

Post-disaster Informal Risk Sharing Against Illness

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Summary. — Using original household survey data collected in rural Fiji, this paper demonstrates how informal risk-sharing institutions upon which poor people heavily rely in times of illness are vulnerable to natural disasters. Household private cash and inkind transfers do not serve as insurance against illness in the relief phase; they do so only after pooled resources are recovered in the reconstruction phase (i.e., resource effect). Risk-sharing arrangements are dependent on the history of labor-time transfers corresponding to housing damage (i.e., reciprocity effect): only disaster non-victims are insured against illness, because victims have already received labor help for their rehabilitation from non-victims.

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Key words — informal risk sharing, natural disasters, illness, Pacific, Fiji

1. INTRODUCTION

Informal risk-sharing institutions are critically important in poor populations. They are particularly important for health shock, because neither health insurance nor public safety nets are available among the poor (Strauss & Thomas, 1998). Numerous studies have shown that informal risk sharing against idiosyncratic shocks, such as illness, is available in developing areas, although it is far from complete (e.g., Dercon & Krishnan, 2000; Gertler & Gruber, 2002; Kochar, 1995). In contrast, such informal institutions are considered to be ineffective against covariate shocks, such as natural disasters, because shocks are highly correlated over space. Although extant works on risk sharing against natural disasters are relatively scarce, recent empirical studies provide evidence for such arrangements against household-level disaster shocks (e.g., Mozumder, Bohara, Berrens, & Halim, 2009; Sawada & Shimizutani, 2008). Of course, disaster relief plays a central role as a public safety net. Post-disaster management is a time-consuming process, consisting of relief, recovery, and reconstruction phases (de Ville de Goyet, 2008).

This paper addresses a question that researchers have not yet explored but is critically important for post-disaster development: How does a natural disaster affect informal risk sharing against illness over time? Although adverse effects of natural disasters on various dimensions of well-being, such as consumption, child nutrition, and public health, have received much attention from researchers (e.g., Noji, 1997), no previous works explicitly address the link between natural disasters and informal risk sharing against subsequent non-disaster shocks.

I hypothesize two links. First, the degree of sharing cash and inkind (e.g., food) to smooth consumption against illness (*non-labor sharing*) depends on the amount of pooled resources that can be shared among people (i.e., the *resource effect*). In the relief phase right after the disaster, risk sharing against illness is weak or even nonexistent, simply because the covariate disaster shock greatly reduces pooled non-labor resources. As rehabilitation progresses, pooled resources and thus risk sharing make a recovery.

Second, in the risk-sharing arrangement with limited enforceability, current transfers are dependent on the past history of transfers (i.e., the *reciprocity effect*) (Ligon, Thomas, & Worrall, 2002). Foster and Rosenzweig (2001, p. 390) demon-

strate that “the existence of binding imperfect commitment constraints implies that households that have made net transfers in previous periods are less likely to provide subsequent transfers, given the current state of the world, than are households that have been net recipients of transfers.” La Ferrara (2003) examines the reciprocity effect in credit transactions among kin members in Ghana.

Natural disasters can elicit the reciprocity effect as follows. Although a natural disaster is a region-wide covariate shock, it may contain significant idiosyncratic components at a local level; for example, a tropical cyclone may damage some, but not all houses within villages. Imagine a situation where there are disaster *victims* and *non-victims* within villages, and in the relief phase (several months after the cyclone), non-victims help victims’ rehabilitation by providing labor time (*labor sharing*); public support for housing rehabilitation becomes available only in the reconstruction phase (a few years later). Even if the resource effect precludes non-labor sharing against the disaster damage, labor sharing can still work unless the disaster significantly lowers labor endowment among villagers (e.g., casualties, disease outbreak, out-migration). The reciprocity effect suggests that victims are less insured against illness than non-victims are in the reconstruction phase.

As such, natural disasters may adversely affect informal risk sharing not only for all contemporaneously, but also for some in a persistent way; in particular, disaster victims may suffer from a lack of private safety nets against illness over time. Then, even if disaster-induced public-health problems (complex disaster) are not a major issue, “hidden” health problems exacerbated by the disaster—through endogenous adjustments in informal risk sharing—can be considerable. Using original

* I wish to thank my field team—Jonati Torocake, Viliame Manavure, Viliame Lomaloma, and 19 enumerators—for their advice, enthusiasm, and exceptional efforts on behalf of this project. Special thanks are owed to the Fijians of the region who so willingly participated in the survey. The Cakaudrove Provincial Office in Fiji offered valuable institutional support for this project. This paper has benefited from the comments and suggestions of participants at the TCER Conference. This research has been made possible through support provided by the Sumitomo Foundation, the Japan Society for the Promotion of Science, and the Ministry of Education, Culture, Sports, Science and Technology in Japan. Any errors of interpretation are solely the author’s responsibility.

household survey data in rural Fiji, the paper shows that a tropical cyclone has strong resource and reciprocity effects: Sick persons are insured in the reconstruction phase, but not in the relief phase; sick non-victims are insured, but sick victims are not.

To test the resource/reciprocity effects, the paper directly analyzes household private transfers; distinct from many extant studies of informal risk sharing that focus on consumption smoothing, it thus explores *how* people share risk, in the same spirit as Udry (1994) and Fafchamps and Lund (2003) (the Fijian data lack consumption data). Although economists have extensively studied private transfers exchanged *among* households within a network (*network-based transfers*) (see, for example, Cox & Fafchamps, 2008 for review), transfers exchanged *directly* with groups to which the household belongs (*group-based transfers*)—such as ritual gifts for kin groups, village communal work, and church donations—have received very limited attention in developing countries; in developed countries, in contrast, transfers to community institutions in general (e.g., charitable giving) have been well studied (see, for example, Schokkaert, 2006 for review). This is a significant lacuna in the literature on risk sharing among the poor, because group-based transfers may contain a significant risk-sharing component, such that group members with adverse shock contribute less than others do. As a unique feature, the Fijian data include comparable household information about these two forms of transfers, enabling their direct comparison; group-based transfers are much greater than network-based transfers, because of significant household contributions to groups for the provision of local public goods (Takasaki, 2011b). Deb, Okten, and Osili (2010) conduct a similar comparison using Indonesian Family Life Surveys, though risk sharing is not their focus. The paper finds resource and reciprocity effects of the cyclone in both transfers.

Although economists often highlight the village as a risk-sharing pool because of its information and enforcement advantages, recent works directly address the question of *among whom* people share risk. Some researchers focus on pre-formed groups other than the village, such as kin, caste, and ethnic groups (e.g., Grimard, 1997; Morduch, 2005), while others study the formation of risk-sharing groups and networks (e.g., De Weerd & Dercon, 2006; Fafchamps & Gubert, 2007). The paper adds to this line of literature by examining not only which pre-formed groups serve as risk-sharing groups in group-based transfers, but also how those groups form household transfer networks and what networks serve as risk-sharing networks in network-based transfers. The findings reveal that kin and religious networks and groups are important risk-sharing pools.

The rest of the paper is organized as follows. The next section describes the study area, the cyclone, and health shock. Section 3 explains household private transfers. Section 4 develops empirical strategies to test the resource and reciprocity effects, which is followed by the results in Section 5. The last section concludes.

2. DATA, CYCLONE, AND HEALTH

(a) Study area and data

On January 13, 2003, Cyclone Ami swept over the northern and eastern regions of the Fiji Islands. Seven native Fijian villages on the coast in the northern region, with distinct environmental and economic conditions, were intentionally chosen for

the survey.¹ After being stratified for each of the selected villages by the smallest kin-group unit (defined shortly), as well as by a combination of leadership status (e.g., kin leader) and major asset holdings (e.g., shops), households were randomly sampled in each stratum. Household interviews were conducted between late August and early November 2003, collecting information about demographics, assets, income, shocks, disaster aid, and private transfers (but not consumption). As such, like other post-disaster surveys, the survey collected disaster information retrospectively (I will discuss retrospective errors in Section 5). In July–September 2005, the second wave of the survey was implemented. Analyses in this paper are conducted for 226 households with complete panel data. All monetized values presented in the paper are real values, with 2003 as the base year.

(b) Cyclone shock

All seven sample villages experienced damage to their structures and facilities, and housing damage and crop damage are the two major damages that individual households experienced.² According to respondents' subjective assessments, the cyclone damaged 58% of residents' houses: 9% were completely destroyed and 49% were partially damaged (see Table 1). Households with and without damaged housing did not significantly differ from each other in their crop damage (discussed next), earned incomes, asset holdings, and other household characteristics at the time of interviews in 2003; they were not different before the cyclone, either. Thus, the incidence of housing damage is not strongly correlated with poverty.³ Among households that experienced housing damage, 36% became refugees who stayed in others' residences in the same village (permanent migration was nonexistent). About two thirds of those refugees lived with households in the same kin group; that is, kin networks served as a major risk-sharing pool. Households without damaged housing also helped others' rehabilitation (I return to this below).

Almost all households engaged in cropping (and fishing),⁴ and 82% experienced crop damage. The mean value of damaged crops was F\$44 per capita (1 Fiji dollar = US\$0.60), which was 11% of the mean annual crop income at the time of interviews in 2003 (crop damage was calculated based on the quantity damaged for each major crop, as reported by respondents). Distinct from housing rehabilitation, households individually rehabilitated cropping by collecting harvestable damaged crops, cleaning fields, and planting seeds with no labor sharing involved. Annual total earned income in 2003 was about half of that in 2005; that is, aggregated resources that could be shared among households were limited after the cyclone.

(c) Relief and reconstruction

The Red Cross, other nongovernmental organizations, and governments provisioned relief, and interviews in 2003 were conducted at the end of the relief phase. Almost all households received emergency food aid, and the mean amount per capita was F\$95, i.e., more than twice the mean crop damage (Takasaki, 2011c). At the time of interviews in 2003, refugees were almost nonexistent and about two thirds of households with damaged housing had completed rehabilitation: 12% had built a new house and 52% had completed repairs. As the government provisioned most construction materials from 2004, these housing rehabilitations were accomplished through people's mutual help. By the time of interviews in 2005 in the

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