Follow the Leader
Time-lag series analysis to discover leaders in S&P 500

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Outline

- Lagged Correlation
- Leadership Discovery
- S&P 500 Historical Leaders
- Leadership Index Application
Lagged Correlation

- Two Time Series and Lagged Correlation

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Lagged Correlation

- Two Time Series and Lagged Correlation

Most examples are NOT that well synchronized
Leadership Discovery

Directed, weighted by lagged correlations, Graph. Extract leaders using PageRank score.
S&P 500 Historical Leaders

- Number of leaders and historical transition of leaders discovered in S&P 500
Leadership Index

- Construct index from selected leaders weighted equally and proportionate to score.
Timing with Leadership Index

- Buy S&P 500 when above 100 SMA
Lagged Correlation in Rcpp Parallel

- For Each Pair in SP500 = 500 * 499 / 2 = 124,750
- 120 look back window = (+)60 lag and (-)60 lag = 120 correlation
- 10 year = 10 * 252 = 2,520

124,750 * 120 * 2,520 = 37,724,400,000
The End

Please visit my blog at systematicinvestor.github.io for more examples and ideas.
References

Download R Code at systematicinvestor.github.io/rfinance2015

- Detecting Leaders from Correlated Time Series
  by D. Wu, Y. Ke, J. Yu, P. Yu, L. Chen

- Time-lag Method for Detecting Following and Leadership Behavior of Pedestrians from Mobile Sensing Data, 2013
  by M. Kjargaard, H. Blunck, M. Wustenberg, Kaj Gronbak, M. Wirz, D. Roggen, G. Troster

- Discovering Shakers from Evolving Entities via Cascading Graph Inference
  by X. Shiy, W. Fanz, J. Zhang, P. Yuy