

The Influence of Culture on Decision Making in Trade

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joint work with

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Context of this work

- Research into the role of trust in international trade networks
- Transaction cost economics and opportunism
- Human behavior in trade under asymmetric information conditions
- Purpose of multi-agent simulations:
 - Validation of models of human behavior
 - Select configurations for gaming simulation



Observation

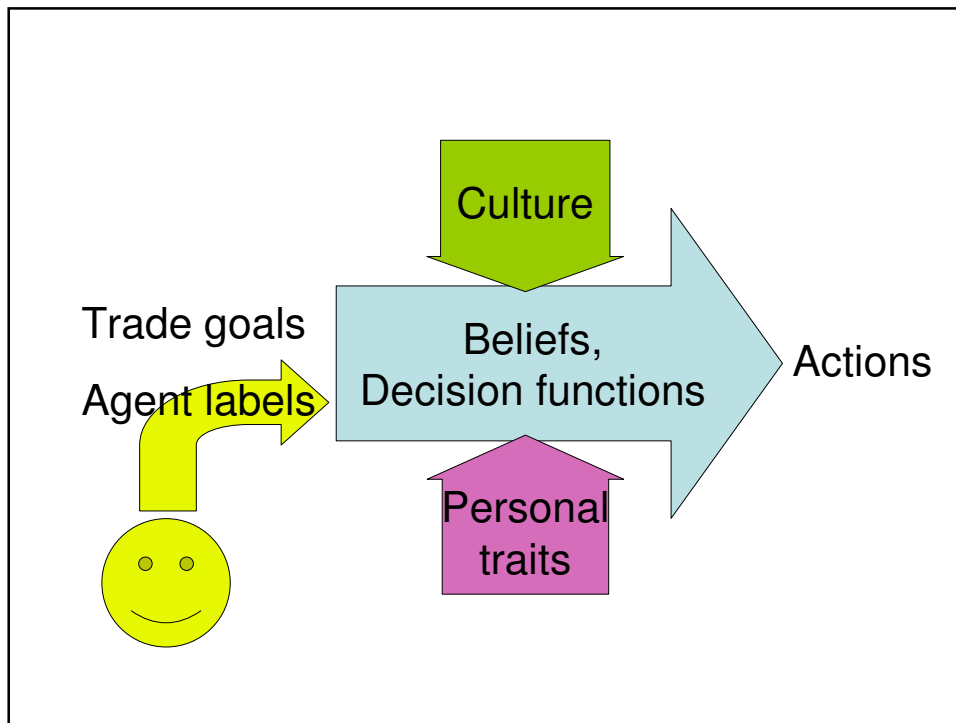
**Game results are different
when played with
people from different
parts of the world**

Motivation

- Differences between national cultures are known to have micro-level effects on trade
- Realistic agent-based modeling of international trade requires culturally differentiated agent behavior

Agent design





Transaction Cost Economics

Searching

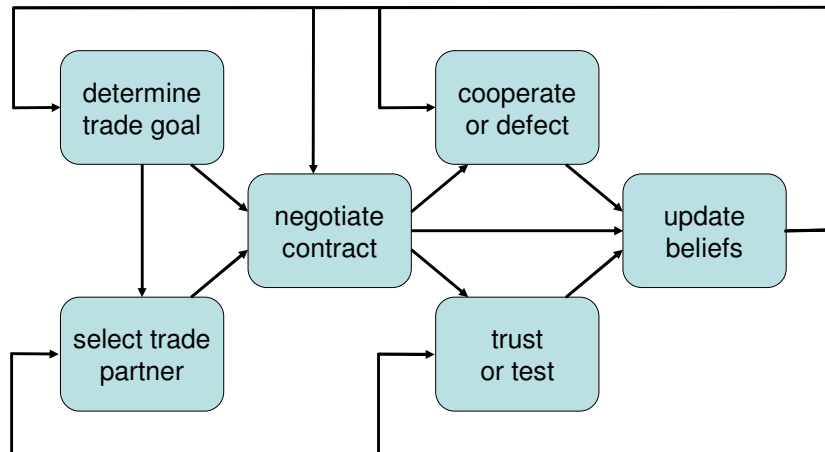
Bargaining

Contract

Monitoring

Enforcing

Trading agent's processes



Approach

1. For each process, describe effects of uncertainty avoidance, based on
 - Hofstede theory,
 - and expert experience.
2. Formalize the descriptions into rules that can be implemented in agents

Agent decisions

- Utility function to compare bids:

$$\begin{aligned} U(b) = & w_P P(b) \quad \leftarrow \text{economic value} \\ & + w_Q Q(b) \quad \leftarrow \text{product quality} \\ & + w_R R(b) \quad \leftarrow \text{risk attitude} \end{aligned}$$

- Production rules for parameter modification and decisions

Example: rule 1

```
/* 1 have patience if in-group partners make unrealistic bids */  
if cultural_script_contains(individualism_index(I: Real))  
  and current_negotiation(C: Trader, X: Integer, L: Commodity_list  
  and current_round(X)  
  and partner_model_contains_belief(C, group_distance, D: Real)  
  and partner_model_contains_belief(C, benevolence, B: Real)  
  and agent_trait_value(impatience, P: Real)  
  and agent_trait_value(cut_off_value, M: Real)  
  and others_bid_utility_in_round(U: Real, X)  
  and U < M  
  and random(0, 1, Z: Real)  
  and P * (1 - (1-I)*max(1-D,B)) * 0.5 > Z  
then stop_negotiation(C, X, L, gap);
```

Some results (individualism)

		individualist				collectivist gr A			
		C1	C2	C3	C4	C5	C6	C7	C8
individualist	S1	3	2	24	0	0	0	0	0
	S2	1	0	0	12	0	1	0	1
	S3	0	16	1	2	0	0	0	0
	S4	14	2	0	7	0	0	0	0
collectivist group A	S5	0	0	0	0	5	6	6	6
	S6	0	0	0	0	8	3	5	6
	S7	0	0	0	0	5	7	5	8
	S8	0	1	0	0	8	7	5	4

Some results (uncertainty avoidance)

		buyer groups	
		<i>UA1</i>	<i>UA2</i>
seller groups	<i>UA1</i>	26	1
	<i>UA2</i>	3	33

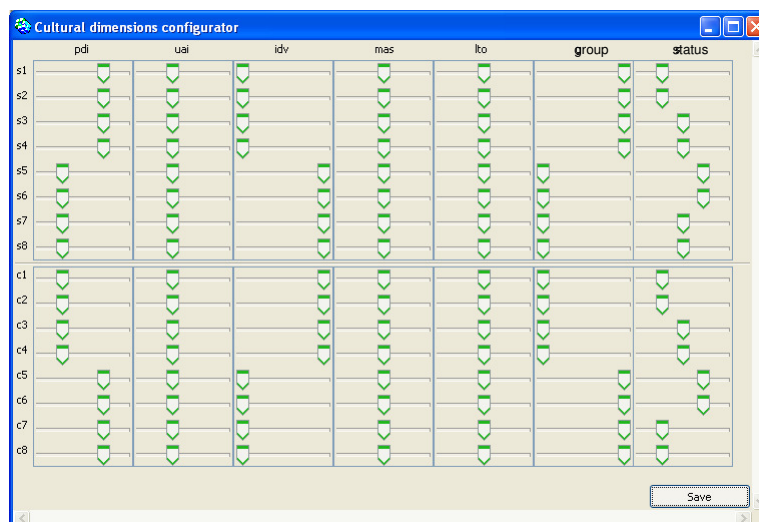
		buyer groups	
		<i>UA2</i>	<i>UA2</i>
seller groups	<i>UA1</i>	7	4
	<i>UA1</i>	9	9

Some results (power distance)

		seller groups	
		<i>HS</i>	<i>HI</i>
buyer groups	<i>HS</i>	36	1
	<i>HI</i>	0	23

		seller groups	
		<i>HS</i>	<i>HI</i>
buyer groups	<i>ES</i>	20	11
	<i>EI</i>	5	13

Current work: integrate dimension models



Validation of integrated models

1. Against case studies reported in literature
2. Experimental validation:
 - Aggregate results with groups in gaming simulations (trust and tracing game)
 - Results of partial models in individual experiments (leman car game)

Request for help

Conclusion

- Negotiation can be modelled as a rational process
- However, it is observed that people from different countries differ with respect to the way they negotiate and the results they obtain
- Realistic simulation models of international supply chains should take a differentiation into account
- Current work explores the feasibility of Hofstede's model
- Preliminary results indicate that culture in agents could be simulated by applying Hofstede's model
- Extensive validations remain for future research