LSE Datathon Problem Statement

Problem statement: Cross Border Banking Exposures

The clustering of crises since 2007 underscores the link between financial network interconnectedness and systemic risk. The collapse of the US subprime mortgage market ignited the 2008 banking crisis, which turned into a global recession. A series of financial sector bailouts in 2008 then sparked a sovereign debt crisis in Europe. Sovereign credit risk became a major concern and Europe faced prolonged consequences to economic growth, investment, employment and fiscal soundness.

FNA's Cross Border Banking Exposures dashboard on the G20 Monitor (access here) monitors the evolution in the consolidated foreign claims of banks by their primary nationality. It aims to understand banks' foreign exposures and the global financial stability ramifications. Identifying the exposures of countries - like Germany and France to Greece in 2008 - can help authorities understand how shocks might propagate globally. It can also inform the appropriate ex-ante response to future shocks.

Data description:

Students will be provided with the publicly available data used and operationalised for FNA's Cross Border Banking Exposures dashboard: The Bank for International Settlements Consolidated Banking Statistics.

The data includes quarterly data from June 2005 to March 20201 on the gross value of cross-border claims, as well as aggregate claims issued and held by each of the 22 countries. The country regions include the Asian Pacific, Europe the Middle East and Africa, North America and South America. Over the timeframe, consolidated claims from all countries range from $12.5 trillion to $15.5 trillion.

Research Option 1:

Detecting anomalous behaviour in financial systems is becoming a key tool for forward-thinking financial supervisors. The ability to quickly and accurately identify when individuals, financial institutions, or consolidated flows are acting unusually can provide authorities with early warnings of possible underlying financial stability issues.

To this end, FNA is currently looking for an anomaly detection model for its cross border banking exposures solution.

Task: Develop a model for anomaly detection in cross border banking exposures that could help authorities anticipate potential financial stability implications. Anomalous behaviour could stem from sudden changes in exposures, changes in relationships between coutries or usual patterns in foreign claims.

Students are encouraged to backtest the model with the data provided to see if it would have picked up the European Soverign debt crisis.

Research Option 2:

Since the Global Financial Crisis, central banks and financial authorities collect significantly more data and in much greater granularity. To make sense of the vast, and in some cases overwhelming, amounts of data authorities require relatively advanced analytical capabilities.

Central banks and financial authorities often come to FNA with a dataset they wish to generate more meaningful insights from. To demonstrate the added value and analytical capabilities FNA offers, we frequently conduct an initial exploratory analysis of the data. This often involves combining the dataset with additional data to generate new insights.

Task: Conduct exploratory analysis on the global banking exposures data and develop a story of relevance to central banks and financial authorities. Students are encouraged to combine the data provided to them with additional publicly available datasets to generate new insights.

Students are expected to investigate questions such as:

- Are there any non-obvious communities structures in the network?
- What are the global and the individual systemic risk levels of each country?
- How do the network properties/statistics of the BIS Cross Border Banking Exposure evolve over time?

Judging Criteria

A good submission will deploy network theory to turn raw data into insights that would help financial institutions and authorities make better decisions. This is in line with FNA's mission - we deliver solutions built on network analytics because they help our clients to make the right decisions to make the financial system safer and more efficient.

We are looking for a submission which has:

- Relevance to FNA's mission to make the financial system safer and more efficient.
- Relevance to a specific industry problem or need.
- The potential to be further developed and refined during an internship programme.
- Is presented with a non-technical summary (Word document, PowerPoint or video recording would be fine)
- Be country-specific when back-testing if choosing to do research Option 1.
- Students will be rewarded for combining datasets
- Individual submissions only

Related Literature

- Soramaki and Cook - Network Theory and Financial Risk
- Barabasi - Network Science
- Nymand-Andersen - Big Data: Advance Data Science for Decision Makers (FNA contributed specific network chapter)
- Ong and Jobs - Stress testing: Principles, Concepts and Frameworks
- John Danielsson - Global Financial Systems: Stability snd Risk

Internship

Winners will be invited to fast track the application process for a data science internship with FNA in 2022.

The internship will typically consist of three months of paid work. Where relevant, interns will be able to focus on developing their datathon project further, with the goal of integrating it into an FNA solution. In addition:

- Interns will be actively involved in the research and development of exciting new tools and use-cases

- Interns will have the opportunity to publish papers stemming from their projects at FNA
- Using the FNA platform and scripting language, interns will be assisting to identify hidden behavioural patterns and interconnections in large datasets, helping to create breakthrough solutions, performing exploratory and targeted data analyses as part of quantitative services engagements or proof of concepts
- Interns will partner with cross-functional teams to solve real-world business problems at scale and identify trends/opportunities for the customers
- Interns will own projects from end to end, stamp your name to important work and document use cases in technical reports, white papers, etc.
- The internship will be completed remotely