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JOIM CONFERENCE SERIES  
AI IN FINANCE AND RETIREMENT INVESTING:  
THE STATE OF THE ART PART I  
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School of Business and Blackrock

CONFERENCE SUMMARIES

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**Rob Engle**

New York University

Keynote Speaker

*Financial Volatility and Geopolitical Risk*

Geopolitical events may impact volatilities of all asset classes, sectors and countries. It is shown that innovations to volatilities are correlated across assets and asset classes and therefore can be used to forecast or hedge geopolitical risks. The paper develops a statistical model of a Geopolitical Volatility Factor or GPVF, based on the standardized residuals from a factor model with GARCH style residuals. A test for GPVF is developed with estimation algorithms. These are applied to 9 ETFs of sectors of the US and to 45 MSCI country ETFs. The model has asset pricing implications for hedging geopolitical risks.

**Kyunghyun Cho**

New York University

*Non-Monotonic Sequential Text Generation*

Standard sequential generation methods assume a pre-specified generation order, such as text generation methods which generate words from left to right. In this work, we propose a framework for training models of text generation that operate in non-monotonic orders; the model directly learns good orders, without any additional annotation. Our framework operates by generating a word at an arbitrary position, and then recursively generating words to its left and then words to its right, yielding a binary tree. Learning is framed as imitation learning, including a coaching method which moves from imitating an oracle to reinforcing the policy's own preference

Experimental results demonstrate that using the proposed method, it is possible to learn policies which generate text without pre-specifying a generation order, while achieving competitive performance with conventional left-to-right generation.

**Vasant Dhar**

New York University

*Artificial Intelligence and Data Science in Modern Financial Decision Making*

There's a tremendous amount of interest in the use of machine learning in modern day financial decision making. Much of this interest is fueled by increasing amounts of available data and the general success of machine learning in other domains such as perception. I start by assessing the opportunities and key challenges for machine learning in exchange traded and OTC markets, and how finance problems are uniquely challenging due to their low inherent predictability. I present results from experiments that highlight how the well-known "variance problem" problem in machine learning manifests itself in building models from data. The results have implications for when should trust autonomous machine learning systems with decision making.

**Ben Golub**

BlackRock

*The Future of Investment Risk Management*

As asset managers continue to grow in complexity and size, their investment risk management framework needs to evolve. This presentation will describe the evolution of Buy-Side Risk Management over time and explore a next possible stage of risk management processes. This "Future of Investment Risk Management" will seek to develop and apply systematic, multi-dimensional and timely analyses of the entire book of business by introducing automated scans of risk and performance analytics to flag those situations requiring

further review by trained professional risk managers. In addition, data on operational risk events will be harvested and analyzed to increase focus on problems that have yet expressed themselves. At the same time, given the inevitable danger of risk managers "fighting the last war," a "smart" auditing framework will be overlaid on the risk management process in order to ensure that there will not be an over-reliance on algorithms. While there will be an increased reliance on technology, data quality and automation, the goal remains to leverage the wisdom of seasoned risk managers.

**Marty Leibowitz**

Morgan Stanley

*The Franchise Earnings Yield*

Projections of year-to-year equity performance often rely on the Earnings Yield (EY) as a convenient proxy for the expected return. However, this estimate fails to include appropriate consideration of the firm's growth prospects. A further (more serious) complication arises when the risk premium is calculated as the EY less some appropriate interest rate. In both these situations, an adjustment is needed that reflects the notional future earnings stream derived from prospective future high-return investments and/or growth opportunities.

Even in theory, these "franchise opportunities" may be comprised of a highly complex and uncertain structure with multiple future opportunities having various investment magnitudes, different returns, and all across a spectrum of distinct availability times. The specific form of a firm's franchise structure will play a key role in determining the path and the relative sensitivities of the firm's price and earnings growth (and hence of the PE's as well). We refer to the total value of these opportunities as the firm's Franchise Value (FV). For certain purposes, the FV itself can serve as a sufficient parameter that encompasses much of this complexity described about.

In this paper, the “Franchise Earnings” associated with the FV form the basis of a Franchise Earnings Yield (FEY), which we label  $g^*$ . Since this  $g^*$  term is analogous to the standard current earnings based EY, the expected return can be viewed as the sum of two yields—the standard EY and  $g^*$ . And, this  $g^*$  turns out to be just the adjustment needed to bring the standard EY into appropriate alignment for estimation of the expected return and the risk premium.

Discussant: Joshua Livnant, QMA and Professor Emeritus, NYU

**Ananth Madhavan**

BlackRock

*Innovation in Retirement and the Role of Research*

The most successful financial innovations—including indexing—have deep roots in academic research. Aging populations and lack of savings imply a huge potential opportunity for disruptive innovation in retirement solutions driven by new research. This talk focuses on how technology and data science intersect to drive new innovation in the retirement space including factor glide paths, smart decumulation using analytics, and overcoming behavioral biases. An important focus

for the discussion is robo-advising, which lies at the intersection of asset management, retirement solutions, and fintech. We will also emphasize the difference between the private and social benefits from financial innovation.

Discussant: Alison Li, CalPERS

**Zhibai Zhang**

Bank of America Merrill Lynch

*Using Machine Learning to Predict Realized Variance*

We investigate how one can use variables built on implied and historic realized variances to predict future realized variance in the frame of machine learning. By using daily price data on SPX, options written on it and VIX, We compare the predictability and stability of each model, and discuss model selection in a few different scenarios. Then we apply mean decrease accuracy type of feature importance analysis to derive the usefulness of each variable in realized variance forecast. The tradability of certain models is also discussed.

Discussant: Deep Srivastav, Franklin Templeton Investments