



EINAUDI INSTITUTE FOR ECONOMICS AND FINANCE



# The Right Amount of Trust

Jeff Butler  
(EIEF)

Paola Giuliano  
(UCLA)

Luigi Guiso  
(EUI & EIEF)

May 13 2009

# The rise of trust

- Big and pervasive effects of trust:
- Highly correlated with GDP per capita and growth (Knack and Keefer)
- Allows firms to grow larger (Shleifer et al) and institutions to improve their quality (Tabellini)
- Raises access to financial markets, increases investment in stocks and diversification (GSZ)
- Affects economic and financial transactions across countries (GSZ) and venture capital investments (Bottazzi, Darin)



# Trust and surplus

- In this literature *aggregate* economic performance increases monotonically with *average* trust
- Hence trust always good=> the more the better
- **Idea:** trust key ingredient in virtually all transactions (Arrow)=> more exchange more creation of surplus



# Questions & Doubts

- But how is that surplus divided?
- Does it always pay an *individual* to trust?
- Even more fundamentally, is it true that trust always generates more surplus?
- Old and recent financial scandals may raise doubts that this is actually the case



# Old and the new swindlers

The Old Master



Charles Ponzi

The New Master



Barnard Madoff

- 1 Those who trusted these guys lost (a lot of) money, the more so the more they trusted
- 2 Their schemes probably destroyed value

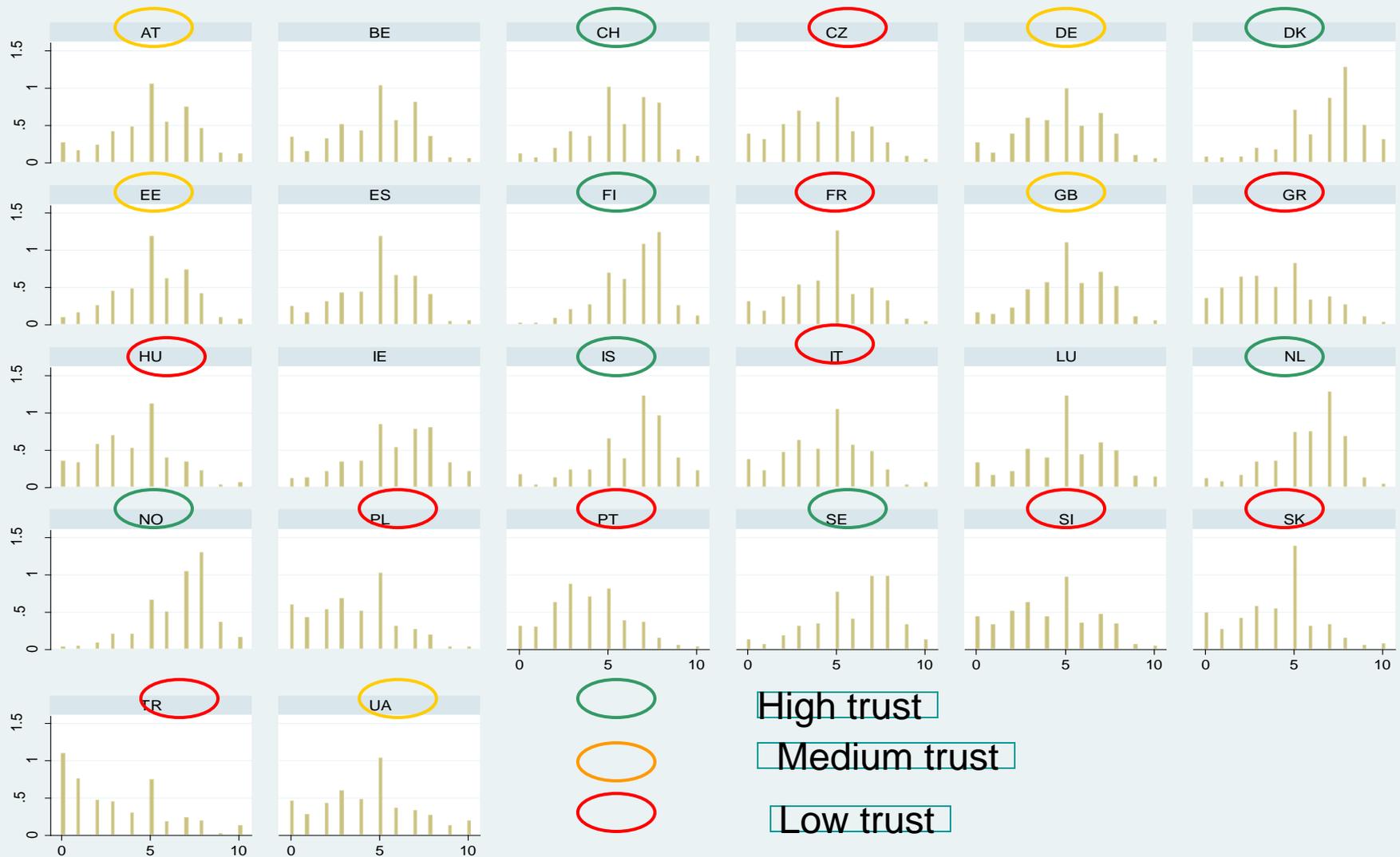


# Our contribution

- Focus on the link between *individual trust* and *individual performance*
- Massive persistent heterogeneity in individual trust=> they cannot all be right
- Argue performance is hump-shaped in own trust beliefs:
  - Those forming too optimistic beliefs:
    - => They trust and trade too much, given the risk of being cheated (and this reduces performance)
  - Those who mistrust will form overly conservative beliefs
    - => They trust and trade too little, losing profitable opportunities as a result=> poor performance



# Trust Values: Density Functions by Country



Most people can be trusted (10) or you can't be too careful (0)

**Bottom line: massive heterogeneity in beliefs within the same community**

# Where is persistent heterogeneity coming from?

- **Two explanations:**
- Parents endow children with priors about others and cultural priors are hard to change – e.g. because of confirmation bias (GSZ, 2008; Dohmen et. al. 2007)
- Parents endow children with values (Bisin and Verdier, 2000, 2001; Tabellini, 2009) and people extrapolate beliefs from their own trustworthiness
- Both values and **false consensus** are persistent
  - Back with evidence on this later



# Outline

- A **simple model** tying false consensus and the hump shaped relationship between trust and performance
- Show **evidence on** the **hump** shaped relation
- Dig into the **mechanisms**: the relationship between trust and being cheated
- Evidence on **culturally driven trust beliefs** from a trust game experiment



# A simple model

1. investor has capital but no ideas;
2. entrepreneur has an idea but no capital; he can cheat (Dixit,03)

$E$  = investor endowment

$S$  = amount investor lends

$f(S)$  = output produced if invest  $S$

$$f'(S) > 0, f''(S) < 0, f'(0) = \infty$$

$\gamma f(S)$  = amount returned by entrepreneur:  $\gamma f(S) > S$

$\pi$  = probability of cheating

## Problem

$$\text{Max}_S Y(S) = E - S + (1 - \pi)\gamma f(S)$$



# Solution

$$FOC : (1 - \pi)\gamma f'(S_\pi^*) = 1$$

$S_\pi^* > 0$ : optimal investment under correct beliefs

$Y(S_\pi^*)$  = income under correct beliefs

Let  $p$  be the subjective trust belief . False consensus  $\Rightarrow$

$p = g(\tau)$ ;  $\tau$  = investor trustworthiness,  $g'(\tau) > 0$

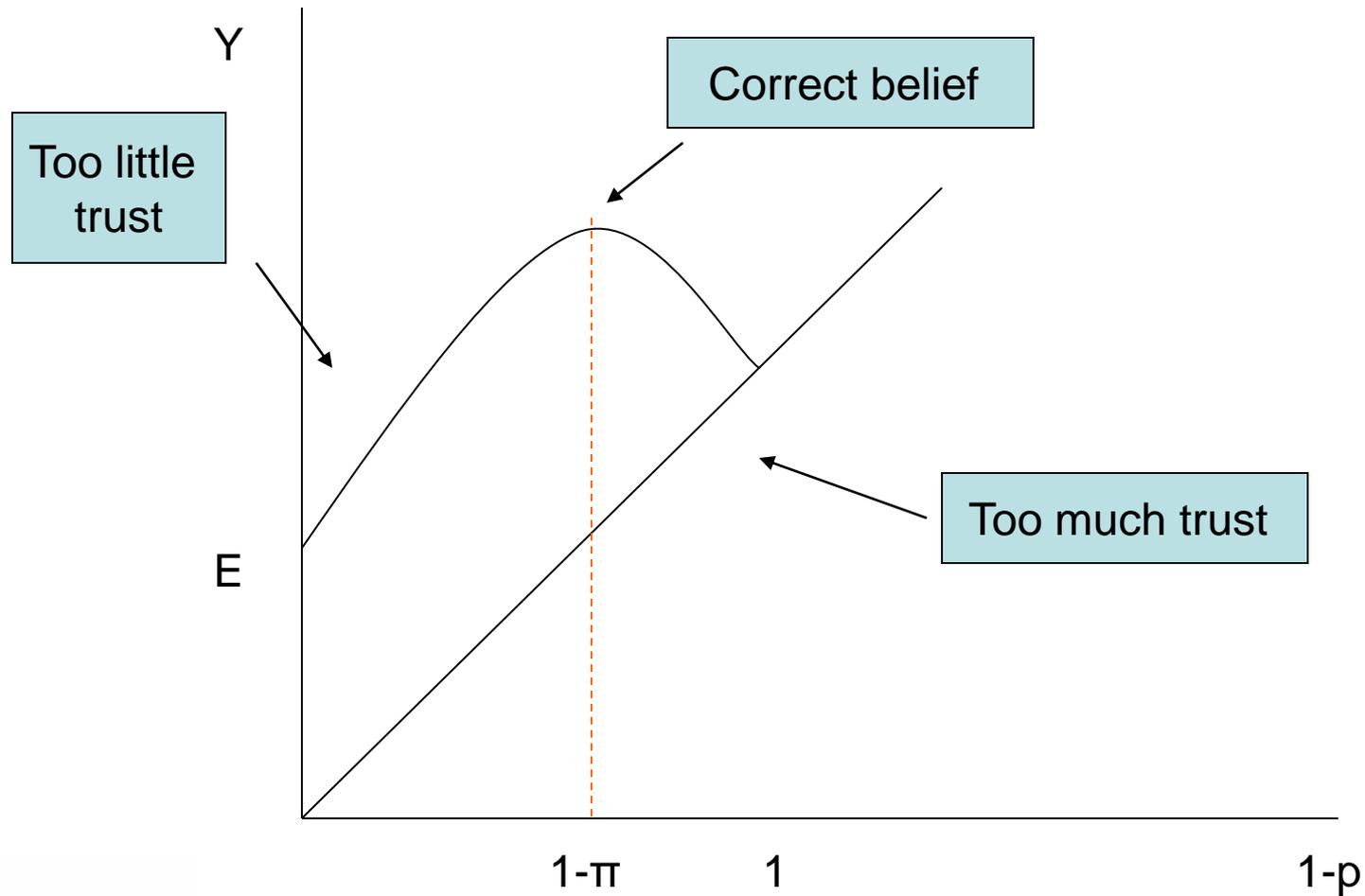
$S_p^*$  = optimal investment under false consensus beliefs

$$Y(S_p^*) = E - S_p^* + (1 - \pi)\gamma f(S_p^*) < Y(S_\pi^*)$$

$$\frac{\partial Y}{\partial(1-p)} = \frac{\partial S_p^*}{\partial(1-p)} \left[ \frac{(1-\pi)}{1-p} - 1 \right]$$



# Solution: graphics



# Predictions

1. Individual performance should **pick at intermediate trust** and be lower for very low and very high trust
2. Pick **more to the right in high-trust countries**
3. More trusting people more likely to be cheated
4. Less trusting people more likely to miss profitable opportunities



# Trust, performance and cheating: empirical evidence

- Dataset description
- Trust and performance
- Trust and cheating



# Data: Description

- European Social Survey (wave 2): data on cross-national attitudes in Europe
- Covers 26 European countries
- About 2000 randomly sampled individuals for each country (800 in less than 2-million countries)
- Standard information on household demographics



# Data: Trust

- Trust is measured using the WVS question
- “ *generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?*”
  - Please tell me on a score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted
- Differently from WVS (only asks a 0,1 measure), in ESS **intensity** of trust is reported => crucial to study hump



# Data: individual performance

- **Performance** is measured with household total disposable **income** (only measure available)
- ESS asks survey participant to report which income level category best describes her household's total net income
- 12 categories are available ranging from less than 1800 euros per year to more than 120,000 euros per year
- Assign midpoint of range and take logs

[income description](#)



# Trust and performance: evidence

$$Y_{ic} = \sum_j a_j \text{Trust}_{jic} + \beta X_{ic} + \delta C + \eta R + \varepsilon_{ic}$$

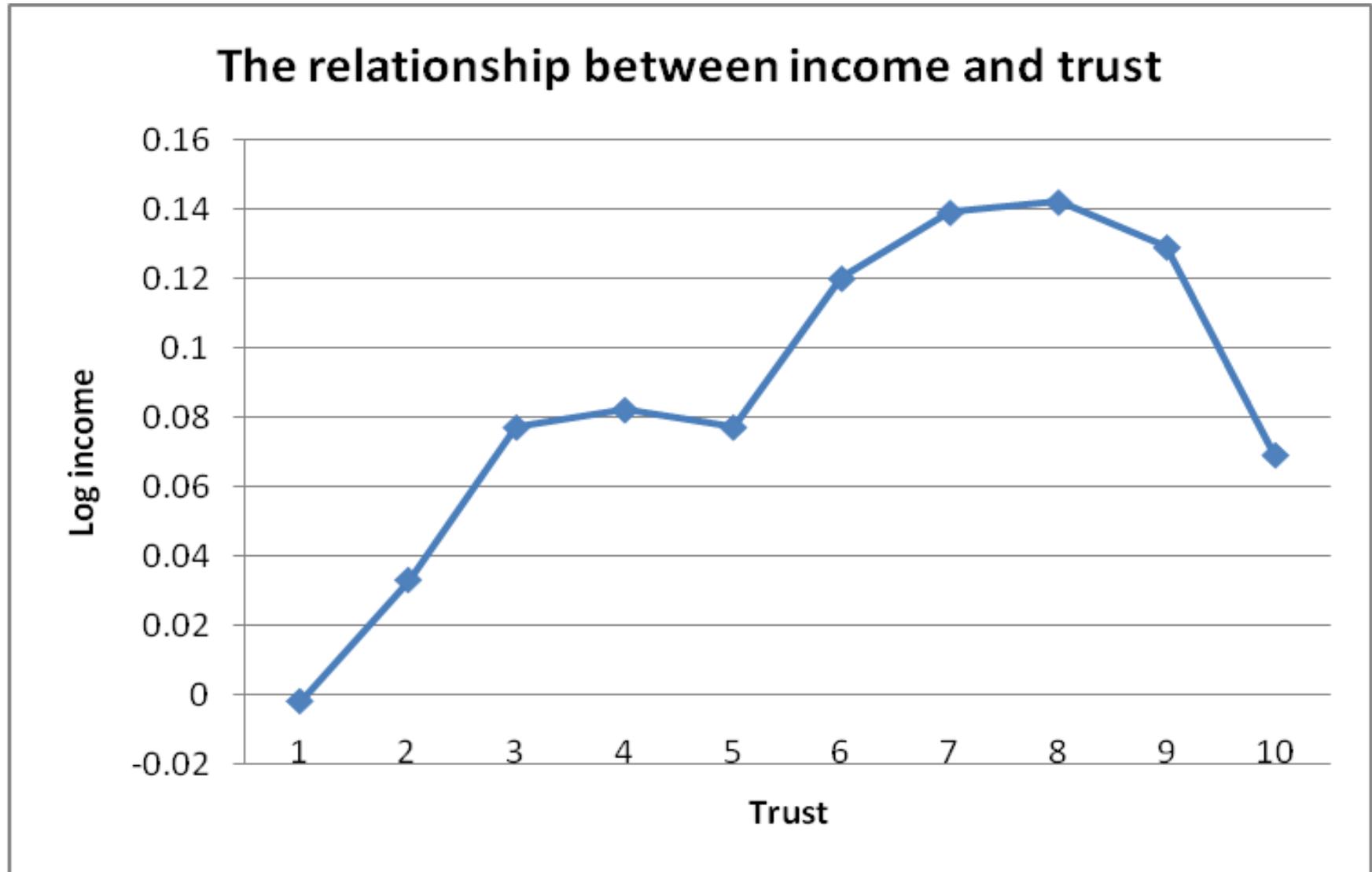
- Regress log income ( $Y$ ) on 10 trust-level dummies: excluded group lowest trust level
- **Controls ( $X$ )**: age, education, gender, marital status, parents education, immigrant, employment status
- **Control** for risk tolerance and altruism
- Full set of **country effects** →
  - absorb systematic differences in average actual trustworthiness and any other relevant country-level effect
- Full set of **regional effects** →
  - absorb systematic within country differences in trustworthiness



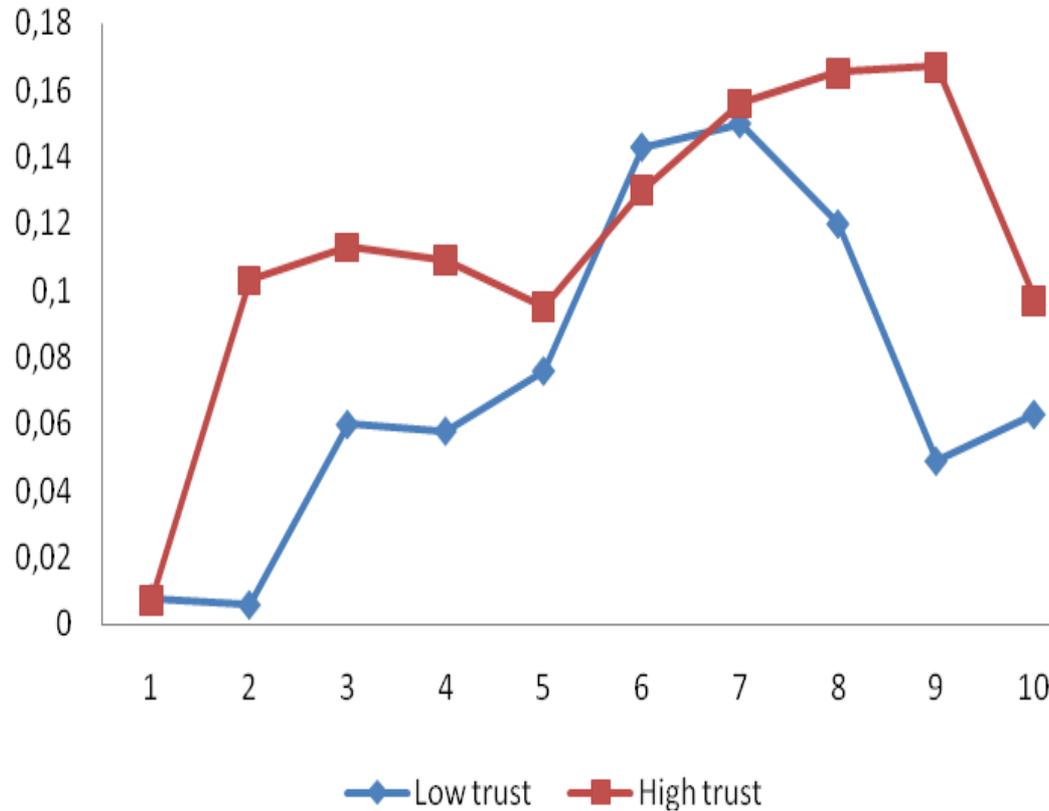
# The trust-performance relation

	Demographics	+ risk tolerance	+ altruism	Quadratic
Trust 1	0.003	0.004	0.006	
Trust 2	0.031	0.039	0.035	
Trust 3	0.071***	0.081***	0.086***	
Trust 4	0.082***	0.083***	0.081***	
Trust 5	0.081***	0.083***	0.085***	
Trust 6	0.119***	0.126***	0.124***	
Trust 7	0.134***	0.142***	0.142***	
<b>Trust 8</b>	<b>0.138***</b>	<b>0.145***</b>	<b>0.145***</b>	
Trust 9	0.133***	0.138***	0.141***	
Trust 10	0.071*	0.079*	0.091**	
Risk tolerance		0.015***	0.014**	0.015***
Trust				0.030***
Trust squared				-0.002**
Altruism			-0.019**	

# The Trust-Income relation



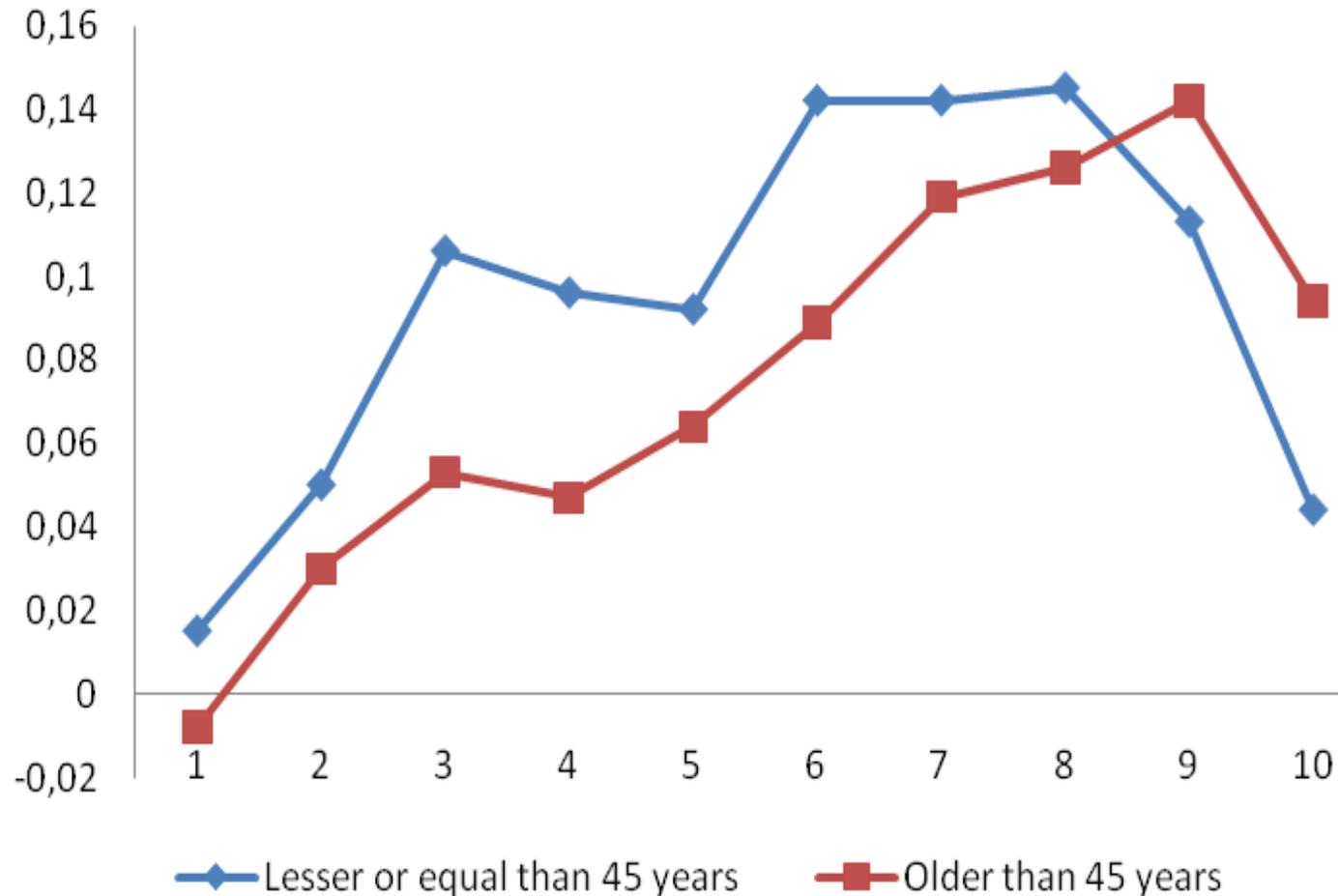
# It picks earlier in low trust countries



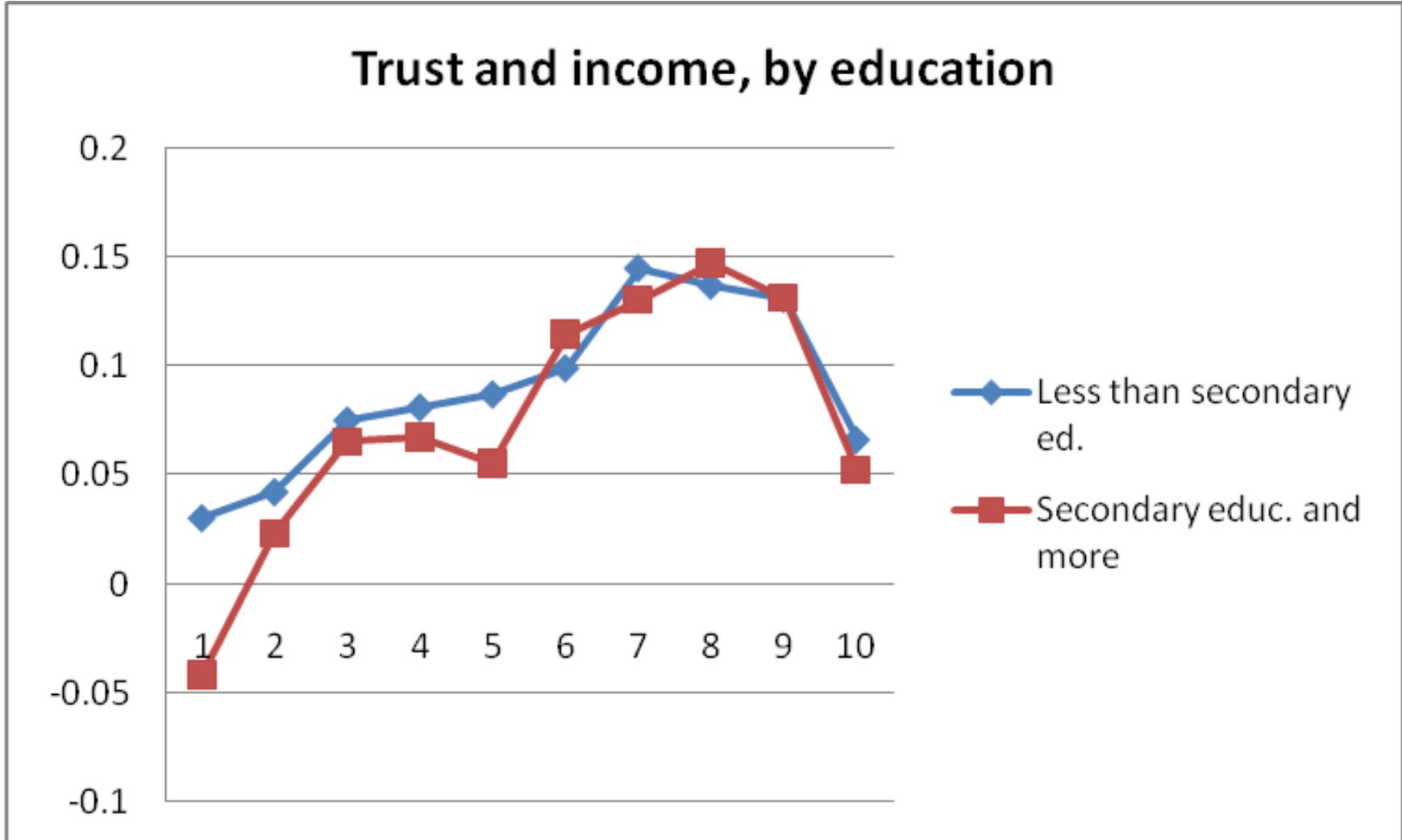
... consistent with simple model

# Does not vanish with experience

## Trust and income by age



# ...nor with education



# Trust and performance: comments

- Unlikely to be driven by reverse causality
  - If more income generates more trust, can explain rising portion but not falling one
  - If it implies less trust, can explain falling portion not rising one
- Effects economically important Compared to the pick
  - A trust of 2 => an income 11 percentage points lower than pick income
  - A trust of 10=> an income 7 percentage points lower than pick income
  - Effects of same order of magnitude as returns to high education

[Histogram trust](#)



# Objection 1: In medio stat virtus

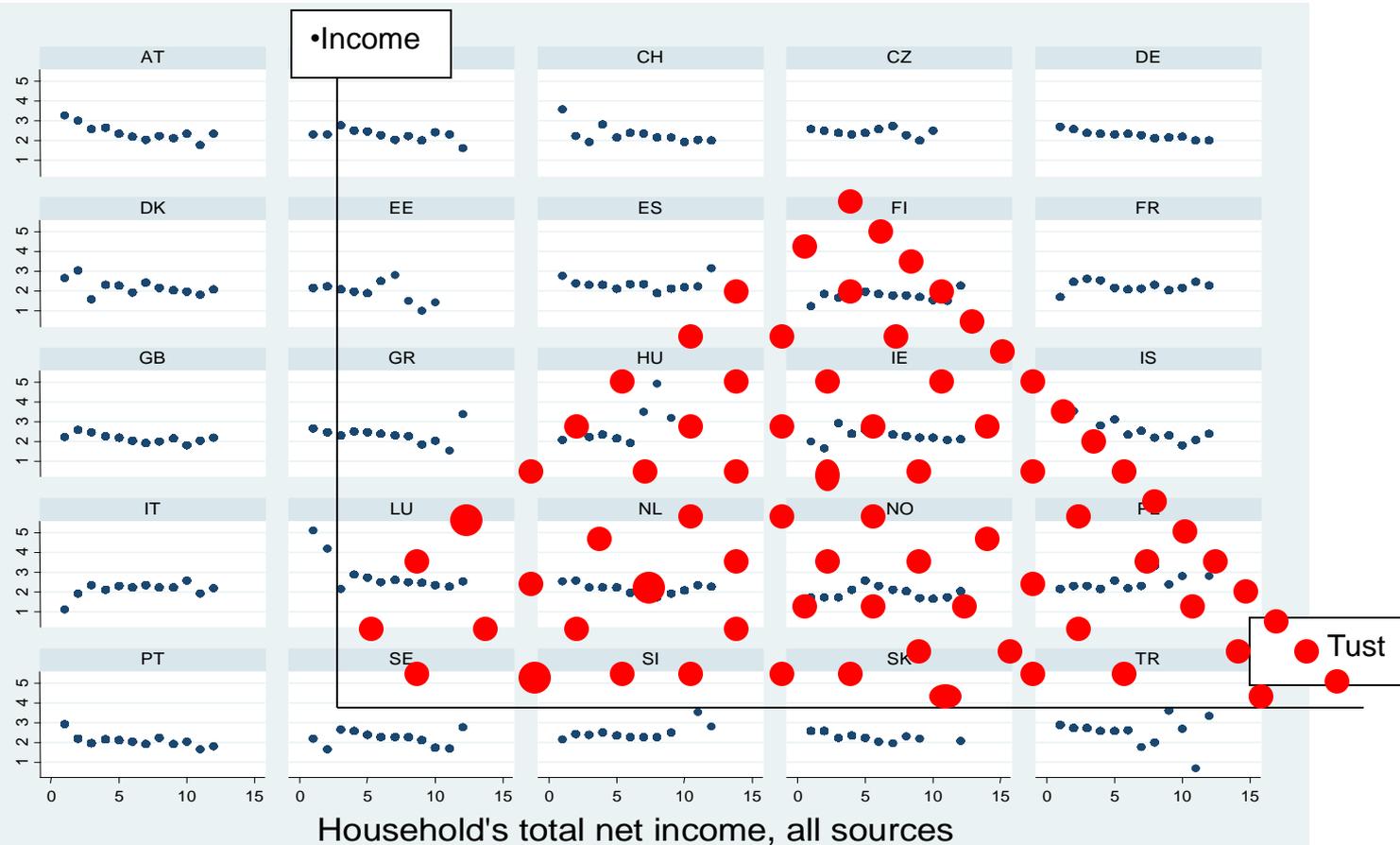
- trust may be picking up unobserved heterogeneity => economic success determined by “moderate attitudes” which happen to be correlated with moderate trust
- Allow for non-monotonic effects of:
  - Risk tolerance (5 categories)
  - Generosity and loyalty (11 categories)
  - Political preferences (left- right, 11 categories)
- Hump effect of trust un-changed
- Only trust and political preferences have a hump shaped relation, but trust robust to political preferences=> does not reflect moderation



# Objection 2: Wealthier people more precise info about other trustworthiness

This implies beliefs are more spread out at low income and less at high income levels generating a hump even when no systematic relation. If so standard deviation of trust negatively correlated with income.

But this is not in the data



# Digging deeper into mechanism

- Too much trust hampers performance because exposes one to:
  - Larger losses if cheated
  - Higher chances of being cheated (GSZ)
- Too much mistrust hampers performance because causes individuals to miss profit opportunities
- We have info on whether and how often individual is cheated, not on missed opportunities

Test whether chances of being cheated increase with trust



# Data on cheating experience

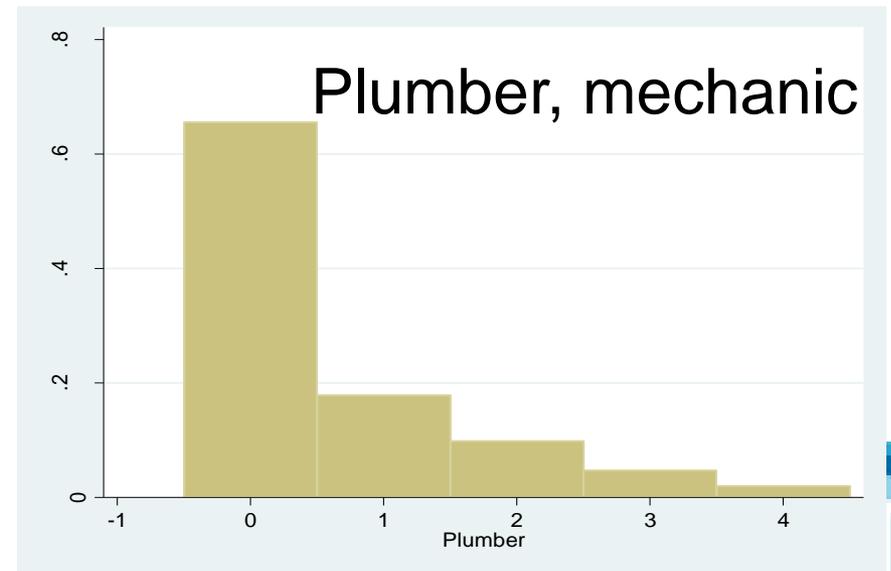
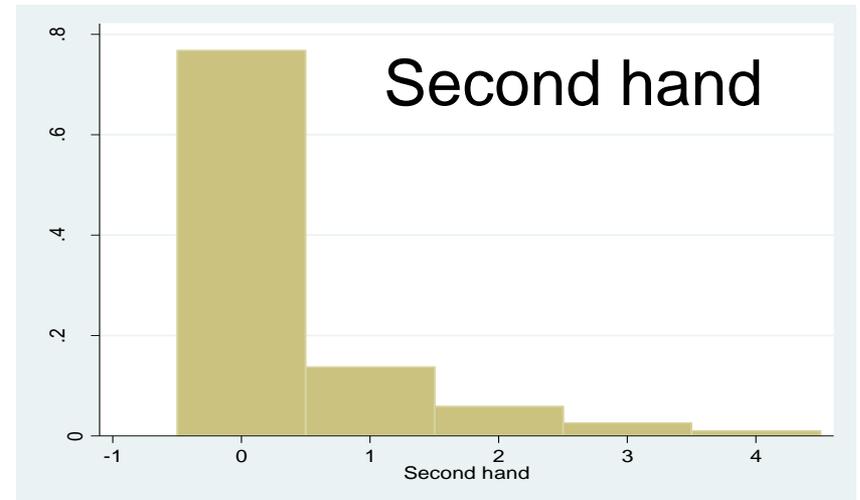
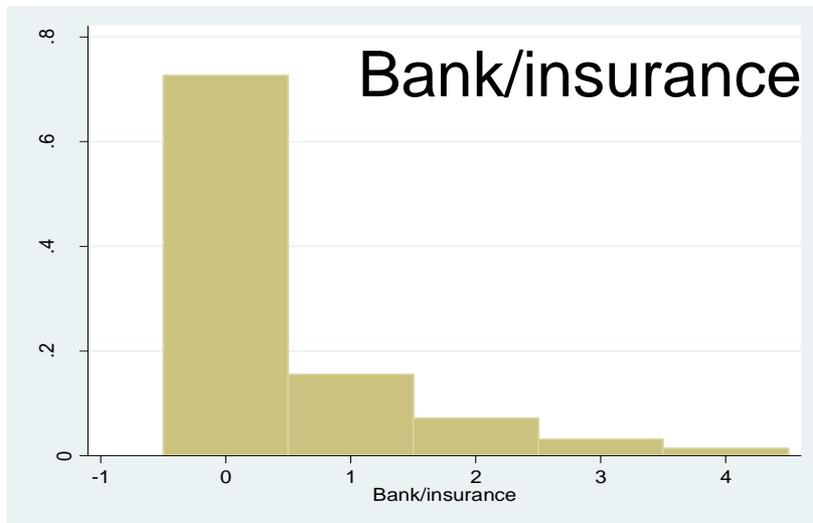
“How often, if ever, have each of these things happened to you in the last five years?”

- A. “A **bank or insurance company** failed to offer you the best deal you were entitled to”
- B. “A **plumber, builder, car mechanic** or other **repair** person overcharged you or did unnecessary work”
- C. “You were sold **food** that was packed to conceal the worse bits ”
- D. “You were sold something **second-hand** that quickly proved to be faulty”

1 Never; 2 Once; 3 Twice; 4 3 or 4 times; 5 5 times or more



# Cheating distributions



# Trust and cheating: problem

- Problem when testing effect of trust on chances of being cheated: people learn and if cheated revise prior downwards
  - ⇒ Learning biases towards finding a negative relation
  - ⇒ Account for this with IV. Rely on false consensus and obtain proxies for one trustworthiness:
    - ⇒ Amount of delegation that is granted by his\her boss at work
      - ⇒ a) freedom to organize daily work; b) power to influence decisions about t activities of the organization; c) freedom to choose pace of their work
    - ⇒ Construct a single index of trustworthiness taking the mean of the delegation on the there domains
  - ⇒ Under FC: higher trustworthiness => higher trust
  - ⇒ Being cheated is private information and thus unobserved by one's boss => delegation orthogonal to error



# Cheating: model

$$Z_{ic}^d = \alpha Trust + \beta X_{ic} + \delta C + \eta R + \xi_{ic}$$

- Measurement issues:
  - Those mistrusting more likely to report because more alerted and more likely to detect cheating => bias towards finding a negative correlation: IV also accounts for this unobserved heterogeneity
  - What is cheating may vary across subjects/cultures=> country and regions FE can take care of this



# Trust and cheating: first stage

	Bank Insurance	Second hand things	Food	Plumber, builder, mechanic, repairer	Times being cheated (sum)
Trustworthiness (Delegation index )	.0084***	.0078***	.0082***	.0087***	.0089***
	(.0020)	(.0019)	(.0019)	(.0019)	(.0021)
Observations	21163	22663	23062	22463	19774
R-squared	0.23	0.23	0.23	0.23	0.24



# Trust and cheating: IV estimates

	Bank insurance	Second hand things	Food	Plumber, builder, mechanic, repairer	Times being cheated (sum)
<b>Trust</b>	<b>0.817***</b>	<b>0.234**</b>	<b>0.599***</b>	<b>0.534***</b>	<b>2.271***</b>
Age	0.010*	-0.008***	0.013***	0.008*	0.016
Age squared	-0.000***	-0.000	-0.000***	-0.000***	-0.001***
Male	0.099***	0.088***	-0.173***	0.112***	0.128
Immigrant	0.009	0.043*	-0.004	0.033	0.046
Married	-0.160***	-0.059**	-0.108**	-0.174***	-0.538***
Single	-0.279***	-0.047	-0.235***	-0.254***	-0.795***
Primary	0.214**	0.103**	0.114	0.117	0.662**
Secondary	0.202**	0.099***	0.090	0.090	0.573**
Risk tolerance	-0.009	0.006	-0.031**	-0.001	-0.043
Log income	-0.049	-0.036**	-0.030	-0.017	-0.133
Big city	0.095**	0.024	0.195***	0.113***	0.481***
Small city	0.123***	0.058***	0.166***	0.114***	0.489***
Observations	21163	22633	23062	22463	19774



# Trust & cheating: effects

A one SD increase in trust:

- Raises the N. of times one is cheated by a plumber by **1.7%** times the sample mean and that when buying second hand by **65%**
- Increases N. of times one is cheated when buying food by **as much as** the sample mean
- **Triples** N. of times one is cheated by a bank



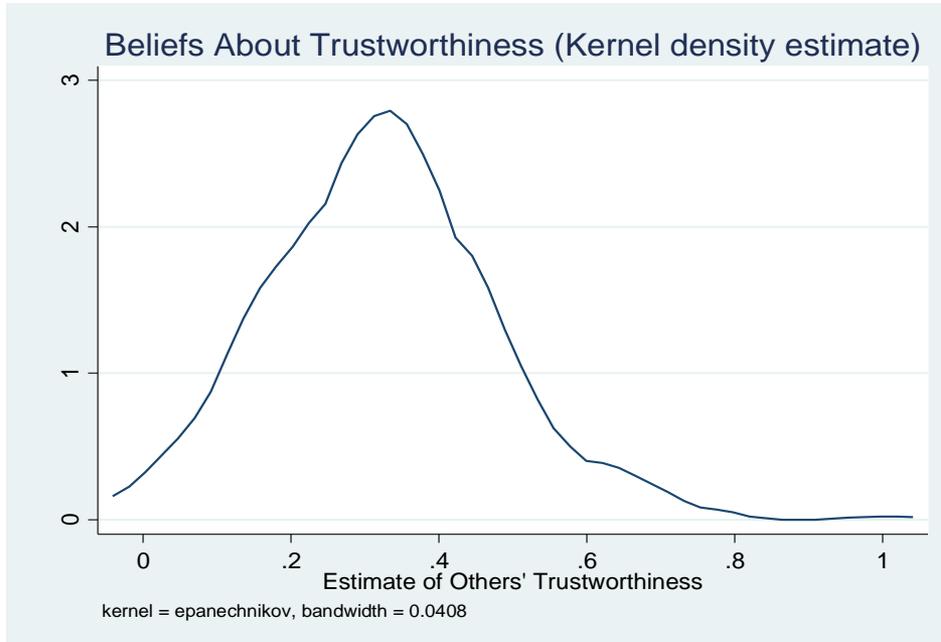
# Evidence from a trust game

1. Perform a trust game experiment on a sample of 124 college students
2. Subjects play repeatedly
3. At each round they are randomly assigned either the role of sender or that of receiver => we can measure
  1. Their **behavioral** trust (when they play as senders)
  2. Their **trustworthiness** (when they play as receivers)
  3. Their **trust beliefs** (expectations about average amounts returned) at each round
4. Independent information, prior to the experiment, on the effort parents put in **teaching trustworthiness** as a value to their kids

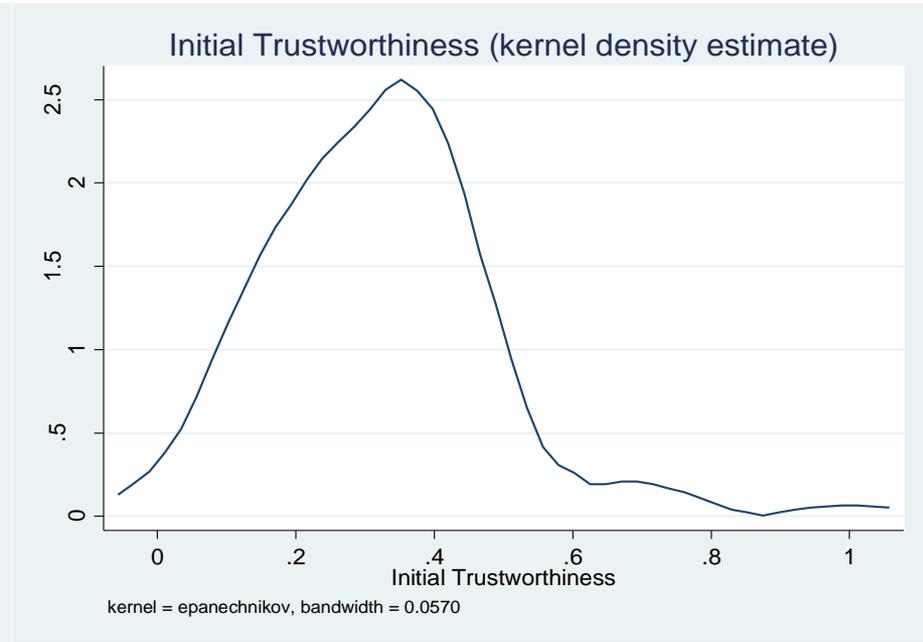


# Own and expected trustworthiness

## Distribution of trust beliefs



## Distribution of initial trustworthiness



- Massive heterogeneity in pure beliefs
  - Cannot reflect risk preferences
  - Cannot be due to different people trading with partners that differ in average trustworthiness (pool of potential partners is the same)
- Massive heterogeneity in trustworthiness
- Are the two correlated? => False consensus

# Own trustworthiness, expected trustworthiness and learning

	Rounds 1-3	Rounds 4-6	Rounds 7-9	Rounds 10-12
	Trust beliefs	Trust beliefs	Trust beliefs	Trust beliefs
Initial own trustworthiness	0.744***	0.542***	0.475***	0.452***
	(0.0419)	(0.0652)	(0.0748)	(0.0766)
Constant	0.0848***	0.106***	0.0763***	0.0653**
	(0.0161)	(0.0232)	(0.0264)	(0.0246)
Observations	276	208	171	171
R-squared	0.586	0.312	0.261	0.249

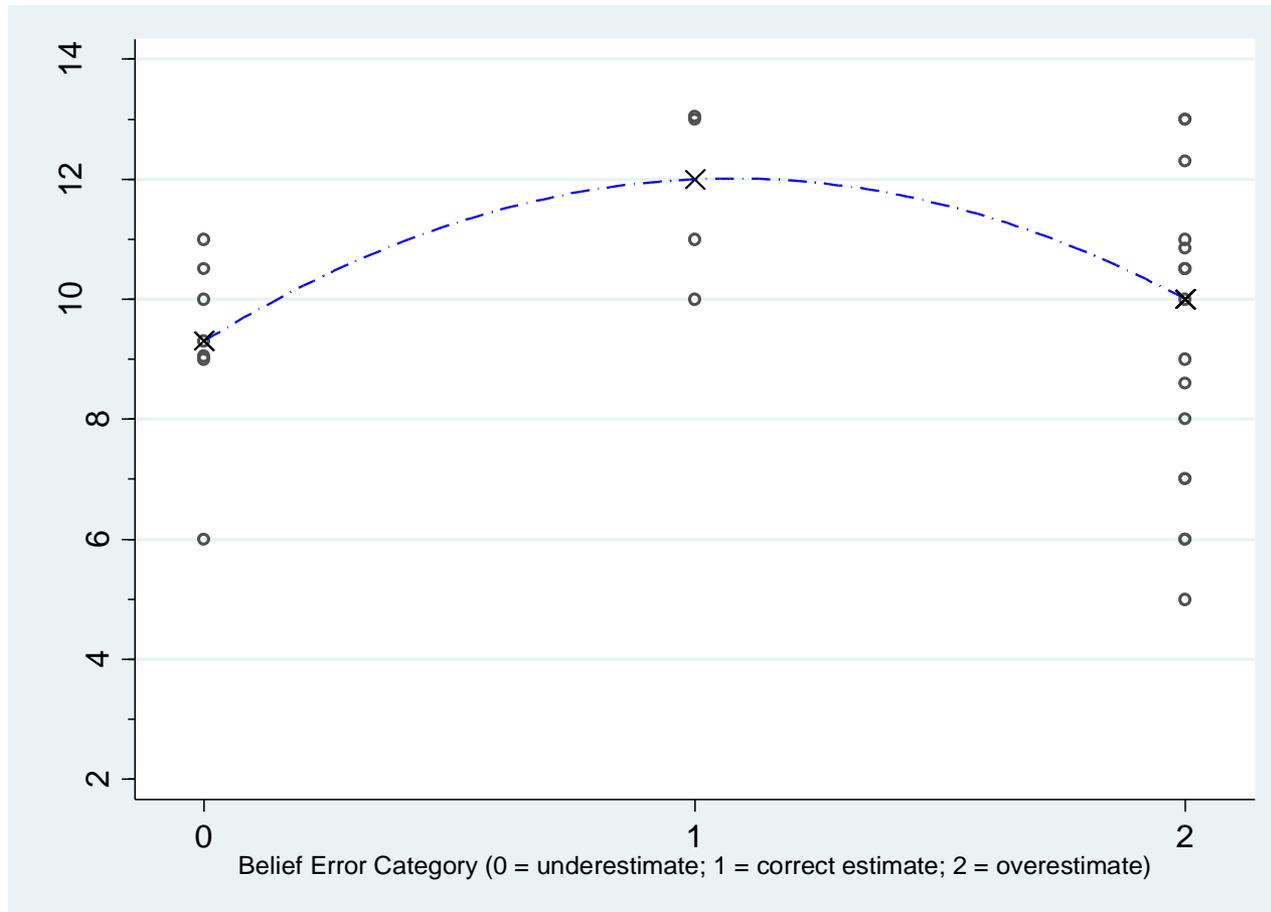
# Where is initial trustworthiness coming from?

## Initial trustworthiness on “good values”

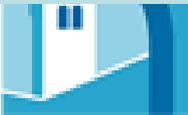
	Initial trustworthiness
Parent's transmitted values	0.169*
	(0.0928)
Constant	0.211***
	(0.0597)
Observations	83
R-squared	0.039



# Trust beliefs and performance in the experiment



- Hump shape confirmed in experiment
- Senders with correct beliefs make 20% more income than those with either too low or too high trust



# Back to field data: persistence

- How persistent is effect of mistaken trust beliefs (false consensus)?
- Experiment suggests it is, but:
  - repetitions in experiments are limited
  - time too short
- In real life lots of interactions and lots of opportunities to learn. Does it vanish?
- exploit information on country of origin of immigrants and **variation in trust across countries of origin**
  1. If FC persistent, immigrants from high trust countries more likely to be cheated than immigrants from low trust countries
  2. Effect may differ between first and second generation



# Persistence: the evidence

	(1)	(2)	(3)	(4)	(5)
	Bank Insurance	Second hand Things	Food	Plumber, builder, mechanic, Repairer	Times being cheated (sum)
Trust c.o -first gen.	0.271**	0.080	0.666***	0.348*	1.491***
	(0.103)	(0.154)	(0.220)	(0.195)	(0.489)
Trust c.o - second gen.	-0.031	0.127	-0.224	-0.066	-0.493
	(0.194)	(0.211)	(0.171)	(0.265)	(0.614)

Freeing oneself from FCE can take as long as one generation



# Persistence: the evidence

	Bank Insurance	Second hand Things	Food	Plumber, builder, Mechanic, repairer	Times being cheated (sum)
Trust c.o. : new arrivals	0.663*	0.292	0.473	0.770**	2.022*
	(0.381)	(0.279)	(0.444 )	(0.332)	(1.056)
Trust c.o.: old arrivals	0.206	0.114	0.425	0.123	1.190
	(0.189)	(0.196)	(0.294 )	(0.312)	(0.810)

Effect stronger among new arrivals (less than 20 years)



# Conclusion: 1

- Mis-calibrated trust beliefs can be individually costly
- Costs can be substantial:
  - Casual evidence: large especially in financial transactions: Madoff' case=> 50 billion dollars (0.4% of US GDP)
  - Our estimates: losses entailed by poorly calibrated beliefs are as important as returns to education



# Conclusion: 2

- Is it better to exceed in trust or to mistrusts?
- Both excesses are individually costly, but exceeding in mistrust is *individually* more costly than exceeding in trust
- Mistrust also socially costly as it reduces the creation of surplus
- Exceeding in trust, while costly to the individual, may be beneficial to society as it promotes surplus creation.
- Reconciles hump-shaped relation in individual data and monotonically increasing relation in aggregate data



# Cultural values and trust beliefs: reduced forms

	Rounds 1-3	Rounds 4-6	Rounds 7-9	Rounds 10-12
	Trust beliefs	Trust beliefs	Trust beliefs	Trust beliefs
<b>Parents transmitted values</b>	<b>0.122**</b>	<b>0.125*</b>	<b>0.122*</b>	<b>0.0515</b>
Constant	0.246***	0.197***	0.143***	0.171***
Observations	339	262	216	216

[experiment](#)

# Discussion

1. So far we have documented a hump-shaped relationship between income and trust
2. We have argued this is the results of heterogeneous beliefs possibly arising from heterogeneity in *own* trustworthiness coupled with false consensus
  1. Is this really the case that beliefs are heterogeneous?
  2. Can't measured heterogeneity in trust reflect **uncontrolled** differences in risk preferences or trustworthiness of trading partners?
  3. Why\how heterogeneity in trustworthiness arises ?



# Discussion

1. Important because:
2. Can separate beliefs from preferences
3. If beliefs are heterogeneous this cannot be ascribed to differences in the trustworthiness of the people one trades with (the same for in the experiment)
4. Any hump in performance cannot be

