

# Weekly Meeting Notes

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## Overview:

- Reduced-Rank Vector Autoregression is an important forecasting approach for high-dimensional data with some advantages over VAR
- Researchers ask the question about the relationship between S&P rating's business and their index business
- Quants are having trouble finding transaction costs for FX swaps and forwards
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## News: Index for Sale

These researchers published a paper on S&P Index and rating agency

- Kun Li, College of Business and Economics at the Australian National University
- Shang-Jin Wei, Graduate School at Columbia University
- Xin (Kelly) Liu, College of Business and Economics at the Australian National University
- Their paper looks at the companies that use S&P to rate their fixed income products and their ability to get membership to the S&P 500
- David Blitzler who led the S&P's index committee for more than two decades until 2019 says that it would've been impossible to have an bearing
- What the researcher found was that S&P 500 increased their purchases of S&P 500 ratings when they were known to be opening in the index
- There was also a drop in S&P ratings sales when they changed the rules blocking foreign companies to joining

**STANDARD  
& POOR'S**

**S&P Global  
Ratings**

#### The S&P 500

- It is not the largest 500 companies on the stock exchange
- They look for “leading companies from leading industries”
- They usually have
  - Usually a market capitalization of at least \$13bn
  - Meets a profitability and liquidity requirement
  - Ultimately it comes down to the S&P Dow Jones Indices’ staff which meets monthly
- They also use an informed approach that allows for quick adjustments when a company’s overall market conditions change

#### Benefits of being included into the S&P 500

- Your stock will now be bought by all funds that track that index
- On a long run companies trade at higher multiples

#### Articles:

Financial Times: Academics cast harsh light on composition of S&P index ([here](#))

National Bureau of Economic Research: Is stock index membership for sale ([here](#))

Baltimore Sun: What’s the value of being included in S&P; 500?; Baltimore’s T. Rowe Price rises on joining Index ([here](#))

Forbes: Tesla Is Joining the S&P 500. Here’s What That Means For You ([here](#))

# Finance: Allocation Wins

A series of Endowments had great success which was driven by how they allocated their positions

Those two endowments

- University of Pennsylvania's Endowment
- Bowdoin College

University of Pennsylvania

- They had an increase of 41.1% for the FY 2021
- A main drivers of their returns are their allocation in private equity and venture capital funds

Markov Process international built a replicating portfolio that tracked the allocation by their benchmarks

- This method is called Dynamic Style Analysis
- Something to notice on their allocation is that over the years they are dropping fixed income and picking up private equity
- The model that they used which tracked indexes pretty much matched the returns of the portfolio
- They also found that the allocations that they had almost matched UPenn.

Another Pension that had a big win was Bowdoin College

Their pension has been beating Ivy League Pensions by

- They beat ivy leagues over a 10 years basis
- Their most recent returns is 14.4%
- Bowdoin had an average of 8.8% through the end of the year at 2018

Bowdoin had some wins

- They had invested in private equity and venture capital funds
- One of their big wins was picking Sequoia Capital's China Focused venture fund

- Bowdoin's allocation history shows that they are cutting their hedge fund positions to pick up venture capital and private equity
- A lot of their hedge funds were absolute return funds

## Articles:

Markov Process International: UPenn's Endowment Wins Big... With Asset Allocation ([here](#))

Markov Process International: Bowdoin FY2021: How to Replicate a Brilliant CIO ([here](#))

# Quant: FX Forwards TCA

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| <ul style="list-style-type: none"><li>• More asset managers are applying transaction cost analysis into their models<ul style="list-style-type: none"><li>◦ They are also looking beyond spot markets which already gets its fair share of criticism</li></ul></li><li>• A problem with the market is that it very bilateral in nature<ul style="list-style-type: none"><li>◦ The problem is that price data needs to be broken up into many tenors used in forward contracts</li><li>◦ That means that some tenors don't get that much data</li></ul></li></ul> | <ul style="list-style-type: none"><li>• The current method is to ask the dealer to carry out the analysis by comparing trades it did with them</li><li>• The other market that people are interested in are the FX swap markets<ul style="list-style-type: none"><li>◦ The FX swap market makes up around \$4.2tn a day in 2019 or <math>\frac{2}{3}</math> of daily market volume</li></ul></li><li>• The market is starting to head for electronic trading<ul style="list-style-type: none"><li>◦ But there are still some areas that trade via request-for-quote</li></ul></li></ul> |
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| <ul style="list-style-type: none"><li>• TCA for forwards are hard to calculate because they require factors from<ul style="list-style-type: none"><li>◦ 2 yield curves</li><li>◦ Cross-currency basis</li><li>◦ Counterparty credit risk</li></ul></li><li>• Settlement dates for forex are also take a lot of time<ul style="list-style-type: none"><li>◦ In the Forex spot market settlement is usually within 2 days</li><li>◦ For the Forex forwards market settlement is around 7 days to 3 months</li></ul></li><li>• There also isn't buy side clearing which means dealers take on counterparty risk</li></ul> | <ul style="list-style-type: none"><li>• Most asset manager really on tehri banks for credit</li><li>• Which means that each individual client of the bank will have a different creditworthiness<ul style="list-style-type: none"><li>◦ And that will lead to each client getting a different price</li></ul></li><li>• WM/Refinitiv offers a software that brings together multiple banks' quotes and if available interbank bid and offer forward points</li><li>•</li></ul> |
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## Articles:

Risk: No fair: buy side takes on pricing problem in FX forwards ([here](#))

# Computer Science: Reduced-Rank Vector Autoregression

## Overview:

- Vector Autoregression is a classic approach to multivariate time series analysis
- Able to identify co-evolution patterns of time-dependent patterns

In the case of high-dimensionality, simple VAR models can suffer from over-parameterization

This is the basic idea of VAR

$$\mathbf{x}_t = \mathbf{A}\mathbf{x}_{t-1} + \boldsymbol{\epsilon}_t$$

This is the closed-form solution to  $\mathbf{W}$  and  $\mathbf{V}$  in the form of a vector

$$\min_{\mathbf{W}, \mathbf{V}} \frac{1}{2} \|\mathbf{X}_2 - \mathbf{W}\mathbf{V}\mathbf{X}_1\|_F^2$$

## Algorithm:

The closed-form solution leads us to use an Alternating Least Squares scheme. There are three steps:

- Initialize  $\mathbf{W}$  and  $\mathbf{V}$  with random values
- Iterative step 1: Update  $\mathbf{W}$  by the least squares solution as mentioned
- Iterative step 2: Update  $\mathbf{V}$  by the least squares solution as mentioned

## Implementation:

- Inputs include the multivariate time series data and reduced rank
- The observations are used for forecasting

Reduced-rank VAR is an important forecasting approach for high-dimensional data. It has advantages of compressing coefficients and solving the over-parameterization issue with vanilla VAR.

RRVAR file ([here](#))

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