DRIVERS AND CONSEQUENCES OF NON-MARKET DECISION-MAKING:
EVIDENCE FROM GLOBAL CORPORATE DISASTER GIVING

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Drivers and Consequences of Non-Market Decision-making under Uncertainty: Evidence from Global

Corporate Disaster Giving

DEDICATION

It has been 10 years. It started as the most unexpected moment in my life. Being married to you encapsulates what overcoming and succeeding means in my mind. For all the great moments during our life in Philadelphia, for all the difficult ones—I continued just for you, thanks to you. Renata, this is not a dedication of my dissertation, nor a dedication of my doctoral degree. This is a confirmation that I dedicate my life to you.

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Being the first of my family to achieve this educational degree, all the clichés apply. Perhaps the most relevant is when I include my dissertation committee in the picture. They took the risk to take a rebellious, naïve kid from Mexico City under their wing, which implied blood and sweat for them. It was not only teaching me about the academic world and aligning my work to the literature. It was psychological counseling, offering suggestions on sleep training my daughters, recommending travel ideas and, in general, being friends. I was extremely lucky to have Mike, Mauro, Tyler, and Zeke.

One thing I don't remember is that one piece of paper with research ideas that Vit did not review. I am not limiting to finished paper drafts, but also extended abstracts, the paragraph on a potential project, the diagram and I sketched when I suddenly woke up at 3:00am. He read thoroughly every single research product I created during my doctoral program; every single one. He crowded out his weekend time and family holidays to dedicate attention to guide me, teach me; over and over again.

I have no doubt that if one good day I become a successful scholar, I will think of these five professors and look back to these years at Wharton Management with immense gratitude: the financial support, the advice, the learning; the confidence, the dedication, the friendship. It was the cornerstone—a solid, wonderful cornerstone.

ABSTRACT

DRIVERS AND CONSEQUENCES OF NON-MARKET DECISION-MAKING

UNDER UNCERTAINTY: EVIDENCE FROM GLOBAL CORPORATE DISASTER

GIVING

Luis Ballesteros

Witold Henisz

The goal of this dissertation is to contribute to the understanding of the determinants of non-market strategy and its consequences for the firm and external stakeholders by studying the provision of collective goods in the aftermath of natural disasters. I use an integrative theoretical framework whose cornerstone is the strength of a firm's economic connection with a national market, or economic reliance. I build this construct by drawing on insights from the theory of clubs. In the first chapter, I argue that firms consider the relative importance of a national market's collective goods for their own operation when they decide to engage in its provision—i.e., to behave pro-socially. Using a model of economic reliance that considers the market standing of the firm, market concentration, and the country's institutional development, I empirically show that accounting for economic reliance results in a more accurate prediction of corporate pro-social behavior than widely accepted arguments in the extant literature. In the second chapter, I study the performance consequences of disaster giving by complementing the effect of economic reliance with insights from the literature on sensemaking. I argue that the firm's financial reward or loss associated with non-market decisions made under high

informational and time constraints are often socially constructed and not strongly

associated with the physical characteristics of the firm, its donation, or stakeholder needs.

This occurs because firms and external stakeholders follow different prominent and easy

to collect signals not associated with the focal decision (i.e., cognitive referents) to decide

about the contextual appropriateness of organizational decisions and spur action. While

stakeholders rely on pre-disaster media reputation, firms focus on financial performance.

In the concluding chapter, I study the effect of corporate disaster giving on the magnitude

and speed of national recovery from natural disasters. I draw on the dynamic capabilities

literature to argue that firms economically reliant to the affected country are better-

equipped than other entities to sense areas of need following a disaster, seize response

opportunities, and reconfigure resources for efficient relief efforts. The evidence shows

that nations benefit greatly from the intervention of economically-reliant firms when

disasters strike.

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PREFACE

What determines firms' engagement in the provision of collective goods that benefit external stakeholders—i.e., pro-social behavior? And what are the conditions and mechanisms of performance benefits associated with such behavior, and those of an economic surplus for external stakeholders? The goal of this dissertation is to address these questions that lie at the heart of corporate non-market strategy. I pursue this goal by studying a growing non-market strategy: the company provision of monetary and in-kind resources in the aftermath of natural disasters. Between 1990 and 2015, for instance, the fraction of the 10,000 largest multinational enterprises engaging in corporate disaster giving in any given year went from 15% to over 70% and their average donation increased 18 times. Thus, firms have been responsible for the largest increase in proportional participation to disaster aid and, for some disasters, their total donation has surpassed the combined contribution by governments, multilateral agencies, and private charity (Ballesteros, Useem, & Wry, 2017).[1]

In comparison, the literature on corporate disaster giving has expanded at a slow rate and become increasingly equivocal over time. Behind this ambiguity, there is a crucial factor that academic research has neglected: how firms' *economic reliance* to market systems —i.e., the extent to which firms sell, buy, or rent raw materials, final products, or services, or hire human capital to/from a given market system—explains the corporate

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[1] For instance, firms accounted for 55.4% of international aid for the 2010 earthquake and tsunami in Chile, 68.3% for the 2011 tsunami and earthquake in Japan and 51.7% for Typhoon Haiyan in the Philippines—more aid than all other international sources combined (OCHA, 2016).

provision of collective goods and its consequences. The essence of this relationship is captured by a manager from Coca Cola when reflecting on Coke's motives to donate in the aftermath of the 2011 disaster that devastated East Japan: *"We are part of a system. If the Japanese government cannot (effect a recovery) ... we need to rebuild,* ***we need the market to recover****,"*[2] he said. This argument was recurrent across my interviews with corporations donating to Japan and Chile in the aftermath of the 2010 disaster. These informants pointed to a strategic consideration that existing theories on non-market strategy do not capture (Dorobantu, Kaul, & Zelner, 2017).

Economic Reliance and the Corporate Provision of Collective Goods

My dissertation thus follows an integrative theoretical framework that centers on the economic reliance of firms to market systems to study the drivers and consequences of corporate disaster giving. This framework centers on insights from the theory of clubs (Buchanan, 1965), which marked a theoretical departure from the pure public-goods approach (cf., Samuelson, 1954)[3] by suggesting that universal accessibility of collective goods—i.e., the pure public good—is rare. Instead, societies are comprised by systems, or *clubs* that entities need to join to use certain physical assets and social benefits. A club is a voluntary group deriving mutual benefits from production costs and consumption rights of collective goods (Sandler, 2013).

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[2] International Public Affairs, Coca-Cola Company, in interview with the author.
[3] The theory of public goods outlines the conditions and potential threats for the establishment and sustainability of social systems of non-excludable goods that are too costly as to be provided by a private (non-central) agent and whose benefits require the organization of co-operative, collective sharing arrangements.

I argue that market systems—i.e., socioeconomic and political structures for commercial exchange, such as national markets, are economic clubs that firms join through their economic affiliation. Market systems are comprised by club goods—i.e., collective goods that are exclusive of the market and necessary to maintain, improve, or reestablish its welfare. Local infrastructure is thus a public good from the perspective of local market—i.e., in the absence of membership fees or quotas, any firm operating in the local market can use the roads or telecommunication systems. However, such infrastructure is a club good from the perspective of a global economic system in which the local market is only a part.

The intuition is simple. In the context of the disruption created by disasters, relief and recovery are club goods whose scarcity may reduce the expected profitability and sustainability of firms that rely economically in the affected market. These firms have a strategic need in the reestablishment of the market's status quo through relief (e.g., provision of water, food, and first aid), and restoration of education, health, transportation, communication, and housing. The biggest the share of a firm's financial performance explained by a disaster-stricken country, the greater the strategic value for the firm of contributing to the country's relief and recovery. That is, corporate pro-social behavior that is driven by economic reliance is in line with profit maximization and, indeed, a form of strategic consideration.

Therefore, if economic reliance to specific markets varies across firms and across time, this second-moment should play a non-trivial role in collective action among

multinational enterprises because it explains their willingness to supply collective goods. This means that firms with a negative expectation to *freeride* have a comparatively greater interest on the recovery of the market. In other words, corporate disaster giving, and corporate pro-social behavior in general, can be studied by applying essential insights from game theory (Camerer & Fehr, 2002). Identifying a prominent causal factor of corporate donations thus centers on formalizing measures of economic reliance that a given firm has in the affected country market.

What the construct of economic reliance brings to the literature?

If the causal effect of economic reliance on pro-social behavior is sizeable, the study of corporate disaster giving calls for a theoretical paradigm absent in the extant literature on non-market strategy. This literature has shown that modeling corporate pro-social behavior as a pure public good is inappropriate because such behavior may not be unselfish at all (cf., Dorobantu et al., 2017; McWilliams & Siegel, 2011). Widely evoked theories based on strategic considerations approaches emphasize the role of reputational capital (Muller & Kräussl, 2011), consumer visibility (Madsen & Rodgers, 2014), informal risk hedging (Douty, 1972), or rent-seeking behavior (Marquis & Qian, 2013). Scholars have found that corporate giving responds to institutional pressures at the local (Tilcsik & Marquis, 2013) and national levels (Zhang & Luo, 2013). To a lesser extent, social-preferences approaches argue that managers pursue psychological and sociological objectives (Charness & Rabin, 2002; Fehr & Fischbacher, 2002).

Despite such theoretical separation, the literature on corporate disaster giving and the broader scholarship on non-market strategy continue to rely largely on the Samuelsonian assumption that private actors benefit of the collective good by virtue of their provision (Andreoni, 1989; Dorobantu et al., 2017; Kaul & Luo, 2017; Roberts, 1984; Yildirim, 2013).[4] However, this assumption is not easy to generalize.

Imagine that Coke had no operations in Japan in 2010 and no future interest to enter such market. Scholars would argue that Coke's donation resulted in a direct benefit, such as a warm glow that it is appropriated by its employees (Flammer & Luo, 2015; Yildirim, 2013) or an indirect benefit, such as buttressing the support of soda consumers interested in the welfare of Japanese victims (Wilburn & Wilburn, 2011). However, it is unclear how Coke appropriated the collective good *per se*. In other words, it is unclear how firms with no economic reliance benefit directly from the rebuilt roads and housing in Japan, for instance.

The sources of benefits of disaster giving for an economically-reliant firm come from the market's exclusive collective goods—i.e., club goods—and the private goods—i.e., the firm may capture direct (e.g., a warm glow) and indirect utility (e.g., reputational capital) or both. On the other hand, the benefits of firms with no economic reliance are not a function of the club goods of the affected market. Distinguishing between high and

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[4] The management literature has overcome the theoretical limitations of the public-goods model regarding the private gains associated with the provision of collective goods. On the one hand, strategic-considerations approaches hypothesize that giving is instrumental for the achievement of indirect benefits. On the other hand, the less developed literature on social-preferences explain that managers indeed achieve intrinsic gains such as the satisfaction of altruistic or reciprocal motivations (Muller et al., 2014), prestige and respect (Jia & Zhang, 2011) or the avoidance of social scorn (Zagefka & James, 2015).

low demanders of such goods thus derives in the identification of firms with a relatively high willigness to engage in pro-social behavior.

In summary, economically affiliated firms give with relatively high frequency and magnitude because they have more certain and proximate benefits associated with a market's club goods and face lower information asymmetry and transactions costs of giving than non-affiliated firms (George, Howard-Grenville, Joshi, & Tihanyi, 2016). Pro-social behavior is less frequent among non-affiliated multinational firms because they are part of a broader public-goods systems where free-riding is pervasive (Alessi, 1975; Douty, 1972).

In Chapter 1, I offer evidence that the effect of economic reliance is not explained by the traditional strategic considerations such as reputational capital with internal (Flammer & Luo, 2015) and external stakeholders (Muller & Kräussl, 2011), a social license to operate (Wilburn & Wilburn, 2011), an agency cost (Jia & Zhang, 2011), or institutional pressures (Tilcsik & Marquis, 2013). Likewise, it is not captured by the social-preferences theories of altruism (Batson & Powell, 2003) and fairness (Kahneman, Knetsch, & Thaler, 1986). Additionally, the explanatory power of economic reliance is not equaled by physical distance (Muller & Whiteman, 2008) or embeddedness (Jamali & Neville, 2011). Overall, this suggests that study that centers on economic reliance uncovers a form of strategic consideration whose effect remains understudied.

Error! Reference source not found. compares the optimization problem of corporate pro-social behavior using my approach, social-preferences' impure altruism,

and alternative strategic considerations approaches. In addition to the role of economic reliance, I integrate the role of cognitive affiliation. As noted, building on club goods and using economic reliance as baseline achieves a clear characterization of the set of agents that benefit from the market's exclusive collective goods and, consequently, have a relatively high willingness to donate to such a market. **<u>Error! Reference source not found.</u>** summarizes the predictions of my model, social preferences, and strategic considerations.

Table 1. Comparison of the optimization problem in the corporate provision of collective goods

Model		Club members (firms with economic reliance)		Non-members (firms with no economic reliance)	
		Cognitive affiliation	No cognitive affiliation	Cognitive affiliation	No cognitive affiliation
Pure public-goods		$U(X,G)$ where X is the set of private goods, G is the set of club goods, g is the private gain (e.g., a warm glow)			
Social preferences	Pure altruism				
	Impure altruism	$U(X,G,g)$	$U(X,G)$	$U(X,G,g)$	$U(X,G)$
Alternative strategic considerations		$U_{t0}(X); U_{t1}(X,z);$ where z is a form of indirect utility in time 1 (e.g., gain out of reputational capital) out of the donation made in time 0			
Clubs theory of economic reliance and pro-social behavior		$\boldsymbol{U(X,G,g)}$	$U(X,G)$	$U(X,g)$	$U(X)$

Table 2. A comparison of predictions with impure altruism and alternative strategic considerations

Main prediction: *Economic reliance affects positively donation likelihood and magnitude*		Clubs theory of economic reliance and pro-social behavior	Social Preferences' Impure Altruism	Alternative arguments in strategic considerations
Moderator	Exclusivity of the club (market size)	+	+	-
	Intervention of central providers	-	-	+
	Quality of governance (agency problem[5])	-	+/-	No clear prediction in the literature
	Social standing	+	+/-	-

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[5] Where the principal is the market membership and the agency is the club management (i.e., regulatory institutions).

The findings in Chapter 1 suggest that the average donor is a firm economically proximate to the affected market, with a prominent level of social standing, and operating in monopolistic markets. Furthermore, the frequency and size of corporate giving drops with the intervention of local governmental agencies, but increases with external intervention and national development.

Economic Reliance and the Consequences of Corporate Disaster Giving

The causal relationship between economic reliance and disaster giving should also provide a baseline for analyzing the consequences of such behavior. As explained above, when corporate revenue is a function of the economic welfare of the market, corporate donors gain benefits from the collective good—i.e., recovery—and not only from the private good—e.g., reputation. Moreover, corporate donors with economic reliance may also obtain greater private benefits than donors with no reliance because such connection materializes institutional forces affecting stakeholder expectations (Marquis, Davis, & Glynn, 2013). This aligns with the prediction that companies will act in the public good when doing so serves their own interests (McWilliams & Siegel, 2011).

However, the extant empirical literature embraces little nuance to understand the value of this argument as it commonly limits to assess post-donation differences between donors and non-donors (Crampton & Patten, 2008; Madsen & Rodgers, 2014; Muller & Kräussl, 2011). When studying the implications for firm value, scholars have left behind two important characteristics of corporate disaster giving that may affect how businesses benefit from such behavior. First, the combination of donation timing and size is,

arguably, an important determinant of the capacity to profit from disaster giving. The theoretical prediction in the extant literature is that the donation amount that would yield the largest *per* donor value should vary across companies because of differences, such as market share and size (Godfrey, Merrill, & Hansen, 2009). Nevertheless, the pattern of significantly different firms donating the same amount with different timing occurs in almost 65% of natural disasters with corporate donations in the period 2000-2015. Thus, one may expect that the lack of consideration of donation timing has led to incorrect measurements of the size and direction of the relationship between disaster giving and financial performance.

Integrating theoretical elements from the timing strategy literature (Fosfuri, Lanzolla, & Suarez, 2013; Lieberman & Montgomery, 2013) to the role of economic reliance thus is a promising method to study the material consequences of disaster giving. Holding everything else constant one face the following questions: is the first economically-reliant corporation to donate more likely to realize rents than one that is subsequently donating an identical amount or one than is subsequently donating a different amount? Additionally, is the imitator better off than the firm deviating from the amount donated by the economically-reliant first mover?

Similarly, when studying the economic consequences of corporate disaster giving for external stakeholders, accounting for the effect of economic reliance should offer a method to identify those firms with specific capabilities to generate economic surplus. That is, holding everything else constant, stakeholder benefit is a function of the

capabilities of the corporate donor to deploy its aid in a certain manner that meets their needs and expectations. Economically-reliant firms should scan post-disaster needs at the local level and deliver aid more efficiently than entities with no economic reliance (Kaul & Luo, 2017).

To the extent that decisions about how to respond to market disruptions are best made when informed by nuanced and diverse data. Economically-connected firms are likely to benefit from local relationships developed through their operations. They use local grass-roots relationships, affiliate networks, and partner organizations to assess disaster damages and to determine where aid is most urgently needed and will have the greatest impact (Useem, Kunreuther, & Michel-Kerjan, 2015). That is, a source of a comparative advantage of firms to deploy aid is their economic reliance to the affected country market.

Why is important to complement the role of economic reliance (based on club-goods theory) with managerial and institutional arguments?

Despite the arguments above, relying solely on the strategic value of economic reliance is likely to produce a theoretical framework with serious econometric deficiencies due to the behavioral and institutional forces affecting the decision to engage in disaster giving. In fact, the literature has relied heavily on the assumption of deliberative thinking among corporate donors and their stakeholders (Luo, Zhang, & Marquis, 2016; Muller & Kräussl, 2011; Zhang & Luo, 2013).

Managers are portrayed as users of computation and logics (Matten & Moon, 2008) that undertake trade-offs (Flammer, 2013), recognize relevant interdependencies (Marquis, Glynn, & Davis, 2007) and, ultimately, assess the characteristics of corporate pro-social behavior that maximizes its associated private returns (Aguinis & Glavas, 2012; Porter & Kramer, 2006). Likewise, external stakeholders are often considered as actors that have copious data on the expected outcomes of different organizational decisions (Hillman & Keim, 2001), which allow them to focus attention on the determinants of socially efficient responses (Madsen & Rodgers, 2014) and identify their substantiveness and sincerity (Cuypers, Koh, & Wang, 2015).

However, like other non-market decisions, corporate disaster giving occurs under conditions of high uncertainty, causal ambiguity, and time pressure. First, the potential material and human impacts of disasters to the firm and the market are often difficult to estimate. Information on the social need is often unavailable or inaccurate for months (Kousky, 2013). Firms often make donation decisions that conflict with the logics of market operation (Lampel, Shamsie, & Shapira, 2009) and follow referents not necessarily associated with the characteristics of the emergency (Wassenhove, Tomasini, & Stapleton, 2008). The mining firm Anglo American, for instance, used its annual social budget in Chile as a referent for its donation in the aftermath of the 2010 disaster.[6]

Second, a calculation of the expected benefits associated with particular characteristics of the donation is complex (Kunreuther, Meyer, & Zeckhauser, 2002).

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[6] VP of Corporate Affairs in interview with the author.

Disaster giving is an infrequent and unstructured behavior for most firms whose

projection in the annual financial plan is rare (Ballesteros, 2015). Furthermore, the

uniqueness of disasters hampers the value of experience. Firms often have to deal with

temporal institutional arrangements and societal contexts for which they lack information

(Klinenberg, 2003). They are involved with myriad non-traditional stakeholders whose

strategic role is hard to discern (Zyck & Kent, 2014). Moreover, external stakeholders

commonly lack the cognitive resources to assess the economic value of firms' choices

(White & Lang, 2012).

In these contexts of uncertainty and causal ambiguity, firms face a decisive tradeoff

when deciding to donate. Waiting can bring relevant data. Laggards have better

understanding of the association between corporate choices and stakeholder reactions

than early movers had. Yet, on average, about 84% of corporate pledges come within a

month of the disaster, when information of the impact to the firm and the market, and

stakeholder needs is scarce (E. Cavallo, Galiani, Noy, & Pantano, 2013). This suggests

that capturing rents has a comparatively short span and decision makers do not engage in

lengthy processes of exploration (Kaplan, 2008). Given these conditions, scholars have

underappreciated the possibility that the performance consequences of non-market

choices are often socially constructed.

To theoretically account for high informational and time constraints that result in a

collapse in the mental processes that facilitate deliberative thinking (Camerer &

Kunreuther, 1989; Weick, 1996), I complement the arguments from club-goods theory

with the microfoundations of institutional theory (Powell & Colyvas, 2008), and particularly the role of sensemaking (Weick, 1996). Sensemaking brings meaning to "an undifferentiated flux of fleeting sense-impressions…" (Chia, 2000).., the micro-processes behind the generation of institutions are simple and aimed at interpretation (Weick, 1996; Wry, Lounsbury, & Jennings, 2014).

In chaotic contexts, decision-makers engage in constructivism and rely on *cognitive referents* or prominent and widely available signals whose gathering entails a low transactional cost and are not necessarily associated with the focal good or decision (Santos & Eisenhardt, 2009; Whiteman & Cooper, 2011; Wry et al., 2014). Cognitive referents represent measures of appropriateness valid in a specific socioeconomic context where choices and exchanges of goods take place and help decision-makers interpret the potential consequences, its contextual appropriateness, and spur action (Bitektine, 2011).

A prominent idea in my dissertation is that firms and external stakeholders differ in the cognitive referents that they use to manage informational and time constraints. I test this idea in chapter 2 and show that while firms follow their peers' financial performance, stakeholders focus on firms' pre-disaster media reputation to form beliefs of their corporate capacity to respond efficiently to the catastrophe. A positive reputation, measured by the net pre-event media coverage sentiment score, provides a signal to customers, governments and other stakeholders that an organization is apt to select options whose means and ends are contextually appropriate (Galaskiewicz, 1997). Thus, reputable first movers are *likely* to accrue first-mover advantages. The legitimization of

their behavior influences consumers, for instance, to increase willingness to pay for the firm's goods when faced with market choices (Sirsly & Lamertz, 2007), workers to be more productive for a given wage (Flammer & Luo, 2015) and governments or other external stakeholders to give the firm preferential treatment (Henisz, 2014).

Comparatively, firms with bad reputations are prone to suffer larger performance shortfalls. Because these firms recurrently lead the industry in responding to disasters (Muller & Kräussl, 2011) and they may also be strong performers (Weigelt & Camerer, 1988), imitation often results in performance losses. At the same time, I argue that mimicking reputable firms generates legitimization spillovers that can override followers' bad reputation and imitating a first mover with a negative reputation results in spillover harm (Barnett & King, 2008).

Given these institutional forces, firms err frequently in their timing and imitation choices due to the salience of cognitive referents when making fast strategic decisions under high uncertainty and ambiguity (Kunreuther et al., 2002; Pahnke, Katila, & Eisenhardt, 2015). Followers find difficult to divert from the choices of high-performing first movers (Henisz & Delios, 2001) because they consider these firms comparatively successful in identifying stakeholder expectations (Servaes & Tamayo, 2013) and abiding by institutions (Rindova & Fombrun, 1999). This exacerbates the negative consequences of the divergence in cognitive referents between firms and stakeholders because firms with bad reputations see moving first as a chance to accumulate reputational capital (Muller & Kräussl, 2011).

In other words, my dissertation proposes that corporate disaster giving is a non-market area where pro-social behavior is often uncorrelated with underlying characteristics of the social need. This variance is also not directly proportional to the scale of the rent; firms gain performance benefits despite their donation being economically suboptimal. Hence, performance advantages created in institutional contexts like the aftermath of disasters are more a function of stakeholder perceptions of the contextual appropriateness of the corporate response—i.e., its legitimacy in the eyes of stakeholders—than a function of its objective social value. This proposition represents a departure from the extant literature where the material benefits are mostly associated with the characteristics of the organizational choices and the physical characteristics of the donor (Madsen & Rodgers, 2014; Muller & Kräussl, 2011).

Finally, a systematic evaluation of the implications of corporate disaster giving for stakeholder welfare is absent in the empirical literature; a reflection of the focus on the broader scholarship on non-market strategy (cf., Aguinis & Glavas, 2012; Mellahi, Frynas, Sun, & Siegel, 2015). The idea that societies benefit from corporate disaster giving has generally been assumed rather than systematically evaluated. Conceptually, the topic has been subject to significant tension. Some work, for instance, suggests that corporate intervention focuses more on firm goals than stakeholder interests, symbolically addressing them but not genuinely responding to them (Cuypers et al., 2015; Marquis & Qian, 2013). At the essence of these empirical issues is the lack of theory to predict the conditions and mechanisms under which corporate pro-social behavior generates social value (Dorobantu et al., 2017; Kaul & Luo, 2017).

When building a theoretical argumentation based on economic reliance for studying the economic value of disaster giving, Professors Michael Useem, Tyler Wry and I considered that disaster-stricken nations may obtain disaster relief and recovery from different sources. Here we confronted the question that, while the business community has the potential to contribute to social welfare based on their resources and influence, this work may be best left to entities such as government—e.g., USAID—and multilateral agencies—e.g., UNOCHA—that specialize in these activities and can be held accountable for their pursuit (Frynas, 2005; Sundaram & Inkpen, 2004). We then suggest considering the unique capabilities of firms as a social entity, and the situations where these capabilities are likely to be deployed in ways that yield positive social outcomes.

We chose the literature on dynamic capabilities (Teece, Pisano, & Shuen, 1997) as an ideal theory that complements club-goods theory to conduct this comparative evaluation of the social value of corporate giving. Studies in this literature examine how firms sense threats in the external environment, seize response opportunities, and reconfigure routines and resources to do so (Teece, 2007). Although, this approach is commonly used to explain variance in firm-specific performance, there is evidence that dynamic capabilities vary systemically among entities with different forms (Rindova & Kotha, 2001). Recent work applies the dynamic capabilities framework to study the management of stakeholder expectations via corporate diplomacy (Henisz, 2016).

We draw on this work to argue that firms have dynamic capabilities that enable them to address social needs in the aftermath of disasters more effectively than other types of

entities. Following Teece (2007), we decompose dynamic capabilities and suggest firms with economic reliance in disaster-stricken nations are well suited to sense threats and diagnose areas of critical need following a disaster, seize upon opportunities to respond, and swiftly reconfigure routines and resources to do so effectively.

We complete this argumentation by reflecting on the strategic value of firm specific versus general routines and resources. Applied to disasters, this idea 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. 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 shocks (Kogut & Zander, 1992; Teece, 2014).

Calculating a Measure of Economic Reliance

To construct a measure of *economic reliance,* I considered three variables—i.e., subsidiaries, sales, and employees—and focused on the share of company affiliates in the country (adjusted for corporate hierarchy) as the main explanatory variable. This measure captures the strategic role of organizational structure in the firm's economic dependency to geographical markets (cf., Andersson et al. 2002). The calculation entailed the following steps:

To account for the diverse types of affiliates, such as joint ventures and fully-owned subsidiaries, I used the Lexis Nexis Corporate Affiliations database to code for the type

of affiliate and its relative importance for the corporation.[7] I calculated the ratio of the

number of affiliates of a given company level in the disaster country to the total number

of affiliates of the same company level at the international level. For instance, a company

that has three of its 10 affiliates level "5" in one country has a ratio of 3/10 for level "5"

in that specific country. Finally, I obtained the sum of weighted ratios of all the available

company levels. I calculate *economic reliance* based on the status of firm affiliates on the

official day of the occurrence of the disaster.[8]

With this procedure, I produce a conservative estimation of economic reliance. First,

firms that have the interest of entering the market in the near future have, arguably, a

higher motivation to aid the system than firms with no such prospective consideration.

Likewise, firms that plan to exit the market system in the immediate future after the

occurrence of the disaster should have few incentives to give. Second, *economic reliance*

does not include export and import and sporadic activity not represented in the Corporate

Affiliations database. That is, the number of corporate donors with some sort of

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[7] This scale starts with "0," for headquarters, and it goes as many levels as the organizational tree has (e.g., a "9" indicates eight levels between the specific affiliate and the headquarters). To consider the descending relative importance of affiliates as the distance from the top organizational structure increases, I assigned each affiliate with its reciprocal inverted value. For instance, for a firm with nine levels in the organizational tree, the headquarters received the number "9;" and affiliates at the bottom of the organizational tree, a "1."

[8] For example, to calculate the economic reliance of 1.95811 that the corporation Amgen had to Turkey during the Izmit earthquake, I obtained the number of subsidiaries of a given hierarchical level in Turkey on the 1st of May of 2003.The firm had 8 affiliates of level 5, 6 of level 3, and 3 of level 2. Then I calculated the share of subsidiaries by adding the ratios of the number of affiliates by level in Turkey to the total number of Amgen affiliates by level at the international level. Amgen had in total 49 subsidiaries of level 5, 38 of level 3, and 15 of level 2. Hence, [(8/49) + (6/38)+(3/15)]. Given that Amgen has seven organizational levels on 5/1/2003 (i.e., 0 to 6), the assigned index values for Turkish affiliates are "2" for level 5, "4" for level 3, and "5" for level 2. I multiplied these values to the correspondent ratio. Thus, [((8/49) x 2)+)+((6/38) x 4)+((3/15) x 5)].

economic reliance is likely higher than the one reflected in the analyses, which is likely to result in the underestimation of its effect.

An integrative theoretical framework for the study of corporate disaster giving

Therefore, my dissertation combines the main predictions of the theory of clubs identify with sensemaking and dynamic capabilities. Through the integration of these theories, I propose a methodology to predict which firms will donate frequently and in large amounts (i.e., those that are economically reliant to a national market), when firms will be better off by donating first, imitating or deviating from the donation amount of the first donor (i.e., when economically-reliant firms focus on the cognitive referents used by stakeholders—media reputation—instead of the cognitive referent used by firms—financial performance), and when corporate donors have a comparative advantage to generate economic surplus (i.e., when they have local operations and use their core competences to deliver aid).

This integrative framework results in more precise predictions regarding the pattern of corporate giving with respect to characteristics of the event, the country in which it occurs, the timing relative to peer donations, and its competitive and economic implications than extant theories employed in the extant literature. This literature offers conflicting accounts about the characteristics of corporate donors and the conditions and mechanisms under which these donors realize performance benefits and generate

economic value for external stakeholders.[9] Most of these studies are cross-sectional

evaluations (covering a single or a few events) of publicly-listed U.S. corporations—a

reflection of the empirical literature in non-market strategy (Dorobantu et al., 2017). This

trend represents a valid concern for the achievement of statistical regularities given the

longitudinal fragmentation of the phenomenon at the international level and the diversity

in the country of origin of corporate donors (White & Lang, 2012).

Using my theoretical approach, for instance, I show that monopolistic firms engage in

pro-social behavior more frequently and in a greater magnitude than firms operating in

fragmented industries. This finding challenges empirical work in the institutional and

strategic philanthropy literatures suggesting that the benefits of corporate pro-social

behavior are comparatively large in competitive industries where the quest and returns to

differentiation are relative big (Bénabou & Tirole, 2006; Godfrey et al., 2009).

Complementing the effect of economic reliance with institutional factors that affect

how firms and external stakeholders perceive behavior (Powell & Colyvas, 2008), I show

that firms often follow wrong cognitive referents and make inefficient decisions

regarding their engagement in disaster giving. I found that 43% of first corporate

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[9] Some authors, for instance, show that firms with a local presence in disaster-stricken countries are
frequent donors (Muller & Whiteman, 2008), while others have found that the giving from locally-
headquartered firms is comparatively low in the wake of high-impact disasters (Tilcsik & Marquis, 2013).
Similarly, the literature on the consequences of corporate disaster giving provides ambiguous insights of
the strategic value of such behavior. Some authors have found that some corporate donors do not realize
sizeable returns. Particularly, firms with a reputation for social irresponsibility—proxied by the *concerns*
data from the Kinder, Lydenberg, and Domini database, which are frequent donors, obtain insignificant
short-run insurance value of their stock prices. They still suffer price drops associated with the disaster
(Muller & Kräussl, 2011). Conversely, other studies find support of a positive association between disaster
giving and financial performance measured by cumulative abnormal market returns (Madsen & Rodgers,
2014).

responders in my sample obtained revenue lower than expected from pre-disaster trends. Furthermore, almost 51% of the time, firms engaging in this behavior obtained negative performance consequences that were significantly larger than the size of their donations.

By bringing insights from institutional theory, I show empirically that firms need to consider pre-disaster media reputation when choosing when to lead or who to follow. I show that, under high informational and time constraints, the argument that moving fast with a large and substantive action accrues greater material benefits than a late, small, and symbolic choice often does not hold (Anderson, 2010; Lieberman & Asaba, 2006; Posen, Lee, & Yi, 2013). I provide evidence that the divergence in cognitive referents between firms and stakeholders is enduring even when the degrees of uncertainty and ambiguity subside.

Finally, my dissertation shows that, contrary to what the statistics on corporate philanthropy suggest (Becerra, Cavallo, & Noy, 2014; Blaikie, Cannon, Davis, & Wisner, 2014; Kellett & Caravani, 2013; White & Lang, 2012), firms with an economic reliance in the affected country detect more efficiently a country's economic vulnerability to large calamities than public and multilateral donors. We confirm that economic reliance offers firms an advantageous position to help drive timely delivery of disaster aid, thereby lessening the adverse impact of natural disasters on social welfare.

My dissertation thus offers evidence for the societal benefits of the corporate provision of collective goods and identify factors that generate and enhance positive outcomes. This addresses a weak spot in the non-market strategy literature and

complements firm-level studies by suggesting that, at least in the context of disaster aid, strategic pro-social behavior may indeed be a win-win proposition (McWilliams & Siegel, 2011).

In conclusion, the integrative theoretical framework of my dissertation reconciles the evidence of the corporate provision of collective goods with the theory on disaster giving. When complementing club-goods theory with institutional and managerial approaches, my dissertation offers insights on how core strategy theories can inform the study of non-market behavior conducted under high informational and time constraints. Chapter 1 identifies conditions and mechanisms under which private actors can overcome the collective action problems outlined by theories on public choice (Morgan & Tumlinson, 2012). Firms with comparatively high stakes in the country market are particularly prone to cooperate in its sustainability because foregoing market profit entails a high opportunity cost. Orders of economic reliance are likely to distribute stakeholders according to their strategic value for the firm (Freeman, 2010), and affect how firms relate to them (Berman, Wicks, Kotha, & Jones, 1999), and the frequency and magnitude by which firms invest resources to meet their expectations (Henisz, 2014).

Given that the findings suggest that proximity to the disaster damage affects the drivers and consequences of corporate giving, my work is relevant for the study of the non-market strategy of multinational enterprises. The exposure of these firms to disaster risk is historically at the peak due to the internationalization of capital and global interdependencies (Boehm, 2014; A. Cavallo, Cavallo, & Rigobon, 2013). Similarly, the

economic hardship associated with natural disasters is expected to continue to grow

globally because of expanding human settlement in disaster-prone areas (Cutter, Emrich,

Webb, & Morath, 2009; Dong & Tomlin, 2012; Kunreuther & Useem, 2009; von Peter,

von Dahlen, & Saxena, 2012). Traditional sources of humanitarian aid and standard

insurance practices have not proven sufficient to disaster losses, particularly in large

markets (Kellett & Caravani, 2013; Noy, 2012; Weitzman, 2011). The value of corporate

disaster giving for socioeconomic development is thus likely to increase over time. In this

context, the cardinal practical question will be how such form of pro-social behavior can

be stimulated and disciplined organically, and this dissertation may inform such

endeavor.

CHAPTER 1

"We are part of a system. If the Japanese government cannot… we need to rebuild, we need the market to recover."
Manager, Coca Cola, in the aftermath of the 2011 tsunami and earthquake in East Japan

INTRODUCTION

The study of what drives firms to incur a cost and provide goods that benefit communities external to the organization—pro-social behavior—has primarily focused on the argument that business decision makers achieve a direct or indirect gain by giving (Du, Bhattacharya, & Sen, 2011; Marquis et al., 2007; Muller & Whiteman, 2008; Porter & Kramer, 2002; Whiteman, Muller, & Voort, 2005). Yet work embedded in social preferences—a desire to win social and psychological objectives such as prestige and respect (Fehr & Fischbacher, 2002; Marquis et al., 2007; Olson, 1971), and strategic considerations—instrumental achievements that help the organization "do well by doing good" (Godfrey, 2005; McWilliams & Siegel, 2011)—provides little attention to the fact that such pro-social behavior often results in collective goods that firms themselves require for their market operation. That is, firms vary in their need for geographically located goods, such as transportation and communication systems, the availability of qualified labor force, or the maintenance of consumer purchasing capacity; these goods are critical for firm performance and sustainability (Gimeno, 1999). This chapter investigates the role of this variance in the organizational decision to supply collective goods.

Building on the theory of club goods initiated by Buchanan (1965), I argue that organizations benefit from certain collective goods through their economic reliance on markets; that is, the extent to which they sell, buy, or rent raw materials, final products or services, or hire human capital to/from geographical communities. Because market gains are a function of club goods (i.e., collective goods that are exclusive of a market system and necessary to sustain, improve, or reestablish its welfare, such as social and economic infrastructure), *ceteris paribus*, a firm's willingness to behave pro-socially in a given market is directly proportional to that market's relative economic importance for that firm. Thus, economically affiliated firms give with relatively high frequency and magnitude because they have more certain and proximate benefits associated with a market's club goods and face lower transactions costs of philanthropy than non-affiliated firms. Pro-social behavior is less frequent among non-affiliated firms because they are part of a broader public-goods systems where free-riding is pervasive (Alessi, 1975; Douty, 1972).

The case of corporate disaster giving—organizations' provision of pecuniary and/or in-kind giving to disaster relief and recovery—provides an example of the potential empirical consequences of neglecting economic reliance in the study of pro-social behavior. For instance, consider the Tōhoku earthquake and tsunami that devastated East Japan in 2011. Following the indirect-benefit paradigm, strategic philanthropy may help identify key firm-specific characteristics that led firms to give. First, some scholars would predict that firms with low social standing gave in the hope of accumulating reputational capital (Du et al., 2011; Freeman, 2010; Gardberg & Fombrun, 2006; Godfrey, 2005;

Roberts & Dowling, 2000; Sacconi, Blair, Freeman, & Vercelli, 2010). Alternatively, a recent history of financial volatility might have motivated some managers to donate because they aimed to smooth market performance by consumers' goodwill from the firm's charitable record (Muller & Kräussl, 2011; Servaes & Tamayo, 2013). Given the high magnitude of the shock, a third prediction would be that managers from corporations headquartered in Japan engaged in scarce giving (Muller & Whiteman, 2008; Tilcsik & Marquis, 2013). This result would be attributed to two factors: financial concerns constrained pro-social behavior, and the network of local philanthropy was damaged to such a degree that external aid would crowd out the local response (Ballesteros & Useem, 2016).

On the other hand, scholars drawing from institutional theory suggest that environmental factors also play a role in philanthropic incentives (Marquis et al., 2007; Zhang & Luo, 2013).These theorists would predict that corporate giving would be greater in fragmented than in concentrated markets serving Japan given that the quest and potential returns to differentiation are bigger in such settings (Bénabou & Tirole, 2006; Godfrey et al., 2009). Likewise, work on CSR predicts pro-social behavior to be inversely associated with economic development (Twigg, 2001). Hence, the Tōhoku disaster might have prompted a lesser amount of donation than shocks in less developed economies, such as the 2010 earthquake in Haiti. Finally, foreign governments' pledging might have fueled private giving due to firms' interest in using political capital as a risk-management mechanism against stakeholder opportunistic behavior (Baker, Gibbons, & Murphy, 2002; Godfrey et al., 2009; Henisz, Dorobantu, & Nartey, 2013).

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The empirical assessment of these predictions is difficult because decision-making is likely endogenous to the suggested factors. The risk of documenting a spurious relationship is particularly high since the discussed organization-specific variables (e.g., financial performance) and pro-social behavior are likely moving in the same direction as idiosyncratic unobserved factors (e.g., managerial capabilities and risk aversion). Alternatively, the direction of the causal relationship may not be clear. To address these issues, in addition to exploit the exogeneity established by the occurrence of sudden natural disasters,[10] I tried to mitigate the potential self-selection issue of geographic location and propensity to donate by coarsened-exact matching the data. In evaluating the predictions, I replicated the empirical measures for a range of theoretical arguments found in the extant literature and analyzed giving of corporations representing 40 headquarters countries to the relief fund of 3,115 natural disasters that affected 175 countries between 2003 and 2013, inclusive. The analyses suggest that the average corporate donor was a firm economically proximate to the affected market, with a high level of social standing, and operating in monopolistic markets. Furthermore, the frequency and magnitude of corporate giving dropped with the intervention of local governmental agencies, but increased with external intervention and national development. These findings are in line with the predictions of the theoretical argument that accounting for firms' varying dependence on markets provides a more efficient identification method than approaches that ignore such relationship.

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[10] These phenomena are, at least, exogenous to a variety of societal processes correlated with the private provision of collective goods. However, one can argue that the magnitude of disasters and, until some extent, their frequency may be associated with historical processes of creation and modification of human settlements.

By testing the robustness of my argument to factors drawn from institutional theory, I demonstrate that *economic reliance* has stronger explanatory power than *embeddedness* (Tilcsik & Marquis, 2013; Uzzi, 1996) or *physical presence* (Whiteman et al., 2005) alone. Finally, this study adds to the strategy literature by analyzing corporate decision making across national contexts, and applying the concept of business internationalization to the understanding of firm-market dynamics. More importantly, this chapter presents an attempt to harmonize attention to firm's market and non-market activity in a discussion of the potential role of corporate pro-social behavior in market sustainability. My study also represents a parallel to the main predictions of the literature on industry self-regulation (Baron, 2010; Barrett, 2010; Ostrom, 2003; Prakash & Potoski, 2007).[11] As I develop later in this chapter, this literature situates the motives of the provision of collective goods (i.e., public goods) in a collectivity circumscribed by the industry (Baron, 2009). My study focuses on the notion of a business community defined by geographical markets, a collectivity of industries. From this perspective, my study extends the literature on industry self-regulation to explain variance in the studied behavior across nations (i.e., groups of industries) using a profit motive.

A THEORY OF ECONOMIC RELIANCE AND THE CORPORATE PROVISION OF COLLECTIVE GOODS

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[11] For exceptional work that delineates such parallel between clubs theory and theory and industry self-regulation, I recommend the studies by Aseem Prakash on corporate engagement in environmental regulation; notably, Prakash and Potoski (2007) and Potoski and Prakash (2005).

Universal accessibility of collective goods (i.e., the pure public good) is rare. Societies are comprised by systems, or *clubs*, that entities need to join in order to use certain physical assets and social benefits (Buchanan, 1965). Consider a geographically circumscribed market (i.e., a socioeconomic and political structure for commercial exchange) a club. Only firms that are economically reliant to such local market have a direct need of the market's specific social and economic infrastructure and other market-exclusive collective goods (i.e., club goods) to provide products and services. In other words, local infrastructure, for instance, may be a public good from the perspective of the local market—in the absence of membership fees or quotas, any entity operating in the local market can use the roads or the telecommunication systems. However, such infrastructure is a club good from the perspective of a global economic system in which the local market is only a part.

Therefore, firms' dependency on a given market's collective goods is a function of its economic reliance to the market. The degree of local investment alters economic reliance. From no operation, firms may sporadically rent, buy, sell, or hire raw materials, final products, services, or human capital. Also, firms may be regular exporters, importers, or leasers via foreign subsidiaries; or manufacturers or producers via owned transformation facilities (Johanson & Vahlne, 1977).

Empirical contexts in which overall market output falls due to the exogenous destruction of collective goods, such as natural disasters, can help to empirically discriminate between theoretical arguments based on club goods theory and more widely

invoked alternatives. A firm economically affiliated with a geographical community affected by a disaster is more likely to suffer a direct economic impact than a firm with no such affiliation. In absence of full provision from a central entity such as a national government, managers acting in the firm's interest finance the reconstruction of roads, bridges, or airports because the profitability and/or sustainability of their business depend on the restitution of their value chain. That is, firms, along with governance institutions and civil society groups, share the costs and benefits of club goods (Harrison & Hirshleifer, 1989; Roberts, 1984).

Firms distribute their resources between composite demands of private goods and collective goods and face a budget constraint. It is assumed that private organizations can produce collective goods from private goods through a simple linear technology and normality in private and collective goods.[12] Consumption equality is not necessary. Under a model of club goods, if the firm is a member of the market (i.e., it has an economic reliance with a focal market system), its utility is comprised by the market's exclusive collective goods (i.e., club goods) and the firm assets (i.e., private goods). With its giving, the firm may increase its utility through a direct (e.g., a warm glow) or indirect gain (e.g., reputational capital) or both. On the other hand, if firm is a non-member, its utility is not a function of club goods.

Thus, business organizations with relatively high stakes in the market are particularly prone to cooperate in its sustainability because foregoing market profit entails a high

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[12] An indirect provision, through tax contributions, is feasible and studied below.

opportunity cost. In other words, firms' demand of club goods is positively associated

with their economic reliance in a focal market system. Because high and low demanders

of club goods are distinguishable, firms with a relatively high proneness to engage in pro-

social behavior can be identified. In sum, the main prediction, which serves as baseline

for this study, is characterized by the following hypothesis:

Hypothesis 1 (H1): The greater the firm's economic reliance on a given market, the

greater the likelihood and magnitude of the firm's engagement in the provision of

collective goods for such a market

The effectiveness of a theory that centers on economic reliance to overcome the

identification issues of alternative approaches depends on several factors that moderate

the main relationship in H1. These moderators are described below.

Exclusivity of the club or market size

A necessary condition of the sustainability of market systems is the achievement of

an optimal affiliation size because the utility that a focal organization receives from club

goods depends upon the number of other members with whom the organization shares

benefits.[13] That is, with respect to club goods, markets are sharing economies, and

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[13] By designating a private good, X_r and partially deriving (1) with respect to j and r, we obtain the marginal rate of substitution between the collective good and private good for the ith agent, $\frac{(u^i_j)}{(u^i_x)}$. If we add the club-size variable, we obtain $\frac{(u^i_{Gj})}{(u^i_x)}$. This ratio describes the rate at which a focal firm is willing to give up consumption of the collective good when the size of the system increases with additional members in exchange for the private good.

members' utility functions are interdependent. Reflecting on the example of a sports club, restricting the use of the club pool to one agent is not economically viable given maintenance costs, but allowing too many members to use the pool at the same time is also an inefficient solution (Buchanan, 1965).

Affiliation or membership, the number of private entities that consume the collective good, is endogenous but independent of the decision of who provides and maintains collective goods (Sandler & Tschirhart, 1997). That is, the firm's strategy and resources to compete in a market determine economic reliance. Thus, the cost of providing collective goods is independent of the costs of entering the business club (i.e., market entry), which are partly determined by market barriers, institutions, and other idiosyncrasies of the market and its stakeholders. Ordinarily, accessing club goods does not entail *per se* transaction costs or direct fees; market competition naturally allocates consumption rights. That is, my theoretical approach differs from club models with positive exclusion mechanisms such as a fine or a coarse exclusion.

Formally, in the absence of central provision, changes in the number of members that share a collective good affect the individual cost of the good to any focal agent. Cost inequality is possible; some club affiliates may bear a disproportionate share of the burden. Pareto optimality is observed by equalizing the marginal cost and utility and such condition represents the rate at which a firm is willing to give up utility in exchange for additional firms in the business club. When the marginal loss in utility equals the

marginal reduction in cost, the business club achieves a stable equilibrium.[14] Factors

endogenous to market competition (e.g., investment in R&D and marketing) and

environmental factors such as institutional arrangements (e.g., trading regulations) may

affect the achievement of an optimal market size.

Holding everything else constant, the smaller the number of entities holding a share

of the market in the system is, the greater the benefit per-firm. When the system is

relatively large, each affiliate is less likely to capture collective benefits (Putnam, 1998).

Conversely, the larger the size of the system, in number of entities, the lower the

individual cost of collective-goods supply due to economies of scale. Therefore,

affiliation size is never a trivial decision for the willingness to give to collective goods.

Regarding the expansion of market systems, incumbents balance marginal decreases in

market gain and collective-goods consumption and cost-sharing gains of maintaining the

system. *Ceteris paribus*, the opportunities of unpunished free-riding are positively

associated with market size. The likelihood that any given firm will engage in collective-

goods provision in any given time is inversely proportional to the number of entities in

the market. Hence, I suggest that:

Hypothesis 2.a (H2a): The greater the exclusivity of the system, the stronger the

relationship between economic reliance and the provision of collective goods

Intervention of central providers

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[14] Given this, it is clear that some collective systems may not meet the condition for optimal
membership when partial sharing arrangements are not feasible (i.e., private-goods systems) and when any
group of finite size is smaller than optimal (i.e., pure public-goods systems) (Buchanan, 1965).

The provision of collective goods in market systems adopts a variety of forms: firm provision, public provision, or a public-private partnership. Because of the ubiquity of free-riding, central entities, such as governments, have traditionally played a critical role in the provision of collective goods that are too costly for a single private entity and whose benefits require the organization of co-operative sharing arrangements. Even when a Pareto optimum may be fostered through the intervention of central entities, such intervention may disturb the perceived value of optimality for club members and, thus, firms' incentives to engage in pro-social behavior.[15]

Specifically, with full central provision, firms may substitute the foregone utility of giving (e.g., the warm glow or reputational capital) with higher consumption of private goods. Conversely, in settings where central entities do not obtain and mobilize resources in a magnitude such that the cost of collective goods is financed, the outpouring of private participation becomes frequent and critical for the maintenance, improvement, or restoration of social welfare (Ballesteros, 2013; White & Lang, 2012). This crowding-out effect is integrated in the model in the following way:

Hypothesis 2.b (H2b): The greater the relative magnitude of intervention of central entities, the weaker the relationship between economic reliance and corporate provision of collective goods

Quality of governance of the club

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[15] However, free-riding is commonly overestimated when pro-social behavior is modeled as a pure-public good because firms' giving may not be orthogonal to self-interest (Andreoni 1993, 2006, Harrison and Hirshleifer 1989, Yildirim 2013). Hence, private provision not necessarily converges to zero in large economies, as predicted by public-goods theory (Samuelson, 1954).

As discussed above, although self-management by private entities is feasible (Ostrom, 2003), market systems commonly have a government *agency.* In this context, business organizations play the role of the *principal.* In the presence of agency costs, which are paid in lieu of direct giving to collective goods (e.g., a tax levy), the greater agent's effort is, the lower the cost of collective-goods provision. However, the agency aims at maximizing her utility, $U = t - c(e)$, where t is a transfer from the membership (e.g., officer pay). The principal-agent problem (Jensen & Meckling, 1976) may arise because the agency's allocation of public resources does not lead to an optimal provision of collective goods that maximizes private effort and investment in capital. For instance, government agencies may underinvest in communication systems that would reduce coordination costs. Market members can observe the cost of collective goods, but not the manager's effort. Because this information asymmetry raises the cost of provision, the marginal benefit of cost sharing increases, which may generate an expansionary bias that results in market sizes bigger than the optimal (Sandler & Tschirhart, 1997).

Therefore, the materialization of private incentives into pro-social behavior may be a function of institutional quality and governance effectiveness (Ballesteros & Useem, 2015; Cohen & Werker, 2008; Henisz & Delios, 2001; Marquis & Qian, 2013; Zhang & Luo, 2013). Systemic issues such as lack of accountability may deter private provision of collective goods because business decision makers fear resources will not be *well spent* by the agency. In other words:

Hypothesis 2.c (H2c): The higher the quality of governance of a market system, the stronger the relationship between economic reliance and corporate provision of collective goods

Social standing

Market affiliation entails a normative influence for the firm's pro-social behavior. Affiliated firms operate amid mechanisms of accountability and expectation to contribute to social welfare. Therefore, pro-social behavior arises not only with the expectation of obtaining a direct or indirect utility, but also to avoid societal sanctions. We can think of these sanctions as an individual cost of free-riding. The cost of free-riding for the affiliated firm is a function of its donation to collective goods g_j, and the firm's relative visibility or standing in a correspondent referent group (e.g., country). Social standing connotes identifiability and goodwill from the perspective of the public (Douty, 1972). Given the standing of firm i, the public expect the organization to contribute at least $g_1^i + g_2^i +, ..., + g_{n+m}^i$ at some point in time. The organization may receive a societal sanction if its total contribution, g^i, is below social expectation, that is, if $g^i < \sum_{j=1}^{n+m} g$. Such sanction will be stronger if the public believes that the firm's giving is necessary for the improvement, sustainability, or recovery of the system's status quo, which arguably is positively related with the firm's standing. Therefore, I expect that:

Hypothesis 2.d (H2d): The higher a firm's social standing in the market system, the stronger the relationship between economic reliance and corporate provision of collective goods

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To summarize, a comparison of the optimization problem using my approach vis-à-vis social-preferences' impure altruism and alternative strategic-considerations approaches is shown in **Error! Reference source not found.** in the Preface. In addition to the role of economic reliance, a firm-community cognitive affiliation is integrated in the analysis. As noted, building on club goods theory and using economic reliance as baseline achieves a clear characterization of the set of agents that benefit from the market's exclusive collective goods and, consequently, have a relatively high proneness to donate to such a market. Likewise, Table 2 contrasts the predictions of my approach vis-à-vis social preferences and strategic considerations.

CREATING A DATASET OF DISASTER GIVING

Regarding the empirical setting, I have coordinated a collaborative project with researchers in Wharton and UPenn's Department of Computer and Information Science to build, arguably, the largest database on disaster aid at the international level. The output of four years of data collection and coding using a combination of manual and automatic procedures, the dataset covers every monetary and in-kind donation from firms, governments, multinational agencies, and non-governmental organizations reported in news media to the relief and recovery fund of all natural disasters that affected the world from 1990 to 2015.[16] The coded data of corporate aid comprises 93,247 donations from 38,980 firms from 83-headquarters countries to 4,637 natural disasters that hit 176 countries in the period 2003-2015.

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[16] I covered newspapers, trade press, magazines, newswires, press releases, TV and radio transcripts, digital video and audio clips, corporate websites and reports, institutional websites and reports, and government websites and reports, among other sources.

We conducted Boolean searches of combinations of the name of the affected country

(e.g., United States), the type of the disaster (e.g., Hurricane), and in some cases the name

of the disaster (e.g., Katrina). These searches resulted in over 2,310,000 reports from

which we searched for mentions of cash and in-kind donations (i.e., free products,

services or labor) from business organizations. To make these reports computationally

tractable, we applied differential language analysis to code information on the donor

organization, the characteristics of the donation (i.e., in-kind, monetary or both, amount,

currency, and timing), the target entity (i.e., government agency, NGO, or victim group),

the target area or sector (e.g., rebuilding of schools), the initiator within the firm (i.e.,

employees or top management), and the organizational vehicle (e.g., subsidiary, group of

employees, department or unit).

For in-kind contributions, we monetized the total value of the goods using the

monetary value reported by the donor, when available; if not, we used the value of

similar donations reported by other donors. Where neither of these two sources was

available, we calculated the value of the donation using current prices in the affected

nation. We also converted values into U.S. dollars when necessary using the exchange

rate on the donation date.

We coded giving from economically-reliant corporations and the degree to which

disaster aid leverages firm-specific routines or resources. We used an automated coding

process to search within each report for details about the type, financial value, date, and

source of each donation. A group of researchers coded donations that were coming from

corporations with local affiliates as reflected in the Lexis Nexis Corporate Affiliations database. 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 number of in-kind donations that aligned with these activities as related [i.e., products, services, or activities that are relevant for the firm's market operation (e.g., Bayer giving medicines in response to Typhoon Haiyan)].

Then, we randomly selected a sample of 5% of coded donations. A group of researchers not involved in the earlier procedures checked for measurement error. We repeated this process with a separate group. This resulted in fewer than 5% of the selected sample that marked as inaccurate. About 60% of these errors were associated with monetizing the in-kind value of donations, with less than 8% of the donations were incorrectly marked as related giving. The rest of sample of discrepancies were due to missing data on the nature of donor's business. Figure 1 illustrates an example of our coding.

Figure 1. Coding donations from economically-reliant corporations and aid associated with the donor's core operation

We first ask, does the donor firm has an affiliate in the affected country?: (0,1)

$10.0 M
AngloAmerican
1

$4.5 M
JCC
0

We code this amount as giving from a locally active firm

Then we ask, is Anglo American's donation related with an activity instrumental for its market operation or where the firm can use its market resources and routines?

Market-nonmarket Relatedness:
% of in-kind donation related to the donor firm's core business

Cash=
$1.25 M

In-kind=
$8.75 M

$ 1.2 M
Food & medicines

$ 7.55 M
Constructing school buildings with mining-related resources and skills

Then, we coded that 75% of Anglo's donation was related giving from locally active firm

Finally, I hired independent researchers to conduct two different procedures to verify the quality of the dataset using third-party sources such as company sustainability reports. We randomly selected five percent of the events (156) for the period 2003-2013 and researchers searched reports using Google, Lexis Nexis, and Factiva. From this procedure, 5.1% percent of the selected events (8) had data inaccuracies, e.g., donation amount, date of donation. We had access to exclusive information of donation for the 2010 tsunami and earthquake in Chile via the Chilean government. By comparing our database with the list of donors given by the Chilean government, we found that our dataset comprised 68% of the official source. Our tracking did not include donating frequency of small- and medium-sized Chilean, non-multinational enterprises. In terms of magnitude, our dataset accounted for 92 percent of the total corporate aid for the event.

When available, we corroborated the accuracy of the data using external sources: a) the Financial Tracking System (FTS) of the United Nations Office for Coordination of Humanitarian Affairs (OCHA), which is a global database that records self-reported international humanitarian aid for different humanitarian crises.[17] The FTS has information on corporate donation for about 3 percent of the tracked events; and government and NGO donation for about 10 percent of the tracked events. In all cases, for corporate giving, the built dataset was larger than the FTS dataset. b) Disaster corporate aid trackers of the Corporate Citizenship Center (CCC) at the U.S. Chamber of Commerce Foundation.[18] This source provided information on corporate donation for 0.61% of the tracked events. In all cases, our database was larger than the CCC dataset.

For my dissertation, I merged this proprietary database with several other event-specific (e.g., Swiss Re's SIGMA database on disaster insurance), country-specific (e.g., The World Bank's World Development Indicators), and firm-specific (e.g., Lexis Nexis' Corporate Affiliations and Capital IQ) databases. Additionally, I built a dataset that reports media reputation of the firm one year before and after the official date of the disaster. The measure uses computer linguistic software, as implemented by Factiva, which quantifies the tone (i.e., sentiment) of each media report.

The database offers a more efficient empirical tool for observing the effect of organizational, industry, country, time, and event variance, and mitigating unobserved

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[17] For information about the method of collection of FTS data and their verification, visit the following site: http://fts.unocha.org/pageloader.aspx?page=AboutFTS-Data.

[18] These data are available at http://www.uschamberfoundation.org/corporate-citizenship-center/disaster-corporate-aid-trackers.

heterogeneity than existing studies on corporate giving, which traditionally focus on single or a few events, one geographical context (e.g., the U.S.), and a type of organization (large, publicly listed firms).

Scholars in specific sub-fields in the management literature may find benefits from the use of these data. For instance, international business scholars can increase their understanding of the role of internationalization and country-specific risk and uncertainty on pro-social behavior. Taken together, the frequency of exposure to systemic shocks that affect local communities is higher for multinational enterprises than for single-country organizations. Accordingly, disasters are relatively likely to affect the strategic trajectory of MNEs.

EMPIRICAL ANALYSIS

For studying the causal relationship between economic reliance and the frequency and magnitude of corporate disaster giving, I restrict the study to natural disasters because their frequency is arguably exogenous to the studied behavior. Furthermore, I focused on sudden disasters (e.g., earthquakes); shocks whose outbreak is clearly identified and is not significantly distant in time (i.e., more than 30 days) from the trigger (e.g., shaking and displacement of ground). Hence, I did not consider evolutionary disasters (e.g., famines or heat waves) that are long-lived events without a single, easily identifiable source or whose trigger is remote in time from the disaster peak (e.g., extended period of below average precipitation). The reason is that such disasters imply a complexity of ex-ante and ex-post socioeconomic and political factors that may be

correlated with the likelihood of receiving disaster aid (Birkland, 1997; Klinenberg, 2003; Platt, 2012). For a similar rationale, I did not include manmade shocks.

The main dataset of the firm-specific predictors is the more than 1.9 million firms worldwide of the Lexis Nexis Corporate Affiliations database (CAD). [19] The analyzed sample comprises the largest 550 multinational organizations by firm value at the international level (Capital IQ). These firms represent 40 countries based on their ultimate-parent's headquarters location.

There are 3,523 sudden natural disasters in the EM-DAT database in the period 2003—2013. I dropped 119 disasters with imprecise dates and 191 that did not meet the 30-day rule. The final list was comprised by 3,115 events that affected 173 countries.[20] On an average sample year, there were around 307 events associated with an economic loss of at least US$102 billion,[21] affecting over 166 million people[22] and killing almost 102,000 others.

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[19] This is an international directory of corporate structure of public and private companies. The CAD's criteria for content inclusion is annual revenue of $1 million or greater for privately held parent companies. For U.S. Public firms: all major publicly traded companies with U.S. located headquarters traded on one of the three major U.S. exchanges: NYSE, NASDAQ and NYSEAMEX. Also included are significant companies traded on smaller U.S. exchanges. Also included are outside service firms attached to the parent companies. Included are the parent companies and their subsidiaries, no matter where the subsidiaries are located. International companies listed generally have revenues of US$10 million or greater, in excess of 300 employee totals or substantial assets/net worth.

[20] Additionally, given that the applied econometric specifications include country-fixed effects, for some models I did not include 12 countries hit by only one disaster and considered events that received corporate disaster giving at least once.

[21] The economic impact of a disaster usually consists of direct (e.g. damage to infrastructure, crops, housing) and indirect (e.g. loss of revenues, unemployment, market destabilization) consequences on the local economy. In EM-DAT estimated damage are) given in US$ ('000). For each disaster, the registered figure corresponds to the damage value at the moment of the event, i.e. the figures are shown true to the year of the event (EM-DAT, 2014).

Dependent variable

For each disaster, I recorded a binary variable that takes value "1" if the firm donated or made a pledge and a continuous variable for the total dollar amount of the donation. Hence, I estimated two dependent variables: $Y=\{0,1\}$, *donating*; and $Y=\{0,\ldots,n\}$, *USD donated*. Given the one-year tracking window, the data reflect donations that mostly target disaster relief (i.e., giving that addresses immediate life-threating concerns), and recovery (i.e., giving that focuses on reconstruction, restitution, and resettlement and rehabilitation). The average donation of sample firms in the analyzed 10-year period was close to $1.7 million.

Main predictor: economic reliance

I used the measure defined in the Preface. I used a polynomial expansion of subsidiaries, sales, and employees as an alternative measure of economic reliance. There are two considerations regarding the sole use of sales and employees as proxies of economic reliance, which have 23 and 27 percent of missingness in the CAD database, respectively. One can argue that the restriction of the analyses to these variables reduces construct validity dramatically. Sales only accounts for the demand side of the market and it does not capture the relevance of the market as a supplier of inputs for the firm. For instance, a disaster in a developing country can potentially reduce the economic standing

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[22] People that have been injured (i.e., individuals suffering from physical injuries, trauma or an illness requiring medical treatment), affected (i.e., individuals requiring basic survival needs such as food, water, shelter, sanitation, an immediate medical assistance during a period of emergency) and left homeless (i.e., individuals needing immediate assistance in the form of shelter) after a disaster are included in this category (EM-DAT, 2014).

of a corporation buying materials from or manufacturing in such country. If the affected

country is not an important end user of the firm's goods, the period sales would likely not

be affected. Finally, some industries are under or overrepresented by sales subsidiaries.

Similar considerations apply for the share of employees as some industries and are more

intensive in their use of human capital than others. Additionally, variance in the number

of employees by country does not necessarily capture the dependency of the firm on the

market's collective goods (Sandler, 2013).

Nevertheless, to use the additional information that income and human resources

provide in robustness tests of economic reliance, I estimated a Chebyshev polynomial

expansion in subsidiaries, market share, and proportion of employees as a functional form

of economic reliance. The central tenant behind this approach is that a high-order

polynomial can be used to approximate most functional forms (Kolsarici & Vakratsas,

2015). For this calculation, I am not imputing missing values. Modeling missingness is

not expected to increase efficiency in a significant fashion given the loss in statistical

power (note that non-sales subsidiaries are not to be considered).

Sales. I calculated market share using the annual dollar amount of national sales was

calculated by adding the reported income by all the subsidiaries in a country. This

amount was divided by total dollar amount of sales for the corporation in the same period

of observation.

Employees. I divided the sum of employees by subsidiary that the firm has at the

country level by the total number of employees at the international level.

The economic reliance, k, of firm i to country m at time t has the following form:

$$k_m^i = f\left(\sigma_m^i, \omega_m^i, \varepsilon_m^i\right)_t \qquad (1)$$

where

$$\sigma_m^i$$

$$= \sum_0^n \left(\frac{number\ of\ subsidiaries\ of\ a\ given\ level\ by\ country\ at\ time\ t}{total\ number\ of\ subsidiaries\ by\ corporation\ \ at\ time\ t}\right) x\ hierarchical\ importance$$

$$\omega_m^i = \frac{\sum_0^n(sales\ by\ subsidiary\ at\ time\ t\ )}{(total\ sales\ by\ corporation\ at\ time\ t)}$$

$$\varepsilon_m^i = \frac{\sum_0^n(number\ of\ employees\ by\ subsidiary\ at\ time\ t)}{(total\ number\ of\ employees\ by\ corporation\ at\ time\ t)}$$

I considered expansions up to the 20th degree, opting for third-order polynomial based on the Bayesian information criterion (BIC).[23]

To assess the construct validity of this measure, I hired researchers to conduct an independent qualitative assessment of the accuracy of the independent variable to measure economic affiliation. A total number of 50 firms, 2.5 percent of the sample, were randomly selected. Diverse sources were analyzed to identify information of the economic importance of geographical areas during the period 2003—2013. The sources were annual corporate reports, Factiva Dow Jones, and Thomson Reuters.

Moderators

To measure *exclusivity* of the club, I built on the Herfindahl–Hirschman Index (HHI) (Rhoades, 1993) and constructed a measure of market concentration. *Exclusivity* is the sum of squares of the market share of the largest five firms in the focal country. This variable provides a normalized value of the market concentration of the business club

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[23] See Donoghue et al. (2012) and Kolsarici and Vakratsas (2015) for a discussion.

[0,1].[24] Relatively large values of the variable suggest the existence of monopolistic market systems; conversely, relatively low values are an indication of competitive, fragmented clubs. The data source is the CAD.

Agency intervention is the estimated proportion of total cost of the disaster that was financed by the national government proxied by the ratio of the estimated economic cost of the disaster to the general government total expenditure. Similarly, *external intervention* is the ratio of the estimated economic cost to the net official development assistance and official aid received. These data were obtained from the World Economic Outlook the World Development Indicators.[25] For robustness purposes, I used two binary variables for each construct. Respectively, whether the national government requested external resources and whether there was an official aid appeal or a response plan reported by the Financial Tracking System of the United Nations Office for Coordination of Humanitarian Affairs (OCHA) (e.g., a volcanic eruption in Peru in 2006). Arguably, aid appeals foster donations from outside the club system (i.e., from public-goods donors).

To proxy *quality of governance*, or agency performance, I used scale indicators based on the World Bank Worldwide Governance Indicators (WGI).[26] For selecting the

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[24] As an alternative measure, I calculated the HHI by industry (four-digit SIC code). Large values of the variable (e.g., .324 for Arrangement of Passenger Transportation in Brazil in 2009) suggest the existence of monopolistic industries; conversely, relatively low values (e.g., 0.014 for Apparel, Piece Goods, and Notions in Sweden in 2009) are an indication of competitive, fragmented clubs. One argument against the use of this variable is that concept of a club is broader than a single industry. Moreover, the hardship caused by the disaster extends to different industries. A given company, hence, consider not only the firms in its own industry, but also in other industries when engaging in disaster giving.

[25] (International Monetary Fund, 2014) and (The World Bank, 2014).

[26] According to the World Bank, the WGI is a research dataset summarizing the views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial

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dimensions that better explain variance in collective-goods provision without creating redundancy, I tested for multicollinearity using variance inflation factors (VIF) and selected *government effectiveness* and *regulatory quality*.[27] For the sake of maintaining the information that each indicator captures, I run interactions with individual betas. For example, in 2010, Haiti had low government effectiveness (3) and regulatory quality (17) in comparison with Belgium (93 and 86, respectively). Finally, *standing* is proxied by rank of the corporation by firm value (Capital IQ), lagged by a year related to the disaster date.[28]

Control variables

One of the estimation vectors has disaster, organization, country, month, year, and firm-by-country fixed effects to control for unobserved time-invariant factors and path-dependent CSR-related investment in the market. To account for potential yearly trends in the availability of disaster risk and aid (e.g., urbanization has increased exposure to certain types of disasters), I included year dummy variables. Additionally, I used month dummies because disasters like hurricanes show seasonal patterns in their frequency and magnitude.

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and developing countries. The six broad dimensions of governance that comprise the WGI are rule of law, voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, and control of corruption. For further information, please refer to (Kaufmann, Kraay, & Mastruzzi, 2011).

[27] *Government effectiveness* reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (Kaufmann et al., 2011). *Regulatory quality* captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The estimates range from 0 (weak) to 100 (strong).

[28] Alternatively, I used the count of regional and national newspapers articles that mention the name of the firm over a year before the disaster date in the affected country. The source was Factiva.

At the firm level, I controlled for *industry* (four-digit SIC code), and one-year lags of firm *longevity* (logged number of years), logged values of employees, revenue, market capitalization, and return on assets (percentage) because research has suggested these variables correlate with philanthropic behavior (Marquis et al., 2007; Muller & Kräussl, 2011; Servaes & Tamayo, 2013). Additionally, I controlled for *customer orientation* because firms with an end-user focus (i.e., business-to-individual industries) may have a different propensity to engage in the provision of collective goods than firms with an industry focus (i.e., business-to-business industries). Using this rationale, I conducted sub-sample tests dividing the data per the industry orientation.

At the country level, *total land area* (km^2) and *total population* may not only skew disaster risk, but also the size of market systems and the likelihood of donation. Hence, using data from the World Development Indicators (The World Bank, 2014), I controlled for the logs of these variables. Regarding event-specific controls, I used dummies for *disaster type* as some specific types may fuel public response and aid more effectively than others (Birkland, 1997). The impact of the disaster was also controlled using the relative magnitude of *killed*, number of *affected,* and associated *economic damage* (i.e., killed/total population, affected/total population, and economic damage/GDP PPP, respectively).[29] Finally, to account for *donor fatigue*,[30] the geographical distribution of shocks, and the learning effects of disasters, I included controls for the *number of*

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[29] I obtained these data the EM-DAT, The World Bank, and the International Monetary Fund (2014). Note that endogeneity may be an issue when regressing measures of disaster hardship. Arguably, hardship is endogenous to the characteristics of the philanthropic response. The following subsections explain the methods to account for this risk.

[30] Club members may face the situation of allocating scarce resources to multiple collective goods in the same fiscal exercise; early disasters may crowd out the response to subsequent shocks.

disasters by country and worldwide in a period of one year before the focal disaster date—both logged. Additionally, I accounted for the possibility that other major social, political, or economic events may have crowded out organizations' attention and financial capacity to provide collective goods (Eisensee & Strömberg, 2007; Franks, 2013). *Newsworthy events* is the average of "the median number of minutes a news broadcast devotes to the top three news segments in a day" over the forty days after the disaster.[31] Table 3 summarizes the different constructs and variables and Table 4 and 5 show descriptive statistics and correlations.

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[31] See Eisensee and Strömberg (2007) for an explanation of this indicator and a test of its effectiveness. The variable is calculated by Professor David Strömberg and is available at http://people.su.se/~dstro/.

Table 3. List of constructs and variables

Construct	Variable	
Dependent variable		
Donating	Company Donated? (1=Yes)	
USD donated	Donated Amount in USD	
Explanatory variable		
Economic reliance	Share of affiliates in the disaster country adjusted by the relative value of the affiliate	
Moderators		
Exclusivity	Dispersion of market share across firms within an affected country (sum of squares of the ratio of the of annual local sales of the largest five firms to the total sum of sales in a given country)	
Central intervention	External	Ratio of estimated damage to net official development assistance and official aid received
	Agency	Ratio of estimated damage to gross national expenditure (current US$)
Quality of governance	Government Effectiveness	Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies
	Regulatory Quality	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development
Standing	Rank of the corporation by firm value (Capital IQ), lagged by a year related to the disaster date	
Controls		
Firm-specific	Primary industry, primary sector, total assets, consumer orientation, market capitalization, total revenue, R&D intensity, ROA %	
Country-specific controls:	total population, land area in squared kilometers, GDP, willingness to receive aid (aid appeal local government)	
Event-specific controls:	Disaster type, ratio of deaths=number of people killed/total population, proportion of affected population=(number of people displaced or injured)/total population, relative economic damage=associated economic damage/GPD PPP News pressure: the median number of minutes a news broadcast devotes to the top three news segments in a day" over the forty days after the disaster Donor fatigue: annual number of disasters by country and annual number of disasters at the international level	
Robustness		
Economic reliance	Polynomial expansion in subsidiaries, market share, and proportion of total employees	
Central intervention	Agency: 1=there was an official appeal for international aid reported by the United Nations. Internal= 1 when the local government explicitly commits to cover an at least 50 percent of the associated direct damage (i.e., amount of disaster cost covered by the government divided by total estimated cost)	
Social standing	Count of regional and national newspapers articles that mention the name of the firm over a year before the disaster date in the affected country. It does not account for the sentiment of the discourse	
Physical Presence	Binary variable indicating if the firm has an affiliate in the affected country	
Degree of Poverty	Poverty headcount ratio at national poverty lines (% of population)	
Employee-driven Donation	1= the employees initiated the donation (and not the top management)	

Table 4. Descriptive statistics

VARIABLES	Mean	SD	Min	Max
Dependent variables				
Donating(Yes=1,No=0)	0.00	0.03	0.00	1.00
USD Donated	1,697,227.00	11,900,000.00	1000.00	350,000,000.00
Explanatory variable				
Economic Reliance	0.01	0.09	0.00	1.00
Moderators				
Exclusivity	0.08	0.15	0.00	1.00
Agency Intervention	1.72	11.91	0.00	178.25
External Intervention	1.54	6.87	0.00	115.36
Government Effectiveness	53.31	27.27	0.00	99.51
Regulatory Quality	51.65	28.02	0.00	100.00
Social Standing	45.85	278.99	1.00	6,000.00
Controls				
Firm				
Total Employees	74,743.85	120,956.29	0.00	2,200,000.00
Total Assets ($USDmm)	3,502,923.00	16,600,000.00	0.00	231,000,000.00
Total Revenue ($USDmm)	1,980,828.92	10,276,140.44	11.00	228,700,000.00
Market Capitalization ($USDmm)	34,156.95	48,053.16	16.50	511,887.00
Return on Assets (%)	5.02	4.49	(7.82)	38.21
R&D Expenses ($USDmm)	27,130.46	433,537.26	0.00	14,319,402.00
Net PP&E ($USDmm)	898,893.00	5,439,931.00	0.00	124,000,000.00
SG&A Expenses ($USDmm)	260,636.50	1,649,753.00	0.00	38,900,000.00
Total Enterprise Value ($USDmm)	1,671,652.00	9,995,316.00	(673,620.00)	231,000,000.00
Consumer Orientation	0.46	0.50	0.00	1.00
Country				
GDP ($USDmm)	2,751,000.00	4,559,000.00	296.00	16,770,000.00
Land Area (SqKm)	2,605,036.15	3,733,879.02	200.00	16,381,390.00
Population (Millions)	244.40	418.00	0.03	1,357.00
Event				
Storm	0.33	0.47	0.00	1.00
Flood	0.49	0.50	0.00	1.00
Earthquake	0.10	0.30	0.00	1.00
Mass Movement Dry	0.00	0.05	0.00	1.00
Mass Movement Wet	0.06	0.24	0.00	1.00
Volcano	0.16	0.13	0.00	1.00

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Table 4. Descriptive statistics

VARIABLES	Mean	SD	Min	Max
People Affected	364,080.72	2,459,571.30	1.00	67,900,000.00
People Killed	392.61	6,902.89	1.00	222,570.00
Estimated Damage	1,163.80	8,171.50	0.01	210,000.00
Annual Number of disasters (Country)	7.58	8.07	0.00	35.00
Annual Number of disasters (World)	237.78	16.71	213.00	260.00
Newsworthy events	8.90	2.57	2.83	29.25
Robustness				
Physical Presence	0.02	0.14	0.00	1.00
Degree of Poverty	26.94	15.45	2.30	75.30
Employee-driven Donation	0.01	0.08	0.00	1.00
Local Aid Appeal	0.01	0.12	0.00	1.00
External Aid (United Nations Appeal	0.03	0.18	0.00	1.00

Table 5. Correlations

	Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12
1	Donating (Yes=1, No=0)	0.00	0.03	0.00	1.00	1.00											
2	USD Donated	1,697,227.00	11,900,000.00	1000.00	350,000,000.00	0.10	1.00										
3	Economic Reliance (Subsidiary)	0.01	0.09	0.00	1.00	0.08	0.01	1.00									
4	Economic Reliance (Employees)	0.03	0.15	0.00	1.00	0.07	0.01	0.72	1.00								
5	Economic Reliance (Sales)	0.03	0.16	0.00	1.00	0.07	0.01	0.69	0.97	1.00							
6	Economic Reliance (Polynomial)	0.03	0.15	0.00	1.00	0.07	0.01	0.69	0.99	0.98	1.00						
7	Exclusivity	0.08	0.15	0.00	1.00	0.01	0.05	0.00	0.30	0.48	0.08	1.00					
8	Agency Intervention	1.72	11.91	0.00	178.25	-0.01	0.00	-0.02	-0.04	-0.03	-0.04	-0.06	1.00				
9	External Intervention	1.54	6.87	0.00	115.36	0.00	0.00	-0.01	-0.02	-0.02	-0.02	-0.02	0.07	1.00			
10	Government Effectiveness	53.31	27.27	0.00	99.51	0.03	0.00	0.15	0.24	0.23	0.25	-0.05	-0.19	-0.02	1.00		
11	Regulatory Quality	51.65	28.02	0.00	100.00	0.03	0.00	0.15	0.24	0.23	0.25	-0.08	-0.18	-0.02	0.93	1.00	
12	Social Standing	45.85	278.99	1.00	6,000.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

Methods

I regressed the *US dollar amount* of giving using the following OLS specification:

$$USD\ Donated_i = \alpha 1(economic\ affiliation, ra) + \alpha_{2a}(ea * exclusivity) + \alpha_{2b}(ea *$$
$$intervention) + \alpha_{2c}(ea * governance) + \alpha_{2d}(ea * standing) + \alpha'(\theta_i) + \varepsilon_i \qquad (2)$$

where the vector θ_i has firm-, country-, and event-specific variables, and, in some

specifications, fixed-effects for these three levels of analysis.

Regarding the likelihood of donating, I interpret the process that firms follow when

deciding to participate in collective-goods provision as an attempt to maximize utility.

The business decision maker makes a marginal benefit-marginal cost calculation based

on the utilities achieved by donating to a given event, by not donating (i.e., using the

resources for something else), and by using the resources for another event. That is, firm

i chooses to contribute to event j, $j \neq k$, given that $P_{ij=}Pr(V_{ij} > V_{ik})$, where P_{ij} is the

probability that the utility that it obtains for event j (V_{ij}) is higher than the utility for

event k (V_{ik}). Hence, the specification should account for the characteristics of the

affected community and the collective good. Formally:

$$X_i = \beta 1(economic\ affiliation) + \beta_{2.d}(standing)$$
$$Z_j = \beta_{2.a}(exclusivity) + \beta_{2.b}(central\ intervention) + \beta_{2.c}(quality\ of\ governance)$$

The probability that firm i engages in provision of collective goods for event j is:

$$(Pij) = \int \prod_{t=1}^{T}\prod_{j=1}^{J} \frac{\exp(X_i\beta_{jt}+Z_{ij}\beta_{jt})}{\sum_{k=1}^{J}\exp(X_i\beta_{jt}+Z_{ij}\beta_{jt})} f(\beta|\Theta)d\beta \qquad (3)$$

Notice that this model combines a multinomial logit (subscripted by firm-specific characteristics) and a conditional logit (examining the characteristics of the choice—i.e., the target country-disaster pair). I used random-effects with bootstrapped errors and firm-by-country fixed-effects.[32] See next sub-sections for further robustness checks, including an additional strategy to address endogeneity concerns via matching, and the Appendix for a description of the process to address missingness.

Results

I found a positive association between the frequency and magnitude of engagement in disaster response with economic reliance, providing support for the baseline hypothesis. *Ceteris paribus*, an increase of one standard deviation in the degree of economic affiliation raises the contribution of the average firm by about 17 percent (Table 6, Model 1). In probabilistic terms, sample firms are 27.5 times more likely to donate for every standard-deviation unit of increase in their economic reliance [0,1] to a given market. The main finding is robust to the inclusion of the different season-, event-, country-, and firm-specific, time-variant and -invariant controls, including the moderating variables, and hold after CEM is implemented. Additionally, the Freedman-Lane semi-partialing method resulted in smaller standard errors than the mixed-conditional logit and linear models, which one may interpret as a conservative estimation of the original model. Moreover, it is important to reiterate that the explanatory variable does not consider sporadic commercial activity not captured by an affiliated in the affected country.

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[32] The p-value for the Hausman test (Hausman, Stock, & Yogo, 2005) was 0.1037 (Wooldridge, 2010). Consequently, I centered on models with random effects and used fixed-effects for robustness checks.

Table 6. The effect of economic reliance on corporate disaster giving

VARIABLES	Model 1 (RE) USD Donation (LN)	Model 2 (MC Logit) Donation Frequency	Model 3 (FE) USD Donation (LN)
Economic Reliance	0.167	3.141	0.129
	(0.003)	(0.737)	(0.013)
Exclusivity x ER	0.116	1.133	0.000
	(0.005)	(0.135)	(0.000)
Agency Intervention x ER	-0.571	-0.067	0.090
	(0.017)	(0.102)	(0.044)
External Intervention x ER	3.983	-0.048	2.761
	(0.028)	(0.149)	(0.148)
Government Effectiveness x ER	-0.009	0.000	-0.019
	(0.001)	(0.000)	(0.004)
Regulatory Quality x ER	0.008	-0.099	0.016
	(0.001)	(0.015)	(0.000)
Social Standing x ER	0.001	0.073	0.000
	(0.000)	(0.012)	(0.000)
Exclusivity (Market Concentration)	0.000	0.319	(0.000)
	(0.000)	(0.498)	(0.276)
Agency Intervention	-0.010	4.419	-0.035
	(0.002)	(0.369)	(0.006)
External Intervention	0.060	-0.200	0.047
	(0.002)	(0.117)	(0.005)
Government Effectiveness	-0.000	0.041	0.000
	(0.000)	(0.015)	(0.000)
Regulatory Quality	0.000	-0.016	0.000
	(0.000)	(0.013)	(0.000)
Social Standing	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
CONTROLS			
Number of Employees	0.000	0.076	-0.000
	(0.000)	(0.020)	(0.000)
Total Revenue	0.000	-0.017	0.001
	(0.000)	(0.041)	(0.001)
Market Capitalization	0.006	-0.061	0.007
	(0.000)	(0.041)	(0.001)
Return on Assets	0.001	0.043	0.000
	(0.000)	(0.006)	(0.000)
R&D	0.000	0.016	0.000
	(0.000)	(0.039)	(0.000)
Consumer Orientation	0.002	0.375	0.004
	(0.001)	(0.055)	(0.003)
GDP	0.002	0.392	0.002
	(0.000)	(0.134)	(0.001)
Area (Size)	-0.001	-0.383	-0.003
	(0.000)	(0.110)	(0.001)
Population	0.002	0.133	-0.006
	(0.000)	(0.156)	(0.011)
Storm	0.008	0.119	0.004
	(0.003)	(1.121)	(0.011)
Flood	0.001	0.015	0.055
	(0.002)	(0.021)	(0.011)
Earthquake	0.029	1.215	-0.017
	(0.003)	(0.133)	(0.036)
Mass Movement Dry	-0.005	0.006	0.006
	(0.007)	(0.000)	(0.012)
Mass Movement Wet	-0.000	0.008	0.230
	(0.003)	(0.000)	(0.209)
Deaths	-0.044	-9.153	-0.001
	(0.040)	(42.272)	(0.001)
People Affected	0.000	-0.180	1,276.850
	(0.000)	(0.380)	(811.887)
Economic Cost	123.098	5.871	-0.000
	(134.505)	(0.414)	(0.000)
Annual Number of disasters (Country)	-0.000	-0.043	-0.001
	(0.000)	(0.025)	(0.000)
Annual Number of disasters (World)	-0.000	0.011	0.002
	(0.000)	(0.008)	(0.000)
Newsworthy events	0.003	0.073	0.002
	(0.000)	(0.050)	(0.001)
Constant	-0.098	-24.650	0.046
	(0.008)	(3.345)	(0.039)
Observations	1,713,250	1,713,250	1,713,250
Number of events	3,115	3,115	3,115

	Model 1 (RE)	Model 2 (MC Logit)	Model 3 (FE)
Country FE			YES
Year FE			YES
Month FE			YES
Firm FE			YES

Clustered-by-event bootstrapped errors in parentheses. Fixed-effects model with month-, year-, country-, and firm-by-country effects

The results suggest that the level of market competition has an inverse effect in the willingness of business decision makers to opt into the provision of collective goods (Models 1 to 3). That is, being a member of exclusive markets, as measured by the Herfindahl–Hirschman Index, is associated with a relatively high donation frequency and magnitude. An affiliated firm operating in a relatively concentrated market is 2.6 times more likely to engage in disaster giving than a similar firm operating in a market one standard deviation more fragmented. Likewise, its donation amount is expected to be 11.6 percent bigger, which is in line with H2a. This finding not only contests the prediction of standard economic theory,[33] but it is also inconsistent with empirical work in the management literature. Management scholars have suggested that the benefits of investing in corporate pro-social behavior are relatively large in competitive industries when such behavior acts as a signal of product quality (Fernández-Kranz & Santaló, 2010; Servaes & Tamayo, 2013).

With respect to H2b, the results suggest that the effect of central intervention on corporate giving depends on whether funding comes from inside or outside the market system. Models 1 to 3 show that affiliated firms reduce frequency and magnitude of provision of collective goods in proportion with increases in local government's financing. An increase of one standard deviation in the degree of local government

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[33] See Harrison and Hirshleifer (1989) for a discussion.

intervention is associated with a reduction of four percent in the average affiliated firm's

donation amount (model 1) and a drop in the donation frequency (model 2). A potential

explanation is that firms see local government intervention as an expected function of the

club agency—an argument that is tested in the following model. The observation of

incomplete crowding-out opposes the prediction of neutrality of some social-preferences

models (cf., Bénabou & Tirole, 2006). Additionally, the observed negative effect of local

intervention contradicts strategic considerations models that predict foreign firms'

motivation to mimic the host country government's response to obtain the favor of local

policymakers (cf., Marquis & Qian, 2013; Zhang & Luo, 2013). On the other hand,

foreign aid increases the donation magnitude of affiliated sample firms by about 3.7

percent (model 1), which challenges public-economics theories that external intervention

crowds out local response (Cavallo & Daude, 2011).

Regarding H2c, I found that different dimensions of the perception of national

political and institutional development may have a divergent impact on the corporate

provision of collective goods. On the one hand, improvements in local regulatory quality

are associated with surges in affiliated firms' donation size and frequency. Given that

regulatory quality measures the public's perception of the local government's

performance to regulate and promote the private sector's development, it is expected that

firms are willing to contribute to the agency when this perception is relatively high. In

such cases, firms are able to satisfy the impact question of their giving. On the other

hand, a one-standard deviation improvement in government effectiveness leads to

reductions of 0.90 percent in the size of the donation (model 1) and 17 percent in the

probability of affiliated firms' giving (model 2). Given the information that *government effectiveness* is aimed to capture, one interpretation is that firms that consider the agency a viable mechanism to manage public goods also see it as having a high capacity to manage shocks. Therefore, they prefer to allocate corporate resources in markets with greater levels of vulnerability where the risk of shortage of collective goods is higher.

In agreement with H2d, the results suggest that social standing motivates the pro-social behavior of economically affiliated firms. Affiliated firms are more likely to donate with every one-standard deviation increase in *social standing*. Additionally, an increase in the level of standing is associated with a greater donation (0.10 percent) vis-à-vis a firm whose standing remained the same. This means that sample market systems rely on firms with high standing to cope with the scarcity of collective goods in the context of sudden systemic shocks.

Robustness

Further identification strategy with matching

One concern in my study is that the decision to enter a market is endogenous to the likelihood of engaging in philanthropic disaster response. That is, given the geographical (and, thus, political, and socioeconomic) heterogeneity in the context of disaster risk, firms with a similar propensity to give self-select into specific market systems. The econometric problem here is that donating and economic reliance are both moving in the same direction as an unobserved factor (e.g., adversity to systemic risk), which prevents

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an observation of the causal effect of economic reliance on the frequency and magnitude of giving.

To mitigate the occurrence of this issue, I applied *coarsened exact matching* (CEM) [34] (Iacus, King, & Porro, 2008, 2011) to balance the baseline propensity to engage in pro-social behavior between the treatment (i.e., firms with at least one affiliate in the affected country) and the control groups (i.e., firms with no presence in the market). To conduct the match, I draw on the literature in philanthropy and, specifically, corporate disaster giving.[35] CEM was carried out with no replacement using the following variables: *primary industry, number of employees, market capitalization, market capitalization, headquarters country of ultimate parent, total revenue, and return on assets*.[36] Pre- and post-descriptive statistics were compared in the treatment and control groups for assessing quality. Additionally, I calculated measures of imbalance as suggested by Iacus *et al.*, (2008). The main results hold in the matched sample, which I include in the Appendix in addition to the matching summary.

Additionally, a plausible argument is that the effect of economic reliance on the provision of collective goods is heterogeneous across events. For some shocks, economic reliance may have relatively little effect because of the magnitude of news coverage (Stromberg, 2007). For instance, events such as Hurricane Katrina in the U.S. and the 2010 earthquake in Haiti were certain to receive philanthropic giving irrespective of the

[34] See (King, Nielsen, Coberley, Pope, & Wells, 2011) for a comparative assessment of the effectiveness of matching methods.
[35] (cf., Crampton and Patten 2008, Marquis et al. 2007, Muller et al. 2014, Patten 2008, Tilcsik and Marquis 2013, Whiteman et al. 2005)
[36] I targeted a treatment-to-control ratio of 1:10, but tested up to 1:2 for robustness.

economic connection of the organization. Therefore, it is likely that the studied association is stronger for events whose probability of being in the news is relatively low. Thus, I followed Eisensee and Strömberg (2007) and conducted robustness analyses limiting the sample to disasters with a probability of being in the news of 50 percent and lower. I also run analyses including countries that never received donations from firms, which does not affect the estimates.

Testing alternative explanations from social preferences and strategic considerations

In this sub-section, I discuss several potential problems of identification and test the robustness of my approach to the inclusion of social-preferences and strategic-considerations factors. On the one hand, social-preferences' impure-altruism and neoinstitutionalism models advance three predictions regarding firms' engagement in the provision of collective goods. First, because members of the firm are embedded in societal arrangements that foster their cognitive membership to communities (Berry, Guillén, & Zhou, 2010; Galaskiewicz, 1997; Marquis et al., 2007; Powell, 1991), a "normative pressure on the company" (DiMaggio & Powell, 1983; Patten, 2008) exerts a particular influence in the pro-social behavior of the geographically proximate organization. This argument provides a simpler explanation to the main relationship of this study. *Ceteris paribus*, there exists a direct association between physical presence, or local embeddedness, and pro-social behavior.[37] Hence, economic reliance would be a

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[37] According to Uzzi (1996) "organization networks operate on a logic of exchange which differs from the logic of markets. I refer to this exchange logic as "embeddedness" because ongoing social ties shape actors' expectations and opportunities in ways that differ from the economic logic of market behavior."

second order measure that could be obviated because the effect of an economic firm-market linkage is captured by differentiating firms based on geographic presence. I tested this argument with the binary variable *physical presence* that takes value "1" when the firm has any type of affiliate in the focal country. Such relationship resulted inverse as shown in Table 8, suggesting that the mechanism driving this form of corporate pro-social behavior is more complex than geographic location or embeddedness alone and that the measure of *economic reliance* better captures such complexity.

A second prediction suggests that inequity aversion drives pro-social behavior and, thus, affiliated firms will mostly give to economically underdeveloped markets (Fehr, Naef, & Schmidt, 2006; Jaramillo, Kempf, & Moizeau, 2003). To test this argument, I regressed an interaction of *economic reliance* and *degree of poverty* proxied by the poverty headcount ratio at national poverty lines (as a percentage of population).[38] As shown in Table 9 in the Appendix, I found that sample firms donate in a lower magnitude to poorer countries than to higher-income countries. A third prediction suggests that employees of affiliated firms seek to satisfy their reciprocal preferences and this fuels the response from top managers (Camerer & Fehr, 2002; Falk & Fischbacher, 2006; Simpson & Willer, 2008). Using data from my dataset, I analyzed the interaction between the binary variable *employee-driven donation* and *economic reliance*. Table 10 shows that a negative coefficient suggests that employees' social preferences crowd out the firm's magnitude of pro-social behavior.

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[38] See Anand and Sen (1994 and 2000) for a discussion on this measurement.

On the other hand, the strategic-philanthropy literature offers another set of alternative predictions. First, the null hypothesis to H2a captures an argument built on the resource-based theory of the firm. If there is a market demand for corporate pro-social behavior that is discoverable for market competitors, some firms may engage in the provision of collective goods in the hope of achieving or sustaining a competitive advantage. Firms strive to capture socially responsible consumers by connecting the demand of their private goods to the provision of a collective good (McWilliams and Siegel 2010, Bagnoli and Watts 2003). Monopolistic markets may entail lower incentives for firms to invest in reputational capital because the internalization of reputation spillovers is relatively low (Bénabou & Tirole, 2006). However, the analyses consistently reject such argument and suggest that monopolistic firms are the type of organization that frequently engages in this form of pro-social behavior and tend to give the largest amounts.

A third prediction suggests that business organizations tend to construct their socially beneficial behavior in accordance with signals coming from central agencies such as the national government. Managers acting strategically invest in government transferences (e.g., operating privileges) to improve their market standing [i.e., rent-seeking and special interest groups may develop (Olson, 1971)] and the approval of the local community [i.e., a social license to operate (Boutilier & Thomson, 2011; Howard-Grenville, 2008; Wilburn & Wilburn, 2011)]. Therefore, firms increase donating in response to the intervention of government agencies. The *null* hypothesis to

Hypothesis 2.b (H2b): captures this argument, which was systematically rejected for the case of local government intervention. The results suggest that local government's disaster financing crowds out affiliated firms' giving.

Lastly, strategic-philanthropy theories suggest that low-standing organizations are relatively likely to engage in the provision of collective goods because the marginal utility of reputational capital is higher for this type of firm than for high-standing firms (Crampton & Patten, 2008; Godfrey et al., 2009; Porter & Kramer, 2002). The several analyses, including the coarsened-exact matched models, provide evidence of the opposite argument.

DISCUSSION

This study investigates the mechanisms and conditions under which firms' economic reliance to markets affects willingness to provide collective goods. Using arguably the largest dataset on disaster giving to date, I identified the existence of a causal process moderated by four main factors in line with the predictions of the theory of clubs (Berglas, 1976; Buchanan, 1965; Sandler, 2013). The setting of business responses to global natural disasters allowed me to test and confirm the main relationship and the role of market exclusivity, firm standing, central intervention, and quality of governance across several organization-, industry-, home and host country-, and time-specific factors. In sum, my study evidences that integrating variation in firms-market economic reliance leads to a more accurate prediction of corporate engagement in collective-goods provision than theoretical arguments than do not account for such relationship.

Contributions to the non-market strategy literature

Whereas much prior work in the CSR literature has focused on the internal and external determinants of pro-social behavior, my study uncovers a form of strategic consideration whose effect remains understudied (cf., Aguinis and Glavas, 2012; McWilliams, Siegel, and Wright, 2006; Mellahi *et al.*, 2015). The effect of economic reliance is not explained by the traditional strategic considerations such as reputational capital with internal (Flammer & Luo, 2015) and external stakeholders (Muller & Kräussl, 2011), a social license to operate (Wilburn & Wilburn, 2011), an agency cost (Jia & Zhang, 2011), or institutional pressures (Tilcsik & Marquis, 2013). Likewise, it is not captured by social-preference theories such as altruism (Batson & Powell, 2003), reciprocity (Falk & Fischbacher, 2006), fairness (Kahneman et al., 1986), or a *warm glow* (Andreoni, 1990). Additionally, the explanatory power of economic reliance is not equaled by physical distance (Muller & Whiteman, 2008) or embeddedness (Jamali & Neville, 2011).

The results suggest that a theory based on economic reliance provides a clear identification of the set of business decision-makers that are prone to behave pro-socially. The observation of pro-social behavior among firms with no clear economic reliance is, in fact, a test of the criterion of falsifiability (Popper, 1963). The frequency and magnitude of such behavior is better characterized by broader public-goods systems. That is, a corporation with no economic reliance may donate to a country affected by a

disaster, but the likelihood of not observing a donation (i.e., free riding) is relatively large.

Additionally, my study advances the literature on global CSR. Both the theoretical and empirical literatures in CSR in an international context remain underdeveloped (Kitzmueller & Shimshack, 2012). Traditionally, pro-social behavior has been studied at the country level and, although there have been influential studies on corporate disaster giving using a multi-country setting, these limit to one event affecting several countries (Whiteman et al., 2005) or a few single-country events (Madsen & Rodgers, 2014). Furthermore, the literature has neglected the study of firms with an emerging country of origin, particularly when they give abroad. My dataset enables overcoming challenges of data quality and mitigates the risks of measurement error and omitted-variable bias that have been a concern regarding the findings of observational studies in developing countries (Mellahi et al., 2015).

Contributions to other literatures

My study also makes relevant contributions to the institutional, stakeholder literatures and industry self-regulation literatures. First, using this empirical setting to evaluate the role of sociopolitical dynamics is particularly valuable for the development of institutional and organizational theory. My findings suggest that the role of institutional quality on the willingness to give of economically reliant companies is more complex than it has been traditionally suggested in the extant literature. On the one hand, firms consider the general capacity of the government to implement policies and regulations

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that assure the effective use of private giving and facilitate the maximization of its positive impact. This conclusion conforms with past work showing that institutional underdevelopment creates challenges for the establishment of CSR (Marquis & Qian, 2013; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008). Conversely, a negative perception of the capacity of the local government raises the disaster giving of an average sample firm. Hence, taken together, my study offers a more nuanced understanding of the role of institutional forces in disciplining firms into a certain pro-social behavior than previous studies.

Second, a contribution to stakeholder theory centers on the emphasis of my theoretical approach on the time and spatial distribution of firm-market linkages. My study informs about the mechanisms and conditions under which geographically located customers, competitors, and governments become salient stakeholders for the organization. The relative standing of the firm and the degree of market competition are two elements necessary to understand when and how power dependence, need for legitimacy, and urgency vary across firm-stakeholder relationships (Mitchell, Agle, & Wood, 1997).

Scholars have shown how stakeholder attention explains competitive advantages out of corporate disaster giving (Crampton & Patten, 2008; Madsen & Rodgers, 2014). A promissory avenue of research is the investigation of the role of social standing in the ability of the firm to attract stakeholder attention and, more importantly, approval to its pro-social choices. For instance, does a firm with relatively high standing in a given

market need to invest significantly more in pro-social behavior than a lower-standing firm in order to capture rents?

Additionally, the finding regarding the role of market competition poses an interesting paradox and challenges paradigms in public economics (Bénabou & Tirole, 2006; Cowling & Mueller, 1978). My study suggests that monopolies act as stop-loss mechanisms in the presence of disruptive shocks that overwhelm the financial capacity of national governments. Given the worldwide interest on antitrust regulation (Woodruff, 2006), an interesting research extension may target a more detailed estimate of the net social value of monopolies, taking into consideration both market and non-market dimensions of business strategy.

Third, my findings provide scholars in the industry self-regulation a context to increase their understanding of the role of internationalization and country-specific factors on the industry-related factors that affect collective action. For instance, taken together, the frequency of exposure to systemic shocks that affect local industries is higher for multinational enterprises (MNEs) than for single-country firms. Accordingly, disasters are relatively likely to affect how industry dynamics impact the strategic trajectory of MNEs. In this sense, the study of global systemic shocks provides a good setting for the evaluation of cross-national heterogeneity in the predictions of industry self-regulation regarding pro-social behavior. Moreover, the effect of systemic shocks on the capacity of industry-based collectivities to overcome collective action problems remains understudied (Baron, 2001; Ostrom, 2003; Prakash & Potoski, 2007). In this

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sense, scholars conducting single-country studies have made progress in the

conceptualization of (geographically circumscribed) business communities (Tilcsik &

Marquis, 2013). My study suggests a method to replicate such endeavor in a multi-

country setting.

Additional limitations and boundary conditions of my study are associated with its

focus on large, publicly traded firms. Although this type of organization accounted for

nearly 90 percent of the recorded corporate donations the observed period (and, thus,

selection bias is mitigated), smaller and/or private firms may follow unique mechanisms

and conditions when behaving pro-socially. Future work based on case studies may better

complete our understanding of private provision of collective goods by unpacking such

factors. This effort also would provide a finer grained understanding of the relationship

between economic reliance and the geographic distribution of club systems particularly in

countries with large territories.

Managerial and policy implications

The practical implications of my study are related with the economic significance of

the findings. The average contribution from sample firms to the relief and recovery fund

of any given studied disaster is almost $1.6 million; more than the median annual

contribution of $1.5 to higher education by the largest 271 companies worldwide in 2014

(CECP, 2015). In any given year, the accumulated giving to disasters worldwide may

account for more than the annual CSR budget of the corporation. The occurrence of a

highly-devastated disaster in a country where the corporation has significant stake may

lead the firm to allocate to disaster aid more than the budget for all social areas for years to come. This finding corroborates the recurrent argument raised by the managers interviewed in preparation for this study. For example, Anglo American's donation for the Chilean disaster in 2010 was greater than $10 million surpassing the mining company's $8-million annual CSR budget in Chile, a market to which the company was highly reliant (0.49).[39] Similarly, the $50 million that Cisco pledged in the aftermath of the 2008 Sichuan earthquake was worth more than three years of Cisco's corporate social activity in China.[40]

The social value of corporate disaster giving is likely to continue to rise. The inflation-adjusted costs of disasters have increased in the last four decades and the real value of the traditional public sources for financing such costs have dropped in the same period (United Nations, 2016). In the last 20 years, no other sector has increased its proportional participation in disaster response more than firms (Ballesteros & Useem, 2015). Hence, information on the firm- and market-specific factors that foster corporate disaster giving may help managers in multilateral and national agencies to predict the influx of corporate giving to a disaster area and better plan requirements of public resources and issue aid appeals. This information would help better address an important public-policy issue by stimulating a structured and organized formal inclusion of corporate giving in disaster relief and recovery around the world.

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[39] Felipe Purcell, Vice President of Corporate Affairs in Chile, in interview with the author on 10/19/2003.

[40] (Cisco, 2010).

APPENDIX

Matching procedure

I used no-replacement coarsened exact matched procedure in which I targeted a treatment-to-control ratio of 1:10, but tested up to 1:2 for robustness. To assess and mitigate the effect of spatial autocorrelation that may hamper econometrically efficient standard errors, I used the Freedman-Lane semi-partialing method (Dekker, Krackhardt, & Snijders, 2007) implemented as a linear probability model with fixed-effects for the treatment and control groups (Rogan & Sorenson, 2013). The sum of absolute differences across the multivariate histogram that has the following form: $L(t,c)\frac{1}{2}_{li..lk} n|t_{li..lk} - c_{li..lk}|$. Where $t_{li..lk}$ is the relative frequency of the categorical variables for the firms in the treatment group and $c_{li..lk}$ is the correspondent number for the firms in the control group.[41] A magnitude of $L(t,c)$=0 means perfect balance while a magnitude of 1 represents perfect separation.

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[41] The procedure to obtain the relative frequencies of the categorical variables is based on Iacus *et al.*, (2008).

Table 7. The effect of economic reliance on corporate disaster giving (Coarsened-exact matching)

VARIABLES	Model 4 (RE) DV Amount (LN)	Model 5 (MC Logit) DV: Donation Frequency	Model 6 (FE) DV: Amount (LN)
Economic Reliance	0.244	19.493	78.723
	(0.054)	(1.609)	(22.327)
Exclusivity x ER	0.126	0.557	-2.529
	(0.005)	(0.137)	(1.572)
Agency Intervention x ER	-0.039	-0.531	-1.509
	(0.002)	(0.052)	(0.396)
External Intervention x ER	0.037	-0.072	-1.572
	(0.002)	(0.068)	(0.716)
Government Effectiveness x ER	-0.005	-0.079	-0.502
	(0.000)	(0.014)	(0.137)
Regulatory Quality x ER	0.007	0.067	0.516
	(0.000)	(0.011)	(0.128)
Social Standing x ER	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Exclusivity (Industry Concentration)	0.001	0.001	0.231
	(0.001)	(0.132)	(0.276)
Agency Intervention	-0.002	-0.388	1.045
	(0.001)	(0.318)	(0.383)
External Intervention	-0.001	-0.200	-0.028
	(0.000)	(0.117)	(0.117)
Government Effectiveness	-0.000	0.039	-0.010
	(0.000)	(0.017)	(0.017)
Regulatory Quality	0.000	-0.017	-0.004
	(0.000)	(0.015)	(0.015)
Social Standing	0.000	0.001	0.000
	(0.000)	(0.000)	(0.000)
CONTROLS			
Number of Employees	0.001	0.078	-0.036
	(0.000)	(0.020)	(0.038)
Total Revenue	-0.000	-0.011	0.049
	(0.000)	(0.041)	(0.097)
Market Capitalization	-0.001	-0.066	-0.039
	(0.001)	(0.041)	(0.103)
Return on Assets	0.001	0.043	0.024
	(0.000)	(0.006)	(0.017)
Consumer Orientation	0.005	0.419	0.209
	(0.001)	(0.056)	(0.139)
GDP	0.004	1.025	-0.573
	(0.001)	(0.386)	(0.445)
Area (Size)	-0.001	-0.407	-0.294
	(0.000)	(0.121)	(0.133)
Population	0.003	-0.013	0.119
	(0.000)	(0.170)	(0.198)
Storm	0.011	3.609	
	(0.003)	(1.173)	
Flood	0.002	3.373	
	(0.003)	(1.154)	
Earthquake	0.035	6.095	
	(0.003)	(1.172)	
Mass Movement Dry	-0.006		
	(0.007)		
Mass Movement Wet	0.001		
	(0.003)		
Deaths	0.036	-32.824	202.022
	(0.056)	(42.089)	(737.407)
People Affected	-0.000	-0.223	20.337
	(0.000)	(0.580)	(6.168)
Economic Cost	3,044.217	297,763.560	-9993698.328
	(1,125.475)	(792,109.162)	(3907004.581)
Annual Number of disasters (Country)	-0.001	-0.049	-0.016
	(0.000)	(0.028)	(0.041)
Annual Number of disasters (World)	-0.000	0.022	-0.018
	(0.000)	(0.009)	(0.011)
Newsworthy events	0.003	0.096	-0.116
	(0.000)	(0.051)	(0.062)
	(0.009)	(4.062)	(4.189)
Observations	1,524,614	1,495,193	113,641
Number of events	2,846	2,791	209
Country FE			YES
Year FE			YES
Month Fes			YES
Firm FE			YES

Table 8. Physical Presence and the Magnitude of Donation

VARIABLES	Model 7 (RE) Dependent variable: USD Donation Amount (LN)
Physical Presence	-0.263
	(0.033)
Exclusivity x Presence	-0.016
	(0.006)
External Int x Presence	0.002
	(0.001)
Agency Int x Presence	0.008
	(0.001)
Gov Effectiveness x Presence	-0.001
	(0.000)
Reg Quality x Presence	0.001
	(0.000)
Standing x Presence	0.000
	(0.000)
Exclusivity (Industry Concentration)	-0.001
	(0.001)
Agency Intervention	-0.000
	(0.001)
External Intervention	-0.001
	(0.000)
Social Standing	0.000
	(0.000)
Government Effectiveness	-0.000
	(0.000)
Regulatory Quality	-0.000
	(0.000)
CONTROLS	
Number of Employees	0.001
	(0.000)
Total Revenue	-0.000
	(0.000)
Market Capitalization	-0.001
	(0.001)
Return on Assets	0.000
	(0.000)
Consumer Orientation	0.005
	(0.001)
GDP	0.004
	(0.001)
Area (Size)	-0.001
	(0.000)
Population	-0.000
	(0.000)
Disaster Type	-0.001
People Killed	0.026
	(0.020)
People Affected	-0.000
	(0.000)
Economic Cost	2,586.047
	(236.313)
Annual Number of disasters (Country)	-0.000
	(0.000)
Annual Number of disasters (World)	-0.000
	(0.000)
Newsworthy events	0.004
	(0.000)
Constant	-0.062
	(0.009)
Observations	1,524,614
Number of events	2,846

Clustered-by-event bootstrapped errors in parentheses.

Table 9. Moderating Effect of Poverty

VARIABLES	Model 9 (RE) Dependent variable: USD Donation Amount (LN)
Economic Reliance	0.135
	(0.015)
Poverty x Economic Reliance	-0.001
	(0.000)
Degree of Poverty	0.000
	(0.000)
Number of Employees	0.001
	(0.000)
Total Revenue	-0.001
	(0.000)
Market Capitalization	-0.001
	(0.001)
Return on Assets	0.001
	(0.000)
Consumer Orientation	0.004
	(0.001)
GDP	0.002
	(0.000)
Area (Size)	-0.001
	(0.000)
Population	0.002
	(0.000)
Disaster Type	-0.000
	(0.000)
People Killed	0.078
	(0.020)
People Affected/Population	-0.000
	(0.000)
Economic Cost/GDP	2,408.327
	(180.395)
Annual Number of disasters (Country)	-0.001
	(0.000)
Annual Number of disasters (World)	-0.000
	(0.000)
Newsworthy events	0.004
	(0.000)
Constant	-0.076
	(0.009)
Observations	1,524,614
Number of events	2,846

Clustered-by-event bootstrapped errors in parentheses with month and year dummies

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Table 10. Moderating Effect of Employee-Initiated Giving

VARIABLES	Model 10 (MC Logit) Dependent variable: Donation Frequency
Economic reliance	5.356
	(0.420)
Economic reliance x Employee Giving	-5.619
	(1.556)
Employee Giving	7.299
	(1.064)
Return on Assets %	0.012
	(0.037)
Consumer Orientation	0.689
	(0.358)
Industry	-0.002
	(0.011)
Number of Employees	0.175
	(0.170)
Market Capitalization	0.348
	(0.144)
Population	0.338
	(0.158)
Area (Size)	-0.506
	(0.171)
Annual Number of disasters (World)	1.198
	(0.283)
Annual Number of disasters (Country)	0.055
	(0.227)
Affected Population	-0.367
	(0.070)
Economic Damage (USD Million)	0.061
	(0.073)
Deaths	0.413
	(0.058)
Storm	0.618
	0.426
Flood	(1.182)
	1.432
Earthquake	(1.148)
	0.934
Constant	-19.249
	(2.994)
Observations	1,524,614.00
Number of Events	2,846

Robust standard errors in parentheses. Firm-by-country fixed-effects. GDP-controlled

CHAPTER 2

INTRODUCTION

The strategy literature has reached theoretical consensus that the decision to move first, imitate or deviate from the first mover's choices is often associated with performance advantages (Fosfuri et al., 2013; Lieberman & Montgomery, 2013). Yet, the empirical work on the performance consequences of imitating or deviating is comparatively scarce (Posen et al., 2013). Furthermore, the theoretical literature on timing strategy has become progressively equivocal and some of its key predictions are often not supported in practice (Fosfuri et al., 2013; Lieberman & Montgomery, 2013).

Consider the cases of the high performer Samsung leading the business response to the 2008 Sichuan earthquake and the much less profitable Nokia and Panasonic donating an identical amount as Samsung in the next couple of days. The responses spurred public backlash in the following weeks, including consumer boycotts decrying them as "a drop in the bucket". Subsequently, Samsung's choice was associated with losses not explained by its market operation, which defies the prediction that firms that perform well tend to accrue first-mover rents (Lieberman & Montgomery, 1998). Moreover, it was not imitating the high-performing first mover which resulted in follower benefits (Gaba & Terlaak, 2013), but deviating from it. Such a decision paid off for firms like Sony, a late mover that accrued performance advantages despite giving an amount 50% smaller than Samsung's (Xinhua News Agency, 2008). In contrast, in the aftermath of the 2010 earthquake and tsunami in Chile, imitating the first mover Anglo American arguably paid

off for the higher-performing BHP Billiton. The Anglo American and its imitators realized performance benefits, while firms than deviated from Anglo American's choice, such as Rio Tinto, faced performance losses.

These examples suggest that the main predictions of the timing strategy literature may not apply in the case of non-market settings such as corporate disaster giving. A setting where informational and time constraints are pervasive (Kunreuther et al., 2002). Additionally, the literature on non-market strategy has shown that the performance consequences of pro-social behavior may depend on external stakeholder perceptions of contextual appropriateness of corporate behavior. That is, the degree firms' choices satisfy their expectations and follow norms, rules, and customs (Madsen & Rodgers, 2014; Marquis & Battilana, 2009; Marquis & Tilcsik, 2016).

The fact that the literature on timing strategy has understudied the role of stakeholders (Fosfuri et al., 2013; Lieberman & Montgomery, 2013) is relevant because the measures that firms use to perceive the contextual appropriateness of business action may differ from the those used by stakeholders. For instance, Samsung's high performance might have influenced Panasonic to imitate this first mover, as previous research suggests (Anderson, 2010; Lieberman & Asaba, 2006; Posen et al., 2013). Instead, customers in China might have focused on the accusations of unethical labor practices that Samsung was facing and other indications of its preexisting reputation when evaluating its donation.

I explore this intuition with a framework that enriches the effect of economic reliance on corporate disaster giving, explored in Chapter 1, with insights from institutional theory. My theoretical stance is that the performance consequences of moving first or following are frequently socially constructed under conditions of high environmental uncertainty, causal ambiguity, and time pressure. I ground my theoretical argumentation in the microfoundations of institutionalization (Powell & Colyvas, 2008) and particularly on the role of sensemaking: the process decision-makers use to generate an appropriate mental model of behavior that facilitate information processing and action (Weick, 1996). Under conditions of high informational and time constraints, situational awareness relies on *cognitive referents*—i.e., prominent and easy to collect firm-specific features that are not necessarily associated with the focal good or decision (Whiteman & Cooper, 2011). Cognitive referents signal a firm's likelihood to select goods whose means and ends are contextually appropriate to replace objective measures of past performance on a focal decision (Galaskiewicz, 1997; Wry et al., 2014).

I identify media reputation as a cognitive referent that external stakeholders recurrently use to form beliefs about a firm's capacity and willingness to meet their expectations. Thus, reputable first movers are *prone* to gain first-mover advantages. The legitimization of their choices influences, for instance, consumers to increase willingness to pay for the firm's goods (Sirsly & Lamertz, 2007) or investors to facilitate access to financing (Cheng, Ioannou, & Serafeim, 2014). Conversely, stakeholders perceive the choices of firms with preexisting bad reputations as symbolic or socially prejudicial (Cuypers et al., 2015). These firms are thus *prone* to suffer performance shortfalls.

The influence of a first mover's reputation then spills over to impact followers. Imitating reputable firms generates legitimization for the follower that can override a bad reputation. For instance, despite facing allegations of damaging environmental practices a year before the 2010 disaster in Chile (KPMG, 2009), BHP Billiton gained rents by arguably imitating Anglo American that had been publicly recognized for its work with small farms. Similarly, imitating a first mover with a negative reputation is likely to result in spillover harm (Barnett & King, 2008). This explains why Panasonic obtained associated losses despite their good reputation as illustrated by its receipt of a sustainability award in 2007.

Firms err frequently in their timing and imitation choices due to the salience of cognitive referents when making fast strategic decisions under high uncertainty and ambiguity (Kunreuther et al., 2002; Pahnke et al., 2015). Followers thus find difficult to divert from the choices of high-performing first movers (Henisz & Delios, 2001). They believe that high performers are comparatively successful in identifying stakeholder expectations (Servaes & Tamayo, 2013) and abiding by institutions (Rindova & Fombrun, 1999). This institutional pressure thus exacerbates the negative consequences of the divergence in cognitive referents between firms and stakeholders because firms with bad reputations see moving first as a chance to accumulate reputational capital (Muller & Kräussl, 2011). Hence, imitation bandwagons often lead to systemic performance losses.

The setting of corporate disaster giving offers several benefits for the study of timing advantages. First, it is subject to fewer of the endogeneity concerns that constrain the development of the literature on timing advantages. For example, the exogenous nature of the disaster mitigates the risk of reverse causality between the organizational choice and firm performance. Second, it allows me to overcome some of the measurement problems that are common in the empirical literature on imitation (Lieberman & Asaba, 2006; Posen et al., 2013). The financial value and the timing of the donation are unambiguous and measurable under objective criteria in my setting. Third, high informational constraints and time pressure are pervasive for firms and stakeholders (Camerer & Kunreuther, 1989; Lampel et al., 2009). Almost 84% of corporate donations are pledged within one month of the disaster date, when information about the impact to the firm and the market, stakeholder needs, and the material consequences of donations is scarce. As expected, imitation is a recurrent phenomenon worldwide with the companies donating the same amount as the first mover in 64% of the events with corporate responses. Finally, the vastly increasing role that business intervention is playing in disaster response represents a novel phenomenon for societies worldwide, limiting the ability of stakeholders to objectively predict the efficiency of corporate giving (Ballesteros et al., 2017).

The main identification strategy relies on the implementation of a quasi-experimental technique: the synthetic control method (SCM) (Abadie, Diamond, & Hainmueller, 2015). SCM is similar to matching techniques but, instead of unit-by-unit matching, it uses an algorithm to generate a weighted combination of multiple control entities: a

synthetic control. SCM is efficient for empirical settings where the focus is on aggregate

entities (e.g., organizations) and the pool of potential controls (e.g., first donors) is small.

Furthermore, SCM accounts for unobserved time-variant heterogeneity in panel data that

traditional quasi-experimental designs, such as differences-in-differences, cannot (Abadie

et al., 2015).

My findings suggest that the divergence in cognitive referents between firms and

stakeholders is enduring even when the degrees of uncertainty and ambiguity subside.

The effects of financial performance and reputation on business and stakeholder decision-

making, respectively, are robust across firms, industries, countries, events, and time. The

fact that using concepts from prior research alone cannot solve the puzzle of why timing

choices based on financial standing have varying material consequences suggests that

theoretically distinguishing between the referents used by firms and stakeholders

contributes to the literature on timing strategy. By merging the idea of economic reliance

based on club-goods theory from Chapter 1 with insight from institutional theory, my

study offers a method to better predict first-mover rents. Additionally, it adds to the scant

scholarship on the efficiency of imitation.

My findings also contribute to the literature on the performance consequences of

corporate pro-social behavior. The results show that disaster giving is a non-market area

where firm choices are not strongly correlated with the social need, yet this variance is

not directly proportional to the scale of the rents received: firms may accrue rents despite

their donation being socially suboptimal. This proposes that the rents generated in

institutional contexts, like the aftermath of disasters, are more a function of the perceived contextual appropriateness of the corporate response than a function of its objective social value.

THEORY

Timing advantages

The timing of choosing or implementing a high-stakes decision is an important factor in the relationship between strategy and firm performance, and scholars in the strategy (Mitchell, 1991), organizational theory (Hannan & Freeman, 1993), marketing (Kerin, Varadarajan, & Peterson, 1992), and innovation literatures (Foster, 1988) have long reached that consensus.[42] However, the performance consequences of moving first or leading vis-à-vis delaying a response or following remains the source of a theoretical debate, and its verification an open empirical question (Fosfuri et al., 2013; Lieberman & Montgomery, 2013). Moreover, the scope of the work has largely been focused upon market entry and, particularly, new-market entry, a highly consequential but rare business decision (Klingebiel & Joseph, 2015).

Despite such active debate and limitations, the literature has achieved strong agreement on the conceptual frameworks around the association between timing and competitive advantages, and there are two ubiquitous and largely accepted arguments

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[42] The study of timing advantages has spanned a wide range of topics such as market barriers in industrial-organization economics (von Weizsacker, 1980), product innovation in business strategy (Agarwal & Gort, 2001), consumer-preference formation in marketing (Carpenter & Nakamoto, 1988), and legitimacy in institutional theory (DiMaggio & Powell, 1983).

(Lieberman & Montgomery, 2013). First, decision-making under uncertainty and time constraints entails a trade-off between learning and seizing a market opportunity. Delaying or deferring a response mitigates the risk of erring by allowing time to obtain relevant information on stakeholder expectations and the institutional environment (Lieberman & Asaba, 2006). At the same time, competitive advantages have, by nature, a narrow window of opportunity (Suarez, Grodal, & Gotsopoulos, 2015). The second argument is that resolving the tradeoff between learning and acting to choose the optimal timing is associated with the possession of strategic resources whose unequal distribution across firms explains the creation, allocation, and sustainability of market rents (Helfat & Peteraf, 2015).

Gaining timing advantages by responding to disasters

Engaging in disaster relief and recovery by donating cash, products or services, or taking active roles in post-disaster logistics is not a new societal function for firms, as reports date back to the late 1800s (Alessi, 1975). In recent years, however, corporate disaster giving has reached a new scale in the non-market repertoire worldwide. For instance, the proportion of the 3,000 largest firms at the international level that engage in disaster giving went from 34% in 1990 to over 91% in 2015. Most of this growth has occurred in the last 10 years, when the real average disaster donation grew 10 times to

reach $1.6 million.[43] For some disasters in the past six years, corporate giving surpassed the combined donations from foreign governments, multilateral agencies, NGOs, and individual charity (Ballesteros et al., 2017). In any given year, the accumulated donation to disaster relief and recovery may be larger than the annual social budget of the corporation and firms often reduce other expenditure to allocate resources to these unpredictable phenomena (Ballesteros, 2015; Useem et al., 2015).

Studies usefully have shown in the context of their samples that corporate donors aim to accumulate reputational capital (Muller & Kräussl, 2011), restore strategic club goods (Ballesteros, 2015), and respond to institutional forces (Tilcsik & Marquis, 2013; Zhang & Luo, 2013). [44] By doing so, donors often accrue rents (Crampton & Patten, 2008; Madsen & Rodgers, 2014). The analyses in this nascent literature, however, lack consideration of the role that the timing of the corporate engagement may have in this process.

For most accounts, this process occurs in stable institutional contexts with clear referents for what constitutes appropriateness in corporate behavior (Thornton, Ocasio, & Lounsbury, 2012). Particularly, the institutional literature proposes that firms encounter and follow enduring geographically located pressures (Marquis & Battilana, 2009). Firms are fungible entities of the geographical market, and the timing of making high-stakes decisions is an extension of customs, norms, and laws (Marquis & Qian, 2013; Zhang &

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[43] As a reference, the median annual contribution to secondary education of companies worldwide went from $1.8 to $1.5 million during the same period (CECP, 2015).
[44] In addition to the referred reports, the author conducted interviews with managers of corporations donating to the 2010 earthquake and tsunami in Chile and the 2011 earthquake and tsunami in Japan.

Luo, 2013). Decision-makers are either "cultural dopes" that align to institutional logics or "change agents" that disrupt the status quo with institutional entrepreneurship (Tracey, Philips, & Jarvis, 2010; Wry, Lounsbury, & Glynn, 2011). Thus, a normative pressure should drive the timing of giving (Galaskiewicz & Burt, 1991; Marquis et al., 2013). Under this approach, timing benefits arise when a firm's decision to give first or defer their response better meets the model of contextual appropriateness than do the choices of competitors.

However, studies in economics (Andreoni, 2006), social psychology (Simonsohn & Ariely, 2008), and institutional theory (Ioannou & Serafeim, 2015; Marquis & Lee, 2013) suggest that under extreme environmental uncertainty, ambiguity, and time constraints, the institutional assimilation of new phenomena is more complex than the extant literature has portrayed. The availability of institutional tools to navigate informational and time constraints has been "taken-for-granted" (Powell & Colyvas, 2008) and the argument that revealed stakeholder expectations govern corporate action is difficult to support in chaotic contexts such as the aftermath of disasters.

Environmental uncertainty

Responding to disasters poses a "formidable challenge" not only to naïve decision-makers, but also to users of logic and probability (Kunreuther et al., 2002). Firms are increasingly exposed to suffer the negative effects of disasters due to economic interdependencies and the internationalization of the business activity (Oh & Oetzel, 2011). These material and human impacts to the firm and the market are often difficult to

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estimate. Hence, managers may make decisions that conflict with the logics of market

operation (Lampel et al., 2009). The chief risk officer of a U.S. firm, a donor to the 2011

disaster in East Japan, recalls one part of this struggle:

"… "We have two large plants in Japan…The east coast plant was damaged, and it took
our capacity offline for months. And that had a significant impact on our earnings and
ability to supply parts so we lost significant market share during that period. It has taken
us 18 to 24 months to regain the share that we lost."[45]

In addition, unlike other non-market areas, information on the social need is often

unavailable or inaccurate for months. Firms are rarely provided with a description of the

damage, what aid is needed, by whom, and where (Fritz, 2004). Therefore, when firms

make donation decisions they sometimes use referents not necessarily associated with the

emergency. For example, Anglo American considered its annual social budget in Chile as

a referent for its donation and, in this way, the firm could respond quickly becoming the

first corporate donor.[46]

Causal ambiguity

Although a consensus in the specialized literature is that disaster giving is associated

with market rents (e.g., Crampton & Patten, 2008; Madsen & Rodgers, 2014; Muller &

Kräussl, 2011), a normative assessment of the characteristics of the donation that

maximizes the expected benefits is a complex task for the average decision-maker

(Kunreuther et al., 2002). Corporate disaster giving is an infrequent and unstructured

activity for most firms (Ballesteros, 2015). Unlike other areas, a projection in the annual

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[45] (Kunreuther, Michel-Kerjan, & Useem, n.d.).
[46] VP of Corporate Affairs in interview with the author.

financial plan is uncharacteristic and a cost-benefit assessment of different donation choices is rare.

Furthermore, the uniqueness of disasters in terms of their frequency and effects constrains the value of experience. Firms often have to deal with temporal institutional arrangements and societal contexts for which they lack information (Klinenberg, 2003). They are involved with myriad non-traditional stakeholders whose strategic role is difficult to discern. Moreover, these stakeholders commonly lack the resources to assess the social value of the corporate response (Useem et al., 2015). Is $10 million too much or too little from the social standpoint?

Time pressure

Firms face a decisive tradeoff when they engage in disaster giving. Waiting can bring relevant data to mitigate causal ambiguity. Laggards will have a richer understanding of the association between corporate responses and stakeholder reactions than early movers had. Yet, traditionally, all corporate aid comes within the first two post-disaster months. This suggests that the opportunity of making a move to capture rents has a shorter timespan than other strategic areas. The longer the organization waits to respond, the lower the likelihood of realizing performance benefits. In such conditions of urgency, decision makers cannot engage in lengthy processes of exploration (Kaplan, 2008).

In response to the concerns regarding the ability of the extant literature to capture the role that extreme informational constraints and time pressure plays in the antecedents and

consequences of organizational decision-making, recent scholarship has brought attention to the microfoundations of institutionalization (Powell & Colyvas, 2008). Its proponents contend the need for a more nuanced characterization of the role of decision-makers in institutional evolution, not only passively behaving, but also choosing; not only aligning, but also creating to institutional referents (Powell & Colyvas, 2008).

This scholarship suggests the existence of environmental contexts where decision-makers confront a unique experience with no reference to probability estimates (Lampel et al., 2009). Normative mechanisms like legislation are often nonexistent and replaced by learning, benchmarking, and voluntarism (Lepoutre, Dentchev, & Heene, 2007). A pertinent question of the microfoundations of institutionalization is how expectations regarding contextual appropriateness emerge in the first place. In addition to the theoretical gap, applying this inquiry to the studied setting has important practical implications. The global salience of disasters give corporate responders high visibility that exacerbates the material consequences of their choices (Eisensee & Strömberg, 2007; Franks, 2013): given the fast-paced decision making, how peer firms and stakeholders solve uncertainty and ambiguity to identify responses that meet stakeholder expectations?

Economic Reliance and Rents

Disasters are most likely to link with a strategic value for the firm when they diminish or disrupt market welfare and, consequently, their firms' performance (Hoffman & Ocasio, 2001; Lampel et al., 2009). The larger the share of a company's income from a given market, the larger the importance of an event disrupting the market's status quo

(Ballesteros, 2015). Consequently, the economic consequences of responding to a given disaster should be directly proportional on their firms' economic reliance on disaster-exposed market (Gavetti, Levinthal, & Ocasio, 2007).

This focus of business managers on a market's recovery is in line with a theoretical expectation that pro-social behavior becomes strategic when it not only helps society but also the company itself, reducing the real cost of corporate giving (cf., Godfrey, 2005; Porter & Kramer, 2002; Saiia et al., 2003; Wokutch et al., 2013). In other words, although corporate disaster giving may be driven by social preferences, such as altruism and reciprocity (Muller, Pfarrer, & Little, 2014), business managers strategically are likely to focus their pro-social behavior in disaster-affected nations where the direct and indirect business implications for the firms are greatest (Chamlee-Wright & Storr, 2009; Sandler, 2013). The self-interested premise that a firm's performance may be weakened if the market is not soon restored may thus have the unintended effect of driving a firm to invest private resources where the gap in international aid is largest.

Hypothesis 1 (H1). The likelihood of obtaining performance benefits from corporate disaster giving is directly proportional with the firm's economic reliance with the affected market.

At the same time, some business decision makers are prone to lead or follow because they the perceived cost-benefit of this strategy is associated with their reliance to the affected market. I argue that the motives of acting are particularly salient for organizations with a significant economic affiliation to the market system. Market-related

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sunk costs drive the firm to participate in economic processes that are relevant for firm performance (Ordanini, Rubera, & DeFillippi, 2008). Recent studies show, for instance, that the share of an organization's income dependent on a given market is a predictor of its willingness to contribute to that market's recovery in the aftermath of systemic shocks (e.g., Ballesteros, 2015; Muller & Whiteman, 2008). Furthermore, an economic affiliation provides an institutional pressure that legitimates making a material commitment regarding a high-stake decision (i.e., leading) a more socially accepted alternative than deferring the response (Zhang & Luo, 2013).

A spokesperson for the pharmaceutical company GSK captured this argument when explaining why the firm had donated a large amount in the aftermath of an earthquake in China in 2008, "We have a lot of business in vaccines and consumer health care goods in China. Our donation reflects…our commitment to the Chinese people," she said.[47]

Consequently, firms with little economic affiliation in the market are, on average, more likely to defer decisions whose pay-offs are highly ambiguous (Ballesteros, 2015). The potential costs of the decision outweigh the uncertain material rewards. Following this argument, I suggest the following hypothesis:

Hypothesis 1a (H1. a). The degree of economic reliance to the affected country is inversely proportional to the timing of the donation

Sensemaking under Uncertainty and Ambiguity

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[47] (Associated Press, 2008).

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The chaotic context generated by disasters is associated with a collapse in the mental processes that facilitate deliberative thinking (Camerer & Kunreuther, 1989; Weick, 1996). In the face of high informational and time constraints, the micro-processes behind the generation of institutions are simple and aimed at interpretation (Weick, 1996; Wry et al., 2014). Firms and stakeholders undertake processes aimed at constructivism and focus on prominent and widely available signals whose gathering entails a low transactional cost (Santos & Eisenhardt, 2009). These *cognitive referents* are the basis of measures of appropriateness that are valid in a specific socioeconomic context where decisions and exchanges of goods take place and help decision-makers interpret the potential consequences of behavior (Bitektine, 2011).

Sensemaking has implications on the microlevel outcomes behind stakeholders punishing or rewarding firms for their choices (Whiteman & Cooper, 2011). Cognitive referents enable firms and stakeholders to stratify, rank, and classify potential suppliers per their perceived capacity to satisfy stakeholder expectations while aligning to institutions. Sensemaking is triggered when decision-makers "bracket" firms and their choices according to specific idiosyncrasies (Wry et al., 2014).

In settings where the scale of private participation has no contextual precedent and experiential learning is rare, decision-makers find cognitive referents in the characteristics of early behavior. Specifically, first movers are often the actors that institutionalize standards for private intervention. Stakeholders and firms draw on the characteristics of first responses to construct beliefs of what the corporate provision may

or should be. This process does not involve a comparative analysis of efficiency. Rather, responses of certain type of early movers are enacted through their strategic salience in an environment of informational scarcity and urgency (Weick & Sutcliffe, 2006).

If firms and stakeholders adopted the same cognitive referents, their beliefs on what is a contextually appropriate response would be aligned and errors made by firms would be infrequent (i.e., stakeholders would reward more frequently than punish firms' choices; Chase & Simon, 1973). I argue that the divergence in cognitive referents, as discussed below, is precisely what determines that the performance consequences of the decision timing often do not follow the predictions of the extant literature.

Using financial standing to make sense of organizational imitation

The literature has long assumed that imitation is a prominent phenomenon under context of environmental uncertainty and causal ambiguity (Cyert & March, 1963; Gaba & Terlaak, 2013; Henisz & Delios, 2001; Rivkin, 2000). Through *strategic imitation* followers learn clues to resolve the ambiguity of unexplored options (Guillén, 2002; Henisz & Delios, 2001), understand institutions and stakeholder dynamics (Howard-Grenville, 2008; Nikolaeva, 2014) and achieve legitimization in market systems (Deephouse, 1996). Organizations, for example, imitate market entry and expansion choices (Belderbos, Olffen, & Zou, 2011; Guillén, 2002; Haveman, 1993; Hsieh & Vermeulen, 2014), labor practices, production standards, or technology (Kogut & Zander, 1992; Ritchie & Melnyk, 2012; Yeung, Lo, & Cheng, 2011), or philanthropic patterns (Galaskiewicz, 1997; Marquis et al., 2007; Tilcsik & Marquis, 2013).

Because the firm's objective function centers on the generation of profits (Sundaram & Inkpen, 2004), managers focus on the financial standing of the first mover to form beliefs of its capacities in interpreting institutional and stakeholder dynamics (Posen et al., 2013). For them, financial standing connotes credibility (Pahnke et al., 2015) and goodwill (Douty, 1972) in the market. Managers thus perceive high performers as firms that are likely to understand what constitutes appropriate behavior within the norms, customs, and laws of the market system (Thornton et al., 2012). Therefore, financial standing becomes the main informational mechanism to mitigate ambiguity and forecast stakeholder reactions to specific characteristics of firm choices (Servaes & Tamayo, 2013).

Follower firms thus use financial standing as a cognitive referent to choose whether to imitate or deviate from the first mover's donation. Because few firms solve the learning-opportunity tradeoff by waiting too long, mimicry is a recurrent strategy in the market of disaster public goods. Particularly, firms will imitate high-performing first movers because managers believe that these organizations give them high chances to sanction their choices (Deephouse, 1996). In this sense, deviating from a first move perceived as aligned with relevant stakeholder preferences and institutions is a risky choice in the eyes of the manager of the follower firm (Kopel, 2009). Hence, imitation will be frequent among firms of the same institutional group (e.g., industry) that share strategies, stakeholders, and institutions (Deephouse, 1999).

In consequence, high-performing first movers create long lasting isomorphic bandwagons and their donation size is a strong predictor of the average corporate giving for a specific disaster. First movers with low performance exert a weaker and less sustainable scale of influence (Deephouse & Heugens, 2009). They generate fleeting imitation and cognitive referents that deviating firms adjust more drastically.

Because several firms set their giving as a function of the choices of early donors, which have comparatively very little objective data on the size of the hardship, the aggregate business response is often uncorrelated with the underlying characteristics of the social need. That is, I expect that the share of corporate giving for a specific disaster will be either too large or too little in relation to variables such as the number of victims. Putting these arguments together, I predict the following:

Hypothesis 2 (H2). The first responses in the industry when first movers are high performers explain the average amount of corporate aid more than objective measures of the social need

Using media reputation to make sense of stakeholders punishing or rewarding organizational choices

Consumers, governments, and other stakeholders directly or indirectly affected by the disaster deal with the uncertainty of firms efficiently helping restore social welfare (Ballesteros et al., 2017). Media reputation, i.e., a general and short-term perception of an organization's attitudes and aptitudes based on stakeholder inferences from its recent

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behavior in different market and non-market domains, functions as this signaling

mechanism (Gamson & Modigliani, 1989; Kuhnen & Niessen-Ruenzi, 2011; Wry,

Deephouse, & McNamara, 2006). This perception is created by the several micro-

encounters that the firm has had with members of society in the recent past (Bitektine,

2011). Replacing the most permanent and focused influence of a history of supplying

disaster goods, media reputation finds its main source in mass outlets (Deephouse &

Carter, 2005).

As such, different disciplines have documented the power of media to influence the

social construction of socioeconomic processes (Deephouse, 2000). In a market system,

the pre-event media coverage sentiment score influences stakeholder beliefs of the firm's

intentions and capacities to increase or hamper social welfare with its aid. Media

communications mitigate information asymmetry among local stakeholders that have no

objective data on the performance of the corporation in the focal action (Weigelt &

Camerer, 1988).

A positive reputation translates to the time of the focal choice and situates the firm as

a reliable actor whose provision is socially desirable. The firm thus achieves moral

legitimacy and stakeholders perceive its behavior to be contextually appropriate. For

instance, they believe that the firm's choices will likely meet social needs and will be in

line with relevant norms, customs, and rules (Deephouse & Carter, 2005). In contrast,

stakeholders perceive that the intervention of firms with negative preexisting reputation

will be less socially beneficial. The underlying motives of low-reputation donors are

likely to be perceived as less altruistic or sincere and more instrumental and symbolic (Cuypers et al., 2015).

The main consequence of this constructivism is the propensity of reputable first donors to realize competitive benefits. A firm whose choices achieve legitimization by way of its preexisting reputation has a comparatively high likelihood of gaining different forms of stakeholder support. For instance, the local government may favor the firm when distributing operational rights (Wilburn & Wilburn, 2011), investors may facilitate access to financial resources (Cheng et al., 2014), and customers may increase their willingness to pay or their demand for the firm's market goods (Servaes & Tamayo, 2013). Additionally, internal stakeholders such as workers may perceive an intrinsic pay through an emotional connection with the organization and increase productivity (Flammer & Luo, 2015), and other external stakeholders may provide goodwill that functions as informal insurance for future calamities (Minor & Morgan, 2011). A positive reputation thus becomes a strategic resource for value creation (Barnett, 2007; Deephouse, 2000).

In sum, I argue that the main determinants of performance benefits associated with timing choices are not the *de facto* capacities of the firm to choose the optimal characteristics of its choices or the firm-specific financial or physical resources, but the perceived efficiency of the corporate response. Formally, I hypothesize that:

Hypothesis 3 (H3). On average, first movers with a positive preexisting reputation will realize performance advantages more often than first movers with a negative preexisting reputation

The Construction of Follower Rents

Whether strategic isomorphism confers performance benefits to the corporate donor depends mainly on the target of imitation. Ideally, a follower will mimic a first donor with a positive reputation, but the institutional pressures previously described will lead several followers to err. Because first donors with bad reputations often move first in the hopes of improving the public image of the organization some firms will imitate its donation (Muller & Kräussl, 2011).

Mimicking first donors with negative pre-disaster reputation may carry a financial cost because firms adopt responses that stakeholders perceive as contextually inappropriate. Once the manager has set her imitation target, adjusting her behavior to deviate significantly from the first mover's donation is a complex task. Such donation amount is a legitimized choice and if the imitator searches additional information, it centers such effort on the data that suit the first move (Asch, 1955; Simonsohn & Ariely,

2008). Therefore, organizations mimic attributes that the market evaluates as contextually inappropriate.[48]

On the other hand, imitating leaders that stakeholders perceive positively often results in performance benefits. Imitators capture positive reputational spillovers and legitimize their behavior as suppliers of disaster aid (Deephouse, 1996; Howard-Grenville, 2008; Nikolaeva, 2014; Salomon & Wu, 2012). Particularly, firms with large informational gaps benefit from savings in the costs of learning (Lee, Smith, Grimm, & Schomburg, 2000; Nikolaeva, 2014; Pingle, 1995; Posen et al., 2013). They economize in collecting and transforming data into relevant information (Levitt & March, 1988).

Rational mimickers thus free ride on early movers' endeavors that absorb the risks and costs of social experimentation. By capturing legitimization spillovers, external stakeholders consider the follower's choices as contextually appropriate. Hence, performance benefits arise due to material savings in the costs of decision-making, and a fit with the institutional environment (Deephouse & Carter, 2005).

It follows from these arguments that if stakeholders judge first donations as contextually suboptimal, due to the perceived inefficiency of the first donor, followers have more opportunities to capture rents by donating a significantly different amount than by engaging in imitation. In other words:

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[48] In other settings, follower organizations may err in entry by expanding to crowded markets with declining life cycles; or they may adopt soon-to-be obsolete technology only because it has surpassed a tipping point of users in a reference group (Haveman, 1993).

Hypothesis 4 (H4). Imitating a first mover's choice is more likely to gain rents than deviating when the first mover has a positive preexisting reputation

Hypothesis 5 (H5). Deviating from the first mover's choice is more likely to gain rents than imitating when the first mover has a negative preexisting reputation

Variance in Uncertainty and Ambiguity and the Use of Cognitive Referents

The heterogeneity in the relative importance of cognitive referents vis-à-vis deliberative or controlled thinking is fundamental in a theory of the social construction of timing advantages. The cognitive capabilities to make choices or evaluate the social value of these choices should vary across firms (e.g., some have more experience in the specific market and understand the institutional context better than others do) and across societies (i.e., some have been more exposed to private supply than others have) (Henisz & Delios, 2001; Zollo, 2009).

Additionally, some choices entail more time for decision-making or their higher frequency enables iterated choices under relatively similar stakeholder and institutional dynamics. Firms in disaster-prone areas, for instance, where the occurrence of these phenomena is seasonal (e.g., tornados in the U.S. Midwest) have more data to mitigate causal ambiguity (Henisz & Delios, 2004). Conversely, seismic activity is highly uncertain even in countries frequently hit by earthquakes such as Japan and China (Baker & Bloom, 2013). Moreover, they are associated with a wide range of socioeconomic

impacts, which hampers predictability of the social need and the organizational ability to respond (Anbarci, Escaleras, & Register, 2005).

Therefore, all else being equal, the higher the frequency of the corporate decision and the existing history providing such good are, the larger the opportunities for learning (Christianson, Farkas, Sutcliffe, & Weick, 2009; Oetzel & Oh, 2014; Rerup, 2009). Learning mitigates the distorting effect of beliefs in ambiguous contexts (Kahneman, 2011) and facilitates the mental association between timing and stakeholder expectations (Starbuck, 2009; Zollo & Winter, 2002). Additionally, firms accumulate context-specific knowledge that help meet internal and external pressures (Beck & Plowman, 2009; Helfat & Peteraf, 2015; Henisz & Delios, 2002).

On the other hand, experiential learning enables stakeholders to make informed assessments of the social consequences of corporate aid. Government stakeholders, for instance, may be more able to identify cases where the participation of the business community or specific firms is more desirable than the intervention of other entities (Ballesteros et al., 2017). Thus, learning helps transforming environmental uncertainty and causal ambiguity into risk. I summarize these arguments in the following moderating prediction:

Hypothesis 6 (H6). The effect of cognitive referents in the generation of follower rents is directly proportional to the degree of uncertainty and ambiguity

EMPIRICAL ANALYSIS

Data

I tested the value of my theoretical argumentation with a dataset that covers the population of major natural disasters worldwide from 2003 to 2015, as reported in the International Disaster Database (EM-DAT) from the Centre for Research on the Epidemiology of Disasters. Although EM-DAT records all 5,237 major disasters,[49] I focused on sudden disasters, such as earthquakes and hurricanes, which have a clear triggering event, immediate disruption, and peak impacts within 30 days. I did not consider slowly emerging disasters, such as famines, because impacts unfold over a long period and it is difficult to identify the total magnitude and timing of aid. I also excluded *manmade* disasters, such as 9/11, as these often involve sociopolitical factors affecting aid and its consequences (Birkland, 1997; Klinenberg, 2003; Platt, 2012). Finally, I dropped events with missing data on or imprecise dates. The final list comprises 4,637 disasters that affected 177 countries.

For corporate disaster giving, I used the propriety dataset described in the Preface. The Annex contains a detailed description of the procedures to monetize in-kind giving, convert to U.S. dollars, and assess measurement error and data quality using third-party sources. After merging this dataset with the several datasets described below on firm-specific data from Lexis Nexis Corporate Affiliates, Capital IQ, and tracking media

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[49] According to EM-DAT, these are events associated with 10 or more people killed, 100 or more people affected, a declaration of a state of emergency, or a call for international assistance, http://www.emdat.be/.

reputation using Factiva, and country-specific data from the World Bank and the United

Nations Development Program, the study covers 5,845 multinational firms from 74

headquarters-countries and 19,958 donations.

Method

My argumentation focuses on how the perception of the contextual appropriateness of

corporate disaster giving, driven by media reputation and corporate financial standing,

affects donations decisions and performance benefits. Testing these associations is a

complex task because reputation, financial standing, and donation choices are likely

endogenous to firm performance. Isolating causality requires an approach that compares

performance variables among firms that donated with different timing and magnitude,

and have different levels of media reputation and financial standing, but are otherwise

similar with regard to underlying attributes. The assumption of heterogeneity in these

characteristics but homogeneity in everything else is difficult to satisfy and poses an

estimation challenge for conventional panel-data techniques. The risk of documenting a

spurious relationship is particularly high since financial performance and pro-social

behavior are likely moving in the same direction as unobserved factors such as

managerial capabilities and risk aversion.

Tools such as fixed-effects and control variables partially address these issues, but

they impose the assumption that *ex ante* disaster trends extrapolate to *ex post* conditions,

which is often not the case (Ballesteros et al., 2017). Large sample matching techniques

like coarsened-exact matching are inefficient in contexts where the potential control pool

is limited (e.g., first movers with good/bad reputation and high/low financial performance) and efficient single comparisons often do not exist (Abadie et al., 2010, 2015).

Given the impossibility of a clean experiment that randomly allocates firms into groups with different donation- and firm-specific characteristics, I used the second-best econometric tool for causal inference: a quasi-experimental design. Traditional quasi-experimental designs, such as differences-in-differences, allow for the inclusion of unobserved confounding influences. This heterogeneity must be time-invariant, though, so that the temporal method can address it. Instead, I chose the synthetic control method (SCM), which mitigates the issues described above and allows the effects of unobserved heterogeneity to vary overtime (Abadie et al., 2010, 2015).

Synthetic control method. 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 firm not affected by an intervention to emulate pre-treatment characteristics of the treated entity. From this, weights are assigned to multiple control firms, which are then combined to form a synthetic comparator that closely resembles the treated firm, except

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for the presence of the intervention (see Abadie et al., 2010, 2015 for detailed discussions). The approach is also capable of matching entities over a long pre-treatment time-period. As Abadie et al. (2015: 498) 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." In my study, this means that SCM matches each treated firm with a combination of carefully selected firms in the control group: a synthetically created organization. For instance, no one firm approximates Anglo American in the years leading up to the 2010 earthquake and tsunami. However, features of Rio Tinto, Antofagasta, Tek, Bifox, and Codelco are combined in different proportions to form a synthetic Anglo American that closely matches features that predict performance.

The efficiency of SCM centers on the capacity of the algorithm to minimize, for each pre-treatment period, the distance between treated firms and each of the synthetic counterfactuals on a case-by-case basis. As a result, SCM does not compute significance levels 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 is 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.

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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). The Appendix has a mathematical description of SCM and how statistical inference is conducted.

Variables

Outcome variable. Calculating performance effects associated with the response to country-localized disasters requires a measure that is sensitive to changes in performance at the national level. Therefore, I use annual revenue at the subsidiary level. Revenue is the income that a corporate subsidiary has from its market activities, usually the sale of products or services to external or internal customers. Previous studies have relied on similar measures to analyze performance of multinational companies (Rangan & Sengul, 2009).

The outcome variable is *the probability of off-trend revenue*, which is the likelihood that a donor firm has of accruing income that it is not explained by the historic trajectory of the determinants of market income at the subsidiary level. To estimate this measure, I use exact inferential techniques as suggested by Abadie et al., (2010), using the predictor variables described below. For each treated firm, I construct a synthetic control based on five years of pre-disaster data at the subsidiary level using the predictors also described below. Then I use revenue one year after the disaster. Lexis Nexis Corporate Affiliations and Capital IQ are the data sources. Negative values of the probability of off-trend revenue means that the firm is, on average, likely to obtain losses associated with its donation.

Local revenue facilitates the evaluation of the main relationship of interest in a way that other variables of financial performance commonly used in the extant literature cannot (Lev, Petrovits, & Radhakrishnan, 2010; Lieberman & Montgomery, 2013). For instance, cumulative measures using stock prices in international markets may be affected by factors that are beyond the subsidiary's control (Lamin & Zaheer, 2012). Furthermore, the impact of giving on consumer behavior may be observed faster via revenue than other economic consequences of strategic philanthropy, such as increases in employee productivity (Lev et al., 2010).

Predictor variables. In my setting, I analyze what would have happened to the generation of off-trend revenue associated with the timing of one specific donation in the absence of a given level of media reputation and/or financial standing. I followed a rigorous data-driven procedure to construct efficient comparison groups that have statistically similar characteristics to the treatment units. Particularly important are the characteristics strongly associated with financial performance as reflected in a voluminous literature on firm resources and capabilities (e.g., Amit & Schoemaker, 1993; Barney, 1991; Du et al., 2011; Lieberman & Montgomery, 2013) and those associated with pro-social behavior (e.g., Marquis et al. 2007, Muller and Kräussl 2011, Servaes and Tamayo 2013). Using I use 1) performance proxied by annual revenue, market capitalization, and return on assets; 2) industry is the four-digit SIC code; 3) size proxied by number of employees and total assets; and 4) innovation proxied by the dollar amount of research and development. The sources of these data are Capital IQ and Corporate Affiliates.

Additionally, I include in the matching logarithm country variables (GDP, life expectancy, inflation rate, trade openness, and government effectiveness) and event-specific variables (human hardship and media visibility), following previous work investigating the effect of institutional development (Volberda, van der Weerdt, Verwaal, Stienstra, & Verdu, 2012) and the development implications of disasters (Kousky, 2013). My approach, hence, isolates the effect of the potential sources of public opinion from several context-based factors that may also contribute to the generation and evolution of performance advantages.

Treatment variables. For hypothesis 1, given that the distribution for economic reliance is symmetric, the mean and standard deviation are efficient indicators of location in the distribution. I thus divided the dataset into three equally sized groups using the 33.3 and 66.6 percentiles as cutoff points: firms with low economic reliance; firms with medium levels of economic reliance; and firms with high levels of economic reliance.

For hypotheses 3, 4, and 5 the treatment variable is net pre-event media coverage sentiment score. Considering limitations, biases, and measurement error, the argument that media captures corporate reputation has been established in several lines of research (Deephouse, 1996). The tone or sentiment of media is the surrogate of unambiguous and objective measures of a firm's attention to (Hoffman & Ocasio, 2001) and engagement in (Henisz et al., 2013) social issues, its predisposition to risky market behavior (Sitkin & Weingart, 1995), its conformity to social norms (Miller, Le Breton-Miller, & Lester, 2012) and regulation (Marquis & Qian, 2013), among other features. Media reports are an

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imperfect substitute of primary data collected through surveys, but the second best

available proxy of public opinion (Kuhnen & Niessen-Ruenzi, 2011).

I calculate *media reputation* by analyzing media reports on the business organization

one year before and after the official date of the disaster. The measure uses computer

linguistic software, as implemented by Factiva, which quantifies the tone (i.e., sentiment)

of each report. I followed work that calculates and ranks organizations based on their

media-sourced reputation (Bansal & Clelland, 2004; Carroll & Hannan, 1989;

Deephouse, 1996) and used the Janis-Fadner coefficient of imbalance (JCE).[50] The JCE is

calculated as follows:

$$JFC = \begin{cases} \dfrac{e^2 - ec}{t^2} & if\ e > c \\ \dfrac{ec - c^2}{t^2} & if\ c > e \\ 0 & \text{otherwise} \end{cases}$$

Where, e=annual number of positive media reports on the firm; c =annual number of

negative media reports on the firm; and t=e+c

In hypothesis 1 I test the argument that peer firms use *financial standing* as their main

cognitive referent of appropriateness and a driving factor of their proneness to imitate. In

this case, I use the rank of the corporation by firm value, lagged by a year related to the

disaster date. Several studies have shown in the context of their samples that firm value is

an efficient proxy of performance and the measure is widely accepted in the strategy

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[50] For an analysis of the reliability of this measure to capture the comparative media reputation of a firm see Bansal & Clelland (2004).

literature and particularly in studies evaluating the performance effects of CSR (Cuypers et al., 2015; Flammer, 2015; Servaes & Tamayo, 2013). See Hansen and Wernerfelt (Hansen & Wernerfelt, 1989) for a thorough discussion.

To capture the *timing* of the choice, I use the log of the number of minutes between the official disaster time, as reported in EM-DAT, and the announcement of the organizational decision to donate based on the earliest media report. In cases of finding the same timing between two or more reports (2.75 percent of cases), I considered seconds as the deciding measure. Additionally, for robustness purposes, I construct categorical variables to denote order groups: D1=1, if the firm is the first mover; D2=1, an imitator; D3=1, a deviator. The exclusion case is abstention.

Regarding the amount of donation and timing, I coded four options: 0) *abstention*, there is no reported donation, p, for organization i, $p^i=0$; 1); *first mover*, organization i is the first reported donor from institutional group A, $t^i < t^j$, when $i, j, \in A$; 2); *imitation*, there is at least one other organization, h, that reported the same cash or in-kind USD amount of donation prior to organization i in institutional group A, $t^h < t^i$, when h and $i \in A$; 3); *deviation*, organization i reported a donation amount significantly different than those of previous organizations, $1...h$, in institutional group A; that is, $t^i < t^h$ when i and $h \in A$.[51] I use two types of classification continuously referred in the literature as sources of

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[51] The organizational behavior is studied as an intended decision. Business decision makers choose the timing of donation, and, if following, they choose to replicate other organizations' responses (i.e., donate the same amount, with the same form—in-kind or cash, and to the same target area), to donate differently, or to abstain (i.e., not to donate). Followers face no ambiguity: imitation is not tacit or complex (Lieberman & Asaba, 2006). Followers know the methods used by leader organizations to pledge a donation.

institutional pressures for managerial decision-making under uncertainty: the industry

(i.e., four-digit Standard Industrial Classification) (Ethiraj & Zhu, 2008), and the country

of headquarters (i.e., country where the organization was founded) (Marquis & Battilana,

2009).

RESULTS

Consistent with earlier studies, the exploratory analyses show that the measure of

firm performance (i.e., revenue) correlates positively with a firm's disaster giving,

providing preliminary evidence that consumers value such behavior favorably.

Economic Reliance and Rents (Hypothesis 1)

Table 11 shows results for hypothesis 1 predicting that firms with high economic

reliance in the affected market are comparatively likely to obtain performance benefits

out of corporate disaster giving. I find that while firms with mean economic reliance

(0.49) are, on average, unlikely to obtain off-trend revenue associated with their donation,

firms with high economic reliance are 16.6 percentage points more likely to realize

performance benefits than firms with low economic reliance. However, when taken

together, corporate donors are more likely to suffer performance losses than benefits.

To assess the capacity of economic reliance to predict donation timing, I run an OLS

specification with fixed-effects where the dependent variable is the expected donation

timing (greater values represent later donations) and the explanatory variable is the

degree of economic reliance (greater values represent higher reliance on the affected

country). To assess and mitigate the effect of spatial autocorrelation that hampering econometrically efficient standard errors, I used the Freedman-Lane semi-partialing method (Dekker et al., 2007) implemented as a linear probability model with fixed-effects (Rogan & Sorenson, 2013).

Table 11. The effect of economic reliance on the probability of obtaining off-trend revenue

| | Economic Reliance | | |
	Model 2 Low	Model 3 Medium	Model 4 High
Firm-Specific Variables			
Total Revenue (USDmm ln)	9.74	9.76	9.97
Market Capitalization (USDmm ln)	9.55	9.64	9.69
Return on Assets %	5.96	4.17	4.05
Primary Industry (ln)	8.51	8.39	8.30
Number of Employees (ln)	10.56	10.67	11.07
Total Assets (USDmm ln)	14.91	15.13	15.15
R&D Expenses (USDmm ln)	9.80	10.12	10.52
Context-Specific Variables			
Human Hardship (ln)	12.63	11.97	8.92
Economic Cost (USDmm ln)	6.36	7.47	9.37
Media Coverage (ln)	9.67	10.35	11.34
Number of Disasters (Nation, ln)	2.17	2.10	2.04
Number of Disasters (Global, ln)	5.49	5.52	5.53
Newsworthy Events	8.69	7.96	7.15
Openness to Aid	0.89	0.75	0.62
Outcome Variable			
Probability of off-trend revenue	**(9.42)**	**0.07**	**7.17**

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Control is firms that did not donate to disasters.

Economic Reliance as a Predictor of Donation Timing (Hypothesis 1a)

Table 12 report the results of the panel fixed-effects estimation that suggest that firms with relatively high economic reliance to the disaster-stricken country tend to donate earlier than firms with relatively low economic reliance.

First Moves and Social Influence (Hypothesis 2)

Table 12 shows results for hypothesis 2, which predicts that the average amount of corporate aid for a given disaster will be more a function of the donation amount of first movers with high financial standing than measures of the social need. Using an OLS model with CEM data, I find that an increase of one standard deviation in financial standing is associated with an increase of almost three times in the average donation (Model 4). On the other hand, the coefficients of total number of deaths and affected population are statistically insignificant.

Table 12. The effect of economic reliance on donation timing

VARIABLES	Timing of the donation
Corporate disaster giving (Yes/No)	-19.493***
	(1.609)
CONTROLS	
Number of Employees	0.078***
	(0.020)
Total Revenue	-0.011
	(0.041)
Market Capitalization	-0.066
	(0.041)
Return on Assets	0.043***
	(0.006)
R&D	0.016
	(0.039)
Consumer Orientation	0.419***
	(0.056)
GDP	1.025***
	(0.386)
Area (Size)	-0.407***
	(0.121)
Population	-0.013
	(0.170)
Storm	3.609***
	(1.173)
Flood	6.095***
	(1.172)
Earthquake	1.215
	(0.133)
Mass Movement Dry	0.006
	(0.000)
Mass Movement Wet	0.008
	(0.000)
Deaths	-32.824

VARIABLES	Timing of the donation
	(42.089)
People Affected	-0.223
	(0.580)
Economic Cost	297,763.560
	(792,109.162)
Annual Number of disasters (Country)	-0.049*
	(0.028)
Annual Number of disasters (World)	0.022**
	(0.009)
Newsworthy events	0.096*
	(0.051)
Constant	-31.404***
	(4.062)
Observations	14,142,850.00
Number of Events	4,637
Country FE	YES
Year FE	YES
Month FE	YES
Firm FE	YES

Clustered-by-event bootstrapped errors in parentheses (*** p<0.01, ** p<0.05, * <0.1).

Media Reputation and First Mover Rents (Hypothesis 3)

This hypothesis suggests that a pre-disaster positive reputation is a necessary condition for the generation of first-mover rents. In line with this argument, first movers realize performance benefits only when they receive a positive net pre-event media coverage sentiment score. In probabilistic terms, knowledgeable and experienced leaders are about four times more likely to realize FMAs than statistically similar leaders that, however, lack one or both cognitive resources as seen in Table 14.

Follower Rents

Imitation (Hypothesis 4). The findings are consistent with the interpretation that early movers generate mental anchors among peer organizations and consumers. Table 15**Error! Reference source not found.** indicates that imitation is a beneficial strategy

when organizations mimic first movers with positive media reputations, which supports H4. In fact, for organizations that have negative reputations, following pays off better than leading. Conversely, when the leader has, on average, a negative media reputation, imitation is a costly choice.

Table 13. The Effect of the First-Mover's Financial Standing on the Average Corporate Donation

VARIABLES	Model 3 Dependent variable: Average Corporate Donation (RE)	Model 4 Dependent variable: Average Corporate Donation (FE)
Financial Standing (First Mover)	6.121***	2.706**
	(3.151)	(3.022)
Number of Deaths	-0.164	-0.142
	(0.530)	(0.701)
Affected Population	0.789	2.972
	(3.355)	(3.810)
CONTROLS		
Return on Assets %	0.069	0.017
	(0.043)	(0.098)
Consumer Orientation	0.705	
	(0.437)	
Industry	0.026**	
	(0.013)	
Employees	0.096	-1.742
	(0.207)	(1.114)
Market Capitalization	0.272	-0.191
	(0.176)	(0.428)
Population	-0.089	-0.003
	(0.276)	(0.296)
Land Area	-1.133***	
	(0.341)	
Number of Disasters (Global)	0.743	1.834***
	(0.522)	(0.495)
Number of Disasters (Country)	0.216	-1.166***
	(0.495)	(0.395)
Affected Population	-0.350***	-0.328***
	(0.107)	(0.125)
GDP Million	0.238**	0.088
	(0.114)	(0.109)
Economic Damage (USD)	0.233*	0.316**
	(0.127)	(0.131)
International Aid	0.153	-0.097
	(0.208)	(0.200)
Storm	4.582**	4.348**
	(1.884)	(1.969)
Flood	3.133	2.762
	(1.969)	(1.969)
Earthquake	4.066**	4.391**
	(1.955)	(1.884)
Constant	-21.848***	
	(4.017)	
Country FE		YES
Year FE		YES
Month FE		YES
Firm FE		YES

Clustered-by-event standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Fixed-effects model has robust standard errors, month-, year-, country-, and firm-effects.

Table 14. Predictor of Probability of Off-trend Revenue (Leading)
Dependent variable: Probability of Off-trend Revenue

VARIABLES	First-Mover with Positive Reputation	First-Mover with Negative Reputation
Predictor Variables		
Revenue (logged)	3.73	3.75
Market capitalization (logged)	4.53	4.33
Return on assets	5.02	5.11
Industry	4.50	4.50
Number of employees (logged)	4.87	4.93
Total assets (logged)	6.54	6.49
R&D expenses (logged)	4.43	4.56
Context-Based Variables		
GDP (logged)	6.92	6.97
Life expectancy	57.32	57.49
Inflation rate	9.15	9.14
Trade openness	57.33	57.48
Government effectiveness	53.98	54.01
Salience	14.35	14.33
Human hardship	380.58	422.13
Outcome Variable		
Probability of off-trend revenue	42.49	(0.32)

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Actual is leading firms with positive pre-disaster media reputation. Control is leading firms with negative net pre-event media coverage sentiment score.

Table 15. Predictor of Probability of Off-trend Revenue (Imitation)
Dependent variable: Probability of Off-Trend Revenue

VARIABLES	Treatment	Control
Predictor Variables		
Revenue (logged)	3.83	3.21
Market capitalization (logged)	4.97	4.62
Return on assets	5.89	5.88
Industry	4.32	4.32
Number of employees (logged)	4.21	4.49
Total assets (logged)	6.42	6.93
R&D expenses (logged)	4.62	4.51
Media reputation	.02	.02
Context-Based Variables		
GDP (logged)	6.93	6.98
Life expectancy	57.37	57.54
Inflation rate	9.16	9.15
Trade openness	57.38	57.53
Government effectiveness	54.03	54.06
Salience	14.36	14.34
Human hardship	380.91	422.50

VARIABLES	Treatment	Control
Outcome Variable		
Probability of off-trend revenue	38.56	(15.89)

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Actual is following firms that imitate first movers with positive media reputation (i.e., net pre-event media coverage sentiment score.). Control is imitators of first movers with bad media reputation.

Deviation (Hypothesis 5). I do not find support for the argument that divergence from naïve leaders is an efficient choice. Table 16 shows a statistically insignificant difference between firms that deviate from leaders with bad reputation and firms that deviate from reputable leaders. However, one should consider that deviants make an additional choice in comparison with mimickers, which affects the evaluation of the efficiency of deviation. When a follower organization deviates, the next key decision is whether its giving will be smaller or greater than the first donation in the industry (i.e., the first move). As per the discussion in the theory section, the likelihood that the deviator accrues rents depends on consumers' perceived contextual appropriateness of its choice. In turn, this perception may depend on the follower's financial standing relative to the first mover's standing (Alessi, 1975).

Therefore, a deviant organization will be more likely to seize off-trend positive revenue when the difference between its giving and the first move is proportional with the difference in standing between the first mover and the follower. Holding everything else constant, if the follower organization has lower standing than does the first mover, it will be more likely to gain rents when the size of its donation is smaller than the first move. Conversely, when the follower has greater standing than does the first mover, its donation must be bigger than the first move.

Table 16. Predictor of Probability of Off-trend Revenue (Deviation)
Dependent variable: Probability of Off-Trend Revenue

VARIABLES	Treatment	Control
Predictor Variables		
Revenue (logged)	3.87	3.25
Market capitalization (logged)	5.03	4.67
Return on assets	5.96	5.96
Industry	4.37	4.37
Number of employees (logged)	4.26	4.54
Total assets (logged)	6.49	7.01
R&D expenses (logged)	4.67	4.56
Media reputation	.01	.00
Context-Based Variables		
GDP (logged)	7.01	7.06
Life expectancy	58.03	58.20
Inflation rate	9.26	9.25
Trade openness	58.04	58.19
Government effectiveness	54.65	54.68
Salience	14.52	14.50
Human hardship	380.91	422.50
Outcome Variable		
Probability of off-trend revenue	7.90	7.36

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Actual is following firms that deviate from first movers with bad reputation (i.e., net pre-event media coverage sentiment score). Control is deviance of first movers with positive reputation.

To test this argument, I use firm value (Capital IQ) as a proxy of financial standing. Table 16 shows the results of a coarsened-exact matched, mixed-conditional logit, which suggest that a follower with higher financial standing than the first mover must make a greater donation than the latter to have a probability of off-trend revenue. This offers further evidence that early movers' choices define a cognitive referent that stakeholders use to make a comparative evaluation of subsequent responses from peer organizations.

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Learning, Uncertainty, and Ambiguity (Hypothesis 6)

This last hypothesis suggests that experiential learning mitigates uncertainty and ambiguity and thus the strategic value of cognitive referents. To measure the degree of causal ambiguity that a firm faces when donating to a specific disaster, I proxied *experience donating to disasters* with the cumulative number of donations to natural disasters that the corporation has done before the focal disaster. Additionally, I used the cumulative number of industry-years of operation in the disaster country based on the first subsidiary operating in such country as a proxy of *knowledge of the market*. As the distribution for these variables is normal, I used the mean (2.9 of experience donating and 7.8 of market knowledge) and +/- one standard deviation to divide the data into three groups.

Table 17. Probability of Off-Trend Revenue (Deviants)

VARIABLES	Probability of Off-Trend Revenue
Excess of Donation over First Move x Financial Standing	78.723***
	(22.327)
Excess of Donation over First Move	1.045***
	(0.383)
Financial Standing	0.000***
	(0.000)
CONTROLS	
Number of Employees	-0.036
	(0.038)
Total Revenue	0.049
	(0.097)
Market Capitalization	-0.039
	(0.103)
Return on Assets	0.024
	(0.017)
Consumer Orientation	0.209
	(0.139)
GDP	-0.573
	(0.445)
Area (Size)	-0.294**
	(0.133)
Population	0.119
	(0.198)
Deaths	202.022
	(737.407)
Economic Cost	-9993698.328**
	(3907004.581)
Annual Number of disasters (Country)	-0.016
	(0.041)

VARIABLES	Probability of Off-Trend Revenue
Annual Number of disasters (World)	-0.018*
	(0.011)
Newsworthy events	-0.116*
	(0.062)
Constant	-3.119
	(4.189)
Country FE	YES
Year FE	YES
Month FE	YES
Firm FE	YES

Clustered-by-event bootstrapped errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

I found that the expected benefit of imitating a reputable first mover and deviating from firm with bad reputation falls as the follower acquires market knowledge and issue experience. However, Table 18 shows that the variation for a standard-deviation unit increase is not significantly different[52] from average levels suggesting that the social constructivism of disaster giving often outstrips deductive reasoning even for knowledgeable and experienced firms.

Table 18. Learning and Causal Ambiguity

Treatment Levels	- Standard Deviation				Mean				+ Standard Deviation			
	Market Knowledge		Experience Donating		Market Knowledge		Experience Donating		Market Knowledge		Experience Donating	
Difference in the probability of off-trend revenue between treatment and control	Imitating	Deviating	Imitating	Deviating	Imitating	Deviating	Imitating	Deviating	Imitating	Deviating	Imitating	Deviating
	42.16	19.97	33.19	17.11	39.96	17.86	30.16	16.89	31.29	15.25	29.81	17.37

The table shows the degree of causal ambiguity that a sample firm is likely to face when engaging in giving to a focal disaster. Market knowledge is the cumulative number of industry-years of operation in the disaster country based on the first subsidiary operating in such country and experience in disaster giving is the cumulative number of donations to natural disasters that the corporation has done before the focal disaster. Treated are firms that imitate reputable first movers or deviate from first movers with bad reputation. The cutoff levels of market knowledge and experience are defined around the mean of 7.8 and standard deviation of 2.9.

To measure environmental uncertainty, I used the World Risk Index from the Environment and Human Security[53] that indicates the country vulnerability to different

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[52] The Appendix has a description of statistical inference and the calculation of significance levels using the synthetic control method.
[53] https://ehs.unu.edu/.

types of disasters. The distribution of this variable that goes from 0.01% to 36.45% of

disaster vulnerability is highly skewed because a few countries are highly prone to large

disasters, which means that the mean value and standard deviation do not provide

adequate cutoff points for categorizing the data. Instead, I use the 50th (6.6% of disaster

vulnerability), 90th (12.7%), and 99th (27.7%) percentiles as levels. Table 19 illustrates

that the positive spillovers of imitating reputable organizations radically increases in the

level of environmental uncertainty whereas the change in the value of deviating from first

movers with bad reputation is marginal.

Table 19. Learning and Environmental Uncertainty

Levels	50th Percentile		90th Percentile		99th Percentile	
Difference in the probability of off-trend revenue between treated firms and synthetic controls (%)	Imitating	Deviating	Imitating	Deviating	Imitating	Deviating
	24.95	2.53	48.35	2.56	156.19	3.10

The table shows variance in environmental uncertainty proxied by country vulnerability, which ranges from 0.01% to 36.45%. Treated are firms that imitate reputable first movers or deviate from first movers with bad reputation. The cutoff percentile levels are 6.6%, 12.7%, and 27.7% of country vulnerability to disasters.

Robustness and Supplementary Analyses

In this subsection, I focus on five tests to assess the robustness and provide boundary

conditions of the results. The Appendix has additional tests and supplementary analyses.

Institutional development and the effect of cognitive referents

It may be possible that the social constructivism influencing corporate disaster giving

and its consequences is only relevant in contexts of relatively underdeveloped

institutions. Countries with high institutional development may have in place the policy

instruments (e.g., tax benefits) enabling the strategic value of disaster aid, which could affect the frequency of imitation of high-performance firms and the use of reputation as cognitive referent.

Although the SCM algorithm matched on several institutional variables, I took an additional step to evaluate the potential influence of local institutions. I stratified the application of the algorithm by *government effectiveness*—a measure from the World Bank Worldwide Governance Indicators 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. As shown in Table 20, I did not find significant differences in the effect of cognitive referents on the off-trend revenue associated with disaster giving.

Table 20. Institutional Development and Rents

Treatment Levels	50th Percentile		90th Percentile		99th Percentile	
	Imitating	Deviating	Imitating	Deviating	Imitating	Deviating
Difference in the probability of off-trend revenue between treated firms and synthetic controls (%)	34.69	6.53	33.97	7.11	41.82	5.87

The table shows variance in institutional development proxied by the estimate of government effectiveness calculated by the World Bank that ranges from -2.5 to 2.5. Treated are firms that imitate reputable first movers or deviate from first movers with bad reputation. The cutoff percentiles levels are -.08, 1.46, and 1.92.

Is pre-disaster media reputation a sufficient driver of rents?

The extant literature offers an alternative prediction regarding the role of reputation as a strategic resource that sufficiently predicts the generation of rents (Weigelt & Camerer, 1988). The pre-disaster firm-specific actions associated with accumulating reputation *per se* may drive off-trend revenue. Reputable firms thus gain rents regardless of their philanthropic engagement. For instance, government stakeholders may ally with or support high reputation firms and these cooperative behaviors determine post-event revenue growth (Ahuja & Yayavaram, 2011). To test this argument, I restricted the SCM algorithm to firms with positive media reputation (JFC>0) and used the binary variable *donating* taking value "1" when the firm gave to the disaster as treatment. In this case, the algorithm also matches on the categorical variable of timing.

I found that reputable firms are 31% more likely to gain rents by engaging in disaster giving than reputable non-donors (Table 21). This supports the central argument of the study that reputation functions as public tool for perceiving the contextual value of corporate action.

Table 21. Predictor of Probability of Off-trend Revenue (Donor versus non-donor)
Dependent variable: Probability of Off-Trend Revenue

VARIABLES	Reputable donors	Reputable non-donors
Predictor Variables		
Revenue (logged)	3.51	3.39
Number of employees (logged)	3.98	3.94
Total assets (logged)	5.23	5.39
Market capitalization (logged)	4.11	4.13
R&D expenses (logged)	3.97	3.45
Primary industry	2.87	2.65
Return on assets	3.15	3.83
Reputation	.84	.88
Timing (categorical)	2.98	2.94
Context-Based Variables		
GDP (logged)	6.11	6.34
Life expectancy	63.12	61.14

VARIABLES	Reputable donors	Reputable non-donors
Inflation rate	5.14	6.12
Trade openness	61.98	58.13
Government effectiveness	61.10	62.35
Salience	15.34	15.99
Human hardship	134.67	123.63
Outcome Variable		
Probability of off-trend revenue	31.73	0.02

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Actual are donor firms with positive media reputation (i.e., net pre-event media coverage sentiment score.). Control are non-donor firms with positive media reputation.

Is the substantiveness of giving what matters?

Recent research suggests that substantive philanthropy is more likely to result in performance benefits than symbolic giving (Cuypers et al., 2015; Madsen & Rodgers, 2014; Marquis & Qian, 2013). For instance, stakeholders perceive in-kind giving as more sincere, altruistic, and generous. To test this argument, in Table 22 I split the sample between in-kind and cash donors and integrate the categorical variable of timing of the donation, reputation, and financial standing in the SCM logarithm. I found no significance in the difference between the two groups.

Table 22. Predictor of Probability of Off-Trend Revenue (Substantive versus Symbolic Giving)
Dependent variable: Probability of Off-Trend Revenue

VARIABLES	In-Kind Donors	Cash Donors
Predictor Variables		
Revenue (logged)	2.31	2.32
Number of employees (logged)	2.85	2.87
Total assets (logged)	3.99	3.84
Market capitalization (logged)	3.11	3.85
R&D expenses (logged)	2.11	2.45
Primary industry	2.23	2.23
Return on assets	2.84	2.94
Reputation	.00	.00
Timing (categorical)	2.36	2.32
Context-Based Variables		
GDP (logged)	3.29	3.11
Life expectancy	58.45	54.58
Inflation rate	7.11	8.09

VARIABLES	In-Kind Donors	Cash Donors
Trade openness	58.76	61.87
Government effectiveness	54.20	59.52
Salience	12.34	13.56
Human hardship	249.09	284.56
Outcome Variable		
Probability of off-trend revenue	0.09	0.18

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Treated are donors of in-kind giving, control are cash donors.

Is the size of the donation what matters?

Studies have found that giving relatively large amounts is more likely to be associated with higher rewards than giving relatively low (Madsen & Rodgers, 2014). For instance, stakeholders give more attention to large donors because they believe that these firms will give more attention to their claims in the future. To test this alternative explanation, Table 23 compares firms that gave that at least one standard deviation more than the mean with firms that gave less or one standard deviation less than the mean. As in the previous test, the SCM algorithm matches firms the categorical variable of timing of the donation, reputation, and financial standing in the SCM logarithm. The probability of gaining off-trend revenue was not significantly different.

Table 23. Predictor of Probability of Off-Trend Revenue (Big versus Small Donations)
Dependent variable: Probability of Off-Trend Revenue

VARIABLES	Big Donations (+SD)	Small Donations (-1SD)
Predictor Variables		
Revenue (logged)	2.34	2.38
Number of employees (logged)	2.84	2.88
Total assets (logged)	3.78	3.87
Market capitalization (logged)	3.02	3.15
R&D expenses (logged)	2.45	2.78
Primary industry	2.14	2.31
Return on assets	2.78	2.83
Reputation	.01	.00
Timing (categorical)	1.98	2.84

VARIABLES	Big Donations (+SD)	Small Donations (-1SD)
Context-Based Variables		
GDP (logged)	3.27	3.74
Life expectancy	58.33	58.45
Inflation rate	7.26	8.34
Trade openness	57.89	58.24
Government effectiveness	54.23	55.28
Salience	11.98	12.03
Human hardship	275.33	285.20
Outcome Variable		
Probability of off-trend revenue	0.98	0.03

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Treated are donor firms of large amounts (+1 standard deviation), control are donors of small amounts (-1 standard deviation).
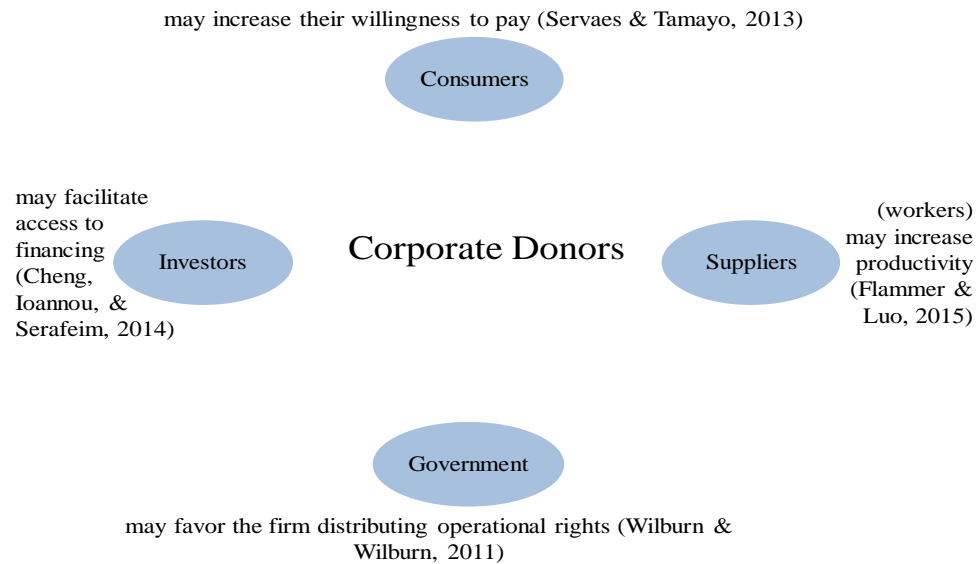
Does the appropriation of rents vary across industries?

Until this point, I have considered the primary industry as a predictor variable to construct the trajectories of revenue. Counterfactual firms thus match the pre-disaster characteristics of treatment firms from the same industry. It may be possible, however, that the performance consequences of corporate disaster giving varies across industries. This is because strategic stakeholder fields vary by industry (Freeman, 2010) and the potential mechanisms behind the financial consequences of disaster giving are, arguably, associated with specific types of stakeholders, as illustrated in Figure 2. For instance, industry demands predominantly formed by individual consumers (i.e., business to consumers) may be more sensitive to changes in the pro-social behavior of the supply than demands formed by businesses (i.e., business to business industries). This is because the effect of pro-social behavior in willingness to pay may be faster than in other stakeholder goods, such as social licenses to operate (Howard-Grenville, 2008). In turn, revenue may be comparatively elastic to willingness to pay.

Additionally, studies suggest that consumers in industries such as personal services and consumer goods tend to have different degrees of awareness of the supply's pro-social behavior than consumers in industries such as business services and capital goods (Du et al., 2011; Servaes & Tamayo, 2013; Tilcsik & Marquis, 2013).

Figure 2. The mechanisms behind the performance consequences of corporate disaster giving

may increase their willingness to pay (Servaes & Tamayo, 2013)

Consumers

may facilitate access to financing (Cheng, Ioannou, & Serafeim, 2014)

Investors

Corporate Donors

Suppliers

(workers) may increase productivity (Flammer & Luo, 2015)

Government

may favor the firm distributing operational rights (Wilburn & Wilburn, 2011)

Given these arguments, I expect the average effect of corporate disaster giving on financial performance to be comparatively strong among firms that operate in industries whose demand are predominantly individual consumers than other businesses. To test this hypothesis, I split the sample between firms operating industries with a *customer focus* and firms operating industries with an *business focus* using a classification by Lev et al (2010). The categories, which use the four-digit Standard Industrial Classification code, have been used before in studies on the effect of disasters on non-market behavior (Tilcsik & Marquis, 2013).

After running placebo tests to calculate the synthetic p-test following the procedure described in the Annex, I do not find sizeable differences in the likelihood of obtaining off-trend revenue associated with corporate disaster giving between firms operating in industries with a customer focus and firms operating in industries with a business focus (Table 24). Despite being apparently counterintuitive, the findings are consistent with previous research (Galaskiewicz, 1997; Tilcsik & Marquis, 2013).

Table 24. Predictor of Probability of Off-Trend Revenue (Industries with Consumer Focus)
Dependent variable: Probability of Post-Event Off-Trend Revenue

VARIABLES	Costumer Focus	Business Focus
Predictor Variables		
Revenue (LN)	14.34	16.69
Number of employees (LN)	10.89	11.14
Total assets (LN)	14.89	15.85
Market capitalization (LN)	9.89	10.84
R&D expenses (LN)	7.68	12.58
Return on assets	1.85	1.84
Reputation	.01	.00
Timing (categorical)	2.01	2.01
Context-Based Variables		
GDP (LN)	13.27	13.48
Life expectancy	68.14	68.23
Inflation rate	6.71	6.12
Trade openness	61.28	63.71
Government effectiveness	78.11	74.36
Salience	12.15	12.17
Human hardship (LN)	13.74	13.74
Outcome Variable		
Probability of off-trend revenue	0.02	0.01

The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Treated are donor firms in industries with a customer focus, control are firms in industries with a business focus.

DISCUSSION

My theoretical argumentation and empirical analysis point to the enduring effects of institutional factors in the likelihood that a firm gains performance benefits by moving

first, imitating, or deviating from the first mover's choices. In the analyzed dataset of 5,845 firms and 4,637 natural disasters affecting the world from 2003 to 2015, due to processes of sensemaking based on cognitive referents, strategic choices and their consequences are often socially constructed and diffused. To research these conclusion, the analyses apply constructs and measures whose internal validity has been carefully tested either here or in other studies; data and a quasi-experimental method that mitigate endogeneity concerns that have affected empirical research; and, in the aggregate, a research design that facilitates replication.

The findings suggest that constructivist processes whereby decision-makers find measures of contextual appropriateness drive corporate behavior and its consequences in settings similar to responses to disasters where environmental uncertainty, causal ambiguity, and time pressure are pervasive and comparatively high (Baker & Bloom, 2013). I have suggested a structural mechanism behind the social construction of performance advantages. When the business intervention in a specific market setting is a relatively novel phenomenon, decision-makers cope with uncertainty and ambiguity by focusing on prominent, easy-to-collect signals. Cognitive referents replace formal institutions and objective mechanisms based on probability estimates.

I have offered evidence that a divergence in the cognitive referents that firms and stakeholders use characterizes the antecedents and, more relevant for the goal of this chapter, the consequences of corporate behavior. On the one hand, firms focus on financial standing to make their decisions of when and who to imitate. High-performing

first movers generate imitation bandwagons because followers believe that these

organizations know how to navigate the stakeholder and institutional complexities of the

market. Early donations from these firms are thus strong predictors of the average

corporate response, even more than the underlying characteristics of stakeholder needs.

On the other hand, customers, investors and other stakeholders focus on firms' media

reputations to form beliefs of the organization's capabilities and willingness to meet their

expectations. Therefore, I find that imitating a small, but reputable first mover is more

likely to gain rents than imitating a large corporation with a negative reputation.

Additionally, imitation bandwagons often lead to performance losses because business

decision-makers focus on large corporations and firms with bad reputations tend to be

early donors.

Theoretical and Practical Implications

Implications for the literature on timing strategy

My study sheds light on the conditions and mechanisms under which the sources of

timing advantages are a perception of contextual appropriateness rather than firm-,

industry-, or market-specific measures of efficiency, innovation, or physical resource

concentration. This proposes a context where the material consequences of timing

choices are not explained by the traditional four types of rents advanced by the extant

literature: monopolistic, efficiency, quasi-, and Schumpeterian (Ahuja & Yayavaram, 2011; Teece et al., 1997).[54]

Hence, I provide evidence that incorporating insights from institutional theory can enrich and enhance the predictive power of the timing strategy literature as recent studies have claimed and called for (cf., Fosfuri et al., 2013). Unlike the traditional approach in strategy research that suggests that institutions shape corporate action (Marquis & Battilana, 2009; Marquis et al., 2013; Zhang & Luo, 2013), my study supports the argument that such action may be a source of new institutional referents (Santos & Eisenhardt, 2009; Tracey et al., 2010). This has allowed me to make theoretically informed predictions about the explanatory power of cognitive referents in the generation and allocation of rents associated with the timing choices.

That the findings are robust to several country-, time-, and event-specific variables provides a contribution to the scarce scholarship on timing advantages at the international level. Neo-institutionalism (Powell, 1991) and new institutional economics (North, 1990; Williamson, 1991) suggest that realization of competitive advantages depends on the level of institutional development. My findings suggest that the type of performance advantages that I observe may be affected by the quality of national institutions, but such influence is secondary to the sociological determinants that my study unpacks. Thus, the causal role of a public perception of contextual appropriateness is arguably active across

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[54] To be clear, I am not suggesting that, for instance, a donor's material resources are unimportant to generate and sustain competitive advantages, but rather that empirical settings such as the aftermath of disasters enable the influence of constructivist processes in off-trend revenue in a unique fashion.

socioeconomic and demographic contexts. The hypothesis that the allocation of rents is socially constructed regardless of how dependable, predictable, and stable country institutions are cannot be rejected in the context of my sample.

In sum, my study responds to the call for systematic evaluations of the conditions and mechanisms that make some timing choices likely to generate rents. Arguably, this endeavor is a more fruitful path for the advancement of the literature on timing strategy, which includes research on imitation and first-mover advantage, than the identification of "an elusive timing-performance relationship" (Klingebiel & Joseph, 2015; Lieberman & Montgomery, 2013).

Implications for the literature on non-market strategy

My study contributes to the literature on corporate social responsibility that has lacked theory and evaluation of the role of timing on the material consequences of pro-social behavior (Mellahi et al., 2015). Traditionally, this literature has approached the study of the association between financial performance and corporate social performance as a comparative evaluation of pro-social versus non-pro-social firms when these choices are made in stable conditions (Aguinis & Glavas, 2012). Hence, how organizations navigate environmental uncertainty and causal ambiguity in fast-paced environments has remained an open empirical question.

By bringing attention to informational constraints and time pressure, I present an alternative explanation to the paradox of why the possession of comparatively large

physical and financial resources (Godfrey et al., 2009) or the donation of relatively large gifts (Madsen & Rodgers, 2014) do not increase the probability of realizing performance benefits. In fact, I show that a symbolic gift may be a contextually more appropriate choice in the eyes of stakeholders than a substantive gift—a contradiction of previous studies (cf., Marquis & Qian, 2013). An important consequence of this finding is that stakeholders often reward or punish firms by using measurements that are detached from the underlying characteristics of their needs.

Implications for managerial practice

In 2015, an average large corporation was 300% more likely to engage in disaster giving than 10 years before. Because the money allocated to disaster aid often surpasses a corporation's total annual social budget (Ballesteros et al., 2017), and several studies suggest that disaster giving is a high-stakes decision often associated with competitive advantages (Madsen & Rodgers, 2014; Muller & Kräussl, 2011; Patten, 2008), the timing of donating is an important managerial question.

My findings suggest that firms are making inefficient decisions regarding their engagement in disaster giving. In my sample, I found that 43% of first corporate responders obtained negative off-trend losses. Furthermore, almost 51% of the time, firms engaging in this behavior obtained negative performance consequences that were significantly larger than the size of their donations. Therefore, understanding the conditions and mechanisms that affect the relationship between corporate disaster giving and firm performance is of increasing strategic value for managers. My study offers an

unambiguous and objective method to calculate the relative probability of accruing off-trend revenue when leading the business community, imitating, or deviating from the first donation. Finally, it identifies the firm-, industry-, and country-specific factors that managers need to consider when choosing to engage in disaster giving. Attention to these pieces of information may increase the strategic value of such response.

Limitations and Future Work

My study points to fruitful avenues of future research combining the literatures on institutional theory and timing strategy. For instance, the findings indicate that early behavior creates a longstanding impression on decision-makers in a way that subsequent responses are evaluated based on their relative rather than their absolute value. Early movers thus influence the value that the market assigns to different attributes of the good, an argument that has been proposed by studies on anchoring and preference formation (Carpenter & Nakamoto, 1989; Hysenbelli, Rubaltelli, & Rumiati, 2013). The analyses illuminate some of the psychological factors affecting stakeholder expectations and their decisions to reward or punish organizational choices, which have been identified mostly in laboratory settings (Hysenbelli et al., 2013). This suggests that my findings extend beyond the immediate conditions associated with disaster responses. Accordingly, my study may be a framework that facilitates theory building on the constructivism of competitive advantages more generally.

My findings present a call for further evaluation of the material consequences of strategic choices under volatile environmental conditions. The diminished capacity of the

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government to meet increasingly complex and fast-changing societal needs associated with complex social issues has fueled systematic attacks to the traditional supply scheme of public goods (Besley & Ghatak, 2007; Lepoutre et al., 2007). In consequence, business organizations have seen a growing number of calls to intervene in areas that historically have been a role of other entities (Ballesteros et al., 2017). Manufacturing companies are running elementary schools in India, banks are setting up telemedicine facilities in Nigeria, consumer-products firms have engaged in rebuilding rebuilt roads in the aftermath of Japan's 2011 disaster, and technology firms are investing in community centers in Mexico. In many cases, this activity is a new phenomenon for both firms and external stakeholders. Given this increasing societal role, I expect future research will expand the examination of the association between timing choices and financial performance under high uncertainty and causal ambiguity, and will develop context-specific predictions. Such efforts will be critical for a more theoretically nuanced understanding of the role that the microfoundations of institutionalization may play in the generation and sustainability of competitive advantages.

Finally, future work may analyze the argument that the influence of cognitive referents and social constructivism decline as stakeholders and firms accumulate relevant information. This type of analysis may give important insights into the relationship between experiential learning and the performance impacts of timing choices. In the setting of disaster aid, imitation fosters a rapid and greater accumulation of valuable social resources. As organizational learning and more *calculated* choices replace cognitive referents, will the benefit to disaster-stricken societies grow or shrink?

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CONCLUSION

This study highlights the relevance of institutional factors affecting timing decisions and their consequences at the international level. My findings suggest that the insight in the extant literature that imitating high-performing first movers or moving first with a substantive action is more likely to realize rents than imitating low-performing firms or move late with a small action is not supported in settings like corporate responses to disasters. As such, I offer evidence of the factors that managers should consider when choosing to lead, imitate, or deviate from the first mover under conditions of high informational and time constraints. Additionally, I show in the context of my sample that firms and stakeholders follow different signals to manage uncertainty and ambiguity in a fast-paced environment. I hope that this initial endeavor fosters research focusing on this divergence in order to enlarge our understanding of the performance consequences of timing choices.

APPENDIX

Supplementary Analyses

I run panel-data estimations as robustness tests. These estimations include firm, country, event, month, and year fixed effects to control for unobserved time-invariant factors. I include year dummy variables to account for potential yearly trends in the availability of disaster giving and risk. In addition to this, I use month dummies because some types of disasters such as tornados show seasonal patterns in their frequency and magnitude.

Regarding other time-variant factors at the firm level, I control for *industry* (four-digit SIC code), and one-year lags of *longevity* (logged number of years), logged values of the number of employees, revenue, market capitalization, advertising expenditure, and R&D intensity (in USD). Research has suggested these variables correlate with philanthropic behavior (e.g., Marquis et al. 2007, Muller and Kräussl 2011, Servaes and Tamayo 2013). Additionally, I control for *customer orientation* because firms with an end-user focus (i.e., business-to-individual industries) may have a different propensity to engage in the provision of collective goods than firms with an industry focus (i.e., business-to-business industries). I also conduct sub-sample tests dividing the data according to the industry orientation. Concerning disaster-specifics, I control for the *number of disasters by year*, as this number may impact the response of the corporate community to the focal event. For instance, the 2010 earthquake in Chile, that occurred five weeks after the earthquake that stroke Port-au-Prince and caused an estimated financial damage three times larger,

might have diverted the attention of the international community from the relief efforts in Haiti. The source was the CRED database. Additionally, I include a binary variable to account for whether a *major sports event* (e.g., Summer Olympics, FIFA World Cup) occurred in the analyzed year (1=a major sport event occurred) and a continuous variable for a number of other *newsworthy events* by year. Scholars have shown that the availability of other newsworthy material may crowd out international catastrophe aid (Eisensee & Strömberg, 2007; Stromberg, 2007). For country-specific factors, I control for the logged values of total country population and total area (km^2) as country size may be associated with the exposure to shocks, ability to cope with the impact of catastrophes, and prominence at the international level—and consequently, proneness to receive international aid.

The opportunity cost of waiting

To analyze if a reputable organization faces an opportunity cost for deferring their donation (i.e., being a follower instead of a first mover), I apply *coarsened exact matching* (CEM; Iacus, King, & Porro, 2008, 2011) using the binary variable *affiliation* (i.e., the firm has a subsidiary in the affected country) as treatment. CEM is carried out with no replacement using the following matching variables: *primary industry, number of employees, market capitalization, headquarters country of ultimate parent, total revenue, and return on assets*. Such variables are chosen in accordance with literature in philanthropy and particularly on corporate disaster giving (cf., Crampton and Patten 2008, Marquis et al. 2007, Muller et al. 2014, Patten 2008, Tilcsik and Marquis 2013,

Whiteman et al. 2005). Pre- and post-descriptive statistics are compared in the treatment, and control groups for assessing quality and measures of imbalance are calculated as suggested by Iacus *et al.*, (2008; see the Appendix). To assess and mitigate the effect of spatial autocorrelation that may hamper econometrically efficient standard errors, I use the Freedman-Lane semi-partialing method (Dekker et al., 2007) implemented as a linear probability model with fixed-effects for the treatment and control groups (Rogan & Sorenson, 2013). I regressed the *US dollar amount* of giving using an OLS specification.

I find that a knowledgeable and experienced organization faces a significant opportunity cost for every minute that it delays a donation—specifically; the firm loses more than $5,000 per minute in off-trend revenue (Table 25). This means that when the firm possesses a good reputation, leading pays off more than following or abstaining. The main finding is robust to the inclusion of the different season-, event-, country-, and firm-specific, time-variant and -invariant controls.

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Table 25. Opportunity Cost of Waiting for a Reputable Organization

VARIABLES	Model 2 Off-Trend Revenue
Donation Timing	-.0000507**
	(.0000156)
Total Employees Corporate	0.000000567***
	(0.000000105)
Return on Assets Corporate	-.0381162***
	(.0022641)
Total Revenue Corporate	0.000000097
	(0.000000403)
Market Capitalization Corporate	.0000104 ***
	(0.000000244)
Primary Industry	-.0114321***
	(.0004695)
People Killed	.0003531**
	(.0001017)
Total #People Affected	0.00000000772**
	(0.00000000225)
Estimated Damage	-0.00000129
	(0.000000864)
Constant	2.692903***
	(.162687)
Observations	14,142,850.00
Number of Events	4,637
Country FE	YES
Year FE	YES
Month FE	YES
Firm FE	YES

Clustered-by-event bootstrapped errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).
Case: organization has positive net pre-event media coverage sentiment score.

CHAPTER 3

(with Michael Useem and Tyler Wry)

INTRODUCTION

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 bolstering the power and influence of corporations therein (Matten & Crane, 2005; Palazzo & Scherer, 2008). One consequence of this is that firms are being relied upon to adopt responsibilities that have traditionally fallen to governments, aid agencies, and non-governmental organizations. Industry self-regulation increasingly substitutes for standards that governments are unable or unwilling to enforce (Ostrom, 2000; Potoski & Prakash, 2005); companies provide public goods by building hospitals, schools, and community projects (Palazzo & Scherer, 2008); and many firms contribute to infrastructure reconstruction efforts after natural disasters (Wassenhove et al., 2008). Scholars have begun to examine when and why firms engage in these unique forms of social responsibility (CSR) (Crilly, 2011; Scherer & Palazzo, 2011) and how they might benefit from doing so (Henisz et al., 2013; Madsen & Rodgers, 2014). Yet, as with the broader CSR literature, we know little about societal outcomes and opinions are divided as to whether social welfare benefits should be expected.

Proponents view CSR as intrinsically good for society. This can be seen in studies that recognize firms may be strategic with their CSR (McWilliams & Siegel, 2011), but consider it positive they are expanding their social responsibility repertoires to include

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the creation of public goods (see Scherer & Palazzo, 2011). However, this work stops short of assessing the extent to which these practices benefit society. Industry self-regulation studies have adopted a similar focus, examining how standards are created (Bartley, 2007) and when they lead to better corporate environmental performance (King & Lenox, 2000; Potoski & Prakash, 2005). Yet this work is limited to harm reduction, versus welfare enhancement, and ecological outcomes are assumed rather than shown.

Taking another view, critics have argued that these forms of CSR do little to benefit society because firms use them primarily to secure government favors, forestall activism, and mollify local communities (Banerjee, 2008). This is supported by evidence that CSR is often symbolic or political, and that firms make little effort to understand or effectively respond to social and environmental problems (Marquis & Qian, 2013; Mellahi et al., 2015). As a result, CSR initiatives may be suboptimal, or even counterproductive, from a societal perspective (Cavallo & Daude, 2011). For instance, a study of resource-extraction firms in the developing world found that more than $500m of CSR spending yielded almost no social welfare benefits (Frynas, 2005). Similar anecdotes have led some to argue that, while companies have the potential to contribute to social welfare based on their resources and influence, 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 societal effects of CSR initiatives—particularly those related to the provision of public goods—and what we do know raises questions

about the effectiveness of their contribution 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 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 capabilities 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 economically-reliant corporations 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, but the level of aid from traditional responders such as governments and aid agencies has been stagnant (Becerra et al., 2014). Firms are increasingly called upon to address this gap, and have emerged in the past 25 years as a large contributor to disaster relief (White & Lang, 2012). While these contributions undoubtedly supplement the efforts of traditional aid providers, we argue that corporate involvement may also create unique benefits for a disaster-afflicted country.

To account for this, we develop a theoretical model based on insights from the dynamic capabilities literature (Teece et al., 1997). Studies in this milieu examine how firms sense threats in the external environment, seize response opportunities, and reconfigure routines and resources to do so (Teece, 2007). Typically, this is used to

explain firm-level performance differences. However, there is also evidence that dynamic capabilities differ systemically among organizations with different forms (Rindova & Kotha, 2001). Recent research has discussed the dynamic capabilities that allow firms to sense external stakeholder expectations and seize opportunities to "win their hearts and minds" (Henisz, 2016).

Building on this, we argue that corporations that are economically reliant to market systems (i.e., those firms that sell, buy, or rent raw materials, final products, or services, or hire human capital to/from a given market)—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 fast decisions, and reconfigure resources for efficient responses. As such, we predict that aid will arrive more quickly, and a nation will recover more fully, when economically-reliant firms account for a larger share of disaster aid. We further 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 from firms, governments, and aid agencies to relief efforts following every major natural disaster in the world from 2003 to 2013. To isolate the effect of corporate aid on our outcomes of interest, we use the synthetic control method (SCM) (Abadie et al., 2015). The method is similar to other matching techniques often used in organizational research. 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 comparisons, either because analysis focuses on aggregate entities like nations, or because the pool of potential controls is small (Abadie et al., 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 support our hypotheses and suggest that disaster aid from economically-reliant firms is not only socially beneficial, but also creates value beyond that provided by other entities. As such, we demonstrate societal benefits of CSR and identify factors that generate and enhance positive outcomes. This addresses a weak spot in the CSR literature (McWilliams & Siegel, 2011). The social impact of CSR is also a metric that is increasingly demanded by stakeholders such as customers and governments (Eccles, Ioannou, & Serafeim, 2014); we provide a way to show this using unambiguous measures. Our study also has policy implications. Disaster costs have grown at a pace that far exceeds the real value of traditional relief funding. Closing the gap is not only a matter of giving more, but giving more efficiently (United Nations, 2015; 2016). We illuminate conditions and mechanisms under which the business community can contribute to this goal in disaster responses.

THEORY

Disasters and the Rise of Corporate Responses

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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 et al., 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 governments and multilateral agencies, to undertake effective responses (United Nations, 2016).

As with other areas of CSR, the diminished capacity of traditional actors has led to growing calls for firms to be involved in disaster relief and recovery (Matten & Crane, 2005; Twigg, 2001; United Nations, 2015). Reflecting this, there has been a significant increase in corporate disaster giving over the past 15 years. More than 90 percent of the world's 2000 largest firms 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).[55] 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] 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.

55.4% of aid was from corporations; more than the combined amount provided by foreign governments and multilateral aid agencies. 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 et al., 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 corporations 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.[56]

Dynamic Capabilities and the Comparative Advantage of Economically-Reliant 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 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 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;

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

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 (Cobb, Wry, & Zhao, 2016; 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 firms 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 economically-reliant firms 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 et al., 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 a firm is likely to sense a disaster is through its effects on local operations. The destruction of physical infrastructure directly affects the production and distribution of goods, while the human toll of a disaster affects employees and the functioning of local markets. Firms that have a economic reliance are likely to be sensitive to such disruptions because they are experienced directly, and interpret them as areas of need because they have obvious financial implications (Hoffman & Ocasio, 2001; Sundaram & Inkpen, 2004). Indeed, studies have shown that in the aftermath of a disaster, economically-reliant firms 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 (Ballesteros, 2015). This aligns with strategic CSR arguments that predict companies will act in the public good when doing so serves their own interests (McWilliams & Siegel, 2011). Broadly speaking, firms are likely to sense disaster impacts 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."[57]

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

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), companies 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 help assess the damages caused by a disaster and to determine where aid is most urgently needed and will have the greatest impact (Useem et al., 2015). Having employees and other stakeholders present in the disaster zone may also enable a firm to gather to contextualized information about disaster impacts, and understand the needs and preferences of local communities (Horowitz, 2008). Thus, just as having 'boots on the ground' aids a firm in making sense of complex and uncertain competitive environments (Teece et al., 1997), local operations offer a close-up look at the nature and scale of disaster impacts, and can thus help with sensing 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). Thus, 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 (Horwitz, 2009). 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… 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." (Polanco, 2012).

There is also evidence that, whereas a firm's fiduciary interests 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). Indeed, studies have shown that up to 50 percent of the variance in disaster relief allocations is explained by electoral considerations (Garrett & Sobel, 2004). Foreign governments also tend to be more attuned to disasters that affect political allies, culturally similar nations, and oil-exporting countries (Fink & Redaelli, 2011). There is also evidence that the amount of aid pledged by governments, NGOs, and multilateral agencies is influenced by the level of media coverage that a disaster receives, irrespective of its actual impacts (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 (Cohen & Werker, 2008; Platt, 2012).

The above considerations support the argument that **economically-reliant** companies are more likely than traditional aid providers to sense and accurately interpret

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information about disaster impacts that relate to a nation's economic functioning. In turn, this should motivate responses that focus on rebuilding key infrastructure 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 disaster relief, we argue that economically-reliant companies will likely have a speed advantage over other types of aid providers.

When a firm is motivated to restore market functioning in a nation, it can delegate decisions about aid allocation to managers whose local knowledge and situational

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

Reconfiguring and the effective provision of aid

In addition to decision-making speed, economically-reliant companies 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 large firms 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

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responders. Large firms also have the ability to smoothly redeploy resources from across

their network of corporate affiliates (Teece, 2014). This contributes to a broader and

more diverse resource base that can be deployed at speed to support relief efforts. For

instance, Wal-Mart and other large retailers were able to mobilize inventory from across

their subsidiary networks to bolster the supply of medicines, food, 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 quickly built state-of-

the-art, earthquake-proof schoolhouse structures (Fernando, 2010). In another example,

the logistics company, TNT, assisted the United Nations in designing relief warehouses

in Italy by using its expertize to help optimize warehouse storage and to train personnel

in inventory management: the result was an estimated $450,000 reduction in annual

operating costs (Wassenhove et al., 2008).

In comparison, the centralization and bureaucracy that often slows decision-making

in governments and multilateral agencies can create barriers to efficient and effective aid

deployment. Unlike companies that already have resources in a nation, these

organizations typically need to marshal resources and put local infrastructure into place

before a response can begin (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). The need to navigate layers of bureaucracy may also contribute to bottlenecks that slow the dispersion of disaster relief (Fritz, 2004). Indeed, nearly 40% of the aid pledged by foreign governments and aid agencies following the 2010 Haiti earthquake was still outstanding in 2013, whereas all corporate aid had been distributed (Ballesteros, 2015; Becerra, Cavallo, & Noy, 2013).

Without discounting the importance of traditional aid providers for effective disaster relief, our collected arguments suggest that firms have capabilities that are uniquely well-suited to fast and effective responses. In turn, this should contribute to positive outcomes for afflicted nations when corporations 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 **economically-reliant** 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 economically-reliant corporations account for a greater share of total disaster aid

The value of firm-specific versus general resources

While 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 routines and resources. 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 Luo (forthcoming) developed a theoretical proof that suggests related CSR contributes to social welfare more efficiently than comparable government or charity initiatives.

Applied to disaster response, 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

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aid implementation, while offering little additive value beyond the cash infusion. This may contribute to a relatively slower and less 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 major 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 resources 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.

Illustrating this, in the aftermath of 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 cost efficient and effective manner (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

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produced separately. Results suggested there are greater social welfare impacts in the first example because production integrates capabilities that are used to produce the private good: this affects the equilibrium provision of the public good. This effect is absent for unrelated giving, however, such as when a transport company donates food or a fraction of sales to disaster relief.

Company-specific knowledge and routines may also be germane to disaster relief efforts. The types of expertise required for many aspects of disaster response—for instance, logistics, construction, and planning—have analogs in business (Wassenhove et al., 2008). Firms incur little cost when they contribute such expertise, yet this can have a meaningful effect on the speed with which aid reaches beneficiaries, as well as the effectiveness of a disaster response (Horwitz, 2009). The actions of express delivery firm, DHL, offer a case in point. DHL often assumes a lead role in coordinating the reception and distribution of relief supplies after a disaster. By drawing on its competencies in rapid dispatch and inventory control, DHL's involvement in disaster logistics regularly contributes to fewer donated goods going to waste and less airport congestion in the disaster-affected nation (Wassenhove et al., 2008). Similar outcomes were apparent when FedEx took a lead role coordinating the delivery of relief goods following the 2008 floods in Mexico (Ballesteros, 2013). As such, we predict:

Hypothesis 3 (H3). Aid from economically-reliant 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

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

EMPIRICAL ANALYSIS

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.[58] We followed the same strategy as Chapter 1 and 2 and 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 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).

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

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[58] 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/.

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 considered 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).[59] 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 over

2,310,000 items which formed the core of our analysis. We then used an automated

coding process to search within each report for details about the type, financial value,

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[59] 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.

date, and source of each donation. This yielded information on over 73,000 donations from more than 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, 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. We elaborate on our search strategy, coding procedures, and validity checks in the Annex.

Methods

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 regarding 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

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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 factors into account may lead to biased, inefficient estimates, or spurious causation.

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 (E. Cavallo et al., 2013). In comparison, traditional quasi-experimental designs, such as differences-in-differences, allow for the inclusion of unobserved confounding influences. These effects must be time-invariant, though, so that the temporal differences method can address them. 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 (E. 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 regarding a focal independent variable (the treatment). Comparison units are selected to

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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 a long pre-treatment time-period. As Abadie et al. (2015: 498) 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.[60]

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[60] 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.

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. Thus, 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 is 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).

Variables

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, 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, 1994). 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 economically-reliant firms*. We used the Lexis Nexis Directory of Corporate Affiliates to determine which firms were located, or had a subsidiary, in an affected country and were thus 'economically-reliant'. 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 efficient strategy to select treatment levels based on the mean value and standard deviations. Instead, we use the 75th (7.7% of aid is from **economically-reliant** firms), 95th (24.5%), and 99th (44.4%) percentiles as treatment levels (see Cavallo 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 number 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 in the Annex.

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Our specific variable is the value of related aid divided by the total value of disaster aid from economically-reliant 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 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)

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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 (Barro, 2007; E. 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.[61] Table 26 shows descriptive statistics while table 27 shows correlations.

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[61] 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).

RESULTS

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

Table 28 shows results for hypothesis 1, which predicted that the speed of aid provision will be faster when economically-reliant corporations account for a greater share of disaster aid. Models 1-3 reflect the 7.7%, 24.5%, and 44.4% 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.[62] Results show that there is no significant difference in the speed of aid provision at 7.7% share of corporate giving in total aid. However, the size of this effect increases dramatically as corporations comprise progressively larger shares of disaster giving. At the 24.5%, treated nations received 121% more aid during the first month as compared to synthetic counterfactuals. The effect is even greater when the share of corporate giving is above 44.4% of aid.

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[62] 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.

Table 26. Descriptive Statistics on the Economic Value of Disaster Giving

VARIABLES	mean	sd	min	max
Donation Amount (US Million)	907.09	46.26	.014	189,857.45
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	385,000.00
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 27. Correlations on the Economic Value of Disaster Giving

	VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Donation Amount (US Million)	1.00												
2	GDP (PPP per capita)	0.09	1.00											
3	Human Development Index	0.10	0.19	1.00										
4	Human Hardship (deaths)	0.20	-0.05	-0.03	1.00									
5	Life Expectancy at Birth, total (years)	0.05	0.79	0.24	-0.05	1.00								
6	Annual Number of Disasters (Nation)	0.05	0.27	-0.17	0.05	-0.03	1.00							
7	Annual Number of Disasters (Global)	0.01	-0.08	-0.20	-0.04	-0.09	0.02	1.00						
8	Newsworthy Events	0.17	0.10	0.15	0.04	0.10	-0.01	-0.08	1.00					
9	Salience	0.07	0.51	0.10	0.01	0.33	0.37	0.09	0.04	1.00				
10	Openness to Aid	0.07	0.57	0.07	0.02	0.44	0.41	0.08	0.01	0.93	1.00			
11	Estimated Damage (US Million)	0.58	0.14	0.14	0.11	0.13	0.03	-0.07	0.27	-0.11	0.12	1.00		
12	School Enrollment, Secondary, (% net)	0.05	0.74	0.21	-0.06	0.85	-0.01	-0.06	0.11	-0.25	0.31	0.13	1.00	
13	Total Investment (ratio of total investment to GDP)	0.01	-0.05	-0.05	0.06	0.11	-0.12	0.09	0.06	0.08	0.04	-0.03	0.07	1.00

Here, treated nations received more than twice the aid of synthetic control nations by the end of the fourth post-disaster week. Thus, while corporate giving has negligible effect on the speed of aid provision for most disasters (because firms comprise a relatively small share of aid in these instances), we observe that prominent levels of giving have a strong and significant effect that is consistent with our prediction in H1. Table 28 and **Error! Reference source not found.** show the average and the trajectory of the accumulated donation each post-disaster week for treatment and synthetic control groups.

Table 28. The Effect of Giving from Economically-Reliant Firms on Speed of Aid

Share of Aid from Economically-Reliant Firms	Model 1 7.7%		Model 2 24.5%		Model 3 44.4%	
Predictors	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	**17.5**	**14.6**	**43.1**	**19.5**	**58.3**	**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 disaster giving coming from

firms economically active in the affected country (as defined by the 7.7%. 24.5% and 44.4% cutoff points). The total sample of country disasters in the period 2003-2013 is 2,084.

Figure 3. The Effect of Giving from Economically-Reliant Firms on Speed of Aid
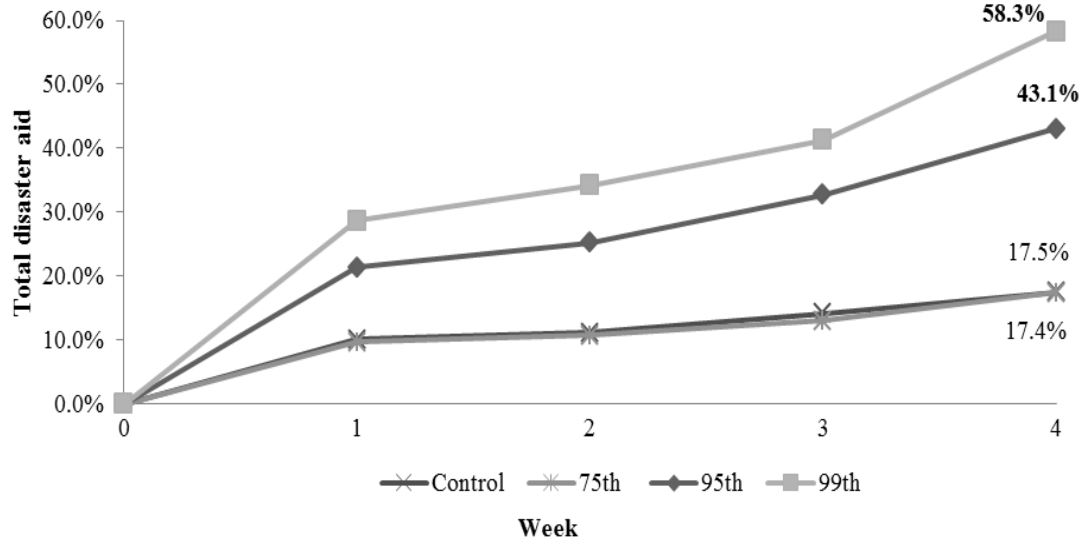
Note: The outcome variable is the accumulated amount of disaster aid. Treated are disaster countries with a substantial share of disaster giving coming from firms economically active in the affected country (as defined by the 7.7%. 24.5% and 44.4% cutoff points). The total sample of country disasters in the period 2003-2013 is 2,084.

Table 29 shows results for hypothesis 2, which predicted that the overall recovery of a nation will be greater when economically-reliant 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 economically-relaint 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 aid equals, or is

lower than, 7.7%, suggesting that positive effects only become apparent when

corporations play an outsized role in a disaster response.

Table 29. The Effect of Giving from Economically-Reliant Firms on Disaster Recovery

Share of Aid from Economically-Reliant Firms	Model 4 7.7%		Model 5 24.5%		Model 6 44.4%	
Predictors	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 (10th post-disaster year)						
% of annual HDI growth	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 size of the disaster response for the analyzed period only as a reference—the 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 disaster giving coming from firms economically active in the affected country (as defined by the 7.7%. 24.5% and 44.4% cutoff points). The total sample of country-year disasters in the period 2003-2013 is 464.

Figure 3 shows the trajectory of change in the annual growth rate between treated and

control nations. Given that the SCM algorithm generates counterfactual disaster countries

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 only during the 10 post-disaster years. Results show that the level of recovery

after 10 years is notably higher for countries that receive over 24.5% of disaster aid from

economically-reliant 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 44.4% of share of

corporate giving. As such, our results suggest a slight decrease in the positive effect on

HDI at higher levels of corporate giving. Hence, we find support for hypothesis 2, but

note that our results suggest that corporate involvement is not panacea for disaster

responses, and that a nation's long-term recovery likely benefits from the participation of

other entities.

Figure 4 The Effect of Giving from Economically-Reliant Firms on Disaster Recovery
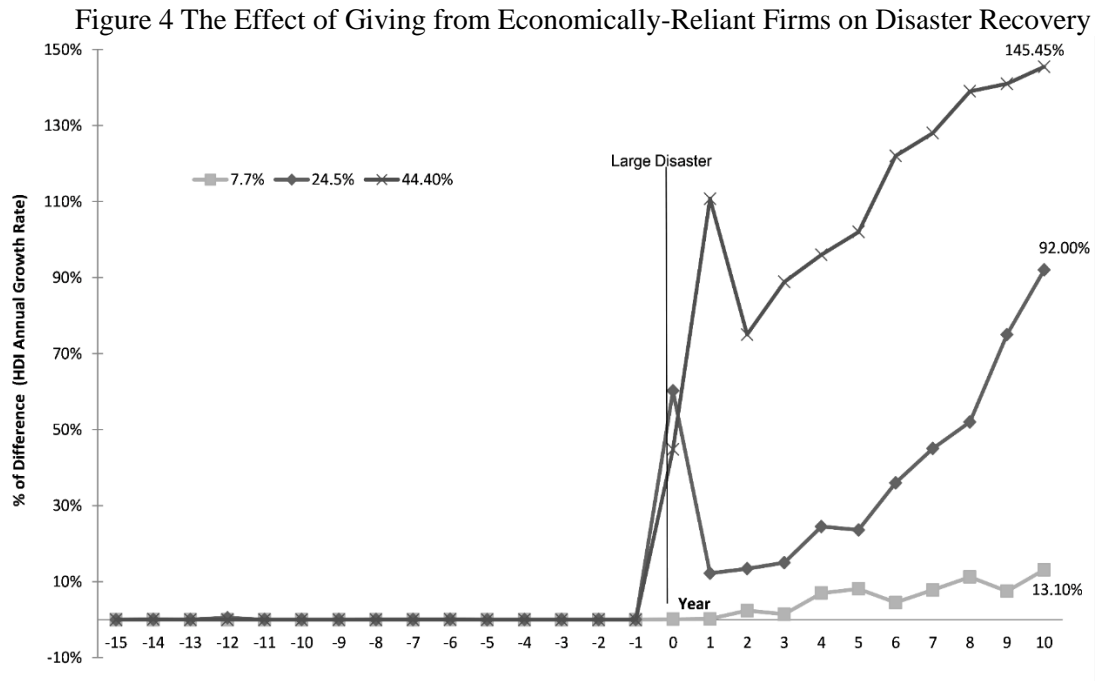
Note: Instead of showing absolute values, the figure shows the difference in HDI growth rate between treatment nations and correspondent synthetic controls for 15 years before the disaster and 10 years after the disaster. Period (0) is the disaster year. No sizeable effects before the disaster year suggest that the synthetic control method has generated efficient control nations. Treated are disaster countries with a substantial share of disaster giving coming from firms economically active in the affected country (as defined by the 7.7%. 24.5% and 44.4% cutoff points). The total sample of country-year disasters in the period 2003-2013 is 464

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 30 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 economically-reliant 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 44.4% of share of

corporate giving and 42.4% 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

economically-reliant 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.

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 31 reports the treatment effect of relatedness on the

growth rate of HDI and shows that it has a consistently positive and significant influence.

Of note, we observe that the greatest average difference between treated and control

nations occurs when there are high levels of corporate aid (44.4% share in aid) 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 6 the trajectory of the annual growth of

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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.

Table 30. The Effect of Relatedness in the Relationship between Disaster Giving from Economically-Reliant Firms and Speed of Aid

| Share of Aid from Economically-Reliant Firms	7.7%						24.5%						44.4%					
Relatedness of Corporate Aid	Model 7 11.5%		Model 8 26.9%		Model 9 42.4%		Model 10 11.5%		Model 11 26.9%		Model 12 42.4%		Model 13 11.5%		Model 14 26.9%		Model 15 42.4%	
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, first four weeks	**11.6**	**10.6**	**15.4**	**13.3**	**18.8**	**15.5**	**30.7**	**11.4**	**38.4**	**16.7**	**46.8**	**23.8**	**NA**	**NA**	**48.7**	**17.6**	**63.2**	**17.0**
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 in-kind giving that is related to the donor's core operation coming from firms economically active in the affected country (as defined by the 7.7%, 24.5%, and 44.4% cutoff points). The total sample of country disasters in the period 2003-2013 is 2,084

Table 31. The Effect of Relatedness in the Relationship between Disaster Giving from Economically-Reliant Firms and Recovery

| Share of Aid from Economically-Reliant Firms	7.70%						24.50%						44.40%					
Relatedness of Corporate Aid	**Model 16 11.50%**		**Model 17 26.90%**		**Model 18 42.40%**		**Model 19 11.50%**		**Model 20 26.90%**		**Model 21 42.40%**		**Model 22 11.50%**		**Model 23 26.90%**		**Model 24 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																		
% of 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 in-kind giving that is related to the donor's core operation coming from firms economically active in the affected country (as defined by the 7.7%, 24.5%, and 44.4% cutoff points). The total sample of country-year disasters in the period 2003-2013 is 464

Figure 5. The Effect of Relatedness in the Relationship between Disaster Giving from Economically-Reliant Firms and Speed of Aid
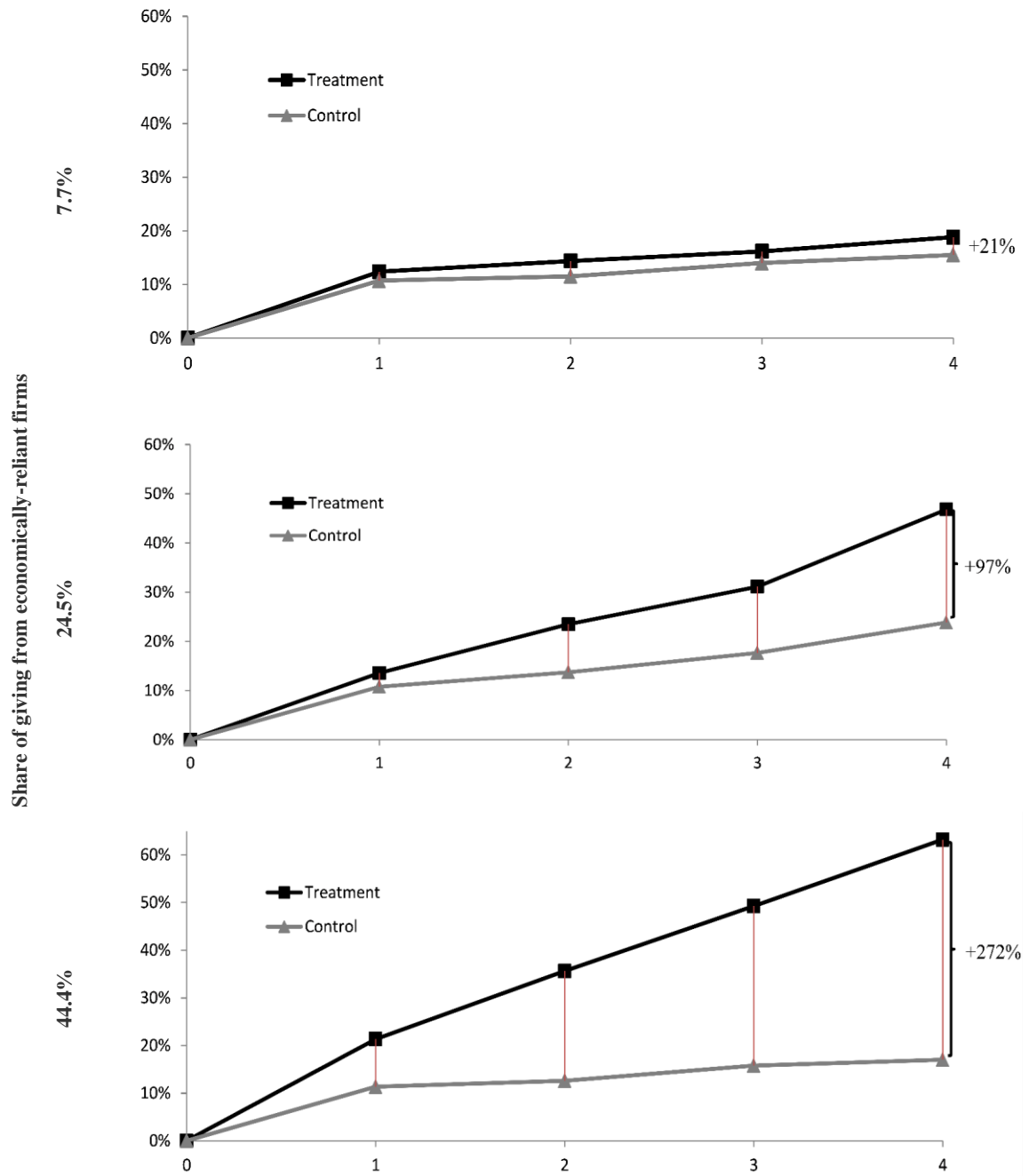
Note: The outcome variable is the accumulated amount of disaster aid for the first four post-disaster weeks. Treated are disaster countries with at least 42.4% of in-kind giving that is related to the donor's core operation coming from firms economically active in the affected country (as defined by the 7.7%, 24.5%, and 44.4% cutoff points). The sample for the period 2003-2013 is 2,084 disasters.

Figure 6. The Effect of Relatedness in the Relationship between Disaster Giving from Economically-Reliant Firms and Recovery
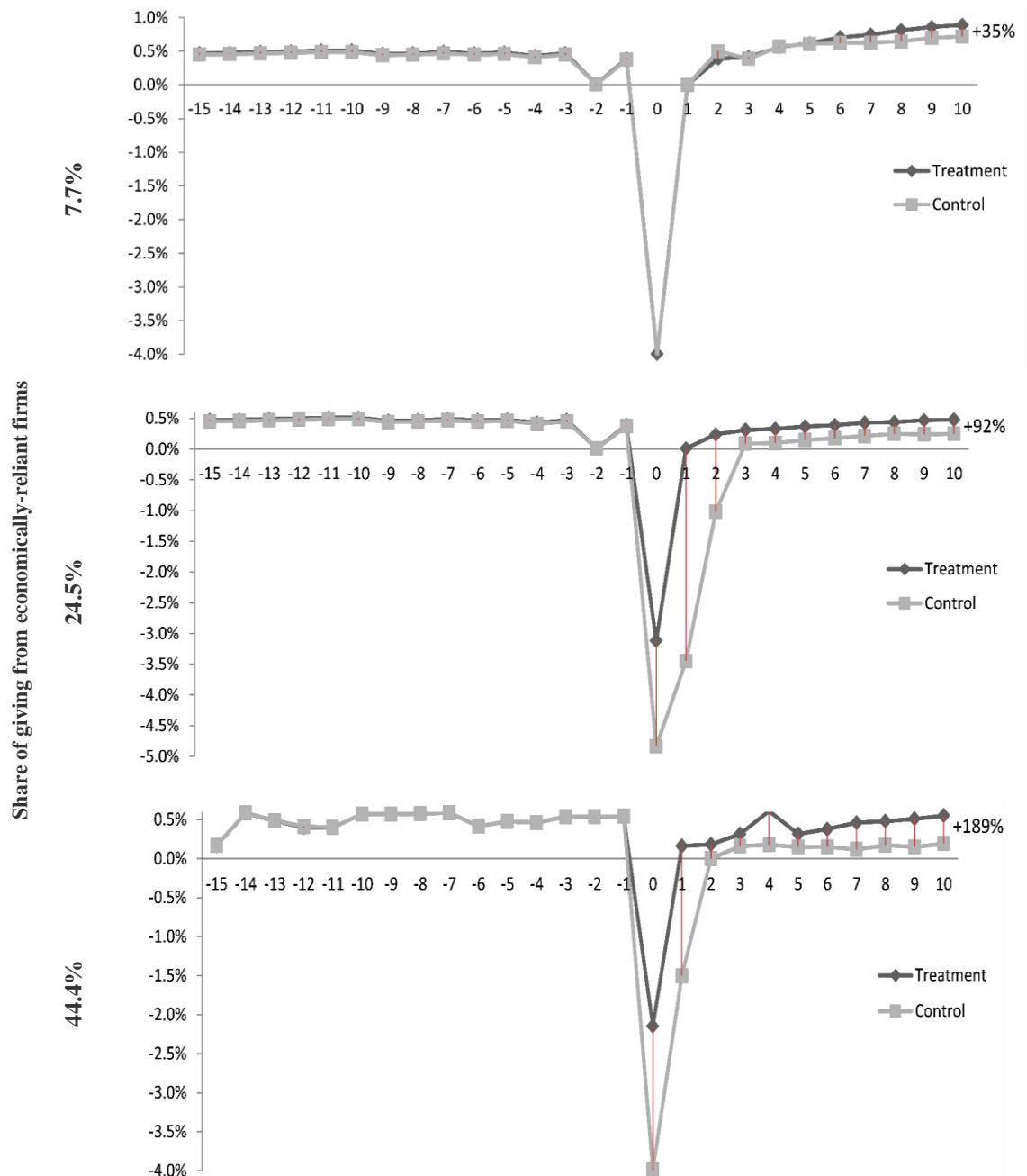
Note: The outcome variable is the annual growth rate of HDI. Treated are disaster countries with at least 42.4% of in-kind giving that is related to the donor's core operation coming from firms economically active in the affected country (as defined by the 7.7%, 24.5%, and 44.4% cutoff points). Each figure shows the difference between the annual growth rates of HDI for treated and control nations 15 years before the disaster and 10 years after the disaster. The total sample of country-year disasters in the period 2003-2013 is 464

Robustness Checks and Supplementary Analyses

We ran a variety of supplementary models and robustness checks to deepen our analysis and bolster our findings. All results are available to view in our online appendix at https://disastergiving.wordpress.com/.

Alternate method

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 in our online appendix. To enhance the econometric efficiency of these estimates, we also applied coarsened-exact matching (CEM) (Iacus et al., 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

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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.

Results of this analysis were consistent with our reported models. We found that a one standard deviation increase in the share of giving from economically-reliant 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 economically-reliant 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 economically-reliant firms strongly affects a nation's economic recovery from disaster. When economically-reliant firms 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 economically-reliant vs. other firms

Another key feature of our argument is that it predicts economically-reliant 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 economically-reliant 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 economically-reliant firms with an analysis of distant firms, 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 economically-reliant firms. We see non-significant effects when economically active firms comprise the minority of corporate giving. This supports our argument that the dynamic capabilities relevant for effective disaster responses are related to having a local presence in the affected nation.

The effect of institutional development

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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 readier 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 economically-reliant companies. 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 percentiles 50th, 75th, and 90th 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 found consistency in the effect of corporate disaster giving on disaster recovery across distinct levels of institutional development (see https://disastergiving.files.wordpress.com/).

Is corporate disaster giving a win-win proposition?

The findings offer evidence that countries, on average, are better off when economically-reliant firms account for comparatively large shares of disaster aid. In turn, the analyses in chapter 2 on the performance consequences of corporate disaster giving

resulted in the finding that corporate donors with positive pre-disaster media reputation are likely to obtain revenue not explained by normal market operation. Taken together, these results suggest that the conditions under which corporate disaster giving is a solution where firms and external stakeholders benefit are economic reliance with the disaster-stricken country and a positive pre-disaster media reputation by the donor.

To offer initial evaluation of this possibility, I use the SCM to run comparative evaluations of changes in reputation and financial performance associated with disaster giving in countries that have benefited by the corporate intervention. First, I compare the trajectory of media reputation of corporate donors with positive pre-disaster media reputation in each of three groups of countries according to the share of disaster aid coming from economically-reliant firms. Group A are disaster-stricken countries that received at least 7.7% of international aid from economically-reliant firms; group B, at least 24.5%; and group C, at least 44.4%. In all cases, synthetic counterfactuals come from the pool of statistically similar non-donor companies.

Figure 7 reports average results one year before and after the donation. In the three cases, corporate donors have significant improvements in media reputation when compared with control non-donors. The largest difference between treatment and control groups is observed in countries where the share of aid coming from economically-reliant firms is the lower (7.7%). This suggests that when the intervention of firms in disaster aid is relatively low, those firms that donate receive larger visibility than when the intervention of firms is higher. The placebo tests show that the difference in reputational

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gains between firms in country groups A and C are particularly prominent in early post-

donation months. Additionally, reputation gains are bigger in group C countries, those

with at least 44.4% share of corporate giving in total aid, that in group B countries, those

with at least 24.5% share of corporate giving, but these differences are not significant in

several months.

Figure 7. The effect of corporate disaster giving on post-disaster media reputation of firms
with positive pre-disaster reputation
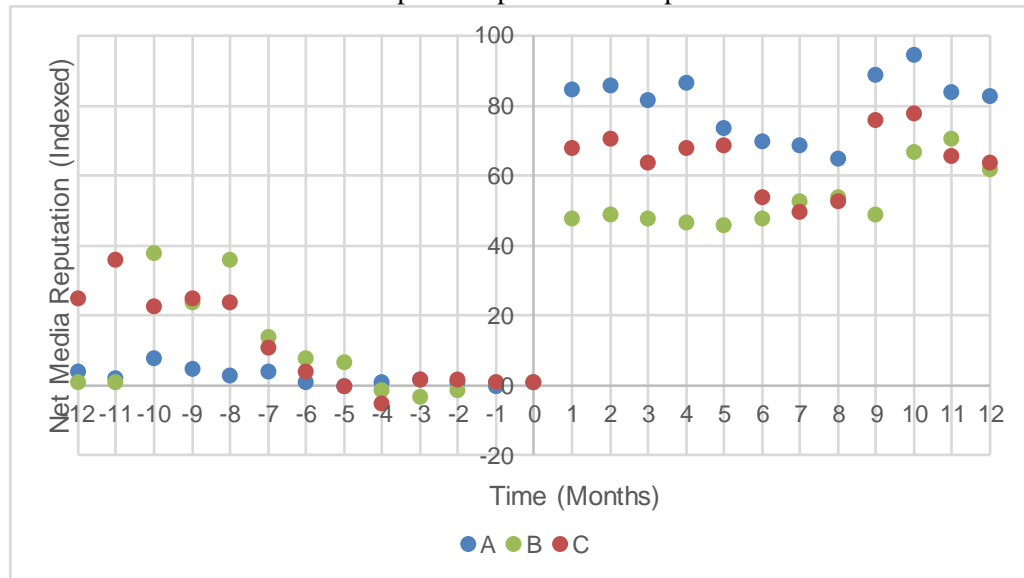
Note: Disaster countries are included in groups A, B, and C based on the share of
corporate giving from economically-reliant firms on disaster aid, as defined by the 7.7%,
24.5%, and 44.4% cutoff points, respectively. The figure shows average differences in each
month between treated and control firms. Month 0 marks the month of the donation. Treated
are firms that donated, have economic reliance with the affected country, and have positive
pre-disaster media reputation. Control are non-donor firms that are otherwise similar.

To provide an analysis of more proximate implications of disaster giving, I use the

measure of off-trend revenue developed in chapter 2. I compare the likelihood of

obtaining revenue that is not explained by market operation for donors in country groups

A, B, and C versus counterfactual non-donors. As in the previous test, I center on firms

with positive pre-disaster media reputation that have economic reliance with the disaster-stricken country.

The results in Table 32 show the average differences in the likelihood of gaining off-trend revenue between treatment and control groups are maximized in countries that received at least 44.4% of international aid from economically-reliant firms. Because these are the countries that receive the largest positive differences in the speed of relief and magnitude of recovery when compared with counterfactual countries, these results propose that when reputable economically-reliant firms mount a large collective effort on disaster relief and recovery, corporate disaster giving may be a private behavior that results in performance benefits and economic value for the affected country.

An argument that solves the contradiction of these findings and the results on the effects on reputational spillovers is that reputational capital has an instrumental value for future performance (Roberts & Dowling, 2000).

Table 32. The effect of corporate disaster giving on the likelihood of obtaining off-trend revenue in countries with different share of corporate giving on disaster aid

Share of corporate disaster giving from economically reliant firms on total international aid		
	7.7%	**24.5%**	**44.4%**
Firm-Specific Variables			
Total Revenue (USDmm ln)	9.74	9.78	10.01
Market Capitalization (USDmm ln)	9.57	9.64	9.78
Return on Assets %	5.92	4.36	3.99
Primary Industry (ln)	8.40	8.37	8.30
Number of Employees (ln)	10.55	10.65	12.11
Total Assets (USDmm ln)	14.89	15.14	17.47
R&D Expenses (USDmm ln)	9.74	10.41	13.18
Context-Specific Variables			
Human Hardship (ln)	12.63	11.85	7.99
Economic Cost (USDmm ln)	6.37	7.44	10.25

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Share of corporate disaster giving from economically reliant firms on total international aid			
	7.7%	24.5%	44.4%
Media Coverage (ln)	9.68	10.37	12.01
Number of Disasters (Nation, ln)	2.19	2.01	2.03
Number of Disasters (Global, ln)	5.47	5.53	5.54
Newsworthy Events	8.88	8.14	7.95
Openness to Aid	0.84	0.75	0.61
Outcome Variable			
Off-trend revenue	**11.84**	**17.72**	**38.95**

Disaster countries are included in groups A, B, and C based on the share of corporate giving from economically-reliant firms on disaster aid, as defined by the 7.7%, 24.5%, and 44.4% cutoff points, respectively. The table shows the mean values of the covariates used for matching cases only as a reference—the synthetic control study algorithm minimizes the distance between potential control firms and the treated firm on a case by case basis. Treated are firms that donated, have economic reliance with the affected country, and have positive pre-disaster media reputation. Control are non-donor firms that are otherwise similar.

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 the corporations therein (Frynas, 2005; Matten & Crane, 2005). Thus, companies are being called upon to adopt responsibilities that have traditionally fallen to governments, multilateral agencies, and NGOs. Scholars have made several inroads regarding describing these practices (Matten & Crane, 2005; Scherer & Palazzo, 2011), and have begun to make predictions about when firms will adopt them, and with what consequences (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

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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 corporations to help address the insufficient response capacity of traditional aid providers (United Nations, 2016). To make predictions about the effects of corporate aid, we developed a theoretical framework based on the dynamic capabilities literature (Teece, 2007). We argued that nations will benefit when economically-reliant firms account for a larger share of disaster aid because these firms are better equipped than governments and aid agencies to sense areas of need following a disaster, seize opportunities to respond, and reconfigure routines and resources to do so. To wit, companies are likely to focus on rebuilding economic infrastructure and restoring market functions as soon as possible after a disaster, leading to faster aid provision and a stronger long-term recovery. We argued these effects would be amplified when responses leveraged 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 several robustness checks, provided 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 debates about the social desirability and effectiveness of CSR. It is popular among management scholars to focus on the organizational implications of CSR, while inferring societal benefits. Some scholars considered it intrinsically good—and certainly better than the alternative—that companies are developing self-regulation standards (Prakash & Potoski, 2007), engaging in disaster responses (Madsen & Rogers, 2014), and contributing to the provision of public goods (Scherer & 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 these initiatives, largely because of their strategic nature (Marquis & Qian, 2013; Surroca et al., 2013). Per 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).

Our study is among the first to provide quasi-experimental evidence for the social value of CSR (Lyneis & Sterman, 2015; Wry, 2009). Our approach assumes that corporate disaster aid is primarily strategic and self-interested (Henisz et al., 2014). Rather than symbolic responses and sub-optimal aid allocation, however, results suggest that firms are taking practical action to restore economic and market functioning (Ballesteros, 2015; Horowitz, 2008). Thus, when firms make a large collective contribution to relief efforts, the net effect is that aid arrives more quickly and a nation recovers more fully following a disaster. In turn, responding companies may benefit from buffering their own economic shocks while also currying favor among local stakeholders

(Henisz et al., 2014; Madsen & Rogers, 2014). In this way, our findings raise interesting questions about the degree to which companies might benefit from CSR, not only as a firm-specific resource, but also through the creation of public or club goods (Ballesteros, 2015).

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 capabilities vary systemically among organizational forms (Battilana & Lee, 2014; Lampel & Shamsie, 2003; Rindova et al., 2007). This allowed us to make theoretically informed predictions about the value of aid from corporations versus other types of organizations. Indeed, our argument and findings casts doubt on the notion that social welfare initiatives are always best left to public organizations (Banerjee, 2008; Sundram & Inkpen, 2004). To be clear, we are not suggesting these organizations are unimportant, but rather that economically-reliant firms have motives and capabilities that enable them to contribute to disaster relief in uniquely valuable ways.

However, by focusing on aggregate initiatives and outcomes, our approach points to a potential tension in the relationship between CSR that benefits society versus individual firms. We argue that society benefits when firms direct their capabilities toward a common goal. Yet there is evidence that firms are incented to mount distinctive

responses to capture private rents (Ramachandran, 2011; Teece, 2007). It will be important for future studies to identify factors that predict coordination and cooperation in CSR initiatives, as opposed to idiosyncratic efforts or free-riding (Ostrom, 2000). In this way, our approach also highlights the importance of focusing on the collective level of analysis to understand the conditions under which CSR is most likely to yield societal benefits (Marquis, Davis, & Glynn, 2013; Tilcsik & Marquis, 2013; Wry, Lounsbury, & Glynn, 2011; York, Hargrave, & Pacheco, 2016; Zhao & Wry, 2016).

Also, while our predictions are context specific, the process of sensing, seizing, and reconfiguring is relevant to a broad range of CSR initiatives. This framework is also amenable to predicting both positive and negative outcomes, and should thus be useful for theorizing about the conditions under which corporate initiatives are likely to contribute to desirable social outcomes. Indeed, while the dynamic capabilities of economically-reliant companies appear to be conducive to fast and effective disaster responses, firms may not be as well suited to deal with other social issues. 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 & Luo, 2017; Mcwilliams & Siegel, 2000).

Implications for managerial practice

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Companies face growing calls not only to adopt social responsibilities, but also to demonstrate that their efforts in this regard are effective (Eccles et al., 2014). Indeed, the benefits that 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 requires outcome data that is reliable and 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.

Our findings also have implications for corporate disaster responses. To this end, we show that disasters are an area where economically-reliant 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 engaging in responses that

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leverage a firm's core expertise, as opposed to providing more general forms of aid (Kaul & Luo, 2017).

Implications for disaster relief and recovery

While 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. Our findings point to an important role for economically-reliant firms 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 small economic footprint of foreign and domestic companies in some nations likely makes corporate giving more a function of social preferences, and—given our argument about the conditions for a comparative advantage of the firm—less impactful for social welfare. Our approach also suggests that firms are more likely than traditional aid providers to engage in responses that are ancillary to their financial interests. There is a broad range of damages wrought by a disaster, and not all of these are equally relevant for a nation's economic functioning. This suggests that 1) the practical contribution that companies make to effective disaster relief varies widely among nations, and 2) corporate involvement is not panacea for all facets of disaster response. Thus, while firms can play a valuable role in disaster relief, this does not obviate the need 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 implications for social welfare outcomes. Disaster relief is only one context where internal and external stakeholders ask firms to play a larger role, though, 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 often ask for liquid resources because in-kind donations cannot be repurposed as needs evolve, and can burden or clog aid-delivery infrastructure (Fritz, 2004). Future studies should deepen our analysis and work to untangle these conflicting predictions. It may be useful here to examine the variable influence of different types of related resources. 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. A clear limitation that affects these ideas is that we do not observe the three dynamic capabilities

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that, we argue, generate the comparative advantage of economically-reliant firms to deploy disaster aid. Future studies that rely on qualitative research designs may shed light on such mechanisms.

Finally, while our analysis focused on isolating the value of aid from economically-reliant firms, 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 consider these other providers, and the degree to which donations are complementary versus redundant. These issues were beyond the scope of the dissertation, 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 companies are increasingly being called upon to participate in response efforts, it is important to understand their ability to contribute to positive societal outcomes. Our findings suggest that firms 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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APPENDIX

Supplementary analyses and robustness checks

OLS Regression. We regressed the *speed of aid* and the *HDI* using the following OLS specifications:

$$Speed\ of\ Aid_i = \alpha1(share\ of\ giving\ from\ locally\ active\ firms, cdg) + \alpha_{2a}(cdg * relatedness) + \alpha_{2c}(relatedness) + \alpha'(\theta_i) + \varepsilon_i$$

$$HDI_i = \alpha1(share\ of\ giving\ from\ locally\ active\ firms, cdg) + \alpha_{2a}(cdg * relatedness) + \alpha_{2c}(relatedness) + \alpha'(\theta_i) + \varepsilon_i$$

where the vector θ_i contains country-, time-, and event-specific variables with fixed-effects with clustered-by event errors. The results are shown in Table 33

Additional Controls and Coarsened-exact Matching in OLS models

The estimation vectors contain disaster, country, month, year, and firm-by-country fixed effects to control for unobserved time-invariant factors and path-dependent CSR-related investment in the market. To account for potential yearly trends in the availability of disaster risk and aid (e.g., urbanization has increased exposure to certain types of disasters), we included year dummy variables. Additionally, we used month dummies because disasters like hurricanes show seasonal patterns in their frequency and magnitude.

Table 33. The Effect of Disaster Giving from Economically-Reliant MNEs on Disaster Relief and Recovery

VARIABLES	Dependent variable: Accumulated Donation First Month	Dependent variable: HDI Growth Rate
Donation from economically-reliant firms (USD)	0.244***	19.493***
	(0.054)	(1.609)
Relatedness x Donation	0.126***	0.557***
	(0.005)	(0.137)
Relatedness	0.001	0.001
	(0.001)	(0.132)
CONTROLS		
School enrollment, secondary, (% net)	0.001***	0.078***
	(0.000)	(0.020)
Life expectancy at birth, total (years)	-0.000	-0.011
	(0.000)	(0.041)
Inflation Rate	-0.001	-0.066
	(0.001)	(0.041)
Trade Openness	0.001***	0.043***
	(0.000)	(0.006)
Openness to Aid	0.005***	0.419***
	(0.001)	(0.056)
Size of the Economy	0.004***	1.025***
	(0.001)	(0.386)
Area (Size)	-0.001***	-0.407***
	(0.000)	(0.121)
Population	0.003***	-0.013
	(0.000)	(0.170)
Storm	0.011***	3.609***
	(0.003)	(1.173)
Flood	0.002	3.373***
	(0.003)	(1.154)
Earthquake	0.035***	6.095***
	(0.003)	(1.172)
Mass Movement Dry	-0.006	
	(0.007)	
Mass Movement Wet	0.001	
	(0.003)	
Human Hardship (deaths)	0.036	-32.824
	(0.056)	(42.089)
People Affected	-0.000	-0.223
	(0.000)	(0.580)
Estimated Damage (US Million)	3,044.217***	297,763.560
	(1,125.475)	(792,109.162)
Annual Number of disasters (Nation)	-0.001***	-0.049*
	(0.000)	(0.028)
Annual Number of disasters (Global)	-0.000***	0.022**
	(0.000)	(0.009)
Newsworthy events	0.003***	0.096*
	(0.000)	(0.051)
Constant	-0.063***	-31.404***
	(0.009)	(4.062)
Observations	1,495,193	113,641
R-squared		
Number of events	2,084	464

Note: Clustered-by-event bootstrapped errors in parentheses. Fixed-effects model with month-, year-, country-, and event-effects. *** p<0.01, ** p<0.05, * p<0.1

Additional Control Variables

At the country level, *total land area* (km^2) and *total population* may not only skew

disaster risk, but also the size of market systems and the likelihood of donation. Hence,

using data from the World Development Indicators (The World Bank, 2014), I controlled

for the logs of these variables. Regarding event-specific controls, I used dummies for

disaster type as some specific types may fuel public response and aid more effectively

than others (Birkland, 1997). The impact of the disaster was also controlled using the

relative magnitude of *killed*, number of *affected,* and associated *economic damage* (i.e.,

killed/total population, affected/total population, and economic damage/GDP PPP,

respectively).[63] Finally, to account for *donor fatigue*,[64] the geographical distribution of

shocks, and the learning effects of disasters, I included controls for the *number of*

disasters by country and worldwide in a period of one year before the focal disaster

date—both logged. Additionally, I accounted for the possibility that other major social,

political, or economic events may have crowded out organizations' attention and

financial capacity to provide collective goods (Eisensee & Strömberg, 2007; Franks,

2013). *Newsworthy events* is the average of "the median number of minutes a news

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[63] I obtained these data the EM-DAT, The World Bank, and the International Monetary Fund (2014). Note that endogeneity may be an issue when regressing measures of disaster hardship. Arguably, hardship is endogenous to the characteristics of the philanthropic response. The following subsections explain the methods to account for this risk.

[64] Club members may face the situation of allocating scarce resources to multiple collective goods in the same fiscal exercise; early disasters may crowd out the response to subsequent shocks.

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broadcast devotes to the top three news segments in a day" over the forty days after the disaster.[65]

Coarsened-exact matching

We used no-replacement coarsened exact matched procedure in which we targeted a treatment-to-control ratio of 1:10, but tested up to 1:2 for robustness. CEM is carried out with no replacement using variables chosen in accordance with the set of predictors of speed of aid and HDI.

a) Speed of aid: 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 at the international level, which speaks to other events that may dilute the attention paid to a focal disaster and; 6) *openness to aid*, which is a binary variable indicating the national

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[65] See Eisensee and Strömberg (2007) for an explanation of this indicator and a test of its effectiveness. The variable is calculated by Professor David Strömberg and is available at http://people.su.se/~dstro/.

government's consent to receive foreign aid as coded from articles in Factiva and Lexis Nexis.

b) HDI: 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).

Pre- and post-descriptive statistics for assessing quality and measures of imbalance were calculated as suggested by Iacus *et al.*, (2008). We used the Freedman-Lane semi-partialing method implemented as a linear probability model with fixed-effects for the treatment and control groups (Rogan & Sorenson, 2013) to control spatial autocorrelation in standard errors, (Dekker et al., 2007). See the Appendix for a description of the CEM procedure.

The sum of absolute differences across the multivariate histogram has the following form:

$$L(t,c) \frac{1}{2} \sum_{li..lk} n|t_{li..lk} - c_{li..lk}|$$

where $t_{li..lk}$ is the relative frequency of the categorical variables for the firms in the treatment group and $c_{li..lk}$ is the correspondent number for the firms in the control group. A magnitude of $L(t,c)$=0 means perfect balance while a magnitude of 1 represents perfect separation. The procedure to obtain the relative frequencies of the categorical

variables is based on Iacus *et al.*, (2008). Once a number of categories for each continuous variable, a cross-tabulation of the discretized variables is generated for the treatment and the control groups. Then, the k-dimensional relative frequency is calculated.

Table 34. Alternate Output Variable: Annual Growth Rate of GDP

Predictor Variables	Model 1 7.70% (75th percentile)		Model 2 24.50% (95th percentile)		Model 3 44.40% (99th percentile)	
	T	C	T	C	T	C
School enrollment, secondary, (% net)	70.24	70.19	89.12	90.12	82.75	79.69
Life expectancy at birth, total (years)	70.11	72.33	80.44	79.33	76.95	77.23
Inflation rate	2.58	2.79	1.99	2.04	1.44	2.04
Trade openness	31.48	31.78	49.91	47.69	46.96	47.96
Total investment (ratio of total investment to GDP)	23.14	26.18	20.74	22.17	19.66	18.78
Estimated Damage (US Million)	810.14	811.17	1008.74	1001.89	117176.74	89992.78
Outcome Variable						
% of annual GDP growth (10th post-disaster year)	**5.97**	**5.01**	**7.49**	**3.89**	**3.68**	**1.22**
p-value	0.677		0.000		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 economically-reliant firms (as defined by the 75th, 95th, and 99th quantiles). The total sample of country-year disasters in the period 2003-2013 is 464.

Table 35. Comparing aid from Local versus Distant MNEs

The Effect of Intervention from Distant MNEs					
Model 27				Model 28	
Predictor Variables	T	C	Predictor Variables	T	C
School enrollment, secondary (% net)	68.44	71.56	Size of the Economy	648.51	701.29
Life expectancy at birth, (years)	56.43	57.97	Human Hardship (deaths)	1250.34	994.36
Inflation rate	7.36	6.34	Salience	10.69	10.85
Trade openness	26.14	27.63	Disasters (Nation)	8.93	8.24
Total investment (ratio of total investment to GDP)	17.89	17.88	Disasters (Global)	290.15	290.14
Estimated Damage (US Million)	45738.15	44993.56	Newsworthy Events	8.17	8.23
			Openness to Aid	0.74	0.76
			Estimated Damage (US Million)	386.91	399.41

	Outcome Variables				
% of annual HDI growth (10th post-disaster year)	**1.89**	**1.93**	**% of accumulated aid at the end of 4th week**	**5.43**	**6.01**
p-value	0.387		p-value	0.527	

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 from distant firms (i.e., at least 51%).

Table 36. The Role of Institutional Development

	Model 1 7.70% (75th percentile)		Model 2 24.50% (95th percentile)		Model 3 44.40% (99th percentile)	
Outcome Variable						
% of annual HDI growth (10th post-disaster year)	0.95	0.84	0.48	0.25	0.54	0.22
Government Effectiveness						
50th	1.15	1.13	0.56	0.32	0.74	0.31
75th	0.94	0.99	0.34	0.19	0.57	0.24
90th	0.81	0.77	0.67	0.38	0.38	0.16

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 from economically-reliant firms (as defined by the 75th, 95th, and 99th percentiles). The analyses are stratified by the magnitude of the government effectiveness index calculated by the World Bank.

CONCLUSION

This dissertation applies an integrative theoretical framework that builds on insights from the strategy, economics, and institutional literatures to understand the drivers and consequences of a form of non-market strategy: the corporate provision of public goods in the aftermath of natural disasters. In three papers, I examine this type of organizational decision-making by focusing on the firm's economic reliance in market systems. I build on the theory of clubs to analyze how this relationship alters the frequency and magnitude of the organization's choice to supply collective goods that benefit local communities. I draw on the literature on sensemaking to evaluate how substantial environmental uncertainty, causal ambiguity, and time pressure influence whether economically-reliant enterprises and their stakeholders choose to imitate reputable first-mover behavior in the face of socially constructed preferences. Finally, I study how economic reliance is the source of dynamic capabilities and the comparative advantage of the firm versus foreign national and multilateral public agencies to speed relief and the degree of national recovery from natural disasters. I use a longitudinal database covering over 93,000 donations from almost 39,000 firms from 83 countries to 4,637 disasters that affected 176 countries, and novel econometric methods to increase the identification of causal effects.

CONTRIBUTIONS

I hope that my dissertation's integrative theoretical framework helps guide similar studies exploring the determinants and consequences of organizational decision-making, particularly those associated with the corporate provision of collective goods. A particularly promising research strategy is accounting for the role of economic reliance

and its effects on the likelihood and magnitude of corporate behavior, the ability of a

corporation to identify what stakeholders consider when facing uncertainty and ambiguity

and, then, choosing efficiently when to move first or follow, and on the competitive

advantage of certain firms to generate economic surplus for external stakeholders. The

results suggest that a theoretical argumentation based on economic reliance provides a

clear identification of the set of business decision-makers that are prone to behave pro-

socially. Broader public-goods systems better characterize the frequency and magnitude

of pro-social behavior among firms with no clear economic reliance. Such firms may

donate, but the likelihood of not observing a donation is comparatively large.

Hence, my dissertation uncovers a form of strategic consideration whose effect

remains understudied (cf., Aguinis and Glavas, 2012; McWilliams, Siegel, and Wright,

2006; Mellahi *et al.*, 2015). My analyses show that traditional strategic considerations

arguments such as reputational capital with internal (Flammer & Luo, 2015) and external

stakeholders (Muller & Kräussl, 2011) or physical presence (Muller & Whiteman, 2008)

alone do not capture the effect of economic reliance. Additionally, in my sample, such

has greater explanatory power than social preferences theories altruism (Batson &

Powell, 2003), fairness (Kahneman et al., 1986), and *warm glow* (Andreoni, 1990).

Across the three chapters, the data confirm that studying national markets as club

systems where entities share the costs and benefits of collective goods is a useful

methodology to predict corporate behavior. This approach informs the institutional

literature on how local institutional forces affect organizational behavior. My findings

suggest that the effect of institutional development on non-market strategy is more complex than the extant literature has suggested (Dorobantu et al., 2017). On the one hand, firms react positively to a government's willingness to follow policies and regulations that guarantee the efficient use of resources and facilitate the maximization of its private benefits. This conforms with work showing that institutional development enhances corporate pro-social behavior (Marquis & Qian, 2013; Young et al., 2008). At the same time, when firms perceive that the government is incapable of supplying collective goods, they increase their average giving. Taken together, my dissertation provides a more nuanced understanding of the role of institutional forces in disciplining firms into a certain non-market strategy than previous studies (Mellahi et al., 2015).

The findings in Chapter 1 contribute to the literature on industry self-regulation (Barnett & King, 2008; King & Lenox, 2000). This literature situates the motives of the provision of collective goods in a collectivity circumscribed by the industry (Baron, 2009). My study focuses on the notion of a business community defined by geographical markets, a collectivity of industries. From this perspective, my study extends the literature on industry self-regulation to explain variance in the studied behavior across nations (i.e., groups of industries). My study thus helps understand how the predictions of the literature on self-regulation regarding the capacity of firms to overcome collective action problems show statistical regularities across nations (Baron, 2001; Ostrom, 2003; Prakash & Potoski, 2007).

Chapter 2 suggests that one source of debate in the literature on timing strategy (e.g, first-mover advantage) is the little attention to the determinants of stakeholder expectations (Fosfuri et al., 2013). In this regard, I suggest a structural mechanism behind the social construction of performance advantages. When corporate behavior is a relatively novel phenomenon, stakeholders cope with uncertainty and ambiguity by focusing on prominent, easy-to-collect signals. Cognitive referents replace formal institutions and objective mechanisms based on probability estimates. Stakeholders often follow different cognitive referents than firms when evaluating the contextual appropriateness of timing choices.

By showing that the performance consequences of donations to disasters depend heavily on the timing of donation, I contribute to contribute to the literature on non-market strategy where timing is a dimension that has not been explored systematically (Mellahi et al., 2015). Traditionally, scholars approach the analysis of the relationship between financial performance and corporate social performance as a comparative evaluation of pro-social versus non-pro-social firms when these choices are made in stable conditions (Aguinis & Glavas, 2012). Therefore, how performance benefits arise under environmental uncertainty and causal ambiguity in fast-paced environments is largely an open empirical question.

Combined lessons from Chapter 1 and 2 formalize a contribution to stakeholder theory by suggesting that economic reliance increases the ability of firms to predict stakeholder expectations. My study informs about the factors that make geographically

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located customers, competitors, and governments strategic stakeholders for the organization (Freeman, 2010). My study suggests that the market standing of the firm and the degree of market competition are two necessary elements to understand when and how power dependence, need for legitimacy, and urgency vary across firm-stakeholder relationships (Mitchell et al., 1997).

Finally, my dissertation suggests that drawing upon the scholarship on dynamic capabilities (Teece, 2007; Teece et al., 1997) may help address a longstanding debate in the literature on non-market strategy scholars. We know very little about the economic consequences of pro-social behavior and opinions are divided as to whether performance benefits for the firm and economic surplus for stakeholders should be expected (Dorobantu et al., 2017). At the heart of this debate is the fact that there is little theory to predict when and why a firm's actions will create sizeable economic surplus, or the conditions under which businesses might be better-able than other types of entities to deliver such benefits (Kaul & Luo, 2017).

I propose that these inquiries can be addressed by connecting the findings in Chapter 3 with the causal intuition in Chapter 1. Economic reliance facilitates the firm to identify local needs in times of distress. This drives managers' attention on economically costly disasters that can disrupt the financial performance of the corporation—those extreme events that hit countries where the firm has economic interdependencies and where there is a significant gap in the traditional sources of aid (Hoffman & Ocasio, 2001). By confirming that economically-reliant firms are in an advantageous position to help drive

timely delivery of disaster aid, thereby lessening the adverse effects of natural disasters on social welfare, my dissertation sheds light on the mechanisms that explain firms' comparative advantage to supply collective goods after disruptions vis-à-vis other donors (Godfrey, 2005; Hart, 1995; Porter & Kramer, 2002).

Consequently, considering the unique capabilities of economically-reliant firms and the situations where these are likely to be deployed in ways that yield positive outcomes for society is a promissory avenue of research. The core insight in the application of dynamic capabilities is that performance differences—especially in rapidly changing and uncertain environments—arise from varied dynamic capabilities (Eisenhardt & Martin, 2000). While most studies compare firms, there is also evidence that dynamic capabilities differ systematically among organizational forms (Hannan & Freeman, 1984; Romanelli, 1991).

To summarize, my dissertation is one step in the direction to understand the antecedents and effects of corporate disaster giving with unambiguous and objective measures that enhance replication. Given the coverage of the dataset, my study better informs on the firm-, industry-, and country-specific factors that moderate and mediate the determinants and consequences of the organizational choice than previous studies. Traditionally, pro-social behavior has been evaluated at the country level and, although there have been influential studies on corporate disaster giving using a multi-country setting, these limit to one event affecting several countries (Whiteman et al., 2005) or a few single-country events (Madsen & Rodgers, 2014). Moreover, my study covers

organizations that commonly are not included in the extant literature such as firms from emerging countries, particularly when they give abroad. Finally, my dataset mitigates the risks of measurement error and omitted-variable bias that have been a concern regarding the findings of observational studies in developing countries (Mellahi et al., 2015).

LIMITATIONS AND OPPORTUNITIES FOR FUTURE RESEARCH

My dissertation centers on the argument that firms in an industry consider themselves as part of a supportive club in a country. Thus, when an exogenous event harms the value of their club good, they may have an incentive to rebuild it by giving. The assumption is that the investment equilibrium reached before the event is disturbed by the disaster, and thus after the event, it again becomes logical to invest in the club good.

Empirically and theoretically, the study of the drivers and consequences of disaster giving within industries make sense given the characteristics of the phenomenon, e.g., firms from the same industry tend to donate the same amount, but the observation of similar donation amounts do not occur across firms from different industries. However, further study of the unpacked conditions and mechanisms that affect the frequency and magnitude of donation and its consequences at different levels of analysis is needed. For instance, one may argue that exclusivity misstates the nature of the effected club. Large disasters destroy assets across a wide range of industries. If the club good is the functioning of the local economy, then actors from many industries own stakes, and the effected club is much broader than a single industry. It follows that the external stakeholders that evaluate the contextual appropriateness of the business response and

reward and punish firms may also be customers of different industries. They thus evaluate such responses across industries and not within the industry.

The findings on the economic value of corporate disaster giving call for further investigation to understand the optimal value of the provision of collective goods from the social standpoint. My dissertation focuses on cases where there is a disaster funding gap, and corporate aid comes as an unmitigated social good. However, a plausible argument is that the marginal productivity of corporate giving will decrease as its magnitude increases because such productivity is partly a product of complementarities with public investment (Cavallo & Daude, 2011; Khan & Kumar, 1997). Private giving, for instance, may well stimulate public intervention in areas or on a scale that firms are not willing or able to fully achieve themselves.

Moreover, corporate giving requires an institutional framework that is difficult to substitute through private mechanisms or externalize via markets. That is, a lack of public goods may make the costs of supplying disaster relief and recovery unbearable for an average firm. Additionally, it is likely that some of the strategic factors that motivate corporate giving may be only salient when there is also an opportunity for enhancing business-government relations. Managers may expect to bolster corporate legitimacy in the local market by giving to disasters (Marquis & Qian, 2013), but that depends on a parallel interest by traditional donors.

Another open question that may be of interest for institutional theorists concerns the association among efficiency in corporate giving, economic growth, and institutional

development. Recalling that low-income nations also tend to have relatively low institutional capacities (The World Bank, 2014), an interesting paradox arises. Corporate disaster giving constitutes a scarcer resource in low-income countries; hence its marginal value should be higher than in high-income countries. At the same time, lower levels of local institutional capacities may result in a lower marginal productivity of business giving. For instance, high levels of corruption increase the inefficiency of recovery funding since governments are less likely to enforce building codes and infrastructure quality (Kahn, 2005), and more likely to engage in rent seeking (Cavallo & Daude, 2011). Hence, from the perspective of global welfare, is it efficient to allocate private giving to lower-income countries that may have a higher marginal utility for its victims but lower utility for productivity? Further empirical work may help clarify this paradox.

Taken the lessons from the three chapters together, my dissertation shows that the low economic footprint of corporations in some countries makes corporate giving more a function of social preferences, such as altruism, and given our argument on the conditions for a comparative advantage of the firm, a less impactful resource on social welfare (Ballesteros et al., 2017). Hence, the fact that traditional international aid concentrates on countries such as Nepal and Burma and corporate aid on countries such as Chile and Japan is an efficient allocation of global resources. The rise of corporate disaster giving is a Pareto-improvement mechanism in disaster countries lacking enough international aid for disaster funding (Hochman & Rodgers, 1969). Moreover, if the corporate donor obtains private benefits from such giving and the private gains are not misdirected from business purposes (e.g., philanthropy is not subject to moral hazard, Jensen & Meckling,

1976; Salomon, 2013), the effect is to enhance shareholder value (Porter & Kramer, 2002) and no other sector of society is worse off, corporate disaster giving can thus be seen as a Pareto optimal choice—a subject worthy of further exploration.

The findings suggest that the study of organizational decision-making in the context of disasters is a good cornerstone for theory development in the strategy and organization literatures, where systemic or correlated risk remains understudied (Oetzel & Oh, 2014; Salomon, 2013). Particularly attractive for institutional and organizational theorists is that natural disasters commonly involve "an excessiveness" where the salience of specific social arrangements and stakeholder relationships increases (Klinenberg, 2003). This phenomenon facilitates the observation of societal and institutional dynamics that are commonly obscured and small in scale (Durkheim & Mauss, 1963; Klinenberg, 2003; Tilcsik & Marquis, 2013).

Nevertheless, applying the integrative framework to other settings may provide a comparative evaluation of the predictive power of the three theoretical cornerstones in more stable market conditions. For instance, in the absence of systematic disruptions, do we need dynamic capabilities to differentiate the comparative advantage of the corporation to provide collective goods or would a differentiation between the general characteristics of the firm and other societal entities suffice? What happens when we compare the ability of the firm to accrue performance benefits in stable market conditions? Do we find that firms are more effective to predict and satisfy stakeholder expectations with their pro-social behavior? My findings suggest that the divergence in

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cognitive referents between firms and stakeholders is robust to lower degrees of uncertainty and ambiguity.

Additional limitations and boundary conditions of my dissertation are associated with the focus on publicly-traded and relatively large firms. Although this type of organizations accounts for nearly 90 percent of the recorded corporate donations in the observed period (and, thus, selection bias is mitigated), smaller and/or private firms may follow unique mechanisms and conditions when behaving pro-socially. Future work based on case studies may better complete our understanding of private provision of collective goods by unpacking such factors. This effort also would provide a finer grained understanding of the relationship between economic reliance and the geographic distribution of club systems particularly in countries with large territories.

In this regard, a future avenue of research entails the collection of data at the local and regional level to better unpack the causal effect of economic reliance on corporate pro-social behavior. For instance, incorporating zip code data in the analyses would help us understand in a more accurate fashion the spatial distribution of disaster damage, market activity, and corporate giving. Scholars conducting single-country studies have made progress in the conceptualization of (geographically circumscribed) business communities (Tilcsik & Marquis, 2013). My study suggests a method to replicate such endeavor in a longitudinal and international setting.

MANAGERIAL IMPLICATIONS

Beyond its theoretical value, this dissertation has implications for management practice. In 2015, an average large corporation was 300% more likely to engage in disaster giving than 25 years before. Because the money allocated to disaster aid often surpasses a corporation's total annual social budget (Ballesteros et al., 2017), and several studies suggest that disaster giving is a high-stakes decision often associated with competitive advantages (Madsen & Rodgers, 2014; Muller & Kräussl, 2011; Patten, 2008), the timing of donating is an important managerial question. In this way, my dissertation—centers on the fundamental transformation that the business world is now undergoing in attention given to the growing number of large (correlated or systematic) risks and, particularly natural disasters, and how it is affecting firms' non-market strategy and their relationships with their stakeholders (George et al., 2016).

Overall, my findings suggest that firms are more likely than not to make inefficient decisions regarding their engagement in disaster giving. About 51% of firms engaging in this behavior obtained negative performance consequences that were significantly larger than the size of their donations. As such, I provide evidence of the factors that managers should consider when choosing to engage in corporate pro-social behavior under conditions under conditions of high informational and time constraints.

The economic hardship associated with natural disasters is expected to continue to grow because of expanding human settlement in regions exposed to extreme natural risks (Cutter et al., 2009; Dong & Tomlin, 2012; Kunreuther & Useem, 2009; von Peter et al.,

2012). Traditional sources of humanitarian aid and standard insurance practices have not proven sufficient to cover fat-tail disaster losses, particularly in large markets (Kellett & Caravani, 2013; Noy, 2012; Weitzman, 2011). The value of corporate disaster giving for socioeconomic development is thus likely to grow over time. In this context, the cardinal practical question will be how such form of pro-social behavior can be stimulated and disciplined organically, and this dissertation may inform such endeavor.

The rise of corporate disaster giving may be a Pareto-improvement mechanism in disaster countries lacking enough international aid for disaster funding (Hochman & Rodgers, 1969). Moreover, if the corporate donor obtains private benefits from such giving and these benefits are not misdirected from business purposes (e.g., giving is not subject to moral hazard, Jensen & Meckling, 1976; Salomon, 2013), the effect is to enhance shareholder value (Porter & Kramer, 2002) and no other sector of society is worse off, corporate disaster giving can thus be seen as a Pareto optimal choice—a subject worthy of further exploration.

My dissertation presents an exploratory effort of this exploration. The findings help unpack the conditions under which corporate disaster giving may provide benefits for the donor firm and the affected country. When disaster-stricken countries receive significant proportions of international aid from firms that have economic reliance and a positive pre-disaster reputation, firms realize post-donation revenue that is not explained by market operation and countries receive relief comparatively fast and recover in great magnitude.

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Aside corporate disaster giving, firms are facing calls to not only engage in traditional forms of non-market strategy, but also to adopt responsibilities that have historically fallen to aid agencies, governments, and non-governmental organizations (George et al., 2016). Firms are increasingly developing self-regulatory standards to substitute for regulations that governments are unable or unwilling to enforce (Ostrom, 2000; Potoski & Prakash, 2005), building hospitals, schools, and community projects (Matten & Crane, 2005; Palazzo & Scherer, 2008). Others are leading important social innovations such as telemedicine and distance learning (Ballesteros, 2013).

In this dissertation, I propose theories and methods suitable for replication in other non-market settings. I hope that my work helps scholars to deepen the understanding of the conditions and mechanisms under which the corporate provision of collective goods provides benefits for the firm and society at large.

ANNEX

A DATABASE OF DISASTER DONATIONS

Data Collection and Coding Procedures

My dataset comprises data on every sudden natural disaster recorded in the EM-DAT database. As detailed below, I used a combination of manual and automatic procedures to find data on disaster donations, and code their value and sources. We searched for news items related to each disaster in the Factiva and Lexis Nexis databases. The search window is one year after the official time of occurrence of the disaster according to EM-DAT. For example, the 2010 earthquake in Chile had the range 02/27/2010-02/27/2011. To identify relevant articles, we searched for combinations of 'affected country name', 'type of disaster', and (where applicable) 'disaster name'.

We searched within each article for information on the type of disaster, and corporate aid donations.

    a.   The disasters that passed the criterion of a sudden shock were identified as follows:
        i.   Mass movement: "landslide" OR "avalanche" OR "rockfall" OR "subsidence"
        ii.   Earthquake: "seismic" OR "quake" OR "earthquake" OR "tsunami"
        iii.   Flood: "flood"
        iv.   Storm: "storm" OR "typhoon" OR "cyclone
        v.   " OR "hurricane" OR "tornado"
        vi.   Volcano: "volcano" OR "volcanic" OR "eruption"
    b.   Corporate giving was identified by searching for the following terms: "donation" OR "donate" OR "donated" OR "donating" OR "pledge" OR "pledged" OR "pledging" OR "give" OR "gave" OR "given" OR "giving." An example of the Boolean search is:

[03/11/2011-03/11/2012]; ("Japan" OR "Japanese" OR "Japan's" OR "Japans"[66]) AND ("tsunami" OR "earthquake" OR "quake" OR "disaster") AND ("donation" OR "donate" OR "pledge" OR "pledging" OR "give" OR "gave" OR "given" OR "giving").

Coding each corporate aid donation

To make over 2,310,000 electronic reports computationally tractable, we applied differential language analysis using *JavaScript Object Notation* (i.e., *JSON* and *AJAX*) to parse the data. For each article, we coded the following fields:

- Entity making the donation

- Actual donation.

    o In case of in-kind donations, the characteristics of the product or service were recorded (e.g., 1000 bottles of water, a team of nine technicians) and monetized using either current prices applicable in the affected country (e.g., the average price of one litter of bottled water, the daily man-power wage for a specific professional or technician) or an equivalent pecuniary value based on other firms' reporting of their donation to the same disaster.

    o In case of donations reported in a currency different than the dollar, we converted using the currency exchange rate of the day of the donation.

- To increase the relevance of the output (for example, some news reports were a series of articles with no relevance to the study but whose combination would

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[66] There were spelling mistakes in some articles.

make the report to be included in the outcome), the search was qualified with the following filtering process:

- o The name of the country had to be within 50 words of the type of the disaster or the word "disaster."

- o Entities and the act of donating were parsed: The entities per article were extracted and grouped in three categories: organization (e.g., Tepco), location (e.g., Canada), and individual (e.g., Barack Obama).

- o The verb identifying the act of donating had to be within 30 words of an entity

Coding for giving from economically-reliant corporations and related aid

We used an automated coding process to search within each report for details about the type, financial value, date, and source of each donation. Researchers coded donations 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, 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.

For Chapter 3, we coded 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 for the firm's market operation (e.g.,

Bayer providing medicines in response to Typhoon Haiyan)].

Once these two coding procedures have been completed, we randomly selected a

sample of 5% of coded donations. Researchers not involved in the previous procedures

checked for measurement error. This resulted in fewer than 5% of the selected sample

that marked as inaccurate. About 60% of these errors were mainly associated with

monetizing the in-kind value of donations, with less than 8% of the donations were

incorrectly marked as related giving. The rest of sample of discrepancies were mainly

associated with missing data on the nature of donor's business.

Assessing Data Quality

The following procedures were implemented to rule out measurement error:

1.   Five percent of the events (156) were randomly selected and giving was

manually searched using Google, Lexis Nexis, and Factiva. From this procedure,

5.128 percent of the selected events (8) had data inaccuracies, e.g., donation amount,

date of donation.

2.   We had access to exclusive information of donation for the 2010 tsunami

and earthquake in Chile via the Chilean government. By comparing our database with

the list of donors provided by the Chilean government, we found that our dataset

comprised 68 percent of the official source. Our tracking did not include donating

frequency of small- and medium-sized Chilean, non-multinational enterprises. In

terms of magnitude, our dataset accounted for 92 percent of the total corporate aid for the event.

3.   When available, the accuracy of the data was corroborated using external sources:

a.   The Financial Tracking System (FTS) of the United Nations Office for Coordination of Humanitarian Affairs (OCHA), which is a global database that records self-reported international humanitarian aid for different humanitarian crises.[67] The FTS has information on corporate donation for about 3 percent of the tracked events; and government and NGO donation for about 10 percent of the tracked events. In all cases, for corporate giving, the built dataset was larger than the FTS dataset.

b.   Disaster corporate aid trackers of the Corporate Citizenship Center (CCC) at the U.S. Chamber of Commerce Foundation.[68] This source provided information on corporate donation for 0.610 percent of the tracked events. In all cases, our database was larger than the CCC dataset.

DATA FOR THE MEASURE OF ECONOMIC RELIANCE

The distinct levels of company hierarchy are the following with information from Lexis Nexis Corporate Affiliations database:

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[67] For information about the method of collection of FTS data and their verification, visit the following site: http://fts.unocha.org/pageloader.aspx?page=AboutFTS-Data.

[68] These data are available at http://www.uschamberfoundation.org/corporate-citizenship-center/disaster-corporate-aid-trackers.

Table 37. Company hierarchy according to the Corporate Affiliations database

Ultimate Parent	The very top company listed in a company hierarchy and the ultimate controlling company within a corporate structure.
Parent	The top tier within an organization but may not be the "ultimate parent." It should have other companies reporting to it, and would itself report to another legal entity. In many cases the terms, "parent" and "ultimate parent" are used synonymously. Corporate Affiliations commonly refers to the "ultimate parent" as the "parent."
Subsidiary	Separate corporate legal entity owned by the company at 50.1% or more.
Joint Venture	A business in which two or more companies share responsibility and ownership.
Affiliate	A separate legal entity in which there is an ownership interest by the parent company of less than 50%.
Division	An internal unit of a company, not incorporated or a separate legal entity. Usually tends to have many employees.
Branch	An internal unit of a company, not incorporated or a separate legal entity. Usually tends to have a small number of employees.
Unit	Same definition as division.
Factory	Same definition as division.
Plant	Same definition as division.
Group	Corporate classification grouping "like" industries or businesses
Holding	A business whose voting stock is owned to influence its board, policies, and management.
Non–Operating Entities (Shells)	Legal non-operating entities (displayed at the bottom of its immediate parent's hierarchy)

Treatment of Missing Data

Given the relatively small subset of firms engaging in disaster giving by event, addressing this issue with traditional strategies like *listwise* deletion or mean substitution would have fostered the risk of obtaining biased estimates, increasing Type II errors, and underestimating correlations and coefficient weights (Stock & Watson, 2003). Therefore, I used two different methods to address missing data. The primary analyses were conducted with the first method and the second method was used for robustness checks.

First, I used a multiple-input bootstrapping algorithm for time-series-cross-sectional data as explained by Honaker et al. (2011). This form of multiple imputation accounts for smooth time trends, changes across cross-sectional variables, and time and space correlations and it susceptible to integrate scant knowledge to specific cells when available. A review of how this method can produce more accurate imputation particularly for data used in the social sciences than traditional procedures can be found in Honaker and King (2010).

Second, I used imputation with maximum likelihood. This strategy centers on the observed relationships among the covariates and considers a degree of random error that takes into account uncertainty of imputation (Blackwell, Honaker, & King, 2015). For increasing accuracy of the MLE calculation, I grouped the data by industry. Additionally, to cope with missing values on the event-specific variables, I applied multiple imputation based on a bootstrapping-based algorithm as recommended by Honaker, King, and Blackwell (2011). To account for nonlinear effects in the case of

disasters, I used dummies to inform if killed, total affected, and estimated damage were in the percentile regions 0th-25th, 25th-50th, 50th-75th, or 75th-95th , with the omitted categories are above 95th.

CAUSAL INFERENCE

The analyses for the different chapters sought to exploit the considerable benefits that the characteristics of the phenomenon present for obstacles for the identification of causal effects. The variation in the studied behavior across firms, geographies, and time facilitate statistical regularity in a degree not observed in the extant literature. Overall, the setting offers several advantages for causal inference that are particularly beneficial for the study of the consequences of corporate behavior.

First, it is not subject to the endogeneity traditionally affecting the study of the implications of corporate pro-social behavior. The exogenous nature of the disaster mitigates the risk of reverse causality when assessing the link between the organizational choice and its material consequences. Second, the characterization of the size and frequency of the organizational choice overcomes subjective concerns that have affected the empirical literature. The key constructs associated with financial performance (i.e., annual revenue) and economic value (i.e., aid collected within the first post-disaster month and the annual growth rate of the Human Development Index) are unambiguous and objective. This enhances internal validity and facilitates replication. Finally, contextual factors that often are assumed such as environmental uncertainty, causal ambiguity, and time pressure can be measured. The size of the dataset increases statistical

power when analyzing country-time factors such as institutional development. By stratifying the dataset, I have been able to better capture the effects of these factors on the studied relationships.

Despite these econometric advantages, the study of the broad relationships present different challenges for the identification of causal effects. Decision-making is likely endogenous to some of the explored covariates. The risk of documenting a spurious relationship is particularly high since the discussed organization-specific variables (e.g., financial performance) and pro-social behavior are likely moving in the same direction as idiosyncratic unobserved factors (e.g., managerial capabilities and risk aversion). Alternatively, the direction of the causal relationship may not be clear. Therefore, I applied followed a variety of strategies to increase causal inference.

Regarding the study of economic reliance as a driver of corporate disaster giving, one concern in my study is that the decision to enter a market is endogenous to the likelihood of engaging in disaster giving. That is, given the geographical (and, thus, political, and socioeconomic) heterogeneity in the context of disaster risk, firms with a similar propensity to donate self-select into specific market systems. The econometric problem here is that donating and economic reliance are both moving in the same direction as an unobserved factor (e.g., adversity to systemic risk), which prevents an observation of the causal effect of economic reliance on the frequency and size of giving.

To mitigate the occurrence of this issue, I applied *coarsened exact matching* (CEM) [69] (Iacus et al., 2008, 2011) to balance the baseline propensity to engage in pro-social behavior between the treatment (i.e., firms with at least one affiliate in the affected country) and the control groups (i.e., firms with no presence in the market). To conduct the match, I draw on the literature in non-market strategy and, specifically, corporate disaster giving. I compared pre- and post-descriptive statistics in the treatment and control groups for assessing quality. Additionally, I calculated measures of imbalance as suggested by Iacus *et al.*, (2008). The main results hold in the matched sample, which I include in the Appendix in addition to the matching summary.

Additionally, a plausible argument is that the effect of economic reliance on the provision of collective goods is heterogeneous across events. For some shocks, economic reliance may have relatively little effect because of the magnitude of news coverage (Stromberg, 2007). For instance, events such as Hurricane Katrina in the U.S. and the 2010 earthquake in Haiti were certain to receive philanthropic giving irrespective of the economic connection of the organization. Therefore, it is likely that the studied association is stronger for events whose probability of being in the news is relatively low. Thus, I followed Eisensee and Strömberg (2007) and conducted robustness analyses limiting the sample to disasters with a probability of being in the news of 50 percent and lower. I also run analyses including countries that never received donations from firms, which does not affect the estimates.

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[69] See (King et al., 2011) for a comparative assessment of the effectiveness of matching methods.

The study of the consequences of corporate disaster giving presents even greater challenges for causal inference. For instance, regarding the effects on firm performance, the study focuses on how the perception of the contextual appropriateness of corporate disaster giving, driven by media reputation and corporate financial standing, affects donations decisions and performance benefits. Testing these associations is a complex task because reputation, financial standing, and donation choices are likely endogenous to firm performance. Isolating causality requires an approach that compares performance variables among firms that donated with different timing and magnitude, and have distinct levels of media reputation and financial standing, but are otherwise similar regarding underlying attributes. The assumption of heterogeneity in these characteristics but homogeneity in everything else is difficult to satisfy and poses an estimation challenge for conventional panel-data techniques. The risk of documenting a spurious relationship is particularly high since financial performance and pro-social behavior are likely moving in the same direction as unobserved factors such as managerial capabilities and risk aversion. Similarly, 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. Not taking these factors into account may lead to biased, inefficient estimates

Conventional panel-data tools such as fixed-effects and control variables impose the assumption that *ex ante* firm- and context-specific trends extend to *post disaster* conditions, which is often not the case. Difference-in-differences and traditional quasi-experimental designs eliminate unobserved heterogeneity but require effects to be time-

invariant (Abadie et al., 2010; Bertrand, Duflo, & Mullainathan, 2004). Furthermore, large-sample matching methods do not work very well when the number of counterfactual units or sample periods is small, as is the case in my study. In turn, matching methods such as coarsened-exact matching exhibit a limited ability to find a suitable control because of the small number of similar cases.

Synthetic control method. Given these considerations, I applied the synthetic control method (SCM) in my second and third chapter as the second-best econometric option for causal inference to a field experiment. This method allows me to reproduce a quasi-experimental design. The key difference between the SCM and traditional matching techniques is that control entities are made up of combinations of different potential counterfactuals. This method uses an algorithm to evaluate the efficiency of every firm not affected by the treatment variable in reproducing the pre-treatment characteristics of firms affected by the treatment. These characteristics are selected from variables (i.e., predictors) thought to drive the outcome variable (i.e., the dependent variable in traditional regression), in my case annual revenue, speed of aid, or the rate of growth the Human Development Index. Once found, these units are averaged into a single case, corresponding to a synthetically created firm (see Abadie et al., 2010, 2015 for detailed discussions). For instance, no one firm approximates the underlying characteristics of Anglo American in the years leading up to the 2010 earthquake and tsunami. However, features of Rio Tinto, Antofagasta, Tek, Bifox, and Codelco are combined in different proportions to form a synthetic 'Anglo American' that closely matches features predictive of corporate disaster giving. Thus, SCM controls time-variant and invariant

unobserved heterogeneity and allows us to understand what would have happened to the donation magnitude of a given firm to a disaster-country pair in the absence of the treatment.[70] Likewise, 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.

The statistical efficiency of SCM relies on minimizing the difference between the predictors of every treated firm and its synthetic control in each of the analyzed pre-donation periods. Because standard errors in traditional panel-data methods measure uncertainty in aggregate data, statistical inference with SCM is run differently. I calculate the likelihood that the observed revenue or measures of disaster recovery are the effect of corporate disaster giving versus chance by conducting falsification exercises like permutation exercises, which are called placebo tests. In practical terms, I artificially reassign the intervention to entities in the control pool and run SCM by using a firm that did not channel its donation through an NPO as a treated entity. I then match this placebo firm with a synthetic counterfactual and assess the results. I repeat this procedure with every entity in the control group, which generates a distribution of effects that are indeed observed by chance. I finally compare this distribution of false treatment effects with the actual distribution and generate p-values. The benefit of the SCM is that is always

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[70] Our online appendix shows how the SCM algorithm combines features of these firms to approximate Anglo-American responding to the 2010 disaster in Chile. See https://disastergiving.files.wordpress.com/2016/08/synthetic-control-method.pdf.

feasible to calculate the exact distribution of the estimated effect regardless of the number of donor firms, disaster-country pairs, and observation periods.

FORMAL DESCRIPTION OF THE SYNTHETIC CASE METHOD

The traditional case-study method used in the extant literature has two critical empirical challenges. First, comparison cases are often chosen based on subjective criteria of affinity. Second, they typically use data on a sample of disaggregated units, but employing inferential techniques that observe uncertainty at the aggregate value in the population.

Uncertainty about the efficiency of the control group to reproduce the counterfactual result is not mitigated with the availability of aggregated data because such uncertainty is not captured by the standard errors of the traditional inferential methods commonly employed (Abadie et al., 2010). Applying the synthetic logarithm to every potential disaster country in the control group allows us to better assess if the studied effect found in the synthetic control for the disaster country with the minimum share of business giving is significantly large vis-à-vis the effect estimated found in a randomly chosen country with no intervention. This inferential method is efficient because it is always feasible to calculate the exact distribution of the estimated effect of corporate disaster giving regardless of the number of disaster countries. Thus, the inference identifies whether the estimated effect of the business intervention is significantly large vis-à-vis the distribution of effects for the disaster countries not exposed to a ratio of corporate disaster giving to disaster relief of at least five percent.

I use Chapter 3 to formalize describe the SCM. To test the hypotheses, we analyzed three levels of treatment. The distribution of corporate giving is highly skewed,[71] which means that using the mean value of 5.25% combined with standard deviations is not an efficiency strategy. Instead, we used the 75th (7.7% of aid is from economically-reliant firms), 95th (24.5%), and 99th (44.4%) percentiles as treatment cutoffs. For relatedness, we used three treatment levels in our analysis. As the distribution for relatedness is relatively normal, we used the mean (26.9%) and +/- one standard deviation (11.5% and 42.4%) as treatment indicators.

We compared disasters that prompted a share of economically reliant corporate giving of at least the share of giving from economically-reliant firms defined by each quantile (i.e., intervention) to a weighted combination of a control events with a lower proportion of business response (i.e., the synthetic control). Without loss of generality, our sample of $J+1$ events contains one event with such a degree of corporate disaster giving and J events in the potential control group. Let Y_{it}^{N} be the dollar amount of total disaster aid or HDI that would be observed for disaster country i at time t in the absence of the intervention, for disaster countries $i=2,...,J+1$, and periods $t=1,...,T$. Let Y_{it}^{I} be the dollar amount of total disaster aid or HDI that would be observed for disaster country i at time t if that country received the intervention, which provides a proxy of the efficiency to supply essential collective goods (Day et al., 2012).

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[71] See the online appendix at https://corpsanddisasters.wordpress.com/.

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Given the unpredictability of the analyzed shocks, the disaster giving has no effect on the outcome before the intervention and anticipation effects are ruled out. That is, for $i \in \{1,...,N\}$ and $t \in \{1,...,T_0\}$, $Y_{it}^I = Y_{it}^N$. Implicit in the notation is the assumption of no interference between units (i.e., the intervention does not affect outcomes of the untreated disaster countries; cf., Rosenbaum, 2007). Let $\alpha_{it} = Y_{it}^I - Y_{it}^N$ be the effect of the intervention for disaster country i at time t, and let D_{it} be an indicator that takes value one if disaster country i is exposed to the intervention at time t. Hence, the observed outcome is

$$Y_{it} = Y_{it}^N + \alpha_{it} D_{it} \qquad (5)$$

Because only the first disaster country is exposed to the intervention and only after period T_0, where $(1 \leq T_0 < T)$, then

$$D_{it} = \begin{cases} 1 & \text{if } i=1 \text{ and } t > T_0 \\ 0 & \text{otherwise} \end{cases}$$

The target parameters are $(\alpha_1, T_{0+1},..., \alpha_1, T)$, which are the lead-specific causal effect of corporate disaster giving on total disaster aid and social welfare. Thus, for $t > T_0$,

$$\alpha_{1t} = Y_{1t}^I - Y_{1t}^N = Y_{1t} - Y_{1t}^N \qquad (6)$$

Since Y_{1t}^I is observed, I approximate Y_{1t}^N to estimate α_{1t}. $t=1,...,T$. Let v_m be a certain weight that captures the relative importance of the n-th variable and helps minimize the

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differences between the pre-disaster characteristics of the treated disaster country and the synthetic country control, *W*. Hence, the synthetic control estimator that captures the effect of the share of *economically connected corporate disaster giving* in the treated disaster country is given by $Y_{1t}^I - \sum_{j=2}^{J+1} w^j Y^{jt}$.

I estimate the studied effect as follows:

$$Y_{it}^N = \delta_t + \theta_t Z_i + \lambda_t \mu_i + \varepsilon_{it} \tag{7}$$

where δ_t is an unknown common factor with constant factor loadings across disaster countries, Z_i is a $(r \times 1)$ vector of the predictors described above, θ_t is a $(1 \times r)$ vector of unknown parameters, λ_t is a $(1 \times F)$ vector of unobserved common factors, μ_i is an $(F \times 1)$ vector of unknown factor loadings, and the error terms ε_{it} are unobserved country-specific shocks affecting disaster aid or social welfare with zero mean for all i and t. Notice that we do not conduct a prediction of *ex ante* disaster giving in our matched-case-study analysis. Arguably, disaster donations are observed only after the occurrence of the shock. Additionally, recall our strategy of focusing on sudden disasters. Also notice that, as suggested, our estimation method allows the effect of unobservable heterogeneity to vary over time.

Case example. Constructing a Synthetic Chile 2010

The following is the result of the SCM algorithm assigning weights to different disaster-afflicted nations whose combination statistically resemble the pre-disaster trajectory of the HDI growth rate.

Table 38. Synthetic control of Chile 2010

Control	Weight
Afghanistan	0
Albania	0
Algeria	0
American Samoa	0
Antigua and Barbuda	0
Argentina	0.460
Armenia	0
Australia	0
Austria	0
Bahamas	0
Bangladesh	0
Barbados	0
Belgium	0
Belize	0
Bolivia	0
Bosnia-Hercegovina	0
Brazil	0.109
Bulgaria	0
Burkina Faso	0
Cambodia	0
Canada	0
China	0
Colombia	0.172
Comoros	0
Congo	0
Costa Rica	0
Croatia	0
Cuba	0
Cyprus	0
Czech Rep	0
Denmark	0
Dominica	0
Dominican Rep	0
Ecuador	0

El Salvador	0
Ethiopia	0
Fiji	0
France	0
Georgia	0
Germany	0
Greece	0
Guadeloupe	0
Guam	0
Guatemala	0
Haiti	0
Honduras	0
Hong Kong (China)	0
Hungary	0
India	0
Indonesia	0
Iran Islam Rep	0
Iraq	0
Ireland	0
Italy	0
Jamaica	0
Japan	0
Kazakhstan	0
Kenya	0
Kyrgyzstan	0
Lao P Dem Rep	0
Latvia	0
Lithuania	0
Macedonia FRY	0
Madagascar	0
Martinique	0
Mexico	0.148
Moldova Rep	0
Mongolia	0
Morocco	0
Mozambique	0
Myanmar	0
Namibia	0
Nepal	0
Netherlands	0
New Zealand	0
Nigeria	0
North Korea	0

Norway	0
Oman	0
Pakistan	0
Panama	0
Papua New Guinea	0
Paraguay	0.083
Peru	0
Philippines	0
Poland	0
Portugal	0
Puerto Rico	0
Romania	0
Russia	0
Rwanda	0
Samoa	0
Saudi Arabia	0
Senegal	0
Serbia	0
Seychelles	0
Slovakia	0
Slovenia	0
South Africa	0
South Korea	0
Spain	0.017
Sri Lanka	0
St Lucia	0
St Vincent and The Grenadines	0
Sudan	0
Sweden	0
Switzerland	0
Taiwan	0
Tajikistan	0
Thailand	0
Tonga	0
Trinidad and Tobago	0
Turkey	0
Turks and Caicos Is	0
Uganda	0
Ukraine	0
United Kingdom	0
United States	0.001
Uruguay	0
Venezuela	0

Viet Nam	0
Yemen	0
Zimbabwe	0

Placebo exercises

To check on the validity of our findings, we extended the procedure suggested in Abadie et al., (2010, 2015) and ran placebo tests as a falsification exercise. The approach works by reassigning the treatment of interest to untreated entities. Each placebo entity is then matched with a synthetic control, and values for predictor and outcome variable are calculated. If the results of this analysis mirror what is observed for actually treated entities, this would cast doubt on the argument that treatment is indeed producing the outcome of interest. For instance, if we want to observe the placebo effect of corporate giving on recovery of the 2008 earthquake in China (given that this nation received fell in the 95% percentile of share of giving from economically-reliant firms), we choose another similar disaster nation that received less than 24.5% of giving from corporations. We expect, if our argumentation is correct, that we will not observe a meaningful difference in post-disaster recovery (as proxied by the trajectory of the HDI growth rate) between the false China 2008 and all those nations included in the synthetic control.

We first need to make sure that the SCM has done a good job in finding a synthetic control. We expect that the differences in the predictor values are not statistically significant.

Predictor Balance:

Table 39. Accumulated placebo exercises for Chile 2010

	Treated	Synthetic Control
Life expectancy at birth, total (years)	71.8	68.5
Exports of goods and services (% of GDP)	22.5	22.2
Imports of goods and services (% of GDP)	19.9	22.2
School enrollment, secondary, (% net)	55.5	5.9
Inflation	5.1	5.9
Total investment (ratio of total investment to GDP)	38.7	30.9

As shown in the following figure, this assertion holds.

Figure 8. A Placebo Effect of Giving in the Post-Earthquake China's Recovery

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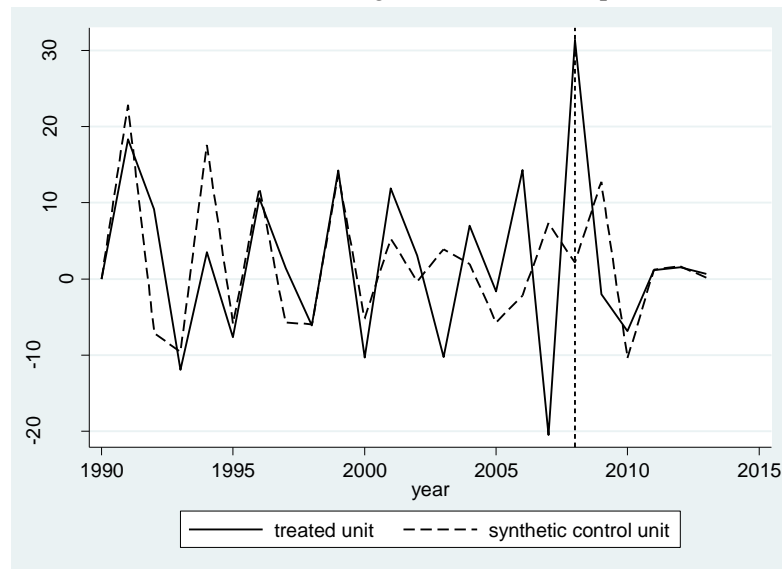
Or the following is one of the falsification exercises for the United States' recovery from 2004 Katrina.

Figure 9. The Effect of Disaster Giving on the Hit of Hurricane Katrina on the U.S. GDP
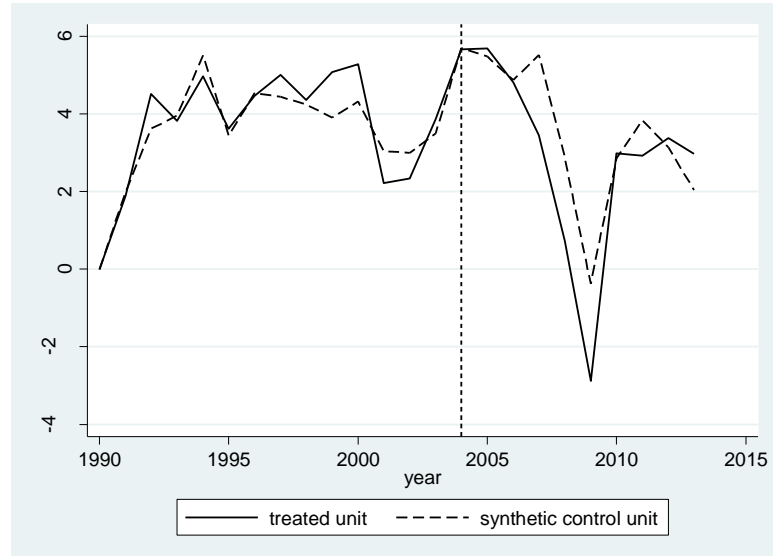
Conversely, the following is the difference in the GDP annual growth rate between the actual Chile that suffered an earthquake and tsunami in 2010, but received over 44% of giving from economically-reliant firms, and a synthetic control.

Figure 10. The Effect of Disaster Giving on the Hit of the 2010 Disaster on Chile's GDP

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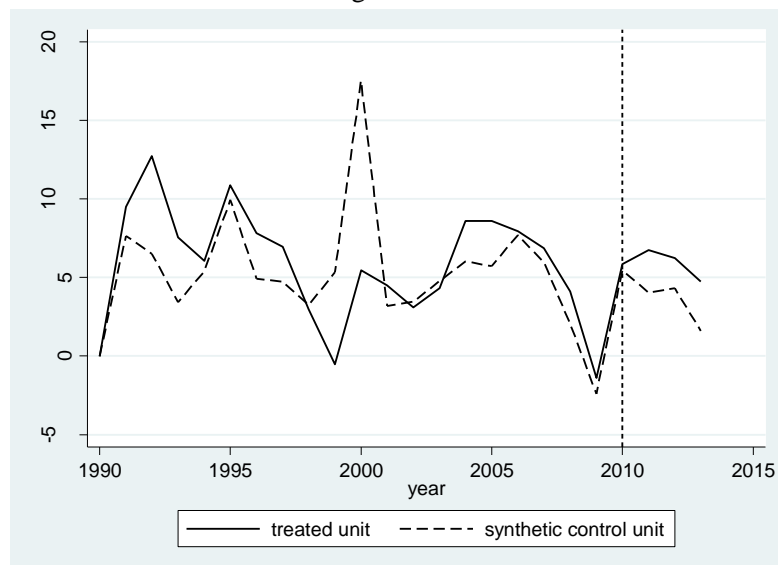
Estimating placebo effects for every control nation allowed us to create outcome distributions for both the speed of aid, and disaster recovery. If results from our analysis of actually treated nations were to fall inside of these placebo-effect distributions, it would cast doubt on the validity of our findings. Ultimately, this process enables to use p-values to conduct a statistical comparison of the placebo-distribution and the estimated effects in treated nations.

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