Weekly Meeting Notes

Table of Contents:

Overview:

- The 2Y Treasury has been in the spotlight
- We had previously reported on Versor Investments which is a quant fund looking into merger arbitrage spreads to predict mergers
- FXHC is the Bloomberg Ticker for Foreign Exchange Hedge Cost price for a foreign investor
- Hierarchical Partial Pooling - is a statistical tool used to analyze individual samples that have different attributes

News: 2Y Treasury in Spotlight

Basis Trade

- Pair a futures contract with
- An opposite position of the underlying note or bond

- Hedge funds are rushing into the basis trade as per the Commodities Future Trading Commission (CFTC)
- Interest rate swaps
    - Now pricing in 2 rate hikes
    - One month ago they were pricing in 1 hike
- As futures get cheaper is what got hedge funds to get into the position
- Most of the activity is on the 2 year notes futures
    - The positioning spread reached the widest since 2016

J.P.Morgan

Quant: Quant Researchers looking into M&A with machine learning

These researchers

- Tugce Karatas
- Ali Hirsa

- Their dataset consisted of around
  - 19,006 unique M&A deals greater than $1m and public target ownership
  - Between January 1st, 2001 to October 30th, 2020

- After cleaning the data they were left with
  - 52 numerical variables
  - 40 binary variables
  - 11 categorical variables

- Examples of types of data
  - Numerical: financial ratios such as TIC/EBITDA
  - Numerical: share prices before and after the deal
  - Binary: deal characteristics
  - Categorical: region

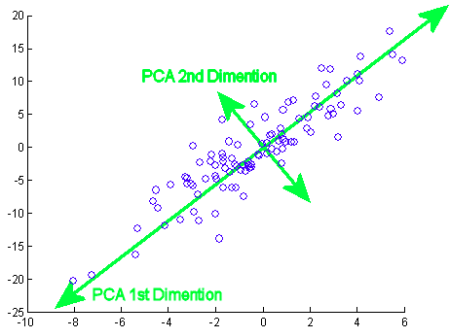
- They use K Nearest Neighbor for the data imputation
- They chose to use 5 variables for the k values
- They used the KNearest data to turn their data set into
  - 52 numerical
  - 108 binary variables

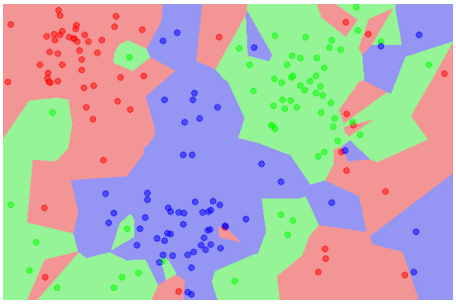
- They also used the Refinitiv MarketPysch
  - That outputs values between -1 and 1
  - A larger absolute value indicates a stronger view about the company

- The final datasets and train and test size
  - 17,440 unique deals
  - Training data: 16,525 deals before 2019 (80.84% completed)
  - Testing data had around 915 deals that were announced (79.89% completed)

COLUMBIA | ENGINEERING

Industrial Operations Research





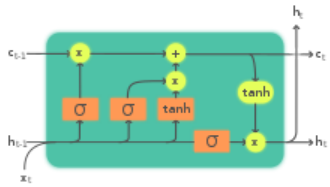
- After data preprocessing
  - 52 numerical variables
  - 108 encoded categorical variables
  - 121 sequential sentiment scores

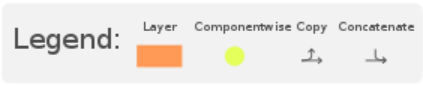
- Then they use Principal component analysis to reduce the number of numerical components
- Then they use an encoder and decoder for LSTM (autoencoder)
  - It takes in X and then reduces it to a lower dimension
  - Then it reduces X to a lower dimension vector Z
  - Then the LSTM takes Z and reconstructs the input sequence as X_hat
  - The goal is to compress high dimensional sequential sentiment scores without losing too much information
  - The loss is constructed via Euclidean distance

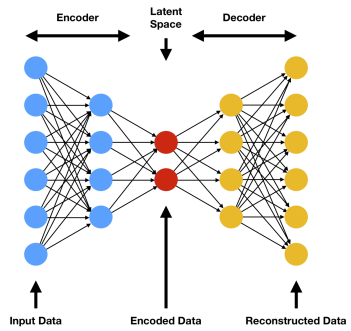
- The dataset is imbalance
  - 80% of the deals are completed
  - 20% of the deals are cancelled

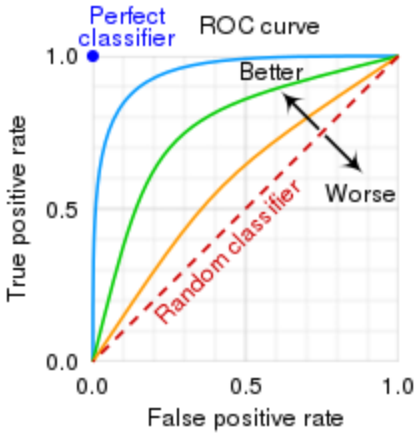
- They used a method called Synthetic Minority Oversampling Techniques (SMOTE)
  - The algorithm generates synthetic examples by operating in the features space

- Evaluation methods
  - They use the receiver operator characteristic (ROC) curve and the Precision-Recall Curve
  - Both curves are used for the result of binary classification
  - ROC curves illustrate the trade-off between true positive rate and false positive for different thresholds that separate two classes









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: FXHC

The FXHC is the Foreign Exchange Hedge cost tool

- It's made by Citigroup
- The goal of the is to estimate the currency-hedging costs for a foreign investors
- Foregn investors may look to put their money into higher returns overseas but you have to take into account the FX rate when coming back
- The following are examples used by Japanese Investors
    - Japanese Investors are the best examples because the country has so low rates

Overview

- For Japanese money managers, one way to protect themselves from currency fluctuations is to sell a foreign currency via a forward contract
- An investor rolls over the position as the forward comes to maturity. The cost for this transaction is the difference between forward and the spot FX exchange rate
- Currency-hedged investments in overseas assets are "economically equivalent" to borrowing a foreign currency using yen as collateral

Example 1

- An Osaka investor is going to buy a 10Y bond at 111.46 (yen/dollar) on April 27 and simultaneously enters a forward contract to sell at 111.15 in three months
- The investor has a hedging cost of 0.31 yen per dollar
    - Current rate 111.46 - 111.15 = 0.31 per dollar
- For the three month period we have 0.27% for the 3 month period
    - (111.46 - 111.15) / 111.46 * 100 = 00.27%
- The USD/JPY dropped to 5.4% to 105.40

- The annualized hedging cost for is 1.11% assuming a static forward point
    - 0.27% * 12 = 1.08%
- That compares to the 1.85% on The US Treasury note as of April 27

FX Hedged Yields

- For example the currency hedging costs for
    - The euro -0.17%
    - The pound 0.75%
- Among the 5 biggest government bonds market Japan, Italy offers the highest currency-hedged yield with 1.32% for 10Y notes

Index Calculation:

- Citigroup and MSCI use a combination of spot buying and forward selling in calculating currency-hedged returns
- Citi computes the total return on its fixed income indexes on the assumption that each security is purchased at the start of a period and sold at the end of the period
    - A one month forward rate, over the period, is used to convert the asset price into an investor's home currency value
- MSCI calculates hedging impact by subtracting non-hedge currency return from hedged currency return

Statistics: Hierarchical Partial Pooling

- When we are pooling information we ignore all of the variation (except sampling variation)
- We can pick one theta and then pull our samples
    - When we pool we are sampling we from the same model
- We can unpool our door which you can think of as one group per sample

- What partial oolong and hierarchical modelling does is that it samples
    - Instead we a sample from a population distribution of parameters
    - We are really pooling from the distribution and to guess the parameters and then creating an unpooled observation

Using PYMC3

- In our example we use the batting average for each player
- The problem is that
    - Each player bats a different amount of times
    - Each player bats in a different order

The Content is for informational purposes only, you should not construe any such information or other material as legal, tax, investment, financial, or other advice. Nothing contained on our Site constitutes a solicitation, recommendation, endorsement, or offer by CU Quants or any third party service provider to buy or sell any securities or other financial instruments in this or in in any other jurisdiction in which such solicitation or offer would be unlawful under the securities laws of such jurisdiction.

All Content on this site is information of a general nature and does not address the circumstances of any particular individual or entity. Nothing in the Site constitutes professional and/or financial advice, nor does any information on the Site constitute a comprehensive or complete statement of the matters discussed or the law relating thereto. CU Quants is not a fiduciary by virtue of any person's use of or access to the Site or Content. You alone assume the sole responsibility of evaluating the merits and risks associated with the use of any information or other Content on the Site before making any decisions based on such information or other Content. In exchange for using the Site, you agree not to hold CU Quants, its affiliates or any third party service provider liable for any possible claim for damages arising from any decision you make based on information or other Content made available to you through the Site.

There are risks associated with investing in securities. Investing in stocks, bonds, exchange traded funds, mutual funds, and money market funds involve risk of loss. Loss of principal is possible. Some high risk investments may use leverage, which will accentuate gains & losses. Foreign investing involves special risks, including a greater volatility and political, economic and currency risks and differences in accounting methods. A security's or a firm's past investment performance is not a guarantee or predictor of future investment performance.

As a convenience to you, CU Quants may provide hyperlinks to web sites operated by third parties. When you select these hyperlinks you will be leaving the CU Quants site. Because CU Quants has no control over such sites or their content, CU Quants is not responsible for the availability of such external sites or their content, and CU Quants does not adopt, endorse or nor is responsible or liable for any such sites or content, including advertising, products or other materials, on or available through such sites or resources. Other web sites may provide links to the Site or Content with or without our authorization. CU Quants does not endorse such sites and shall not be responsible or liable for any links from those sites to the Site or Content, or for any content, advertising, products or other materials available on or through such other sites, or any loss or damages incurred in connection therewith. CU Quants may, in its sole discretion, block links to the Site and Content without prior notice.

YOUR USE OF THIRD PARTY WEB SITES AND CONTENT, INCLUDING WITHOUT LIMITATION, YOUR USE OF ANY INFORMATION, DATA, ADVERTISING, PRODUCTS, OR OTHER MATERIALS ON OR AVAILABLE THROUGH SUCH WEB SITES, IS AT YOUR OWN RISK AND IS SUBJECT TO THEIR TERMS OF USE.