USING MARKET REGIMES, CHANGEPOINTS AND ANOMALY DETECTION IN QWIM

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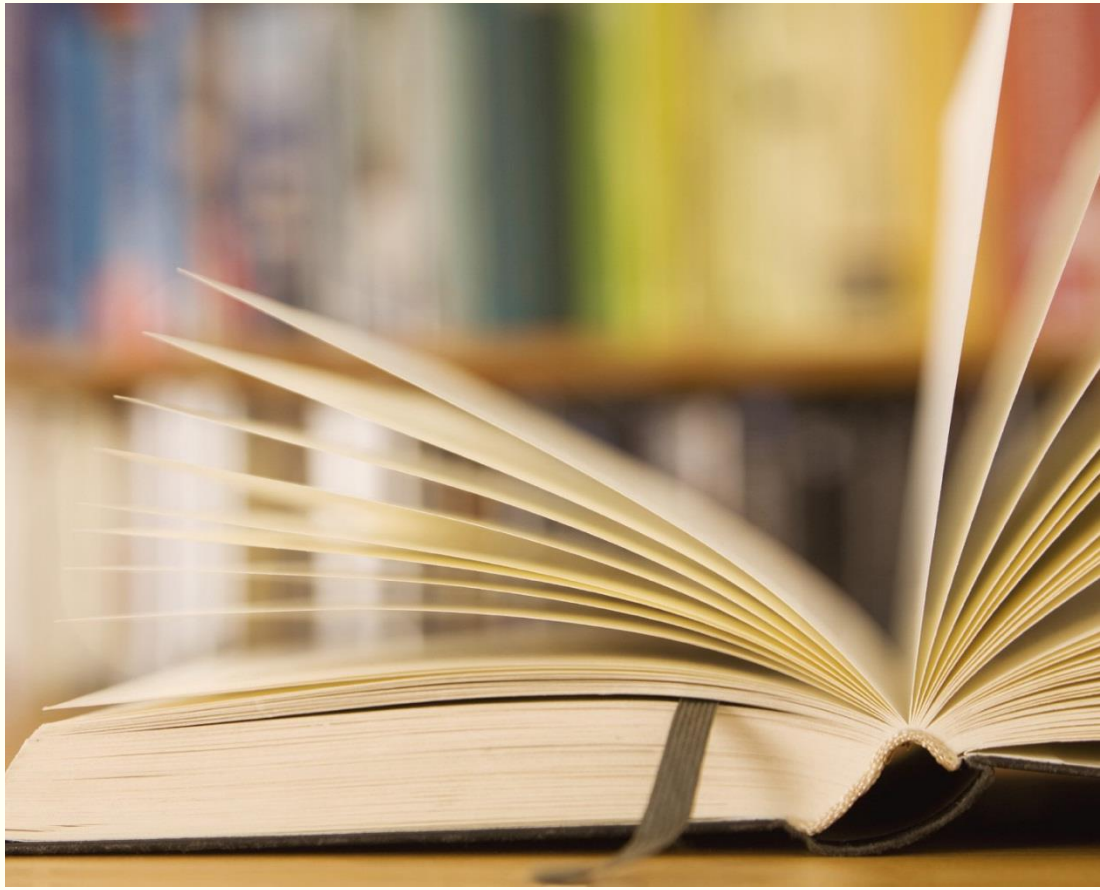

Motivation

Models:

- Markov Models on single indices like S&P500 and VIX
- Markov Models on economic variables like inflation, unemployment rate
- Non-parametric model

Problems:

- Not our interest/target (time horizon, portfolio management…)
- Hard to evaluate signal quality…

Main Reference

Dynamic Strategic Asset Allocation: Risk and Return across Economic Regimes

- Detect regime change:

1. Credit Spread, Earnings Yield, ISM, Unemployment
2. Standardize the four economic variables using full-sample median and standard deviation
3. Add them up and dividing by square root of 4
4. Compare it with NBER indicator

Expansion: score > 0 and increasing

Peak: score > 0 and decreasing

Recession: score < 0 and decreasing

Recovery: score < 0 and increasing

Main Reference

Dynamic Strategic Asset Allocation: Risk and Return across Economic Regimes

- Asset Allocation:

1. SAA : fix weights
2. TAA: optimize for highest expected return
3. TAA-C: optimize expected return subject to same risk as SAA
4. DSAA: optimize expected return subject to a fixed risk

Main Reference

Dynamic Strategic Asset Allocation: Risk and Return across Economic Regimes

- What's good?

1. Evaluate classifications by comparing with NBER indicator
2. Time horizon: 6 months ~ 10 years
3. Portfolio management: a diversified universe

Main Reference

Dynamic Strategic Asset Allocation: Risk and Return across Economic Regimes

- Drawbacks:

1. Strong assumptions
2. Using full sample data in generating signals
3. Using full sample data in determining asset weights in different regimes

‘… Our results do not aim to represent real-life investment strategies.’

Takeaway:

In order to give meaningful investment advice, we must not use future information/data to make decisions

Idea

Using supervised learning algorithms to detect regime change

- **Different algorithms**

  more robust, ease assumptions made by authors

- **Different classifications**

  expansion vs recession

- **Different testing procedure**

  forward chaining, moving windows…

PROJECT PLAN

Data (1948 –)

Trading Universe

- U.S. large cap equities (S&P500)
- U.S. small cap equities (Russell 2000)
- U.S. value equities (MSCI BARRA value)
- U.S. growth equities (MSCI BARRA growth)
- U.S. credits (Lehman U.S. Corporate)
- U.S. Treasuries (Lehman U.S. Treasury)
- Commodities (GSCI)
- Cash (U.S. 30-day T-bills)

Economic Indicators

- Credit spread (Baa-Aaa)
- Earning yields (E/P ratio of the S&P500)
- ISM
- Unemployment rate

Supervised Learning

1. Implement different supervised learning algorithms
2. Replicate method in the main reference
3. Cross validation (forward chaining/moving windows)
4. Metrics to be considered: accuracy, confusion matrix, f score……

Asset Allocation

Using the same strategies as the paper……