

Dissertation Meeting

LEI

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Overview

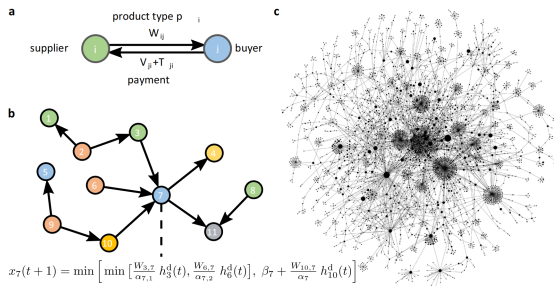
- ① Literature
- ② data & method
- ③ Implement in Python
- ④ Related idea & information
- ⑤ Plan

- *Mapping a country's entire economy to predict—and prepare for—the next supply chain disruption*
- *Quantifying firm-level economic systemic risk from nation-wide supply networks*(nature scientific)

First Paper: Mapping...

Using a unique dataset of value-added tax (VAT) information—a general tax that, in principle, is applied to all goods and services—the team was able to reconstruct the production processes and the supply relationships between companies to an unprecedented extent and determine how each enterprise was affected by supply chain disruptions.

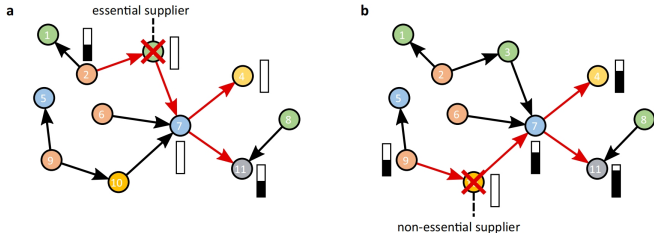
Second Paper: Quantifying ...



Supplier and Buyer Relationship:

The supplier (node i) produces a product type(p) and delivers a certain quantity (W_{ij}) to the buyer (node j).

The total payment from the buyer includes the net price () and value-added tax (T).



- A production network with 11 companies is shown. Nodes represent companies, and links represent the supply of goods and services between them.
- Different colors represent the industries to which the companies belong.
- Using company 7 as an example, it shows how its production depends on inputs from companies 3, 6, and 10. Companies 3 and 6 provide essential inputs, while company 10 provides non-essential inputs.

Key function(\star) :

$$x_i = \min \left[\min_{k \in \mathcal{I}_i^{\text{es}}} \left[\frac{1}{\alpha_{ik}} \Pi_{ik} \right], \beta_i + \frac{1}{\alpha_i} \sum_{k \in \mathcal{I}_i^{\text{ne}}} \Pi_{ik}, \frac{1}{\alpha_{l_i}} l_i, \frac{1}{\alpha_{c_i}} c_i \right],$$

$$x_i^d(t+1) =$$

$$\min \left[\min_{k \in \mathcal{I}_i^{\text{es}}} \left(\frac{1}{\alpha_{ik}} \sum_{j=1}^n W_{ji} h_j^d(t) \delta_{p_j, k} \right), \beta_i + \frac{1}{\alpha_i} \sum_{k \in \mathcal{I}_i^{\text{ne}}} \sum_{j=1}^n W_{ji} h_j^d(t) \delta_{p_j, k} \right],$$

- Generalized Leontief production function (GLPF).
- Quantifying the economic systemic risk of frms.
- The economic systemic risk index (ESRI).

$$\text{ESRI}'_j = \sum_{j=1}^n \frac{s_j^{\text{out}}}{\sum_{l=1}^n s_l^{\text{out}}} (1 - h_j(T)).$$

The data required for the mentioned model approach include:

- The current market share of each company in its industry;
- The amount and type of inputs (essential and non-essential) used by each company;
- Supplier and buyer relationship data (network);
- GLPF: α_{ik} , β_i , I_{es} , I_{ne} ;
- Each company's industry classification data is categorized according to the NACE classification system(The National Association of Colleges and Employers);

...

Personal idea (supplement)

To build a clearly specific **supply chain network**, the following elements need to be identified for each company:

- product category
- directional (as the buyer or supplier)
- quantity of product
- amount of payment Transaction
- transfer occurrence time

Therefore, for our project, some data may be difficult to obtain, which also brings a thinking, how to use the **existing available data** to complete the model.

Or how to find out the **Estimator** or **fitting value**.

Implement in Python(try-to)


- pseudocode
- Database
- practicable & professional
- OOP or Framework
- Github repository
- suggest?

Several relevant data sources have been identified:


- Tomaž has already shared a set of Italian invoices for an MSc Computer Science project.
- [Sarafu Network Community Asset Vouchers, 2022-2023](#)
 - We describe a dataset of account information and transaction records for many digital community inclusion currencies aka community asset vouchers in Kenya as well as Cameroon and South Africa. One unit of each voucher is equivalent in value to a 10 Kenyan shillings of the issuers products. The Sarafu. Network system has existed since 2010 and began operating digitally via USSD feature-code cellular technology in 2017. This dataset includes pseudonymized account information for around 20,000 users and records of all voucher transactions conducted from 20/04/2022 to 04/07/2023. User transactions capture various economic and financial activities such as purchases, transfers, and participation in traditional rotational labor and savings and lending groups. So-called "chamas" are key to the operation of the Sarafu. Network system and clearly labeled in the data. This dataset will contribute to research on the operation of community inclusion currencies, monetary systems, and economic networks in underdeveloped areas.
- Local Loop Merseyside intends to start collecting data from local SMEs as soon as possible.


Database: Sarafu.Network Community Asset Vouchers 2022-2023


Key words: Balockchain, Tokenization, DLT, Underdeveloped country SC....


 README-manifest-Sarafu-Network-All-Data-July-4-2023_pub.txt


 system-accounts-Kitabu-Jul-4-2023_pub.csv

 token-transactions-data-all-July-4-2023_pub.csv

 upload_description.pdf

 users-meta-July-4-2023_pub.csv

 voucher-full-list-Jul-4-2023_pub.csv

 voucher-specs-Jul-4-2023_pub.csv

Plan of Dissertation Project

For me personally, I hope I can make a real contribution in helping Tom and his company.

At the same time, since I hope to have further study, it is necessary to try make it feels like as professional and high-level as possible. (At least, as the publication.)

Additional, it there is any chance for me to make it as the ACADEMIC paper, I could consider about using more time and work futher on it. And the anticipant timeline...

Expected Timeline:

- research proposal in June
- LR first draft by July
- LR modification in July
- method and py code at the same time
- the model and implement should be adjusted
- outcome analysis after the database used
- need some time to make it more academic and different version if nesscessary

**There is nothing either good or bad, but
thinking makes it so.**

— *Helmet*

The End

THANK!