by Anureet Saxena, Ph.D., CFA

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Analyst Coverage and Information Diffusion (ACID)

The following are key excerpts from an interview with Anureet Saxena, McKinley Capital's Director of Quantitative Research, to understand his approach to empirical finance in the backdrop of Analyst Coverage and Information Diffusion.

Q. Can you give some insight into how McKinley Capital's Quantitative Research team (QRT) chooses research topics?

A. The research agenda of McKinley's QRT is determined based on feedback from and conversations with a variety of stakeholders, external parties, and senior management to ensure that the output of the QRT is aligned with the commercial interests and strategy of overall firm. While some of the research topics are informed by the sell side research reports, others are motivated by the interactions between our QRT and McKinley's Scientific Advisory Board (SAB). We usually work on inter-disciplinary topics spanning the fields of finance, economics, accounting, optimization, decision science and machine learning.

Q. Can you give a specific example to illustrate the thought process behind choosing research topics?

A. As a growth momentum investor, understanding the drivers of stock momentum is a particularly important topic for McKinley. For instance, given a cohort of high momentum stocks, can we systematically differentiate stock price appreciation justified by improving fundamentals from speculative rallies? This question has tremendous practical importance, and we believe can help us differentiate successful momentum from others.

Q. That sounds like a very intuitive question. How do you crystallize a normative question like that into a research question that is amenable to quantitative research?

A. This is an iterative process where you refine the initial inquiry to add more technical details finally arriving at a formulation that can be addressed using quantitative tools. I illustrate this process below.

> Normative Question: Given a cohort of high momentum stocks, can we systematically differentiate stock price appreciation justified by improving fundamentals from speculative rallies?

Research Formulation: Bayesian adjustment to momentum factor by conditioning on exogenous variables that capture fundamental information dissemination?

Explanation: Intuitively, we are looking for ways to adjust the momentum factor so as to incorporate exogenous fundamental information. Economists refer to this phenomenon as "Bayesian Adjustment"; next we give some examples to illustrate the concept of Bayesian adjustment and unpack the research formulation given above.

As investors, we have priors on pricing and valuation of various stocks, and these priors get updated as new information gets revealed. For example, investors had well defined priors on prospects of Alibaba in 2020-Q3 based on their fundamental forecasts and corporate strategy. As the CEO of Alibaba went missing in 2020-Q4, investors were forced to update their priors on the company. While some investors might have regarded this as an immaterial event, others might have viewed it differently. Regardless of the specific stance, it is important to update one's priors when events like these happen. Bayesian adjustment is a systematic methodological way to update one's priors.

It is important to recognize the nature of the information that is being used to perform an update. For example, investors can consider the corporate governance structure, M&A activity, risk of nationalization, etc. to inform their views on growth-momentum stocks, and determine if the stock price momentum is likely to continue or result in a reversal.

Q. Once you have formulated such a research question, how do you break it into smaller components and address each one of the sub-components?

A. Let me use the Bayesian adjustment to momentum factor as an example to answer your question. To perform such an adjustment, we need three separate components, namely,

- Conceptual framework for momentum strategies
- A suite of conditioning variables
- An analytical framework to perform the Bayesian adjustment

There are multiple competing models that have been proposed in the literature. None of these models offers a comprehensive picture to momentum, although each model has some interesting marginal contributions. In our case, we chose the model proposed by Hong and Stein in 1999 as the conceptual framework for momentum.

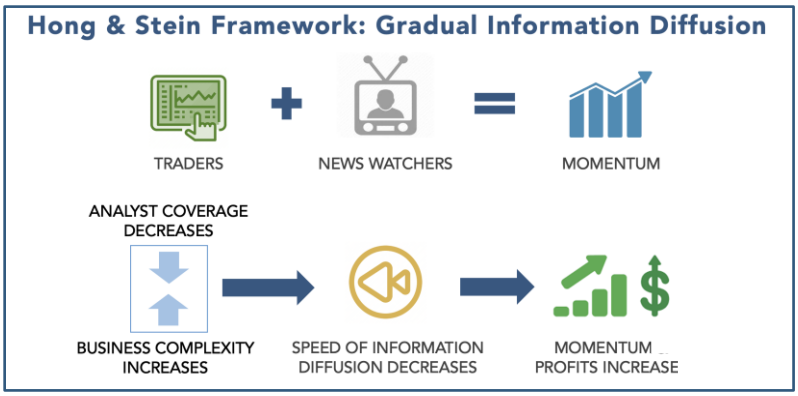
There are a wide variety of conditioning variables to choose; examples include residual analyst coverage (RAC), corporate governance, ESG factors, ownership characteristics, etc. In our current project, we decided to use RAC for its conceptual simplicity and computational tractability. Finally, we use the well-defined notions from the field of Bayesian Econometrics to perform Bayesian adjustment to the momentum factor.

Q. How do you explain the Hong and Stein approach to Momentum Strategies in simple terms?

A. Hong and Stein (HS) model is one of a variety of models that have been proposed to explain the momentum effect. Unlike behavioral models, HS model operates using two different kinds of fully rational investors, namely, traders and news watchers.

News watchers are best represented by Financial Analysts who are interested in reading the historical financial statements, earnings reports, and industry commentary to carefully formulate their views on forward looking fundamentals. Admittedly, pursuit of fundamental information in this manner in extremely crucial for any efficiently working security market but is also time consuming. Furthermore, the time and effort required to analyze a company can differ markedly depending on the complexity of the underlying operating segments. For example, it is considerably more complex and difficult to forecast the fundamentals of a semiconductor company than that for a utilities company.

Traders, on the other hand, invest only on the basis of technical or pricing signals. It is the combination of the actions of traders and news watchers that results in the momentum phenomenon. It is worth noticing that speed with which news watchers analyze the fundamental information can have significant impact on momentum profits. Specifically, momentum profits are inversely proportional to the speed of information diffusion.



Q. Given the salient role of speed of information (SoD) diffusion with regard to momentum profits, what are the primary drivers of SoD?

A. First and foremost, SoD directly depends on the resources that are dedicated to analyzing a firm. For example, a company covered by fifty analysts is likely to have much higher SoD than one that is covered only by five analysts. Thus, analyst coverage is one of the primary determinants of SoD.

Second, the complexities of the underlying business segments can also have a significant impact. For example, a company going through corporate restructuring that entails spinning off some or all the operating segments can be far more difficult to analyze than

a stable going-concern. Similarly, companies that spend a good portion of their earnings on R&D have higher future cash flow uncertainties which makes them difficult to forecast than those that do not spend on R&D. Ceteris paribus, companies with higher business complexity have slower SoD

Q. I understand various themes that are involved in this ACID, namely, Hong & Stein momentum model, speed of information diffusion, analyst coverage and complexities of underlying operating segments. How do you bring all this together to perform a Bayesian adjustment to the momentum factor?

A. The key research insight is that analyst coverage adjusted for business complexity can serve as a conditioning variable for Bayesian adjustment of momentum factor.

Q. Business complexity makes a lot of intuitive sense. However, how do you capture it in a quantitative model?

A. We use a variety of fundamental metrics to quantify the notion of business complexity. As mentioned earlier, R&D spending by a firm is a very good indicator of the complexity of the products and services offered by the firm. Similarly, presence of intangibles on a company's balance sheet, higher advertising expense, depreciation expense and high revenue growth acceleration are examples of other fundamental variables that capture various kinds of business complexities.

Q. Finally, can you explain the key tenets of Bayesian econometrics?

A. Bayesian econometrics deals with the notion of updating one's views when new information becomes available. The magnitude of such an update depends on two key informational characteristics, namely, strength of information and relevance to the said prior.

For example, consider the scenario where you are trying to predict if it will rain tomorrow morning. One can formulate unconditional expectations for this event using historical information and time of the year.

Next consider the situation where you hear a news that an important outdoor sporting event has been canceled due to forecast of rain and thunderstorm. Would this prompt you to update your rain forecast? To extrapolate the example, what if NASA announces that they have postponed a rocket launch due to bad weather. How would you process this information?

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Naturally, it will be unwise to ignore this information while updating one's prior views. Bayesian econometrics offers a methodological well-calibrated framework to deal with these questions and update one's prior.

To put this in context, consider a high momentum biotech firm that has just published a landmark paper which appeared in a high-profile academic journal and was also featured in the *Wall Street Journal*, albeit, not on the front page. All things being equal, such an event is likely to further facilitate momentum continuation particularly due to salience of the discovery (high profile journal article) and the fact it did not receive front page coverage (inattention bias). While the event makes the high momentum stock even more desirable, the precise update to the momentum score is complex analytical problem. Bayes theorem and its analytical machinery, namely, Bayesian econometrics, offer a structured way to answer that question.

Interestingly, we believe the framework can also be used to aggregate heterogeneous views of risk derived from multiple risk models. Among other things, this can help to better understand and act upon divergent views of statistical, fundamental, and macro risk models; long, medium, and short horizon risk models, etc.

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Anureet Saxena, Ph.D., CFA, joined McKinley Capital in 2020 as the Director of Quantitative Research. This followed Anureet's several-year-tenure on the firm's Scientific Advisory Board, and his close collaboration with Dr. John Guerard, Ph.D., McKinley Capital's former Director of Quantitative Research, on several publications including Quantitative Corporate Finance (John B. Guerard, Jr., Anureet Saxena and Mustafa Gultekin, Revised edition, New York: Springer, 2020). Anureet's academic pedigree, industry-leading research, and hands-on investment knowledge is an asset to McKinley Capital's leadership team and quantitative research department. Anureet and his team conduct thorough reviews and enhancements of the firm's investment methodology. In addition, Anureet is conducting and completing research on key business initiatives including analyst coverage and information diffusion, and managed volatility. Prior to joining McKinley Capital, Dr. Saxena was a Portfolio Manager at Lazard Asset Management, and held various positions at Allianz Global Investors, Qontigo (formerly Axioma Inc), and Assiduous Investment. Dr. Saxena has taught in the Quantitative and Computational Finance (QCF) program at Georgia Institute of Technology and Quantitative Methods program at Krannert School of Management and has published several papers in peer-reviewed journals such as Mathematical Programming, Journal of Portfolio Management, Journal of Investment Management, Journal of Investing and Journal of Risk. Dr. Saxena is the winner of 2004 Egon Balas award for best paper in Algorithms, Combinatorics and Optimization; the 2008 Gerald L. Thompson award for best dissertation in Management Science; and the 2014 excellence in Economics scholarship by Krannert School of Management. He earned his B.Tech in Computer Science and Engineering from IIT Bombay, M.S. and Ph.D. in Management Science from Tepper School of Business (Carnegie Mellon University), M.S. in Economics from Krannert School of Management (Purdue University), and a certificate in Accounting from UC Berkeley (extension program). Anureet is a CFA, CIPM and CQF charter holder.

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