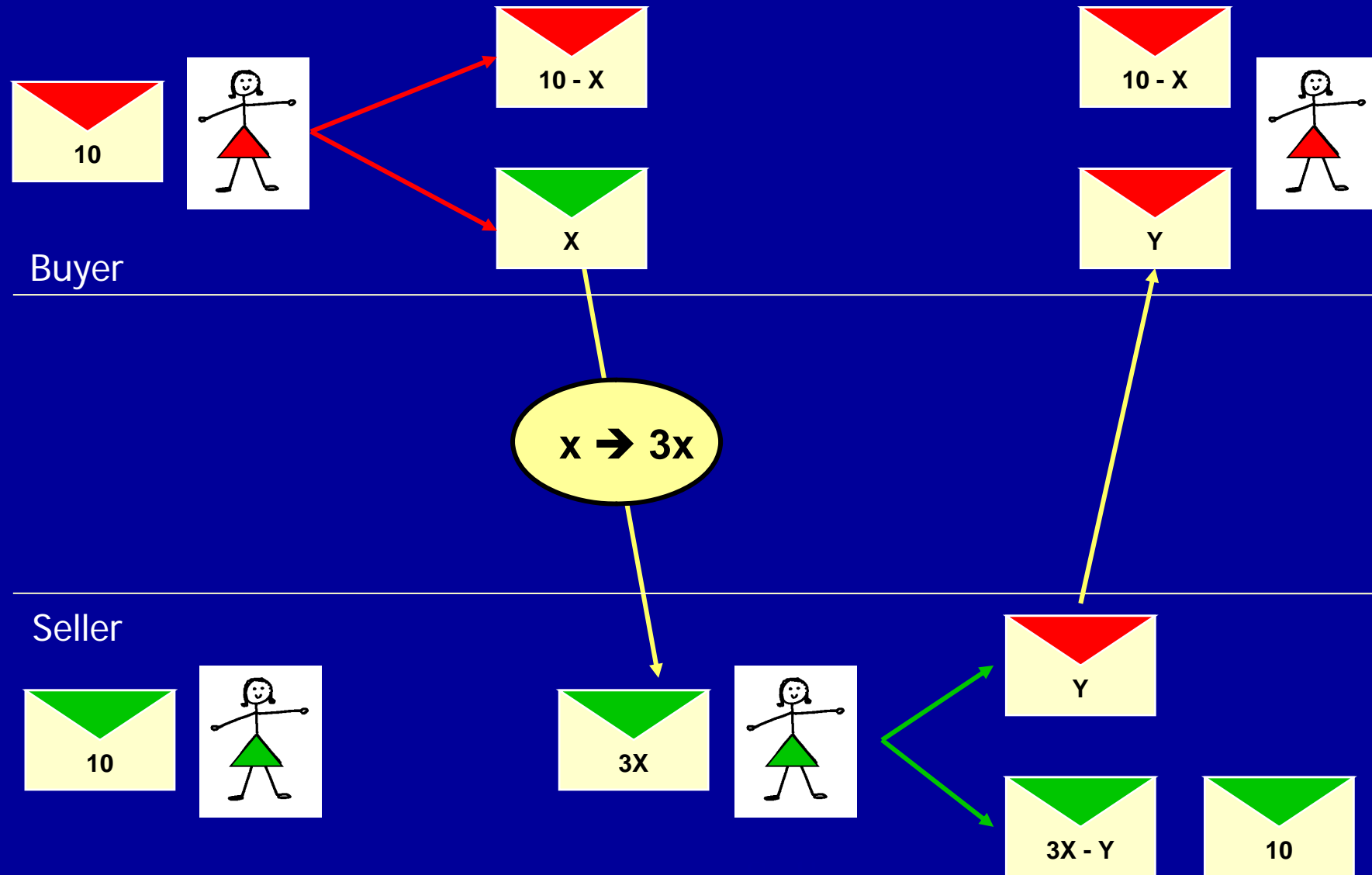
The background of the slide is a photograph of a sunset over a body of water. The sky is a gradient of dark blue at the top, transitioning through purple and orange to a bright orange line at the horizon. The water below is dark blue with some ripples.

Game-theory based trust experiments relating reputation management with trust and trustworthiness

Claudia Keser
Professor of Microeconomics
University of Göttingen, Germany

FIA, Stockholm
November 2007

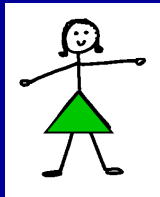
Let us consider this game



This "trust game" provides measures of trust and trustworthiness



Investment by buyer
= **measure of trust**



Relative return by seller
= **measure of trustworthiness**

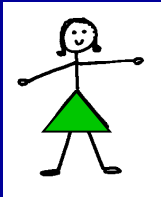
Subgame perfect equilibrium solution of the trust game predicts no transaction

Assume:   homo oeconomicus type

Backward induction:



Buyer: No investment → **No trust**



Seller: No return → **No trustworthiness**

... and this is an inefficient solution !

Experimental Economics

Examines human decision making in controlled laboratory environments

Test validity of theories

Develop new theories (bounded rationality)

How do institution design & social environments influence behavior and economic outcomes ?

Business applications: Complement field studies

Cheaper, quicker, more controlled, less risky

Experimental economics results on the trust game show

... some trust:

- Buyers tend to invest positive amounts
- Trust level depends on culture, gender etc.

... trust does not really pay

- Average return by sellers
 \approx average investment by buyers

Trust in online markets (Keser 2003)

Why do so many people trade on informal online markets ?

Involves risks, trust plays an important role



eBay's Feedback Forum

eBay Motors: HOBIE CAT 16' SAILBOAT W/ GALVANIZED TRAILER (item 170032368123 end time Sep-30-06 - Microsoft Internet Explorer)

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Recycle Mail Print Fax Stop Bluetooth


Address http://cgi.ebay.com/ebaymotors/HOBIE-CAT-16-SAILBOAT-W-GALVANIZED-TRAILER_W0QQitemZ170032368123QQihZ007QQcategoryZ63729QQrdZ1QQc Go Links

Home Buy Sell My eBay Buyer Services & Protection Tips & Advice

[Back to list of items](#) Listed in category: [eBay Motors](#) > [Other Vehicles & Trailers](#) > [Boats](#) > [Sailboats](#) > [Sailboats Under 20 feet](#)

1983 HOBIE CAT 16' SAILBOAT W/ GALVANIZED TRAILER Item number: 170032368123

Seller of this item? [Sign in](#) for your status [Watch this item](#) in My eBay | [Email to a friend](#)



1 of 16

[Supersize](#)

Starting bid: **US \$50.00** [Place Bid >](#)

[Reserve not met](#)

[Get low monthly payments](#)

Buy It Now price: **US \$495.00** [Buy It Now >](#)

End time: **Sep-30-06 12:00:00 PDT** (6 days 21 hours)

Shipping: Buyer responsible for vehicle pick-up or shipping. [Vehicle shipping quote is available.](#)

Sells to: United States

Item location: Brick, New Jersey, United States

History: [0 bids](#)

You can also: [Watch this item](#)
[Email to a friend](#) | [Sell one like this](#)

Listing and payment details: [Show](#)

Meet the seller

Seller: [ridingbob](#) ([63](#) ★)

Feedback: **100% Positive**

Member: since Jan-25-00 in United States

- [Read feedback comments](#)
- [Ask seller a question](#)
- [Add to Favorite Sellers](#)
- [View seller's other items](#)

Buy safely

- Check the seller's reputation**
Score: 63 | 100% Positive
[Read feedback comments](#)
- Learn how you are protected**
Free buyer protection coverage
eBay provides up to \$20,000 in [fraud protection](#) for this vehicle.

Done Internet

start

Address 97% 5:25 PM Saturday 9/23/2006

Infoprint M... demo trust 5 NotesB... 2 Interne... Replication... 2 Microso...

eBay's Feedback Forum

eBay Member Profile for ridingbob - Microsoft Internet Explorer

Address: <http://feedback.ebay.com/ebaymotors/ws/eBayISAPI.dll?ViewFeedback&userid=ridingbob>

eBay Motors [eBay home](#) | [Pay](#) | [Register](#) | [Site Map](#) | [Community](#) | [Help](#)

Search eBay Motors Start new search Search Advanced Search

Home Buy Sell My eBay Buyer Services & Protection Tips & Advice

Hello! [Sign in](#) or [register](#).

[Back to list of items](#) Home > [Community](#) > [Feedback Forum](#) > **Member Profile**

Member Profile: ridingbob (63 ★)

Feedback Score: 63
Positive Feedback: 100%

Members who left a positive: 63
Members who left a negative: 0
All positive feedback received: 68

[Learn about](#) what these numbers mean.

Recent Ratings:

	Past Month	Past 6 Months	Past 12 Months
positive	5	20	43
neutral	0	0	0
negative	0	0	0

Bid Retractions (Past 6 months): 0

Member since: Jan-25-00
Location: United States

- [ID History](#)
- [Items for Sale](#)
- [Add to Favorite Sellers](#)
- [View my Reviews & Guides](#)

[Contact Member](#)

Feedback Received [From Buyers](#) [From Sellers](#) [Left for Others](#)

68 feedback received by ridingbob (0 ratings mutually withdrawn) Page 1 of 3

Comment	From	Date / Time	Item #
Very prompt and courteous buyer, great to deal with.	Seller nyy134578891015162337 (5205 ★)	Sep-22-06 10:07	330025274837

start | Infoprint M... | demo trust | 5 NotesB... | 2 Interne... | Replication... | 2 Microso... | 96% | 5:23 PM Saturday 9/23/2006

Trust and Reputation Systems

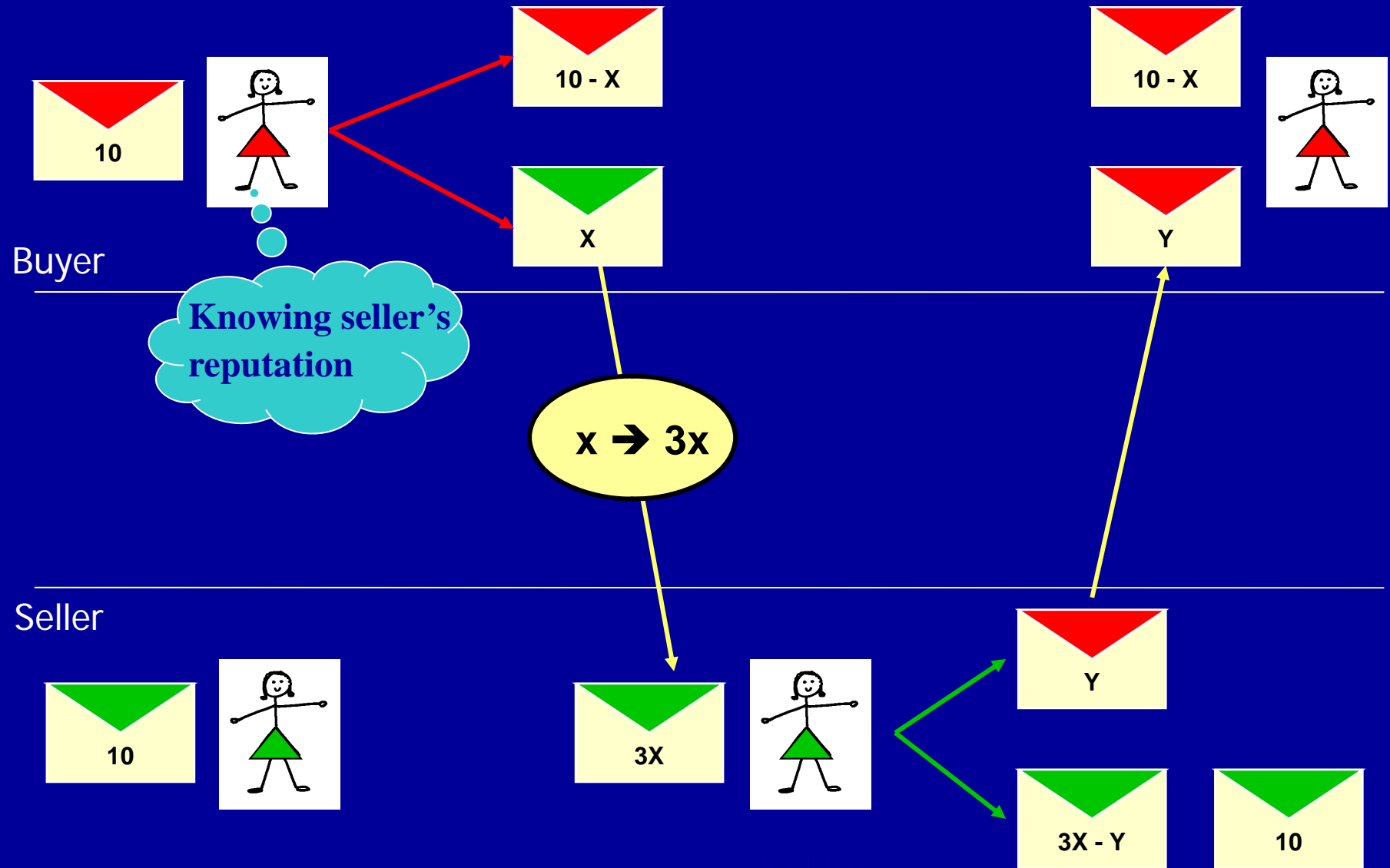
Can we define a set of rules on how to design efficient reputation systems ?

- Recurring incidents of fraud suggest shortcomings
- No standard reputation system

Analyze impact of reputation management on trust and trustworthiness in an experimental trust game (Berg, Dickhaut, McCabe, Games & Economic Behavior 1995)

Define trust as the expectation of another person's goodwill

Extended trust game



Experimental treatments

Baseline treatment: 20-fold repetition of trust game among "strangers" (random re-matching of buyers and sellers)

Reputation treatments (extension of baseline treatment):

Buyer rates seller's cooperation based on the return

as:

positive

neutral

negative

Buyer knows seller's previous rating(s)

Short-run reputation: most recent rating

Long-run reputation: distribution of previous ratings, most recent recent

Partners treatment: 20-fold repetition of trust game among "partners" (same buyer and seller)

Period

2

Your endowment in this period : 10

What amount do you send to player B?

Please enter any amount greater than or equal to 0 and less than or equal to 10 :

Player B's Ratings

Most Recent Rating : Negative

Positive	Neutral	Negative	Not Rated
		1	

Your History

Period	Your Endowment	You Sent B	B Received	B Returned	Your Profit	Your Total Profit
1	10	10	30	15	15	15
2	10					

OK

Organization of the experiments

CIRANO, Montreal, French

Written instructions, read aloud

Computerized questionnaire

Cash payment

- based on cumulative payoffs
- average \$30, 1 to 1 ½ hours

5 buyers and 5 sellers per strangers session

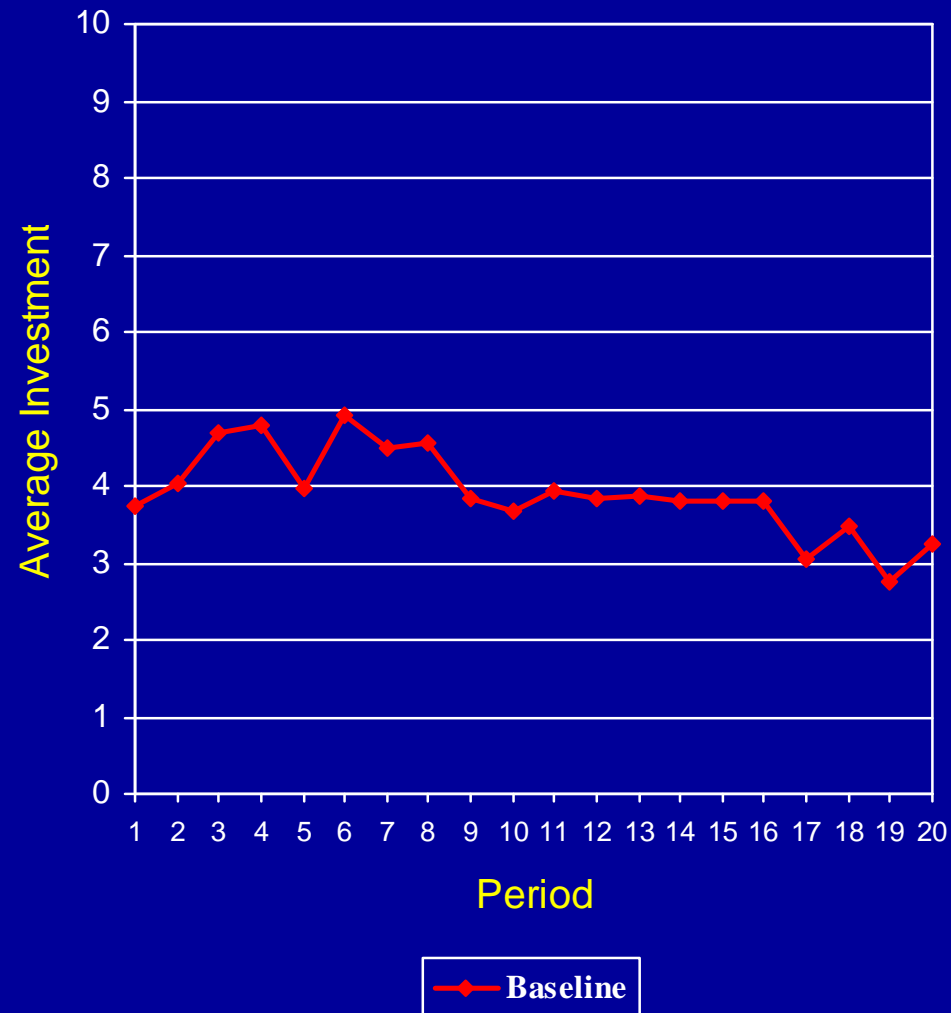
# Observations:	8	baseline
	12	short-run reputation
	12	long-run reputation
	16	partners



Results: trust

Average investment (std): 3.91 (3.53)

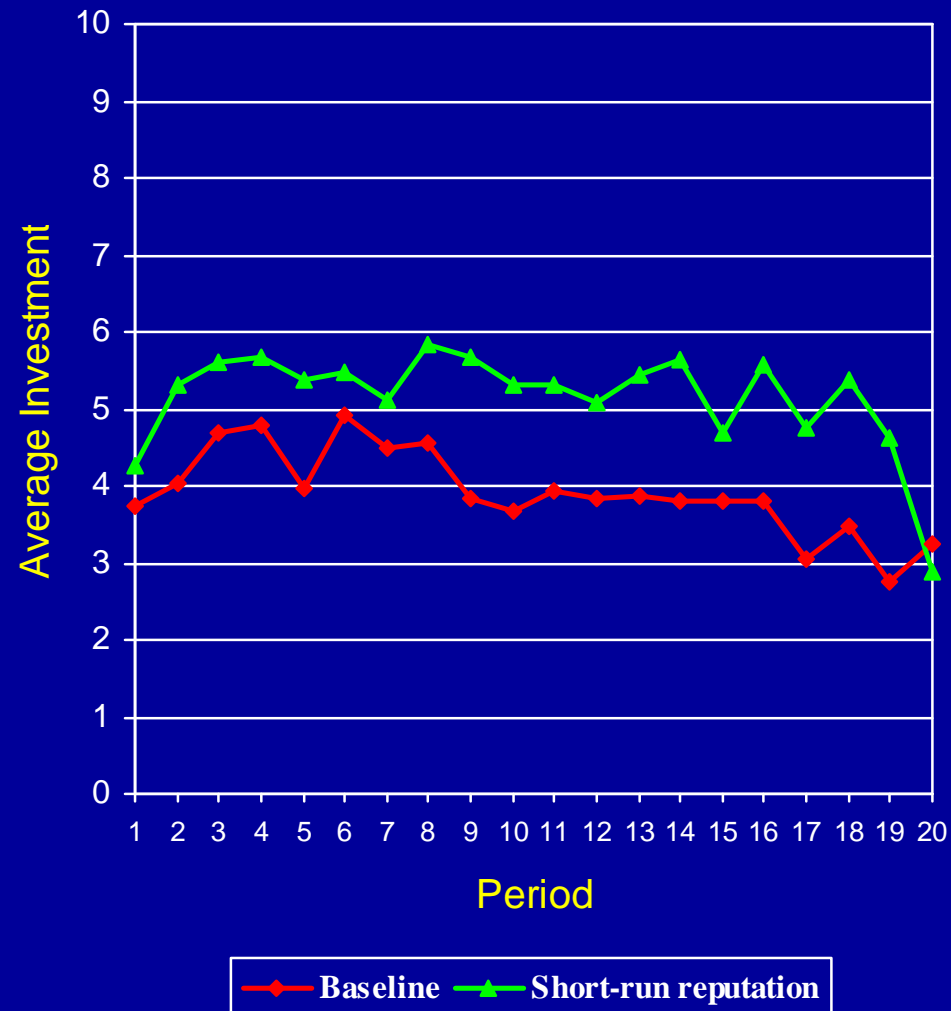
Median investment: 3



Results: trust

Average investment (std): 3.91 5.15 (3.71)

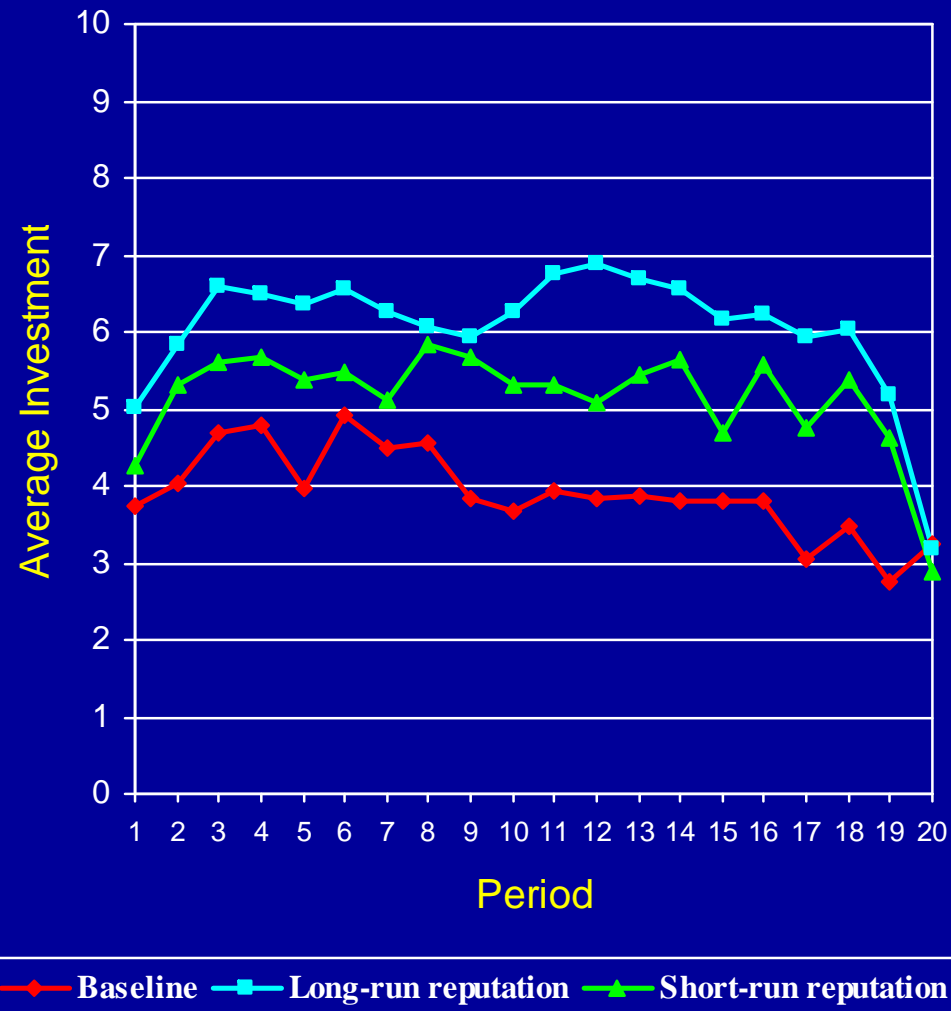
Median investment: 3 5



Results: trust

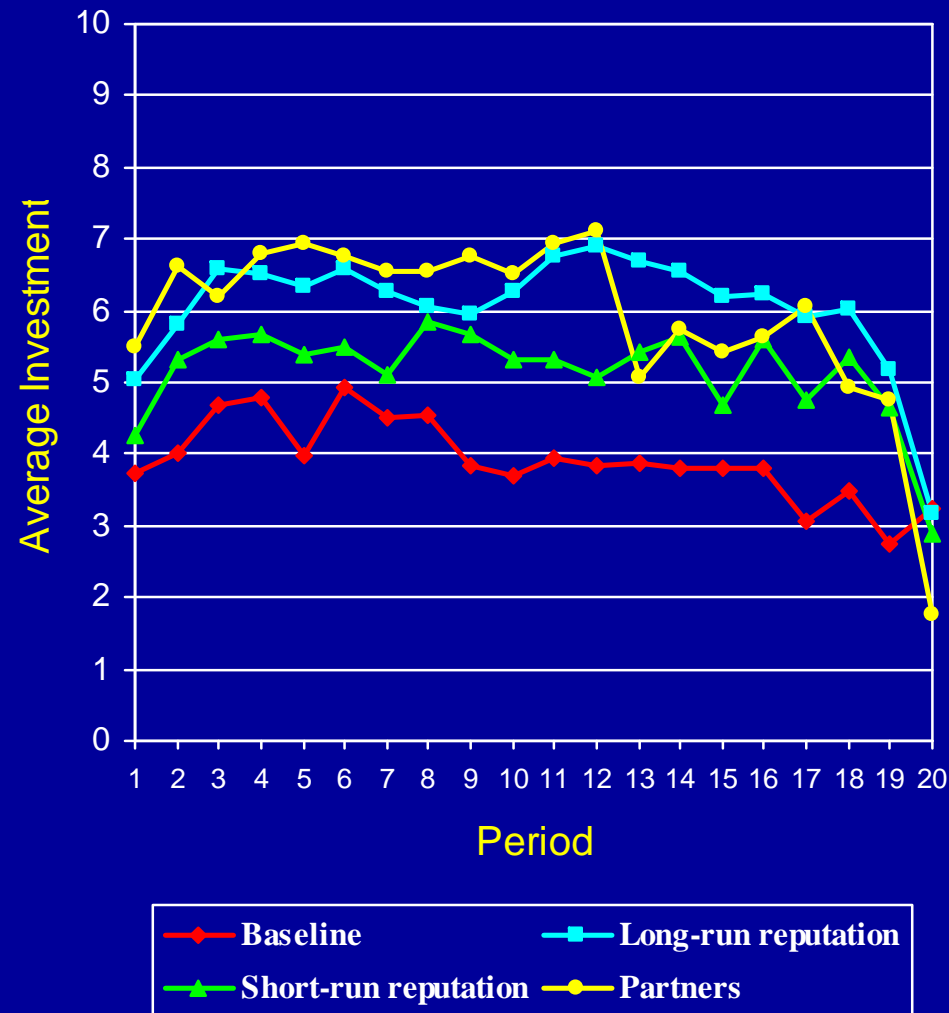
Average investment (std): 3.91 5.15 6.05 (3.80)

Median investment: 3 5 7

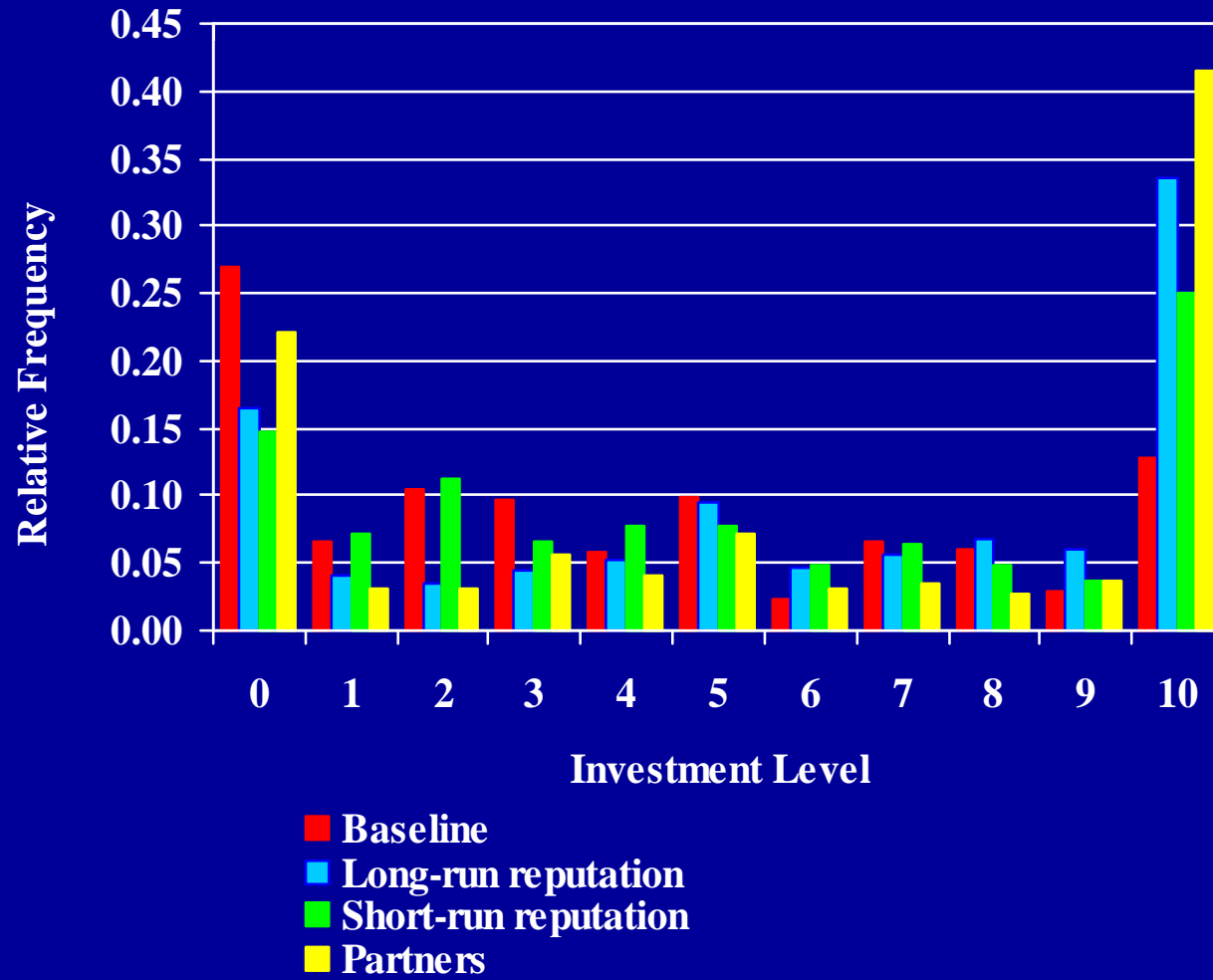


Results: trust

Average investment (std): 3.91 5.15 6.05 5.93 (4.15)
Median investment: 3 5 7 7

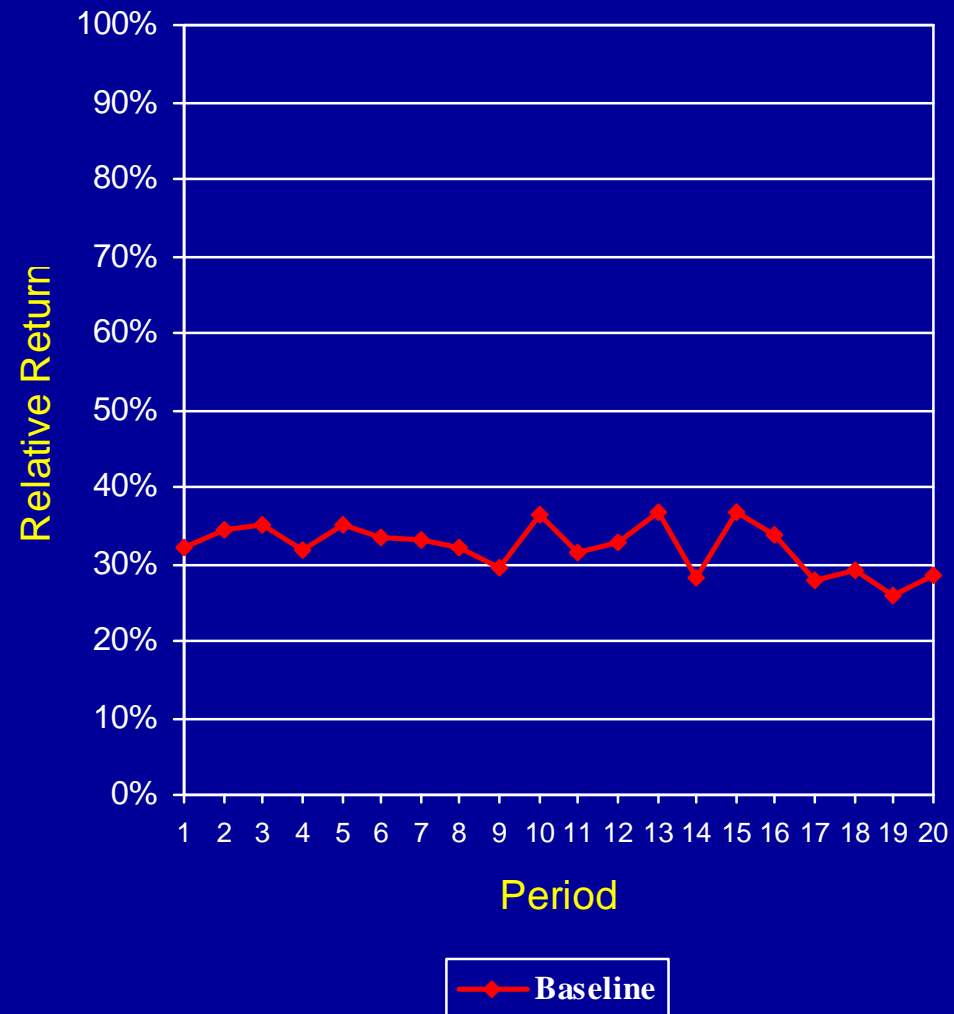


Results: trust



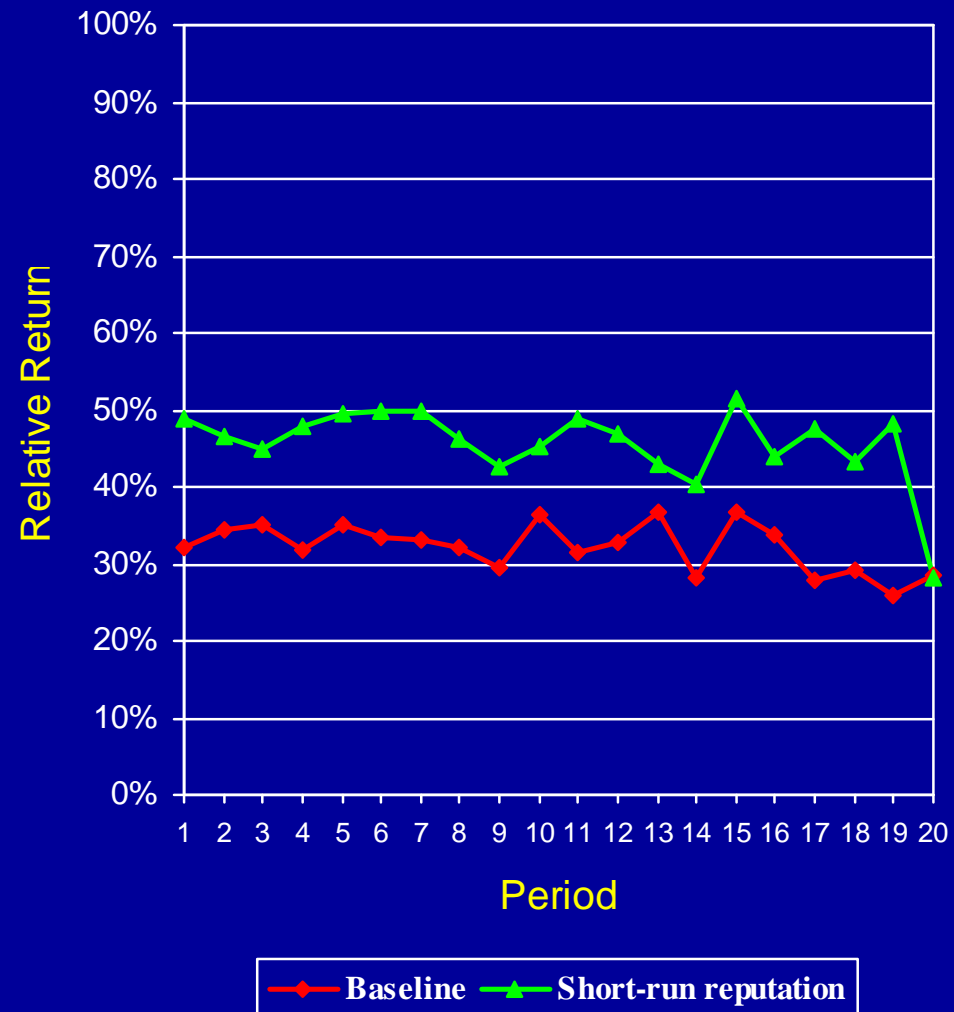
Results: trustworthiness

Relative return (std): 0.32 (0.24)



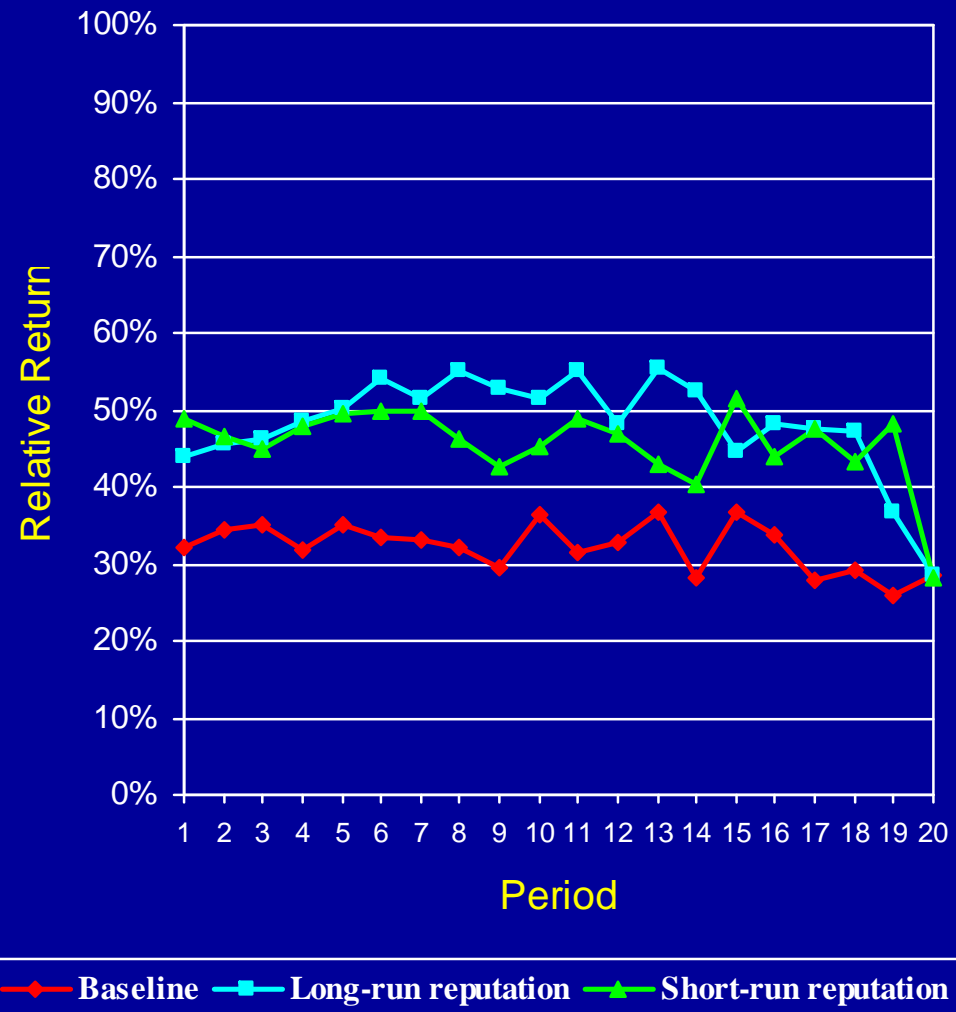
Results: trustworthiness

Relative return (std): 0.32 0.46 (0.26)



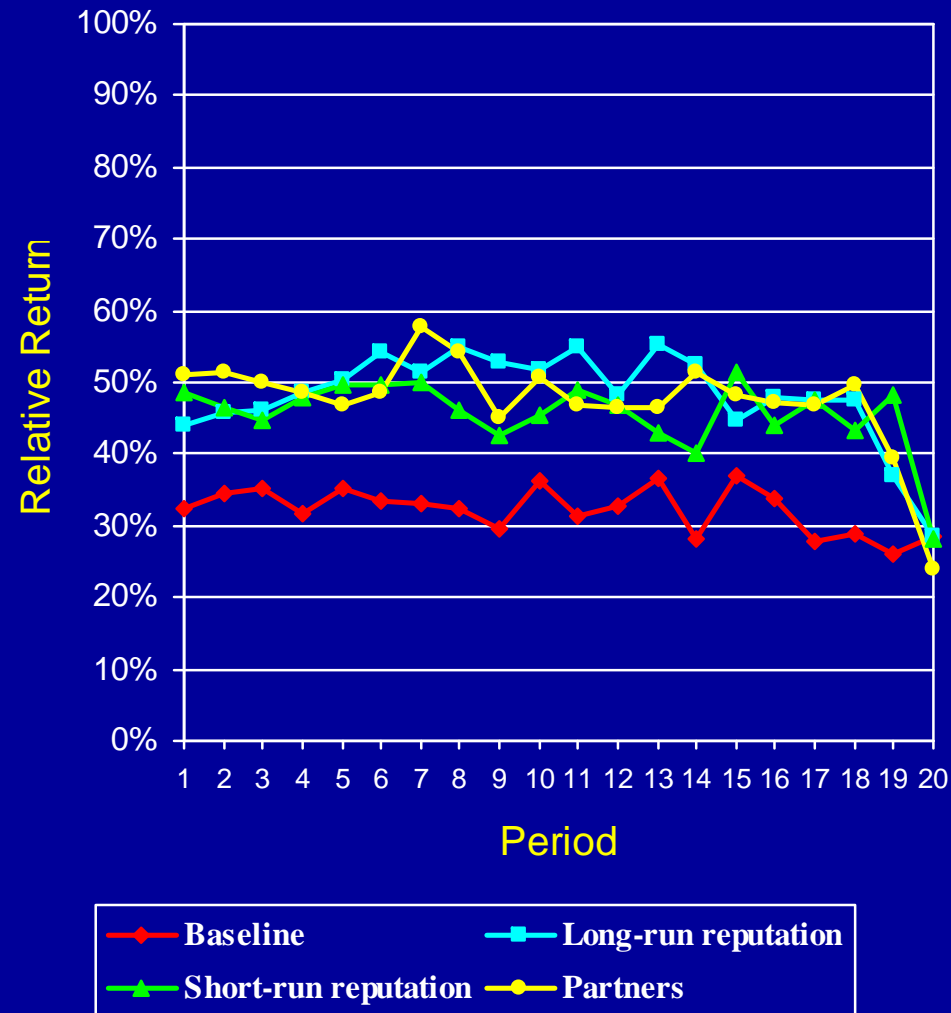
Results: trustworthiness

Relative return (std): 0.32 0.46 0.48 (0.23)



Results: trustworthiness

Relative return (std): 0.31 0.46 0.48 0.48 (0.24)



Results: profits

	Buyer	Seller
Baseline	9.90	17.93
Short-run reputation	11.95	18.36
Long-run reputation	12.83	19.27
Partners	13.10	18.76

- Sellers gain significantly more than buyers
- Buyers gain significantly more in reputation and partners treatments than in baseline
- Sellers do not gain significantly more in reputation and partners treatments than in baseline

Results: reputation effect on investment

Most recent rating:

Short-run reputation:

Positive rating has a positive effect

Negative rating has a negative effect

Long-run reputation treatment:

Only positive rating has a positive effect

	Rating	#	Investment
Short-run reputation	Negative	432	3.62
	Neutral	200	5.08
	Positive	503	6.61
Long-run reputation	Negative	386	4.82
	Neutral	211	5.89
	Positive	537	7.12

Results: reputation effect on investment

Distribution of previous ratings:

Overall rating score: sum of previous scores,

where each positive rating: +1

each negative rating: -1

each neutral rating: 0

Positive overall rating has a positive effect

Negative overall rating has a negative effect

Rating score	#	Investment
Negative	293	4.23
Zero	167	5.62
Positive	293	6.87

Results: rating

Norms of cooperation?

Results: rating

Norms of cooperation?

- Equal split of transaction: relative return $1/2$
- Equal profits: relative return $2/3$

- Positive rating if more than $1/2$ returned (62%, 62%)
- Neutral rating if about $1/2$ returned (50%, 51%)
- Negative rating if less than $1/3$ returned (21%, 25%)

Conclusion

Introduction of a reputation system into a strangers environment

... increases trust and trustworthiness

... leads to an outcome similar to a partners situation

... is likely to play an important role in the Internet of Services

Outlook

- ✓ Game-theory based experiments as a tool for measuring trust
- ✓ ...