

Infrastructure

Private market education

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This primer provides an overview of infrastructure and covers the strategy basics, manager value-add, performance, and benefits in an investor’s portfolio.



Infrastructure strategies target investments in utilities, transportation, energy, communication, and social infrastructure sectors.



Infrastructure managers leverage their expertise in deal sourcing, repositioning, development, and operational execution to identify, value, and monetize on infrastructure assets.



Infrastructure strategies can add diversification, stable yields, and inflation protection to investor portfolios.

Summary

- Government stimulus globally, like the US 369bn Inflation Reduction Act and the European Green Deal, have created a supportive environment for private infrastructure investments.
- Infrastructure funds can invest across utilities, transportation, energy, communication and social infrastructure sectors. The three main infrastructure strategies available to investors include core, value-add, and opportunistic.
- Core strategies aim to generate recurring income through regulated or contracted revenues from monopolistic assets.
- Value-add strategies focus on properties that require some level of capital expenditure to improve or expand services, with returns derived from a mix of income and capital appreciation.
- Opportunistic strategies target greenfield projects or assets that require substantial capital expenditures.
- Infrastructure funds can improve portfolio diversification by expanding an investor’s universe to real assets that tend to be less correlated with traditional equity and fixed income investments.
- Core infrastructure strategies can provide a stable source of yield for investors requiring ongoing payouts from their portfolios. These investments can also help hedge against inflation given revenue streams are often tied to CPI.
- With significant differences in manager performance, key risks to private infrastructure investing include leverage, political/regulatory, weather, development, and commodity risk.

This report is part of a series of short primers on specific private market strategies. For a deeper understanding of private markets, please read our [Introduction to Private Markets](#) more information on the client portal or contact your advisor for assistance.



9.4%

Median vintage year IRR



5.1%

Lower quartile IRR*



12.9%

Upper quartile IRR*



USD 800bn

AuM in infrastructure strategies



USD 369bn

in investment incentives with US inflation reduction act

Source: Based on historical data for funds launched between vintage years 1993-2019 using Pitchbook data, UBS estimates. *Quartile IRR's reflect minimum and maximum value across vintage years. Note: Given most funds take a few years for performance to settle, performance of recent vintage years may be less meaningful. Internal rates of returns are net of fees, expenses, and carried interest. Data as of November 2023.

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Infrastructure needs are driven by structural trends

Infrastructure strategies represent USD 800bn, or 6%, of global private markets AUM. While there are many sectors comprising the infrastructure universe, infrastructure assets often exhibit the following common characteristics: high barriers to entry, low price elasticity of demand, stable and inflation-linked cash flows.

Infrastructure needs

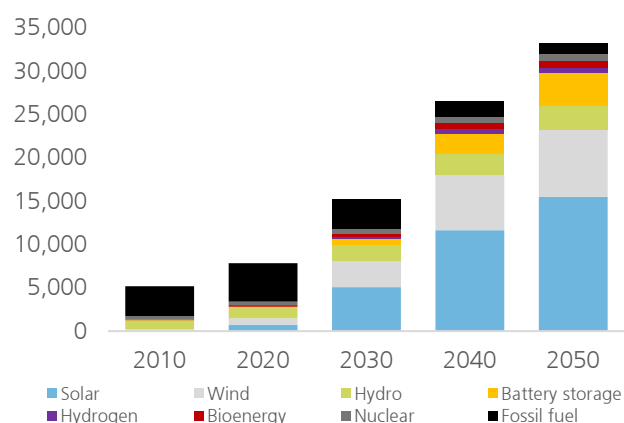
- Infrastructure assets play a key role in the economic productivity of a society by facilitating the movement of goods, people, or ideas.
- Structural trends are forcing the need to create new infrastructure assets. The replacement and modernization of existing assets could provide attractive investment opportunities.
- Governments globally are providing stimulus plans, with plans like the US 369bn Inflation Reduction Act and the European Green Deal aiming to incentivize infrastructure investment.
- The UN forecasts urban population to increase by over 2 billion by 2050, resulting in more demand for resilient transportation and mobility systems as well as uninterrupted access to electricity and water.
- Digitalization trends including smart automation and artificial intelligence are powering the fourth industrial revolution. This should see more investments in communication assets from fiber to data centers and wireless antennas.
- Importantly, achieving the ambitious target of net-zero emissions by 2050 requires ramping up the efforts on green energy and energy efficiency technologies, particularly in areas such as solar, wind, hydrogen, and battery storage.

What does the infrastructure strategy do?

- Broadly, infrastructure encompasses the following sectors:
 - **Regulated utilities:** Involved in electric/gas/water distribution and transmission.
 - **Transportation:** Toll roads, airports, bridges, tunnels, seaports, and rail.
 - **Energy:** Power generation, oil & gas processing, transportation and storage facilities, liquefied natural gas (LNG) facilities, and renewable energy.
 - **Communication:** Data centers, fiber optic networks, wireless and broadcast towers, satellites.
 - **Social infrastructure:** Government buildings such as schools, hospitals, courthouses.
- In addition to the sector breakdown and similar to private real estate, there are three main infrastructure investment strategies including core, value-add, and opportunistic.

Fig. 1: Structural themes require significant infrastructure investing

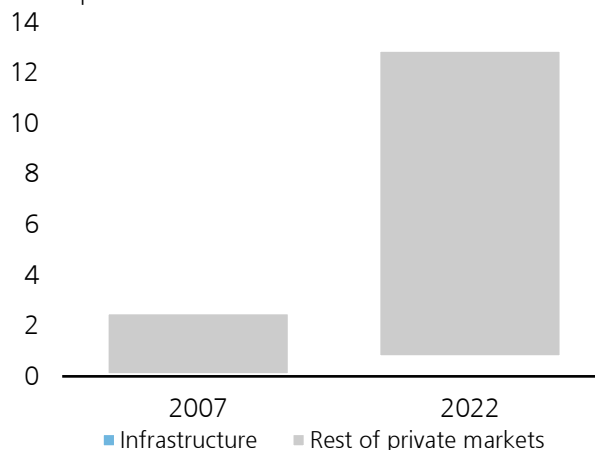
World electricity production - Net Zero Emissions by 2050 scenario (in Gigawatt)



Source: IEA, WEO 2022, UBS, December 2023

Fig. 2: The private market industry has grown rapidly in the last decade

With near USD 800bn, infrastructure represents about 6% of total private markets AUM



Source: Pitchbook, UBS, December 2023

Core/Core-plus

- The core strategy focuses on brownfield assets (investment in existing assets) with minimal capital expenditure requirements and low operational complexity.
- Income tends to be predictable through contracted or regulated revenues. Therefore, core assets can typically tolerate higher debt levels.
- Core assets tend to be monopolistic and GDP resilient, with returns correlated with inflation.
- Core-plus assets may be more sensitive to economic activity or require modest developmental improvements for higher return potential.
- Sample projects include investments in utilities, contracted/regulated toll roads and pipelines, and social infrastructure.
- Target returns typically range between 5%-10% IRR net of fees, with a high income component.

Value-add

- The value-add strategy focuses on mostly brownfield assets that require some capital expenditures to improve or expand services.
- Income tends to be less predictable than core strategies given investments in more complex assets. Cash flow may be re-invested and not paid out until enhancements are complete
- Value-add assets tend to be more correlated to GDP versus core assets, with some degree of inflation sensitivity.
- Sample projects include investments in railways, airports, unregulated pipelines, and power generation.
- Target returns are typically between 10-14% IRR net of fees, with a mix of income and capital appreciation.

Opportunistic

- The opportunistic strategy focuses on generating returns through greenfield projects (investments in new facilities) or assets that require substantial capital expenditures.
- Opportunistic investments exhibit high demand uncertainty and returns tend to be more correlated to market cycles. Therefore, opportunistic assets tend to incur lower debt levels.
- Sample projects include investments in merchant power plants, telecommunication, and unregulated waste sectors.
- Target returns typically are 14%+ IRR net of fees, with a high proportion derived from capital appreciation.

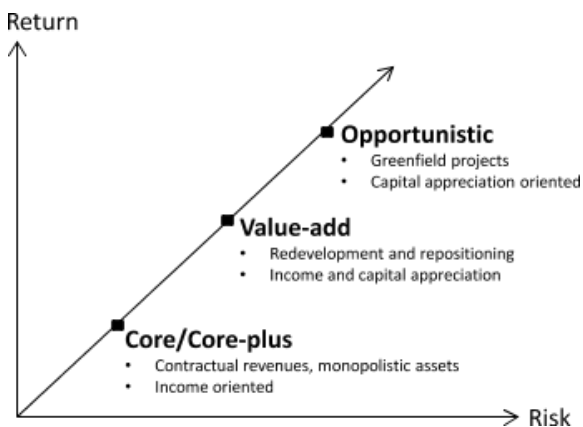
Sources of value add

Infrastructure assets have various characteristics that differentiate themselves from traditional assets. Given information asymmetry and local segmentation, assets often require significant managerial attention, regulatory knowledge, and sector expertise.

- Deal sourcing: Access to a pipeline of high-quality and hard-to-find deals is key. To gain an advantage against other buyers and potentially avoid competitive bidding processes, managers rely on a strong network of developers, construction companies, and government agencies to source deals.
- Profitability assessment: Assessing the return potential of an infrastructure asset can be challenging, especially when value needs to be created. Industry expertise and accurate deal underwriting is also required to forge a clear deal thesis. While for core assets, managers aim for attractive entry values, non-core assets typically require a detailed cost analysis on how to improve services, revenues, and operating profitability.
- Value creation through repositioning and improving assets: Core managers can help improve or de-risk assets (sale of non-core assets, improved governance, etc.) to drive value. For managers following value-add/opportunistic strategies, successful repositioning and developing new capabilities and service areas are the key factors to unlocking value to underlying assets.
- Integrating add-on acquisition strategies: Managers can purchase platform companies and add-on complementary acquisitions to drive value through synergies and margin expansion, which can in turn improve cash flows.
- Implementing strong governance structures: Given that infrastructure assets typically play a central role in society, maintaining good relations with stakeholders is of high importance. In addition, highly regulated assets require strict compliance with government authorities. Overall, having control over environmental, social, and governance impacts can help optimize revenues and operations while mitigating risks.
- Exit process: managers need to be adept at assessing the timing and exit method to maximize realized gains. Planning multiple exit strategies can help diversify and mitigate against adverse scenarios.

Fig. 3: Illustration of infrastructure strategies

Potential risk-return across core, value-add, and opportunistic strategies



Source: UBS

Infrastructure equity vs debt

- Infrastructure debt can be characterized as loans collateralized by an underlying infrastructure asset. This differs from equity investments, which represent ownership of a company or asset.
- Due to regulations that increased capital requirements, traditional bank lenders have been exiting the space, creating a gap in borrower needs for liquidity. This has created an opportunity for private lenders to provide funding.
- Interest costs may be fixed or floating rate and are typically serviced by the cash flows generated by the financed asset.
- Maturities typically range between 5-7 years but can last longer for higher-quality assets that have a superior degree of visibility to cash flows.
- While drivers for both infrastructure debt and equity investors are similar (based on pricing and usage of the underlying asset), debt ownership typically generates lower return than equity ownership but entails less operating risk and is senior to equity investors in the event of a default.
- Infrastructure debt returns can vary based on the seniority within the capital structure as well as asset exposure. As per Cambridge Associates, investments towards more senior positions and conservative assets (investment grade and/or monopolistic assets) typically target 3%-5% gross IRR (internal rate of return), while on the other side of the spectrum, more macro sensitive, lower credit quality, and/or junior debt with equity type exposure target 6%-10%+ gross IRR.
- Risks for infrastructure debt investors include, but are not limited to, illiquidity, default, and duration risk.

Listed, private, and limited redemption infrastructure

Private versus listed funds

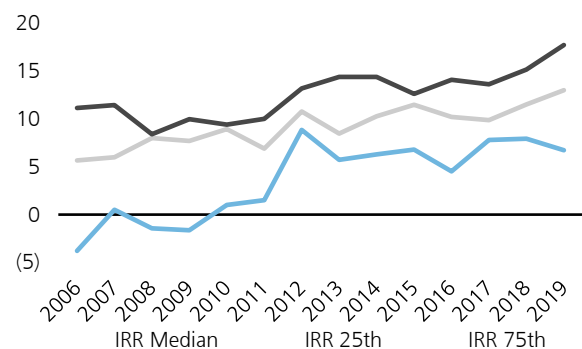
- Listed infrastructure funds purchase a basket of publicly listed infrastructure stocks, while private funds own and operate unlisted infrastructure assets.
- Private fund managers are direct owner/operators of infrastructure assets. Therefore, investing through these structures can benefit from more active ownership and value creation derived from manager skill. Listed funds in contrast, take more of an indirect/passive approach as managers typically own a minority share in their investments.
- While listed funds offer daily liquidity, they experience mark-to-market volatility. Adverse market environments may drive forced selling of underlying positions to redeem cash for investors looking to exit.
- Private funds are structured in a way that requires long term commitment of 12+ years or more, with investors encountering capital calls, then distributions across this time frame. However, investors are somewhat shielded from mark-to-market volatility experienced by listed funds.
- Listed funds are typically more diversified and incur less concentration/asset risk versus closed-ended private funds.
- Private funds can invest more in value-add or opportunistic strategies with higher return potential that derive returns more through capital appreciation versus income.

Limited redemption private funds

- Relative to the finite terms attributed to the closed-ended private funds described previously, limited redemption or perpetual private funds aim to maintain a perpetual structure.
- Limited redemption private funds typically offer softer lock-ups versus closed-ended funds. While periodic liquidity exists for investors in perpetual private funds, they may be subject to risk of large scale redemptions from other investors. Investor and fund level gates can help alleviate this risk.
- Limited redemption private funds incur less blind pool risk given that underlying investments are known at time of fund investment.
- Given the evergreen nature of limited redemption private funds, there is higher emphasis on buy-and-hold versus private fund structures, which have defined exit periods.
- Private closed-ended funds tend to have a higher risk/return profile versus that of limited redemption private funds given exposure to more value-added/opportunistic strategies, whereas limited redemption private funds often focus on core/core-plus strategies.

Fig. 3: Infrastructure vintage year net IRR between 2006–2019

High level of dispersion within each vintage year shows importance of manager selection

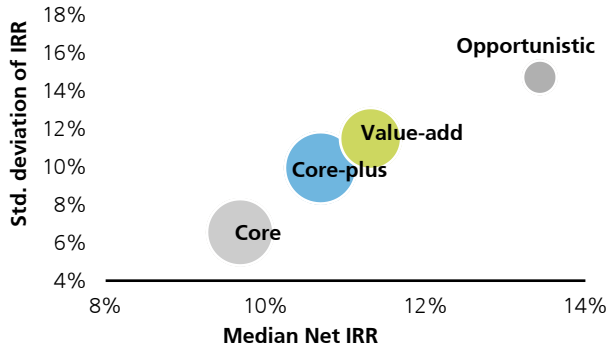


Source: Pitchbook (all infra), UBS, December 2023

Performance analysis

- When observing vintage year IRR performance from Pitchbook (a widely followed data provider in the private market industry), median vintage year net IRR was 9.4% from 2006–2019.
- We observe a wide range of IRRs for each vintage year, highlighting the importance of manager selection when considering infrastructure strategies.
- The standard deviation of median vintage year IRR was 2.2% over the 2006–2019 period.
- When analyzing historical infrastructure equity vintage year IRRs, we observe a higher risk/return profile when going from Core/Core-plus to Value-add to Opportunistic strategies.

Fig. 4: Infrastructure risk/return by strategy

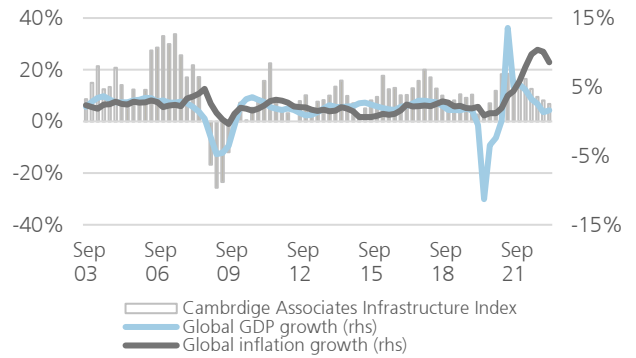


Source: Preqin, UBS, (vintages 2007–18), size of each circle represents the of AUM. December 2023

Infrastructure and the business cycle

- Infrastructure returns are modestly linked to economic cycles, with GDP growth and rising PMI/inflation supporting infrastructure dynamics.
- When observing private infrastructure median vintage year IRR, returns were typically lowest a few years ('06 vintage) before the global financial crisis, given elevated valuations and a higher interest rate environment. On the other hand, returns generally improved and were highest right after the crisis ('10-'14 vintages) as managers were able to purchase assets at attractive valuations at a lower cost of capital.
- We note that the range of historical infrastructure median vintage year returns is relatively narrower versus private equity and private real estate strategies.
- However, dynamics can vary by geography, fund strategy (core, value-add, opportunistic) and sub-sector (utilities, transportation, energy, communications, social infrastructure), with local demographics also influencing each infrastructure market.
- Social infrastructure tends to be the most stable, but lowest-returning infrastructure subsector. These projects are often commissioned by governments through public private partnerships (PPP) and revenues are earned on an availability basis, which are contractually mandated regardless of utilization.
- Utilities tend to be resilient during economic downturns. The demand profile tends to be inelastic, and revenues are largely regulated. Utility assets are often permitted to earn a set return on invested capital as higher costs of operation and additional capital expenditures can be passed on to the end user.
- Similar to utilities, investing in core renewable energy assets can provide consistent yield given they tend to be regulated/contracted. Through long-term power purchasing agreements (PPAs), power generated from assets such as wind and solar can be sold to the grid at a set price, with revenues varying based on electricity usage and weather patterns.

Fig. 5: Illustration of infrastructure strategies

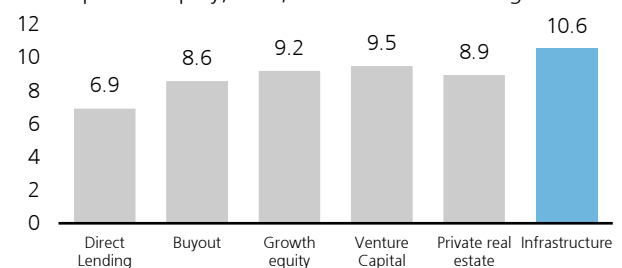


Source: OECD, Cambridge Associates, UBS, December 2023

- Communication assets are currently benefiting from secular trends within digitization and e-commerce. Data consumption is less correlated with GDP or traditional economic indicators, leading to potentially resilient long-term demand for wireless, fiber, and datacenter infrastructure assets.
- Transportation assets are tied to macro activity given traffic across roads, airports, and seaports can vary based on miles driven, business/leisure travel, and trade activity. Contractual stipulations may offset some of this cyclicity through minimum volume agreements and built-in mechanisms to pass on higher costs to the end consumer.
- Energy assets in the midstream sector focus on transporting, processing, or storage of oil and natural gas, whereas upstream assets focus on extracting raw materials. The midstream sector is tied to economic activity as volumes can fluctuate with end-user demand. Similar to transportation assets, inflation escalators and minimum volume agreements can help stabilize cash flow volatility.
- Within energy assets, merchant power generation revenues can be relatively unpredictable as services can be uncontracted. Revenues and profits can fluctuate based on market rates and prices of underlying commodities (used as input to fuel power).

Fig. 6: Years to break even, by private market strategy

Infrastructure funds typically took longest to break even across private equity, debt, and real estate strategies



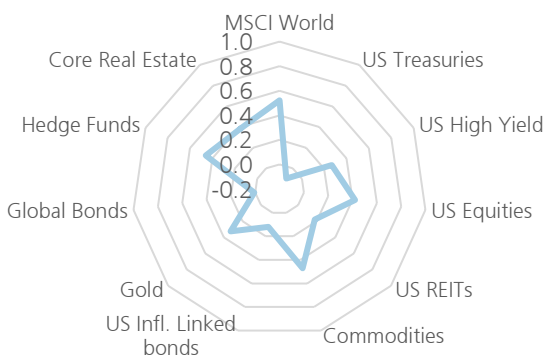
Source: Pitchbook, UBS as of December 2023. Note: Chart reflects the amount of time each strategy took to break even on a cash flow basis, or when the amount of distributions equals contributions.

Infrastructure in your portfolio

- Infrastructure funds can improve portfolio diversification by expanding an investor’s universe to real assets that tend to be less correlated with other asset classes (Figure 7) and fixed income investments.
- Core infrastructure strategies can provide a stable source of yield for investors requiring ongoing payouts from their portfolios. When observing historical performance of lower-risk, core infrastructure strategies, more than 50% of total returns were derived from income.
- Infrastructure investments can help hedge against inflation given revenue streams are often tied to CPI, particularly for core strategies operating in regulated or contracted assets.
- High barriers to entry, monopolistic positioning, ownership of tangible assets, and contractual nature of core infrastructure investments can help mitigate against economic uncertainty.
- For investors with long-term liabilities, owning infrastructure can help offset duration risk in the portfolio by aligning the long-term nature of infrastructure cash flows to these liabilities.
- Overall, infrastructure investments are well suited for investors with longer time horizons given the lengthier nature of underlying projects and contracts. Indeed, infrastructure funds took about 10 years to break even on cash flows, higher versus other private market strategies.

Fig. 7: Infrastructure assets exhibit low correlation to other asset classes

Correlation of the Cambridge Infrastructure index vs other asset classes (2005-2022)



Source: UBS, Bloomberg, Cambridge Associates, December 2023

Risks

- Risks of investing in infrastructure include leverage, potential for defaults, sector concentration, and deal timing.
- Changes in general business conditions can impact end-user demand for infrastructure assets, particularly for more GDP-sensitive sectors such as transportation and energy. Therefore, it is important to diversify across sectors.
- There are different political and regulatory policies across countries/regions. Policy changes can have material adverse effects on infrastructure asset values as contracted revenues may go unprotected, driving uncertainty for future cash flows. Investing in managers with local resources and in countries with well-established rule of law/property rights can help mitigate these risks.
- Investing in infrastructure (greenfield projects in particular) may encounter challenges from higher-than-expected licensing or construction costs.
- Adverse weather conditions can damage infrastructure assets or inhibit the ability for these assets to provide services (cloudy conditions for solar energy, for example). Commodity price fluctuations may negatively impact infrastructure assets given the impact they have on input prices and end-user demand.
- Therefore, it is important to evaluate the creditworthiness of these counterparts.
- End users of infrastructure assets may not be able to pay for services. Therefore, it is important to evaluate the creditworthiness of these counterparts.
- Other, more general private market risks also apply, including significant illiquidity of fund vehicles, limited control, disclosure, and transparency on underlying holdings, and high fees. These risks cannot be fully eliminated but can be reduced through extensive institutional due diligence and rigorous investment and monitoring processes.

Appendix

Selected definitions

- **Correlation:** the degree to which the fluctuations of one variable are similar to those of another.
- **Leverage:** the use of borrowed capital or instruments to increase the potential return (but also potential losses) of an investment, a simple example is a mortgage used in real estate transactions.
- **Leveraged buyout funds:** a private equity strategy using borrowed capital to gain control of a company.
- **Illiquidity premia:** the premium that an investor can demand depending on how difficult it is to convert the underlying security can be converted to cash.
- **Multiples:** a term that measures some aspect of a company's financial well-being, determined by dividing one metric by another metric. The metric in the numerator is typically larger than the one in the denominator, because the top metric is usually supposed to be many times larger than the bottom metric.
- **Multiple expansion:** describes the way a particular valuation metric increases to reflect a higher value assigned to an underlying investment.
- **Value add:** describes the operational, business, or structural improvements private market managers seek through underlying portfolio investments.
- **Cash flows:** cash flow is the net amount of cash and cash equivalents being transferred into and out of a fund.
- **Public Market Equivalent (PME):** a method that converts public market returns to a benchmark that can be compared to private market returns.
- **IRR:** a return method used to evaluate private market investments and reflects the discount rate at which the present value of an investment's future cash flow equals the cost of the investment.
- **TVPI (Total Value to Paid In):** a return metric that describes the total capital distributed back to the investor + residual value left in the fund divided by invested capital.
- **Exit:** the time period in which an investor can convert holdings into cash to be liquidated over a designated period of time.
- **IPO:** the first sale of stock by a private company to the public. Also referred to as an "initial public offering."
- **Standard deviation:** a measure of the degree to which individual values vary from the distribution mean. The higher the number, the greater the risk.
- **Dry powder:** refers to cash reserves kept on hand by a private markets firm to cover future obligations, purchase assets or make acquisitions.
- **J-curve:** illustrates a period of initial negative cash flows (contributions) towards positive cash flows (distributions back to the investor) over a period of time.
- **Sponsor:** the general partner in a limited partnership who organizes and signs up investors.
- **Secondary buyout:** describes a sale between private market firms.
- **Trade sale/strategic sale:** describes a sale of a business to another business operating in a similar industry.
- **Senior debt:** loans or debt securities that have claim prior to junior obligations and equity on a corporation's assets in the event of liquidation.
- **Junior debt:** loan or security that ranks below other loans or securities with regard to claims on assets or earnings. In the case of borrower default, creditors who own subordinated debt won't be paid out until after senior debt holders are paid in full.
- **Vintage year:** is the year in which the first influx of investment capital is delivered to a project or company. This marks when capital is contributed by venture capital, a private equity fund or a partnership drawing down from its investors.
- **M&A:** mergers and acquisitions is a general term that refers to the consolidation of companies or assets through various types of financial transactions. M&A can include a number of different

transactions, such as mergers, acquisitions, consolidations, tender offers, purchase of assets and management acquisitions.

- **Blind pool:** money collected from several people which is put into a fund and invested for their profit. It is left unspecified which properties are to be acquired.
- **Unit economics:** a measure of direct revenues and costs on a unit basis for a particular business model.
- **Minority stake:** reflects a non-controlling interest that is less than 50% of a particular entity.
- **Spin off:** describes the separation of an independent company from a larger parent.
- **Control provisions:** designed to provide a level of influence over significant operational and business matters.
- **Redemption rights:** gives investors the right to force a company to repurchase their shares after a period of time.
- **Idiosyncratic risk:** risk associated with a narrow set of factors pertaining to a particular company. Risk that has little association with overall market risk.
- **Tag-along provisions:** provides a minority shareholder the right to join in on a sale of a company that is initiated by a majority shareholder.

Non-Traditional Assets

Non-traditional asset classes are alternative investments that include hedge funds, private equity, real estate, and managed futures (collectively, alternative investments). Interests of alternative investment funds are sold only to qualified investors, and only by means of offering documents that include information about the risks, performance and expenses of alternative investment funds, and which clients are urged to read carefully before subscribing and retain. An investment in an alternative investment fund is speculative and involves significant risks. Specifically, these investments (1) are not mutual funds and are not subject to the same regulatory requirements as mutual funds; (2) may have performance that is volatile, and investors may lose all or a substantial amount of their investment; (3) may engage in leverage and other speculative investment practices that may increase the risk of investment loss; (4) are long-term, illiquid investments, there is generally no secondary market for the interests of a fund, and none is expected to develop; (5) interests of alternative investment funds typically will be illiquid and subject to restrictions on transfer; (6) may not be required to provide periodic pricing or valuation information to investors; (7) generally involve complex tax strategies and there may be delays in distributing tax information to investors; (8) are subject to high fees, including management fees and other fees and expenses, all of which will reduce profits.

Interests in alternative investment funds are not deposits or obligations of, or guaranteed or endorsed by, any bank or other insured depository institution, and are not federally insured by the Federal Deposit Insurance Corporation, the Federal Reserve Board, or any other governmental agency. Prospective investors should understand these risks and have the financial ability and willingness to accept them for an extended period of time before making an investment in an alternative investment fund and should consider an alternative investment fund as a supplement to an overall investment program.

In addition to the risks that apply to alternative investments generally, the following are additional risks related to an investment in these strategies:

- **Hedge Fund Risk:** There are risks specifically associated with investing in hedge funds, which may include risks associated with investing in short sales, options, small-cap stocks, "junk bonds," derivatives, distressed securities, non-U.S. securities and illiquid investments.
- **Managed Futures:** There are risks specifically associated with investing in managed futures programs. For example, not all managers focus on all strategies at all times, and managed futures strategies may have material directional elements.
- **Real Estate:** There are risks specifically associated with investing in real estate products and real estate investment trusts. They involve risks associated with debt, adverse changes in general economic or local market conditions, changes in governmental, tax, real estate and zoning laws or regulations, risks associated with capital calls and, for some real estate products, the risks associated with the ability to qualify for favorable treatment under the federal tax laws.
- **Private Equity:** There are risks specifically associated with investing in private equity. Capital calls can be made on short notice, and the failure to meet capital calls can result in significant adverse consequences including, but not limited to, a total loss of investment.
- **Foreign Exchange/Currency Risk:** Investors in securities of issuers located outside of the United States should be aware that even for securities denominated in U.S. dollars, changes in the exchange rate between the U.S. dollar and the issuer's "home" currency can have unexpected effects on the market value and liquidity of those securities. Those securities may also be affected by other risks (such as political, economic or regulatory changes) that may not be readily known to a U.S. investor.

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