Capital market assumptions and portfolio construction

How capital market assumptions can power smarter portfolio decisions

By Barbara McEvilley, Ashby Monk and Dan Golosovker

1. Welcome

Capital market assumptions (CMAs) are increasingly used by long-term investors to provide a basis for expectations of multi-asset performance, standard deviations and correlations. These forecasts of asset-class specific risks and returns help to steer fundamental investment activities, namely setting target asset allocation. But while CMAs are seen as increasingly useful to investors, they are also a moving target; they change as the trajectory of economies, markets and industries changes.

With this in mind, the Addepar Research team began studying CMAs as a means of understanding investment decision-making and improving long-term risk-adjusted performance. We launched a new CMA survey in 2022 that, today, offers timely CMA data. This survey provides investors with a consensus view of what their peers believe about the general outlook for financial markets and specific asset classes.

In conjunction with surveys, our team has sought to provide a deeper understanding as to how our clients use CMAs in their investment decision-making. This ARB, more specifically, is intended to offer deeper insights into how our clients identify, select, validate and implement CMAs.

2. NTK

Here's what you "need to know" from this brief.

- **Powering multi-asset models:** CMAs are useful tools for comparing risk and return across asset classes. This should allow investors to more intelligently move capital to assets that offer more return per unit of risk over the appropriate time horizon.

- **Flawed but valuable:** Even firms that see CMAs as valuable also note that these forecasts are usually flawed. As one interviewee noted, "They are always wrong." And yet, our case studies find value in reviewing consensus takes among their peers, as this gives insight about these peers' potential future investment behavior, as well as indications of overall market shifts.

- **Innovation is needed:** Overall, investors seem satisfied with the quality of CMAs for public assets, but they often view private and alternative asset CMAs as deficient. This has led many firms to investigate novel forecasting methods in order to improve CMAs, such as incorporating variables beyond macroeconomics into their long-term scenario planning (e.g., factors regarding geopolitics, the environment and technology). This CMA project is itself an attempt to help meet the demand for innovative CMAs.

3. Significance

Capital market assumptions are a critical part of strategic portfolio construction, because they provide a basis for expectations of both returns and risk. While many sources of capital market assumptions exist, there are differences in institutional and individual approaches to portfolio management, and information about the trajectory of economies and markets is constantly evolving. Whatever the approach, investors often use these projections to inform their asset allocation and build portfolios that can meet future objectives.

While CMAs appear to be universally valued, even when they're flawed, there are very few "best practices" on CMA selection or implementation. Our research confirmed that investors lack even basic standards around CMAs. In fact, we launched the Capital Market Assumptions Survey Program to respond to this finding, and we seek to field a new survey every six months to provide

investors (and CIOs, in particular) with timely data about the consensus view of their peers regarding CMAs and financial markets in general.

In May 2022, we launched our inaugural CMA survey, which canvassed Addepar clients on their CMAs. Between mid-May and late June 2022, 35 investment professionals representing 1,970 portfolios and $92 billion in assets responded to the survey. In January 2023, we launched our second survey and received responses from 91 investment professionals representing 16,430 portfolios and $177 billion in assets. Our survey asks respondents about their 1-year and 10-year expected total returns (nominal capital appreciation, plus payouts) for nine distinct asset classes: U.S. Treasuries and agency debt, U.S. corporate bonds, U.S. equities, international equities, hedge funds equity strategy, hedge funds multi-strategy, private equity buyout, private equity venture and real estate funds. We also asked investors about macroeconomic assumptions, including GDP growth, inflation and recession risk.

In what follows, we seek to provide investors with a better understanding of how these survey findings—which include consensus CMAs—can be included in decision-making.

4. Context

The history of CMAs dates back to the 1950s, when Harry Markovitz wrote his landmark article on Modern Portfolio Theory (MPT) and its use of Capital Market Assumptions (CMAs), which he published in the *Journal of Finance* in 1952. In this work, which he extended in his 1952 book on the same subject, Markovitz formalized the math regarding the benefits of diversifying investments.

We can simplify the foundations of this theory as follows: a mean-variance theory, Markovitz's MPT compares the expected (mean) return of a portfolio with its standard deviation. Assuming that an investor should maximize a portfolio's expected return while minimizing the variance of that return, Markovitz showed that a security's contribution to the variance of the overall portfolio is more important than a security's independent variance. In other words, securities cannot be evaluated in isolation. Variations of this original idea are commonly used today by institutional portfolio managers to structure their portfolios and measure their performance.

For multi-asset class investors, this finding has led to a generation of analysts looking for correlations between assets, while searching for assets that could help to diversify a portfolio. To

achieve this, investors often needed to understand where markets were headed in the future. But this raised the important question of where investors could source reliable estimates of asset risk, correlation and performance.

Often buy-side investors have been obligated to rely on sell-side financial institutions for their CMAs (see appendix). We launched our survey as a means of sharing family offices' and high net worth individuals' views on market assumptions. These individuals are often seen as "smart money," which adds further weight to their expectations.

5. Approach

We sought to understand how Addepar clients used CMAs in their portfolio construction. We conducted eight case studies with investors in July and August 2022. These included three pension funds, four single family offices (SFOs—with two reported below) and one registered investment advisor (RIA) with offices spread across Australia, Europe and North America. We chose a multi-method qualitative approach, given the dearth of CMA best practices available in the literature and the scarcity of quantifiable information available from our clients on CMAs.

In addition, our desk-based research revealed that the seminal papers on CMAs appeared to be published exclusively by sell-side banks such as BNY Mellon and JP Morgan. While the quality of these institutional reports is high, the objectivity was harder to determine. As such, we sought to objectively assess our more sophisticated clients on this matter.

To be clear, our goal and approach in this ARB is not to deliver a well-reasoned set of best practices on CMAs. Given the lack of scholarship in the domain, we opted to expose and illustrate how sophisticated investors use CMAs. We hope this approach will inform the collection and delivery of more data on CMAs, such as we're undertaking with our CMA Survey Program.

6. Findings

Our case studies differed in the relative value they place on CMAs. But we discerned generalizable differences based on the category of investors. Perhaps not surprisingly, given their fiduciary responsibilities to broad stakeholders, our pension case studies articulate investment processes that are more structured and rigorous than those of their SFO and RIA counterparts. For that

reason, we describe our findings by interviewee cohort: first pension funds, followed by SFOs and RIAs.

The following table summarizes some directional themes that emerged when we compared findings about investment processes across the major investment firms/organization types we interviewed (pension, SFO, RIA). That said, we observed stark differences in approach within cohorts (for example among SFOs or among pension funds).

Firm type	Portfolio construction elements (Use of…)				
	CMA models	**Economic scenario planning**	**Macro risk models**	**Non-macro models**	**Governance mandates**
Pension	High	High	Med	High	High
SFO	Med	Low	Low	Low	Low
RIA	High	Med	Low	Low	Low

#1: European Pension: This client described its annual investment planning process as incorporating eight asset classes: public equities, government bonds, global credit, real estate, infrastructure, private equity, private debt and direct lending, and special situations equity. For each of these asset classes, the pension fund has its own forecasting model that seeks to convey risk and return to decision-makers with the following key takeaways:

- On the equities side, the pension describes its model as "vanilla"—essentially a valuation-driven CAPM process founded on the belief that, over 10 years, the leading indicator of expected return is value. The fund analyzes its equity asset classes in ways meaningful to each–whether that's rental yields in corporate real estate or EBITDA in private equity.

- For fixed income, its model looks at current levels of yields and the shape of yield curves, assuming this will provide "90% of the return."

- The models are all tested according to three economic scenarios that hinge on key macroeconomic variables such as inflation and interest rates. The fund's model is typically updated annually, although more frequently in times of extreme macroeconomic or other shocks.

#2: American Pension: This interviewee described its CMA model as a "building block approach with a reversion view," one that takes into account underlying sources of risk and return as well as history to estimate asset-class performance before rolling up to the portfolio's ultimate return. The fund describes its use of CMAs with the caveat that "They are always wrong," elaborating to say that they are about "preparedness, not prediction." That said, here are the key aspects of the fund's CMA process:

- The pension conducts (with oversight by its board) an annual CMA survey with third-party service providers, including well-known asset managers and investment banks.

- It layers into the process three economic scenarios that test how the portfolio would perform: "base, upside and downside." These three scenarios are derived according to different assumptions for GDP and inflation.

- In the future, the pension's goal is to have two distinct models that it can compare—the one described above, as well as one more akin to Bridgewater's All Weather fund that allocates a portfolio based on four possible macroeconomic environments (growth: rising and falling; and inflation: rising and falling).

- In the future, this pension also aims to layer into its planning a geopolitical lens. With this in mind, the fund recommends the work of the National Intelligence Council (NIC), in particular the framework NIC describes in the report they produce every four years (at the beginning of each presidential cycle). NIC's global framework looks at four key factors (demographics and human development, environment, economics and technology), from which they create five potential scenarios.

#3: APAC Pension: This pension fund described its model as "likely very different from other firms," saying, "We don't really use CMAs a lot because they are always wrong." In this respect, the fund was surprised to hear that CMAs are often used by firms that view them with healthy skepticism. The pension's approach had the following characteristics:

- Instead of trying to pinpoint specific returns per asset class (e.g., 6.5% or 7% for equities), the goal is to agree upon large bands of yields (e.g., between 5–10%).

- Rather than develop detailed forecasts and "putting too much science into something that is fairly uncertain," the pension chooses to work within a process that it describes as "pragmatic and flexible." While the fund does do quantitative analysis, it points out that it's careful not to rely on backward-looking analysis, saying, "Most models are like a rearview mirror; our job is to look out the windscreen and see what's coming."

- Once the pension has its bands, the next step is to create a broad rank order of asset classes in terms of risk-adjusted returns, as well as the convictions for each. Once the fund has determined its ranking, it looks to see how to spend its risk budget, in an interactive process described as both top-down and bottom-up. This entails putting the "ideal allocation" into the context of two constraints: liquidity (of its portfolio) and cost (of the market). For example, at a given time private infrastructure investment may look particularly promising from a risk-adjusted perspective; however, the pension may adjust its allocation to this asset class downward if it finds a crowded marketplace and therefore feels the desired returns will not be feasible. "It is not a model exactly," the fund declares of this iterative approach. "That is too generous of a term."

- The APAC pension's team members connect widely with and read CMAs from the investment community, pointing out that they prefer research about long-term strategy (they cited Jan Loeys' work at JP Morgan). The primary value they find in CMAs is that the forecasts give them the consensus view—so that they can know "where we are consensus and where we are non-consensus."

- As described in the private infrastructure example above, "if everyone thinks an asset class will be great, and everyone is piling in, then perhaps the profits may not be there."

#4: East Coast SFO: This fund manages the considerable wealth of two East Coast families. Here are the key lessons from this case:

- The fund uses sell-side firms for its CMAs, favoring the vendors that do a particularly good job articulating or revealing the underlying assumptions.

- In describing its own CMA process, the SFO says, "it is not 'rocket science'—we look at where we are in the cycle, CMAs and Schiller P/Es to construct portfolios that meet our clients' objectives."

- For private equity, this SFO relies on a name-brand consultant, appreciating how this firm aggregates historical data of various private asset classes by vintage to help with investors' future projection efforts (e.g., "We're in a 1999 moment, a 2006 moment or a 2009 moment.").

- The fund commented about its awareness of CMA data for hedge funds, but also noted that it does not analyze CMAs. Instead, the SFO spends time to properly underwrite individual hedge funds against different economic scenarios.

- While the fund pays attention to CMAs for public and fixed income asset classes, it elaborates, "if you told me I'd never get to see such forward-looking assumptions for private markets, I wouldn't blink an eye."

#5: Home-biased SFO: The fund's investment portfolio was heavily skewed towards alternatives. Its process focused less on CMAs and more on doing due diligence at the level of each individual deal to assess it for potential risks and returns.

- The SFO acknowledged having a strong "home country bias" ("It gives us an emotional comfort level.").

- The fund doesn't subscribe to Modern Portfolio Theory and its related use of CMAs. Instead, the SFO describes itself as a "risk-parity" shop that took its original inspiration from Ed Qian's paper on the subject.

- The fund focuses its energies not on assessing the expected returns of asset classes, but instead on analyzing how the portfolio would likely perform based on three scenarios of risk.

- It designs its portfolio with long time horizons ("6–16 years") that can accommodate the inevitable losses.

#6: Registered Investment Advisor: This investor manages investment portfolios for high net worth individuals and families in tech whose chief goal is to diversify concentrated portfolios from recent or semi-recent IPO-like events. Compared to the pensions and SFOs we interviewed, this RIA relies more heavily on a purely quant model that it describes as very analytical and "nerdy." As initial inputs for its model, the RIA loads asset classes, with expected returns and volatility for each. Then, the RIA "plays around with weights to determine optimization." Finally, the investor puts that optimized portfolio through a "mean variance optimizer to make sure they are not missing anything." In short, the RIA is putting a modern spin on a classic CMA process.

7. The ARB-itrage

Based on our findings, the key to using CMAs to drive long-term investment outperformance is as follows:

Models inform allocations: Our case studies use CMA modeling to update and implement asset allocations. Because CMAs often extend 10 years into the time horizon, many investors include CMAs in longer-term horizon investment plans. This is what we would call (even if they do not) their strategic asset allocation process.

Scenarios drive preparedness: Investors use CMA models—base case, pessimistic case and optimistic cases—to compare how their portfolio performs in different stress scenarios. This process allows allocators and CIOs to build more resilient portfolios, which surprisingly included being more aggressive and holding less cash (as their portfolios were more resilient than they thought).

Alternative data integration: The utility of ESG and other non-traditional data sets seems to increase when investors are seeking to build their CMAs. Indeed, the investors in our small sample seemed more interested in geopolitics, climate and other non-traditional factors in their portfolios when setting longer-horizon strategies. The team building CMAs is thus often a key partner with the team developing ESG policies.

Insight vs. foresight: Nobody seems to trust CMAs implicitly, because CMAs are about the future. As such, the CMA process involves collecting organizational insights and knowledge in service of establishing a set of core "beliefs" about the future. This process is valuable even when the outputs are wrong.

8. Coda

The business of investing is largely about forecasting; aligning present-day portfolios with future goals and objectives. The only way to do this effectively is to have some well-founded assumptions about how present-day portfolios will perform, especially under likely scenarios. This is precisely the goal of formalizing and sharing CMAs.

In this ARB, our intention was to share how a sample of our clients are using CMAs to inform decisions. We're continuing to build our CMA Survey Program at Addepar, and hope you and relevant colleagues will participate in the future. If you have any topics you'd like us to explore in future survey questions, please share those with our team!

References

BNY Mellon: "10-Year Capital Market Assumptions," Calendar Year 2022.

Elkami, Redouane, Lee, Jacky S. H. and Salerno, Marco (2022). "Factor Investing Using Capital Market Assumptions," *The Journal of Portfolio Management,* Quantitative Special Issue 2022, 48 (2) 119-143.

Black, Fischer and Litterman, Robert (1991). "Asset Allocation: Combining Investor Views with Market Equilibrium," Academia.

JP Morgan: "2022 Long-Term Capital Market Assumptions."

Morgan Stanley: "Annual Update of GIC Capital Market Assumptions," March 31, 2022.

Markowitz, H. (1952), "Portfolio selection," *Journal of Finance* 7(1), 77–91.

Rubenstein, M. (2002). "Markovitz's "Portfolio Selection": A Fifty Year Retrospective," Journal of Finance, VOL LVII Nov 3, June 2002.

Acknowledgements

Authors

Dan Golosovker, Deputy Head of Research (dan.golosovker@addepar.com)
Barbara McEvilly, Research Director (barbara.mcevilley@addepar.com**)**
Ashby Monk, Head of Addepar Research (ashby.monk@addepar.com)

Appendix

To provide a deeper understanding of how CMAs are developed and used, we offer an example from a oft-cited sell-side CMA research study. In our research, investors mentioned consuming a range of sell-side research firms' reports about CMAs. We reviewed the reports mentioned and found that BNY Mellon does a particularly good job laying out its CMA process in a way that's clear and straightforward. For this reason, we summarize its approach below.

BNY Mellon methodology: Similar to its peers, each year BNY Mellon (BNYM) develops expected returns for major global asset classes to guide its investors' long-term strategic asset allocations. BNYM creates CMAs for approximately 50 global asset classes, with assumptions based on a 10-year investment horizon. BNYM uses a building-block approach to develop its CMAs, starting with macroeconomic projections. The bank starts with inflation, real GDP growth, short-term interest rates and exchange-rate projections based on three-year forecasts developed by its internal BNY Mellon Investment Management Global Economic and Investment Analysis Group. For each asset class, BNYM creates initial baselines by taking the consensus view of external experts. Next, it adjusts its baselines to reflect insights about global market imbalances identified by an internal team of global research experts. Finally, it assumes that the macroeconomic building blocks will gradually glide toward an equilibrium based on the final long-term market expectations, or to historical averages. This methodology is intended to give BNYM flexibility in generating expected returns under multiple macroeconomic scenarios and time horizons.

BNYM's scenarios: The economic projections that underpin BNYM's CMAs are based on four economic scenarios, which it outlines in its quarterly "BNY Mellon Investment Management's 2021 Q4 Vantage Point." The most recent scenarios are summarized by: good recovery, overheating, tight money, and bad recovery. The bank develops expected returns for each, assigning each a probability and then weighting each for its overall expected return. This enables BNYM to shock a given portfolio under various scenarios beyond the expected. For investors with large illiquid allocations, these shocks and scenarios offer material insights about potential future cash positions, liquidity profiles, unfunded commitments and a range of other significant portfolio risks.

BNYM's specialization: The CMA report addresses the following asset classes in depth:

(1) **Equity markets:** Not surprisingly, inflation and real GDP growth are the key drivers of BNYMs expected earnings growth for equity. The bank's building-block approach for equity

also includes: real earnings growth, income return valuation adjustments and currency adjustments. As a baseline, BNYM assumes that real corporate earnings growth will be consistent with its projections of real GDP growth.

(2) **Fixed income markets:** To derive its fixed income return assumptions, BNYM analyzes current yields in the market, projects yields based on four macroeconomic scenarios, reduces returns due to defaults and makes further adjustments based on currency fluctuations. Beyond the intermediate term, the bank assumes these factors will migrate to market consensus expectations or to long-term historical averages. BNYM relies on the projections of its chief economist to: project short-term interest rates, as well as to determine the slope of the yield curve and credit spreads in the intermediate term (three years).

(3) **Dividend yields:** Over the next 10 years, BNYM expects dividend yields to be a blend of historical average yields and current yields in the market.

(4) **Alternatives:** BNYM believes that expected returns for alternative asset classes will generally be in line with publicly traded markets on a risk-adjusted basis plus incremental return for alpha and liquidity.

To calculate risk-adjusted returns, the bank first determines the beta of the asset class relative to public markets based on: its expectations of return, standard deviations and correlations. BNYM applies the beta to the public-market expected return to determine the expected return of a given alternative asset class.

For private markets, BNYM adds additional returns to account for illiquidity. For hedge funds and other alpha-oriented asset classes, it also adds additional returns to reflect the residual risk not captured by market returns. These additional returns assume an information ratio of 0.3 multiplied by the residual risk.

Other CMA sources: As described below, firms/organizations employ divergent processes for transforming data (CMAs and otherwise) to develop investment assumptions and strategies. While processes differ considerably——including the relative value placed on CMAs—we heard a lot of overlap regarding preferred sources of CMAs by segment, as outlined below.

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