Lead-lag Relationships in Foreign Exchange Markets

<https://arxiv.org/pdf/1906.10388.pdf>

The purpose of this paper is to develop insight between lead-lag relationships in time series exchange rate data. Three methods are proposed to predict foreign exchange markets: lag correlations, partial lag correlations, and Granger causality. The Granger causality statistical tests are used to determine possible causal relationships between two exchange rates by considering predictive potential using past returns. Next to test statistical significance, the PageRank algorithm is used to rank influence of individual exchange rates on currency values. This paper ends up providing evidence against the Efficient Market Hypothesis, suggesting that information is not dispersed as quickly to all investors. Using the PageRank algorithm on the statistically significant correlations found that the most influential rates are those involving market indexes. Despite lag correlations and causality challenging the efficient market hypothesis in foreign exchange markets, there is still uncertainty revolving around the existence of arbitrage.

Network versus portfolio structure in financial systems

<https://arxiv.org/pdf/1308.0773.pdf>

The purpose of this paper is to determine how a banks balance sheet affects other banks in the industry as well as systematic risk of the entire market. The weight of each element of risk is determined using the PageRank algorithm. The results of this paper show that the topology of the financial network is the main cause of the variance in asset allocation that minimizes systematic risk if asset returns have negative correlations. From a macroeconomic view, it does not matter which banks should diversify their portfolios, the only concern is how many banks should do so. Using the topology of the network of banks each bank is considered a node, and that node is then ranked using the PageRank algorithm to determine its importance. A bank’s ineffectiveness is closely related to its PageRank score. This is because the bank collects a larger fraction of credit from each of its counterparties. In conclusion, the optimal allocation of external assets that minimizes systemic risk depends on the extent of both simultaneity risk and externality. The analysis reveals that the use of negatively correlated assets will be quite effective in reducing systemic risk by lowering the probability of collective fundamental defaults. The most infective bank, or the topologically most influential bank indicated by PageRank, does not always need to be the safest.