Timeline for Tasks in Semester 1

19 Apr - 2 May **Find and download financial data of listed companies in 5 industries**

19 Apr - 2 May **Read related work (a total of 10-15 articles are expected), find and summarize useful models. And pay attention to commercial systems that are relevant to the problem.**

26 Apr - 10 May **Analyze the datasets (including data cleaning, basic variable analysis and selection)**

6 May - 16 May **Preliminary model development: Simply debug statistical models and get preliminary results**

17 May - 22 May **According to the current progress, propose for semester 2**

17 May - 26 May **Prepare for the presentation and report**

Due day of the presentation and report for semester 1
28 May

Two related researches.

(1) Climate Change and Financial Performance in Time of Crisis

(2) The impacts of climate change risks on financial performance of mining industry: Evidence from listed companies in China

Climate Change and Financial Performance in Time of Crisis

Conclusion:

The hypothesis that posited synergy between financial and environment performance in times of economic crisis was accepted

- Methodology and data

  - 2 models based on a linear regression.

$$\text{RTDO ECO}_{it} = \beta_0 + \beta_1 \text{RTDO M} - \text{A}_{it} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{CRISIS}_{it} + \beta_4 \text{RTDO M} - \text{A} \times \text{CRISIS}_{it} + \varepsilon_{it} \quad (1)$$

$$\text{RTDO M} - \text{A}_{it} = \beta_0 + \beta_1 \text{RTDO ECO}_{it} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{CRISIS}_{it} + \beta_4 \text{RTDO ECO} \times \text{CRISIS}_{it} + \beta_5 \text{KYOTO}_{it} + \beta_6 \text{SC.INTENSIVE}_{it} + \varepsilon_{it} \quad (2)$$

- Two dependent variables：
  - Economic performance:
    - It uses ROA (return on assets) as a measure of profitability
    - $Return\ on\ Assets = \frac{Net\ Income}{Total\ Assets}$
  - Environmental performance:
    - The impact of business activities and products on the natural environment
    - Total CO2 emission / Total sales

- Independent Variables：
  - The economic crisis
  - The Kyoto Protocol
  - Intensive sector
  - Company size

The impacts of climate change risks on financial performance of mining industry: Evidence from listed companies in China

Methodology:

- Dependent variable:
  - financial performance of the company
  - Return on total assets (Roa).
- Independent variable:
  - Climate risk index (CRI)
  - Microeconomic variables
  - Macroeconomic variables

- Linear regression model:

$$Roa_{it} = \beta_0 + \beta_1 CYRI_t + \beta_2 CYDI_t + \beta_3 CYTI_t + \beta_4 CYHI_t + \beta_5 CYFI_t + \beta_6 Debtas_{it} + \beta_7 Totalin_{it} + \beta_8 \ln Size_{it} + \beta_9 Holder_t + \beta_{10} Ownership_t + \beta_{11} PGDP_t + \beta_{12} Finance_t + \beta_{13} Humanresource + e_{it}$$

- Conclusion：
  - The CRI has a positive impact on the financial performance of listed mining companies.
  - Mining companies with different resource types have different degrees of sensitivity to climate changes. CRI has both positive and negative effects on the financial performance of the mining industry.

Ideas:

- CRI:
  - It is based on the climate events loss data of China in the past ten years, which is processed by nonlinear function and normalized to obtain the weight of the index.
  - The climate risk index includes five levels: Drought Index, Rain-waterlogging Index, High temperature Index, Typhoon Index and Cryogenic Freezing Index.

- ROA:
  - ROA as the indicator of company’s financial performance.
  - Reflect the profitability of total assets

- Linear Regression model

- Use other economic indicators:
  - Asset-liability ratio -> the company's capital structure
  - The total asset growth rate -> the company's growth
  - The company's total assets -> the company's size