

Machine Learning and Financial Crises

Discussion of
Fouliard, Howell, and Rey

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Good paper!

Highly recommended.

Some Issues Regarding Methods

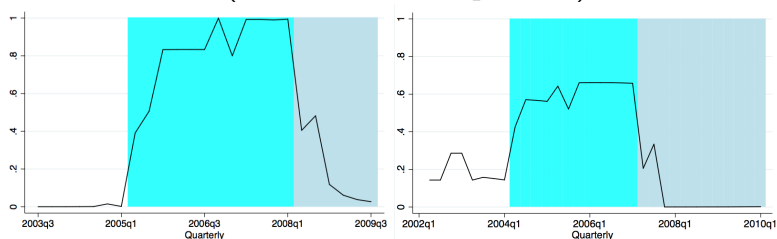
Ex ante expected loss minimization

vs.

Ex post realized regret minimization

Some Questions Regarding Results

Crisis Forecasting France vs. Germany $P(\text{crisis in next 12 quarters})$



- Would be nice to see more than France and some Germany
 - Germany looks worse (less sharp)

Some Questions Regarding Results, Continued

Crisis Forecasting France vs. Germany RMSE's

| Online Aggregation Rule | RMSE | Online Aggregation Rule | RMSE |
|-------------------------|-------|-------------------------|---------|
| EWA | 0.233 | EWA | 0.0738 |
| Uniform | 0.351 | Uniform | 0.288 |
| ML | 0.236 | ML | 0.0658 |
| OGD | 0.282 | OGD | 0.106 |
| Ridge | 0.208 | Ridge | 0.101 |
| Best convex combination | 0.212 | Best convex combination | 0.00168 |
| Best linear combination | 0.117 | Best linear combination | 0.0003 |

- Germany looks better!
- Best linear much better than best convex
- Are the RMSE differences significant?

What to Forecast?

The paper forecasts:

$$I_t = 1(\exists h \in H = [1, 12] \text{ s.t. } C_{t+h} = 1)$$

(1) Why not forecast $C_t = 1(\text{crisis})$ directly?

(2) Even if forecasting I_t , why use $h = 12$ exclusively?

Real Time vs. Quasi Real Time

Real time (RT):

$$F_{t+h,t} = g(\text{expert}_1(x_{t,t}^1, x_{t,t}^2), \text{expert}_2(x_{t,t}^1, x_{t,t}^2))$$

Quasi-real time (QRT) with 4 quarters of revisions (say):

$$F_{t+h,t} = g(\text{expert}_1(x_{t,t+4}^1, x_{t,t+4}^2), \text{expert}_2(x_{t,t+4}^1, x_{t,t+4}^2))$$

RT $x_{t,t}$'s replaced by QRT $x_{t,t+4}$'s !!!

So “quasi real time” is equally “quasi cheating”.

Consider the paper's optimistic tone:

“We are able to predict systemic financial crises 12 quarters ahead in quasi-real time with remarkable precision.”

How to get Better Approximations to Real Time? (This is the key issue.)

1. Use vintage data
2. Use only x 's subject to no revision
3. Use only x 's subject to "small" or no revision
4. Use only appropriately *lagged* x 's