To trust or to control

Informal value transfer systems and computational analysis in institutional economics

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Research questions and contributions

Conceptual level

How can trust and social control be operationalized formally?

Applied level

Do trust or control carry a larger relevance for functioning of IVTS?

Do they relate as substitutes or complements?

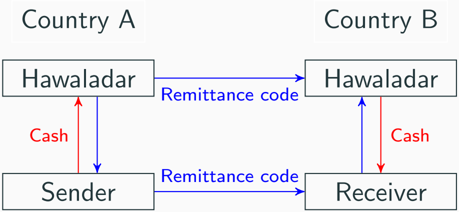
Methodological level

Illustration of the use of computational experiments with ABM for institutionalist analysis.

The Hawala

Hawala: Functioning and challenges

- People use Hawala to transfer cash from one country to another.



- Small commission fees ranging from 2 to 5 percent
- Annual transfer volume 100 billion to as much as 680 billion dollars per annum (e.g. Razavy, 2005; Schneider, 2010)
- Informal and legally unenforceable claims among participants
- Plentiful opportunities for swindling clients and partner hawaladars

Resulting question

How does Hawala stabilize expectations and deters opportunistic defection from the participants' obligations?

Hawala: Functioning and challenges

- The literature so far discusses two major stabilizing mechanisms
  1. Generalized trust
  2. Social control

The model

Model setup

- We use an agent-based model to represent the functioning of the system as directly as possible
- Here: focus only on interaction among hawaladars
- N agents (hawaladars), allocated equally to M regions.
- Two main types of agents:
  - **Cooperative agents** will always cooperate after they decided to enter an interaction.
  - **Selfish agents** are willing, under certain conditions, to exploit their fellows.
- Different behavioral strategies for the agents:
  - Trust $\tau \in \{0, 1\}$, and control $\kappa \in \{0, 1\}$

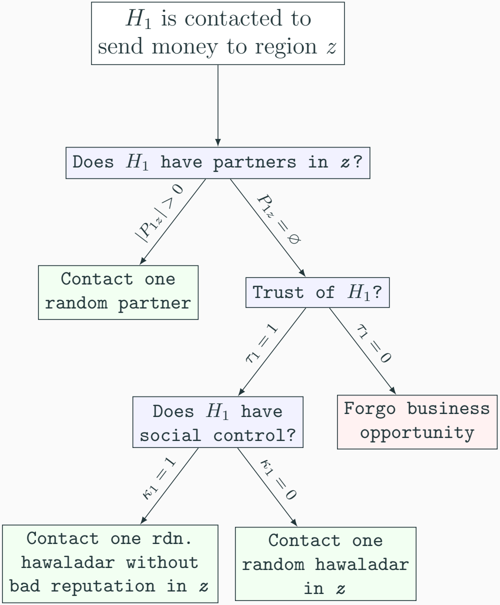
Sequence of events

1. The agents attempt I_{max} interactions.
2. A selection process for strategies takes place (replication).
3. Statistics are recorded for all state variables necessary to understand the dynamics of the model.

Sequence of events

1. **The agents attempt I_{max} interactions.**
    1.1 Create a random demand
    1.2 Choose a random hawaladar in the first region.
    1.3 Find an interaction partner in the second region

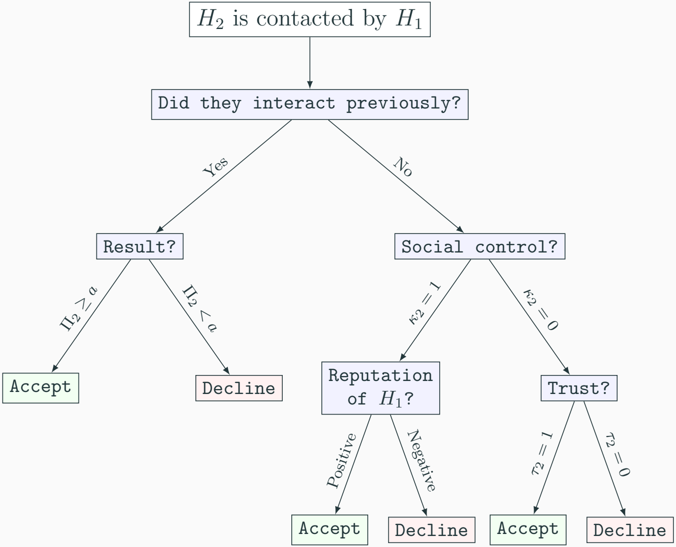
Decision tree for the first hawaladar (the sender).



Sequence of events

1. **The agents attempt I_{max} interactions.**
    1.1 Create a random demand
    1.2 Choose a random hawaladar in the first region.
    1.3 Find an interaction partner in the second region
    1.4 Potential partner accepts or rejects the interaction.

The decision tree for the second hawaladar (the receiver).



Hawala: Trust vs. Social Control

Operational definition of general trust

Trust captures the willingness to interact with someone one has no information about and who has the potential capability to harm one.

Operational definition of social control

Control captures the ability and willingness to memorize, monitor, communicate, and sanction defectors.

Sequence of events

1. **The agents attempt I_{max} interactions.**
    1.1 Create a random demand
    1.2 Choose a random hawaladar in the first region.
    1.3 Find an interaction partner in the second region
    1.4 Potential partner accepts or rejects the interaction.
    1.5 If potential partner accepts, agents play a PD

The interaction structure

- PD as ubiquitous incentive structure

Prisoners' dilemma			
		Sender	
		C	D
Recipient	C	4,4	-2,8
	D	8,-2	0,0

- If $\Pi_i > 0$, agent j becomes a partner of *i* and vv.
- If $\Pi_i \leq 0$, *i* will remember j as a defector
  - Will reject her once approached
  - If $\kappa_i = 1$, *i* also informs all of her partners about *j*'s defection.

Sequence of events

1. **The agents attempt I_{max} interactions.**
    1.1 Create a random demand
    1.2 Choose a random hawaladar in the first region.
    1.3 Find an interaction partner in the second region
    1.4 Potential partner accepts or rejects the interaction.
    1.5 If potential partner accepts, agents play a PD

Sequence of events

1. The agents attempt I_{max} interactions.
2. **A selection process for strategies takes place (replication).**
   - The worst agents copy behavior of the best agents
3. Statistics are recorded for all state variables necessary to understand the dynamics of the model.

Sequence of events

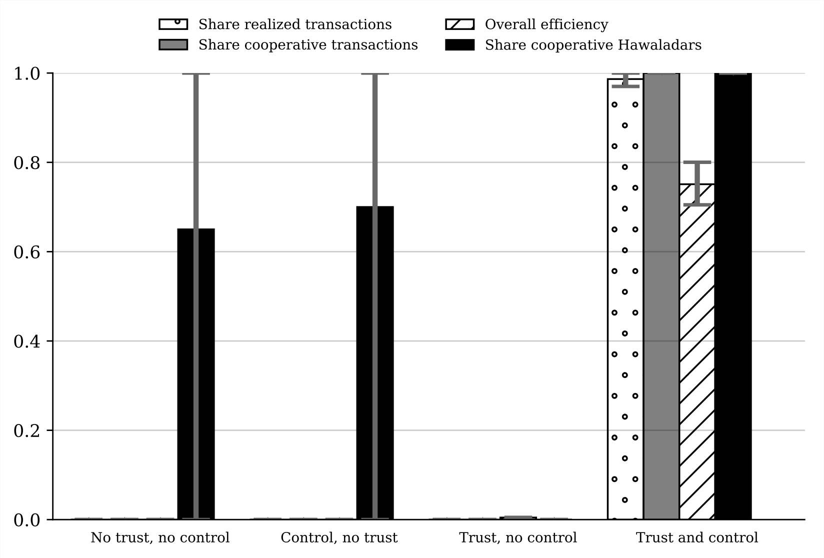
1. The agents attempt I_{max} interactions.
2. A selection process for strategies takes place (replication).
3. **Statistics are recorded for all state variables necessary to understand the dynamics of the model.**
   3.1 Share of successful interactions
   3.2 Type of interactions that have taken place (i.e., mutual defection, exploitation, or cooperation),
   3.3 Share of cooperators,
   3.4 Efficiency of the system, i.e., the total realized payoff divided by the maximum payoff possible

Results

The respective impacts of trust and control

- Four ideal baseline constellations:
    1. $\tau = \kappa = 0$: no trust, no social control.
    2. $\kappa = 0$, but $\tau = 1$: trust but no social control.
    3. $\kappa = 1$, but $\tau = 0$: social control but no trust.
    4. $\tau = \kappa = 1$: trust and social control.

Results for the baseline questions

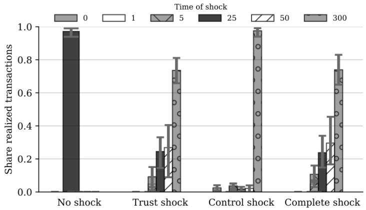


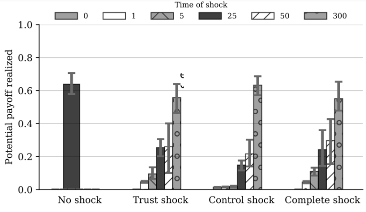
The dynamic relationship between trust and control

- Does the importance of trust and control varies over time?
- To test this, we ‘shock’ the system by exogenously setting the trust or control for cooperators to zero.
- Importance of out-of-equilibrium dynamics

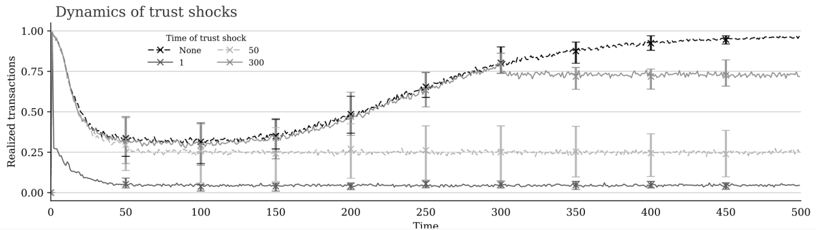
Results for the dynamic relationship

- Trust/complete shocks: the earlier the shock, the more profound and persistent its impacts.



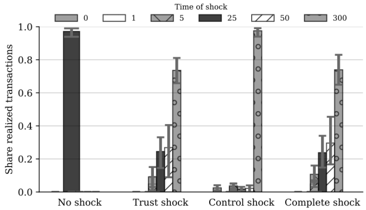


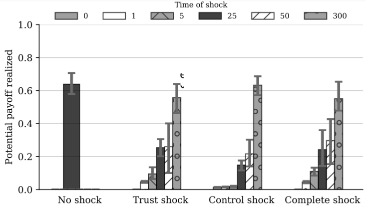
  - Once trust gets eradicated from the system, no new relationships can be formed.



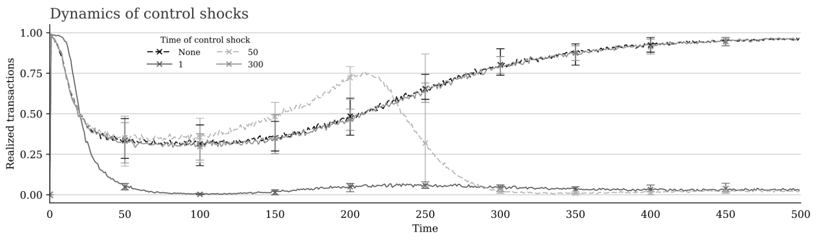
Results for the dynamic relationship

- Every control shock before the complete eradication of defective agents can cause the system to break down completely



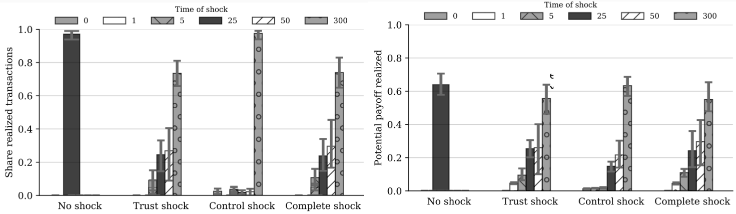


  - Once there are no defectors in the system any more, also social control becomes obsolete.



Results for the dynamic relationship

- Statistical similarity of the results for the trust and the complete shocks is surprising:



  - Zero trust after some time can even serve as a (imperfect) substitute for social control

Summary

Results

- Our model contributed to open questions on trust and control:
  1. It provides a theoretical definition and formal operationalization.
  2. It clarifies that both are equally relevant for the functioning of IVTS.
  3. It shows that their relation as substitutes or complements is time-dependent.
  4. It unveiled their temporal interaction.
  5. In the paper we also show how they interact with a number of other ‘framework’ conditions.
- This way we also illustrated the usefulness of computational experiments for institutionalist analysis.