

## **Clojure in Finance Proposal**

### 1. Topic: Clojuring a Financial Signaling Game

This project would explore whether the timing for firms to start their investments and operations could have a signaling effect about their quality theoretically and practically.

### 2. Literature Reviews

It would be assumed by investors that the starting time of firms' operation would be significant signals for firms' quality since firms with lower quality would choose to delay their operation (Grenadier & Malenk, 2011). Therefore, the low-type and inexperienced firms would have the signal incentive to mimic the investment timeline of high-quality firms, and high-type firm would distinct their identities by accelerating their investments with costs (Wang & Kwok, 2019), which would undermine the signaling effect of timing options.

### 3. Methods and Database

In the theoretical part, we would use Clojure to establish a Signaling Game Model to test whether low-type firm could extract benefit in their debt loans (coupon rate etc.) by imitating the timing strategy of high-type firm following the methods in Wang and Kwok (2019). In the practical part, we would then test whether this type of timing strategy could be effective as signals for investors by applying this Signaling Game Model with empirical data and assessing the partial effects of firms' timing strategies on their benefits in debt loans.

We will use the panel data from the World Banks' Enterprise level survey on 2848 enterprises across 25 cities of China across 28 industries, which was conducted between 2012 and 2013. The firm's qualities could be classified by their sizes, net book values, sales and revenue etc. The evaluation of investors on their qualities would be revealed in their value of loan, coupon rates, and success rate of getting loan approval from financial institutions.

### 4. Tentative Timeline

- a) 9 Nov- 7 Dec: Literature Review & Clojure Learning
- b) 8 Dec- 10 Feb, 2022
  - i. Model Building
  - ii. Data Processing
- c) 11 Feb onwards: Report and Poster Design

### 5. References

- Grenadier, S., & Malenko, A. (2011). Real Options Signaling Games with Applications to Corporate Finance. *The Review of Financial Studies*, 24(12), 3993-4036.
- Wang, Q., & Kwok, Y. K. (2020). Real option signaling games of debt financing using equity guarantee swaps under asymmetric information. *International Journal of Theoretical and Applied Finance*, 23(05), 2050036.