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Beyond Finger Painting – Building Active Multi-Alternatives Portfolios

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Executive summary

- With challenging opportunities for alpha and diversification in traditional assets, alternative investments – including private equity, real estate, infrastructure, private credit, and more – have evolved from being optional to essential components of investor portfolios.
- Historically, constructing alternatives portfolios was more art than science, likened by some to "finger painting", due to limited access to fundamental data, modelling challenges, and a narrower investment universe.
- As alternatives have matured in scope, scale, and accessibility, a "finger-painting" approach will no longer suffice.
- To present a more systematic approach to portfolio construction, this paper proposes a comprehensive investment framework for multi-alternatives (multi-alts) portfolios, which integrates the strategic sizing of positions with active marginal capital allocation. The framework is designed with objectives to improve portfolio returns and reduce downside risk, moving beyond sole reliance on historical trends and qualitative assessments.
- Despite the growth of alternatives, the industry still faces significant hurdles in accessing institutional-quality alternatives data, resulting in persistent market inefficiencies. These inefficiencies, together with significant dispersion in returns across asset classes and among managers, present opportunities for skilled allocators to generate alpha by taking advantage of information asymmetries.

- A key contribution of this research is the explicit quantification of two distinct sources of alpha in alternatives investing:
    - **Dynamic asset allocation alpha ("Alpha 1"):** captured through dynamic allocation decisions that exploit return dispersion across alternatives asset classes.
    - **Manager selection alpha ("Alpha 2"):** captured by identifying the performance differential among managers within a single category and investing with outperforming managers, particularly in non-core or capital appreciation-oriented alternatives.

- To demonstrate a practical application, the paper presents an established multi-alts investment framework that adapts to evolving macroeconomic conditions and investment views. It outlines a six-step process for constructing and managing multi-alts portfolios:
    1. **Establish investment objectives**
    2. **Identify the target universe of alternatives**
    3. **Size long-term positions and set strategic allocations**
    4. **Actively allocate capital to capture near-term opportunities**
    5. **Integrate risk management**
    6. **Maintain ongoing evolution and oversight**

- The framework enables allocators to systematically address data challenges, capitalise on market inefficiencies, and build resilient portfolios, demonstrating the benefits of a thoughtfully sized and actively managed multi-alts portfolio.

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Introduction

Portfolio construction in alternatives[1] has traditionally been more of an art than science, primarily due to the opacity of investment data and unique challenges posed by alternatives compared to traditional assets, such as data availability, illiquidity, and execution complexities. A senior executive of a pension plan once described their approach to investing in alternatives as “akin to finger painting”.

While this approach may have worked in the past, there have been significant developments in the alternatives industry over the past decade. Today, with the maturation and growth of alternatives across scope, scale, and access, as well as the critical place they have taken in portfolios, such “finger painting” will no longer suffice.

Investing in alternatives today presents a wide range of opportunities. Success, however, is dependent on developing and implementing a comprehensive investment framework that takes into consideration the breadth of variables which can influence portfolio outcomes. In this paper, we discuss:

- The importance of adopting a systematic, data-driven approach to building multi-alternative (multi-alts) portfolios for institutional investors;
- The key factors that contribute to an effective framework for a multi-alts portfolio—sizing and active capital allocation. In the latter, we quantify two important alpha sources in multi-alts investing—allocation alpha and manager selection alpha—which go beyond just harvesting structural risk premia and the diversification benefit from alternatives;
- An original step-by-step guide on building a multi-alts portfolio, including practical insights on active management to reap allocation and manager alpha, alongside risk management and liquidity considerations.

[1] Alternatives is broadly defined as any investment outside of public equities, public fixed income and cash. For the purpose of this paper, alternatives is comprised of private alternatives and public alternatives including private real assets, private real estate, private alternative credit, private equity, REITs and listed real assets.

1. Beyond finger painting – the need for a systematic investment framework for multi-alternatives

Alternatives have evolved from being optional to essential in investors' allocations over the last decade. The change has been driven by several key factors related to investment outcomes:

- Firstly, the pursuit of alpha from informational advantage has become increasingly challenging in traditional assets—typically, stocks, bonds, and cash. Investors' ability to generate consistent and repeatable alpha is now relatively limited given the broad array of data available and easily accessible tools to analyse companies' fundamentals and technical information. Alternatives hence present opportunities for enhanced portfolio returns through active management and the exploitation of market inefficiencies.
- Secondly, the diminishing ability of fixed income to provide portfolio preservation in periods when needed—such as market downturns and periods of inflation—has led investors to explore alternative investments as new sources of diversification and downside management. Alternatives, especially income-oriented categories, have proven to be good diversifiers to traditional assets.

As traditional asset classes face challenging opportunities for alpha and diversification, alternatives are addressing these shortfalls and increasingly becoming important parts of the toolkit for allocators to achieve return and risk goals.

Beyond investment outcomes, the accessibility and regulatory landscape for alternatives have also evolved over the years, making alternatives more viable for a broader range of investors, including smaller institutions and private wealth.

Despite this growth, however, data and modelling challenges pose significant headwinds for investors of all types and sizes. Data on alternatives remains fragmented, with no centralised platform for aggregation. Even where data is available, valuations are determined by asset managers and appraisers (until crystallisation at the point of asset sale) and not through frequent market transactions.

This mechanism limits the ability to understand the "DNA" of these alternative asset classes as multi-cycle institutional data is available for only a small number of categories. The use of public alternatives as a proxy for private alternatives has its flaws too—empirical evidence indicates low correlation and different risk and return profiles between the two. Additionally, even in alternative categories where multi-cycle institutional quality data does exist, the risk and return profiles of the asset classes differ depending on the index provider used.[2]

Such data challenges also create unique market inefficiencies, creating opportunities for allocators to exploit informational asymmetries to generate alpha. In addition, the fragmented data landscape also provides allocators that have access to a broad array of data and specialised knowledge with a competitive edge. It could, for example, allow them to better assess risk and return associated with selecting assets and managers that is not readily apparent to the broader market. By appropriately sizing and actively managing their allocation, allocators can navigate the complexities of alternatives data and deliver better outcomes than alternatives portfolios that are constructed using a more qualitative framework (i.e. the "finger-painting" approach).

[2] See appendix section on "Data – Overcoming challenges to solve the conundrum" for more details on the data challenge in alternatives.

2. Key factors for an effective multi-alts framework

2A. Sizing a long-term portfolio allocation to alternatives

Constructing the right inputs for sizing alternatives portfolios

Key inputs—related to returns, volatility, and correlation—serves as the foundational element in constructing alternative investment portfolios. While historical data provides valuable insights into the intrinsic characteristics of asset classes, relying solely on past performance assumes that future outcomes will mirror historical trends. Empirical evidence suggests that this assumption may not hold true.

Portfolio allocation in alternatives should instead be informed by forward-looking data that accounts for the anticipated macroeconomic environment's impact on asset classes over the forecast horizon. This data should be presented as net-of-fees, time-weighted returns, adjusted for the smoothing effects inherent in alternative investments,[3] and should be comparable across both traditional assets and alternative asset classes. By adopting a forward-looking data approach, investors can better size their portfolios to access the outcomes in alternatives.

[3] Source: J.P. Morgan Asset Management Long-Term Capital Market Assumptions: Methodology Handbook. Published in September 2024.

Exhibit 1: What are the building blocks for constructing alternatives portfolios?

Forward-looking 10 – 15 years median manager, asset class level, net of fees, time weighted returns

		Compound Return 2024 (%)	Annualised Volatility (%)	Arithmetic Return 2025 (%)	Compound Return 2025 (%)	AC World Equity	US Aggregate Bonds	US Core Real Estate	US Value-Added Real Estate	Global Core Infrastructure	Global Core Transport	Global Timberland	Direct Lending	Diversified Hedge Funds	Private Equity
Traditional Assets	AC World Equity	7.1	8.4	16.7	7.8	1.0									
	US Aggregate Bonds	4.6	4.7	4.5	5.1	0.3	1.0								
Private Real Assets	US Core Real Estate	8.1	8.7	11.3	7.5	0.3	-0.1	1.0							
	US Value-Added Real Estate	10.1	11.7	19.1	9.7	0.3	-0.1	1.0	1.0						
	Global Core Infrastructure	6.3	6.9	11.0	6.8	0.5	0.0	0.3	0.3	1.0					
	Global Core Transport	7.8	8.6	13.5	7.7	-0.1	-0.1	0.2	0.2	0.1	1.0				
	Global Timberland	5.3	5.8	10.1	6.2	0.5	0.1	0.0	0.0	0.5	0.0	1.0			
Financial Alternatives	Direct Lending	8.2	9.0	13.6	8.5	0.7	0.0	0.4	0.4	0.5	0.1	0.4	1.0		
	Diversified Hedge Funds	4.9	5.1	5.8	5.0	0.7	0.0	0.3	0.3	0.4	-0.2	0.5	0.6	1.0	
	Private Equity	9.9	11.6	19.6	9.7	0.8	0.0	0.3	0.3	0.6	-0.2	0.6	0.7	0.8	1.0

Forecasts are not a reliable indicator of future performance. Source: J.P. Morgan Asset Management; estimates as of September 2024. Forecasts are based on J.P. Morgan Asset Management 2025 Long-Term Capital Market Assumptions in USD, net of fees and reflects the median manager performance of the asset class. The expected returns, volatilities and correlations are for illustrative purposes only and are subject to significant limitations. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections and other forward statements, actual events, results or performance may differ materially from those reflected or contemplated.

To properly set beta returns in alternatives, long-term capital market assumptions (LTCMA) can be leveraged. These assumptions should include expected return and volatility for required asset classes, and a correlation matrix across them. There can be different approaches on developing LTCMA, but some recommended principles are as follows (from JPMAM LTCMA[4]):

- It should have a 10- to 15-year time horizon (to account for a full market cycle).
- It should be representative of median manager performance in the industry (assuming median managers carry a systematic allocation to all the styles of the asset class).

[4] Long-Term Capital Market Assumptions, by J.P. Morgan Asset Management. Published in September 2024.

- It should capture economic instead of accounting volatility, especially for alternative asset classes. Otherwise, allocations will be skewed to alternatives compared to traditional assets.
- The return assumptions should reflect baseline[5] expectations along with the level of uncertainty around that central scenario. This can be reflected in the return assumption's volatility.

A transparent building block approach based on both financial theory and market observations is favourable. Return assumptions should be based on views of key macroeconomic indicators like real GDP trend and inflation.

More context on the importance of LTCMA and how these forward-looking assumptions are formulated can be found in the appendix.

For portfolio construction, investors first need to think of portfolio strategy across different time horizons. From a long-term perspective, there needs to be key policy anchors for harvesting long-term risk premia. Investors should also take advantage of structural rotation into assets to enhance portfolio risk-reward and resilience. From the near-to-medium-term perspective, actively positioning portfolios in view of valuations and macro risks will be key to performance improvement.

Portfolio sizing frameworks

Long-term strategic asset allocations can be quantified by running selected asset allocation frameworks that account for the following:

- Investment objectives on return and risk;
- Portfolio constraints, e.g. due to market capacity and growth;
- Strategy scalability;
- Deployment capacity;
- Liquidity tolerance; and
- External constraints.

[5] The baseline expectations represent a middle-ground forecast that neither reflects extreme downside or upside cases.

There is no right answer on which framework is best and the selected approach for allocators should take into consideration investment objectives and constraints. Exhibit 2 below highlights several prevailing asset allocation frameworks.

Exhibit 2: Overview of illustrative asset allocation frameworks

Potential methodology	Portfolio construction objectives	Strengths and limitations
Modern portfolio theory	Improve portfolio risk and return profiles through a quantitative framework	+ Able to quantify return, risk and correlation - Assumes normal return distribution and can underestimate tail risk - Sensitive to inputs and tends to give corner solutions without constraints (but when applied, constraints essentially force answers)
Post-modern portfolio theory	Optimize portfolio downside risks over return through a quantitative framework	+ Incorporates downside risk measurement to address the asymmetrical return distribution - More complexity with sophisticated data requirements; limited adoption in the industry
Risk budgeting models	Risk management	+ Focuses on allocation of risk and avoids over-concentration - Does not factor in return information
Omega ratio	Outperform portfolio return threshold	+ Optimizes gain vs. losses based on certain benchmark (e.g., target return) + No requirements on return distributions - Risk is not explicitly considered; tends to give corner solutions without constraints
Liability-driven investments	Liability cash flow management	+ Helps pensions and insurance companies meet projected liabilities - Not suitable for all types of investors
Endowment model	Seek aggressive returns through alternatives	+ Takes illiquidity premium into account - Limited only to long-term investors with more illiquidity tolerance and access to top-tier managers
Pre-defined portfolios	Choose pre-defined alternatives model portfolios based on objectives and constraints	+ Easier process for selection; more suitable for less sophisticated investors - Less flexibility for customising choice of alternatives and size of allocation within pre-set portfolios
Core (traditional) vs. satellite (alternatives) portfolios	Group alternatives exposure into one simple satellite portfolio	+ Simplified allocation process allowing more effective decision-making - Difficult to differentiate attributes within alternatives

Source: J.P. Morgan Asset Management - Alternatives Investment Strategy & Solutions (AISS) as of 2Q2025, "Alternative investments: The essential buyer's guide". Initial publication in October 2021.

Among the various approaches, modern portfolio theory remains one of the most widely used frameworks in asset allocation. However, this framework has high input sensitivity and assumes normal distribution of returns which does not always hold, especially for alternatives. Also, the choice of objective function or risk constraint—such as maximising absolute return versus maximising Sharpe ratio—can result in different allocation outcomes. Employing *multiple* allocation frameworks, rather than relying on a single method, can often yield complementary insights and more robust allocation decisions.

2B. Active capital allocation

Two types of alpha—dynamic asset allocation and manager selection

Strategic asset allocation sets the beta return for the portfolio and alpha is the incremental return over this beta. Alpha generation is a multi-faceted construct and varies across traditional assets and alternatives. Exhibit 3 below compares sources of alpha for the two markets.

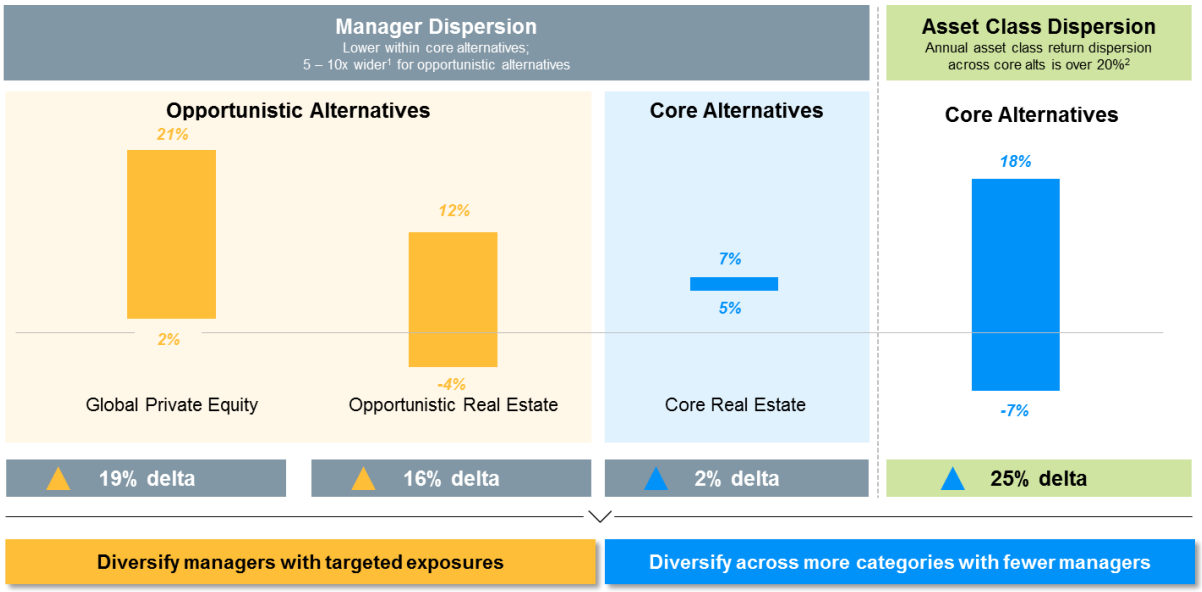
Exhibit 3: Comparison of alpha in traditional assets and alternatives

Sources of Alpha/ Responsibility	Traditional Assets	vs.	Alternatives
Dynamic Asset Allocation *(Cross-Asset Class Portfolio Management)*	Equities vs Fixed Income *(Selection and weighting of geography and styles)*		Cross-Alts *(Selection and weighting of alts asset classes and geography)*
Manager Selection	Alpha potential is greater in asset classes which have higher manager dispersion *(E.g. emerging markets vs. developed markets)*		Alpha potential is greater in asset classes which have higher manager dispersion *(E.g. capital appreciation-oriented alts vs income-oriented alts)*

Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

Alternatives exhibit substantial return dispersion at both the asset class and manager-level, which is demonstrated in Exhibit 4 below. Significant asset class dispersion enables investors to actively rebalance and adjust allocations over time to reposition portfolios and add new exposures as the alternatives landscape evolves. Significant manager dispersion in non-core/capital appreciation-oriented alternative categories also creates alpha opportunity through the selection of outperforming managers.

Exhibit 4: Return dispersion in alternatives—manager dispersion and asset class dispersion



Past performance is not a reliable indicator of current and future results. Core alternatives are investments in high quality, stabilized assets in the developed markets with the majority of their returns generated from income through long-term contracted revenue. These investments have a conservative risk profile and include core real estate and core infrastructure. Opportunistic alternatives are generally alternatives investments which derive the majority of returns from capital appreciation. Investments may be in the development or growth stage and have a higher risk profile. Examples include private equity and opportunistic real estate. 1. Sources: Burgiss, NCREIF, J.P. Morgan Asset Management. Manager dispersion for core real estate is based on annual returns over a 10-year period ending 4Q 2024 for U.S. Core Real Estate; Opportunistic Real Estate and Global Private Equity are represented by the 10-year horizon internal rate of return (IRR) ending 4Q 2024. 2. Bloomberg, MSCI, Barclays, S&P, NCREIF, FTSE EPRA/NAREIT, Clarksons, Giliberto-Levy, Cliffwater, Burgiss, J.P. Morgan Asset Management. Illustrative long-term real assets analysis using asset class annual returns from 2015 to 2024. Alternative asset class returns are based on best data available. For illustrative purpose only.

We categorise these sources of alpha as dynamic asset allocation alpha ("Alpha 1") and manager selection alpha ("Alpha 2").

- **Alpha 1** refers to the potential alpha generated from dynamically allocating capital across alternative asset classes or sub-asset classes, leveraging their diverse return drivers which lead to wide and persistent dispersion of returns in different market environments that may last for extended periods of time. For example, core alternatives, like infrastructure assets, are equipped with long-term leasing contracts that yield consistent income. They also have the partial capacity to pass inflation to end customers. As a result, infrastructure historically has outperformed during economic recessions (given their essential nature and lower economic

sensitivity to revenue generation such as with utilities) and periods of elevated inflation. In contrast, real estate, typically performs well during economic expansions, when cash flow growth and property demand are strong while supply is kept in check.

- **Alpha 2** reflects the return dispersion among managers within a single category of alternatives, which is more pronounced in non-core or capital appreciation-oriented alternatives like private equity compared to core alternatives like core real estate or infrastructure. Non-core investments tend to be riskier, with a greater uncertainty of outcomes due to earlier-stage investments with a longer development runway, increased operational challenges, a greater reliance on capital appreciation to generate returns, and a higher leverage profile. These factors lead to higher manager dispersion in non-core investments compared to core investments in stabilised (brownfield) assets where a greater percentage of returns come from long-dated contracted income, which is more consistent.

To understand the impact of these alphas on an alternative portfolio, it is important to establish a framework to quantify their impact.

Quantification of dynamic asset allocation alpha ("Alpha 1")—capturing cross-alternatives dispersion

Alpha 1 is captured when more capital is allocated to outperforming categories than underperforming ones. It can be quantified approximately using the formula below:

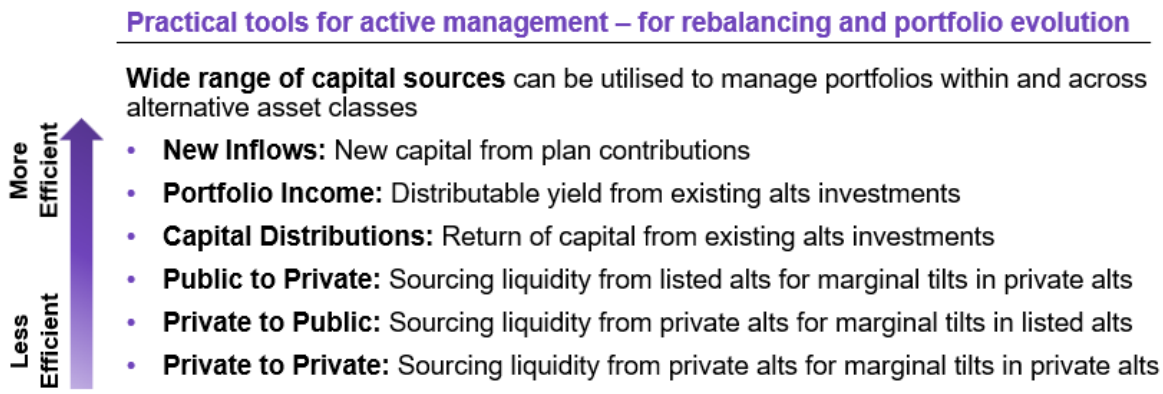
Exhibit 5: Quantification of Alpha 1

Measurement periods can differ by investors, but for illustrative purposes they are assumed to be annual. Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

- **Cross-alts dispersion** is structural, as return drivers behind alternative asset classes are usually non-overlapping. For example, infrastructure returns are more closely tied to inflation, while private equity performance is more correlated with how well public equity performs. This dispersion is measured as the return differential between the best- and the worst-performing asset class in the portfolio. Though it varies year-on-year, the differential typically ranges from 15 to over 25% on an annualised basis depending on the portfolio composition.

- **Portfolio turnover** measures the extent to which allocations deviate from the initial weights. Sources of capital to generate turnover include new capital inflows, portfolio income, capital distributions, and public/private rebalancing. The relative efficiency of these capital sources is illustrated in Exhibit 6.

Exhibit 6: Practical tools for active management



Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

New inflows are the most natural source of turnover. However, even without fresh inflows, a diversified and well-constructed multi-alts portfolio may still be able to achieve around 5% annual internal turnover. To enrich sources of capital and increase turnover, investors can blend private and public alternatives, with stronger programme design leading to greater consistency in turnover.

- **Friction cost** arises from delays or discrepancy between investment decision and implementation—a common challenge due to the less liquid nature of alternatives. They can result in idle cash, leading to opportunity costs if valuation of investments rise before capital is deployed. The magnitude of friction cost depends on the design and execution of the specific alternatives programme, but can be back-tested by comparing actual portfolio performance to a hypothetical scenario where investment decisions are implemented without any delay. Friction cost can be mitigated with a thoughtful portfolio design that factors in capital deployment timelines when selecting investments to optimise idle capital while ensuring liquidity to meet commitment calls.

An Illustrative Example of Friction Cost

After a decision is made to invest in an alternative investment, a time lag may exist between investment decision and implementation. This can be caused by several reasons, such as time spent on additional due diligence, internal governance processes, etc.

Using the illustrative chart below, assuming the investment is executed at the time of decision without any delay in Q1, the potential unrealised profit for the investor as of Q4 is:

115 / 100 - 1 = **15%**

However, factoring in a time lag of implementation, the investor is left with only:

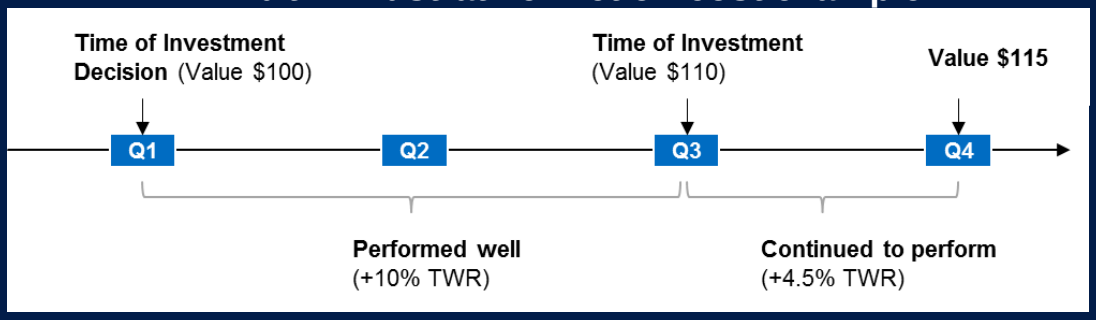
115 / 110 – 1 = **4.5%**

The friction cost for this investment can then be quantified as:

1 – 4.5% / 15% = **70%**

Meaning that 70% of potential return is lost due to friction in timing of execution.

Exhibit 7: Illustrative friction cost example



Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

- **Accuracy of relative views:** Allocating marginal capital effectively depends on the accuracy of the relative assessment of the underlying asset classes-specifically the ability to identify future top and bottom performers. This accuracy, which can range from -100% to 100%, reflects an investor's active asset allocation skills. It can be back-tested by comparing the investor's predicted relative return rankings of asset classes against actual outcomes. Relative views can be informed by macroeconomic setups, lead-lag relationships, medium-term return potential, and fundamental sector outlook. They will be discussed in greater detail in subsequent sections.

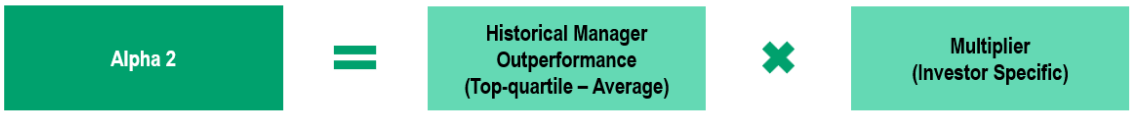
With all components of Alpha 1 defined, assuming a 20% cross-alts dispersion, 15% portfolio turnover, 50% friction cost, and 60% accuracy, annualised alpha that can be added on top of a market-beta portfolio is:

20% * 15% * (1 – 50%) * 60% = **0.9%**.[6]

Quantification of manager selection alpha ("Alpha 2")—capturing manager dispersion

Alpha 2 is captured when outperforming managers are selected as General Partners (GPs). It is measured as the return differential between selected managers' performance and market performance. Market performance can be defined as the weighted average performance of all managers in the market.[7] The formula for Alpha 2 is presented in Exhibit 8:

Exhibit 8: Quantification of Alpha 2



Source: J.P. Morgan Asset Management – AISS. Expected returns and downside risk are based on J.P. Morgan Asset Management 2025 Long-Term Capital Market Assumptions in USD. For illustrative purpose only.

It is generally assumed that **historical manager outperformance** will on average persist in the future. The degree to which an investor can capture this outperformance is represented by a **multiplier**, reflecting their manager selection skills. The multiplier can theoretically be any number, with 100% indicating the ability to consistently pick top-quartile managers across all vintages. *(More details on the quantification of these components are provided in the appendix.)*

[6] A selection of sensitivity tables is available in the appendix for more combinations.
[7] The average instead of median is used here because it may be more representative of the market—assuming an investor has enough capital to build a portfolio that is fully diversified across all managers in the market. It is comparatively more difficult to accurately pick the median manager among hundreds (or more) managers in the market.

Total alpha potential

Since Alpha 2 is often calibrated in Internal Rate of Return (IRR) terms, an adjustment is needed to make it comparable to Alpha 1 and additive to the beta return of a portfolio. Dividing by 1.2 converts IRR to a multiple on invested capital (MOIC)-equivalent time-weighted return (TWR), assuming a steady-state, multi-vintage programme with efficient capital recycling and a pre-set cap on overcommitment ratio.[8]

Assuming a 1.5% manager selection alpha in IRR terms can be captured by skilful Limited Partners (LPs), which is the midpoint of the 1-2% range for buyout funds based on academic research and empirical data,[9] its MOIC-equivalent TWR is ~1.25%. This represents the incremental return that skilled manager selection can add to a buyout portfolio.

By combining Alpha 1 and 2, we can estimate the total alpha that is reasonably achievable in an actively managed multi-alts portfolio. For instance, if Alpha 1 applies to 60% of the portfolio where there is better liquidity with more consistent cash flows, and Alpha 2 applies to the remaining 40% where manager selection is key to success, then total alpha in TWR terms can be approximately estimated as:

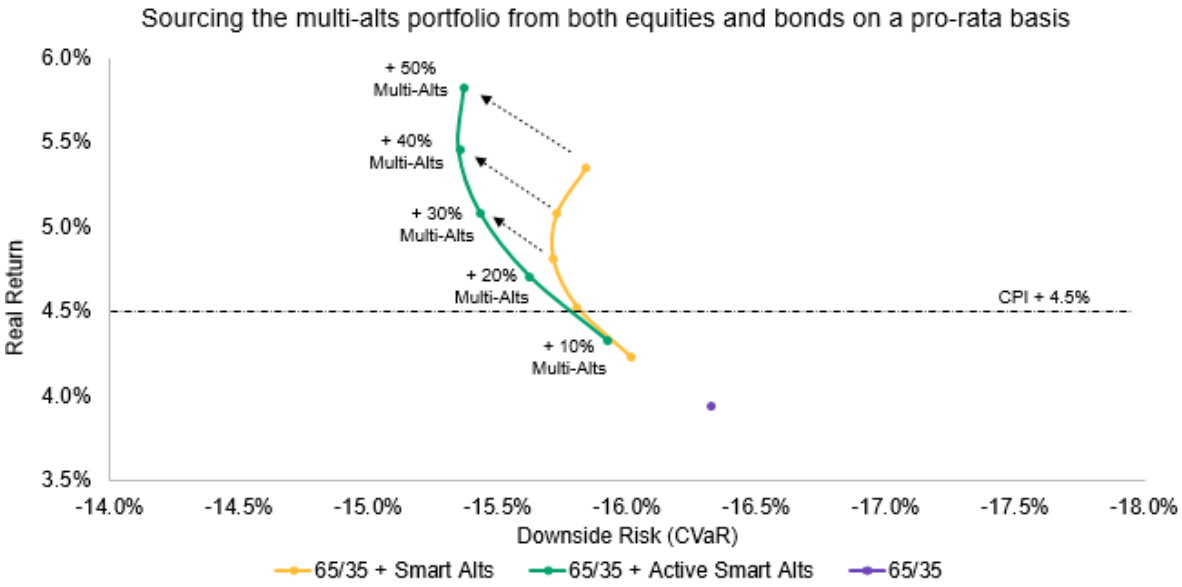
60% * 0.9% + 40% * 1.25% = **1%**.

2C. The impact of an effective multi-alts portfolio

A thoughtfully sized (smart alts[10]) and actively managed multi-alts (active smart alts[11]) portfolio can help improve return and reduce downside risk for a traditional portfolio. Exhibit 9 below illustrates the impact:

[8] Source: J.P. Morgan Asset Management - AISS. For illustrative purposes only. “Alternative asset returns: Apples, oranges and best practices”, Pulkit Sharma, Jason DeSena, Richard Wang, July 2022.
[9] See appendix for further elaboration on manager selection alpha quantification.
[10] A thoughtfully sized multi-alternative portfolio derived in step 3 of the six-step framework to be discussed in detail later.
[11] This shares the same strategic asset allocation with “smart alts” but has an alpha from active management added on top (combining alpha 1 and alpha 2). The approach to capture alpha 1 is explained in step 4 of the six-step framework.

Exhibit 9: A thoughtfully sized and actively managed multi-alts portfolio can help improve return and reduce downside risk of a traditional portfolio



Source: J.P. Morgan Asset Management – AISS, data as of 3Q2025. Expected returns and downside risk are based on J.P. Morgan Asset Management 2025 Long-Term Capital Market Assumptions in USD. For illustrative purpose only.

- The 65/35 global equities/fixed income portfolio is unlikely to achieve a 4.5% real return on a long-term basis; however, adding 20% or more of multi-alts to it can make this target attainable.
- Adding 50% Smart Alts to 65/35 can outperform the benchmark (CPI + 4.5%) by another ~1%, and an actively managed multi-alts portfolio (labeled as "Active Smart Alts") can further add an additional 1% alpha (combining alpha 1 and 2) on top of Smart Alts.
- In all scenarios above, adding multi-alts can help reduce downside risk[12] for the overall portfolio.

When constructing and managing multi-alts portfolios, liquidity is a key consideration. Please refer to the section on liquidity in the appendix for additional information.

[12] Source: J.P. Morgan Asset Management. For illustrative purpose only. Real return and downside risk are based on J.P. Morgan Asset Management 2025 Long-Term Capital Market Assumptions in USD. Downside risk is measured as expected conditional Value-at-Risk @95% confidence level, also known as expected shortfall. The 65/35 portfolio refers to 65/35 global equities/global fixed income portfolio, and serves as a benchmark of the traditional portfolio in this paper.

3. Bringing it together—a six-step multi-alts framework

The effectiveness of multi-alts portfolios hinges on the adoption of a robust, actively managed investment process. Our proposed six-step investment process is designed to build resilient multi-alts portfolios:

- **Step 1** starts with setting clear objectives to fulfil the mandate requirements.
- **Step 2** involves evaluating the full opportunity set to identify strategies that can fulfil the objectives identified above.
- **Step 3** focuses on position sizing, with careful calibration of long-term exposure across various alternatives categories.
- **Step 4** involves managing a multi-investor portfolio with dynamic capital flows, enabling capital allocation to areas that are bottoming and redemption from those that have peaked, while continuously assessing for the best relative value.
- **Step 5** looks at integrating risk management throughout the process.
- **Step 6** looks at the continuous evolution and adaptation of portfolio allocations over time.

Exhibit 10: Active management is a multi-step process, essential in multi-alts portfolio construction

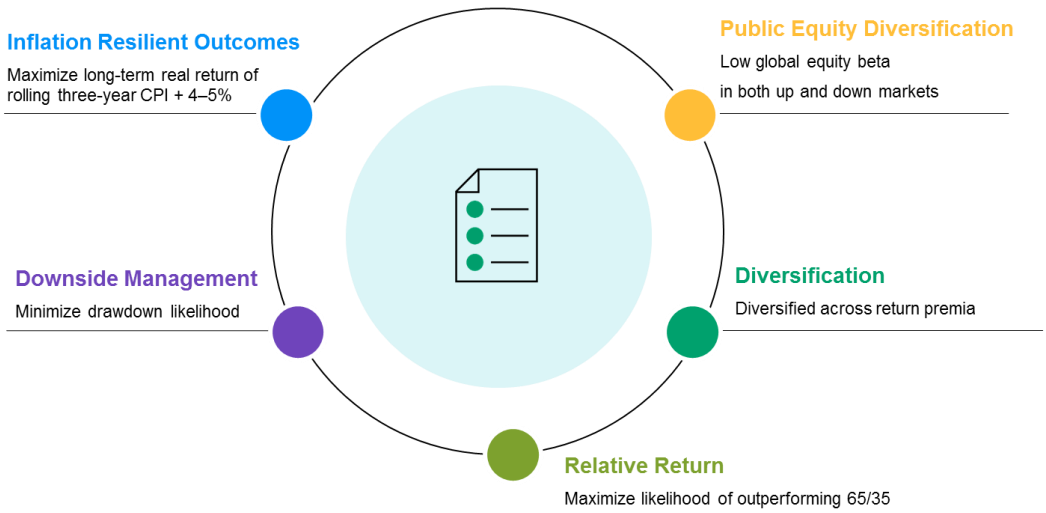
Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

Step 1: Establish key investment objectives

A resilient multi-alts portfolio is often expected to meet multiple goals simultaneously, which requires an investment framework capable of accounting for trade-offs among return, liquidity, and risk characteristics. The objective is not solely to outperform traditional benchmarks, but to construct portfolios that are fundamentally more robust in the face of structural shifts, monetary policy changes, inflationary environments, and market stress. By clearly specifying measurable investment goals at the outset, investors are better positioned to pursue a disciplined and repeatable process for portfolio construction. These objectives serve as the guiding framework for structural rotation into portfolio decisions to enhance portfolio risk-reward and resilience. They can also serve as reference points for the periodic evaluation and adjustment of the strategy in response to changing conditions.

As an example, the below illustrative multi-alts portfolio targets a return that is +4-5% of the Consumer Price Index (CPI), has low global equity beta, a diversified exposure across alternatives, and a similar drawdown to a 65/35 public equities/fixed income portfolio.

Exhibit 11: Establish key investment objectives



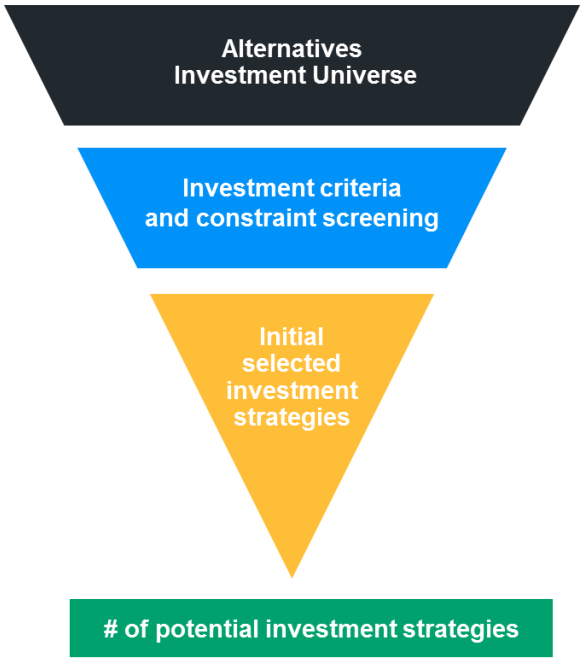
Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only. Diversification does not guarantee positive returns or eliminate risk of loss.

Step 2: Identify the target universe of alternatives

Once key investment objectives are established, the next step is to identify the investment universe from which alternatives strategies will be selected. The initial screening is based on the predetermined investment objectives in step 1, with additional filters applied to account for diligence factors and constraints such as investment structure, currency exposures, strategy assets under management (AUM), track record, liquidity profile, and external constraints.

For opportunistic alternatives, given significant manager dispersion, implementing an enhanced investment due diligence process, with the objective of selecting top-quartile managers across all vintages, is key to realising the potential of Alpha 2 in a multi-alts programme.

Exhibit 12: Investments selection utilising a screening process



Strategy Name	Attribute 1	Attribute 2	Attribute 3	Attribute 4	Attribute 5	Attribute 6	Attribute 7	Attribute 8	Attribute 9	Attribute 10	Strategy Fit (Y/N)?
Investment 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 7	✓	✓	✓	✓	✓	✓	✓	X	✓	X	X
Investment 8	✓	X	✓	✓	X	✓	X	✓	✓	✓	X
Investment 9	✓	✓	✓	✓	✓	X	✓	X	✓	X	X
Investment 10	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	X
Investment 11	✓	✓	✓	✓	✓	X	✓	✓	X	✓	X
Investment 12	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	X
Investment 13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 14	✓	✓	✓	X	✓	✓	✓	✓	X	✓	X
Investment 15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 17	✓	✓	✓	X	✓	✓	✓	X	X	X	X
Investment 18	✓	X	X	✓	X	✓	X	✓	✓	✓	X
Investment 19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Investment 20	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X
...											
Investment 45	✓	X	X	✓	X	X	X	✓	✓	✓	X

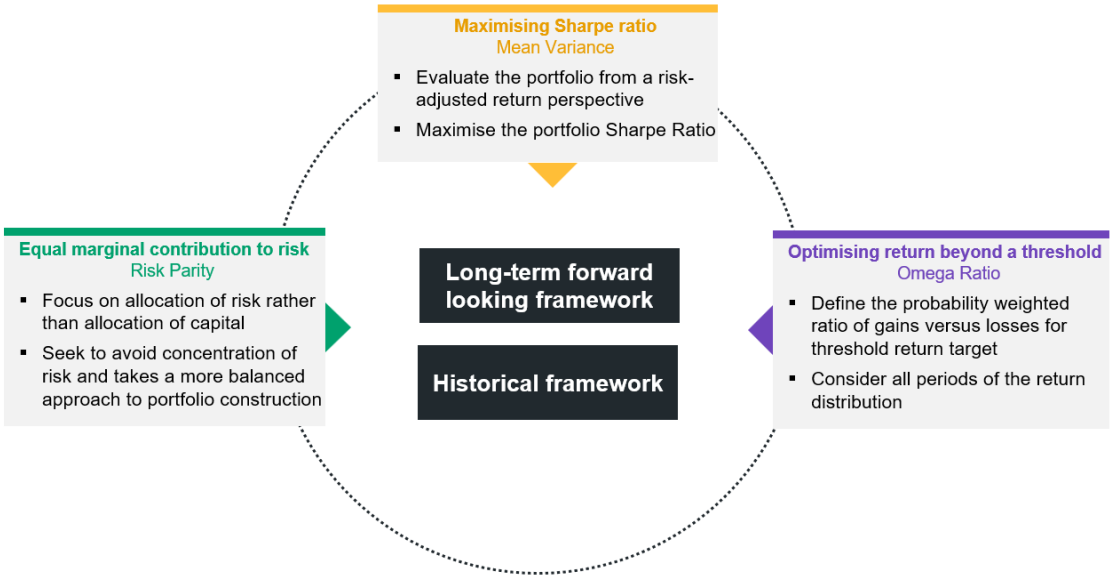
Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

Step 3: Long-term positions sizing—establishing strategic allocations

Once the appropriate managers and investment strategies have been screened and selected, the next step is to determine the strategic asset allocation for the portfolio.

Generic allocation frameworks have been discussed in the previous section. Specific to multi-alts portfolio construction, a combination of the following three frameworks may provide non-overlapping insights into asset allocation.

Exhibit 13: Selected asset allocation frameworks for alternatives



Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

- **Mean-Variance Optimisation (MVO):** Maximisation of the Sharpe ratio is the objective of this framework. While widely used and easy to interpret, it is known to be highly sensitive to inputs such as expected returns, volatility, and correlations. MVO also assumes the normality of return distributions, a condition commonly violated in financial markets, especially for alternatives.

- **Risk Parity (RP):** This framework focuses on risk allocation rather than returns. By avoiding concentrated exposure to any single asset class, it can provide balanced allocations. RP can enhance portfolio stability, especially during periods of heightened volatility, but as a result, it may underweight categories with higher expected returns if they also exhibit higher volatility.
- **Omega Ratio (Omega):** This framework maximises the probability-weighted ratio of gains to losses beyond a specified return threshold. It is well-suited for alternatives asset allocation in two ways-first, unlike MVO and RP, Omega does not require normality or other pre-specified distributions, which is an important advantage given the usually fat-tailed nature of alternatives. Second, it solves for an absolute return by construction, complementing alternatives, which usually do not have clearly defined benchmarks.

No single approach is universally superior. Rather, the appropriateness of each model depends on the specific investment context and the robustness of the inputs. The pros and cons of these frameworks are summarised in Exhibit 14:

Exhibit 14: Pros and cons of selected asset allocation frameworks for alternatives

Framework	Pros	Cons
Max Sharpe Ratio Mean Variance	• **Widely used and understood** in the industry • **Simple** to calculate and interpret • Provides a **single measure** of risk-adjusted return	• **Assumes returns are normally distributed**, which may not be true • Focuses only on mean and variance, **ignoring higher moments** • **Sensitive to inputs** and can lead to cornered solutions
Equal marginal contribution to risk Risk Parity	• **Diversifies risk across all assets**, reducing concentration risk • Focuses on **risk allocation** rather than return allocation	• May lead to **over-allocation in low-volatility** assets • **Assumes equal risk contribution is optimal**, which may not suit all investors • Does not explicitly consider expected returns • Requires **accurate estimation of covariance** matrix
Optimising return beyond a threshold Omega Ratio	• **No requirements on return distributions** • Accounts for both **upside potential and downside risk**	• **More complex** to calculate and interpret; less adopted by the industry • **Requires a benchmark** (e.g. target return), which can be subjective • **Pure focus on return** may lead to cornered solutions and over-concentration risk

Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

The investment results from applying these frameworks are displayed in Exhibit 15:

Exhibit 15: Active sizing in alternatives can generate better outcomes than naïve 1/n diversification

		65/35 Global Equities/ Fixed Income	MVO (Maximising Sharpe)		Risk Parity		Omega Ratio		Naive Alts	Smart Alts
			Forward	Historical	Forward	Historical	Forward	Historical		
Allocation	Global RE	-	56%	0%	25%	24%	19%	0%	20%	28%
	Global Listed Alts	-	0%	0%	17%	12%	0%	0%	20%	5%
	Global Core Infra	-	7%	0%	26%	29%	0%	0%	20%	10%
	Private Credit	-	36%	49%	19%	22%	0%	0%	20%	17%
	Private Equity	-	1%	51%	13%	13%	81%	100%	20%	40%
LTCMA	Compound Return	6.3%	8.4%	9.4%	8.2%	8.2%	9.7%	9.9%	8.4%	9.0%
	Volatility	11.3%	10.7%	15.9%	11.1%	11.0%	17.2%	19.6%	11.9%	13.4%
	Sharpe Ratio	0.34	0.54	0.47	0.51	0.51	0.46	0.43	0.50	0.50
	CVaR (95%)	-16%	-13%	-22%	-14%	-14%	-25%	-29%	-16%	-18%
	% of Time Outperforming CPI + 4.5%	50%	58%	59%	57%	57%	60%	59%	57%	59%
	Global Equity Beta	0.67	0.47	0.80	0.57	0.55	0.86	0.97	0.63	0.68
15-yr Historical	Compound Return	8.1%	7.4%	11.7%	7.6%	7.7%	12.6%	14.0%	8.4%	9.9%
	Volatility	10.1%	4.3%	6.4%	4.5%	4.2%	8.3%	9.4%	5.2%	5.8%
	Sharpe Ratio	0.76	1.54	1.71	1.52	1.63	1.45	1.44	1.48	1.57
	Max Calendar Year Drawdown	-24%	-17%	-24%	-23%	-22%	-25%	-27%	-24%	-22%
	% of Time Outperforming CPI + 4.5%	67%	60%	73%	53%	53%	80%	80%	60%	67%
	Global Equity Beta	0.71	0.07	0.32	0.23	0.20	0.34	0.42	0.27	0.24

Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only. LTCMA metrics are based on J.P. Morgan Asset Management 2025 Long-Term Capital Market Assumptions in USD. 15-year historical analysis uses asset class level annual net performance data from 2010 to 2024 in USD (best data available). CVaR (95%) stands for conditional value-at-risk at a 95% confidence level, also known as expected shortfall. CPI refers to U.S. CPI. Global equity refers to MSCI World Total Return Index. Global Real Estate assumes 50/30/20 US/EU/APAC core real estate. Global Listed Alts assumes 30/70 global REITs/listed real assets. Private credit assumes 50/10/40 global direct lending/mezzanine debt/distressed credit. Private equity assumes 100% global private equity. The breakdowns are based on either AUM or investment universe.

While the MVO framework tends to generate the highest Sharpe ratio, the portfolio allocation often results in corner solutions. The RP framework meanwhile can produce a more diversified portfolio, but tends to over-allocate to low-risk alternatives categories, thereby limiting return potential. In the case of the Omega framework, the portfolio tends to have an extremely concentrated allocation to opportunistic alternatives (in this case, private equity).

By applying a weighted average[13] across various allocations from different forward-looking and historical frameworks, the framework-weighted portfolio (labeled as “Smart Alts” in the rightmost column) achieves a balanced exposure across growth- and income-oriented alternatives. This approach generates strong real returns with similar risk-adjusted return compared to an equal-weighted portfolio (labeled as “Naïve Alts”).[14]

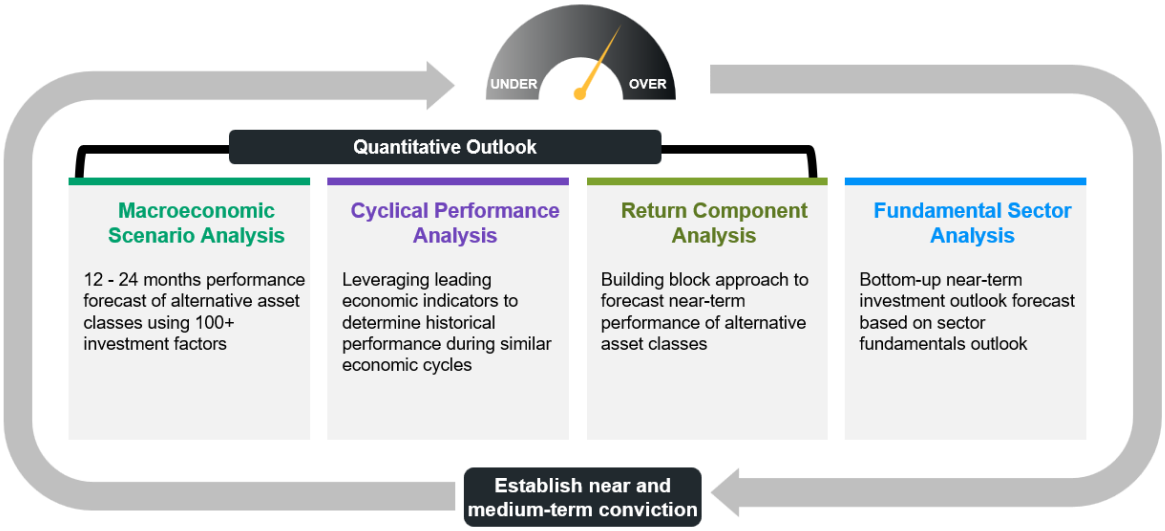
Step 4: Active capital allocation

While strategic allocation sets the foundation for long-term portfolio structure, active capital deployment is critical for the portfolio to tap into near-term opportunities and capture Alpha 1. As part of this process, the efficient management of portfolio liquidity is essential.[15] To capture the significant intra-category return dispersion, particularly in income-oriented strategies, a near-term forward-looking relative value framework over a 12–24-month horizon should be employed.[16]

[13] Source: J.P. Morgan Asset Management – AISS. Smart alts are a weighted average of outcomes from MVO (Maximizing Sharpe)/Risk Parity/Omega Ratio with 30%/30%/40% weights. Only forward-looking results are used for MVO and Risk Parity, while both historical and forward-looking results (equally weighted) are used for Omega Ratio, given that historical performance data of alternatives are not often normally distributed. Slightly more weight is given to Omega Ratio as it comes with highest chance of outperforming inflation + 4-5%.
[14] While it is valuable to arrive at point estimates for allocations, the illiquid nature of most alternatives makes perfect rebalancing almost impossible. However, the authors believe that it is plausible to establish a set of corridors to accommodate potential allocation drift.
[15] Further details can be found in the appendix.
[16] This framework provides the basis for the quantification of the accuracy of relative views, referenced in Exhibit 6 in relation to quantifying Alpha 1.

Exhibit 16 provides an overview of the relative value framework, which includes both qualitative and quantitative categories:

Exhibit 16: Quantitative and qualitative frameworks to establish relative value views



Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

- **Macroeconomic scenario analysis**: This framework reviews over 100 macroeconomic factors to establish relationships and forecast returns for different alternative asset classes.
- **Cyclical performance analysis:** This framework analyses performance patterns of alternatives during similar historical market cycles to provide future reference points.
- **Return component analysis:** This framework reconstructs key return building blocks, including yield, cash flow, valuation, and leverage, over a medium-term horizon.
- **Fundamental sector outlook:** This framework involves constructing a sector-level outlook that considers supply and demand dynamics, capital flows, and other market dynamics impacting each alternatives asset class.

All four frameworks serve as input for determining relative value rankings across alternatives, with the objective of identifying near-term investment opportunities.

Allocators should implement their long-term strategic asset allocation in tandem with their near-term relative value framework to improve portfolio return and reduce downside risk. In a scenario where the two frameworks diverge, allocators should exercise judgement in determining the best use of marginal capital. This should involve incorporating factors such as ranking of relative value conviction, timing of execution, liquidity, and opportunity cost.

Applying relative value frameworks: An illustrative example comparing real estate and infrastructure

Relative conviction is derived based on the prevailing market environment. Here, private real estate and infrastructure are highlighted during the mid-2022. During this period, the economy was characterised by stagflationary pressures, with all four relative value frameworks suggesting that private infrastructure, with its income durability and ability to pass through inflation, had a relatively higher conviction than private real estate, which was more susceptible to a slower economy and the impact on cash flow growth potential.

Exhibit 17: Illustrative comparison of real estate and infrastructure relative conviction

Scenario (mid-2022): Regime of declining global economic growth, elevated inflation, and rising interest rates

Overall Relative Conviction: Private infrastructure (outperformed private real estate by +18% in the next 12 months)

Macroeconomic Scenario Analysis

- Private real estate inversely correlates with corporate spreads
- Private Infrastructure is positively correlated to inflation

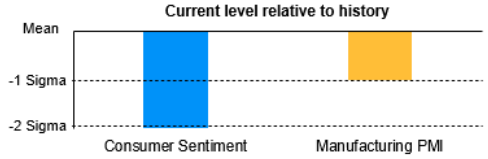
	Private Real Estate	Private Infrastructure
Macro Factors (next 18-month)	Wider Spreads	Above-average Inflation
Overall Return Outlook	Negative	Positive

Return Component Analysis

- Estimate total returns using yields, yield curve, cash flows, GDP growth, and key drivers
- Private real estate faces yield expansion, lowering valuations
- Private infrastructure benefits from stable returns due to monopolistic and regulatory structure

Cyclical Performance Analysis

- Leverages leading economic indicators to assess past cycles
- In past cycles with -2 sigma sentiment and -1 sigma PMI, infrastructure outperforms real estate due to resilient demand



Fundamental Sector Outlook

Private Real Estate Outlook
- Industrial supply may limit rent growth
- Office vacancies rise with slower urban demand

Private Infrastructure Outlook
- Utilities benefit from inflation pass-throughs
- Renewables gain from fossil fuel shift post-Ukraine conflict

Tools for Portfolio Turnover

- New inflows, portfolio income, capital distributions, private/public alts and potential secondaries

Source: J.P. Morgan Asset Management – AISS. Note: The asset class views apply to a 12-24-month horizon. Based on JPMAM AISS forecasts, as of 3Q2022. Spread increase is relative to the spread forecast in the preceding quarter.

Over time, the relative value framework also provides insight on the near-term conviction of alternative asset classes in different macro-economic regimes. Exhibit 18 provides a summary of the relative value views from an existing multi-alts portfolio:

Exhibit 18: Evolving relative value forward views over time

AISS Illustrative relative value heat map over time:
Forward 12 -24 months outlook

Source: J.P. Morgan Asset Management – AISS, as of 2Q2025. The relative value views constructed by AISS was applied to the illustrative AISS multi-alts portfolio for large institutional clients. Note: The asset class views apply to a 12-24-month horizon. The color coding in the heatmap does not indicate the absolute expected return levels—for example, red does not indicate negative returns—but is instead used to identify near-term relative value opportunities for marginal overweight/underweight in a portfolio. The heatmap also does not consider risk-adjusted returns, which is an important consideration for investors constructing a portfolio of alternatives. The scores on the heatmap reflect views on asset classes and not specific managers or products. Opportunistic alternatives strategies with a long j-curve such as private equity and venture capital primaries are omitted from the near-term relative value framework over time as their primary source of alpha is from manager selection (Alpha 2). However, allocators can express their near-term conviction in the secondaries market where there is faster deployment of capital.

During risk-on periods characterised by high growth and rising inflation, growth-oriented alternatives categories with inflation sensitivity, such as private real estate, broadly exhibit higher forward-looking (12-24 months) conviction relative to income-oriented alternatives.

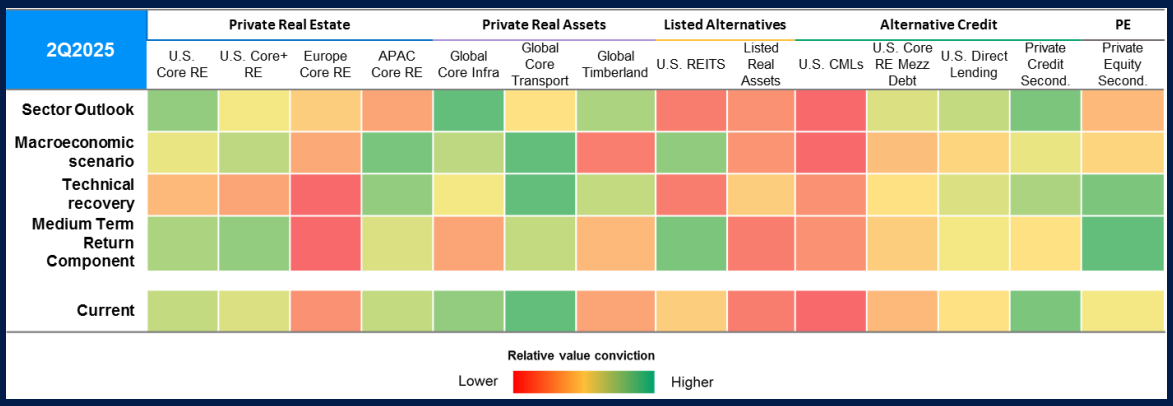
The reverse also holds true during risk-off periods characterised by declining economic growth and elevated inflation. During these periods, income-oriented categories

with high-quality assets and strong counterparties, such as private infrastructure, demonstrate relatively higher forward-looking (12-24 months) conviction when compared to growth-oriented alternatives. For example, when central banks globally were raising interest rates in mid-2022 to combat elevated inflation, real estate had continuously negative conviction and experienced a cumulative drawdown of 20% over the next two years, underperforming other categories.

The relative value framework in action: 2Q 2025

Against a specific macroeconomic backdrop (2Q 2025) of subdued expectations for the pace of economic growth (but with no recession anticipated), weaker business and consumer sentiment, and uncertain trade policy, the 12-24-month relative value framework favours alternatives that can provide constant cash flows with downside management. In this context, income-oriented alternatives, such as core real assets, have a positive relative outlook. Additionally, alternatives such as US and APAC core real estate are well-positioned. These consist of investments in stabilised assets in developed markets where rental income is a significant component of total return, have favourable valuation entry points and/or positive growth expectations.

Exhibit 19: Illustrative snapshot of the near-term relative value framework in 2Q2025



Source: J.P. Morgan Asset Management – AISS, as of 2Q2025. Heatmap denotes the forward looking 12-24 months relative ranking across the different alternative asset classes. Color coding does not denote positive or negative returns but the relative ranking of the asset class relative to the population.

Step 5: Risk management

Risk management is a crucial component of the investment process, considered during the initial strategy design, ramp-up phase, prior to investment decisions, and throughout the ongoing portfolio review. The risk management process should involve continuous oversight related to investment

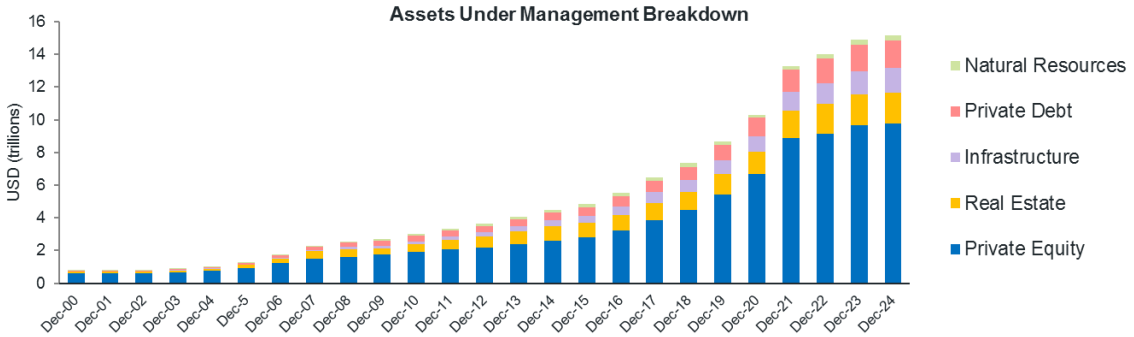
and regulatory guidelines, including monitoring investments for compliance, sector allocations, leverage, liquidity, such as contribution and redemption queues, and asset concentration.

Expected portfolio risks need to be factored in, whether they are absolute and/or relative risks to the benchmark or reference index. Scenario and sensitivity testing may be conducted at the overall portfolio level to assess absolute risks. These assessments include stress loss—encompassing scenario-based, historical, and simulated loss estimates—as well as peak-to-trough drawdown analysis, which helps measure absolute risk exposure. Portfolio sensitivities are mapped by identifying key relevant risk drivers such as interest rates, foreign exchange, equity beta, and equity volatility, and running simulations to evaluate tail risks.

Step 6: Ongoing evolution and active oversight

While long-term multi-alts allocation provides structural discipline, ongoing portfolio evolution and active oversight are essential to ensure the portfolio remains dynamic and accommodates new investment strategies and asset classes as they emerge. The addition of innovative strategies—ranging from digital infrastructure to climate solutions, and secondaries to niche credit—enhances the toolkit available to investors and broadens the potential for differentiated outcomes.

Exhibit 20: New and evolving opportunities in alternatives over time



Source: Preqin; data as of 3Q2025. For illustrative purpose only.

Conclusion

Alternatives have evolved from being an optional component in portfolios to an essential tool for investors given their ability to improve long-term investment outcomes relative to a portfolio exclusively comprised of traditional securities. The expanding breadth, depth, and accessibility of the alternatives universe present meaningful opportunities for investors of all types, from individuals to large institutions.

However, portfolio construction and active management in alternatives remains less mature than in traditional markets. This provides a unique opportunity for skilled investors to target inefficiencies and return dispersion as sources of alpha.

This paper advocates for a disciplined, data-driven investment framework that moves beyond qualitative approaches. The diverse set of alternatives strategies available today, each presenting distinct advantages, provides investors with the flexibility to tailor allocations to meet specific objectives. However, success requires a thoughtful and systematic investment process, grounded in clear objectives and a comprehensive understanding of the available investment universe when setting long-term strategic allocations.

An active approach that evolves as markets change is equally critical for an effective multi-alts portfolio. Alternatives are inherently inefficient, with significant dispersion in returns across asset classes and among managers. By actively managing allocations and evolving portfolios in response to changing market conditions, investors can capture these sources of alpha and enhance portfolio resilience.

Ultimately, integrating strategic portfolio construction with an active overlay enables investors to improve total returns and mitigate downside risk, delivering robust outcomes across a wide range of investment mandates.

Appendix

A. Data – Overcoming challenges to solve the conundrum

Investors in traditional assets benefit from extensive data availability, allowing them to analyse performance characteristics and identify key drivers. However, this is not the case with alternative investments, where performance data is often limited, opaque, and inconsistent across different providers. This lack of transparency poses significant challenges for investors seeking to understand and capitalise on the unique attributes of alternative asset classes.

To address these challenges, some investors have turned to publicly listed alternatives as proxies to gain insights into the "DNA" of alternative asset classes. However, despite similar underlying assets, there are notable differences between public and private alternatives. For instance, in real estate, while public REITs and private funds may invest in similar assets, the buyer pools differ significantly. Public REITs attract a diverse range of investors, including those focused on yield, capital appreciation, and intrinsic real estate value, whereas private real estate primarily attracts real estate-focused investors. These differences in investment perspectives and objectives, along with factors like leverage, sector mix, and fees, contribute to varying outcomes between public and private alternatives.

The discrepancy between the return and risk profile of public alternatives and private alternatives can be examined through a comparison between several listed infrastructure indices relative to a private infrastructure index.

Exhibit 21: Public alternatives indices are not representative of private alternatives performance

		MSCI Private Infrastructure Asset Index	DJ Brookfield Global Infrastructure Index	MSCI World Infrastructure Index	S&P Global Infrastructure Index	STOXX Global Broad Infrastructure Index	FTSE Infrastructure Index Series	MSCI World
Returns	3 year	7.7%	3.8%	6.9%	7.9%	2.6%	3.3%	7.6%
	5 year	8.3%	10.2%	10.3%	13.9%	8.7%	10.2%	16.1%
	10 year	8.0%	5.6%	5.7%	6.8%	5.2%	6.9%	9.5%
	15 year	9.5%	8.5%	6.5%	7.9%	6.9%	8.6%	9.7%
Volatility	3 year	1.3%	16.4%	16.8%	11.4%	16.6%	15.2%	16.2%
	5 year	1.3%	14.1%	13.7%	10.7%	14.1%	13.0%	16.1%
	10 year	1.8%	14.7%	12.8%	13.8%	13.7%	13.4%	15.8%
	15 year	2.6%	13.7%	12.2%	12.5%	12.8%	12.4%	15.5%
Return / Volatility	3 year	5.8	0.2	0.4	0.7	0.2	0.2	0.5
	5 year	6.2	0.7	0.8	1.3	0.6	0.8	1.0
	10 year	4.6	0.4	0.4	0.5	0.4	0.5	0.6
	15 year	3.6	0.6	0.5	0.6	0.5	0.7	0.6

15 year Correlations	MSCI Private Infrastructure Asset Index	DJ Brookfield Global Infrastructure Index	MSCI World Infrastructure Index	S&P Global Infrastructure Index	STOXX Global Broad Infrastructure Index	FTSE Infrastructure Index Series	MSCI World
MSCI Private Infrastructure Asset Index	1.0						
DJ Brookfield Global Infrastructure Index	0.1	1.0					
MSCI World Infrastructure Index	0.0	0.9	1.0				
S&P Global Infrastructure Index	0.1	0.9	0.9	1.0			
STOXX Global Broad Infrastructure Index	0.0	0.9	1.0	0.9	1.0		
FTSE Infrastructure Index Series	0.1	1.0	0.9	0.9	1.0	1.0	
MSCI World	(0.1)	0.8	0.8	0.8	0.9	0.8	1.0

Sources: MSCI, Bloomberg, S&P, J.P. Morgan Asset Management – AISS. Based on toral return, net of fees indices as of March 31, 2025. Private infrastructure index is based on MSCI Global Quarterly Private Infrastructure Asset Index (Unfrozen) – Low Risk asset style. For illustrative purpose only.

As shown in Exhibit 21, public indices and the private index exhibit low correlations even though the underlying assets are all infrastructure assets. The private infrastructure index exhibits higher return, lower volatility, and higher risk-adjusted return compared to the publicly listed infrastructure indices. While private alternatives indices provide a better reflection of the asset class, investors should be cautious of the smoothing and survivorship bias inherent in some of these indices. Forward-looking data, adjusted for smoothing, net-of-fees and in time-weighted returns should be used for asset allocation.

Investors have also explored index providers for alternatives where institutional quality data exists. While this presents valuable insights into the fabric of these investments, there are nuances in the data depending on the index provider. For

the same asset class, alternative indices may differ in sectoral, geographical, and leverage profiles, all of which can impact their return and risk characteristics. Additionally, historical data may suffer from survivorship bias, potentially overstating the performance of the asset class.

In addition, some data is based on asset-level data and typically does not include the impact of fund-level leverage and fees, while others are based on fund-level data with fund-level leverage and fees included. Understanding these differences is essential for selecting the appropriate index provider and making informed decisions regarding benchmarks and asset allocation. Without a thorough understanding of these nuances, relying solely on institutional index data can lead to sub-optimal investment choices.

Exhibit 22: Differences exist in alternatives indices with institutional data

	European Open-End Real Estate Indices		Global Private Infrastructure Indices	
	INREV European ODCE Quarterly Index	**MSCI Pan-European Quarterly Property Fund Index**	**Scientific Infra & Private Assets Infra300 Index**	**MSCI Global Quarterly Private Infrastructure Asset Index**
Description	• Represents the quarterly performance of open-end core funds with a strategy to invest across Europe and across multiple sectors • Index is value weighted	• Measures net asset value of funds with an intended strategy to invest at least 80% of their gross assets in direct property within Europe • Index is capitalisation weighted	• Tracks the quarterly performance of 300 unlisted infrastructure companies • Index can be equally weighted, or value weighted	• Measures the performance of the direct private infrastructure investment market • Index is capitalisation weighted
Market Capitalisation	• Includes 16 funds and represents total gross asset value (GAV) of EUR 42 billion	• Includes 22 funds and represent total gross asset value of EUR 71 billion	• Market capitalisation of USD 342 billion	• Market capitalisation of USD 135 billion • 180 constituent assets
Key Sector Exposures	• Industrial (31%), Office (31%), Residential (18%), Retail (14%), Other (5%)	• Industrial (56%), Office (21%), Residential (11%), Retail (9%), Other (3%)	• Transport (27%), Renewable power (20%), Network Utilities (16%), Power ex renewables (10%), Energy and water resources (10%), social infrastructure (8%), environmental services (5%), data infrastructure (4%)	• Power ex renewables (34%), Renewable power (25%), Transport (22%), Communication (8%), Water (6%), Public facilities (3%), Other (2%)
Key Geographic Exposures	• Germany (24%), France (19%), Netherlands (11%), UK (10%), Spain (8%), Other (29%)	• Germany (23%), France (17%), Benelux (15%), UK (13%), Southern Europe (13%), CEE (9%), Nordic (9%), Other (1%)	• Europe (69%), Oceania (14%), Americas (10%), Asia (7%)	• Europe (50%), North America (34%), Australia (14%), New Zealand (1%)
Return Profile (10 years)	• 3.2%	• 5.1%	• 8.1% (Value weighted)	• 10.5%

For discussion purpose only. Sources: INREV, MSCI, Scientific Infra & Private Assets. Returns are expressed in time-weighted returns. Exposures have been rounded up to the nearest integer. Figures may not add to or exceed 100% due to rounding. Based on information as of Q4 2024 for European real estate and information as of Q3 2024 for private infrastructure. The Infra300 index return is shown in local currency to make it comparable with MSCI Global Quarterly Private Infrastructure Asset Index in USD fixed.

B. Long-term capital market assumptions

Properly sizing the long-term portfolio in step 3 requires high-quality alternative inputs in return, volatility, and correlation. When conducting strategic sizing, asset allocation analyses that incorporate return inputs blending internal rate of return (IRR) and time-weighted return (TWR) is not uncommon in industry practice. This misalignment results in non-comparable inputs—effectively an "apples to oranges" approach—which can lead to corner solutions, skewed optimisation output, and reduced decision-making robustness.

TWR and the IRR are not directly comparable—and these different metrics, used by private alternatives (alts) funds with different structures (perpetual life funds vs. vintage funds) can signal different investment outcomes.[17] Therefore, to ensure a reliable and coherent strategic asset allocation process, we advocate for a consistent performance measurement framework across all asset classes.

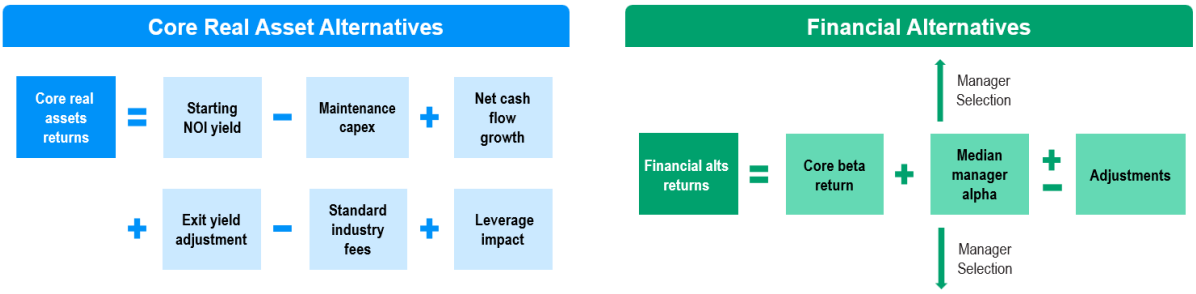
In this process, all alternative assumptions are constructed using TWRs, rather than IRRs, and are derived through a consistent approach that incorporates TWRs for equities, fixed incomes, and relevant macroeconomic return assumptions. Additionally, all alts return inputs reflect median manager performance and are product-neutral and net of fees. The building block approach is applied to construct alternative assumptions. For real assets, the process begins with net operating income, adjusted for maintenance capital expenditures, growth, and exit yield; adjustments are made upward for leverage, and fees are deducted. For financial alternatives, the return comprises both beta and alpha, where beta is derived from public market projections, and alpha accounts for trends specific to each asset class.

[17] J.P. Morgan Asset Management – AISS – "Alternative asset returns: Apples, oranges and best practices", Pulkit Sharma, Jason DeSena, Richard Wang, July 2022.

For volatility, most alternative assets exhibit higher economic volatility compared to accounting volatility. The appraisal-bias return should be corrected by adjusting the returns for these hard-to-price assets to account for serial correlation and to reflect the true volatility profile.

Exhibit 23: Building block methodology for alternatives

Methodology decomposes returns into various return drivers



Source: J.P. Morgan Asset Management. For illustrative purpose only.

C. Dynamic asset allocation alpha sensitivity tables

Exhibit 24: Alpha 1 sensitivity to its components

Assuming 50% friction cost and 60% accuracy

Alpha 1		Cross-Alts Dispersion				
		10%	15%	20%	25%	30%
Portfolio Turnover	5%	0.2%	0.2%	0.3%	0.4%	0.5%
	10%	0.3%	0.5%	0.6%	0.8%	0.9%
	15%	0.5%	0.7%	0.9%	1.1%	1.4%
	20%	0.6%	0.9%	1.2%	1.5%	1.8%

Assuming 20% cross-alts dispersion and 15% turnover

Alpha 1		Friction Cost				
		90%	70%	50%	30%	10%
Accuracy of Relative Views	20%	0.1%	0.2%	0.3%	0.4%	0.5%
	40%	0.1%	0.4%	0.6%	0.8%	1.1%
	60%	0.2%	0.5%	0.9%	1.3%	1.6%
	80%	0.2%	0.7%	1.2%	1.7%	2.2%
	100%	0.3%	0.9%	1.5%	2.1%	2.7%

Source: J.P. Morgan Asset Management – AISS, as of 2Q2025. For illustrative purpose only.

D. Manager selection alpha quantification

Historical outperformance can be calibrated from historical data, shown in the table below. For buyout funds, it is ~10% (=25.7%-15.3%) in IRR terms on average. For venture capital funds, this number is closer to 15% (=26.6%-11.4%).

Exhibit 25a: Historical buyout manager performances (internal rate of return) by vintage

Quartiles[30]	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg.
75 – 100%	36.3	27.6	22.7	11.7	18.9	20.3	28.1	26.8	25.2	27.4	22.9	31.4	29.9	23.8	33.1	**25.7**
50 – 75%	20.5	17.1	11.3	10.1	14.4	14.3	18.2	30.0	14.2	18.2	18.6	17.5	20	18.8	20.5	**17.6**
25 – 50%	12.1	9.0	5.6	7.0	7.4	10.6	14.4	13.4	12.2	15.3	13.9	10.8	15.1	15	17.2	**11.9**
0 – 25%	5.6	-7.6	-0.8	-4.5	1.0	4.9	1.8	0.0	-4.8	-1.3	6.8	8.5	5.5	9.3	11.0	**2.4**
Avg.	**21.8**	**14.4**	**10.6**	**7.6**	**8.1**	**13.0**	**19.0**	**16.5**	**14.2**	**17.3**	**16.5**	**15.5**	**17.9**	**16.9**	**20.2**	**15.3**

Source: Preqin, J.P. Morgan Asset Management – AISS, as of 2Q2025. IRRs are weighted averages by AUM, covering 1137 buyout funds in total. 2018 and later vintages are excluded as they are not mature enough to have meaningful performance data. Quartiles are assigned by Preqin based on a combination of both the net IRR and multiple rankings of constituent funds according to their investment strategy, geographic focus, and vintage year. Quartiles are calculated on a weighted average basis. For illustrative purpose only.

Exhibit 25b: Historical venture capital manager performances (internal rate of return) by vintage

Quartiles[31]	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg.
75 – 100%	13.3	15.9	16.4	11.5	31.1	21	18.3	35.6	48.2	19.7	30.4	25	24.8	57.4	30.1	**26.6**
50 – 75%	4.0	3.6	6.1	6.2	12.9	12.4	10.6	20.0	18.6	15.8	17.6	19.1	18.6	17.2	15.1	**13.2**
25 – 50%	-10.9	-3.4	1.1	-1.4	4.2	5.2	3.6	6.0	12.1	7.3	10.7	11.6	12.6	11.7	10.7	**5.4**
0 – 25%	-22.2	-16.4	-20.7	-16.2	-7.9	-19.6	0.0	1.3	-0.5	2.5	-1.5	2.0	-1.1	1.9	4.9	**-6.2**
Avg.	**2.1**	**1.5**	**2.8**	**2.8**	**12.0**	**7.5**	**11.7**	**18.3**	**18.1**	**13.7**	**18.6**	**17.9**	**12.9**	**17.7**	**13.2**	**11.4**

Source: Preqin, J.P. Morgan Asset Management – AISS, as of 2Q2025. IRRs are weighted average by AUM, covering 1877 venture capital funds in total. 2018 and later vintages are excluded as they are not mature enough to have meaningful performance data. Quartiles are assigned by Preqin based on a combination of both the net IRR and multiple rankings of constituent funds according to their investment strategy, geographic focus, and vintage year. Quartiles are calculated on a weighted average basis. For illustrative purpose only.

The multiplier can theoretically be back-tested and calculated as (investor's historical aggregated performance – historical market average performance) / (historical top-quartile manager performance – historical market average performance). Practically, statistical analysis based on historical data shows that some investors consistently outperform, and their skill at picking private equity funds contribute to their private equity portfolio returns.[18] It is estimated that a one-standard-deviation increase in LP skill led to a difference in annual IRR between 1-2% on LPs' private equity investments. This range widens to 2-4.5% for venture capital. By dividing these IRR ranges by corresponding historical manager dispersion, the multiplier falls in the range of 0.1-0.3.

In addition, extensive research has been published regarding manager dispersion from the GP's perspective, especially on the persistence of private equity fund outperformance over time. A paper published in The Journal of Corporate Finance has shown interesting findings:[19]

- There is some evidence of outperformance persistence in private equity/venture capital funds. Overall, the percentage of funds that were top-quartile for one vintage and top-quartile for the GP's next vintage is between 35-45% for the entire history.
- The persistence of GPs consistently outperforming the median manager is more significant in venture capital than buyout funds.
- For buyout funds, pre-2001 funds displayed a much higher persistency than post-2000 funds, as the private capital sector has grown in size and sophistication. For venture capital funds, persistency differential by time is not as significant.

[18] The Journal of Finance – "Measuring Institutional Investors' Skill at Making Private Equity Investments", Daniel R. Cavagnaro, Berk A. Sensoy, Yingdi Wang, and Michael S. Weisbach, December 2019.
[19] Journal of Corporate Finance – "Has persistence persisted in private equity? Evidence from buyout and venture capital funds", Robert S. Harris, Tim Jenkinson, Steven N. Kaplan, Ruediger Stucke, 2023.

- The above points highlight several fund-level performance trends. It is important to highlight that from an LP's perspective, they may not have access to this information prior to decision making given the overlap in timing. At the time investors are asked to commit to a follow-on fund (usually 3-5 years into the life of the current fund or often earlier in the case of venture capital), investors only observe a noisy signal of ultimate performance, which to some extent is measured based on the estimated net asset values of the remaining unrealised portfolio companies. If performance is measured at fundraise, for both buyout and venture, the 35-45% persistence lowers to 25-35%.

Some additional key findings from other papers include:

- Good performance has persisted in small and medium sized funds, but not large.[20]
- Top-quartile private equity firms have annual returns that are 7-8% (in IRR) higher than bottom-quartile firms, on average, across all fund types. But performance is noisy, and there is little investable persistence. Based on past performance alone, an investor needs to observe an excessive number of funds to identify the PE firms with top-quartile expected returns.[21]
- In a study including buyout, venture capital, and private equity real estate, the rule of "survival of the fittest"[22] applies to both buyout and venture capital but not real estate. No persistence is found in the real estate category.

These findings show that previous performance of a manager is not an ideal indicator of its future performance.

[20] Schroders – "Is there persistence in private equity returns?" August 8, 2022
[21] "Skill and Luck in Private Equity Performance", Arthur Korteweg and Morten Sorensen, February 2015.
[22] Selection process causes less-skilled fund managers (GPs) to exit the market, while more-skilled GPs survive to offer subsequent funds. "Persistently Poor Performance in Private Equity Real Estate", Da Li, Timothy J. Riddiough, May 2023.

E. Portfolio liquidity

In constructing and managing alternative portfolios, liquidity is a key consideration and can have implications across a range of factors which impact investment outcomes. Access to sources of liquidity is beneficial, both as a source to reposition allocations over time as market conditions change, as well as to meet liquidity requirements of the overall mandate. Because alternative programmes come in multiple formats, the approach to liquidity management will differ, as well as the tools used to manage ongoing liquidity. The below provides two examples of different approaches in constructing alternative allocations, as well as the potential challenges associated with each in the subsequent table:

- **Private Alternatives Vintage Programme:** A programmatic approach to constructing an allocation of illiquid, closed-ended opportunistic funds within one category of alternatives where capital distributions from earlier vintages are recycled into subsequent vintages.
- **Private + Complementary Public Perpetual Programme**: Investments in a range of core and non-core private alternatives complemented by listed alternatives.

Exhibit 26: Overview of two different approaches in constructing alternative allocations

Consideration	Private + Complementary Public Perpetual Programme	Private Alternatives Vintage Programme
Return/Risk	Potential for higher returns **through active capital allocation**	Potential for higher returns **driven by capital appreciation**
Liquidity Sources/ Dry Powder	**Greater**—private + public provides potential for income distributions and LP-driven redemptions which are tools to reposition allocation	**Limited**—investments in illiquid structures where distributions are at GP discretion; Can not be used as dry powder, may consume additional liquidity with capital call
Underperformance/ Downside Risk	**Lower**—diversification across alternatives with differentiated return/risk drivers, investments in established portfolios, primary driver of returns is contracted income, lower relative leverage	**Higher**—concentration in single category of alternatives, opportunistic risk profile, typically higher leverage. Asset class tilt vs. opportunity cost carries uncertainty. Bigger risk of underperformance.

Source: J.P. Morgan Asset Management – AISS. For illustrative purpose only.

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