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 malleable (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 rich data to account for earthquake’s impact through work or family relations

Experimentally-Validated Patience Measure

Survey question:
Williness 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

| Direct econ. impact: | o0 | destruction of assets |
| Indirect econ. impact: |
| y | disruption of work, more expensive commute |
| π | increased uncertainty |
| Borrowing constraint increases precautionary motive |
| y | economic aid, indirect benefits from reconstruction work |

Time preference shock, if β

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

Estimated Impact of Earthquake

Difference-in-differences estimations on patience

<table>
<thead>
<tr>
<th>Panel &lt; 125km</th>
<th>Non Panel</th>
<th>Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>T=live within 50km</td>
<td>-5.646***</td>
<td>-5.168***</td>
</tr>
<tr>
<td>(0.363)</td>
<td>(0.628)</td>
<td>(0.565)</td>
</tr>
<tr>
<td>T=shaken but not devastated</td>
<td>-5.454***</td>
<td>-5.454***</td>
</tr>
<tr>
<td>(0.971)</td>
<td>(0.796)</td>
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</tbody>
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Robust standard errors clustered at the commune level are in parenthesis.

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

\[
\max_{(c_t, c_{t+1})} E_0 u(c_0) + \beta u(c_1) + \mathbf{1}_{S} \pi S
\]

s.t. \( c_0 + c_1 \frac{1}{R_t} + \pi S = A_0 = a_0 + y_0 + \frac{1}{R_t} \)

Estimation result

Testable implication

High mental cost \( \pi \Rightarrow low \beta(S) \)

Less educated/smart are less patient

Less educated/smart are less patient after experiencing earthquake

No university degree \( \Rightarrow \) 2-fold patience

Lower cognitive ability \( \Rightarrow \) 3-fold patience

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.