

Interview Slides

Department of Economics
Royal Holloway

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Outline

1. Self Introduction

2. Current work

3. Future

Self Introduction

Wenbin Wu

- **Current Research Focus**

- Computational finance and DeFi using agent-based modeling.

- **Specialization**

- Price stability mechanisms of on-chain collateralized stablecoins.

- **Experience**

- ABM simulation and sensitivity analysis.
- Large scale stylized on-chain data analysis.
- Formal verification.

Education

Wenbin Wu

- **King's College London**
 - PhD in Computer Science
 - MSc Banking and Finance
- **Peking University**
 - MS Computational Finance
- **University of Electronic Science and Technology of China**
 - BSc Information Security

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PhD Research

Background and Question

- **Background**

- Stablecoin is a type of decentralized cryptocurrency.
- Many stablecoins have experienced bank runs.
- Some encountered outright collapse, e.g., Terra  and Basis .

- **Question**

- What stabilization policies improve price stability?
- What is the implication of this?

PhD Research

Methods and Findings

- **Methods**

- Analysis of stylized blockchain data and smart contracts.
- ABM simulation.
- Some formal verification for the modeled stablecoin system.

- **Findings**

- Two key parameters are most notable, **collateralization ratio** and **auction discount curve**.
- High collateralization helps reduce irrational runs, and a steep discount curve limits the damage of rational runs.
- Runs are inevitable. Many on-chain stablecoins are taking up risky or dubious assets.

Collaboration

Professional Collaborations and Roles

- **SoCityDAO and MIT Media Lab**

- Collaborated with SoCityDAO on carbon credit stablecoin.
- Assisted in designing their token framework.
- Advised on blockchain application for carbon credit trading.

- **School of Economics, Peking University**

- Assisted in research on the Chinese CBDC under the guidance of a leading economist.
- Contributed to conference presentations and policy briefs.

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Highlights

- Cryptocurrency and Blockchain Research
- Interdisciplinary experience intersecting with financial policy
- Experience with economic experiments on Miner's Dilemma
- Tools:
 - Python and NetLogo for ABM
 - Python (joblib for multip), R, and SQL for financial statistics
 - Solidity, Infura, and Web3 for blockchain integration

Thank you

Appendix: Some Stylized Data

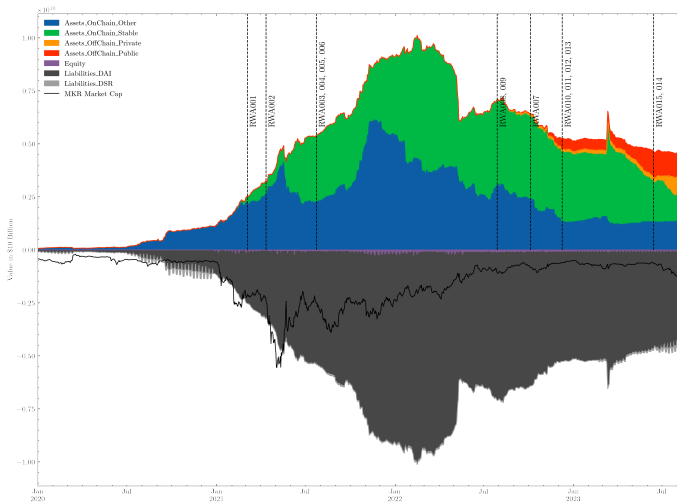


Figure: MakerDAO Balance Sheet, 2020-2023

Appendix: Some System Components

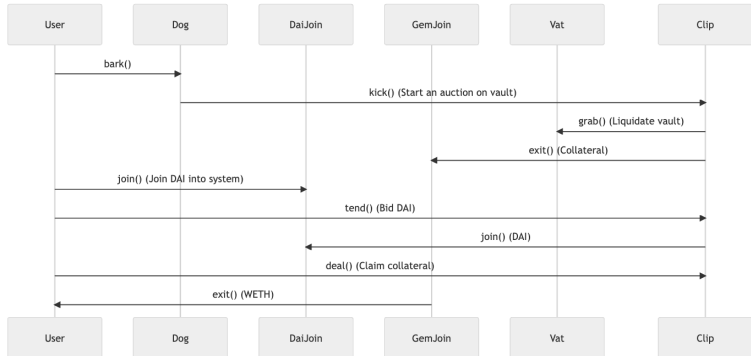


Figure: Simplified System Components of MakerDAO

Appendix: Formal Design of Method

Kick

$\Delta\text{Clipper}$

$tab : \mathbb{R}$

$lot : \mathbb{R}$

$kpr : \text{seq } \text{CHAR}$

$now : \mathbb{N}$

$tab > 0$

$lot > 0$

$kicks' = kicks + 1$

$ACTIVE' = active \cup \{kicks'\}$

Schema: Begin Collateral Auction

Appendix: Global Interactive Sensitivity

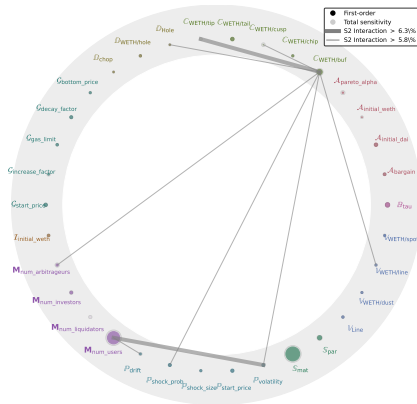


Figure: Global Sensitivity Analysis, 8960 model runs

Appendix: Some Time series Sensitivity

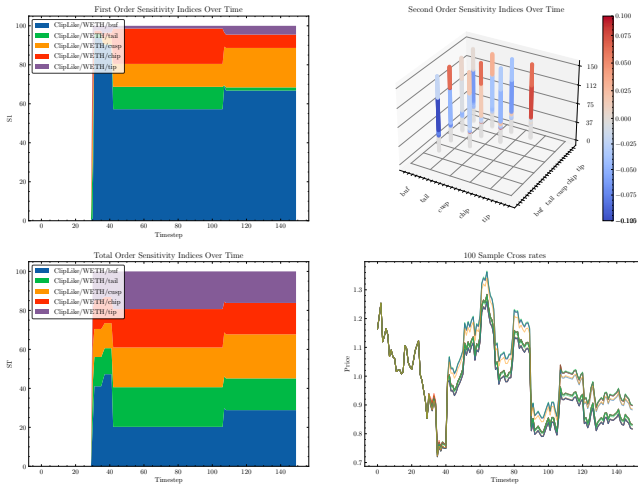


Figure: Sensitivity Analysis for Auction Parameters, 10240 Model Runs