Virtual Coordination of the Philanthropic Response to Disasters

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Abstract

History provides innumerable examples of society's resilience in the face of natural disasters, through neighbors helping neighbors, organized philanthropy, and public sector assistance. Recently assistance has begun to be channeled through websites and social media. Peer-to-peer assistance, like much disaster relief, is provided outside of the confines of the price system. This paper examines the generation of trust in such virtual communities, specifically, the trustworthiness of requests for assistance. The lack of face-to-face interaction and the non-repeated nature of disaster assistance create an inhospitable setting for reputation and trust. Virtual assistance establishes trust through three channels, transfer of credibility from existing organizations, traditional and virtual due diligence, and forms of crowd sourcing. The relationship of virtually coordinated peer-to-peer assistance to traditional philanthropic disaster relief and its policy implications are also discussed.

1. Introduction

Natural disasters afford the opportunity to observe many of the mechanisms of the voluntary society in operation, and often at a high-speed relative to normal day-to-day operations. Research demonstrates that civil society does not collapse in the aftermath of disaster (Fischer 2008, pp. 49-74) and that recovery is also typically swift, as noted by economists since Malthus and Mill. Disasters highlight several important elements of the market process. For example, nature's almost instantaneous significant shifts in demand and supply emphasize the role of time and place in economic knowledge. Kirznerian entrepreneurship is required to recognize and respond to these rapidly changing market conditions. And rebuilding the capital stock highlights the investment and development process.

Disaster also highlights the philanthropic side of human nature. People seem hard-wired to want to help the victims of disasters, resulting in spontaneous convergence of outsiders to disaster areas, as observed by researchers for years (Dynes 1970). Spontaneous volunteerism has been taking on new forms in recent disasters, with the potential for digital volunteers and virtual assistance using new information and communications technologies (ICT). Technology is creating new possibilities for peer-to-peer disaster assistance, as either substitutes or complements to traditional organized philanthropy represented in the National Voluntary Organizations Active in Disaster (NVOAD) coalition.

The past decade has witnessed an extension of market process economics to natural disasters, highlighting the limits of government response (Sobel and Leeson 2007), policy uncertainty created by recovery planning (Chamlee-Wright 2007), the role of business in response (Horwitz 2009), and the coordination of public expectations regarding recovery by civil society leaders (Chamlee-Wright

and Storr 2009). Some significant puzzles remain however. The voluntary sector provides more effective assistance than the government sector, even though both operate in a non-price, non-profit environment. The exact means by which the philanthropic sector overcomes the knowledge problem engendered by a lack of the use of prices remains unclear (Horwitz 2011).

Viewed in this light, virtually coordinated peer-to-peer assistance offers both promise and peril. The detailed nature of requests for assistance substitutes for the information component of the price signal, as would-be donors are told exactly what is wanted and where. Yet the potential for preference falsification seems overwhelming; if posting a message on Facebook is sufficient to acquire a scarce good, the quantity demanded must surely exceed the quantity supplied.

This paper examines some of the mechanisms ensuring the veracity of virtual requests for assistance in a disaster setting. Three distinct mechanisms appear to be at work, the transfer of reputation from existing organizations, volunteer-provided due diligence, and forms of crowd-sourced validation, and the mechanisms also operate to spontaneously identify misinformation in disaster aftermaths. The implications of virtually coordinated peer-to-peer assistance for philanthropy and policy, both for disasters and beyond, are explored as well. Traditional, organized disaster philanthropy has a comparative advantage in addressing general, anticipated demands, particularly when pre-disaster planning and preparation is required for timely response and relief. Peer-to-peer assistance seems ideally suited for the diversity of demands resulting from heterogeneity and the particular circumstances of a disaster. Generally peer-to-peer assistance offers a means to provide safety net philanthropy without the necessity of membership in an organized club.

2. Disaster Philanthropy and the Challenge of Virtual Peer-to-Peer Assistance

The aftermath of natural disasters demonstrates the significance of Hayek's (1945) observation regarding the contextual nature of economic knowledge, or alternatively, the circumstances of time and place. People will stand in lines for hours for normally plentiful and inexpensive goods. Natural disasters cause rapid and substantial increases in local demand for certain goods and services and often disrupt the supply side of the market. Furthermore, circumstances typically quickly return to normal. Significant profits can be made from normally competitively supplied goods, but the profit opportunity is localized in time and space.

Figure 1 displays a disaster-produced shock to a local market. The increase in demand from D_1 to D_2 disrupts the equilibrium of P_1 and Q_1. A new equilibrium in the market would temporarily prevail at P_2 and Q_2, but the resulting price rise violates many peoples' sense of fairness (Kahneman, Knetsch and Thaler 1986), which provides the support for laws against price-gouging. Consequently many observers wish to see the needed goods provided to victims without an increase in price, and the willingness of so many people to assist their fellow humans after a disaster offers a way to pay for needed supplies. Sentiment against price gouging establishes that the price should not rise after a disaster, but does not answer whether victims should have to purchase needed items at the pre-disaster price of P_1 or if goods should be provided to victims for free. Thus if we wanted to rely on philanthropy (or government assistance) to avoid "price gouging," the exact response is unclear: should Q_2 or Q_3 be supplied, and at a price of P_1 or zero? I will assume in this discussion a zero price is desired and the quantity is Q_3, but these assumptions do not affect the inferences.

Prices are both an information signal and an incentive to act on the information. Consequently making relief supplies available at a zero price to victims creates a knowledge problem for government or charitable relief. The incentive problem is overcome by the willingness of people

to help disaster victims.[1] Overcoming the information problem when disaster relief is provided without charge remains the challenge.

The challenge has two parts. First, as Figure 1 highlights, quantity demanded increases to Q_4 at a price of zero, which either substantially increases the cost of relief, or requires accurate discrimination between genuine disaster related demands (Q_3) and low valued demands, $Q_4 - Q_3$. Second, whether demand has shifted as represented in Figure 1 must also be determined. The veracity of demands at a zero price must be established. Low valued demands may be registered by persons not affected by the disaster seeking to obtain free supplies, or represent the law of demand effect of the zero price for genuine disaster victims.

Peer-to-peer assistance offers significant advantages in this context. Relief agencies can use knowledge accumulated from prior disasters to identify typical, recurring demands, and thus should be able to respond to such demands fairly well (Smith and Sutter 2014). Yet the heterogeneity of disasters and disaster victims suggests that many idiosyncratic demands will likely go unmet from organized relief, at least without a tailored response. Peer-to-peer assistance overcomes the knowledge problem because victims announce exactly what they desire. The disaster after the disaster problem of in-kind donations mismatched with victims' needs should be avoided altogether.[2] Virtual peer-to-peer assistance allows access to a wide network of potential donors and

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[1] Organizational incentives can still matter in disaster relief. People are willing to either make contributions to charities or see tax dollars appropriated to help victims. Whether government or philanthropic organizations have an incentive to provide the intended relief remains an issue, which I will return to in the final section.

[2] Given the high transactions costs faced by disaster victims, effective peer-to-peer assistance may even be preferred to cash. Cash donations to a charity will generally be preferred to in-kind donations, since cash allows the charity to use its accumulated knowledge to purchase items needed to assist victims.

intermediaries to find and deliver the exact needed items.

The great obstacle for virtual peer-to-peer assistance is obviously the threat of false demands. Virtual coordination reduces transactions costs, but also reduces the cost of preference falsification to essentially zero. Consider the contrast with queues. Queues use transactions costs to ensure a nonzero full price even for free relief supplies. The cost of sending a tweet or posting a Facebook message requesting something is negligible. If a Facebook message can "purchase" the desired item, the quantity demanded seems certain to overwhelm the quantity supplied. Further, mechanisms available to discriminate in person between the Q_3 demands and the Q_4 - Q_3 demands, like visual observation, are not available online. Humans have developed biological-based mechanisms to identify cheating and lies to help sustain small group cooperation, yet these "tells" will not be accessible with virtual coordination. The non-recurring element of natural disasters suggests that repeat dealings or reputation will have little power to ensure truthtelling. The prospect of peer-to-peer assistance not being available the next time a disaster ravages the local community is probably unlikely to deter requests unneeded assistance. Will potential donors view virtual requests for assistance to be trustworthy?

Peer-to-peer assistance is not a new phenomenon, and is part of the spontaneous convergence of volunteers to a disaster area long observed by researchers (Dynes 1970). Such informal assistance succeeds by employing the substantial resources available in a community, often in shops, storage rooms, garages and basements. Getting an old chainsaw or generator collecting dust a garage into the hands of the disaster victim creates economic value. Economists and other social scientists who do not appreciate the contextualized nature of economic knowledge may fail to recognize the value creation occurring, and consequently systematically undervalue peer-to-peer disaster assistance.

Communities affected by disasters do employ such mechanism, and to great effect. Chambers of commerce often facilitate peer-to-peer assistance among businesses. The Joplin Chamber maintained an old style "Haves and Needs" bulletin board after the May 2011 tornado (Smith and Sutter 2013). The Texas Chamber of Commerce maintains facilities in Austin for local chambers from coastal communities to use to coordinate peer-to-peer assistance after a hurricane. Chamlee-Wright (2010) notes the substantial resources available even in some of New Orleans' poorer communities put to work after Katrina.

The digital age has created the potential for new forms of peer-to-peer assistance. Starbird and Palen (2011) observed a form of charitable contribution in the aftermath of the Haiti earthquake consisting of adding minutes to the cell phones of persons engaged in locating missing persons or identifying needs in the field. They also noted the editing and retweeting information in more concise and searchable forms as a type of volunteering. And as I will return to in the next section, identifying, challenging, and ultimately correcting misinformation is an important new form of volunteer activity (Mendoza et al. 2010, Starbird and Palen 2013).

3. Trust in Online Disaster Assistance

ICT facilitates peer-to-peer disaster assistance despite the obvious potential for preference falsification. How is trust being generated using social media in disaster situations? Much of the research to date regarding disasters and social media has focused on the veracity of citizen-based and crowd-sourced information generated about disaster conditions (e.g., reports about washed out bridges, the exact location of a fire, or collapsed buildings) and not just requests for specific forms of assistance. Considerable focus has been on the use of crowd sourced information by organized

charities (Tapia et al. 2011) and government agencies (Department of Homeland Security 2013). Information messages pose similar but not identical credibility issues to requests for assistance. The potential gain to users from deliberate falsification would seem more significant for aid requests than for information.[3] Thus the challenge of falsification would seem greater for assistance requests. Nonetheless, I draw on research on information and not merely assistance requests in this analysis.

Three mechanisms appear to contribute to trustworthiness in disaster communications: the transfer of credibility from existing organizations, traditional due diligence being conducted in a virtual world, and genuinely collaborative or crowd-sourced types of authentication. Credibility transfer draws on the reputation of an existing organization or group to enhance the trustworthiness of electronic communication. Due diligence involves verification and fact checking, through both conventional and new electronic forms. Crowd sourced forms of trustworthiness refer to small acts by individuals which may seem of limited importance in isolation but which in the aggregate can reveal veracity. The lines of demarcation between these channels are not necessarily clear and trust in specific cases might arise from multiple channels, so I will not dwell on trying to fit examples in one of these categories.

Existing organizations can transfer credibility in multiple ways. One common manner is through tweets or posts by organization members. Charitable organizations active in disaster relief typically have relied on on-the-ground reports by their personnel to guide their relief efforts (Tapia et al. 2011), so tweeting these reports merely broadcasts this information as opposed to using a private channel. Existing organizations can also establish webites or Facebook pages to assemble

[3] Some individuals clearly enjoy spreading false rumors, and given the impossibility of interpersonal utility comparisons, the greater incentive to falsify assistance requests cannot be considered to hold universally.

assistance requests. For instance, Journey Church operated the website HelpMooreRebuild.com to coordinate requests for ass assistance, donations and volunteers, lending its reputational capital to the effort. The Student Volunteer Army emerged as a spontaneous effort the University of Canterbury in response to the Christchurch, New Zealand earthquakes 2010 and 2011 (Lewis 2013). And in the online world, collaborative groups like Ushahidi and Humanitiy Road formed after one disaster can persist and transfer their reputation (and economic knowledge) to future endeavors.

Due diligence with electronic communication can take a variety of old and new forms. Information provided in a tweet or post, like a phone number, address, or email address, can be checked out. Information contained in a user's profile can be verified. IP addresses of computers and the geolocation of phones can be validated in more sophisticated verification, again providing clues that a request may not be valid. Many of these tasks can be carried out by virtual volunteers with no prior relationship with an organized charity and who live thousands of miles from the disaster zone. Starbird and Palen (2013) argue that verification of tweets or poses represents the primary contribution of digital volunteers.

Trust also arises from some activities which are best described as crowd sourced. For instance, retweeting provides a form of credibility, as the act indicates that a Twitter user found the tweet interesting and presumably credible. The number of followers a person has on Twitter, the number of likes on Facebook, the number of links to a blog or website all convey credibility. A user typically only builds a large number of followers on Twitter by being a source of interesting and reliable tweets.[4] Knowledge that a tweet was sent to a large number of followers and its content not

[4] In addition, a large number of followers allows a person to relay information or a request for assistance to a large number of persons, increasing the likelihood a recipient of the request may be in a position to help.

challenged is itself a signal of credibility. ICT allows people to upload pictures and videos of disaster damage which can increase the credibility of an assistance request. Of course the potential exists for photoshopping, so visual evidence will not necessarily be proof positive. Due diligence blends into a form of crowd sourced verification, as every detail offered in a request or message may be falsfisied, and a large enough audience will in the aggregate possess knowledge of disaster areas and might be able to identify misstatements or fake photos or videos. The inclusion of details or a phone number or email address in a request consequently itself signals trustworthiness by facilitating and welcoming due diligence.

The potential for crowd sourced truthfulness is not new and should not surprise economists. Reputation is ultimately a crowd sourced means to verify statements by firms or service providers about quality. A firm with an excellent reputation for high quality products essentially has had their statements about quality vetted by a crowd of consumers, and over an extended period of time.

Daley and Starbird (2014) provide an example of collaborative due diligence in upstate New York in the aftermath of Hurricane Irene and Tropical Storm Lee in 2011. Numerous highly local peer-to-peer assistance groups emerged in response to extensive flooding in the Catskills region, with many of these local efforts involving a Facebook or web page, facilitating assistance from people outside of the region. To help discriminate valid community efforts from scams, two local papers maintained a publicly viewable but not publicly editable Google spreadsheet listing reported assistance groups, with notes added periodically regarding verification of efforts. Reporters and members of the community known and trusted by the reporters vetted the groups, generating the notes. While each individual report about a group arose from traditional due diligence, technology extended this into a distributed effort. Furthermore, by listing groups when first identified, the

spread sheet helped coordinate digital volunteers willing to conduct due diligence. Ninety six local relief operations formed in the two weeks after the storms.

The newspapers examined by Dailey and Starbird (2014) also employed a live blog allowing public postings and thus potentially contributing to misinformation. Yet the reporters as editors of the live blog engaged in and encouraged what Dailey and Starbird label visible skepticism, challenging posts they knew or believed to be false, also allowing later posts regarding the same rumors. The authors note that allowing a rumor to resurface and be challenged again may facilitate more effective rumor control than dispelling it once and blocking future posts. The live blog mechanism helped focus crowd sourced rumor control, through multiple denials, some from beyond official channels.

Wild rumors and misinformation certainly circulate after disasters, but social media may not be as vulnerable to propagating falsehoods as popularly believed. Mendoza, Poblete and Castillo (2010) examined almost 5 million tweets in the aftermath of the February 2010 Chilean earthquake, and patterns of tweets differed significantly depending on information veracity. The authors identified seven ultimately truthful pieces of information and seven ultimately baseless rumors, and characterized tweets on each topic as affirming, denying, or questioning the report. For the ultimately truthful stories, 95% of tweets and retweets affirmed the information, while 2.5% questioned and 0.3% denied. On the other hand, 50% of tweets denied and 13% questioned the ultimately incorrect stories, with only 30% affirming. False reports were retweeted, but the process appears to possess efficiency in discriminating truth and falsehood. Software also exists for extracting and analyzing tweets in near real time, a technology which could allow an ever larger network of connections for peer-to-peer assistance after disasters (Imran et al. 2013).

4. Conclusion and Directions for Future Research

Websites, Facebook, Twitter and other social media are facilitating peer-to-peer assistance, and this paper has examined the generation of trustworthiness in a setting seemingly totally vulnerable to demand falsification. A natural next research question involves quantifying the level of virtual peer-to-peer assistance relative to traditional charitable or government assistance, to determine if it actually is more than a novelty. Peer-to-peer assistance also avoids the overhead organizational costs of relief agencies. The tailoring of assistance to the exact demands of victims implies that a dollar of peer-to-peer assistance should generate far more value to victims than a dollar of traditional relief. Given the likely greater value of each dollar of virtual peer-to-peer assistance, equality in volume is not necessary for equality of impact.

Virtually coordinated peer-to-peer assistance offers several implications for disaster relief and recovery. In part it provides additional evidence of the importance of spontaneous volunteering after disasters, and thus the importance of voluntary sector versus government assistance and relief. Peer-to-peer assistance has long existed, with electronic ICT merely dramatically reducing its transactions costs, much as Ebay and Amazon Marketplace have lowered transactions costs for and dramatically reshaped the market for used books, CDs, and other items. Cowen and Sutter (1999) discuss how the choice between the private or public sector for delivery of a good or service depends on the level of cooperative efficacy; when voluntary groups can cooperate more effectively, a representative citizen will choose to locate more activity in the private sector. Technologies which increase our ability to voluntarily cooperate increase the optimal size of the voluntary sector. Social media and the internet have significantly increased the ability of groups to organize spontaneously and provide assistance tailored to the demands of disaster victims. The mismatch between donations

or even assistance provided by an agency and the true needs and wants of disaster victims vanishes with coordinated peer-to-peer assistance. The knowledge problem of non-priced disaster relief can be eliminated *if* high valued or genuine requests can be effectively sorted from low valued requests.

If technology has indeed significantly lowered the cost of peer-to-peer assistance and the trust problem can be surmounted, the implications for the organization of philanthropy are significant. As discussed in Section 2, the willingness of people to help disaster victims overcomes one portion of the incentive problem created with nonprice allocation. In other words, a willingness to help can provide the resources needed to supply goods to disaster victims at less than cost to avoid "price gouging." Yet the incentive problem still exists for the organization: will the resources actually be used to help victims as intended? In a world of subjective costs and innumerable forms of potential mismatch, a public sector agency or charity tasked with disaster relief can easily dissipate donations while providing little effective assistance. And organized charities have costs of maintaining their organizations. Peer-to-peer assistance can be provided on demand and allows cutting out the organized intermediary, rendering the organizational incentive problem moot. Informal groups helping assure trustworthiness could coordinate amongst each other and avoid the problem of a disaster-related demand being presented to and satisfied by multiple groups by employing software like CharityTracker.

Organized charities and peer-to-peer assistance could have their own comparative advantages, suggesting a likely division of labor in the future. The members of NVOAD likely have a comparative advantage addressing recurring, anticipated disaster needs when timely response requires advance planning and preparation. Peer-to-peeer assistance can be tailored to the idiosyncratic demands resulting from the heterogeneity of disasters and victims, and for demands

that can be met using resources available at the time of the disaster.

Mechanisms for coordinating peer-to-peer assistance can be extended to other types of philanthropy. Indeed, the Rebuild Joplin website emerged out of a website established by the Joplin Public Schools to help direct community assistance to district students in need. Peer-to-peer philanthropy could potentially reduce the role for organized charities immensely, or transform their function into one of assuring the trustworthiness of requests for assistance submitted to a virtual community instead of serving as assistance intermediaries. The potential for peer-to-peer philanthropy to redraw the optimal line between the citizen and the welfare state is significant. The role of voluntary and mutual aid in providing a safety net prior to the rise of the welfare state has been well-documented (Beito 2002, Green 2002). Societal changes may have raised the cost of membership in the fraternal organizations to an unacceptably high level for many citizens. Citizens may have decided that paying taxes for a government safety net was less costly in total than having to belong to and contribute to a community organization to be eligible for aid if ever needed. Peer-to-peer assistance can provide the aid without the tied participation in club activities, and perhaps provides a way to reintroduce voluntary aid to society today.

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Figure 1