Masters of Disasters? An Empirical analysis of how Societies benefit from Corporate Disaster Aid

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ABSTRACT

Despite the rich literature on corporate social responsibility (CSR), we lack theory and evidence to support the assumption that CSR is socially beneficial. This is particularly true in the multinational context, where scholars disagree about the desirability of corporations adopting responsibilities that have traditionally fallen to governments, aid agencies, and other types of organizations. We address this by making and testing predictions about the societal outcomes of corporate disaster aid; an area where foreign firms are increasingly being asked to make up for the diminished response capacity of governments and aid agencies. Theoretically, we draw on insights from the dynamic capabilities literature to argue that firms with a direct presence in a nation are better able than traditional aid providers to sense areas of need following a disaster, seize response opportunities, and reconfigure resources for fast and effective responses. Based on this, we predict that aid will arrive faster, and nations will recover more completely when companies account for a larger share of disaster aid. We test our predictions with a proprietary dataset comprising information on every major natural disaster and aid donation in the world from 2003 to 2013. Using a novel quasi-experimental method—synthetic control analysis—we find strong support for our predictions. As such, we not only demonstrate that strategic CSR can deliver meaningful societal benefit, but that nations benefit greatly from corporate involvement when disaster strikes.

Keywords: **corporate disaster giving, corporate social responsibility, disaster relief and recovery, international aid, synthetic control method**

In recent years, there has been a growing interest among both scholars and practitioners in understanding the corporate social responsibility (CSR) of multinational enterprises (MNEs). This work highlights that globalization and the advance of neoliberal economic policies have made it more difficult for nations to regulate their economies and provide for their citizens, while increasing the power and influence of foreign companies (Matten & Crane, 2005; Palazzo & Scherer, 2008). The behavior of MNEs thus takes on a particular poignancy, as instrumental and opportunistic practices can cause significant damage to a country (Surroca, Tribo, & Zahra, 2013), while CSR has the potential to limit the harms of economic activity and also make a positive contribution to social welfare (Potoski & Prakash, 2005; Prakash & Potoski, 2007).

Of particular note, studies have observed that MNEs are facing calls to not only engage in traditional forms of CSR, but also to adopt responsibilities that have historically fallen to aid agencies, governments, and non-governmental organizations. Firms are increasingly developing self-regulatory standards to substitute for regulations that governments are unable or unwilling to enforce (Ostrom, 2000; Potoski & Prakash, 2005). MNEs are also engaging in the provision of public goods by building hospitals, schools, and community projects (Matten & Crane, 2005; Palazzo & Scherer, 2008), and by reconstructing national infrastructure in the wake of disasters (Wassenhove, Tomasini, & Stapleton, 2008). Based on the observation of these unique forms of CSR, scholars have begun to develop frameworks to predict the CSR of MNEs (Crilly, 2011; Scherer & Palazzo, 2011) and examine how firms benefit from these practices (Henisz, Dorobantu, & Nartey, 2013; Madsen & Rodgers, 2014). As with the broader CSR literature, though, we know very little about societal outcomes (Margolis, Elfenbein, & Walsh, 2007) and opinions are divided as to whether or not social welfare benefits should be expected.

For proponents, CSR is considered an intrinsic social good (Margolis et al., 2007). In the multinational context this can be seen in studies that recognize firms may be strategic with their CSR (McWilliams & Seigel, 2011), but consider it positive that MNEs are expanding their social responsibility repertoire. To wit, scholars have tracked the proliferation of corporate codes of

conduct (Béthoux, Didry, & Mias, 2007), pledges to pursue socially beneficial goals (Rasche, Waddock, & McIntosh, 2012), and the creation of public goods (Scherer & Palazzo, 2011), but have stopped short of assessing the extent to which these practices benefit society. Studies of corporate self-regulation have adopted a similar focus, examining how standards are created (Bartley, 2007) and when they lead to better environmental performance among MNEs (Potoski & Prakash, 2005; Prakash & Potoski, 2007).[1] Yet this work is limited to harm reduction, versus welfare enhancement, and ecological outcomes are commonly assumed rather than shown.

Taking another view, critics question the value of CSR in the multinational context, and have suggested it may be of little benefit. This work argues that MNEs engage in CSR primarily to secure government favors, forestall activism, or mollify local communities (Banerjee, 2008). This is supported by evidence that MNEs often use CSR for symbolic or political purposes rather than trying to understand and effectively respond to societal problems (Marquis & Qian, 2013; Mellahi, Frynas, Sun, & Siegel, 2015). As such, efforts may not target the areas of greatest need, with the result that CSR is socially suboptimal or even crowds out other sources of aid (Cavallo & Daude, 2011). For instance, a study of CSR spending by oil, gas, and mining firms in the developing world found that $500m of investment yielded almost no social welfare benefits (Frynas, 2005). Similar anecdotes have led some to argue that MNEs may have the potential to contribute to social welfare based on their resources and influence, but that this work is best left to organizations such as governments and aid agencies that specialize in these activities and can be held accountable for their pursuit (Frynas, 2005; Sundaram & Inkpen, 2004).

In short, we know little about the effects of CSR initiatives by MNEs, and what we do know raises questions about the efficiency and effectiveness of their contributions to social welfare. We also lack theory to predict when and why a firm's actions will create meaningful social welfare benefits, or the conditions under which businesses might be better-able than other

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[1] This work shows that there is generally a positive relationship between self-regulation and a firm's environmental performance. A parallel research stream on self-regulation in the United States chemical industry has found similar results, while also suggesting that the adoption of such standards can buffer a firm from negative spillovers when competitors have environmental accidents (Barnett & King, 2008; King & Lenox, 2000).

types of organizations to deliver such benefits. To this end, we suggest it is useful to consider the unique capabilities of corporations vis-à-vis other types of organizations, and the situations where these are likely to be deployed in ways that yield positive outcomes for society. We argue that disaster responses are one such area, and that the speed of emergency relief and the level of a nation's recovery will be greater when locally active MNEs account for a greater portion of aid.

Responding effectively to natural disasters is a grand and growing challenge worldwide. The inflation-adjusted cost of a typical disaster has sextupled in the last 40 years, whereas the level of aid provided by traditional responders such as foreign governments and multinational aid agencies has displayed modest or even negative growth (Becerra, Cavallo, & Noy, 2014). As with other areas of multinational CSR, corporations are increasingly being called upon to address this gap, and have emerged over the past 25 years as a significant contributor to disaster relief efforts (White & Lang, 2012). While these contributions undoubtedly supplement the efforts of traditional aid providers, we argue that the involvement of MNEs may also create unique benefits for a disaster-afflicted country.

To account for this, we develop a simple theoretical framework that leverages insights from research on dynamic capabilities (Teece, Pisano, & Shuen, 1997). This work focuses on the ability of firms to sense threats in the external environment, seize response opportunities, and reconfigure resources and routines to do so (Teece, 2007). While this framework is typically used to explain firm-level performance differences, dynamic capabilities also differ systemically among organizations with different forms (Rindova & Kotha, 2001). Building on this, we argue that MNEs—as compared to other types of organizations that give disaster aid—have dynamic capabilities that enable them to more effectively sense areas of critical need following a disaster, make quick decisions, and reconfigure resources for efficient, effective responses. Based on this, we predict that aid will arrive more quickly, and a nation will recover more fully from a disaster when MNEs account for a larger share of disaster aid. We argue that these outcomes will be enhanced when disaster giving leverages firm-specific routines and resources.

We test our arguments with a proprietary dataset comprising all reported contributions by firms, foreign governments, and multilateral agencies to relief and recovery following each major natural disaster from 2003 to 2013. To isolate the effect of corporate aid on our outcomes of interest, we use the synthetic control method (SCM) (Abadie, Diamond, & Hainmueller, 2015). The method is similar to other matching techniques that are often used in organizational research (e.g., McDonnell & King, 2013). Rather than matching treated entities with a single member of the control group, though, SCM constructs comparison units based on a combination of multiple entities: a synthetic control. The approach can thus be applied in contexts where it is hard to find suitable single comparison units, either because analysis focuses on aggregate entities such as nations, or the pool of potential controls is small (Abadie, Diamond, & Hainmueller, 2010). This is useful for us because our analysis requires a comparison of nations that have similar attributes and are afflicted by similar disasters, but receive different levels of corporate aid.

Results provide strong support for our hypotheses and suggest that disaster aid from locally active MNEs is not only socially beneficial, but also creates value beyond that provided by other entities. As such, we show direct evidence for the societal benefits of CSR and identify factors that generate and enhance positive outcomes. This addresses a weak spot in the CSR literature and complements firm-level studies by suggesting that, at least in the context of disaster aid, strategic CSR may indeed be a win-win proposition (McWilliams & Siegel, 2011). Further, the social impact of CSR is a metric that is increasingly demanded by stakeholders such as customers and governments (Eccles, Ioannou, & Serafeim, 2014); our paper provides a way to calculate such impact using measurable and unambiguous metrics. Our study also has important policy implications. Over the last 30 years, disaster costs have grown at a pace that exceeds the real value of traditional financing sources for disaster relief. Closing this gap is not only a matter of giving more, but giving more efficiently (United Nations, 2015, 2016). Our

study helps illuminate the conditions and mechanisms under which the business community can contribute to this goal in disaster responses around the world.

THEORY AND HYPOTHESES

Disasters and the Rise of Corporate Responses

Nations face significant challenges in the aftermath of disasters. Earthquakes, floods, hurricanes and other calamities destroy infrastructure, cause human suffering, and are a source of negative economic growth that can take years to recover from (von Peter, von Dahlen, & Saxena, 2012). A typical large disaster causes a 20% reduction in national GDP (Barro, 2007), and the annual inflation-adjusted loss from even average disasters has grown from $54 billion in 1980 to over $314 billion in 2015 (United Nations, 2016). Disasters are also underinsured, even in developed nations (Bevere, Orwig, & Sharan, 2015). As a result, there is a growing gap between the scale of disasters and the capacity of traditional aid providers, such as foreign governments and multilateral agencies, to undertake effective responses (United Nations, 2016).

As with other areas of multinational CSR, the diminished capacity of traditional actors has led to growing calls for MNEs to be involved in disaster relief and recovery (Matten & Crane, 2005; Twigg, 2001; United Nations, 2015). Reflecting this, there has been a large increase in corporate disaster giving over the past 15 years. More than 90 percent of the world's 2000 largest MNEs now participate in relief efforts each year, and their average inflation-adjusted donation has grown by over 10 times to $1.6 million (Ballesteros, 2015).[2] Corporate giving also comprises a growing share of all disaster aid, and in some cases exceeds the contributions of traditional providers (Ballesteros, 2015; White & Lang, 2012). For instance, in the aftermath of the 2010 earthquake and tsunami in Chile, 55.4% of aid was from corporations; more than the combined amount provided by foreign governments and multilateral aid agencies.

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[2] The recent rise of corporate disaster giving is an expected consequence of firms' strategic behavior. During the last thirty years, the number of firms with multinational operations and the number of foreign affiliates among the world's largest companies grew three-fold and 10-fold, respectively. Given that exposure to disasters is higher for the average MNE than for single-country firms, the internationalization of economic activity has likely increased management attention to disaster risk.

Similarly, 68.3% of the aid that Japan received after the 2011 tsunami was from firms, as was 51.7% of aid received by the Philippines after Typhoon Haiyan (OCHA, 2016).

Although corporate giving undoubtedly helps to address disaster funding gaps, we argue that such efforts are more than a supplement for traditional aid. We base this on the fact that the effectiveness of a disaster response is related to not just the quantity of aid, but also to the speed with which it arrives and the extent to which it addresses areas of critical need (Cutter, Emrich, Webb, & Morath, 2009; Klinenberg, 2003; Wassenhove et al., 2008). Following a disaster, resources can be directed to many different areas, with the implication that allocations may create logistical clogs in the disaster zone, not match the emergency at hand, or focus in areas that do not contribute to a nation's long-run recovery. There is also evidence that the damage and suffering caused by a disaster is inversely related to the speed that aid reaches beneficiaries (DeLeo, 2013; Wassenhove et al., 2008). To wit, disaster recovery is significantly affected by the fast delivery of essential resources, such as food, water, and medicine, as well as the quick restoration of communication and transportation infrastructure (Day, Junglas, & Silva, 2009; Day, Melnyk, Larson, Davis, & Whybark, 2012). The slow response to Hurricane Katrina is a case in point: harm from the storm's physical destruction was greatly compounded by the inability of Federal and local officials to respond quickly and adequately (Horowitz, 2008).

In what follows, we develop a theoretical framework which predicts that MNEs that have an active economic presence in a disaster-affected nation are uniquely well-suited to undertake fast and effective responses, and that their involvement thus contributes to more socially beneficial relief and recovery efforts.[3]

Dynamic Capabilities and the Advantage of Locally Active Firms in Disaster Response

Our approach for theorizing about the social value of corporate disaster giving is based on the dynamic capabilities literature. This research studies how organizations identify threats

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[3] We define local presence based on an MNE having an affiliate or subsidiary that creates products or performs services in a focal nation.

and opportunities in the external environment and reconfigure their routines and resources to undertake strategic responses (Teece, 2007; Teece et al., 1997). The core insight is that performance differences—especially in rapidly changing and uncertain environments—arise from the varied dynamic capabilities of different organizations (Eisenhardt & Martin, 2000). Recent work has also used this approach to explain variance in the strategic CSR of different companies (Scherer & Palazzo, 2011). While most studies in this milieu have been at the firm-level, there is also evidence that dynamic capabilities differ systematically among organizational forms, which are groups of entities that share common distinguishing features (Hannan & Freeman, 1984; Romanelli, 1991). This has been shown in cross-sectional research on firms with different governance structures (Hedlund, 1994), and in studies that examine how strategic behavior changes when a company switches forms (Lampel & Shamsie, 2003; Rindova & Kotha, 2001). Studies have also observed systematic differences in the governance structures, goals, and decision-making processes of businesses, charities, and government agencies as distinct organization forms (Kaul & Luo, 2015; Lee, Battilana, & Wang, 2014).

Building on this, we argue that corporations—as compared to other organizational forms such as government agencies and multilateral aid providers—are likely to have capabilities that enable fast and effective disaster responses. Following Teece (2007), we decompose dynamic capabilities into sensing, seizing, and reconfiguring components, and argue that MNEs with a presence in a disaster-afflicted nation are well-suited to 1) sense threats and diagnose areas of critical need following a disaster, 2) seize upon opportunities to respond, and 3) quickly reconfigure routines and resources to do so effectively. We suggest that, collectively, these factors will lead to a nation receiving aid more quickly, and recovering more completely, when locally active MNEs account for a greater share of total disaster relief.

Sensing areas of need. As with rapidly changing competitive environments, the aftermath of a disaster is characterized by uncertainty, complexity, and urgency (Baker & Bloom, 2013; Day et al., 2012). In such contexts, the first step for organizations in determining

how to respond is to sense and interpret the situation at hand (Lampel, Shamsie, & Shapira, 2009; Teece et al., 1997). This entails scanning the environment and gathering data that can be used to inform strategic decision-making. In this regard, effective sensing capabilities yield diverse, accurate, and nuanced information, and thus support a robust understanding of threats and opportunities (Helfat & Peteraf, 2015).

The most immediate way that an MNE is likely to sense a disaster is through its effects on local subsidiaries. The destruction of physical infrastructure directly affects the production and distribution of goods, while the human toll of a disaster affects employees as well as the functioning of local markets. MNEs are likely to be sensitive to such disruptions because they are expeienced directly, and interpret them as areas of critical need based on their financial implications (Hoffman & Ocasio, 2001; Sundaram & Inkpen, 2004). Indeed, studies have shown that MNEs often rebuild transportation infrastructure to restore distribution and supply channels, construct housing and health facilities to bring normalcy to customers and employees, and make direct transfers to disaster victims to restore purchasing power (see Ballesteros, 2015). This also aligns with strategic CSR arguments that predict firms will act in the public good when doing so serves their own interests (McWilliams & Siegel, 2011). Broadly speaking then, firms are likely to sense disaster impacts that have economic implications that threaten their market performance and view these as requiring immediate responses (Horwitz, 2009). Discussing this, a Coca-Cola manager explained her firm's response to the 2011 earthquake and tsunami in Japan by saying: "We are part of a system. If the government cannot [respond effectively], we need to rebuild. We need the market to recover."[4]

Further, to the extent that decisions about how to respond to market disruptions are best made when informed by nuanced and diverse information (Teece et al., 1997), MNEs are likely to benefit from relationships developed through their operations in a country. There is evidence that firms utilize local grass-roots relationships, affiliate networks, and partner organizations to

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[4] Manager, International Public Affairs, Coca-Cola Company: interview with the first author.

help assess the specific damages caused by a disaster and interpret where aid is most urgently needed and will have the greatest impact (Useem, Kunreuther, & Michel-Kerjan, 2015). Having employees and other stakeholders present in the disaster zone—and experiencing adverse effects directly—also enables a firm to gather to contextualized information about disaster impacts, and understand the needs and preferences of local communities (Horowitz, 2008). In short, just as having 'boots on the ground' can help a firm to sense and understand complex, uncertain competitive environments (Teece et al., 1997), local operations give MNEs a close-up look at the nature and scale of disaster impacts, and can thus help sense areas of critical need.

By comparison, non-local governments and multilateral aid agencies usually do not have significant established infrastructure or contact networks in a disaster zone (Cohen & Werker, 2008). As a result, the information that guides response planning for these organizations is more likely to be second-hand and from fewer sources. This may create challenges for sensing disaster impacts as well as confusion about how and where to best intervene. Indeed, a lack of local understanding has been cited as a key factor in the insufficient and misguided response from FEMA and other Washington, D.C. based aid providers following Hurricane Katrina (Horowitz, 2008). The same issue is made vivid in the account of a municipal official in Chile's Maule region, which was devastated in 2010 by an earthquake and tsunami:

> *The government disappeared…we are too far away from Santiago and the national government was absent for days after the disaster…and when they arrived, they did not know exactly what to do, how to coordinate the aid, what functions to perform… we coped with it with our own resources and with a lot of help from the private sector that came from other countries" (Polanco, 2012).*

There is also evidence that, whereas the fiduciary interests of MNEs contribute to a focus on economically relevant disaster impacts (Ballesteros, 2015), traditional aid providers often confront multiple pressures and preferences that shape how they interpret information coming from a disaster zone. For governments, decisions about how to intervene following a disaster may be guided by political factors (Reeves, 2011), with studies showing that up to 50 percent of the variance in disaster relief allocations is explained by electoral considerations (Garrett &

Sobel, 2004). Foreign governments also have a tendency to be more attuned to disasters that affect political allies, culturally similar nations, and oil-exporting countries (Fink & Redaelli, 2011). The level of media coverage that a disaster receives—regardless of its actual impact— also affects the amount of aid that is pledged by governments, NGOs, and multilateral agencies (Eisensee & Strömberg, 2007; Franks, 2013). In sum, the capability of these organizations to sense areas of critical need following a disaster is often constrained by political considerations and special-interest pressures, rather than being guided by assessments of need and impact alone; this may lead to sub-optimal response decisions (Cohen & Werker, 2008; Platt, 2012).

The above considerations support the argument that locally active MNEs are more likely than traditional aid providers to sense and accurately interpret information about disaster impacts that relate to a nation's economic functioning. In turn, this should result in responses that focus on rebuilding key infrastructure for economic activity and restoring the market status quo. Importantly, there is evidence that such initiatives have a positive effect on national growth and social welfare: in comparison, the less focused and politically motivated initiatives undertaken by governments and aid agencies have been shown to generate less social surplus (Cavallo & Daude, 2008; Khan & Kumar, 1997; Robinson & Torvik, 2005). For instance, in a sample of 24 countires, Khan and Reinhart (1990) found that public investments had an overall negative influence on economic growth, whereas private investment had a significant positive effect.

Seizing opportunities to act. Once an organization has sensed disaster impacts and come to an understanding of where to intervene, the next step is to seize the opportunity to act (Teece, 2007). As with other strategic decisions, the speed with which action takes place has significant implications for the effectiveness of disaster relief and recovery (Day et al., 2012; Eisenhardt & Martin, 2000). In this regard, dynamic capabilities research shows that local autonomy and decentralized decision-making enhance the speed and effectiveness with which a firm can respond to threats and opportunities in the external environment (Teece et al., 1997). Extending

this to the multinational context and disaster relief, we argue that locally active MNEs likely

have a speed advantage over other types of aid providers.

When MNEs are motivated to restore market functioning in a nation, they can delegate

decisions about aid allocation to managers whose local knowledge and situational proximity are

conducive to the agility and improvisation required for quick and effective action in complex

environments (Fan, Wong, & Zhang, 2007). In comparison, governments and multilateral

agencies often have centralized, bureaucratic decision-making processes which can impede rapid

action (Dolowitz & Marsh, 2000). Hence, when a disaster requires donors to swiftly ramp-up

their engagement, firms likely face fewer decision-making constraints than other aid providers

(White & Lang, 2012). For example, following the 2010 Chile disaster, multi-national mining

firm, Anglo American, relied on local managers to assess damages and lead its response. Just

hours after the earthquake, the company's London-based headquarters was briefed on the

destruction and authorized managers to respond. The result was one of the first major donations

for relief and recovery from any source (Useem et al., 2015).

Reconfiguring and the effective provision of aid. In addition to decision-making speed,

locally active MNEs are also likely to have resources and routines that can be quickly

reconfigured for disaster relief (Teece, 2007). With regard to resources, the cash position of

most MNEs allows them to purchase response goods or transfer money to victims (Matten &

Crane, 2005). Productive assets within an affected country can also be repurposed to address

disaster needs, such as when Anglo American rapidly dispatched heavy equipment from its

mining operations to gather debris and remove rockslides after the Chile earthquake (Useem et

al., 2015). Similarly, following the 2004 Indian Ocean tsunami, handset manufacturer, Ericsson,

moved quickly to provide mobile phones to help disaster responders. MNEs also have the ability

to redeploy resources from across their network of corporate affiliates without encountering

significant frictions (Teece, 2014). This contributes to a broader and more diverse resource base

that can be deployed at speed to support relief efforts, such as when Wal-Mart and other large

retailers mobilized inventory from across their subsidiary networks to bolster the supply of food, medicines, and clean-up supplies following Hurricane Katrina (Horwitz, 2009).

Routines and competencies that a company has developed for business purposes can also be utilized to implement fast, effective relief efforts (Eisenhardt & Martin, 2000). Following the Indian Ocean tsunami, for example, industrial companies helped rebuild schools by drawing on their experience with large-scale engineering projects. These firms had no history building schools, but ample expertise with construction materials and methods. Coordinating with makers of mobile buildings, they rapidly built state-of-the-art structures to serve as seismic-proof schoolhouses (Fernando, 2010). In another example, the logistics company, TNT, assisted the United Nations in designing relief warehouses in Italy by applying its business acumen to optimize warehouse storage and train personnel in inventory management. These efforts saved the U.N. agency an estimated $450,000 annually (Wassenhove et al., 2008).

In comparison, the centralization and bureaucracy that often slows decision-making in foreign governments and multilateral agencies can also create barriers to efficient and effective aid deployment. Unlike MNEs that already have resources in a nation, these organizations typically need to marshal resources and put a local infrastructure into place before a response can start (Cohen & Werker, 2008; Lipscy & Takinami, 2013). In addition to slowing the flow of aid, it is costly to create new structures and routines, and there are often kinks to be worked out before operations become smooth (Raffaelli & Glynn, 2014; Teece et al., 1997). Further, the need to navigate layers of bureaucracy may contribute to bottlenecks that interfere with the dispersion of resources that have been committed to disaster relief (Fritz, 2004). For example, nearly 40% of disaster relief pledged by foreign governments and aid agencies for the 2010 Haitian earthquake was still outstanding in 2013, whereas all corporate aid had been distributed (Ballesteros, 2015; Becerra, Cavallo, & Noy, 2013).

Taken together, our arguments suggest that the sensing, seizing, and reconfiguring capabilities of MNEs are conducive to faster and more effective disaster responses than those

undertaken by traditional aid providers. In turn, this should contribute to positive outcomes for afflicted nations when MNEs account for a larger share of disaster relief. Formally, we predict:

Hypothesis 1 (H1). The speed with which aid is provided to a disaster-affected nation will be faster when locally active corporations account for a greater share of total disaster aid.

Hypothesis 2 (H2). The long-term recovery of a disaster-affected nation will be greater when locally active corporations account for a greater share of total disaster aid.

The value of firm-specific versus general resources. Although we expect that corporations as an organizational form have a comparative advantage in delivering fast and effective aid following a disaster, there is undoubtedly variance in the degree to which responses fit with the need being addressed (Kogut & Zander, 1992). For instance, even at a high level of analysis, there is likely to be a difference in the speed and effectiveness of responses that draw on firm-specific versus general resources and routines. According to the dynamic capabilities literature, firms work to develop areas of core expertise around co-specialized routines and resources, which they then look to deploy in response to environmental shifts (Kogut & Zander, 1992; Teece, 2014). Mirroring the general finding that firms perform better when they are able to leverage such competencies, research on strategic CSR has shown that companies are more disciplined with their giving when it is consistent with business objectives (Porter & Kramer, 2002; Saiia et al., 2003), and that CSR that is *related* to core business competencies is more likely to produce financial benefits for the firm (McWilliams & Siegel, 2000). Extending this to societal outcomes, Kaul and Lou (2015) developed a theoretical proof that suggests related CSR contributes to social welfare more efficiently than comparable government or charity initiatives.

Applied to disasters, this points to a distinction between firms that respond with general resources—such as donating money to relief efforts—versus those that respond by reconfiguring areas of core expertise. Financial donations undoubtedly make a valuable contribution to disaster relief, but they also insert a layer between the firm and aid implementation, while offering little additive value beyond the cash infusion. This may contribute to a relatively slower and less

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effective response. In comparison, leveraging areas of expertise has the potential to add unique value that contributes to the effectiveness of a relief effort without imposing significant transactional or operational costs. Such efforts can also be undertaken quickly, as they draw on existing products or services and generally don't require intermediaries for implementation.

For instance, it stands to reason that the impact of disaster giving will be greater when a firm contributes goods that are similar to those it has expertise producing for private sale. For the firm, the marginal cost of providing such goods is relatively low, as significantly new skills and routines are not required for their production. Quality and speed of delivery should also be high, given the firm's production competencies. In comparison, it will likely be costly for other entities—corporate or otherwise— to provide similar goods if they lack the relevant capabilities (Besley & Ghatak, 2007). The implication is that related CSR should be more efficient, cost effective, and high quality than other options. For instance, following the 2004 Indian Ocean tsunami, Coca-Cola converted soft-drink production lines in Sri Lanka to bottle water, and used its own trucks to distribute the water to victims. In so doing, Coke was able to quickly produce and distribute an essential good in a more cost efficient and effective manner than has been observed for other providers and other disasters (Fritz, 2004). Supporting this argument with formal models, Kotchen (2006) compared the provision of public goods that firms produced jointly with private goods, versus those that they produced separately. Results suggested that the social welfare impact is greater in the first case because joint production integrates competencies used for the production of private goods that positively affect the equilibrium provision of the public good. The effect is not present when such competences are absent, however, such as when an information-technology firm donates food or a fraction of its revenues.

Moreover, corporate aid is likely to be more efficient and effective when it leverages firm-specific competencies. The types of expertise required for many aspects of disaster response—for instance, construction, logistics, and planning—have analogs in business (Wassenhove et al., 2008). Firms incur little cost when they contribute such expertise, but this

can have a significant impact on the speed with which aid reaches beneficiaries, as well as the overall effectiveness of a disaster response (Horwitz, 2009). The actions of DHL, an express delivery firm, offer a good case in point. DHL often assumes a lead role coordinating the reception and distribution of relief supplies after a disaster, drawing on its competencies in rapid dispatch and inventory control. When DHL has assumed the main role in these tasks, fewer donated goods have gone to waste and there has been less airport congestion in the disaster-affected nation (Wassenhove et al., 2008). Likewise, FedEx took a lead role in delivering relief goods following the 2008 floods in Mexico, leveraging its competencies in logistics and distribution to do so (Ballesteros, 2013). As such, we predict:

Hypothesis 3 (H3). Aid from locally active corporations will have a greater effect on the speed with which aid is provided to a disaster-affected nation when this giving leverages firm-specific routines and resources.

Hypothesis 4 (H4). Aid from locally active corporations will have a greater effect on a nation's recovery from disaster when this giving leverages firm-specific routines and resources.

METHODS

We tested our hypotheses with a dataset that covers every major natural disaster in the world from 2003 to 2013, as reported in the International Disaster Database (EM-DAT) from the Centre for Research on the Epidemiology of Disasters.[5] Whereas EM-DAT records all disasters, we restricted our analysis to sudden disasters, such as earthquakes and hurricanes, which have a clear triggering event, immediate disruption, and peak impacts within 30 days. We excluded slowly-emerging disasters, such as famines, because impacts unfold over a long period of time and it is difficult to identify the magnitude and timing of disaster responses. We also excluded human-caused disasters, such as 9/11, as these are often accompanied by social and political factors that affect the likelihood of receiving aid (Birkland, 1997; Klinenberg, 2003).

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[5] To register an event in the International Disaster Database, at least one of the following criteria must be fulfilled: 10 or more people killed, 100 or more people affected, a declaration of a state of emergency, or a call for international assistance. Further information can be accessed at http://www.emdat.be/.

Overall, there were 3,523 disaster-nation pairs in our analysis period (i.e., instances where a country was affected by a sudden natural disaster). Of these, we dropped 119 where the start- and end-dates of the disaster were imprecise, as well as 191 where peak impacts occurred outside of 30 days. We gathered information on the economic and human toll of each disaster using data provided by the company, Swiss Re, which tracks insured and uninsured disaster losses (Sigma, 2014), and from international-aid data provided by the United Nations Office for Coordination of Humanitarian Affairs. Data on these variables were missing or incomplete for 1,031 of the records in our dataset, which were dropped from our analysis. This left us with 2,084 discrete disaster-nation events that we used to test our predictions about the speed of aid provision (H1 and H3). For our analysis of post-disaster recovery (H2 and H4), we took into account that a nation may be affected by multiple disasters in the same year. In such cases, we added the damages for each disaster to create a collective annual disaster. This resulted in 464 country-year disasters. Collectively, the disasters in our analysis affected over 836 million people in 129 countries and caused over $1.3 trillion in damage.

For disaster aid, we built a propriety dataset with information on every donation that a nation received for 12 months following a disaster, and from what source (i.e., corporations, governments, and multilateral agencies). To do this, we began by searching Factiva and Lexis Nexis for media reports with headlines that featured a combination of the affected country, the type of disaster, and—where relevant—the name of the disaster (e.g., Typhoon Haiyan).[6] We then narrowed our sample to reports that contained information on disaster giving by searching for a Boolean combination of the term 'donate' as well as various derivations and synonyms. In total, this yielded 2,310,000 items which formed the core of our analysis. We used an automated coding process to search within each report for details about the type, financial value, date, and source of each donation. This yielded information on over 73,000 donations from more than

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[6] These databases cover newspapers, trade publications, magazines, newswires, press releases, television and radio transcripts, digital video and audio clips, corporate websites and reports, institutional websites and reports, and government websites and reports, among other sources.

34,000 corporations. For each donation, we coded those that were coming from corporations with local affiliates as reflected in the Lexis Nexis Corporate Affiliations Database. For each in-kind donation, we recorded the characteristics of the product or service in question and converted this to a monetary figure based on current prices in the affected nation (as reported in the Billion Prices Project[7]), the monetary value reported by the donor, or the reported value of similar donations from other organizations. Donations were converted into U.S. dollars using the exchange rate on the date the gift was made.

Specific details about our search strategy, coding procedures, and validity checks are discussed in an online appendix at

https://corporatedisastergiving.files.wordpress.com/2016/08/creating-a-database-of-disaster-donations.pdf.

Estimation Strategy

Our hypotheses focus on how corporate disaster giving affects the speed of aid provision and the level of disaster recovery in a nation following a sudden natural disaster. Given the impossibility of a clean experimental design where disaster-affected nations are randomly allocated into groups with different levels of corporate disaster giving and donation relatedness, we aim for the second-best econometric tool for causal inference: a quasi-experimental design. For our analysis, isolating causality requires an approach that compares relief and recovery among nations that receive different levels of corporate aid, but are otherwise similar with regard to underlying attributes and disaster impacts. The assumption of heterogeneity in corporate disaster giving, but homogeneity in everything else, is difficult to satisfy and poses an estimation challenge for conventional panel-data techniques. To wit, nations may have capacities that are independent of corporate giving, but difficult to empirically isolate, such as variance in their ability to care for citizens and manage disaster responses. Failing to take these into account may lead to biased, inefficient estimates, or spurious causation.

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[7] http://bpp.mit.edu/.

Tools such as country-specific fixed-effects and control variables can be used to help address these issues, but this imposes the assumption that *ex ante* disaster trends extrapolate to *ex post* conditions, which is often not the case, particularly over long time periods (Cavallo, Galiani, Noy, & Pantano, 2013). In comparison, traditional quasi-experimental designs, such as differences-in-differences, allow for the inclusion of unobserved confounding influences. However, these effects must be time-invariant so that they can be eliminated with temporal differences. Large sample inferential techniques like coarsened-exact matching are another way to deal with this issue. It is difficult to apply these techniques in contexts such as ours, however, because suitable single comparisons often do not exist for aggregate entities like nations (Abadie et al., 2010, 2015). The challenge is amplified when the number of potential control units or sample periods is small, such when matching similar countries affected by disasters that caused similar hardship (Cavallo et al., 2013).

Synthetic control method. Based on these considerations, we chose the synthetic control method (SCM) for our analysis, which is a quasi-experimental technique that overcomes some of the limitations of traditional matching approaches (Abadie et al., 2010, 2015). As with other matching techniques, SCM matches a focal (treated) entity with a control that is statistically similar for a set of relevant predictors, but different with regard to a focal independent variable (the treatment). Comparison units are selected to reproduce the counterfactual for the focal entity, and thus isolate how treatment affects the outcome of interest. SCM is unique, though, in that controls are a combination of multiple potential comparators, rather than single entities.

The approach works by using an algorithm that, first, evaluates the capacity of every entity not affected by an intervention to emulate pre-treatment characteristics of the treated entity. From this, weights are assigned to multiple control entities, which are then combined to form a synthetic comparator that closely resembles the treated entity, except for the presence of the intervention (see Abadie et al., 2010, 2015 for detailed discussions). The approach is also capable of matching entities over long pre-treatment time-period. As Abadie et al. (2015: 498)

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note, this effectively controls for unobserved variance, as "only units that are alike in observed and unobserved [factors]…should produce similar trajectories on the outcome variable over extended periods of time." As applied to our analysis, this means that SCM matches each treated nation with a combination of carefully selected countries in the control group: a synthetically created nation. For instance, no one country approximates Chile in the years leading up to the 2010 earthquake and tsunami. However, features of Argentina, Brazil, Colombia, Paraguay, Brazil, Mexico, and the United States can be integrated in different proportions to form a synthetic Chile that is a close match on features that predict the speed of disaster relief as well as the nation's historical levels of social welfare.[8]

The efficiency of SCM centers on the capacity of the algorithm to minimize for each pre-treatment period, the distance between treated entities and each of the control entities on a case-by-case basis. As a result, significance levels are not computed as in traditional panel-data techniques, and effect sizes are interpreted directly as the difference between the values for treated versus control entities on the outcome of interest (Abadie et al., 2015). The statistical likelihood that observed outcomes are the result of treatment versus chance are calculated using placebo tests. The approach works by telling the SCM algorithm that entities in the control group have received treatment (even though they have not). These 'placebo' entities are then matched with synthetic counterparts, and outcomes of interest are assessed. Repeating this analysis for all non-treated entities creates a distribution of outcomes that are essentially observed by chance. This distribution of false treatment effects is then used to compare with the actual treatment effects and generate p-values (see Abadie et al., 2015).

Variable Definitions

Outcome variables. Our analysis features two outcome variables: the *speed of aid provision*, and; a nation's *disaster recovery*. As with previous studies of disaster management,

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[8] Our online appendix shows how the SCM algorithm combines features of these nations to approximate 2010 Chile. See https://disastergiving.files.wordpress.com/2016/08/synthetic-control-method.pdf.

we used the portion of total disaster aid provided in the four weeks following a disaster as a proxy for the speed of aid provision (Day et al., 2012; O'Donnell, 2009). We analyze a nation's recovery from disaster based on the annual growth rate of its Human Development Index (HDI) score, which is a measure of aggregate social welfare (Anand & Sen, 2000). HDI is calculated annually by the United Nations Development Program and tracks a nation's level of health and longevity, knowledge and education, and standard of living.

Treatment variables and levels. For hypotheses 1 and 2, our treatment variable is the share of *aid from locally active firms*. We used the Lexis Nexis Directory of Corporate Affiliates to determine which firms had a subsidiary in an affected country, and were thus 'locally active'. Our variable is the amount of aid from these firms divided by the total amount of aid received by a nation in the year following a disaster. To test our hypotheses, we analyzed three levels of treatment. The distribution of corporate giving is highly skewed, which means that is not an efficiency strategy to select treatment levels based on the mean value and standard deviations. Instead, we use the 75th (7.7% of aid is from locally active MNEs), 95th (24.5%), and 99th (44.4%) percentiles as treatment levels (see Caravallo et al., 2013 for a similar approach).

For hypotheses 3 and 4 we developed a measure of *related giving* that reflects the degree to which disaster aid leverages firm-specific routines or resources. To calculate this, we began by using a firm's four-digit SIC code to identify its key business activities. We coded the dollar amount of in-kind donations that aligned with these activities as *related* [i.e., products, services, or activities that are relevant to the firm's market operation (e.g., Bayer providing medicines in response to Typhoon Haiyan)]. Details about how we coded related versus unrelated giving can be found at https://disastergiving.files.wordpress.com/2016/08/creating-a-database-of-disaster-donations.pdf. Our specific variable is the value of related aid divided by the total value of disaster aid from locally active firms. Again, we used three treatment levels in our analysis. As the distribution for relatedness is relatively normal, we used the mean (26.9% of corporate aid is

in the form of related giving) and +/- one standard deviation (11.5% and 42.4%) for our treatment indicators.

       Predictor variables. We created a synthetic counterpart for each treated nation using the STATA algorithm developed by Abadie et al. (2010). For all matching, we included a variable for the economic hardship caused by a disaster, as reflected in USD amount of damage to property, crops, and livestock reported by Swiss Re and EM-DAT. Beyond this, however, different predictors are relevant for the speed of aid provision versus a nation's recovery from disaster (Day et al., 2012; Ray, 1998; Wassenhove et al., 2008). As such, we added different matching variables for these two analyses.

       Speed of aid provision. Studies of disaster management and corporate disaster giving have suggested that key predictors for aid speed include the size of a nation's economy, it's openness to aid, and the prominence of a disaster (Eisensee & Strömberg, 2007; Stromberg, 2007). To this end, we used the following predictors in our matching: 1) *size of the economy*, measured as the natural logarithm of a country's pre-disaster GDP per capita (PPP); 2) *human hardship*, which is the natural logarithm of either the number of people killed or number of people affected, as reported by EM-DAT; 3) *salience*, measured with the natural logarithm of (one plus) the count of news articles in Factiva and Lexis Nexis that referred to the event in the 48 hours after its occurrence; 4) *newsworthy events,* defined as the average of the median number of minutes that a news broadcast devotes to the top three news segments in a day over the forty days after the disaster (see Eisensee & Strömberg (2007) for an explanation of this indicator and a test of its effectiveness); 5) number of *disasters* at the country and 6) at the international level, which speaks to other events that may dilute the attention paid to a focal disaster and; 7) *openness to aid*, which is a binary variable indicating the national government's consent to receive foreign aid, as coded from articles in Factiva and Lexis Nexis.

       Disaster recovery. We chose predictors of disaster recovery based on their relevance to HDI as reflected in a voluminous literature on economic development and the social costs of

disaster (cf., Barro, 2009; Cavallo et al., 2013; Kousky, 2013). These are: 1) *schooling* measured by secondary education attainment; 2) *life expectancy* at birth; 3) *inflation rate* as reflected in the annual percentage change for consumer prices; 4) *trade openness* proxied by real exports plus real imports as a percentage of real GDP; 5) *investment rate,* which is the ratio of real domestic private and public investment to real GDP. Data for these variables is from World Bank's World Development Indicators (WDI). For each treated nation, we constructed a synthetic control based on 15 years of pre-disaster data. For calculating disaster recovery, we followed nations for 10 years and, thus, in some cases use forecast values for 2016 to 2023 as reported in the WDI.[9] Table 1 shows descriptive statistics while Table 2 shows correlations.

-----Insert Table 1 and Table 2 about here------

RESULTS

The Effect of Corporate Aid on Response Speed and Recovery from Disaster

Table 3 shows results for hypothesis 1, which predicted that the speed of aid provision will be faster when locally active corporations account for a greater share of disaster aid. Models 1-3 reflect the 75th, 95th, and 99th percentile levels of the treatment variable, respectively. We observe similar average values for treatment and control groups on each predictor variable, which shows that our matching was effective. P-values were calculated using the placebo method discussed above, and analyze differences for the outcome variable.[10] Results show that aid arrives significantly faster when the share of giving from locally active corporations is above the 95th percentile (24.5% of aid). In such cases, treated nations received 121% more aid during the first month as compared to synthetic counterfactuals. This difference is greater when the share of corporate giving is above the 99th percentile (44.4% of aid). Here, treated nations received

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[9] Some country-specific data were missing from the WDI, in such case, we applied the multiple-input bootstrapping algorithm for time-series-cross-sectional data as explained by Honaker et al. (2011). The online appendix provides a detailed description of the missing data, our approach and the relevant checks of accuracy and efficiency. See: https://disastergiving.files.wordpress.com/2016/08/treatment-of-country-specific-missing-data.pdf

[10] The online appendix https://disastergiving.files.wordpress.com/2016/08/inference-with-placebo-exercises.pdf provides details on the placebo tests that were used to support our analysis.

more than twice the aid of synthetic control nations by the end of the fourth post-disaster week. As such we find support for H1. **Error! Reference source not found.** shows the average accumulated donation for each of the post-disaster weeks for treatment and synthetic control groups.

-----Insert Table 3 and Figure 1 about here-----

Table 4 shows results for hypothesis 2, which predicted that the long-term recovery of a nation will be greater when locally active corporations account for a larger share of disaster aid. Again, models reflect different levels of the treatment variable, and report average values for treatment and control groups on each predictor. The outcome variable is the annual growth rate of HDI 10 post-disaster years. We observe a significant difference between HDI growth rate for treatment and control groups when locally active firms account for more than 24.5% of disaster aid. The result is stronger when firms contribute more than 44.4% of all aid. However, we do not observe a significant effect on social welfare when the share of corporate disaster giving equals, or is lower than, 7.7%.

Figure 2. The Effect of Giving from Locally Active Firms on Post-Disaster Recoveryplots year-by-year values for treatment versus control groups. In line with a large literature on natural disasters (cf., Kousky, 2013), we see an enduring negative effect of large disasters on social welfare. One year after a disaster, HDI drops by an average of 3.14% for all treatment nations and 5.92% for controls. One may argue that the difference in this immediate drop is related to the speed with which aid arrives in treated countries. We also see that the level of recovery after 10 years is notably higher for countries that receive over 24.5% of disaster aid from locally active firms. On average, the HDI growth rate for such nations is 92% higher than for their synthetic controls: this gap grows to 145.5% at the 99th percentile level of treatment. As such, our results suggest that there is a slight decrease in the positive effect on HDI at higher levels of corporate giving.

Figure 2 shows the trajectory of the change in the annual growth rate between treated and control nations. Given that the SCM algorithm generates the synthethic controls based on the pre-disaster history of the predictors of HDI, we expect no significant differences before the disaster. Accordingly, we observe the differences in the HDI growth rate during the 10 post-disaster years. Hence, we find support for hypothesis 2, but note that our results suggest corporate involvement is not panacea for disaster responses, and that a nation's long-term recovery likely benefits from the participation of other entities.

<div align="center">-----Insert Table 4 and Figure 2 about here-----</div>

The Value of Firm-Specific versus General Resources

Regarding our last two hypotheses, we found that the positive effect of corporate aid on the speed of aid provision and a nation's recovery from disaster becomes greater when the portion of this giving that is related to firms' core business increases. To analyze this, we examined the effects of relatedness (i.e., 11.5%, 26.9%, and 42.4%) at each treatment level of corporate giving (i.e., 7.7%, 24.5%, and 44.4%). Table 5 reports the results for hypothesis 3, which focuses on the effects of related giving on the speed of aid. We observe that increases in relatedness lead to significantly faster aid provision when the share of giving from locally active firms is at least 24.5% of total aid. For instance, at 95th percentile of share of corporate giving and 7.7% of relatedness, treated nations receive aid 170% faster than counterfactual nations; at the 99th percentile of giving and 44.4% relatedness, nations receive aid 260% faster than control nations. In other words, the marginal effect on relief speed increases with the share of related corporate giving. Figure 3 plots the trajectory of accumulated aid for each post-disaster week for the cases of a nation with at least 24.5% of aid coming from locally active firms and 11.4% of relatedness; and one receiving 44.4% and 42.4% respectively. In sum, these effects suggest a strong case for hypothesis 3.

<div align="center">-----Insert Table 5 and Figure 3 about here-----</div>

We followed the same procedure for hypothesis 4, which predicted that a nation's recovery from disaster will be stronger when a greater portion of corporate aid comes in the form of related giving. Table 6 reports the treatment effect of relatedness on the growth rate of HDI at each level of corporate aid and shows that it has a consistently positive and significant influence. Of particular note, we observe that the greatest average difference between treated and control nations occurs when there are high levels of corporate aid (99th percentile) and a large portion of this aid comprises related giving (42.4%). Ten years after a disaster, the average HDI annual growth rate for such nations is expected to be almost 190% greater than for comparators. To show the magnitude of the role of relatedness in the effect of corporate giving on HDI, we compare in Figure 4 the trajectory of the annual growth of HDI between two similar treated nations and their control nations. When relatedness is not considered, the difference between treated and synthetic controls is 56 percentage points lower. As such, we find strong support for hypothesis 4.

-----Insert Table 6 and Figure 4 about here-----

Robustness Checks and Supplementary Analyses

We ran a variety of supplementary models and robustness checks to deepen our analysis and bolster our findings. Results can be viewed at https://disastergiving.wordpress.com/2016/08/02/supplementary-analyses-and-robustness-output/000

Alternate modeling approach. Although SCM allows us to cleanly identify the effect of corporate aid on the speed of aid provision and the level of recovery following a disaster, we conducted additional analyses using traditional regression techniques. While there are limits to this type of approach in contexts like ours—namely that they do an inefficient job of accounting for unobserved heterogeneity—consistent results would add support to our findings, while offering insight into the influence of our treatment variables across a broader range of values.

To this end, we ran OLS regressions: country-level fixed-effects were used to control for time-invariant unobserved factors, and a variety of country-, disaster-, and time-specific variables were used to control for time-variant effects. A description of these variables, as well as their sources and definitions, is provided at:

https://disastergiving.files.wordpress.com/2016/08/additional-controls-and-coarsened-exact-matching.pdf. To enhance the econometric efficiency of these estimates, we also applied coarsened-exact matching (CEM) (Iacus, King, & Porro, 2008, 2011). The rationale for using CEM is that it provides a way to deal with unobserved variance in country-specific capacities to manage disasters and enhance HDI over time. To conduct the matching, and balance baseline nation-specific factors between treatment and the control groups, we used the same predictors as in our SCM analysis. As discussed, however, the ability of CEM to produce efficient estimates drops considerably when the number of available comparison entities or periods is low, in addition to its comparative disadvantage vis-à-vis the SCM to account for the aggregate nature of nations.

The results of this OLS regression were consistent with our reported models. We found that a one standard deviation increase in the share of giving from locally active firms resulted in a 230% increase in the portion of aid that arrived during the first four weeks after a disaster, as well as a 37.2% increase in HDI growth rate. The magnitude of these impacts increases 36% and 29.2%, respectively, for every standard deviation increase in the degree of relatedness of giving.

Alternate dependent variable. In our main analysis, we modelled a nation's recovery from disaster using its HDI annual growth rate, as this provides a measure of aggregate social welfare. Our arguments suggest, however, that the disaster response efforts of locally active firms are likely to center around restoring market functions and economic infrastructure. If this is correct, we would expect to see increases in economic as well as social indicators when corporations account for a greater portion of disaster aid. To test this, we replicated our analysis using a nation's annual growth rate of GDP in place of the correspondent rate for HDI. This

exercise replicated the significance and direction of our main findings. Aid from locally active MNEs strongly affects a nation's economic recovery from disaster. When locally active MNEs account for at least 44.4% of total aid, GDP growth for treated nations is twice that of control nations. This adds further support to our theoretical arguments. It also aligns with literature on the economic costs of disasters (Kousky, 2013) as well as work that show private investment has a larger effect than public investment on economic development (Khan & Kumar, 1997).

The influence of locally active vs. distant MNEs. Another key feature of our argument is that it predicts locally active firms will have dynamic capabilities that enhance the efficiency and effectiveness of disaster response. Thus, while disaster aid may also come from firms that do not have a presence in an afflicted nation, we excluded these from our main analysis. If aid from outside firms has a similar effect to what we observed for locally active companies, this would cast doubt on the validity of our theory. While the ideal way to check for this would be to replicate our analysis of giving from locally active firms with an analysis of distant firms, a large portion of disaster aid comes from the former. As such, there are not enough cases to support a meaningful comparative analysis: very few nations receive 24.5% (let alone 44.4%) of aid from distant firms. As the next best option, we selected a binary treatment level of 49.9% or more of aid from locally active firms. As shown at https://disastergiving.files.wordpress.com/2016/08/comparing-aid-from-local-versus-distant-mnes.pdf, we see insignificant effects of giving when locally active firms comprise the minority of corporate giving. This supports our argument that the dynamic capabilities that are relevant to effective disaster responses are related to having a local presence in the affected nation.

The effect of institutional development. One may argue that the underlying quality of national institutions may drive the efficiency of corporate disaster giving. Countries with more developed institutions may be more ready to absorb, manage, and account for aid flows. Less corruption and higher accountability may also increase the willingness of firms to donate. Further, government effectiveness should be associated with a stronger capacity to match relief

aid with victim needs. Although our SCM algorithms matched nations on several institutional variables, we took an additional step to evaluate the potential influence of local institutions on the speed and effectiveness of aid from locally active MNEs. Specifically, we stratified the application of the synthetic case algorithm by *government effectiveness*—which is a measure from the WDI that reflects perceptions about the quality of public services, the civil service and its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies—using the 50th, 75th, and 90th percentiles as cutoff values. We did not use lower percentiles because the number of available disaster countries with which to generate synthetic controls was insufficient. We did not find significant differences in the effect of corporate giving on disaster recovery across these groups (see https://disastergiving.files.wordpress.com/2016/08/the-role-of-institutional-development.pdf). This is consistent with studies of emergency international assistance that have found no evidence that policy effectiveness or capacity to implement aid affects donation magnitude (Olsen, Carstensen, & Høyen, 2003).

DISCUSSION

Globalization and the advance of neoliberal policies have made it more difficult for nations to ensure the welfare of their citizens, while simultaneously giving more power to multinational enterprises (Campbell, 2004; Frynas, 2005). As a result, MNEs are being called upon to adopt responsibilities that have traditionally fallen to governments, multilateral agencies, and NGOs. Scholars have made a number of inroads with regard to describing these practices (Matten & Crane, 2005; Scherer & Palazzo, 2011), and have begun to make predictions about when MNEs will adopt them, and with what consequences (Crilly, 2011; Henisz et al., 2014; Prakash & Potoski, 2007). Yet, as with the broader CSR literature, societal outcomes have been largely overlooked (Frynas, 2005; Margolis et al., 2007). We also lack theory to predict when and why a firm's actions will create meaningful social welfare benefits, or the conditions under which businesses might be better-able than other types of organizations to deliver such benefits.

We examined these issues in the context of sudden natural disasters; an area where there are growing calls for MNEs to address the diminishing response capacity of traditional aid providers (United Nations, 2016; White & Lang, 2012). To make predictions about the effects of corporate aid, we developed a simple theoretical framework based on the dynamic capabilities literature (Teece et al., 1999; Teece, 2007). We argued that nations will benefit when locally active MNEs account for a larger share of disaster aid because these firms are better equipped than foreign governments or multilateral agencies to sense areas of critical need following a disaster, seize opportunities to respond, and reconfigure existing routines and resources to do so. To wit, MNEs are likely to focus on rebuilding economic infrastructure and restoring market functions as soon as possible after a disaster, leading to quicker aid provision and a stronger long-term recovery. We argued that these effects would be amplified when responses leveraged more firm-specific routines and resources. We tested our predictions using a proprietary dataset comprising information on every major natural disaster from 2003 to 2013, as well as each aid donation and its source. Synthetic control analysis, as well as a number of robustness checks, provided strong support for our predictions. Corporate disaster aid appears to be not only socially beneficial, but also more efficient and effective than aid from traditional providers.

Theoretical and Practical Implications

Implications for corporate social responsibility research. Our study is relevant to ongoing debates about the desirability and effectiveness of CSR in the multinational context. As with other strands of strategic CSR research (e.g., McWilliams & Siegel, 2001), it is popular among management scholars to focus on the organizational implications of multinational CSR, while inferring societal benefits. For some scholars, it is considered intrinsically good—and certainly better than the alternative—when MNEs develop self-regulation standards (Prakash & Potoski, 2007), engage in disaster responses (Madsen & Rogers, 2014), and contribute to the provision of public goods (Sherer & Palazzo, 2011). This interpretation is open to critique, however, because societal outcomes are assumed rather than shown. Indeed, critics have argued

there are inherent problems with multinational CSR, precisely because of its strategic nature (Marquis & Qian, 2013; Surroca et al., 2013). According to this view, firms use CSR primarily for symbolic and political purposes, rather than as a tool to deliver meaningful social benefits. This has led some to argue that efforts to enhance social welfare are best left to governments and aid agencies, and should not be ceded to corporations (Banerjee, 2008; Frynas, 2005).

To the best of our knowledge, our study is the first to provide quasi-causal evidence for the social value of CSR (Lyneis & Sterman, 2015). Results indicate that—at least with regard to disaster relief—there are reasons to believe that strategic CSR is indeed the win-win proposition that proponents suggest. While we do not discount that corporate disaster responses may also be motivated by other considerations, our approach assumes that such efforts are primarily strategic and self-interested (Crilly, 2011; Henisz et al., 2014). Yet rather than symbolic responses and the sub-optimal allocation of aid (Frynas, 2005), our results suggest that firms are taking substantive action to restore economic and market functioning, as these affect their own pecuniary interests (Ballesteros, 2015; Horowitz, 2008). In so doing, locally active MNEs contribute to the speed of aid provision and long-term recovery of a host nation, while simultaneously buffering their own economic shocks and potentially currying the favor of local communities (Crampton & Patten, 2008; Madsen & Rogers, 2014). As such, our findings cast doubt on the argument that other types of organizations are uniformly better-able than corporations to handle social welfare issues (Banerjee, 2008; Sundram & Inkpen, 2004). Indeed, we find support for the idea that locally active MNEs possess capabilities that make them uniquely well-suited to undertake efficient and effective disaster relief efforts.

Our approach also contributes to the CSR literature by showing that dynamic capabilities can be usefully applied to theorize about the relationship between corporate action and societal outcomes. Unlike studies that have used this framework to explain why CSR differs among firms (Ramachandran, 2011; Scherer et al., 2016), we followed research that has shown dynamic capabilities vary systematically among organizational forms (Battilana & Lee, 2014; Lampel &

Shamsie, 2003; Rindova et al., 2007). This allowed us to make theoretically informed predictions about how and why corporate aid is more socially beneficial than aid from other types of organizations. Further, this approach helped us to theorize boundary conditions that added nuance and insight to our argument: specifically, the importance of a local presence for sensing areas of critical need and reconfiguring resources for effective responses.

Also, while our predictions are context specific, the general process of sensing, seizing, and reconfiguring are relevant to a broad range of CSR initiatives. This framework is also amenable to predicting both positive and negative outcomes (Teece, 2007), and should thus be useful for theorizing about the conditions under which corporate initiatives are more or less likely to contribute to desirable social outcomes. Indeed, while the dynamic capabilities of locally active MNEs appear to be conducive to fast and effective disaster responses, corporations may be less well-suited to deal with other situations and social problems. Of course, the efficacy of CSR may also differ among firms. We anticipate that future studies will apply dynamic capabilities at the firm level to make predictions about the variable effectiveness of CSR initiatives undertaken by different companies. Our analysis of related versus unrelated aid is a first step in this direction, and provides evidence in support of the argument that corporations create greater societal benefits when CSR leverages firm-specific competences (Kaul & Lou, 2015; McWilliams & Siegel, 2000)

Implications for managers. Companies face growing calls not only to adopt social responsibilities, but also to demonstrate that their efforts in this regard are effective: this is particularly true in the multinational context (UNCTAD, 2008; Wang, Tong, Takeuchi, & George, 2016). Indeed, the benefits a firm receives from CSR are blunted when stakeholders criticize its initiatives as being instrumental and symbolic (Frynas, 2005). As such, it is in a firm's self-interest to have objective data that show how its efforts affect outcomes of interest. Scholars have begun to develop tools for assessing the societal outcomes of public sector initiatives (e.g., Ebrahim 2003) but, as Frynas (2005: 276) notes, "linking CSR to development

[goals] requires a new repertory of tools…by which such private interventions can be justified, planned, executed and evaluated." Our study offers a first step in this direction by advancing an approach that uses official data to empirically assess the social outcomes of corporate action. While this approach requires outcome data that is reliable and also relevant to the aims of a focal initiative—and thus has some notable limitations—it nonetheless has the potential to help managers and other stakeholders more critically evaluate the social value of CSR. Such understanding may help firms maximize their social return on investment, while enhancing the strategic benefits of CSR initiatives (McWilliams & Siegel, 2011).

Our findings also have implications for corporate disaster responses. To this end, we show that disasters are one area where locally active firms have a comparative advantage over other organizations in contributing to social welfare. Moreover, these efforts appear to be enhanced when responses are fast and leverage firm-specific routines and resources. For managers, this suggests that there is value in delegating response decisions to local affiliates. It also highlights the value of tailoring responses to extant resources, versus contributing general resources or responding in ways that diverge from areas of core expertise. Results also show that nations recover more quickly and completely when corporations account for a greater share of disaster aid. Thus, while afflicted nations are the direct beneficiaries of corporate aid, firms themselves are also likely to benefit from the expedient return of economic normalcy.

Implications for disaster relief. Although there is anecdotal evidence that disaster responses benefit from corporate involvement (e.g., Horowitz, 2008; Tilcsik & Marquis, 2013; Useem et al., 2015), our study is the first to empirically model this relationship. In this regard, our findings point to an important role for locally active MNEs in disaster relief, but also key limitations. To the extent that corporate aid is motivated by a desire to restore market functions, our analysis suggests that a nation's ability to recover from disasters may be related to the level of development and openness in its economy. Put another way, the lower economic footprint of MNEs in some nations likely makes corporate giving more a function of social preferences such

as altruism, and—given our argument about the conditions for a comparative advantage of the firm—less impactful for social welfare. While it is a matter for future study, this implies that the practical influence of MNEs on disaster recovery may vary widely among nations. As such, we caution against relying too heavily on corporations in disaster responses, and see an important ongoing role for traditional aid providers.

Limitations and Future Work

In this study, we have started to elucidate the characteristics of corporate donors and their giving that may have larger implications for social welfare. However, disaster relief is only one context where MNEs are being asked to play a larger role, and caution should be taken when generalizing our findings. We anticipate that future studies will examine the influence of CSR for different social issues, and will develop context-specific predictions and findings. Such efforts will be important for generating a more robust and theoretically nuanced understanding of the relationship between corporate action and social welfare.

Also, while our study strongly suggests that corporate aid is beneficial for disaster relief, important unresolved issues remain. For instance, our results suggest that beneficiaries are likely to receive in-kind goods more quickly than other types of donations, and that these are helpful for a nation's disaster recovery. Yet disaster-management practitioners have argued that liquid resources are more valuable because in-kind donations cannot be repurposed as local needs evolve and can burden, or even clog, aid-delivery infrastructure (Fritz, 2004). Future studies should deepen our analysis and work to untangle these conflicting predictions. It may be useful to examine the variable influence of different types of related resources on disaster recovery. Some firms may have routines and resources that greatly benefit relief efforts, whereas it may be more beneficial for others to provide general resources. Further, to the extent that firms in some industries are better equipped to contribute to disaster responses, this type of analysis may also give insight into the relationship between a nation's industrial demography and its recovery from disaster. This would represent an important boundary condition on our arguments and findings.

Finally, while our analysis focused on isolating the value of aid from locally active MNEs, effective disaster relief requires coordination and cooperation amongst all responders (Cohen & Werker, 2008; Fritz, 2004). As such, the value of corporate aid may be shaped by interactions with other stakeholders, the extent to which aid decisions take into account these other providers, and the degree to which donations are complementary versus redundant. These issues were beyond the scope of the current paper, but provide fruitful terrain for future research.

CONCLUSION

Addressing the hardship caused by sudden natural disasters is a grand challenge with implications for human misery and the economic functioning of both nations and corporations. As multinational enterprises are increasingly being called upon to aid in response efforts, it is important to understand their ability to contribute to positive societal outcomes. While debates about the desirability and effectiveness of CSR in the multinational context are ongoing, our findings suggest that MNEs with operations in an affected country have unique capabilities that allow them to sense areas of critical need, seize response opportunities, and reconfigure routines and resources to respond more quickly and effectively than traditional aid providers. As such, we not only demonstrate that strategic CSR can deliver meaningful societal benefits in some contexts, but that nations benefit greatly from corporate involvement when disaster strikes.

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Tables and Figures

Table 1. Descriptive Statistics

VARIABLES	mean	sd	min	max
Donation Amount (US Million)	9.09	46.26	.014	595.45
GDP (PPP per capita)	13,730.17	14,179.09	388.20	62,571.35
Human Development Index	0.31	0.35	0.00	0.94
Human Hardship (deaths)	392.61	6,904.36	1.00	222,570.00
Life Expectancy at Birth, total (years)	70.37	8.10	42.15	83.33
Annual Number of Disasters (Nation)	7.45	7.90	0.00	33.00
Annual Number of Disasters (Global)	237.78	16.71	213.00	260.00
Newsworthy Events	8.90	2.57	2.83	29.25
Salience	18.83	17.32	0.18	50.00
Openness to Aid	35.37	18.16	0.12	137.97
Estimated Damage (US Million)	1,163.80	8,175.15	0.01	210,000.00
School Enrollment, Secondary, (% net)	70.19	21.12	6.92	99.84
Total Investment (ratio of total investment to GDP)	26.31	8.92	6.59	61.47

Table 2. Correlations

|	VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Donation Amount (US Million)	1.0000												
2	GDP (PPP per capita)	0.0945	1.0000											
3	Human Development Index	0.0965	0.1920	1.0000										
4	Human Hardship (deaths)	0.1950	-0.0545	-0.0275	1.0000									
5	Life Expectancy at Birth, total (years)	0.0457	0.7887	0.2358	-0.0469	1.0000								
6	Annual Number of Disasters (Nation)	0.0543	0.2723	-0.1742	0.0520	-0.0331	1.0000							
7	Annual Number of Disasters (Global)	0.0144	-0.0830	-0.2032	-0.0351	-0.0949	0.0164	1.0000						
8	Newsworthy Events	0.1742	0.0967	0.1501	0.0416	0.1040	-0.0119	-0.0828	1.0000					
9	Salience	0.0729	0.5090	0.1005	0.0068	0.3345	0.3749	0.0868	0.0362	1.0000				
10	Openness to Aid	0.0745	0.5714	0.0720	0.0152	0.4403	0.4057	0.0843	0.0114	0.9340	1.0000			
11	Estimated Damage (US Million)	0.5843	0.1361	0.1397	0.1122	0.1312	0.0267	-0.0652	0.2694	-0.1098	0.1205	1.0000		
12	School Enrollment, Secondary, (% net)	0.0507	0.7406	0.2088	-0.0596	0.8525	-0.0074	-0.0615	0.1081	-0.2462	0.3078	0.1251	1.0000	
13	Total Investment (ratio of total investment to GDP)	0.0068	-0.0486	-0.0540	0.0554	0.1058	-0.1211	0.0914	0.0582	0.0808	0.0425	-0.0281	0.0687	1.0000

Table 3. The Effect of Giving from Locally Active Firms on Speed of Aid

Dependent variable: % of disaster aid 4 weeks

Predictors	Model 1 7.70% (75th percentile)		Model 2 24.50% (95th percentile)		Model 3 44.40% (99th percentile)	
	Treated	Control	Treated	Control	Treated	Control
Size of the Economy	10782.72	11074.42	11677.95	11680.89	22236.14	22311.46
Human Hardship	418.47	438.71	397.28	394.78	7515.66	6872.36
Salience	15.07	16.33	17.12	17.24	25.21	23.89
Disasters (Nation)	8.75	8.95	7.24	7.31	8.46	8.69
Disasters (Global)	241.11	237.44	240.37	239.98	239.61	241.28
Newsworthy Events	8.69	8.87	8.11	8.36	7.15	7.58
Openness to Aid	0.79	0.82	0.89	0.86	0.68	0.71
Estimated Damage	811.74	810.83	1025.42	1017.85	117176.74	99815.27
Outcome Variable						
% of disaster aid 4 weeks	**17.4**	**14.6**	**43.1**	**19.5**	**58.9**	**18.4**
p-value	0.234		0.006		0.000	

Note: The table shows the mean values of the covariates used for matching cases and the magnitude of the disaster response for the analyzed period only as a reference—the synthetic control algorithm minimizes the distance between potential control disaster countries and the treated disaster country on a case by case basis.

Treated are disaster countries with a substantial share of giving locally active firms (as defined by the 75th, 95th, and 99th quantiles). The total sample of country disasters in the period 2003-2013 is 2,084.

Figure 1. The Effect of Giving from Locally Active Firms on Speed of Aid
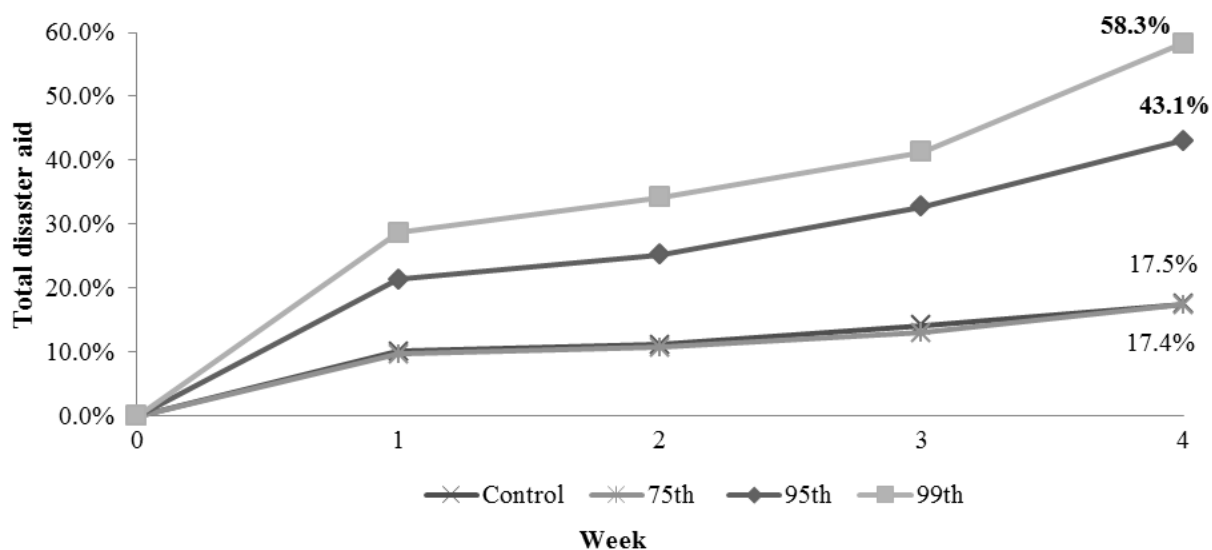
Note: The outcome variable is the accumulated amount of disaster aid. Treated are disaster countries with a substantial share of disaster giving coming from firms with operations in the affected country (as the defined by 7.7%. 24.5% and 44.4%). The total sample of country-year disasters in the period 2003-2013 is 2,084.

Table 4. The Effect of Giving from Locally Active Firms on Post-Disaster Recovery

Predictors	Model 4 7.70% (75th percentile)		Model 5 24.50% (95th percentile)		Model 6 44.40% (99th percentile)	
	Treated	Control	Treated	Control	Treated	Control
School Enrollment	70.24	70.39	89.12	84.68	82.75	83.33
Life Expectancy	70.11	71.25	80.44	79.98	76.95	75.48
Inflation rate	2.58	3.15	1.99	2.01	1.44	2.54
Trade openness	31.48	31.25	49.91	48.71	46.96	47.91
Total Investment	23.14	24.19	20.74	21.14	19.66	19.84
Estimated Damage	810.14	790.36	1008.74	1000.79	117176.74	98815.27
Outcome Variable						
% of annual HDI growth (10th post-disaster year)	**0.95**	**0.84**	**0.48**	**0.25**	**0.54**	**0.22**
p-value	0.239		0.007		0.004	

Note: The table shows the mean values of the covariates used for matching cases and the magnitude of the disaster response for the analyzed period only as a reference—the synthetic control algorithm minimizes the distance between potential control disaster countries and the treated disaster country on a case by case basis.

Treated are disaster countries with a substantial share of giving locally active firms (as defined by the 75th, 95th, and 99th quantiles). The total sample of country disasters in the period 2003-2013 is 464.

Figure 2. The Effect of Giving from Locally Active Firms on Post-Disaster Recovery (15 years pre-disaster; 10 years post-disaster)
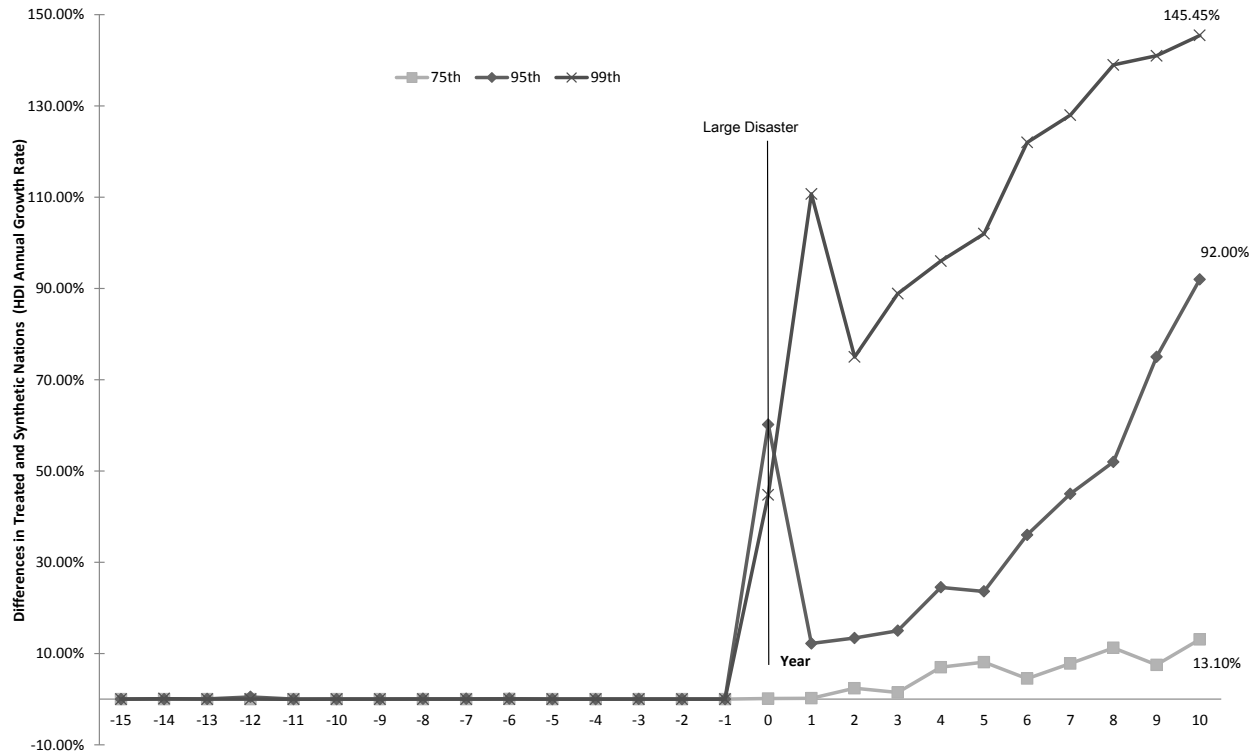
Note: Instead of showing absolute values, the figure shows the difference in HDI growth rate between treatment nations and correspondent synthetic controls. Period (0) is the disaster year. No sizeable effects before the disaster year suggest that the synthetic control method has generated efficient control nations. Treated are disaster countries with a substantial share of disaster giving coming from firms with operations in the affected country (as the defined by 7.7%. 24.5% and 44.4%). The total sample of country disasters in the period 2003-2013 is 464.

Table 5. The Effect of Relatedness in the Relationship between Disaster Giving from Locally Active Firms and Speed of Aid

Share of giving from locally active firms	7.70% (75th percentile)						24.50% (95th percentile)						44.40% (99th percentile)					
Relatedness of Aid	Model 7 11.50%		Model 8 26.90%		Model 9 42.40%		Model 10 11.50%		Model 11 26.90%		Model 12 42.40%		Model 13 11.50%		Model 14 26.90%		Model 15 42.40%	
Predictors	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C
Size of the Economy	785.6	700.5	15845.4	15511.7	17890.4	16998.2	2748.4	2478.5	17864.3	17448.8	50711.8	49788.2	0.0	0.0	7412.1	7314.1	29648.2	29008.4
Human Hardship	1025.4	1031.7	994.3	987.4	380.7	380.2	847.6	888.3	236.8	236.2	348.5	347.3	0.0	0.0	6125.3	6785.2	8211.7	8305.5
Salience	11.7	11.9	15.0	15.4	18.3	18.4	16.8	16.7	24.6	25.1	25.9	24.8	0.0	0.0	21.7	22.2	35.1	30.5
Disasters (Nation)	8.3	8.3	8.8	7.6	8.8	7.7	7.8	7.8	7.3	7.2	7.5	7.4	0.0	0.0	9.0	9.1	9.8	9.7
Disasters (Global)	289.1	289.9	240.4	229.7	240.8	222.0	310.1	309.7	248.4	247.7	239.4	239.6	0.0	0.0	211.3	215.4	240.9	241.3
Newsworthy Events	8.2	8.2	8.2	8.0	8.5	7.2	8.3	8.5	7.4	7.3	8.0	8.6	0.0	0.0	6.1	6.8	7.1	7.1
Openness to Aid	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.8	0.9	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.5	0.6
Estimated Damage	557.6	553.8	810.8	799.1	811.0	756.4	739.2	736.6	976.5	981.5	1008.7	1000.8	0.0	0.0	11594.5	11587.5	169974.6	167857.4
Outcome Variable																		
% of disaster aid 4 weeks	11.6%	10.7%	15.4%	13.3%	18.8%	15.5%	30.7%	11.4%	38.4%	16.7%	46.8%	23.8%	NA	NA	48.7%	12.5%	63.2%	17.6%
p-value	0.470		0.225		0.209		0.030		0.004		0.001		NA		0.002		0.000	

Note: The table shows the mean values of the covariates used for matching cases and the magnitude of the disaster response for the analyzed period only as a reference—the synthetic control algorithm minimizes the distance between potential control disaster countries and the treated disaster country on a case by case basis. Treated are disaster countries with a substantial share of giving locally active firms (as defined by the 75th, 95th, and 99th quantiles) and a proportion of related giving defined by 7.7%, 24.5% and 42.4%. The total sample of country-year disasters in the period 2003-2013 is 2,084

Figure 3. The Effect of Relatedness in the Relationship between Disaster Giving from Locally Active Firms and Speed of Aid

A nation whose share of corporate disaster giving is at least 24.5% and 11.5% of related giving

A nation whose share of corporate disaster giving is at least 44.4% and 42.4% of related giving
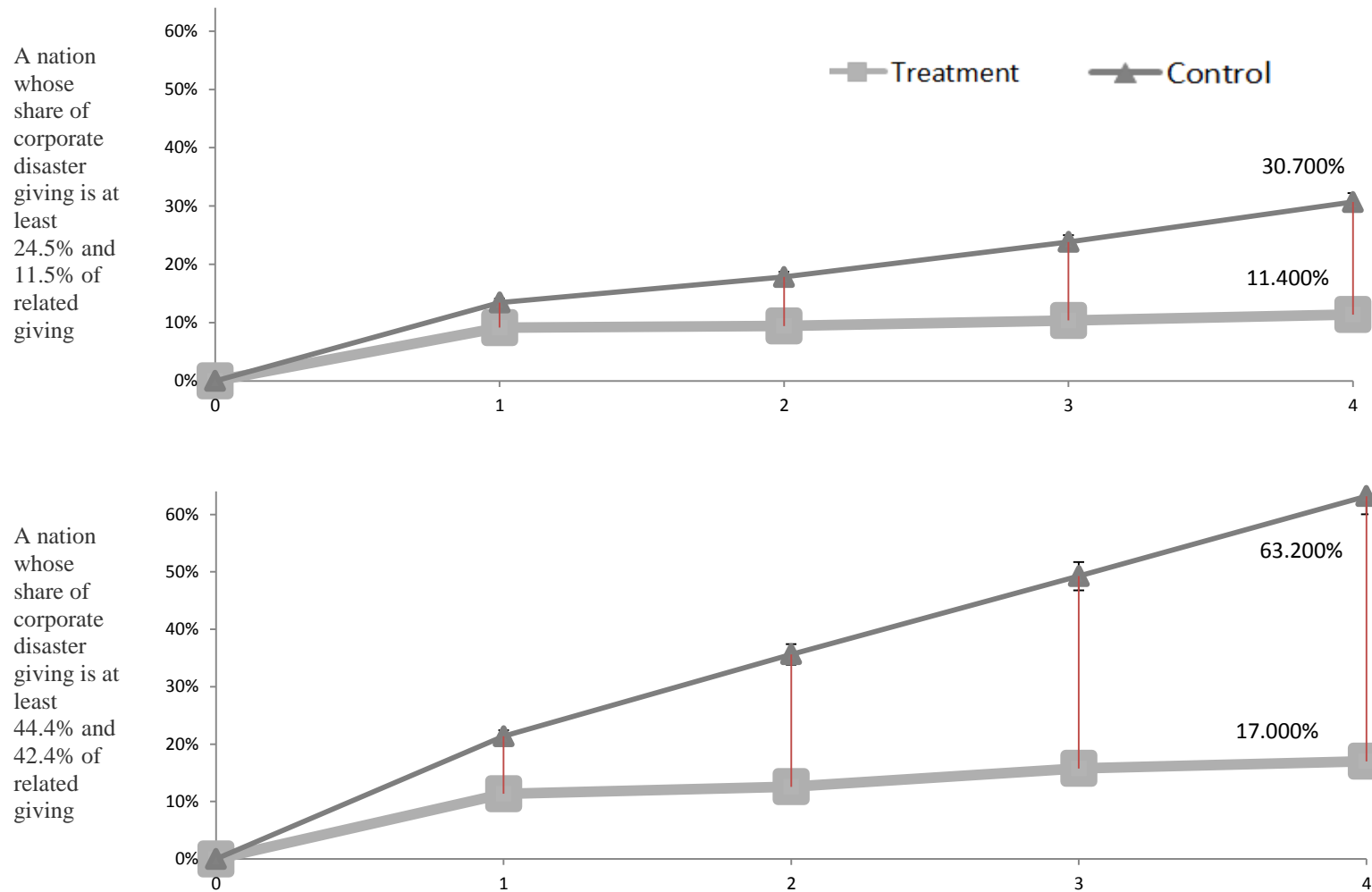
Note: The outcome variable is the accumulated amount of disaster aid. Treated are disaster countries with a substantial share of related disaster giving coming from firms with operations in the affected country (as the defined by 7.7%. 24.5% and 44.4%). The total sample of country-year disasters in the period 2003-2013 is 2,084. We did not find observations for the case of 44.4% of giving and 11.5% of related giving.

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Table 6. The Effect of Relatedness in the Relationship between Disaster Giving from Locally Active Firms and Post-Disaster Recovery

	Share of giving from locally active firms																	
	7.70% (75th percentile)						24.50% (95th percentile)						44.40% (99th percentile)					
	Model 16		Model 17		Model 18		Model 19		Model 20		Model 21		Model 22		Model 23		Model 24	
	Relatedness																	
	11.50%		26.90%		42.40%		11.50%		26.90%		42.40%		11.50%		26.90%		42.40%	
Predictors	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C
School Enrollment	63.11	64.85	69.72	70.02	71.98	71.71	0.00	0.00	0.00	0.00	89.12	84.68	0.00	0.00	65.14	66.05	91.55	90.14
Life Expectancy	67.15	67.89	68.57	67.39	72.51	73.51	0.00	0.00	0.00	0.00	80.44	79.98	0.00	0.00	68.71	69.14	81.07	82.17
Inflation rate	5.69	6.11	4.56	4.78	3.39	3.52	0.00	0.00	0.00	0.00	1.99	2.01	0.00	0.00	2.93	2.68	0.69	1.25
Trade openness	21.36	22.18	28.67	28.11	34.78	32.14	0.00	0.00	0.00	0.00	49.91	48.71	0.00	0.00	27.91	26.87	57.21	57.36
Total Investment	15.4	15.68	19.75	19.84	26.34	27.89	0.00	0.00	0.00	0.00	20.74	21.14	0.00	0.00	19.66	18.76	21.6	20.7
Estimated Damage	557.64	553.81	810.76	799.13	811.01	756.36	0.00	0.00	0.00	0.00	1008.74	1000.79	0.00	0.00	11594.47	11587.47	169974.58	97994.17
Outcome Variable																		
HDI annual growth, end of 10th year (%)	1.47	1.48	0.96	0.97	0.89	0.72	NA	NA	NA	NA	0.48	0.25	NA	NA	0.52	.24	0.55	0.19
p-value	0.374		0.317		0.224		NA		NA		0.007		NA		0.005		0.002	

Note: The table shows the mean values of the covariates used for matching cases and the magnitude of the disaster response for the analyzed period only as a reference—the synthetic control algorithm minimizes the distance between potential control disaster countries and the treated disaster country on a case by case basis. Treated are disaster countries with a substantial share of giving locally active firms (as defined by the 75th, 95th, and 99th quantiles) and a proportion of related giving defined by 7.7%, 24.5% and 42.4%. The total sample of country disasters in the period 2003-2013 is 464.

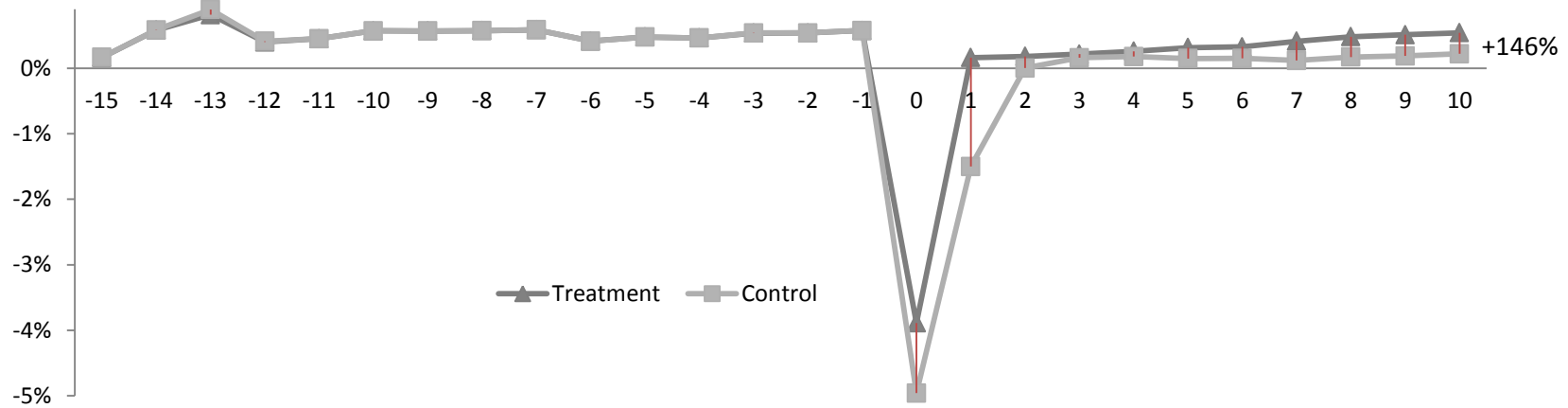**Figure 4. The Effect of Relatedness in the Relationship between Disaster Giving from Locally Active Firms and Post-Disaster Recovery**

+146%

+190%

>=44% of giving from locally active firms was closely connected with the donor's market operation
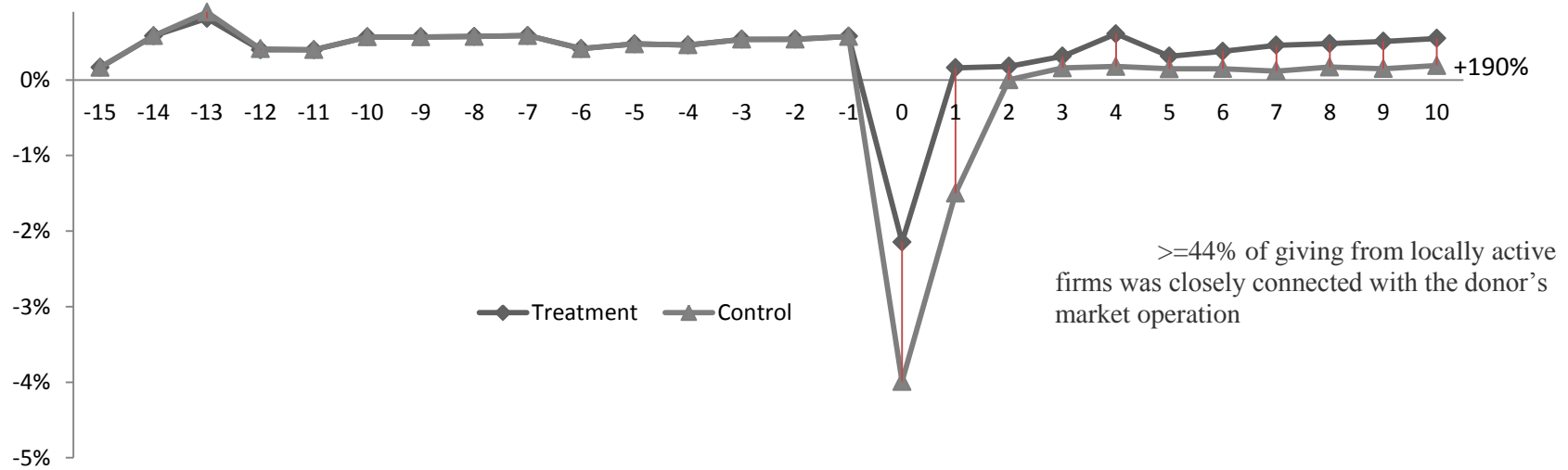
Note: The graph compares two similar treated nations and their differences in annual HDI growth with their synthetic countries. In the case below, we integrate the effect of relatedness of giving. Treated are disaster countries with a substantial share of related disaster giving coming from firms with operations in the affected country (as the defined by 7.7%. 24.5% and 44.4%). The total sample of country disasters in the period 2003-2013 is 464