



Disaster, Aid, and Preferences: The Long-run Impact of the Tsunami on Giving in Sri Lanka

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Summary. — Do natural disasters produce effects on preferences of victims in the long run? We test the impact of the tsunami shock on generosity of a sample of Sri Lankan affected/unaffected microfinance borrowers seven years after the event.

Specifically, we test the effect of the shock at the extensive margin by comparing damaged with non-damaged individuals in terms of giving and expected giving in a dictator game. Moreover, at the intensive margin, we compare the participants based on the amount of damage experienced and recovery aid received. The advantage of this last comparison is that differences in observables between the groups are minimized. We reduce further identification problems by selecting a random sample of damaged and non-damaged borrowers belonging to the same microfinance organization who are, therefore, likely to share some important common traits that are usually unobservable to researchers. We complete our identification strategy with weighted least squares, instrumental variable estimates and a sensitivity analysis on the exogeneity assumption.

The main findings of the paper support the hypothesis that the shock affects participants' preferences in the long run. First, the tsunami negatively affects generosity at the extensive margin as those who suffered at least one damage give and expect less than those who did not. Second, while large recovery assistance does not directly affect giving and expected giving, it increases especially the latter indirectly, i.e., when interacted with the number of damages.

Our results reconcile that part of the literature showing evidence of natural shocks having a detrimental effect on social preferences (Fleming, Chong, Alberto, & Bejarano, 2011; Cassar, Grosjean, & Whitt, 2013) with that supporting, instead, a positive link (Solnit, 2009; Whitt & Wilson, 2007; Cassar, Healy, & Von Kessler, 2011). Furthermore, since our study focuses on the long-run impact of a natural disaster, previous results on short-run effects are not necessarily inconsistent with ours.

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1. INTRODUCTION

Natural disasters are dramatic shocks that may produce, beyond all of the visible damages, relevant consequences at a micro level by affecting expectations, preferences, and choices of economic agents with consequences on their consumption/savings and human capital investment decisions (see Arouri, Nguyen, & Youssef, 2015; Becchetti & Castriota, 2011; Carter, Little, Mogues, & Negatu, 2007; Gitter & Barham, 2007; Morris & Wodon, 2003).

A recent branch of empirical papers has started to investigate this topic with conflicting conclusions related to the disaster's effects on time preferences (Callen, 2015; Cassar, Healy, & Von Kessler, 2011), attitudes toward risk (Cameron & Shah, 2015; Cassar *et al.*, 2011; Eckel, El-Gamal, & Wilson, 2009; Willinger, Bchir, & Heitz, 2013) and prosocial behaviors (Cassar *et al.*, 2011; Cassar, Grosjean, & Whitt, 2013; Castillo & Carter, 2011; Fleming, Chong, Alberto, & Bejarano, 2011; Solnit, 2009; Whitt & Wilson, 2007). For what concerns the latter, Whitt and Wilson (2007) consider individuals affected by Hurricane Katrina and find increased group cooperation among the evacuees in Houston shelters. Similarly, Solnit (2009) provides evidence that disasters are often catalysts for social capital increase and Cassar *et al.* (2011)—by exploiting the variation in victimization status at village level—find that tsunami victims are more trusting and moderately more trustworthy. Castillo and Carter (2011) use the community-level

variation in rainfalls during the Hurricane Mitch in 1998 as a proxy for damage intensity and find that intermediate shocks promote cooperation while extreme shocks undercut it. On the contrary, Fleming *et al.* (2011) find that residents of the areas affected by the Chilean 2010 earthquake reveal significantly less trustworthiness than those of non-affected ones. Only a few studies, however, focus on generosity. In particular, Li, Li, Decety, and Lee (2013) compare dictator-game behavior of Chinese children before and after the 2008-earthquake and find that its effects on generosity vary by age, being negative on 6-year olds and positive on 9-year olds children. The 2008 Chinese Wenchuan earthquake has been shown by Rao *et al.* (2011) as affecting positively adults' generosity. This effect is shown to increase with the levels of residential devastation.

In this study, we focus on the long-term impact of the 2004-tsunami on the generosity of inhabitants of the Sri Lankan southern-coast affected by the shock at different degrees. We contribute in four main respects to the current debate that clearly presents mixed evidence regarding the direction of the effects of disaster.

First, we argue that the factors that may help to explain the observed heterogeneous results in the literature are, on the one hand, the degree of damage suffered and, on the other hand, the contextual recovery aid received by damaged villagers.

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For this purpose, we collect and use information on both the type of damages and of recovery aid received.

Second, Callen (2015) and Cassar *et al.* (2011) collected data and ran experiments on the effects of the tsunami on trust, risk, and time preferences in mid-2007 and mid-2009, respectively, while our database dates December 2011, seven years after the catastrophe. This longer time horizon allows us to capture longer run disaster and recovery effects on victims' preferences.

Third, different from both Callen (2015) and Cassar *et al.* (2011), by exploiting information on individuals' victimization statuses as well as on the intensity of damages and recovery aid within each village, we do not measure the impact of the shock at the village level but rather at the individual level. This approach reduces heterogeneity between the treatment group (village inhabitants affected by the tsunami) and the control group (unaffected village inhabitants).

Fourth, both damaged and non-damaged individuals in our study belong to a selected group of individuals borrowing from the same microfinance organization (MFI). This implies that they share some common unobservable factors (i.e., sense of entrepreneurship, trustworthiness) that are typically inaccessible to the experimenter and are the main drivers of self-selection. These factors also help this group of individuals to pass the screening of the same MFI that has salient incentives to select only potentially successful borrowers. Furthermore, because the MFI under our scrutiny organizes frequent borrower meetings (as many others traditionally do), we also reasonably assume that damaged and non-damaged individuals share similar cultural features represented by the organization *ethos*. In addition to it, only damaged individuals who were AMF borrowers before the tsunami could receive aid according to donors' rules and AMF policies and this institutional aspect rules out the suspect of correlation between unobservable characteristics and the status of damaged borrowers in our sample.

The combination of these features, jointly with the results of inverse p-score weighted least squares as well as instrumental variable estimations and a sensitivity analysis on the exogeneity assumption implemented as robustness checks, contribute to mitigate the identification problem arising from the impossibility of randomizing ex-ante the calamity experience and from the lack of pre-tsunami individual information. To address the non-representativeness of our sample composed by microfinance borrowers, we implement a post-stratification weighted least squares estimate based on Census data.

Our findings show that the tsunami negatively affects generosity after seven years from the calamity; however, especially for the highly damaged individuals, this effect is compensated by the recovery assistance received. These results suggest the existence of an indirect and non-material channel (i.e. indirect reciprocity) through which properly targeted recovery aid compensates for the losses in pro-social attitudes caused by the disaster.

The paper is divided into seven sections. In the second, we formulate research hypotheses, illustrate the experiment background and describe our research design. In the third we present descriptive findings and in the fourth we discuss results on hypotheses testing. In the fifth and sixth we illustrate and comment on our econometric findings and robustness checks. The seventh section concludes the paper.

2. RESEARCH DESIGN

In what follows we first formulate research hypotheses (Section 2(a)). We then sketch the historical scenario in which

our research is conducted (Section 2(b)) and discuss the details of our experiment design (Section 2(c)).

(a) Research hypotheses

Our aim is to test whether the tsunami shock affects generosity as proxied for in a dictator game (see Section 2(c) for details) by:

- (i) sender's giving;
- (ii) receiver's expectation regarding sender's giving.

Given the longer time distance from the shock in our experiment with respect to similar studies in the literature, our hypotheses may be considered as tests on the long-run effects of the tsunami on social preferences. More formally, we first test the null hypothesis that the tsunami has no long-run impact at the extensive margin on giving or on expected giving using the following two specifications (see Section 2(c) for a detailed description of the damages variables):

- (i) Giving $H_0: G^{Dam} = G^{NonDam}$
- (ii) Expected giving $H_0: E[G]^{Dam} = E[G]^{NonDam}$

where G^{Dam} and G^{NonDam} are, respectively, the amounts given by damaged and non-damaged senders, while $E[G]^{Dam}$ and $E[G]^{NonDam}$ are the amounts that recipients from the two groups expect to receive from the sender.

Our alternative hypotheses ($H_1^{i,ii}$) are that the calamity does reduce giving and expected giving. The channels through which this might occur are of economic and psychological type. With respect to the first mechanism, natural catastrophes can decrease generosity through reduced savings and increased propensity to precautionary savings. After a natural hazard—and especially in developing countries where insurance schemes are weakly implemented—damaged people might be forced to use their personal resources to recover, for example by re-building the house or the office, re-buying the working tools or raw materials or just to survive until the economic situation improves. For the same reason, even well after recovery, individuals might react by increasing their savings to cope with possible similar events in the future (Roson, Calzadilla, & Francesco, 2007). In a theoretical model of constant absolute risk aversion, Freeman, Keen, and Mani (2003) show that the optimal amount of precautionary savings depends on the expected losses, which in turn depend on the probability of the event, the damages suffered and the individual risk aversion. Therefore, the rise in the expected probability of negative events and the damage entity are expected to increase savings, especially if people become more risk averse (Cameron & Shah, 2015; Cassar *et al.*, 2011) and more patient (Callen, 2015).

With respect to the second mechanism, the literature has shown that natural disasters produce unhappiness, bad mood, and anger, which can negatively affect interactions and cooperation. Västfjäll, Peters, and Slovic (2008) find that the effect elicited by reminding Swedish undergraduates about the 2004-tsunami disaster negatively influences their judgments on wellbeing, future optimistic thinking, and risk perceptions. Happiness levels are shown in turn to influence the taste for social comparisons as the willingness to lower another person's payoff below one's own is correlated with unhappiness (Charness & Grosskopf, 2001). The aforementioned channels could possibly have played a role in reducing generosity as calamities decrease happiness of damaged people in developing and developed contexts (Becchetti & Castriota, 2010, 2011; Luechinger & Raschky, 2009).

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