹⁶ PWC, Global Infrastructure Trends. Accessed 4/10/24.

<https://www.pwc.com/gx/en/industries/capital-projects-infrastructure/publications/infrastructure-trends/global-infrastructure-trends-financing.html#:~:text=As%20a%20result%2C%20the%20total,demand%20being%20in%20emerging%20markets.>

¹⁷ Dealogic, accessed 4/8/24. It is important to note that deal volume includes co-investments and direct investments that are not intermediated by buyout funds.

¹⁸ Doidge, C., G.A. Karolyi, & R.M. Stulz (2017). The U.S. Listings Gap. *Journal of Financial Economics* 123 (3), 464 – 487.

¹⁹ Preqin, accessed 3/15/24.

²⁰ Dealogic, accessed 3/16/24.

²¹ The four largest transactions are *Medline Industries Inc* (\$30 billion, LBO of a private company); *athenahealth Inc* (\$17 billion, secondary buyout); *Citrix Systems Inc* (\$16.6 billion, public-to-private); and *McAfee Corp* (\$15.4 billion, public-to-private). Dealogic, accessed 3/16/24.

²² Ernst & Young (2023). Economic Contribution of the US Private Equity Sector in 2022. Prepared for the American Investment Council. April 2023. Numbers of private equity-backed company are rounded, as of end-2022. U.S. companies include all business as of 3/31/23.

²³ Gompers, P. & J. Lerner (2000). Money Chasing Deals? The Impact of Fund Inflows on Private Equity Valuations. *Journal of Financial Economics* 55 (2), 281 – 325.

²⁴ Table 4 does not include banks, non-SWF government agencies, multilateral institutions, and some other investors. While banks used to be important part of the LP universe, many of them have exited the market due to regulatory changes. As far as non-SWF government agencies and international organizations are concerned, investments in private equity are often motivated by multiple objectives. Investments by these LPs are usually limited to venture capital.

²⁵ Cap Gemini (2023). Unlocking Growth in Wealth Management. World Report Series 2023.

²⁶ <https://www.forbes.com/billionaires/>. Accessed 3/19/24.

²⁷ The difference of approximately \$150 billion is explained by commitments by institutions that are excluded from our analysis, especially banks and non-SWF government agencies and multilateral institutions. It is important to note that some investors have co-invested alongside private equity funds. Alpinvest estimates that annual co-investments have averaged approximately \$100 billion in recent years. These co-investments are not included in Table 5.

²⁸ Barron's. Private Equity is Coming to 401(k)s. Be Aware of the Risks. 10/25/2022. <https://www.barrons.com/advisor/articles/private-equity-401k-investing-risk-51666648855>. Accessed 3/20/24.

²⁹ Department of Labor. Employee Benefits Security Administration. Information Letter 06-03-2020. <https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/resource-center/information-letters/06-03-2020>. Accessed 3/20/24.

³⁰ Department of Labor. Employee Benefits Security Administration. U.S. Department of Labor Supplement Statement on Private Equity in Defined Contribution Plan Designated Investment Alternatives <https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/resource-center/information-letters/06-03-2020-supplemental-statement>. Accessed 3/20/24.

³¹ This case was brought by two Intel retirement plan participants and former employees, who sued, on behalf of themselves and other participants, alleging that the asset allocation levels of nontraditional investments in the retirement plan's target-date funds and Intel Global Diversified Fund were too heavily weighted and therefore violated ERISA's fiduciary duties. In particular, the plaintiffs alleged that the Intel investment committee breached its duty of prudence by adopting an asset allocation model that excessively allocated assets to hedge funds, private equity, and commodities, despite the higher fees incurred by those investments and the risks

associated with investing in such assets. Following a series of procedural rulings culminating in an unanimous opinion by the U.S. Supreme Court in February 2020, the case was sent back to the district court to address the merits. The U.S. District Court for the Northern District of California rejected claims that the defendants breached their ERISA fiduciary duties by including certain alternative assets — such as hedge funds and private equity — in Intel's defined contribution plans. This decision marks the first time that a court has substantively addressed the question of whether a sponsor of a retirement plan can be held liable for a breach of fiduciary duty for including nontraditional investment strategies on a plan's investment lineup. J.A. Lichtenstein, D.V. Ward, D.A. Kirchner, J.M. Reinstein. 3 Takeaways from Intel Retirement Plan Leaders' ERISA Win. Ropes & Gray. February 18, 2021.

<https://www.ropesgray.com/en/insights/alerts/2021/02/3-takeaways-from-intel-retirement-plan-leaders-erisa-win>

³² Brown, G.W., K.J. Crouch, A. Ghent, R.S. Harris, Y.V. Hochberg, T. Jenkinson, S.N. Kaplan, R. Maxwell, & D. T. Robinson (2022). Should Defined Contribution Plans Include Private Equity Investments? *Financial Analysts Journal* 78, 5–17.

³³ The Sharpe ratio measures the performance of an investment such as a security or portfolio compared to a risk-free asset after adjusting for its risk. It is defined as the difference between the returns of the investment and the risk-free return divided by the standard deviation of the investment returns. It represents the additional amount of return that an investor receives per unit of increase in risk.

³⁴ Congressional Research Services. CRS Report. Private-Sector Defined Contribution Pension Plans. An Introduction. June 8, 2022. Accessed 4/10/24. <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://crsreports.congress.gov/product/pdf/R/R47152>.

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