SuperCENT README

Junhui Cai, Dan Yang, Wu Zhu, Haipeng Shen, Linda Zhao

This file is produced by `SuperCENT_README.Rmd` and includes description of the replication materials for "Network Regression and Supervised Centrality Estimation". All related materials are hosted in a GitHub repository.

1 Folder structure

The folder structure is as follows.

- **code**: contains code to reproduce the results for simulations and case study. The two main files are:
  - `SuperCENT_case_study_trade_premium.Rmd`: it contains descriptions and codes for the case study. The corresponding report `SuperCENT_case_study_trade_premium.pdf` is generated by `SuperCENT_case_study_trade_premium.Rmd` using RMarkdown.
  - `SuperCENT_empirical_network.Rmd`: it contains descriptions and codes to reproduce the plots for the four empirical networks: (A) global trade network, (B) innovation network, (C) production network, and (D) equity network. The corresponding report `SuperCENT_empirical_network.pdf` is generated by `SuperCENT_empirical_network.Rmd` using RMarkdown.
  - `SuperCENT_simulation.Rmd`: it contains descriptions and codes for the simulation results. The corresponding report `SuperCENT_simulation.pdf` is generated by `SuperCENT_simulation.Rmd` using RMarkdown.
  - Details instructions are within the files.
- **data_empirical_network**:
  - `trade_data_sub.csv`: Trade network
  - `naics3_uspc_naics3_W_matrix.csv`: Innovation network
  - `IO_naics3_1997_2018_naics07.xlsx`: Production network
  - `equity_network_svd.csv`: Equity network is proprietary data but we provide the top 50 singular values
- **data_trade_premium**:
  - `FX.csv`: risk premium constructed based on Richmond, R. J. (2019). "Trade network centrality and currency risk premia." *The Journal of Finance*, 74(3), 1315-1361. See instructions here.
  - `real_gdp_long.csv`: GDP data generated using `construct_gdp_data.R`.
  - `trade_data_sub.csv`: bilateral trade data generated by `construct_trade_data.R`.
- **output_simulation**: contains the simulation results. Please download from Dropbox.
- **output_trade_premium**: contains the results for the case study.

2 Installation instructions

In order to replicate the results, one needs to use R and install all the relevant packages.

2.1 `SuperCENT` package

Install our `SuperCENT` package on github as follows.

```
if(!require("devtools")) install.packages("devtools")
if(!require("SuperCENT")) devtools::install_github("cccfran/SuperCENT")
```

2.2 Other packages

We use `pacman` package to manage packages. Run the following chunk to install all the packages needed.

```
if (!require("pacman")) install.packages("pacman")
pacman::p_load(data.table, matrixStats, dplyr, ggplot2, igraph,
               latex2exp, tidyverse,
               irlba, xtable, stargazer, circlize, kableExtra,
               ggpubr, grid, gridExtra, gtable, facetscales)
```

3 Tables and figures

The following table lists all the tables and figures of the simulations and case study.

- Figure 1
  - Code SuperCENT_simulation.Rmd
  - Output output_simulation/plot/1745349_epsy-2_small_exmaple.pdf
- Figures 2-9, S3-S22
  - Code SuperCENT_simulation.Rmd
  - Output output_simulation/plot/
- Figures 10-12
  - Code SuperCENT_case_study_trade_premium.Rmd
  - Output output_trade_premium/plot
- Figure S12
  - Code SuperCENT_empirical_network.Rmd
- Table II
  - Code SuperCENT_case_study_trade_premium.Rmd
  - Output output_trade_premium/10_year_return_gap5.tex
- Table III
  - Code SuperCENT_case_study_trade_premium.Rmd
  - Output output_trade_premium/trade_premium_2008_gap10_miter1000.tex

4 Reference

Richmond, R. J. (2019). "Trade network centrality and currency risk premia." *The Journal of Finance*, 74(3), 1315-1361.