



Carmen Cheung



Haiyuan Zhang



Linh To



Song Lin



Zichen Wang

1. Introduction

- Who?** Analytical team of a FOF manager
- What?** Define and identify tradable signals based on past performance to provide insight that supplements and aids in deciding investment strategies
- How?** Build and evaluate models targeting the 20 assets for each of the three datasets (ETF, MF, Retail)
- Data**
- Weekly data from 2006 to 2017
 - 20 different asset classes.
 - 11k rows and 6 variables.

2. Exploratory Data Analysis

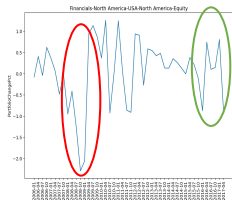
Takeaways

2.1 Observed dive around Oct 2008 and upsurge around April 2016 across all industries

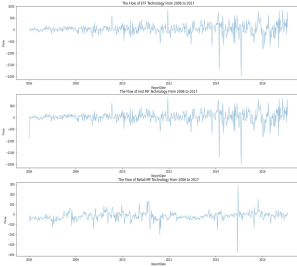
2.2 ETF and MF flow trends are similar while Retail trend shrinks after 2012

2.3 ETF and MF AssetEnd shows upward trend while retail experiences greater fluctuations

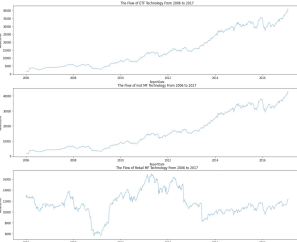
2.1 Avg PortfolioChangePct Trend Example



2.2 Flow Trend of ETF, MF, Retail



2.3 AssetEnd Trend of ETF, MF, Retail



5. Limitations

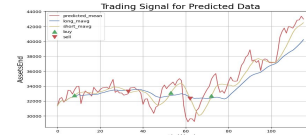
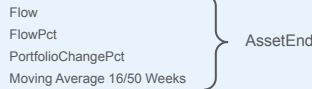
The amount of information in the data and the size of the dataset is small, so that the transaction information of the market itself is difficult to support long-term forecasts.

3. Time Series Models

3.1 SARIMAX

Method of Identifying The Signal

Predicting both the long-term and short-term, When the short term moving average crosses above the long term moving average, this indicates a buy signal.



Feature Engineering

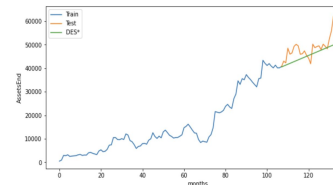
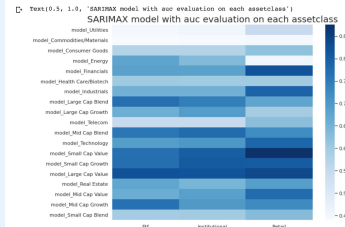
- M16 / M50** : Moving Average 16/50. M16 / M50 uses a window of 16/50 weeks and calculates the values based on the past 16 moving average of the AssetsEnd.

Evaluation

- AUC**: 4 industries > 80%
9 industries > 70%
14 industries > 60%
2 industries < 50%

Works best on Retail Dataset and Small Cap Value industry

- MSE**: 10~100 million
Works best on all dataset but does not predict well on Large Cap Blend industry



3.2 DES

Model Introduction

$$F_t = \alpha A_{t-1} + (1 - \alpha) F_{t-1}$$

$$T_t = \beta (F_t - F_{t-1}) + (1 - \beta) T_{t-1}$$

$$FIT_{t+k-1} = F_t + kT_t$$

- Prediction of next month higher than this month → **Buy**
- Prediction of next month lower than this month → **Sell**

6. Potential Improvements

- Introduce external information such as interest rates
- Separate analysis of systematic risk and idiosyncratic risk using risk exposure analysis models

Evaluation

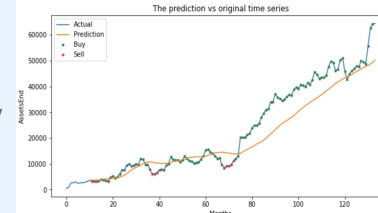
- Accuracy: 56.10%
- Sensitivity: 85.53%
- Specificity: 8.51%
- Precision: 60.19%

One Month Interval

True Positive: 65 (52.85%)	False Negative: 11 (8.94%)
False Positive: 43 (34.96%)	True Negative: 4 (3.25%)

Signals

- Monthly
- Identified by prediction



4. Findings & Business Value

- SARIMAX has performed well in various industries, and to a certain extent can be used as a guide for medium-term transactions
- DES performed well for short term transactions with three months interval, but overall is better for long-term trend prediction

For detailed slides

