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STATE STREET GLOBAL ADVISORS

Frank J. Fabozzi, Editor

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Alex Rudin, Ph.D.

Global Head of Multi-Asset and Fixed Income Research

Alex leads quantitative research efforts across SSGA's Multi-Asset ("Investment Solutions Group") and Fixed Income Cash and Currency ("FICC") business lines. Within ISG, Alex drives quantitative research agenda in support of tactical and strategic asset allocation processes, portfolio construction analytics, target volatility models, and the target date fund franchise. Within FICC, Alex oversees quantitative research effort for enhanced indexing, systematic credit, ETF management, and top-down active fixed income process.

In addition, Alex works with the broader ISG and FICC business teams to help bring new ideas, products, and thought leadership to our clients.

Alex joined State Street Global Advisors in September 2014. Before joining ISG in 2018 to head up its research effort, Alex was a Global Head of Liquid Alternative Investments at SSGA.

Alex holds a Ph.D. degree from Theoretical Physics, has 24 years of industry experience in quantitative finance and alternative investments, and is an author or co-author of more than 40 articles in academic journals in the areas of theoretical physics and finance.

Interview with Alexander Rudin of State Street Global Advisors

Frank J. Fabozzi, Editor

Alexander Rudin
heads quantitative research efforts across Multi-Asset and Fixed Income Cash and Currency business lines for State Street Global Advisors in Boston, MA.
alexander_rudin@ssga.com

Frank J. Fabozzi: How do you define your investment philosophy for creating systematic multi-asset strategies?

Alexander Rudin: We think of systematic, multi-asset strategies as "coherent portfolios of ideas". In other words, we aim to create diversified and self-consistent strategies. Diversification is key as no single magic bullet of an idea is always right. A suite of ideas, followed together, usually produces better investment outcomes. We also strive to make our strategies "coherent". By this, we mean that asset classes are structurally connected, and we want to imprint those connections into our models. Credit spreads and equities are a good example: they both represent market views on corporate earnings, and both are substantially driven by market risk sentiment. Consequently, we would aim to use similar sentiment indicators for equities and credit spreads.

Since we are talking about investment philosophy, two more principles are worth mentioning. One, we strongly prefer signals supported by clearly articulated economic logic over empirically discovered signals. Two, we value simplicity over complexity; each additional level of complexity must be justified by a measurable improvement in performance.

The reason is that in the multi-asset strategy space, we don't invest in individual securities, and our trades usually last months. That makes the amount of data available to us rather small. If we started from data alone or overcomplicated the models, we would inevitably overfit the data and "find" things that do not really exist.

Fabozzi: What metrics are most important when assessing the success of a multi-asset strategy?

Rudin: As asset managers, we exist to help investors meet their objectives. Such objectives vary widely, and so do metrics we use to assess success of our work. Let me go over several examples to help illustrate. The purest form of a multi-asset investment objective is absolute return—the goal is to maximize investor's wealth over time, usually subject to certain risk-related limitations, such as portfolio volatility, maximum drawdown, or maximum position sizing. The typical metric of success is the Sharpe ratio of the outcome or how much absolute return a strategy delivers per unit of its risk budget.

A slightly more nuanced way to articulate the objective is to aim to maximize total portfolio return while limiting (or targeting) the level of relative risk to an investor-provided benchmark. An important new angle here is the correlation between the strategy and the benchmark. Strategies that offer lower correlation to the benchmark are more valuable from the total portfolio return perspective.

Another key but sometimes overlooked aspect of any multi-asset strategy is how the liquidity of portfolio instruments relates to strategy turnover and to the frequency of cash flows in or out of that strategy. A liquidity mismatch may lead to unseemly outcomes, especially during market dislocations. That element is particularly important when assessing strategies that include private assets, such as hedge funds, private equity, and debt.

As multi-asset strategies evolve, investor objectives—and corresponding success metrics—become more nuanced and often include several angles at once. For example, a modern equity volatility targeting strategy may include an absolute return

objective alongside the traditional volatility target. Or, when measuring performance or a complex, absolute return strategy, one could introduce variable performance "hurdles" that reflect the passive performance of underlying markets such as equities or corporate bonds.

Fabozzi: How do you hedge against significant equity market downturns?

Rudin: An investor who made a strategic decision to be long equity markets has three broadly defined ways to protect himself against downturns: an active approach to asset allocation, diversification, and a hedge overlay.

Active tactical asset allocation adds value by carefully and deliberately changing asset class exposures over time. Hypothetically, whenever such a strategy anticipates a market downturn, it is designed to derisk the portfolio and take the proverbial chips off the table. Of course, this is easier said than done: market forecasting is a challenging task with high uncertainty of outcomes.

This naturally brings us to diversification, which is central to our approach. As we design the "portfolio of ideas" for our active strategies, we consciously consider how those ideas behave in various market environments, including market downturns. Generally, we prefer signals that are additive from the absolute performance perspective while simultaneously diversifying to major risk premia we have structural exposure to, such as equities, credit, and term.

Diversification in terms of signals and assets reduces uncertainty but doesn't eliminate it. This brings us to hedge overlays and risk-based exposure management more broadly. Many options are available, each with its own advantages and challenges. Let me walk through a couple of examples.

The first is volatility-managed equity solutions. Those are effective in reducing sharp and deep equity drawdowns but tend to underperform in equity recoveries. Another popular remedy is replacing core equities with their low-volatility variety or high-yield credit. Broad equity exposure is indeed reduced that way, but at the expense of bringing new (and uncertain) return drivers into the mix. Finally, direct hedging through options overlays could be very precise and effective in cutting market exposure to size. That said, it usually is the most expensive out of the available routes.

As you can see, the three approaches offer differentiated trade-offs between uncertainty of outcomes and incurred costs. They all play important, complementary roles.

Fabozzi: What are the key components of your asset allocation strategy?

Rudin: Regarding our tactical asset allocation strategy, we organize most of our ideas into three broad categories: value, sentiment, and carry. Value signals inform us about where asset prices are against fundamentals. Sentiment signals measure market's appetite for risk. Carry incorporates current income (for example, for bonds).

That said, there is another key component of our tactical asset allocation strategy—portfolio construction. It is generally challenging to convert a diversified set of signals that operate across multiple speeds into a set of investment decisions (trades), which attracts significant research attention.

Fabozzi: What role do macroeconomic factors play in your models?

Rudin: They are very important. Asset prices reflect both the health of the economy (fundamentals) and the mood of the market participants (sentiment). Macroeconomic factors are key to determining the former and substantially affect the latter. Despite challenges in using those factors in multi-asset strategies, we believe they are indispensable.

Let's talk about the most critical of those challenges for a minute and ways of overcoming them. There are two. First, economic data comes in a variety of forms

and is difficult to compare and contrast. Say, unemployment rate and industrial production figures provide information about the current economic growth rate, but in different units and from different angles. We usually assume that a combination of standardized macro factors is more useful than any of such factors in isolation.

Second, macroeconomic information comes at different times and frequencies and is also subject to retroactive revisions. One has to tread carefully here and ensure that look-ahead biases are not introduced into signals over time.

When these challenges are appropriately met, macroeconomic information, along with asset prices, "quantified" news, and other sources, becomes a key component of a systematic multi-asset strategy.

Fabozzi: What shifts are you currently observing in the multi-asset investing landscape, and what new challenges do those shifts pose to asset managers?

Rudin: I would point out three major ones: broader adoption of private assets, the sudden proliferation of AI-aided strategies, and increased client interest in mass customization.

Private investment vehicles such as private equity or private credit funds used to be limited to high-net-worth individuals, large pension funds, and high-end endowments. In other words, to those investors that tend to have long investment horizons and high risk tolerance. Nowadays, private assets often make a higher allocation in the same investor's portfolio and, on top of that, are increasingly used by smaller investors, both individual and institutional. The reasons are self-evident—the performance of private equity and private credit has been so phenomenal over the last decade and a half that everyone loves them. We are a bit more cautious. At their core, these assets contain leveraged equity and even more leveraged risky credit bets in an infrequently priced wrapper. There may be a continued opportunity for improved returns in this space, but significant and prolonged market downturns could bring serious challenges exacerbated by leverage and illiquidity. Investors entertaining private asset allocations need to be prepared to live through the drawdowns or face potentially deeper realized losses than what they expected when subscribing.

Another new feature of the multi-asset landscape is the abundance of newly created "AI" strategies. Most of them are the same old quantitative strategies, just renamed "AI" to keep up with the Joneses. But there is a new variety that uses unsupervised large language models (LLMs) to produce results that look great in a backtest but are unverifiable in terms of economic logic or the extent of data fitting. This is a source of concern.

Don't get me wrong—I'm all for using sophisticated new technology such as "generative AI" as a tireless research assistant or coding co-pilot. That said, I feel strongly that any successful quantitative strategy needs to be clear in terms of its economic logic, be thoroughly tested for robustness, and avoid data fitting. Some of the new "AI" strategies effectively delegate decision-making to a black box that is not your own making. The proliferation of such approaches may, at some point, become a systemic challenge to the asset management industry, and this is something both regulators and responsible industry participants may want to acknowledge and prevent.

Mass-customization is another frontier changing the industry landscape. Individual investors and small institutional asset owners increasingly prefer strategies customized to their specific objectives and constraints. Executing on this new demand requires substantial investment into operational and client reporting infrastructure for asset managers. In some cases, it also brings new demands on strategies themselves. We actively explore machine learning optimization methods, for example, as tools to quickly and effectively construct thousands of differentiated portfolios simultaneously.

Fabozzi: How does the evolving technological landscape affect your strategies, both in terms of ideas you incorporate and in terms of process for how such strategies are developed?

Rudin: The quantitative finance industry has always been enthusiastic about technological innovation. We use cloud infrastructure to house data and perform large-scale computations. We utilize a suite of machine learning tools, from classical ones, such as Markov chains and regularized regression, to recently developed ones, such as supervised learning algorithms and ML optimization.

A good example of how technological innovations lead to an effective embrace of new ideas in multi-asset research is so-called "textual data." This term refers to textual information that was converted to numerical format for quantitative comparisons. Earnings statements and conference call transcripts can be converted by the so-called natural language processing (NLP) algorithms into quantitative scores that help compare companies' perceived success and can be used for constructing relative value portfolios of stocks or bonds. Until recently, this type of analysis has been confined to quantitative security selection and were seldom used in the multi-asset space, but times are quickly changing. Aggregate score changes (from exuberant to pessimistic and back) may also inform overall risk positioning of a multi-asset portfolio. Central bank communications and other news could be similarly processed with an eye on changes in monetary policy and market sentiment. Processed news is particularly attractive from the multi-asset modeling perspective as it comes with a very little temporal delay, almost in real-time. This differentiates them from macroeconomic data that usually arrives with multi-week delays.

Another groundbreaking technological innovation is the host of new, so-called "Generative AI" tools. They not only process complex information but also generate outputs in a form that humans can directly consume. There are many challenges associated with using such unsupervised tools directly in systematic strategies, but they have great potential to improve the process of *how* we create those strategies. We are looking into Generative AI use as a co-pilot for coding, a research assistant for literature and data hunting, and a power tool for visualization applications. Legal environment is a bit challenging around Generative AI, so we tread very carefully.

Fabozzi: What are common, practical challenges in implementing systematic multi-asset strategies within a large asset management organization?

Rudin: Working within a large asset management organization that values model-driven, multi-asset strategies is exciting. As a researcher, you get significant resources and scale for implementation. But that same scale brings certain limitations. Strategies that you design need to be able to move the needle. Since they are impacting billions of dollars, strategies must be relatively liquid and slow. This affects modeling choices. Clever ideas you might have about how markets behave over a day or even a week are usually impractical to implement in practice.

The large size of an asset management organization also brings inevitable legal, regulatory, and client-driven complexity. In a simpler firm, a single generic model could potentially serve all clients via a single unrestricted private placement vehicle. The reality of a large asset management organization is usually different. While a subset of its clients could implement that hypothetical investment strategy without adjustments, many other clients cannot. For example, some investors are prohibited from using derivatives or leverage. That alone is a significant restriction, as many multi-asset strategies, such as risk parity or curve strategies in fixed income or commodities, cannot be effectively implemented in the presence of such constraints.

Wealth space is particularly challenging. For example, most wealthy investors are not tax-exempt, which brings tax consequences of our trading into scope. Another peculiarity of Wealth is limited available instruments for even seemingly trivial

multi-asset strategies. Say, you wanted to implement a sector rotation strategy in the US equity market. 1940 act rules bind available ETFs, which makes them differ significantly from the institutional index funds that are not subject to those rules. Tracking error could be quite large, so sometimes we have to find clever workarounds.

In all, you have to be careful when applying a generic model to a particular set of circumstances. We spend a fair amount of time thinking about problems like that.

Fabozzi: I understand that processes in many multi-asset investment organizations combine discretionary and systematic elements. How does this work?

Rudin: Yes, symbiosis of discretionary and quantitative is common at large firms. For example, our multi-asset investment organization combines a team of discretionary portfolio managers with a team of quantitative researchers—joined by a common objective of delivering investment returns. Models run by the research team act as core to our investment process as they always take a well-controlled amount of risk. That said, discretionary portfolio managers sometimes act as sources of ideas ultimately coded up in the model. Discretionary folks also help our organization navigate through highly unusual periods, such as a COVID pandemic or other earthquake-like geo-political events. Finally, discretionary managers maintain a portfolio of their own trades that reflect economic relationships that are either not yet coded up within models or are too idiosyncratic ever to be coded.

Benefits go both ways and so does accountability. Trades placed by the model and by portfolio managers are recorded in separate "books" and tracked separately in terms of investment outcomes and risks. We consider this aspect crucial for our collective success.

Fabozzi: How do you stay informed about new investment opportunities and innovations in asset management?

Rudin: Well, I personally stay informed in the old-fashioned way: I read, speak with colleagues, and participate in industry conferences. When it comes to reading, I review certain publications regularly as part of the job and some other publications more opportunistically. You will be heartened to hear that *The Journal of Portfolio Management* is my favorite publication by far. I review new issues every quarter, and often use the Journal as a starting point when conducting a literature search on subject matters that are new to me. What I like about this particular publication is its balance being academic rigor, readability, and breadth.

I opportunistically read other PMR publications, periodically review NBER and other similar sources, and read books if a subject matter is substantially new to me (which happens quite regularly, believe it or not).

Discussions with colleagues are also helpful. We have a great team at State Street Global Advisors with deep expertise in many areas, from active systematic investing to indexing and machine learning. But besides quantitative research expertise, I find discussions with market practitioners—from in-house economists and CIOs to portfolio managers and strategists—very helpful as well.

Fabozzi: How do you communicate complex multi-asset strategies to clients or stakeholders?

Rudin: Clients usually reserve their interest in strategy investment outcomes and the broad economic logic behind them. Both are explained at a high level in conversations or due diligence meetings. Another frequent focus of attention is performance attribution—the linkage between investment outcomes and declared sources of risk and return. Another venue for client communication is our thought leadership activities, including articles in external peer-review journals, SSGA-sponsored white papers, and various forms of video communication.

Internal stakeholders are often more demanding because by being on our side of the information wall, they can be. Such stakeholders include portfolio managers, risk and model validation folks, and senior management. Some of those stakeholders contribute to the economic logic behind our strategies, so understanding inner workings of our models is a necessary requirement for the job. We have developed a suite of model visualization tools to satisfy this constituency. They are web-based, daily updated, visual descriptions of each model that allow portfolio managers and other internal stakeholders to understand model outcomes on a very detailed level.

Fabozzi: What illusions would you recommend getting rid of when entering systematic multi-asset strategy creation for the first time?

Rudin: There are many, but let me focus on the top four as I see them.

Illusion 1: finding ideas for a systematic, multi-asset strategy is easy given hundreds of academic and industry papers published on multi-asset topics each year. There are two wrinkles associated with this viewpoint. First, while some of the papers out there are indeed relevant and useful, many others are not helpful or are simply wrong. Second, creating an implementable, coherent multi-asset strategy out of a cacophony of disparate, unconnected "ideas" is a challenge in itself.

Illusion 2: the amount of data required to support multi-asset strategies is relatively small, so one doesn't need to build an industrial-quality infrastructure for the effort. I see it the other way: given how easy it is to overfit the limited amount of data that we usually have, it is imperative to create and maintain a very disciplined research process. That requires a top-notch infrastructure. Plus, modern multi-asset strategies increasingly use computer-intensive machine learning techniques. That alone suggests having an equally robust and computationally powerful infrastructure to support the effort.

Illusion 3: Asset prices and macro fundamentals are enough to build a compelling multi-asset strategy. That may have been the case years ago, but now we increasingly see additional information sources as integral parts of our strategy. Alternative data on flows, jobs, inflation, and news are often part of the process. Stock and bond fundamentals on the securities level are often also part of it.

Illusion 4: Given the deep liquidity of instruments associated with multi-asset strategies, there are very few limitations on signals themselves. This may be true for small systematic macro hedge funds, but the reality of large asset management organizations is much less forgiving. Multiple levels of review and approvals for trades take a significant amount of time, resulting in multi-day implementation delays. Multi-billion size of tactical portfolios demand careful, deliberate execution and controlled turnover. Investor-driven and regulatory constraints often limit the list of instruments and overall flexibility allowed for a strategy. We covered some of these considerations earlier today. A practical multi-asset strategy creator needs to skillfully navigate these complexities in order to remain relevant.

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