

Identifying Preference Shocks: Earthquakes, Impatience, and Household Savings

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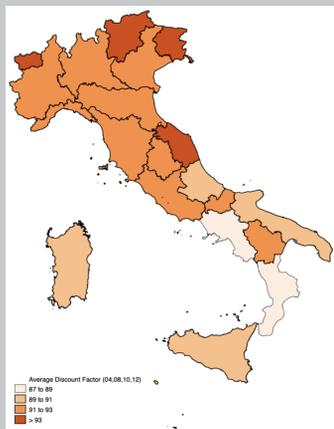
DO LIFE EXPERIENCES CHANGE PREFERENCES?

- **Direct economic impacts of life experiences are well-documented**
 - e.g. natural disasters can affect consumption, social stability, inequality, macroeconomic outcomes (Rentschler 2013)
- **Indirect economic impacts through preference changes are more difficult to identify**
 - e.g. psychologists suggest natural disasters also affect life-attitudes, and economists have shown that preferences and behavior are mullable (Brunello et al. 2001, Dai et al. 2016, Dell'Osso et al. 2011, Voors et al. 2012, Malmendier and Nagel 2011, 2014, Jakiela and Ozier 2019)
- **We show indirect impacts are important and persistent from a life-cycle perspective using a natural experiment from Italy**

CHALLENGE IN IDENTIFYING PREFERENCE SHOCKS

- Challenge I: Endogeneity
 - preferences and behavior are observed simultaneously (Do the patient save more? Rich can afford to be more patient?)
 - (solution) **exogenous traumatic event**: 2009 L'Aquila earthquake. Quasi-randomly affected some households but not others
- Challenge II: Identifying indirect effects, separate from direct damages
 1. Define novel "Shaken but not devastated" treatment
 - (a) Felt the earthquake: local seismographs
 - (b) But no damage to house: "First Response Team" data
 2. Link damage data to **panel** Survey of Household Income and Wealth
 - investigate dynamics in preferences and behavior
 - control for unobserved heterogeneity
 - exploit richness of data to account for earthquake's impact through work or family relations

EXPERIMENTALLY-VALIDATED PATIENCE MEASURE



Survey question:

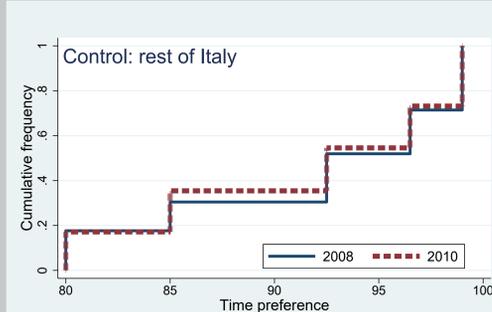
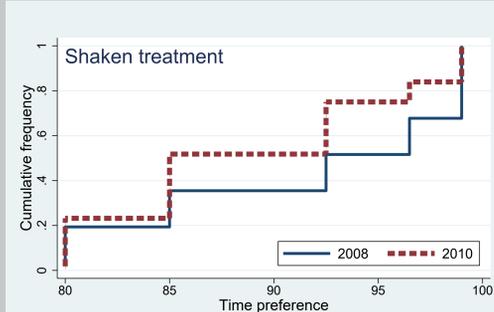
Willingness to trade off of monetary payments in different periods

Elicited in a **panel** twice before and twice after the earthquake

L'Aquila earthquake

- April 6, 2009, 309 people died
- 1,600 injured, 65,000 inhabitants evacuated, 45 towns affected

Note: Dark colors indicate more patience.



EARTHQUAKE IMPACT ON HOUSEHOLD BEHAVIOR

A simple life-cycle model: Driving force

Behavior c_0

Direct econ. impact: $a_0 \searrow$ destruction of assets	\searrow
Indirect econ. impact:	
$y \searrow$ disruption of work, more expensive commute	\searrow
$\sigma_y \nearrow$ increased uncertainty	\searrow
borrowing constraint increases precautionary motive	\searrow
$y \nearrow$ economic aid, indirect benefits from reconstruction work	\nearrow
Time preference shock, if $\beta \searrow$	\nearrow

Note: Change in time preferences has similar impact as change in life expectancy.

ESTIMATED IMPACT OF EARTHQUAKE

Difference-in-differences estimations on patience

$$Patience_{it} = \alpha_0 + \beta Earthquake_{ct} + \alpha_1 X_{it} + \nu_i + \mu_t + \nu_r + \epsilon_{icrt}$$

- households devastated by the earthquake become the most impatient, due to direct economic losses (column 1)
- shaken but not devastated become impatient as well (columns 2, 3). In the panel sample, discount factor falls from **91** to **86**.
- results hold when control group neighbors the treated households (Panel < 125km)

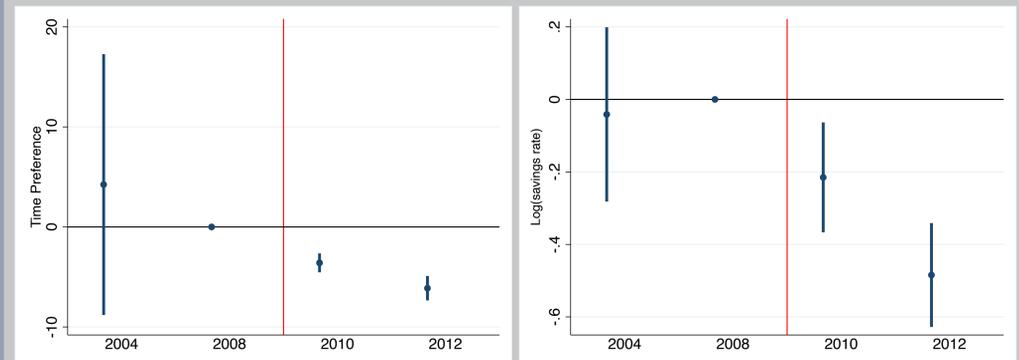
	(1) T=live within 50km	(2) T=shaken but not devastated	(3) T = surely shaken
Non panel	-6.833*** (3.567)	-5.646*** (0.631)	-5.215*** (0.559)
Panel	-6.751*** (3.546)	-5.600*** (0.628)	-5.168*** (0.565)
Panel < 125km	-7.754* (4.432)	-6.454*** (0.971)	-5.741*** (0.796)

Robust standard errors clustered at the commune level are in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Each reported coefficient is from a distinct specification. All specifications include household head, year and priority year fixed effects. Results are robust to the inclusion of controls, including demographic variables, income, and credit constraint.

Event study estimations on patience and savings



Note: Savings rate is defined as the amount of savings as a percentage of income.

Persistent changes in consumption and savings

- we use earthquake to instrument for patience (DD as first stage) to examine impact of predicted patience on behavior
- those who are shaken but not devastated increase consumption by **130 Euros** per month in 2012
- they also save **24% less (or 1700 Euros fewer)** in 2010 and **30% less (or 2400 Euros fewer)** in 2012

MECHANISM - COGNITIVE EFFORT

Two-period example

$$\begin{aligned} & \max_{\{c_t, a_t\}_{t=0,1}, S} E_0 u(c_0) + \beta(S) u(c_1) \\ \text{s.t. } & c_0 + \frac{c_1}{R_1} + \pi S = A_0 = a_0 + y_0 + y_1 \frac{1}{R_1}, \quad a_0 \text{ given, } R_0 = 1 \end{aligned}$$

Testable implication

High mental cost $\pi \Rightarrow$ low $\beta(S)$
 $\pi \nearrow \Rightarrow \beta(S) \searrow$
 $\pi \nearrow$ smaller $\beta(S) \searrow$ when low π

Estimation result

Less educated/smart are less patient
 \downarrow patience after experiencing earthquake
 No university degree \Rightarrow 2-fold patience \downarrow
 Lower cognitive ability \Rightarrow 3-fold patience \downarrow

Note: Cognitive question (elicited before the earthquake): given a nominal interest rate and inflation, will purchasing value of savings increase?

LASTING INEQUALITY DUE TO TRAUMA

Survivors, even if not economically impacted, become **less patient**, and **decrease savings sizeably and persistently**, thus become **vulnerable to future shocks**.

Those with **low education/cognitive ability** need most help with building resilience.