My project titled ‘Learning Financial Time-Varying Networks’

Basically it is aimed to model financial systems as networks that evolve over time.

* BACKGROUND:

Network science is been developed to study groups of elements as a whole and the dynamic and cause/effects of their relationships, where the networks consist on nodes (elements) and the connections between them, the edges, that show the relationship between the nodes.

* TARGET

The interesting side of this project are two: first the comparison of state-of-the-art algorithms built to recover time-varying networks (recent developed field since it has been always studied assuming static networks) and secondly applying them to study the evolution of financial networks and understand their changing topology and the mechanisms that lead to those changes, almost no previous work done.

* WHY IT MATTERS

Apart from the usual insight we can get from a static network (its distribution, relationships, most important nodes that can lead changes in the whole system…) we can get more information. Since the output are consecutive snapshots of the network in different points of time we are going to be able to study how it has been rewiring over critical events (crisis, housing bubble…) in order to find indicatives of these coming events or identify important nodes that can be used to avoid contagion effect.

* ALGORITHM

We have some algorithms to try but we have a strong candidate: TESLA.

TESLA algorithm consists of three parts: a log conditional likelihood (under a regression model) to estimate the relationships of the stocks, a lasso regularization term (enforce sparsity over the networks so we recover only the most important nodes) and a smoothing term to enforce that networks on close intervals don’t change dramatically.

The inputs are consecutive intervals of time series from the elements of the system we are analysing. The outputs are matrices of values 0-1 encoding the edges of the network.

BACKGROUND

Networks (definition, ndoes edges)

TARGET

. Compare performance of state-of-the-arts algorithms

. Application on finance to understand the changing topology of these systems

MOTIVATION