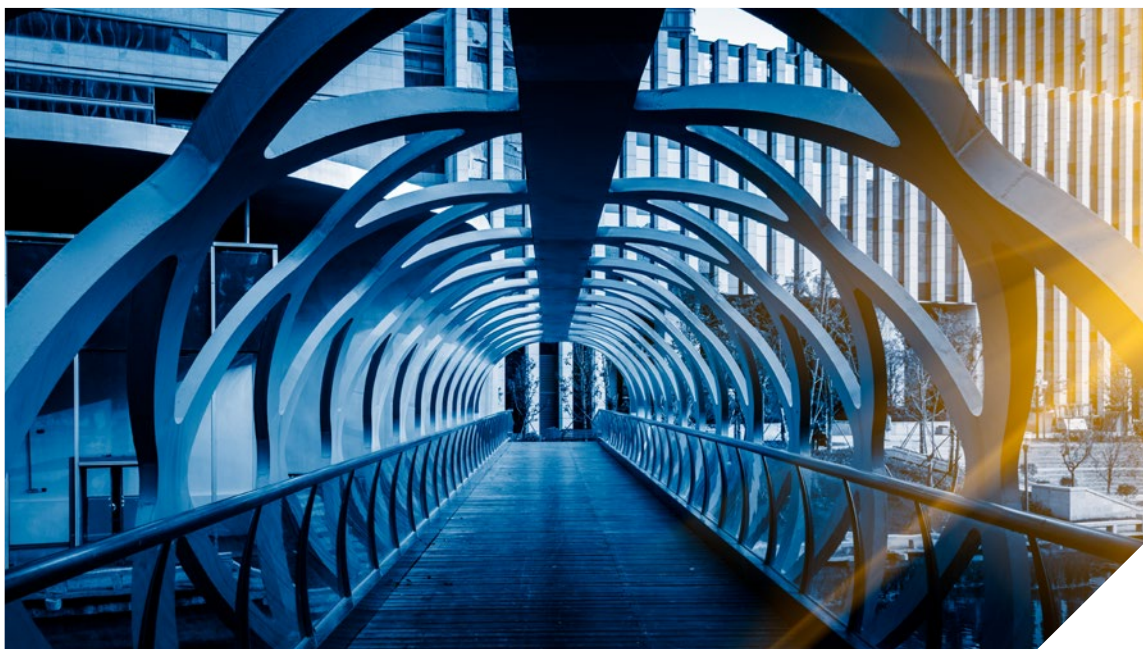


Outcome-Based Investing

An approach for more demanding times

June 2019



Invesco Investment Solutions Focus Paper Series

1. Outcome-Based Investing

2. Factors for risk management
3. Factors for potential return enhancement
4. Managing to liabilities - US
5. Managing to liabilities - EMEA/APAC
6. Multi-asset portfolio management
7. Investing with alternatives

We may have reached an inflection point in portfolio management. Fewer of the requests we get from institutions are to fill specific, narrow investment mandates. Instead, the conversations we have today with institutional investors are increasingly tied to specific goals – often multi-period challenges whose complexity only increases as we dig deeper into solutions, and that draw on substantial expertise to implement.

At the heart of these conversations are such questions as:

- How can we most effectively evaluate the risks in our portfolio? Are there any risks or unintended exposures that we are unknowingly accepting?
- How can we prepare for a lower-return market environment or a change in market regime?
- How can we accommodate both near-term cash flow needs and longer-term liabilities?

We not only welcome this shift in thinking, we encourage it with clients through a dedicated group and a set of capabilities we have built methodically over time. Because, as we shall discuss in this paper, outcome-based investing can offer an altogether better path to the construction and management of portfolios.¹

This white paper is the first of a seven part series highlighting the thinking and capabilities of Invesco's Investment Solutions team. For more information on Invesco Investment Solutions, contact your Invesco representative.

¹ There is no guarantee that these strategies will be successful in meeting their investment objectives.

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What's driving outcome-based investing

Investors have more resources than ever to meaningfully expand and refine portfolio diversification – analytical and quantitative methods and tools, factor analysis, and broader access to differentiated assets such as factor-based strategies and private market investments.

At the same time, institutional investors are increasingly asked to be expert generalists across a number of domains (macroeconomics, emerging technologies, advanced quantitative methods, and regulations, to name a few) now considered part of investment management. In short, chief investment officers and other decision-makers at institutions are expected to be “masters of all.”

Meanwhile, traditional approaches haven't been as effective through the market disruptions of the last two decades. In fact, one of the first outcome-based approaches – liability-driven investing, or LDI – gained popularity in the aftermath of the difficult markets of the early 2000s. As investors face what could be a prolonged period of low expected returns, they're increasingly and justifiably focused on what matters: achieving purposeful outcomes.

However, many institutional investors lack the analytical and professional resources required to effectively develop, evaluate, implement, and monitor multi-asset portfolios designed to help achieve their desired outcomes. To take one example, most institutions will likely consider investing in private market assets. Attracting, managing, and retaining even a small staff with the expertise to manage private investments in-house may not be a feasible proposition for many institutional investors. Furthermore, they may have access to only a limited subset of the analytical tools and data required for the modeling of such assets in a manner that is consistent with their traditional portfolio holdings. Effective portfolio management today requires access to analytical, informational, technical, and intellectual resources that may be beyond the reach of many investors.

That's why institutions are seeking to build deeper, more substantive partnerships with fewer large asset managers that can provide access to the requisite analytics, data, and expertise. Instead of facing down these challenges alone, they can partner with asset managers to help them think through their investment goals, overall portfolio challenges, and specific portfolio solutions. While this may seem to make for an uneasy alliance, since investors are understandably concerned about being pitched solutions stuffed with proprietary investment products, we believe the financial services marketplace has evolved such that objectivity and collaboration will be a key differentiator for asset management firms and investors alike. The truly objective asset managers that can provide invaluable analytical and practical support to decision-making are in demand. We believe Invesco will be one of those firms.

Outcome-based investing starts with clearly defining the desired outcome, then works toward a solution that helps deliver on this objective as closely as possible.

Outcome-based investing: Reframing the question

Outcome-based investing starts with clearly defining the desired outcome, then works toward a solution that helps deliver on this objective as closely as possible. Compared to managing for risk and return, it's a more holistic method of problem-solving. Its goal isn't simply higher returns or greater diversification; it's also about how you achieve the necessary returns and the right kind of diversification, in the context of a particular goal:

- Understanding and managing the risks associated with the many trade-offs inherent in multi-asset portfolios.
- Developing portfolios with specific objectives or characteristics - for example, income, growth, downside mitigation or ESG focused.
- Positioning portfolios to be more resilient to changes in market regimes – for example, rising rates, higher inflation, or lower equity returns.
- Blended goals – for example, combining cash flow-driven investing (CDI) to manage near-term capital flows with LDI to manage long-term liabilities – an elegant solution to a complex, multi-phase investment challenge.

With goals reframed as outcomes, benchmarks also change. It may be an absolute benchmark (a reference asset or portfolio), but very often it's a benchmark that is relative to the outcome. In the classic example of LDI, the liabilities themselves become the benchmark. Outcome-based investing enhances the metrics against which asset managers construct portfolios.

Finally, outcome-based investing also reframes the assets we might consider for investment. As alternatives, particularly private investments, have proliferated over the last 15 years, outcome-based investing requires a careful evaluation of the investment opportunity set to be considered for each investor situation. Instead of simply plugging in asset classes, investors must consider the careful modeling of alternative assets and think hard about what can be expected from any investment category.

In the normal course of portfolio construction, investors must take into account a wide variety of (often conflicting) considerations – for example, complying with regulations or bylaws, accommodating style preferences, and meeting complex multi-period investment goals. While outcome-based investing may produce an end portfolio whose overall risk-return characteristics may appear similar to those of a traditional investment approach, its components can be very different. Outcome-based investing leads to solutions that aren't apparent when using traditional portfolio construction approaches.

Investment Solutions engagements allow clients to iteratively and clearly evaluate the upsides, downsides, stress scenarios, and range of outcomes that result from modifying their portfolio.

Portrait of an outcome-based process: Invesco's approach

Our process typically begins with a thorough review of a client's portfolio in the context of the client's specific objectives. We seek to understand the rationale behind the strategic asset allocation, any criteria for selecting managers, and whether the portfolio is more benchmark- or outcome-driven. Through this intensive process, we develop a detailed understanding of not only a client's investment goals, but also overall portfolio challenges, investment policy statement constraints, regulatory considerations, and organizational dynamics.

Next comes analysis, guided by an ongoing client conversation in which we explore possible solutions and exchange views. Critically, we work closely with clients to model portfolio assets (and liabilities) in a consistent manner that is aligned with their beliefs. Investors can choose to leverage the Solutions team's proprietary capital market assumptions (CMAs) for an exhaustive set of assets, or they can elect to use their own set of expectations. These modeling efforts establish the foundation for portfolio evaluation, portfolio construction, and risk management exercises. This work also sets the stage for us to evaluate the portfolio through Invesco Vision, our portfolio management decision support system. Invesco Vision facilitates the identification and assessment of a wide variety of risks and the evaluation of the various trade-offs an investor may face in developing the solution that might best achieve a desired outcome. Possible investment decisions can be explored in the context of the outcomes that might result from making those decisions.

We often employ advanced portfolio construction techniques – for example, robust optimization can help to address the problems presented by the likelihood of errors in the estimates used for portfolio optimization. Without such considerations, an unconstrained mean-variance optimization can result in efficient portfolios that are less diversified than might be desired. We may also approach optimization from a multi-period perspective, versus the traditional single period, in the context of cash flows.

At any point in this process, clients can also access the practical viewpoints of our investment managers, whose deep domain expertise across asset classes and portfolio combinations provides an enormously valuable real-world perspective on the model-based output of Invesco Vision.

These Investment Solutions engagements allow clients to iteratively and clearly evaluate the upsides, downsides, stress scenarios, and range of outcomes that result from modifying their portfolio. They encourage collaboration, foster constructive debate, and reveal the client's preferences for and aversions to a wide range of specific portfolio risks. The entire exercise leads to greater goal clarity and serves to strengthen the professional bonds between us and the client.

Factors also provide another way to think about diversification, looking within asset classes to understand more deeply how asset classes and their subcomponents relate to each other.

The factor framework

Invesco has over 30 years of practical experience with factor investing and believes that it is one of three pillars of investing.² This expertise has extended to our team's efforts, with factor analysis being integral to our process. Because factors are at the core of what explains asset characteristics, the factor framework provides us with insights into what is truly driving the return and myriad risks of specific scenarios, and how they might lead to help achieve desired outcomes.

Factors are highly useful in portfolio construction as they provide valuable insights regarding the drivers of asset returns which can, in turn, help in selecting the right assets for implementation. For example, Fung and Hsieh (2004) demonstrated that as much as 80% of hedge fund returns are driven by systematic factors.³ Understanding the underlying sources of the return for an investment strategy under consideration can help to identify situations where similar exposures can be had through other investments, but at a much lower cost, with higher liquidity, or both. These deeper insights into manager performance help investors understand what they're getting for their active management fees.

Factors also provide another way to think about diversification, looking within asset classes to understand more deeply how asset classes and their subcomponents relate to each other. For example, factors may reveal that one subset of fixed income may have similar characteristics to a subset of equities, uncovering a risk that would be hidden from a purely asset class-based analysis. We use factors to understand returns from a multi-asset perspective, to run historical and hypothetical scenarios, and to provide an alternative attribution analysis.

Finally, factors are often important even when their role isn't necessarily apparent – for example, with liability-driven investing (LDI).

Example: LDI and CDI (cash flow-driven investing)

The differences between LDI and CDI nicely illustrate how outcome-based investing works, in our view. On the surface, LDI and CDI seem similar. Both are intended to solve a specific liability-related problem. Both involve a liability stream and a corresponding set of cash flows. Looked at with an outcome-based lens, however, they're really quite different.

LDI seeks to match the mark-to-market risk of a liability stream, which is determined by interest rate curve movements and changes in credit spreads. Having more complete information about a liability stream's exposure to specific factors, such as rates, inflation, or credit, allows us to identify assets that can more effectively achieve the objective of seeking higher returns while minimizing funding ratio volatility. Having a better understanding of the factor exposures of both the liabilities and the portfolio intended to fund that liability also provides greater insights as to how different market environments might affect the portfolio's ability to meet its objectives.

In contrast, CDI's explicit goal is to match individual cash flows. Instead of looking holistically at all the risks and matching the funding ratio volatility, as we do with LDI, CDI requires us to think holistically about both traditional and alternative asset classes to meet these liabilities, often through sovereign or corporate bonds. Here, the modeling of both assets and liabilities using a consistent factor framework allows for more effective portfolio construction.

² Quance, Stephen. "Factor investing: the third pillar of investing alongside active and passive." Risk & Reward. 2nd Issue 2018, pages 4 - 10.

³ Fung, William, and David A. Hsieh. 2004. "Hedge Fund Benchmarks: A Risk-Based Approach." Financial Analysts Journal, vol. 60, no. 5 (September/October): pages 65 - 80.

Investment capabilities are the building blocks that turn methodologies and ideas into solutions that help meet client needs.

Criteria for delivering outcome-based solutions

As we have developed our outcome-based approach to investing over time, we have conducted extensive research into the essential requirements for asset managers to provide compelling and practical solutions. We have identified three key areas:

1. Capabilities

We believe that access to the broadest available set of the right tools increases the likelihood that a particular outcome can be delivered. An investment toolkit that can deliver complex institutional outcomes will likely include a global selection of active, passive, factor-based, and alternative investments (including private market investments). Moreover, each tool should be chosen based solely on whether it produces a material client benefit, and not (for example) on its source or its profitability to the investment manager.

It's not just the breadth of suitable tools that's important; it's also how those tools are used. Yes, managers should have a core investment philosophy that informs implementation. But they should also have the flexibility to balance their philosophy with the pragmatism often demanded by highly customized goals. Managers have traditionally attacked investment problems in largely the same way. Outcome-based investing is situational and requires managers to carefully select the most important part of that core philosophy for each situation, in a way that delivers what the investor is asking for. The breadth of Invesco's investment offerings affords our clients direct access to a wide range of asset class specialists that can help provide unique insights and practical expertise to inform how solutions are developed.

Investment capabilities are the building blocks that turn methodologies and ideas into solutions that meet client needs. They're the difference between simply listing recommendations and being prepared to collaborate with investors and deliver on those solutions. In our experience, investors want managers that can be such partners.

Example: Managed volatility

The importance of capabilities in offering investment solutions is highlighted through Invesco's experience in implementing managed volatility strategies designed to address changing market risk dynamics faced by investors. While investors might seek to create portfolios with specific risk and return expectations, markets can experience high- and low-volatility regimes with risk characteristics that differ from those indicated by the longer-term average. Of obvious concern for investors are periods when risk is higher than expected. It is during these periods that investors often experience large drawdowns. A relatively straightforward way of addressing these changes in market risk levels is to consider a managed volatility strategy. This approach seeks to maintain portfolio volatility at or below a predetermined level, reducing risk during extreme equity market declines but allowing for some upside participation when markets rise. During volatility spikes, equity exposure is reduced, and cash exposure is increased. During more normal periods of volatility, equity exposures are increased. Hedging assets such as equity index futures are used to adjust asset allocations dynamically in response to market shifts. Applying these strategies to existing client portfolios requires both risk modeling capabilities as well as derivatives expertise.

By taking the edge off volatility – mitigating the impacts of the lowest market troughs and highest market peaks – this outcome-based strategy has specific applications to retirement portfolios such as target-date portfolios.

2. Analytics

Portfolio construction is a complicated endeavor, presenting challenges that increasingly require access to advanced analytics. Effective decision-making about the multitude of trade-offs that portfolio construction requires that investors first be able to identify those trade-offs and then make decisions about how best to address them individually and in the context of other trade-offs being considered.

We believe an analytics platform designed to provide outcome-based situations should look across the breadth of any multi-asset portfolio, providing both a view of the portfolio's components and its totality, in factor and non-factor terms. It should help managers and clients understand the interconnectedness of the portfolio's investments.

Invesco Vision was created in-house by investors for investors, and provides a robust, multifaceted view into portfolio risk and a broad set of portfolio construction capabilities to manage that risk.

This was the genesis for the development of Invesco Vision, our portfolio management decision support tool that:

- Enables us to conduct comprehensive risk assessments, asset allocation exercises, and risk evaluation in more detail as part of developing client solutions.
- Puts product and strategy information – both ours and third-party investments – at our fingertips, so we can explore them in the context of specific investor challenges and make objective recommendations on constructing a custom solution.
- Features enhanced asset return, risk, and correlation modeling capabilities for alternative assets, including private market investments, that can often be difficult to incorporate in a manner that is consistent with existing traditional portfolio holdings. This includes the flexibility for investors to leverage Invesco Investment Solutions Capital Market Assumptions (CMA) or to use their own return expectations.
- Emphasizes stress testing to help understand how each portfolio might perform in various market scenarios, providing relevant information from asset class, industry, and factor perspectives.
- Provides a crucial forward-looking lens, giving us a read on how a portfolio should be positioned today, with forecasted risk and return assumptions, and whether that portfolio can meet liabilities, cash flow needs, or other desired outcomes over time, facilitating better decisions about portfolio improvement.
- Facilitates iterative optimization, where we repeat the steps above many times as we explore different solutions, making concrete progress with each step toward improving the asset allocation and helping achieve the desired outcome.

Invesco Vision was created in-house by investors for investors, and provides a robust, multifaceted view into portfolio risk and a broad set of portfolio construction capabilities to manage that risk. The analyses we conduct with Invesco Vision help us better understand investor needs, processes, and decision-making, so we can partner at the highest possible levels with our clients.

An academically-focused research team can provide strong theoretical underpinnings to ideas and strategies.

3. People

In the end, people are central to successful client engagements. They are a critical part of understanding client needs, providing experience and investment acumen, and fostering a culture of providing solutions – all essential to outcome-based investing.

We believe the optimal team emphasizes practitioner experience, supported by technical and academic proficiency. Senior staff should have 20 years or more experience as practitioners, including client-side experience, with significant asset class expertise that includes fixed income, insurance, alternatives, and private investments. They will have implemented equity, fixed-income, and alternative portfolios during both rewarding and challenging times in the financial markets.

The ideal team will also possess strong academic and technical backgrounds, integrating mathematics, investments, and programming skills that allow for the translation of ideas into investment strategies and scalable tools that facilitate better decision-making.

An academically-focused research team can provide strong theoretical underpinnings to ideas and strategies. A practitioner mindset will translate these strategies into practical, real-world applications designed to overcome a host of practical challenges, including liquidity and trading concerns.

Finally, outcome-based investing is not an overlay on a product- or sales-oriented culture. It is a culture that should be fully integrated into the organization as a shared belief in and strong commitment to providing solutions. Clients should expect a very clear line of outcome-oriented thinking from their very first discussion with our Investment Solutions team to the delivery of the final portfolio.

We partner with such institutions as Cambridge University and with recognized asset management experts such as Harry Markowitz, Nobel Prize winner and the founder of modern portfolio theory (MPT).

Seeks to deliver better outcomes

Invesco Investment Solutions is a 50-plus-member team comprising research and portfolio analytics, client solutions and advisory, and portfolio management professionals working together to deliver solutions to clients, with a global practitioner footprint that interfaces with clients on a global, regional, and local basis.

Our Solutions team includes over 40 PhDs and master's degree holders, with decades of experience managing multi-asset portfolios.

We believe a global physical presence is crucial to understanding regulations, cultural affinities, and other nuances that ensure we deliver effective solutions aligned with client expectations, whether those clients are located outside the US or are US corporations with an international presence.

Outside partnerships

A vibrant outcome-based organization should also look outside its own walls to find the best thinking on behalf of clients. We believe the best organizations grow and evolve.

Invesco Investment Solutions routinely reaches out for best-in-class ideas to ensure we are expanding our capabilities intelligently. We partner with such institutions as Cambridge University and with recognized asset management experts such as Harry Markowitz,* Nobel Prize winner and the founder of modern portfolio theory (MPT).

The direction of outcome-based investing

Based on our regular interactions with asset owners, consultants, and other industry participants, we see several trends in this field:

- **Accommodating private markets.** As private investment allocations increase, many investors struggle with how to include private markets in portfolio optimizations. Because Invesco Vision is one of the few analytical platforms that accommodates illiquid assets, we are frequently asked to model and optimize strategic asset allocations with these assets.
- **LDI and CDI.** We see the biggest interest in CDI from Europe, and in LDI from the US. The biggest concern among investors, and where asset managers can help the most, is in putting these portfolios together, modeling them, and including appropriate hedging and growth assets.
- **Adapting to regime changes.** As the current expansionary cycle winds to a close, we see more investors targeting additional levels of portfolio diversification that can work across a variety of market environments.
- **Factors.** Education across the investor organization has always been the key to successfully adopting the factor framework. We continue to use our over 30 years of experience in this area to help inform investors new to factors, as well as to keep more seasoned factor investors abreast of new developments in areas such as fixed income factors.

A better basis for partnership

We view outcome-based investing as a positive market response to the dual problems of today's more complex investing environment and the resulting heavy burden it places on institutional investors. As that burden is appropriately shifted to asset managers, much is – and should be – expected of us: broader capabilities, robust analytics, factor fluency, the right people and culture, and a genuine organizational focus on putting clients' objectives first. In our experience, the reward is a better working partnership and outcomes that truly benefit the investor.

Invesco's Investment Solutions team has been built expressly to help deliver end-to-end outcome-based investing solutions to clients, over long-term relationships where we can have a truly beneficial impact on organizations, firms, and ultimately the beneficiaries of the investment solutions we can help to produce. For more information about how we can deliver outcome-based investment solutions for your organization, contact your Invesco representative.

* Cambridge University and Harry Markowitz are not affiliated with Invesco or its member companies.

About risk

The value of investments and any income will fluctuate (this may partly be the result of exchange rate fluctuations) and investors may not get back the full amount invested.

Invesco Investment Solutions (IIS) develops Capital Market Assumptions (CMAs) that provide long-term estimates for the behavior of major asset classes globally. The team is dedicated to designing outcome-oriented, multi-asset portfolios that meet the specific goals of investors. The assumptions, which are based on 5- and 10-year investment time horizons, are intended to guide these strategic asset class allocations. For each selected asset class, IIS develop assumptions for estimated return, estimated standard deviation of return (volatility), and estimated correlation with other asset classes. Estimated returns are subject to uncertainty and error, and can be conditional on economic scenarios. In the event a particular scenario comes to pass, actual returns could be significantly higher or lower than these estimates.

This information is not intended as a recommendation to invest in a specific asset class or strategy, or as a promise of future performance. Refer to the IIS CMA methodology paper for more details.

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Data as at May 28, 2019, unless otherwise stated.

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