

Institutional Disruptions and the Philanthropy of Multinational Firms

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ABSTRACT

This paper studies philanthropy by multinational enterprises (MNEs) during institutional disruptions—the sudden and unexpected, temporary, and systemic breakdowns in market-oriented institutions. The central argument is that, under institutional disruptions, MNEs aim to restore factors that are essential for the market to function, such as infrastructure and labor markets, and the strength of the market restoration motive is positively associated with the economic importance of the affected country to the MNE. Analyses of donations from 2,000 MNEs headquartered in 63 countries in the aftermath of 265 major epidemics, natural disasters, and terrorist attacks affecting 129 countries suggest that the economic importance of the country to the firm strongly explains donations. Country market concentration, public aid, and the country's regulatory quality moderate this effect. These associations are robust to a matching method; a vector of firm-, country-, and event-specific time-varying and -constant variables; and alternative motives such as reputation, altruism, media salience, market standing, and poverty-gap avoidance. They offer evidence that company philanthropy in the aftermath of institutional disruptions may deviate from predicted behavior under stable conditions. Particularly, the findings contest the expectation that philanthropy rises in market competition. Monopolistic firms are comparatively large donors and may act as an economic stop-loss mechanism during large disruptions.

Keywords: institutional economics, institutional disruptions, grand challenges, company philanthropy, multinational enterprises, disasters

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Introduction

Over the past decade, substantial research in the field of organization science has explored the motivations underlying for-profit organizations' involvement in addressing large societal issues (Cabral et al. 2019, George et al. 2016, Luo and Kaul 2019). An extensive literature studies company philanthropy toward chronic societal problems under stable institutional contexts (e.g. poverty reduction and inadequate education and healthcare) (Bénabou and Tirole 2010, Lev et al. 2010). Yet, an increasingly important societal issue stems from what we term *institutional disruptions*—the severe and systemic, yet sudden, unpredictable, and temporary breakdown of market-oriented institutions. These institutions are the intangible and physical factors necessary for business activities (Acemoglu et al. 2005, Chakrabarti et al. 2011, Coase 1988, Dutt et al. 2016). Phenomena such as epidemics, natural disasters, and terrorist attacks disrupt country market-oriented institutions. They halt firms' ability to obtain inputs or sell due to the destruction of infrastructure and purchasing power (Becerra et al. 2014, Boehm et al. 2019); reduce productivity because employees lose housing, schooling, or health status (Altay and Ramirez 2010, Baker and Bloom 2013); lead to suspended regulatory and enforcement systems (Copeland 2005, Garrett and Tetlow 2006); and cancel investments due to the impact on financial intermediaries (Hosono et al. 2016).

Since the turn of the 21st century, multinational enterprises (MNEs) have become the fastest-growing sector worldwide in funding recovery from disruptions, outpacing governments, multilateral agencies, and individual charity (High-Level Panel on Humanitarian Financing 2016). Considering that these shocks can create poverty traps and hamper economic development (Baker and Bloom 2013, Barro 2009), understanding MNE motivations to donate in the aftermath of institutional disruptions is crucial for fostering and coordinating important resources for country recovery.

Scholars thus far have applied motives widely tested under stable institutional contexts to explain philanthropy after such events. That is, firms donate to meet social preferences such as altruism or reciprocity (Morgan and Tumlinson 2019) or pursue strategic considerations such as to accumulate reputational capital (Muller and Kräussl 2011), hedge the firm against political risk (Zhang et al. 2016), or

comply with social norms or political pressure (Luo et al. 2016, Tilcsik and Marquis 2013, Zhang and Luo 2013). These approaches have deepened our understanding of company philanthropy. In this study, and by building on the importance of the firm's locations with an economic rationale, we suggest that institutional disruptions provide a context that makes salient a different, previously not studied motive: restoring the market.

We theorize that institutional disruptions reveal the strategic value of a country's market for firms. Company performance relies on the market-oriented institutions in the countries in which the firm operates (Chittoor et al. 2009, Khanna and Palepu 1997, Toulan 2002), and disruptions increasingly explain performance volatility and survival for firms with operations in the affected country (Aghion et al. 2017, Baker and Bloom 2013). The larger the economic importance of a country for the MNE (i.e., the extent to which the firm sells, buys, or rents inputs, final products, or services, or hires human capital in the country), the greater the shock to firm performance and thus its incentive to allocate resources toward the country's market recovery.¹ Consequently, a measure of the relative economic importance of a country market for MNEs can identify which firms will donate when disruption strikes.

Drawing on arguments on the costs and benefits of nonmarket decisions and our interviews of business decision-makers from S&P 500 firms,² we argue that this baseline relationship will be moderated by the availability of alternative sources to fund market recovery and the nature of the market institutions (Buchanan 1965, Kaul and Luo 2017, Yildirim 2014). Along with the formal insurance system, countries use two alternative sources for funding recovery: private and public aid. Thus, we focus on other corporate donors and aid coming from the state power and foreign agencies as substitutes for a focal firm's giving.

First, when the pool of large company donors is small, the cost of foregoing nonmarket action is considerable. We hypothesize that the average donation of an economically connected firm falls in the population of MNEs with a large share of the country market. Second, a country's recent history of substantial public expenditure and foreign aid fosters the expectation that government resources will fund recovery and thus will be associated with smaller donation amounts from economically connected MNEs.

Finally, low regulatory quality rise the cost of funding recovery because of bureaucratic delays and the misallocation of resources (Ballesteros and Gatignon 2019, Becerra et al. 2015). Accordingly, we expect economically connected MNE donations will increase with country regulatory quality.

To empirically test the hypotheses, we construct the Global Database of Disaster Responses. The database covers reported monetary and in-kind donations from firms, governments, multinational agencies, and non-governmental organizations reported in news media to the relief and recovery of all disasters (epidemics, natural disasters, and terrorist attacks) from 1990 to 2019. We select shocks that meet the characteristics of institutional disruptions to our event panel.³ Our firm panel is the 2,000 largest public MNEs (by revenue) at the international level and their affiliates worldwide. We construct a time-varying, pair-specific measure linking ownership-weighted company operations to countries for the relative economic importance of markets for each MNE.

Consistent with the strategic motive of donating to restore the country market, the analyses provide systematic and robust empirical evidence that the economic importance of a country to the MNE is positively associated with its philanthropic response in the aftermath of institutional disruptions. The association is significantly moderated by the theorized constructs that influence the costs and benefits of donating for country market recovery. Moreover, we exploit variation in donation reports using natural language processing to identify the allocation of cash and in-kind resources toward factors critical for the functioning of market-oriented institutions. Our data indicate that economically connected MNEs frequently donate toward such areas, which gives additional evidence of the argued philanthropic motive.

The results survive the inclusion of a battery of fixed effects and time-variant firm-, country-, and event-specific variables, including the standard measures of other major alternative explanations of company philanthropy such as reputational capital, pressure by the host-country government, market growth, media visibility, inequity and poverty aversion, and the altruistic motivations of employees. We also apply a matching technique to produce estimates that de facto condition on the possibility of self-selection of MNEs into countries with specific exposure to disruptions or proneness to receive aid and find consistent results.

We contribute to the nonmarket literature by bringing attention to a different underlying motive of company philanthropy. A market restoration motive leads to predictions that diverge from extant work. Specifically, research suggests that organizations with operations in an affected country are likely to incur substantial damages and, therefore, will engage in scarce giving in the aftermath of large shocks (Crampton and Patten 2008, Tilcsik and Marquis 2013). In contrast, using a comprehensive database across disruptions, countries, and time, we find systematic evidence that economically connected MNEs are the largest donors in the context of institutional disruptions. When market-oriented institutions are disrupted, limiting resources to the organization's assets can be insufficient for reinstating performance.

Additionally, scholars predict that the quest and potential returns to differentiation via prosocial behavior are large in competitive markets (Kitzmueller and Shimshack 2012), that company giving aligns with pledges from public actors due to the interest in using political capital as a risk-management mechanism against stakeholder opportunistic behavior (Bertrand et al. 2020, Henisz et al. 2014), and that such incentives rise in institutional underdevelopment (Hornstein and Zhao 2018, Zhang and Luo 2013). In contrast, our findings indicate that companies donate comparatively large in highly concentrated country markets, with high regulatory quality, and their giving misaligns with that of public entities.

The study also contributes by distinguishing the concept of institutional disruptions and its relevance to company behavior. The concept may help to delineate the economic implications of these phenomena on company performance and the possible strategies firms may use to manage them. Institutional disruptions are ubiquitous to emerging and developed economies alike and are distinct from the long-lasting or permanent absence of market-based institutions (voids) in emerging market countries (Doh et al. 2017, Khanna and Palepu 1997). The results consistently indicate that this theoretical distinction is meaningful. For instance, the overlap between private and public benefits in concentrated country markets appears to be substantially greater during institutional disruptions. Monopolistic firms seem to act as a stop-loss mechanism when disruptions overwhelm the capacity of governments. We observe this across levels of economic and institutional development.

Finally, we contribute to the literature on shocks by formally characterizing them based on temporality, suddenness and unexpectedness, severity, and pervasiveness. Existing research considers one or several of the characteristics but does not formalize all four.⁴ For instance, studies have focused on expectedness and severity (Dye et al. 2014), severity, frequency, and expectedness (Oetzel and Oh 2014, 2021), and severity, pervasiveness, and permanence (Klüppel et al. 2018). Our framework allows for the combined study of different human and naturally caused events such as terrorist attacks, natural disasters, and epidemics. It enables us to differentiate which shocks will have disruptive rather than evolutionary institutional impacts, allowing testable predictions on firm outcomes and behavior. This study identifies how the economic importance of the country to the MNE and country conditions are associated with MNEs' response to large-magnitude shocks.

The different main and robustness analyses highlight the conditions and mechanism under which the motive to restore the country market is likely to be active. In this way, this study complements research on the economic efficiency of the company behavior that indicate that firm giving speeds economic recovery (Ballesteros et al. 2017). By helping restore market-based institutions, MNEs become key actors to help overcome societal issues around the world.

Theory and Hypotheses

Market-Oriented Institutions and Firm Operations

Markets are “institutions that facilitate the exchange of goods” (Coase 1988, p. 7). Market-oriented institutions combine to create interlocking activities that shape business in the country market (Nelson 1995). They entail not only product, capital, and labor markets, but also intermediaries, physical infrastructure, and regulatory and enforcement systems (Acemoglu et al. 2005, Chakrabarti et al. 2011, Chan et al. 2008, Coase 1988, Dutt et al. 2016, Khanna and Palepu 1997). Market-oriented institutions affect firm costs of exchange and production and the ability to transact or operate. Underpinning the functioning of market-oriented institutions is the presence of tangible and intangible factors that allow

market transactions to occur. When these factors disappear, become damaged, or destroyed, there is a breakdown in market-oriented institutions.

Traditionally, researchers have studied the absence or evolution of market-oriented institutions with two broad streams of scholarship. On the one hand, the chronic absence of goods for country market operation, referred to as *institutional voids*, creates market failures (Khanna and Palepu 1997). When factors such as communication, transport, and energy infrastructure, skilled labor, intermediaries, and contract enforcement mechanisms are absent, firms face substantial operational and transactional frictions (Chan et al. 2008, Doh et al. 2017, Khanna and Palepu 1997). These frictions impede firms from accessing the resources and agents necessary for economic activities and have significant organizational and performance implications. Consequently, firms with the relevant resources often internalize activities, and those without such resources may not be able or may choose to not operate in the country market.

On the other hand, scholarship on evolutionary changes to market-oriented institutions studies permanent alterations. The institutional changes are mainly due to slowly evolving socioeconomic and political processes but may (more rarely) be punctuated changes (Klüppel et al. 2018, Newman 2000, Peng 2003). Punctuated changes include upheavals (Newman 2000), transitions (Chittoor et al. 2009, Peng 2003), and traumatic shocks (Klüppel et al. 2018).⁵ Institutional upheavals and transitions are rapid and comprehensive changes that enduringly alter the systems and underlying factors for the competitive landscape of a country's market (Newman 2000, Peng 2003). Traumatic shocks, such as war, change institutions to affect firm strategy and structure decades or even centuries after (Klüppel et al. 2018). The radical changes lead firms to adjust their operations to fit the new institutional environment and survive.

The literature is not explicit about institutional disruptions, which we posit are different from existing concepts of institutional voids and evolutionary changes in four cardinal ways:

Short-lived Temporality. In contrast to the persistent shifts from evolutionary changes and chronic absence from voids, disruptions are temporary deviations from the status quo. Although there may be some

adjustments in norms like building codes, most institutions return to a similar level after an institutional disruption (Bloom et al. 2018, Useem et al. 2015).

The transient nature is driven by the phenomena behind institutional disruptions developing and disappearing in days, yet, leaving a wake of destruction whose length of restoration may be substantial. For essential goods, such as education and housing, repair often comes within weeks (Tomasini and Van Wassenhove 2009). For others, such as transportation infrastructure, rebuilding may take several years (Ballesteros and Kunreuther 2018). For instance, it took nearly three months to restore the water system in Japan after the Tohoku earthquake (Ballesteros 2019). The displacement and malfunctioning of labor markets after U.S. Hurricane Katrina lasted over two years (Deryugina et al. 2018).

Suddenness and Unexpectedness. For institutional voids or evolutionary changes, checks and balances and due processes using macro variables facilitate assessing challenges from the lack of or underdeveloped market-oriented institutions (Henisz 2000). Decision-makers can assess country attractiveness (Berry et al. 2010) and adjust their organizations' structures and strategies (Chittoor et al. 2009, Toulan 2002) to the evolving institutional context (Flores and Aguilera 2007, Wu and Chang 2014). For institutional upheavals, transitions, and traumatic events, the changes typically take two to three years to unfold (Newman 2000), providing firms time to adjust their operations.

Conversely, institutional disruptions are highly unpredictable and characterized by rapid drops in the functioning or availability of factors necessary for market operation. In this sense, traditional measures of country risk and development are often poor indicators of the resilience of economic institutions against disruptions (Ballesteros et al. 2017). To illustrate, before the Tōhoku disaster that resulted in the largest economic damage from one event in history, scientists calculated a zero probability that a hundred-foot tsunami could hit Japan (Ferris and Solis 2013), and many firms believed that the Japanese economy barely would be affected (Kunreuther and Useem 2018). The CEO of a chemical company explained: "...*We got together all of our leaders and we had them work through three different scenarios using data from the government on what they would do...we had those plans in place... (The loss) turned out to be a lot worse.*"

High Severity. Whereas evolutionary changes often target improved market-oriented institutions, disruptions entail significant destruction in the affected country. For instance, in the U.S., the Federal Emergency Management Agency calculates that 40 percent of businesses do not reopen after experiencing a natural disaster, and 90 percent go bankrupt within a year if they do not resume operations in a week (FEMA 2015). The disruptions result in an extensive loss in connectivity with stakeholders (Alfaro and Chen 2012) and, more broadly, the provision of products and services (Bloom et al. 2018). The 2010 Chile and 2011 Japan earthquakes and tsunamis, for instance, destroyed respectively 32 percent and 17 percent of goods supply for at least two months (Cavallo et al. 2014).

There is systematic evidence that these events explain economic development, and one key mechanism through which this occurs is drops in productivity (Altay and Ramirez 2010, Bloom 2009). In practical terms, organizations face reductions in the ability of their labor force to work at the same level. Not only are employees or their family members often direct victims and their residencies affected, which implies that they must relocate, but they may also suffer the loss of their children's school or the transportation systems to commute. Crucially, this affects employees of both business and government organizations. As a municipal official commented on the 2010 Chile earthquake, *"there was no light, we had no water, no staff, the city disappeared, officials disappeared...There was absolutely no one."* The magnitude of the consequences was ubiquitous in our interviews. After the Japanese 2011 earthquake and tsunami, a manager of a logistics company stated, *"(The firm is) worried about roads, trains, airports. Things that get produced are going to be delayed and also the materials to produce them. Everyone is going to miss their numbers."*

Pervasiveness. Scholars traditionally situate institutional voids in lower-income countries or emerging economies (Doh et al. 2017, Khanna and Palepu 1997) and evolutionary changes in transitional economies (Banalieva et al. 2015, Peng 2003, Toulan 2002). Conversely, institutional disruptions spread across economic and institutional development levels, with costlier shocks affecting medium- and high-income countries (High-Level Panel on Humanitarian Financing 2016). MNEs increasingly acknowledge this ubiquity in our interviews. The head of operational risks of a bank indicated that *"Before the terrorist*

attacks (of 9/11 in the U.S.) there was a sense that things happen in places like Nigeria, but they don't happen in places like New York City.”

The effects of institutional disruptions are systemic at the country level. Interdependencies transmit shocks across industries and country regions. For example, Thailand, which manufactures one-third of the world's hard-disk drives and is a production hub for carmakers, experienced a flood in 2011 that damaged or destroyed the facilities of more than 14,000 businesses. Companies such as Apple, Toyota, and Ford that relied on operations or suppliers in the country had to suspend or delay production due to part shortages and inability to access alternative sources of parts. The effect on financial intermediaries is similarly problematic. To illustrate, after the Tōhoku earthquake, 11.4 percent of firms operating in Japan indicated that their bank could not operate (Miyakawa and Hosono 2014), causing otherwise undamaged firms to have significantly smaller investments (Hosono et al. 2016).

Donations as a Nonmarket Response to Institutional Disruptions

Significant changes in market-oriented institutions affect firm performance and survival, motivating their response (Chittoor et al. 2009, Toulan 2002). Firms can react by altering their governance structures to fit the institutional environment or by transforming the institutional environment (Dorobantu et al. 2017, Williamson 1998). A vast literature focuses on firms matching their governance structures to the institutional environment (Williamson 1991, 1998). Nevertheless, institutional economists have long acknowledged that firms should first get the institutional environment right (first-order economizing) and then select the best governance structure based on the institutions (second-order economizing) (Williamson 1998). As discussed below, the characteristics of disruptions are crucial to understanding MNE response.

More specifically, the temporal nature of disruptions attenuates incentives to change the supply chain, alter governance structures, or exit the country market. Organizations benefit from close proximity, inter-firm asset specialization, and relationships developed over time with their exchange partners (Dyer 1996, Elfenbein and Zenger 2014). Switching suppliers can be expensive and create a loss of valuable relational

capital (Elfenbein and Zenger 2014). Additionally, exiting the country market often is not an attractive option given the access to customers, resources, or local knowledge (Alcácer and Chung 2007). Consequently, these are often costly or undesirable strategic responses to disruptions.

The abruptness and ambiguity of disruptions often yield prevention and coping mechanisms unfeasible or ineffective. For instance, despite over 75 percent of the firms that we interviewed indicating that they had routines for threat identification and prioritization against disruptions, they noted that the relevant required information for planning is mostly unavailable and inaccurate. Moreover, although over the last 20 years firms have had sophisticated instruments to hedge catastrophe losses (e.g. index-based insurance such as catastrophe bonds), the financial impact of these shocks has skyrocketed, resulting in an uncovered magnitude of hazard (Kunreuther and Useem 2018).

The multi-faceted and pervasive nature of disruptions means that firms often need to consider strategic actions beyond their operations. Additionally, their high-magnitude consequences incentivize decision-makers to allocate resources that mitigate impacts on firm performance. Although firms may lobby governments to distribute public aid for country market recovery, such indirect strategies unfold slowly (Cohen and Werker 2008) and can be costly as the firm waits for restoration.⁶ Donations can be a direct and effective means of transforming a disrupted institutional context.

Our database provides evidence of the market restoration motive for philanthropy. In response to the 2011 Thailand flood, Honda donated US\$3.7 million and 200 generators for the Thai government to provide power in areas so that customers, businesses, and government organizations could function. Another case is when Hurricane Katrina severely damaged Royal Dutch Shell's large operations in the Gulf of Mexico. The MNE helped rebuild public facilities and assist agencies, including the New Orleans Police and Justice Foundation's housing initiative for police, fire, and emergency medical staff. Additionally, Shell provided \$45 million to support its employees and "*made getting them back to work a priority*" (Ballesteros 2019).

At the same time, given the uncertainty of institutional disruptions, this type of philanthropy is rarely budgeted. The firm must often face the opportunity cost of deferring country investments or cancelling previously planned social projects (Ballesteros et al. 2018). Corporations regularly re-allocate resources from previously approved causes that account for their annual social responsibility budget or even more. Take the case of Pfizer, which donated \$47 million in the aftermath of the 2004 Indian Ocean tsunami, or many times its combined annual social expenditure in the eight affected countries.

Given the opposing forces of the need to recover the country market and the opportunity costs of philanthropy, a central question is what affects when an MNE becomes a contributor toward recovery. Donating to restore the elements necessary for market-oriented institutions to function is a nonmarket strategy that helps to re-establish the institutional context. Firms are motivated to influence their institutional environment based on the costs they face and their perceived benefits from the nonmarket strategy. In the context of disruptions, this logic allows to predict which MNEs will donate.

The Economic Importance of Countries and the Philanthropy of MNEs after Disruptions

MNEs with a large proportion of their performance explained by the affected country will suffer greater financial consequences than similar firms without such connection (Aghion et al. 2017, Alfaro and Chen 2012). One might expect firms with economically important operations to focus their resources on restoring their facilities and engage in scarce giving (Tilcsik and Marquis 2013). Economic concerns constrain company philanthropy, and the disruption creates fiscal pressure on the firm. Additionally, affected nonprofits create a broken country infrastructure for philanthropic giving (Ballesteros and Gatignon 2019).⁷ Altogether, these factors suggest that MNEs with economically important operations will donate less after an institutional disruption.

Contrary to this prospect, we argue that these firms will be the *largest* donors for several reasons. First, institutional disruptions have a systemic impact. Thus, although a firm may rebuild its operations, the lack of factors necessary for market-oriented institutions to function means that it still may not achieve pre-

disruption performance levels until market institutions are reestablished. For instance, the 2011 Tōhoku disaster extensively damaged three Toyota factories, destroyed Japanese ports, and crippled the power supply. Consequently, even if Toyota had rebuilt its plants, it would not have been able to operate fully. Its suppliers could not supply components without power, nor could it ship its automobiles or supply auto parts to its international manufacturing facilities until the ports were restored (Forbes 2011). Toyota donated power supply systems to ease power shortages in the country and paid full salaries to their employees to help its suppliers start producing again (Rodríguez and Sanchez 2012).

Second, firms are motivated to provide financial resources to minimize the spillover effects across affiliates (Gopalan et al. 2007) and are more likely to respond where the impact of existing institutions on the firm's business is greater (Hadani and Schuler 2013, Hillman et al. 2004). For firms whose performance is largely explained by the affected country market, the costs of not restoring the country market are extensive. Affiliates of strategic importance are likely to receive support from top management in response to institutional changes because the impact is material to the firm (Gubbi et al. 2015). Our interviewees frequently refer to this idea. A manager of a manufacturing firm commented, *“The situation in Thailand was very different from Japan following the earthquake in an important way. When the impact (hit) a size of our business that was much greater, we immediately mobilized resources.... We knew that if it escalated, it will be bad for us because of a larger supply chain disruption... in this case, a component sourcing from Thailand.”* Likewise, the vice president of a British mining company remarked on the 2010 Chilean earthquake: *“Chile is [our] number one copper producer, and that represents a big part of our business... so we mobilized....”*

Third, this type of philanthropy has immediate financial payoffs. MNEs with large host-country operations are more efficient at identifying areas instrumental for country market functioning, providing capital faster than traditional sources of aid, and assisting rebuilding efforts toward recovery, which reduces the cost of philanthropy (Ballesteros et al. 2017, Kunreuther and Useem 2018). For example, the mining company above used their technology and machinery for restoration, commenting: *“the first action, to clean*

the roads... and allow communication and transportation systems to be restored.” By taking these actions, not only could the firm start transacting again, but also its customers and suppliers could operate and thus it helped reinstate the country market system. Consequently, the benefits extend beyond the focal donation and are proportional to the economic importance of the country to the MNE. Thus:

Hypothesis 1 (H1): The greater the economic importance of a country for the firm, the greater its donation in response to an institutional disruption.

As previously discussed, we expect that a country’s concentration of dominant MNEs, public aid, and regulatory quality will be three contextual elements that moderate the baseline relationship.

Dominant MNE Index. A firm’s share of benefits and costs from influencing market-oriented institutions depends not only on where the business impact is greatest, but also on whether other firms are able to participate. A country’s index of dominant MNEs reflects the concentration of large firms in the country. When the country is highly competitive—that is, when there are a large number of players with sizeable country market shares—then the costs of changing the institutional environment may be divided across more firms capable of contributing (Sandler 2013).

In practical terms, MNE managers that we interviewed discussed how in deciding how much to donate in an economically important country, they look to the presence of other large firms in the country such as Coca Cola, Microsoft, Mitsubishi, and Tata. *Ceteris paribus*, the fewer firms holding a significant share of the country market, the greater the strategic value of restoration for MNEs with economically important operations. Monopolistic firms realize comparatively large proportions of the benefits from restoring market-oriented institutions (Bonardi et al. 2005, Luo and Kaul 2019).

After the 2010 Chile earthquake, managers from a large mining company reflected that its operations accounted for approximately three percent of Chile’s GDP to emphasize the marginal relevance of operative interruptions. The firm donated \$10 million on rebuilding. For monopolistic firms, the cost-benefit of giving

approximates private investments. These firms can capture comparatively large value from the capital injected to restore the country market. Therefore:

Hypothesis 2 (H2): The Dominant MNE Index positively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Public Aid. Public actors traditionally play an essential role in managing grand societal challenges. For disruptions, public relief and recovery come from the host country and foreign governments and multilateral agencies, such as the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) (High-Level Panel on Humanitarian Financing 2016).⁸ Thus, host-country public aid and foreign public aid are two distinct sources of aid that MNEs consider in donating. A recent history of substantial host-country and foreign public aid to restore human welfare, damaged infrastructure, and other factors necessary for market-oriented institutions fosters an expectation by firms that public aid will fund the country's recovery.

There is evidence at the individual level that public intervention crowds out philanthropy (Andreoni 2006, Yildirim 2014). We hypothesize that a similar relationship operates at the organizational level because public aid brings the benefits of country market restoration to the MNE without incurring the costs of giving. Conversely, when host-country and foreign public agencies do not mobilize resources in sufficient magnitude, MNEs with high economic importance are more likely to deem firm resources as costs critical for achieving country market restoration.

This dynamic is captured by a vice president of a soft-drink manufacturer when explaining his company's philanthropic engagement after the 2011 disaster in 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.*" MNEs with high economic importance in the affected country will donate more after a disruption when they believe that its economic magnitude outstrips public resources.

Hypothesis 3a (H3a): Host-country public aid negatively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Hypothesis 3b (H3b): Foreign public aid negatively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Regulatory Quality. A country's governance quality influences the materialization of incentives to engage in nonmarket behavior (Aguilera et al. 2007, Dorobantu et al. 2017, Zhang et al. 2016). Government commitment and ability to formulate and implement policies to permit and promote private sector development, referred to as regulatory quality (Kaufmann et al. 2011), is critical for creating and maintaining market-oriented institutions. High regulatory quality enables the swift use and dedicated allocation of resources toward factors necessary for economic activity. It, therefore, enhances the comparative benefits of firm donations toward the recovery of country markets. On the other hand, low regulatory quality increases the costs of donating. In such case, the process of rebuilding can be substantially impeded by lower government commitment, ability, or red tape (Becerra et al. 2014). Even if the MNE uses its efforts and resources to rebuild directly, the logistical complexity from regulations and controls reduces the efficiency of such efforts (Ballesteros and Gatignon 2019).

Some of our interviewees noted these problems after the Chile earthquake in 2010 when companies were encouraged to contribute to recovery directly through the government's ministries. Firms soon realized that government inefficiencies mired the delivery of funds. As one manager stated, "*we were worried that the public system would take forever to apply resources to the emergency... and that, for sure, led firms to think twice about donating.*"

Donations are more likely to be diverted or suffer leakages before reaching the target areas when regulatory quality is low. For example, reports suggest that the government's misuse of aid may be behind the lengthy recovery of Haiti from the 2010 earthquake (Useem et al. 2015). Country officials demanded cuts of donations and held up goods at borders to force payment (Farny et al. 2019).

Thus, low regulatory quality deters donations from economically connected MNEs because decision-makers fear that resources will be delayed or not well spent, which increases the relative cost of giving. In such environments, skepticism abounds as to whether the benefits of donations will materialize as one survivor of the Haiti earthquake commented, “*there might be some more money (from the donors), but those who need it won’t receive it*” (Fletcher and Guylor Delva 2010, p. 1). Therefore:

Hypothesis 4 (H4). Country regulatory quality positively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Empirical Strategy

Data

Company philanthropy. We built the Global Database of Disaster Responses using automated Boolean searches and natural language processing in Python. The database contains information on reported cash and in-kind donations from organizations (firms, governments, multinational agencies, and non-governmental actors) for the relief and recovery of every major disaster that affected the world from 1990 to 2019. The Boolean searches in Factiva, Google, and Lexis Nexis 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 and resulted in over 2,310,000 reports. We made the reports computationally tractable with differential language analysis and code information on the donor organization, the characteristics of the donation (i.e., in-kind, monetary or both, amount, currency, and timing), the initiator within the firm (i.e., employees or top management), and the target of the donation (i.e. essential goods, factors for the market, etc.). The database covers 96,858 donations from 40,170 firms from 84 countries of origin.

The online Appendix (<https://institutionaldisruptions.com/>) contains the detailed procedures for data collection and coding, including the monetization of in-kind donations and conversion of non-U.S. dollar

reports.⁹ It also describes the independent assessments of data quality and checks with third-party sources, including UNOCHA.

Firm panel. Internationally large corporations account for over 90 percent of the growth in the participation of firms on disaster aid (Ballesteros et al. 2017, Kunreuther and Useem 2018). We rely on the largest 2,000 publicly traded MNEs by total revenue at the international level from Orbis to cover a representative sample of these firms. The MNEs had a total of 545,664 affiliates over the 2007-2019 period.

A major task was cleaning the ownership of the MNE affiliates for entry and exit into the MNE due to mergers, acquisitions, dissolutions, and spinoffs. We use shareholder and legal event data from the Orbis database to code changes in ownership over time. Where data were missing, or conflicting information was provided in the database, we cross-checked the data with public filings, corporate websites, and internet searches. Procedural details are in the online Appendix.

Country and disruption panels. Data on public aid, regulatory quality, and country-level controls came from the World Bank's World Development Indicators (WDI) and the Worldwide Governance Indicators (WGI).¹⁰ We gathered data of all shocks from the International Disaster Database (EM-DAT) created by a center supported by the World Health Organization.¹¹ For each shock, we obtained data on human and economic loss from the UNOCHA and the reinsurance company Swiss Re.¹²

Measures

Institutional Disruptions. For institutional disruptions, we identify sudden and unpredictable shocks that created systemic and severe losses in the country market. First, we follow Baker and Bloom (2013) who show that large terrorist attacks and natural catastrophes are associated with abnormal levels of market volatility and significantly explain country GDP growth. Barro (2009) also includes epidemics as phenomena with several times more welfare costs for countries than frequent economic fluctuations. Additionally, large epidemics, natural disasters, and terrorist attacks tend to have systemic impacts on the

country market (Aghion et al. 2017, Bloom et al. 2018, Kozeniauskas et al. 2018). We then adopt the 30-day criterion between the start and end dates consistent with Ballesteros *et al.* (2017) for sudden shocks.

Finally, to characterize severity, we calculate the percentile distribution for deaths, affected people, and economic damage. The distribution of each variable was calculated by country for all shocks reported between 1997 and 2019 in EM-DAT, which uses a minimum degree of impacts to record events. We use percentiles because the mean and standard deviations are inefficient location statistics given the skewness of the historic impact distribution. We choose shocks that rank at the 99th percentile in the affected country in any of the three impact areas (i.e., deaths, affected people, or economic damage; Cavallo et al. 2013) to capture severe shocks for the country. We test the sensitivity of the results to the 75th and 90th percentiles.

The firm-level data covers 2007-2019 that had 4,273 shocks worldwide. From these, 3,822 shocks passed the 30-day criterion. At the 99th percentile of severity, there are 265 shocks that affected 129 countries across the four levels of country income.¹³ Online Appendix Table III contains robustness tests with the 75th and 90th percentile impact cutoffs, the identification procedure, and severity cutoffs by country.

Dependent Variable. The dependent variable *Donation* is a continuous variable of the total U.S. dollar amount donated, logged for the analyses. We further refined the internal validity of our measure with *Donations Toward Market Factors*. We calculate it by summing donations whose reports explicitly indicate targeting the factors underpinning the functioning of market-oriented institutions. The factors include rebuilding transportation, communication, power, and other infrastructure, and goods necessary for labor country market functioning, such as housing for displaced workers (see online Appendix for details). We also use the variable to test alternative explanations, such as the pursuit of reputation. We, however, do not use it as our primary variable because companies self-select to report the target of the donations.

Economic Importance. Measuring the economic importance of a country to the MNE is not trivial given affiliates' idiosyncratic characteristics that affect their strategic value and data constraints. For instance, measures based on revenue may strongly represent sales and underrepresent production affiliates.

In contrast, measures based on employees and assets may underrepresent the strategic value of highly automated affiliates that employ few people. These measures largely reflect the demand side of the market rather than both the supply and demand side. While industry and country-level fixed effects can mitigate some of these concerns, there are substantial missing data for affiliate-level revenues, employees, and assets in databases. Although there is greater database coverage of the existence of affiliates than of their financial and operational metrics, a measure of economic importance based on the proportion of MNE affiliates in a country assumes an equal strategic value for each affiliate.

To operationalize a country's economic importance to the MNE, we start with the proportion of total affiliates owned by the MNE in the affected country. The international business literature has consistently identified the geographical dispersion of affiliates as a determinant of corporate performance (Chakrabarti et al. 2011, Flores and Aguilera 2007, Magelssen 2020). We adjust the measure by the MNE's ownership percentage of each affiliate because the strategic value of country-specific performance for the firm rises in ownership. For countries where the MNE has no operations, economic importance equals zero. *Economic importance*, k , of country c to firm f at year t , ranges from 0 (low) to 1 (high) and has the following form:

$$(1) \quad k_{ct}^f = f(\sigma_c^f)_t$$

where

$$\sigma_c^f = \frac{\sum_0^n (\text{affiliate in country } c * \% \text{ ownership})}{\sum_0^w (\text{affiliate} * \% \text{ ownership})};$$

n is the number of firm affiliates in country and w is the number of firm affiliates in the world in the year of the disruption.

We test alternative explanatory variables with individual and combined polynomial expansions for affiliate revenues, assets, and employees (Table 4).¹⁴ Additionally, we run models excluding headquarter affiliates (online Appendix Table VI) and a measure not adjusting for ownership (omitted). The results were qualitatively consistent across these alternative measures.

We analyze missing data patterns and found no systematic divergence between those with missing data and those with available data. In other words, the hypothesis that data are missing completely at random

cannot be rejected. To deal with missing data, a polynomial expansion can approximate the complete data. We use a multiple-input bootstrapping algorithm to address missing data that accounts for smooth time trends, changes across cross-sectional variables, and time and space correlations and integrates scant knowledge to specific cells when available (Honaker and King 2010). This form of multiple imputations was used because addressing missing data with listwise deletion or mean substitution would foster the risk of obtaining biased estimates, increasing Type II errors, and underestimating correlations and coefficient weights.¹⁵ We expand using Chebyshev polynomials because they can arguably approximate most functional forms (Kolsarici and Vakratsas 2015). We opted for a third-order polynomial based on the Bayesian information criterion after considering expansions up to the 20th degree.

Using our base estimation model, we examine the overall MNE donations-economic importance elasticities of the various operationalizations of economic importance and find that it is greater for the ownership-weighted proportion of MNE affiliates in a country than for the alternative measures. Dividing the ratio of the coefficient of the independent variable by the linear prediction results in a higher overall prediction effect. The analyses suggest that economic importance based on the proportion of ownership-weighted MNE affiliates is the best linear unbiased estimator. Thus, we use it as our baseline measure.

Of note, our measure offers a conservative estimate of the economic importance of a country to the MNE in two ways. First, MNEs with no ongoing operations that plan to expand to the country soon may have a comparatively high incentive to donate. Alternatively, firms that plan to exit the country may have a reduced incentive to donate. Given that we calculate this variable on the year of the disruption, the donation of firms with these two strategies should reduce the statistical significance of our predictor. Second, this variable does not include sporadic commercial activity. Consequently, the number of donors with some economic activity with the affected country is likely higher than what the analyses reflect.

Moderators. For H2, the *Dominant MNE Index* is a Herfindahl-Hirschman Index (HHI) calculated at the country level as the sum of squares of the proportion of revenues of the largest five firms in the focal country in the year of the institutional disruption. This variable provides a normalized value of firms with

large shares of the country market. It ranges from zero to one, with larger values indicating more dominant MNEs in the country market. The raw data source is Orbis.

For H3a and H3b, according to the literature on aid and disaster management, (1) the average foreign net official development assistance and official aid, and (2) the country's average gross national expenditure explain the availability of foreign and host-country resources toward disruptions, respectively (Becerra et al. 2014, Cavallo et al. 2013). When a disruption occurs, a firm may not know precisely how much general funding will be provided before it donates. Yet, the firm can form an estimate based on recent history. Therefore, to avoid reverse causality and capture the information available when making the donation decision, we use data from the two years before the event occurs. We construct *Foreign public aid* with the average of foreign net official development assistance and official aid for disasters in the two years preceding the disruption. *Host-country public aid* is the average value of gross national expenditure in current U.S. dollars in the previous two years.

For H4, we use *regulatory quality* from the World Bank Worldwide Governance Indicators (WGI).¹⁶ The variable ranges from -2.5 to 2.5 and “captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development” (Kaufmann et al. 2011, p. 4).

Controls. In our most stringent specification, we use firm (i.e., MNE), affiliate industry (or simply “industry”), country-event, and year fixed effects that absorb all time-invariant donor and industry-specific effects and account for path-dependency of aid and year idiosyncrasies via year fixed effects. Country-event fixed effects are included because disruptions often affect different countries, particularly in some regions of the world, such as the Asian Pacific and Central America. Therefore, the shock data are naturally nested by country-event. Estimation vectors contain a battery of time-variant variables that influence company philanthropy. At the firm level, return on assets (*ROA*) and *Tobin's q*, both winsorized at 5 percent, and logs of *total assets*, *total revenue*, *number of employees* proxy for performance and size, which may affect the firm's capacity to donate and the existence of disruption-specific resources (Ballesteros and

Gatignon 2019, Flammer et al. 2019, Liang and Renneboog 2017, Patten 2008). Research and development intensity (*R&D intensity*) and *advertising and administration* expenditures (logged) may determine intangible resources, such as reputation and visibility, that are behind the capacity to accrue rents from philanthropy (Servaes and Tamayo 2013).¹⁷ To address *donor fatigue*, we include the number of MNE donations made within the previous year (Andreoni 2006). Orbis categorizes affiliates' main activities into four categories: retail, service, manufacturing, and wholesale. We include *business-to-consumer*, measured as a binary indicator set equal to one when the MNE's main activity is retail or services, because it may entail a different propensity to donate (Marquis and Tilcsik 2016). These variables are lagged by one year.

At the country level, we include logs of *GDP* adjusted for purchasing power parity in current U.S. dollars, *trade* as a percentage of GDP, *population*, percentage of *urban population*, and *land area* (km²). These variables may skew shock exposure, the functioning of market-oriented institutions, and the availability of aid (Acemoglu et al. 2005, Becerra et al. 2015, Cavallo et al. 2013, Kahn 2005). We account for a measure of *control of corruption* that indexes "perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests" (Kaufmann et al. 2011). We lag these variables by one year.

At the event level, we gather data from EM-DAT, UNOCHA FTS, and Swiss Re to control for *disruption type* (e.g., terrorist attacks, epidemics, floods, earthquakes, etc.) because global philanthropy may be biased to some events (Eisensee and Strömberg 2007), and logs of the *number of deaths* and *people affected* (i.e., displaced and injured) and *economic damage* to control for the magnitude of events (Cavallo et al. 2013). The number of shocks in any given year may decrease the likelihood that a disruption receives donations (Eisensee and Strömberg 2007). We include logs of the number of *disruptions in the country* and *worldwide* in the year before the focal disruption. Finally, we control for other *news pressure* that may crowd out aid by using the average of the median number of minutes a news broadcast devotes to the top three news segments in a day over the 40 days after the disaster date (Stromberg 2007).

Our baseline method uses models of the following form:

$$(2) \quad \ln(1 + \text{donation}_{fcd}) = \beta_0 + \beta_1(\text{economic importance}_{fcd}) + \beta_2(\text{e.i.}_{fcd} \times \text{dominant MNE index}_{cd}) + \beta_3(\text{e.i.}_{fcd} \times \text{host-country public aid}_{cd}) + \beta_4(\text{e.i.}_{fcd} \times \text{foreign public aid}_{cd}) + \beta_5(\text{e.i.}_{fcd} \times \text{regulatory quality}_{cd}) + \mu_f + \delta_c + \gamma_d + \varepsilon_{fcd}$$

where f is firm, c is country and d is event, $e.i.$ is economic importance, and μ is a vector of firm, δ is a vector of country, and γ is a vector of event controls. ε_{fcd} is the error term. We apply generalized least squares with random effects (the p -value for the Hausman test is 0.1037).

Results

Table 1 contains descriptive statistics. Panel A in Table 1 presents information at the MNE level. The average company in our sample has 57,695 employees, \$82.8 billion in total assets, and \$19.9 billion in revenue. Panel B presents country-level data. The average GDP of the affected countries was \$740.6 billion. On average, sample countries have a level of regulatory quality of -0.01, close to the midpoint of zero on the scale. Similarly, countries have mean control of corruption of -0.09, which is comparatively close to the midpoint. Panel C presents disruption-level data. The 265 events have mean impacts of 2,105 deaths, 2.0 million people affected, and \$5.5 billion in economic damage. The vast majority of these disruptions are caused by floods and storms, with earthquakes the next most common event.

Approximately 31.4 percent of the MNEs in our sample are donors. For each event during our sample period, the average contribution by MNE donors totals \$858 thousand. A large number of firms do not donate to a given event. As shown in Panel D, which contains the MNE-Country-Event variables, the average donation is \$5 thousand once we consider nondonors. The high maximum value of \$54 million and standard deviation of \$220 thousand indicate that the distribution of donations has a long right tail. Similarly, economic importance has a right-skewed distribution. There are a number of countries where many MNEs are not located, such as Vanuatu or Mali, which receive a zero for economic importance. Thus, the mean is 0.04, with a standard deviation of 0.15 and a maximum of 1.0.

[INSERT Table 1 ABOUT HERE]

Table 2 contains the full theorized model adding incrementally more demanding sets of control variables and fixed effects. Model 1 displays the results for the model without controls. We include time-varying controls in Model 2. Model 3 incorporates firm, industry, country-event, and year fixed effects. We discuss the baseline specification findings that have firm, country, and event controls (Model 2).

The coefficient for economic importance remains positive and significant across specifications. These results indicate that the economic importance of the country is an underlying factor for MNE donations in the aftermath of institutional disruptions.¹⁸ Considering a model with no interactions, a one-unit increase in the economic importance of the country for the MNE raises the average donation over 81 percent (an estimated coefficient of 0.596), which makes the impact economically significant.

The observed magnitude of this relationship is influenced by two aspects. First, we focus on the largest MNEs at the international level whose operations tend to be highly geographically diversified. A one-unit increase in the economic importance is extraordinary for these firms. Second, our sample includes a large portion of nondonors, which provides stability and robustness to the estimates and makes the elasticity pronounced. This empirical strategy of considering a representative sample of firms and including nondonors adds to the literature, given that previous work has limited analyses to donor companies.

Regarding the interactions, in line with H2, the results suggest that the dominant MNE index positively moderates MNE donations for economically connected firms. Country markets have many large firms on average in our sample, with a mean value of 0.01. Holding everything else constant at the mean level of the interaction, a one-unit increase in the dominant MNE index is associated with 65 percent larger donations from MNEs for which the affected country is economically important.

We find mixed results for the interaction of public aid and economic importance on MNE philanthropy. On the one hand, we observe a non-complete crowding-out effect. As hypothesized in H3a, at the means, a one percent increase of host-country aid is associated with smaller donations from economically connected MNEs. Contrary to our expectations, however, a one percent increase in foreign public aid is correlated

with larger donations.¹⁹ This result could be driven by MNEs perceiving the amount of foreign aid as a signal of the country's resilience. The more resources that the country receives from abroad, the lower the resilience and the greater the perceived need for firm resources. To further delve into this association, we run the analysis by country income group and present the results in the online Appendix Table VIII. As discussed in the Appendix, the results highlight that when countries do not have sufficient resources for recovery, there is no crowding-out effect for public aid.

For H4, the level of country regulatory quality appears to be a significant factor when MNEs with economically important operations in the country decide to donate after institutional disruptions. The results consistently indicate that the average giving by these firms rises in regulatory quality. At the mean, a one-unit increase in the affected country's regulatory-quality index is associated with an increase in donations from economically connected MNEs of about 48 percent (see Model 2 in Table 2).

[INSERT Table 2 ABOUT HERE]

We employ alternative measures of economic importance. Table 3 reports the baseline random-effects model with firm, country, and event controls using a measure of economic importance based on assets (Model 1), revenue (Model 2), employees (Model 3). Model 4 uses the combined expansion on assets, revenue, and employees. The results are qualitatively comparable.

[INSERT Table 3 ABOUT HERE]

Donations Toward Market Factors. We next examine whether economic importance is predictive of donations, explicitly targeting the restoration of factors necessary for market-oriented institutions to function in Table 4. Model 1 includes economic importance without interaction effects and incorporates firm, country, and event controls. Model 2 adds the interaction effects, and Model 3 includes firm, industry, country by event, and year fixed effects. The results indicate that holding everything else constant at the

mean, a one-unit increase in the economic importance of the country for the MNE increases its donations toward country market factors by 79 percent (Model 2).

[INSERT Table 4 ABOUT HERE]

Robustness

Matched Sample. One concern is that given the geographical (and, thus, political and socioeconomic) heterogeneity of countries exposed to disruptions, firms with a similar propensity to donate may self-select to specific institutional environments. This can introduce bias in the estimation because philanthropy and economic importance may be moving in the same direction as unobservable variables (e.g., disruption-risk aversion). To mitigate this risk, we applied *coarsened exact matching* (CEM) (Iacus et al. 2011) to balance the baseline propensity to donate between the treatment (i.e., firms with at least one affiliate in the affected country) and the control groups (i.e., firms with no affiliates). The matching uses variables that the extant literature has identified as impacting company philanthropy: *ROA, Tobin's q, total assets, total revenue, number of employees, R&D Intensity, advertising and administrative expenses, consumer orientation, and industry*. While we cannot rule out the existence of all unobservable effects, the results are qualitatively unaffected by this procedure (see online Appendix Table X).

Controlling for Omitted Variables and Confounders

Other Strategic Considerations

Is it the Pursuit of Reputation? A stream of research suggests that decision-makers engage in philanthropy to boost their firms' reputation (Exley 2018). Muller and Kräussl (2011), for instance, proxy reputation for social irresponsibility with the number of concerns in the Kinder, Lydenberg, and Domini (KLD) database and find that negative scores are associated with a relatively high likelihood of donating in the aftermath of Hurricane Katrina.

To explore the possibility that MNEs' pursuit of reputation explains variance in donations, we calculate a Janis-Fadner coefficient of imbalance (JFC)—a widely used variable of media reputation (see Zhang 2016

for a survey). We use natural language processing to quantify the tone of media reports in Factiva, mentioning each MNE in our sample in a period of one year before the start date of the disruption. Table XI in the online Appendix, which also contains the procedural description, shows that reputation becomes statistically insignificant when the model includes *economic importance*. Interaction of the two variables, whose effect is sizeable ($p < 0.01$), indicates that the economic importance of the country to the MNE is a precondition for the pursuit of reputation. This suggests that economic importance mediates the effects of the quest for reputation on donating in this context.

As an additional validation, we explore the predictive power of reputation on the likelihood of donating toward factors necessary for market-oriented institutions to function. We substitute economic importance with our reputation variable in the specification of Table 2. The coefficient of such a variable is not statistically significant (online Appendix Table XII).

Is it the Pursuit of Market Standing? An established argument in the nonmarket literature is that corporations engage in philanthropy to enhance their market position. The strength of this motive is inversely proportional to country market standing. Therefore, one expectation is that low-standing organizations should donate relatively large amounts because the marginal utility of such strategies is higher for them than for higher-standing firms (Liang and Renneboog 2017, Servaes and Tamayo 2013). To address this potential confounder, we proxy market standing by the rank of the MNE in the country by firm revenue the year before the disruption. The coefficient of interaction with *economic importance* indicates that the donations from economically connected MNEs fall with every standard-deviation decrease in *market standing* (see online Appendix Table XII).

Is it the Pursuit of Political Favors? Another prediction is that firms construct their nonmarket behavior in accordance with signals coming from influential government actors (Bertrand et al. 2020, Marquis and Qian 2014, Zhang and Luo 2013). Under this argument, when the domestic government allocates aid, firms will increase their giving to seek its preference and capture political favors for rent-

seeking opportunities. The analyses for H3a systematically reject the likelihood of such a motive being a part of the studied donations.

Social Preferences

Is it Altruism or Reciprocity? Firms may donate in response to social preferences from internal stakeholders. For instance, the reciprocal motives of employees may foster the philanthropic behavior of MNEs (Charness and Rabin 2002, Fehr and Fischbacher 2002, Small and Simonsohn 2008). The risk of this confounder is essential in our setting, given that research has shown that people react more strongly to shock-related losses than to chronic conditions (Ballesteros and Pamphile 2021, Small 2010). We find that the interaction of *employee-driven donation* with *economic importance* is statistically significant and negative (Appendix Table XIV), suggesting that when MNEs donated following an initiative by employees, the donation amount was significantly lower than when not.

To further test the argument that business decision-makers donate to satisfy altruistic motives, we incorporate a ratio of *human to economic loss*, operationalized as the number of deaths divided by economic damage. The measure captures the relative humanitarian damage. Results indicate that the donation amount decreases in the interaction of *human to economic loss* with *economic importance* (online Appendix Table XV). The result is consistent with the skewness of donations to institutional disruptions with substantial economic costs vis-à-vis human impacts across the events for 1997-2019 as documented in the Appendix.

Is it Media Salience? Studies have shown that media can influence humanitarian aid, but its influence is heterogeneous across events and skewed to some types of disasters (e.g., earthquakes) and countries (e.g., higher income) (Eisensee and Strömberg 2007, Franks 2013). For some institutional disruptions, economic importance may be correlated with countries that receive a sizeable magnitude of news coverage. Events such as the 2017 Hurricane Maria in Puerto Rico and the 2011 earthquake and tsunami in Japan were certain to receive firm aid due to media coverage. We thus follow Stromberg (2007) and run analyses with only disruptions that had a probability of being in the news of 50 percent and lower. The magnitude

and direction of the estimates hold (online Appendix Table XVI).

Is it Social Pressure Coming from Local Presence? Firms are embedded in societal arrangements that foster normative pressure for philanthropy on the geographically proximate firm (Marquis et al. 2013, Zhang and Luo 2013) and may donate for the approval of the local community [i.e., social license to operate (Boutilier and Thomson 2011, Wilburn and Wilburn 2011)]. The MNE's physical presence may be a simpler explanation, and economic importance would be a second-order measure captured by differentiating firms based on geographic presence. We test this by substituting our predictor with *physical presence*, a binary variable taking value "1" when the firm has at least one affiliate in the country. Online Appendix Table XVII shows that its coefficient is negative and significant, consistent with work that suggests that firms present in a country struck by a major disaster will engage in scarce giving (Tilcsik and Marquis 2013). Given that physical presence weights all locations equally, this result reconciles with existing work and thus implies that not considering the strategic value of affiliates is econometrically important. It suggests that the mechanism driving MNE philanthropy in the aftermath of institutional disruptions is more complex than local presence alone and our measure captures such complexity.

Is it Inequity or Poverty Aversion? Firms may allocate resources to reduce financial disparity (Camerer and Fehr 2005, Fehr et al. 2006). If this preference dominated restoring market-oriented institutions, MNE philanthropy would be comparatively greater in countries with high poverty levels where economic inequality is pervasive. To test this argument, we regress an interaction of *economic importance* and *poverty* using the poverty headcount ratio at \$3.20 a day (2011 PPP) (as a percentage of population) from the WDI (see Anand and Sen 2000). We find that MNEs in the sample donated in a lower magnitude to more impoverished countries than to higher-income countries (online Appendix Table XVIII).

Discussion and Conclusion

This study investigates how the economic importance of a country to an MNE spurs its philanthropy in the aftermath of institutional disruptions. Situated at the intersection of scholarly work on the drivers of

organizational nonmarket behavior and on organizational response to the institutional environment, this paper responds to calls for research that integrates these independent literatures (Aguilera and Grøgaard 2019, Ahuja and Yayavaram 2011, Bonardi 2004, Doh et al. 2017, Dorobantu et al. 2017).

Contribution to the Nonmarket Literature on Company Philanthropy

We theorize that company philanthropy in the aftermath of institutional disruptions is driven by a motive not previously studied: restoring the country market. Firms with operations in an affected country are likely to incur substantial damages. Therefore, extant studies predict that these firms will engage in scarce giving after large shocks. We replicate the results of extant work and find a negative relationship with physical presence. However, once we consider the economic importance of firm locations, we find that MNEs facing the prospect of performance shocks, due to the economic importance of the affected country to the firm, allocate resources to help its recovery.

Prior work on company philanthropy emphasizes that donors pursue firm-specific benefits such as reputation and political favors. Our study introduces a strategic motive whose benefits approximate a public good (i.e. it is not firm-specific). That is, it can be difficult to disentangle private benefits from those received by other organizations and society at large. Given its public nature, this type of philanthropy is more susceptible to collective action issues. For instance, some companies will free ride on the contribution of others and still benefit from the outcome. Consequently, a measure of economic importance facilitates the identification of the pool of firms that are likely to become substantial contributors to the recovery of the country market.

A key implication is that our moderator predictions differ from those in the extant literature. For instance, a prevailing logic is that firms in competitive country markets have greater incentives to engage in philanthropy because the potential returns to firm differentiation are larger when there are fewer dominant firms (Liang and Renneboog 2017). Accordingly, if there is demand for nonmarket behavior, firms will engage in such behavior with the hope of achieving or sustaining a competitive advantage (Kaul

and Luo 2017). Conversely, our findings show that companies in highly competitive country markets tend to donate comparatively less since other firms can contribute.

Similarly, studies predict that firms use philanthropy to foster stakeholder relationships by aligning their giving with the interests of influential host-country actors and generate firm political favors (Bertrand et al. 2020), particularly when such giving occurs in countries with low institutional development (Hornstein and Zhao 2018, Zhang and Luo 2013). In contrast, we find that firms give less when the host country can provide resources for recovery and find a strong positive link between donation magnitudes and regulatory quality. The results underscore the importance of the market restoration motive after institutional disruptions as firm behavior differs from commonly studied behaviors under stable contexts.

More broadly, the findings suggest that the motives of pursuing reputation, meeting social pressures, achieving market standing or media attention, or satisfying reciprocal and altruistic goals do not replicate the explanatory power of the economic importance of a country to the MNE after institutional disruptions. Although company philanthropy toward institutional disruptions may still result in a warm glow or rents via a signal of product quality and willingness to pay, the robustness analyses indicate that the economic importance of restoring country markets may mediate strategic considerations and social preferences.

Our study connects with theories on the importance of communities for “organizations in a global age” (Marquis and Battilana 2009, p. 283). While the existing literature considers how firms imitate other organizations in their community (Marquis and Tilcsik 2016) and how the social embeddedness of headquarters and other links with local stakeholders foster social and political pressures that activate firm giving (Luo and Chung 2013), it has not explored the effect of differences in the economic importance of the geographic location to the firm. Our analyses show that such a measure can help illuminate the conditions and mechanisms under which firms with a worldwide presence will respond to local causes.

Finally, this study adds to the literature on international nonmarket strategy. Traditionally, company giving is evaluated within countries or with a few single-country events, which has constrained our

understanding of how differences in the institutional environment affect firm engagement in societal issues. The longitudinal dataset alleviates the risks of measurement error and omitted-variable bias that have been a concern for observational studies (Liang and Renneboog 2017).

Contribution to the Literature on Organizational Responses to the Institutional Environment

We also contribute to the theoretical and empirical literature that examines firms' response to the institutional environment (see, e.g., Aguilera and Grøgaard 2019, Ahuja and Yayavaram 2011, Doh et al. 2017, Dutt et al. 2016, Khanna and Palepu 1997, Peng 2003). We formalize the concept of institutional disruptions based on the four characteristics of temporality, suddenness and unexpectedness, severity, and pervasiveness. Despite extensive research on the enduring absence of country market-based institutions (i.e., voids) and evolutionary institutional changes, the concept of institutional disruptions has yet to be fully developed. Systematic attention to this context is particularly pertinent to the study of MNEs that are increasingly exposed to a wide range of disruptions vis-à-vis domestic firms. Interestingly, the country markets that have experienced substantial growth in the last three decades, such as China and India, also top the list in terms of exposure to large shocks. The characteristics of disruptions are key to understanding why MNEs increasingly allocate resources toward country market restoration. Considering the trends of globalization and economic integration, the strategic value of these country markets for international business makes exiting or avoiding shock-prone locations an economically unattractive option.

The findings offer a fresh perspective of how organizations affect institutional development. A large literature studies how organizations may seek to influence public policy for market-oriented institutions that benefit the organization at the expense of social welfare (Ahuja and Yayavaram 2011, Bertrand et al. 2020). We propose that MNEs donate their resources and therefore influence institutions in a fundamentally different way. Firm action toward country market recovery may have substantial positive implications (Ballesteros et al. 2017, Ballesteros and Gatignon 2019, High-Level Panel on Humanitarian Financing 2016). Donations to restore country market-oriented institutions are the opposite of starvation strategies used by firms to constrain the resources for such institutions by directly providing resources to rebuild them.

We offer an empirical test for theoretical work on when firms will use a nonmarket strategy that creates a social benefit (Alessi 1975, Douty 1972, Kaul and Luo 2017).

This study points to the importance of the quality of country market-oriented institutions for garnering firm donations for recovery. The results of our analysis by country income level suggests that regulatory quality is crucial in lower-income countries for economically connected MNEs to donate. When economically connected firms are faced with greater inefficiencies, bureaucracy, and logistical complexity, their incentives to donate are tempered. For these countries, an implication of our results is that augmenting the investment in structures to manage firm response may facilitate greater support when disruptions strike.

Our findings suggest that institutional disruptions are a context in which the goals of some organizations are more closely aligned with society. For instance, the results pose an interesting paradox on the economic value of monopolistic firms. A vast literature suggests that firms with large shares of the country market seek to influence institutions to enhance their profits, maintain voids, and restrict competition. However, our theory suggests that monopolistic firms have substantial incentives to contribute after disruptions. Altogether, the findings indicate that large MNEs are critical for the country during institutional disruptions that overwhelm the financial and operational capacity of governments.

Limitations and Future Research

Important limitations and boundary conditions remain. First, we restrict the analyses to large, publicly traded firms. Although this type of organization accounted for nearly 90 percent of the recorded corporate donations over the observed period (and, thus, selection bias is mitigated), future research may explore whether the philanthropy of smaller or private firms may follow different mechanisms. Second, our theory and empirics are at the country level, whereas some disruptions may be regional. Our method of identifying large shocks with systemic effects at the 99th percentile of severity increases the construct validity of institutional disruptions. While our econometric analysis provides a conservative approach, a promising avenue of investigation is the use of more fine-grained data. Third, our measure of economic importance

does not include exports and imports and sporadic economic activity not represented by company affiliates. Our findings thus underestimate the effect of economic importance. Future consideration of intra- and inter-firm trade can provide meaningful insights on international interdependencies.

Practical Contributions

Through influencing economic activity, institutions affect the welfare of the constituents in society (Coase 1960) and have often been viewed as central causes and/or solutions to societal issues (Mair and Marti 2009, Vakili and McGahan 2016). Given their tremendous economic impact (Baker and Bloom 2013, Barro 2009), the role of MNEs in responding to institutional disruptions has important implications for society. During the World Humanitarian Summit in 2016, the United Nations highlighted the need to formalize firm participation to help close the growing financial gap of disaster costs (High-Level Panel on Humanitarian Financing 2016). Public aid has been unable to keep pace with the economic costs of shocks that have increased six-fold since 1990. We hope that our study can help government and multilateral agencies to predict the outpouring from firms toward relief and recovery. Collectively, our findings inform on the contextual determinants that affect the MNE incentives underlying this action. This can help stimulate and coordinate the engagement of firms for overcoming challenges from disruptions worldwide.

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Tables

Table 1. Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Min	Max
<i>Panel A. Multinational Enterprise</i>					
Return on Assets	1,891	4.21	4.14	-16.84	32.05
Tobin's Q	1,891	0.85	0.82	0.01	6.47
Total Assets	1,891	82,800,000	249,300,000	246,034	2,899,000,000
Total Revenue	1,891	19,940,000	30,530,000	1,346,000	471,900,000
Number of Employees	1,891	57,695	83,246	214	2,202,000
R&D Intensity	1,891	2.97	4.14	-0.06	35.56
Advertising & Admin Expenses	1,891	8,603,000	15,730,000	20,275	119,800,000
Business to Consumer	1,891	0.44	0.41	0.00	1.00
Donor Fatigue	1,891	0.06	0.26	0.00	2.69
<i>Panel B. Country</i>					
Dominant MNE Index	129	0.01	0.07	0.00	0.74
Regulatory Quality	129	-0.01	0.97	-2.00	2.00
GDP (PPP current international)	129	740,600,000,000	2,274,000,000,000	198,200,000	18,050,000,000,000
Population	129	50,000,000	170,100,000	52,045	1,351,000,000
Trade (% of GDP)	129	87.20	54.98	0.00	391.00
Urban Population (%)	129	54.10	23.43	10.50	100.00
Control of Corruption	129	-0.09	1.00	-2.00	2.00
Area (km ²) (ln)	129	12.129	2.807	5	17
Disruptions in Country	129	0.74	0.14	0.69	1.50
<i>Panel C. Event</i>					
Home-Country Public Aid	265	2,271,000,000,000	5,307,000,000,000	244,200,000	20,660,000,000,000
Foreign Public Aid	265	336,600,000	526,400,000	0	2,997,000,000
Earthquake	265	0.11	0.32	0.00	1.00
Epidemic	265	0.02	0.15	0.00	1.00
Extreme Temperature	265	0.03	0.18	0.00	1.00
Flood	265	0.40	0.49	0.00	1.00
Forest Fire	265	0.01	0.09	0.00	1.00
Landslide	265	0.01	0.11	0.00	1.00
Mass Movement	265	0.01	0.11	0.00	1.00
Storm	265	0.35	0.48	0.00	1.00
Terrorist Attack	265	0.01	0.11	0.00	1.00
Volcanic Activity	265	0.01	0.09	0.00	1.00
Wildfire	265	0.03	0.17	0.00	1.00
Number of Deaths	265	2,105	16,983	0	222,570
Number of People Affected	265	2,033,000	8,842,000	0	85,000,000
Economic Damage (USD Million)	265	5,515	18,732	0	210,000
Disruptions Worldwide	265	29.06	12.25	14.00	57.00
News Pressure	265	9.24	3.56	0.00	18.50
<i>Panel D. MNE-Country-Event</i>					
Donation	501,115	5,116	219,707	0	54,000,000
Factors for Market (binary)	501,115	0.17	0.37	0.00	1.00
Economic Importance	501,115	0.04	0.15	0.00	1.00

Notes: Each subheading provides the level of aggregation of the data presented in that part of the table. Panel A provides summary statistics for our analyses based on the dataset of the 2,000 largest multinational enterprises (MNEs) at the international level across the 2007-2019 period. Panel B summarizes data when the countries were affected by institutional disruptions. Panel C shows the epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected in the 12-year period. Panel D shows the dependent and two independent variables for the full dataset. Economic importance is based on the share of affiliates that the MNE has in a country in any given year, adjusted by proportion of ownership. Factors for market represents donations whose reports explicitly state that the MNE is allocating resources to areas instrumental to restore market-oriented institutions functioning. The data in this table are summarized in original units. We log-transform large covariates in the analyses. Please see the text for further details on variable definitions and construction.

Table 2. Economic Importance of the Country to the MNE and Donations to Disruptions

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	0.313*** (0.039)	0.229*** (0.040)	0.127*** (0.042)
H2: EI x Dominant MNE Index	0.362*** (0.062)	0.651*** (0.064)	0.400*** (0.073)
H3a: EI x Host-Country Public Aid	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
H3b: EI x Foreign Public Aid	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
H4: EI x Regulatory Quality	0.552*** (0.018)	0.480*** (0.019)	0.457*** (0.022)
Dominant MNE Index	-0.039*** (0.012)	-0.003 (0.012)	-0.005 (0.012)
Host-Country Public Aid	0.000*** (0.000)	-0.000*** (0.000)	-0.000* (0.000)
Foreign Public Aid	-0.000 (0.000)	0.000*** (0.000)	0.000* (0.000)
Regulatory Quality	-0.012*** (0.002)	-0.009*** (0.003)	0.062 (0.057)
Firm Controls	NO	YES	YES
Country Controls	NO	YES	YES
Event Controls	NO	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	0.046*** (0.005)	-0.648*** (0.036)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports regression estimates for the relationship between the economic importance of a country for a firm and donations in the aftermath of institutional disruptions. The database includes the largest 2,000 MNEs at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Alternative Measures of Economic Importance of the Country to the MNE and Donations to Disruptions

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
H1: Economic Importance (Assets)	1.364*** (0.305)			
H2: EI (Assets) x Dominant MNE Index	0.134*** (0.033)			
H3a: EI (Assets) x Host-Country Public Aid (ln)	-0.049*** (0.011)			
H3b: EI (Assets) x Foreign Public Aid (ln)	0.006*** (0.001)			
H4: EI (Assets) x Regulatory Quality	0.196*** (0.013)			
H1: Economic Importance (Revenue)		1.306*** (0.309)		
H2: EI (Revenue) x Dominant MNE Index		0.132*** (0.034)		
H3a: EI (Revenue) x Host-Country Public Aid (ln)		-0.047*** (0.011)		
H3b: EI (Revenue) x Foreign Public Aid (ln)		0.007*** (0.001)		
H4: EI (Revenue) x Regulatory Quality		0.202*** (0.013)		
H1: Economic Importance (Employees)			1.772*** (0.312)	
H2: EI (Employees) x Dominant MNE Index			0.131*** (0.034)	
H3a: EI (Employees) x Host-Country Public Aid (ln)			-0.063*** (0.011)	
H3b: EI (Employees) x Foreign Public Aid (ln)			0.006*** (0.001)	
H4: EI (Employees) x Regulatory Quality			0.203*** (0.013)	
H1: Economic Importance (Combined)				0.723*** (0.154)
H2: EI (Combined) x Dominant MNE Index				0.068*** (0.017)
H3a: EI (Combined) x Host-Country Public Aid (ln)				-0.026*** (0.005)
H3b: EI (Combined) x Foreign Public Aid (ln)				0.003*** (0.001)
H4: EI (Combined) x Regulatory Quality				0.106*** (0.006)
Dominant MNE Index	0.149*** (0.009)	0.158*** (0.009)	0.165*** (0.009)	0.145*** (0.009)
Host-Country Public Aid (ln)	-0.016*** (0.001)	-0.016*** (0.001)	-0.015*** (0.001)	-0.016*** (0.001)
Foreign Public Aid (ln)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Regulatory Quality	-0.009*** (0.003)	-0.009*** (0.003)	-0.009*** (0.003)	-0.010*** (0.003)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	-0.490*** (0.036)	-0.488*** (0.036)	-0.489*** (0.036)	-0.491*** (0.036)

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
Observations	501,115	501,115	501,115	501,115
MNEs	1,891	1,891	1,891	1,891
Countries	129	129	129	129
Disruptions	265	265	265	265

Notes: This table reports regression estimates for the relationship between the alternative constructions of economic importance of the country for a firm and donations in the aftermath of disruptions. Each explanatory variable uses the share of affiliates in the affected country adjusted by ownership and is calculated with a third-order Chebyshev polynomial expansion on an additional explanatory variable. In Model 1, the explanatory variable is the share of assets; Model 2, the share of revenue; Model 3, the share of employees. Model 4 expands on affiliates and the three other predictors. See text for additional variable definitions and constructions. The database includes the largest 2,000 MNEs at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Economic Importance of the Country to the MNE and Donations Aimed at Restoring Factors Necessary for Market Functioning

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	0.092*** (0.004)	0.790*** (0.280)	0.738** (0.298)
H2: EI x Dominant MNE Index		0.049* (0.028)	0.029 (0.030)
H3a: EI x Host-Country Public Aid (ln)		-0.028*** (0.010)	-0.026** (0.010)
H3b: EI x Foreign Public Aid (ln)		0.005*** (0.001)	0.004*** (0.001)
H4: EI x Regulatory Quality		0.102*** (0.009)	0.106*** (0.011)
Dominant MNE Index		-0.003 (0.004)	0.006 (0.005)
Host-Country Public Aid (ln)		-0.000 (0.001)	0.005 (2.662)
Foreign Public Aid (ln)		-0.000*** (0.000)	0.001 (1.278)
Regulatory Quality		-0.000 (0.001)	-0.004 (54.072)
Firm Controls	YES	YES	YES
Country Controls	YES	YES	YES
Event Controls	YES	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	-0.138*** (0.016)	-0.125*** (0.017)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports random effects regression estimates for the relationship between the economic importance of a country for a firm and donations to factors that are necessary for market functioning in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Endnotes

¹ We also refer to high economic importance of the affected country to the MNE as “economically connected MNEs.”

² We conducted 148 unstructured interviews with business decision-makers such as chief financial officers, risk managers, and other employees from 102 S&P 500 firms on their firms’ strategies and actions dealing with disasters and terrorist attacks and their consequences. The interviews occurred between 2012-2017 and covered a broad range of MNEs across industry sector and size (see online Appendix at <https://institutionaldisruptions.com/> for details).

³ We consider 265 epidemics, natural disasters, and terrorist attacks that have sudden and systemic impacts (Baker and Bloom 2013, Bloom et al. 2018, Kozeniauskas et al. 2018) ranking in the top one percentile of damage (Cavallo et al. 2013) over the last 30 years in the 129 countries that they affected.

⁴ In the economics literature on shocks, scholars have studied uncertainty shocks based on volatility and have described their systemic and temporal nature (Aghion et al. 2017, Bloom 2009, Kozeniauskas et al. 2018). However, uncertainty shocks can differ in their severity and the extent to which they are expected. Other scholars have differentiated shocks based on their unexpectedness and the magnitude of their impact (see, e.g., Barro 2009), but these shocks may also have lasting impact rather than temporal effects.

⁵ Punctuated changes may result in pre-existing market-oriented institutions disappearing, such as that experienced in Central and Eastern European countries during the upheaval from communistic to market-based economies, but they ultimately result in a radically new, permanent institutional state (Newman 2000).

⁶ Lobbying for market-oriented institutions often take years to achieve outcomes (Hillman and Keim 1995).

⁷ Conversely, firms without economically important operations in the affected country may be motivated to donate for the satisfaction of social preferences such as altruism, reciprocity, and homophily. Additionally, large shocks frequently receive substantial global media attention, which offers the prospect, for instance, to foster a public image. To illustrate, the 2010 Haitian earthquake was covered extensively in the media. Without Haiti being economically important, worldwide media coverage creates a global opportunity for firms to generate reputational capital.

⁸ Host-country public aid primarily is sourced from the national governments and allocated to multilateral agencies or to local governments which in turn distribute the funds. Considering institutional disruptions are based on the most severe, high-magnitude shocks, we expect the national government to intervene and be the primary contributor.

⁹ Less than one percent of the donations in the sample required converting goods to donation market values.

¹⁰ The WDI database contains internationally compatible statistics on 1,600 time-series indicators for 217 economies and more than 40 country groups. The database is compiled by the World Bank.

¹¹ Events included in the EM-DAT must meet at least one of the following criteria: 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/>.

¹² Despite being the most used disaster database in empirical studies, EM-DAT has pervasive data inaccuracies and missingness. A substantial part of our work was dedicated to collecting disruptions and we received critical assistance from UNOCHA and Swiss Re. We conducted independent checks for data accuracy (see the Appendix at <https://institutionaldisruptions.com/>).

¹³ <https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined>.

¹⁴ Revenue and employees were not our first choice because these measures may skew the results toward certain types of firms and operations, such as sales affiliates.

¹⁵ 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 Blackwell *et al.* (2017).

¹⁶ According to the World Bank, the WGI is a dataset summarizing the views on the quality of governance provided by a large number of enterprise, citizen, and expert survey respondents in industrial and developing countries. The six broad dimensions of WGI governance are rule of law, voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, and control of corruption (Kaufmann et al. 2011).

¹⁷ Orbis does not separate advertising and marketing from general and administrative expenditures. Therefore, we relied on the full measure of advertising and general and administrative expenses for our control variable.

¹⁸ We apply the Freedman-Lane semi-partialing method and find smaller standard errors than linear models, indicating that our main estimation is conservative.

¹⁹ The estimates in Table 2 rely on the non-logged values of public aid. Using logged values, at the means, a one-percent increase of host-country aid is associated with 25.4 percent smaller donations for economically connected MNEs. A one percent increase in logged foreign public aid is correlated with 1.4 percent larger donations from MNEs for which the country market is economically important.

Tables

Table 1. Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Min	Max
<i>Panel A. Multinational Enterprise</i>					
Return on Assets	1,891	4.21	4.14	-16.84	32.05
Tobin's Q	1,891	0.85	0.82	0.01	6.47
Total Assets	1,891	82,800,000	249,300,000	246,034	2,899,000,000
Total Revenue	1,891	19,940,000	30,530,000	1,346,000	471,900,000
Number of Employees	1,891	57,695	83,246	214	2,202,000
R&D Intensity	1,891	2.97	4.14	-0.06	35.56
Advertising & Admin Expenses	1,891	8,603,000	15,730,000	20,275	119,800,000
Business to Consumer	1,891	0.44	0.41	0.00	1.00
Donor Fatigue	1,891	0.06	0.26	0.00	2.69
<i>Panel B. Country</i>					
Dominant MNE Index	129	0.01	0.07	0.00	0.74
Regulatory Quality	129	-0.01	0.97	-2.00	2.00
GDP (PPP current international)	129	740,600,000,000	2,274,000,000,000	198,200,000	18,050,000,000,000
Population	129	50,000,000	170,100,000	52,045	1,351,000,000
Trade (% of GDP)	129	87.20	54.98	0.00	391.00
Urban Population (%)	129	54.10	23.43	10.50	100.00
Control of Corruption	129	-0.09	1.00	-2.00	2.00
Area (km ²) (ln)	129	12.129	2.807	5	17
Disruptions in Country	129	0.74	0.14	0.69	1.50
<i>Panel C. Event</i>					
Home-Country Public Aid	265	2,271,000,000,000	5,307,000,000,000	244,200,000	20,660,000,000,000
Foreign Public Aid	265	336,600,000	526,400,000	0	2,997,000,000
Earthquake	265	0.11	0.32	0.00	1.00
Epidemic	265	0.02	0.15	0.00	1.00
Extreme Temperature	265	0.03	0.18	0.00	1.00
Flood	265	0.40	0.49	0.00	1.00
Forest Fire	265	0.01	0.09	0.00	1.00
Landslide	265	0.01	0.11	0.00	1.00
Mass Movement	265	0.01	0.11	0.00	1.00
Storm	265	0.35	0.48	0.00	1.00
Terrorist Attack	265	0.01	0.11	0.00	1.00
Volcanic Activity	265	0.01	0.09	0.00	1.00
Wildfire	265	0.03	0.17	0.00	1.00
Number of Deaths	265	2,105	16,983	0	222,570
Number of People Affected	265	2,033,000	8,842,000	0	85,000,000
Economic Damage (USD Million)	265	5,515	18,732	0	210,000
Disruptions Worldwide	265	29.06	12.25	14.00	57.00
News Pressure	265	9.24	3.56	0.00	18.50
<i>Panel D. MNE-Country-Event</i>					
Donation	501,115	5,116	219,707	0	54,000,000
Factors for Market (binary)	501,115	0.17	0.37	0.00	1.00
Economic Importance	501,115	0.04	0.15	0.00	1.00

Notes: Each subheading provides the level of aggregation of the data presented in that part of the table. Panel A provides summary statistics for our analyses based on the dataset of the 2,000 largest multinational enterprises (MNEs) at the international level across the 2007-2019 period. Panel B summarizes data when the countries were affected by institutional disruptions. Panel C shows the epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected in the 12-year period. Panel D shows the dependent and two independent variables for the full dataset. Economic importance is based on the share of affiliates that the MNE has in a country in any given year, adjusted by proportion of ownership. Factors for market represents donations whose reports explicitly state that the MNE is allocating resources to areas instrumental to restore market-oriented institutions functioning. The data in this table are summarized in original units. We log-transform large covariates in the analyses. Please see the text for further details on variable definitions and construction.

Table 2. Economic Importance of the Country to the MNE and Donations to Disruptions

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	0.313*** (0.039)	0.229*** (0.040)	0.127*** (0.042)
H2: EI x Dominant MNE Index	0.362*** (0.062)	0.651*** (0.064)	0.400*** (0.073)
H3a: EI x Host-Country Public Aid	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
H3b: EI x Foreign Public Aid	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
H4: EI x Regulatory Quality	0.552*** (0.018)	0.480*** (0.019)	0.457*** (0.022)
Dominant MNE Index	-0.039*** (0.012)	-0.003 (0.012)	-0.005 (0.012)
Host-Country Public Aid	0.000*** (0.000)	-0.000*** (0.000)	-0.000* (0.000)
Foreign Public Aid	-0.000 (0.000)	0.000*** (0.000)	0.000* (0.000)
Regulatory Quality	-0.012*** (0.002)	-0.009*** (0.003)	0.062 (0.057)
Firm Controls	NO	YES	YES
Country Controls	NO	YES	YES
Event Controls	NO	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	0.046*** (0.005)	-0.648*** (0.036)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports regression estimates for the relationship between the economic importance of a country for a firm and donations in the aftermath of institutional disruptions. The database includes the largest 2,000 MNEs at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Alternative Measures of Economic Importance of the Country to the MNE and Donations to Disruptions

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
H1: Economic Importance (Assets)	1.364*** (0.305)			
H2: EI (Assets) x Dominant MNE Index	0.134*** (0.033)			
H3a: EI (Assets) x Host-Country Public Aid (ln)	-0.049*** (0.011)			
H3b: EI (Assets) x Foreign Public Aid (ln)	0.006*** (0.001)			
H4: EI (Assets) x Regulatory Quality	0.196*** (0.013)			
H1: Economic Importance (Revenue)		1.306*** (0.309)		
H2: EI (Revenue) x Dominant MNE Index		0.132*** (0.034)		
H3a: EI (Revenue) x Host-Country Public Aid (ln)		-0.047*** (0.011)		
H3b: EI (Revenue) x Foreign Public Aid (ln)		0.007*** (0.001)		
H4: EI (Revenue) x Regulatory Quality		0.202*** (0.013)		
H1: Economic Importance (Employees)			1.772*** (0.312)	
H2: EI (Employees) x Dominant MNE Index			0.131*** (0.034)	
H3a: EI (Employees) x Host-Country Public Aid (ln)			-0.063*** (0.011)	
H3b: EI (Employees) x Foreign Public Aid (ln)			0.006*** (0.001)	
H4: EI (Employees) x Regulatory Quality			0.203*** (0.013)	
H1: Economic Importance (Combined)				0.723*** (0.154)
H2: EI (Combined) x Dominant MNE Index				0.068*** (0.017)
H3a: EI (Combined) x Host-Country Public Aid (ln)				-0.026*** (0.005)
H3b: EI (Combined) x Foreign Public Aid (ln)				0.003*** (0.001)
H4: EI (Combined) x Regulatory Quality				0.106*** (0.006)
Dominant MNE Index	0.149*** (0.009)	0.158*** (0.009)	0.165*** (0.009)	0.145*** (0.009)
Host-Country Public Aid (ln)	-0.016*** (0.001)	-0.016*** (0.001)	-0.015*** (0.001)	-0.016*** (0.001)
Foreign Public Aid (ln)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Regulatory Quality	-0.009*** (0.003)	-0.009*** (0.003)	-0.009*** (0.003)	-0.010*** (0.003)
Firm, Country and Event Controls	YES	YES	YES	YES
Constant	-0.490*** (0.036)	-0.488*** (0.036)	-0.489*** (0.036)	-0.491*** (0.036)
Observations	501,115	501,115	501,115	501,115
MNEs	1,891	1,891	1,891	1,891
Countries	129	129	129	129
Disruptions	265	265	265	265

Notes: This table reports regression estimates for the relationship between the alternative constructions of economic importance of the country for a firm and donations in the aftermath of disruptions. Each explanatory variable uses the share of affiliates in the affected country adjusted by ownership and is calculated with a third-order Chebyshev polynomial expansion on an additional explanatory variable. In Model 1, the explanatory variable is the share of assets; Model 2, the share of revenue; Model 3, the share of employees. Model 4 expands on affiliates and the three other predictors. See text for additional variable definitions and constructions. The database includes the largest 2,000 MNEs at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4. Economic Importance of the Country to the MNE and Donations Aimed at Restoring Factors Necessary for Market Functioning

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	0.092*** (0.004)	0.790*** (0.280)	0.738** (0.298)
H2: EI x Dominant MNE Index		0.049* (0.028)	0.029 (0.030)
H3a: EI x Host-Country Public Aid (ln)		-0.028*** (0.010)	-0.026** (0.010)
H3b: EI x Foreign Public Aid (ln)		0.005*** (0.001)	0.004*** (0.001)
H4: EI x Regulatory Quality		0.102*** (0.009)	0.106*** (0.011)
Dominant MNE Index		-0.003 (0.004)	0.006 (0.005)
Host-Country Public Aid (ln)		-0.000 (0.001)	0.005 (2.662)
Foreign Public Aid (ln)		-0.000*** (0.000)	0.001 (1.278)
Regulatory Quality		-0.000 (0.001)	-0.004 (54.072)
Firm Controls	YES	YES	YES
Country Controls	YES	YES	YES
Event Controls	YES	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	-0.138*** (0.016)	-0.125*** (0.017)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports random effects regression estimates for the relationship between the economic importance of a country for a firm and donations to factors that are necessary for market functioning in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

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Institutional Disruptions and the Philanthropy of Multinational Enterprises

Appendix

Description of the Study

This paper studies philanthropy by multinational enterprises (MNEs) during institutional disruptions—the sudden and unexpected, temporary, and systemic breakdowns in economic institutions. The central argument is that, under institutional disruptions, MNEs aim to restore factors that are essential for market functioning, such as infrastructure and labor markets, and the strength of the market restoration motive is positively associated with economic importance of the affected country to the MNE. Analyses of donations from 2,000 MNEs headquartered in 63 countries in the aftermath of 265 major epidemics, natural disasters, and terrorist attacks affecting 129 countries suggest that the economic importance of the country to the firm strongly explains donations. Dominant MNE Index, public aid, and the country's regulatory quality moderate this effect. These associations are robust to a matching method, a vector of firm-, country-, and event-specific time-varying and -constant variables, and confounders such as reputation, altruism, media salience, and market standing. They offer evidence that company philanthropy in the aftermath of institutional disruptions may deviate from predicted behavior under stable conditions. The results contest the expectation that philanthropy rises in market competition. We find that monopolistic firms are comparatively large donors and may act as an economic stop-loss during large disruptions.

Keywords: institutional economics, institutional disruptions, grand challenges, philanthropy, multinational enterprises

Procedures

Global Database of Disaster Responses

We coordinated a collaborative five-year project with researchers in the business school and department of computer and information science of a university in the United States to build, arguably, the largest database on disaster aid at the international level. The dataset covers monetary and in-kind donation from firms, governments, multinational agencies, and non-governmental organizations (NGOs) reported in news media to relief and recovery from all major disasters that affected the world from 1990 to 2019. The coded data of corporate aid comprise 96,858 donations from 40,170 firms from 84 headquarters countries to 4,706 natural disasters that hit 208 countries in the period 2003-2019.

Collecting Data. We used the following procedure to track disaster donations:

1. We obtained data on epidemic outbreaks, natural disasters, terrorist attacks, and technological accidents from a variety of sources. First, we used the International Disaster Database (EM-DAT) from the Centre for Research on the Epidemiology of Disasters that register disasters based on the following criteria: 10 or more people killed, 100 or more people affected, a declaration of a state of emergency, or a call for international aid. Further information is available at <http://www.emdat.be/>. Second, to overcome inaccuracies and missing data in EM-DAT, we obtained data from the reinsurance company Swiss Re and the Financial Tracking System (FTS) of the United Nations Office for Coordination of Humanitarian Affairs (UNOCHA).
2. We automated code in Python to identify disaster donations in news reports using Factiva, Google, and LexisNexis. The search range was within a year from the official disaster start date. A story is relevant for our database if the headline or body is in the results of a Boolean search that has the combination of the affected country, the type of the disaster, and in some cases, the name of the disaster. Specifically, the Boolean combinations are as follows:
 - a. The affected country.
 - b. Event. Derivations of:
 - i. Epidemic: “pandemic” OR “epidemic”
 - ii. Mass movement: “landslide” OR “avalanche” OR “rockfall” OR “subsidence”
 - iii. Earthquake: “seismic” OR “quake” OR “earthquake” OR “tsunami”
 - iv. Flood: “flood”
 - v. Storm: “storm” OR “typhoon” OR “cyclone” OR “hurricane” OR “tornado”
 - vi. Volcano: “volcano” OR “volcanic” OR “eruption”
 - vii. Technological accident: “accident” OR “explosion”
 - viii. Terrorism: “terrorist” OR “attack”
 - c. Action. Derivations of: “donation” OR “donate” OR “donated” OR “donating” OR “pledge” OR “pledged” OR “pledging” OR “give” OR “gave” OR “given” OR “giving.”
 - d. Disaster name, when available.

An example of a Boolean combination is: [03/11/2011-03/11/2012]; (“Japan” or “Japanese” or “Japan’s” or “Japans”¹) and (“tsunami” or “earthquake” or “quake” or “disaster”) and (“donation” or “donate” or “pledge” or “pledging” or “give” or “gave” or “given” or “giving”).

3. To make over 2,310,000 electronic reports computationally tractable, we apply differential language analysis using *JavaScript Object Notation* (i.e., *JSON* and *AJAX*) to parse the data. We code the following fields by article:
 - a. Actor: Entity making the donation.
 - b. Actual donation.
 - i. In case of in-kind donations, the characteristics of the product or service were recorded (e.g., 1,000 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 liter 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.

¹ There were spelling mistakes in some articles.

- ii. In case of donations reported in a currency different than the U.S. dollar, they were converted using the currency exchange rate of the day of the donation.
- c. Donations toward market factors.
 - i. The donation reports were coded for whether the target was associated with factors that underpin the functioning of the market. For instance, if the donation report states that the company donated for “power,” “generators,” “communication,” “airport,” “transport,” “roadways,” “emergency housing,” “rebuilding,” “restoring,” “reconstruction,” “schools,” etc., the donation would receive a one, and a zero otherwise.
- d. Employee-driven donation. When the news article mentioned that the donation was an initiative of the employees (and, for example, the company is matching whatever the employees collected), a binary variable took value 1.
- e. Direct impact: When the news article mentioned that the disaster affected the organization physically in any way (e.g., corporate assets such as buildings were damaged) and/or employees were injured, a binary variable took value 1.
- f. 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 make the report to be included in the outcome), the search was qualified with the following filtering process:
 - i. The name of the country had to be within 50 words of the type of the disaster or the word “disaster.”
 - ii. Entities and the act of donating were parsed:
 - 1. 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).
 - iii. The verb identifying the act of donating had to be within 30 words of an entity.

Assessing the Quality of Data. We used the followed procedure to check the accuracy of the data collected:

1. We 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. About 60 percent of these errors were associated with monetizing the in-kind value of donations, with less than 8% of the donations were incorrectly marked. The rest of sample of discrepancies were due to missing data on the nature of donor’s business.
2. We ran another random draw excluding previously evaluated cases and the researchers repeated the analysis. No other discrepancies were found.
3. We extended the search period to three years after the event. Less than 0.0001 percent (or two donation reports) of the donation reports were made after one year. This is consistent with studies reporting that most company giving to shocks come within two months after the event start date.
4. We compared our data with third-party sources:
 - a. We had access to exclusive information of donations 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 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.

- b. We worked with staff members of UNOCHA to compare our database with the FTS. This is a global database that records self-reported international humanitarian aid for different humanitarian crises.² The FTS covered about 7 percent of our firm donations and 65 percent of our government and NGO donations.
 - c. The U.S. Chamber of Commerce Foundation maintains Disaster Corporate Aid Trackers that are self-reported records for company responses to disasters that focus on U.S. firms.³ Their data start in 2010 for selected disasters, particularly in the U.S., and account for 11 percent of our database.
5. We hired research assistants to run another set of random checks in 2020 for all the data in the database and did not find any discrepancy.

² 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>.

³ These data are available at <https://www.uschamberfoundation.org/corporate-aid-trackers>.

Institutional Disruptions

To ensure internal validity of the analyses with the concept of institutional disruption, we focus on sudden, unpredictable, and temporary shocks that created severe and systemic losses in the country market. The following were the steps taken to select disruptions:

1. Baker and Bloom (2013) show that large terrorist attacks and natural catastrophes are associated with abnormal levels of market volatility and significantly explain GDP growth. Barro (2009) also includes epidemics as phenomena that have several times more welfare costs than frequent economic fluctuations. Accordingly, we identify large epidemics, natural disasters, and terrorist attacks as shocks whose effects are systemic to the country market (Aghion *et al.* 2017, Bloom *et al.* 2018, Kozeniauskas *et al.* 2018).
2. We collected data on these disruptions from different sources.
 - 2.1 We start by pulling all the data on shocks from the EM-DAT. EM-DAT records a shock if it meets at least one of the following criteria: 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/>.
 - 2.2 There are 4,273 shocks in the period 2007-2019 in the EM-DAT database. For each shock, we obtained data on human and economic loss from UNOCHA and the reinsurance company Swiss RE.
3. We build on Ballesteros and Gatignon (2019) to capture suddenness and unpredictability and select shocks whose end date is within 30 days of the start date. Close to 90 percent of firm responses to these shocks come within eight weeks of the start date when environmental uncertainty and causal ambiguity are high (Ballesteros and Kunreuther 2018, Bloom 2009). There are 3,822 events that classify as sudden shocks.
4. To meet a stringent characterization of severity, we calculate the percentile distribution separately for each of the three variables of deaths, affected people, and economic damage by country for all disasters reported between 1997 and 2019 in EM-DAT. We use percentiles because the mean and standard deviations are inefficient location statistics given the skewness of the historic distribution of consequences.
 - 4.1 Following previous work that classifies disasters based on their impacts, we focus on severity values at the 99th percentile (Cavallo *et al.* 2013), and test the sensitivity at the 75th and 90th percentiles. Shocks that were in the 99th percentile of any one of the three separate percentile distributions of deaths, affected people, and economic damage were included as a severe disruption. See Table I for the cutoffs of each variable by country.
 - 4.2 At the 99th percentile of severity, there are 265 disruptions. Our analyses thus cover 129 countries representing the four levels of country income according to the World Bank. Refer to <https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined> for information on how the World Bank defines these groups.

Table I. 99th Percentiles by Country

Country	Affected	Damage (\$Million)	Killed
Albania	125000	45	6
Angola	1420000	10	105
Antigua and Barbuda	25800	250	2
Argentina	350000	3400	59
Armenia	64000	60	4
Australia	52539	2700	139
Bahamas	10000	1000	33
Bangladesh	8978541	2300	1110
Barbados	2500	5	1
Belarus	50539	33	43
Belgium	1200	450	410
Benin	60238		9
Bhutan	20016		200
Bosnia and Herzegovina	1000000	437	25
Botswana	4225		12
Brazil	1500015	1000	900
Bulgaria	37950	545	17
Burkina Faso	151000	150	18
Burundi	23000		12
Cambodia	3448053	500	347
Cameroon	250000		57
Canada	100000	5700	70
Central African Republic	33919		3
Chile	2671556	30000	562
China	39400000	8000	762
Comoros	345311	5	8
Congo	180000	15	3559
Costa Rica	128618	200	31
Côte d' Ivoire	25000		27
Croatia	7116	161	3
Czech Rep	1300000	2400	29
Dominica	71393	1456	64
Dominican Rep	1792000	1982	688
Ecuador	800000	2000	672
Egypt	32572	100	110
Ethiopia	490000	5	498
Fiji	350000	600	44
Gambia The	17767		3
Georgia	100018	350	40
Germany	330108	12900	27
Ghana	1000000	12	45
Guatemala	1714414	988	1513
Guinea	40411		9
Guyana	199000		10
Haiti	3700000	8000	222570
Hong Kong	15000	756	80
Hungary	90700	440	8
India	22000000	16000	9843
Indonesia	618486	4452	4340

Country	Affected	Damage (\$Million)	Killed
Iran Islam Rep	10000000	2500	26796
Iraq	65000	1	58
Ireland	600	325	8
Israel	2003000	520	15
Italy	56000	15800	296
Jamaica	350000	595	15
Japan	390000	210000	246
Kazakhstan	36626	130	48
Kenya	2600000	350	100
Kiribati	1500		0
Kyrgyz Rep	16780	12	74
Lao P Dem Rep	615145	225	136
Latvia	0	325	6
Lebanon	1000000		15
Lesotho	5000		26
Liberia	17000		10
Libya	20030	7	4
Lithuania	0	30	5
Luxembourg	1519	31	0
Malawi	975672	390	278
Malaysia	230000	605	80
Mali	41603		37
Marshall Islands	600		0
Mauritius	30000	50	11
Mexico	1600000	6000	274
Micronesia Fed States	35000	11	47
Mongolia	264000	0	26
Montenegro	5000		0
Mozambique	1851500	2000	602
Myanmar	2420000	4000	138366
Namibia	350000	8	92
Nepal	5639722	5174	8831
Netherlands	2000	844	7
New Zealand	301500	15000	181
Niger (the)	1131300	10	84
Nigeria	1922332	275	200
Norway	1500	130	4
Oman	20000	3900	76
Pakistan	20400000	9500	1985
Panama	24610	72	16
Papua New Guinea	544300	61	2182
Paraguay	310595	25	55
Peru	1800505	3100	593
Philippines	4785460	2190	1619
Poland	100000	3080	78
Portugal	3967	1350	64
Puerto Rico	750000	68000	64
Russian Federation	330613	1000	172
Rwanda	26051	28	54
Saint Kitts and Nevis	0	20	0

Country	Affected	Damage (\$Million)	Killed
Samoa	12703	150	143
Saudi Arabia	13000	900	161
Senegal	264000	41	165
Serbia Montenegro	49600	2048	51
Sierra Leone	24303	30	1102
Slovenia	50000	292	6
Solomon Islands	44096	2	52
South Africa	125000	1200	73
South Sudan	234800		50
Spain	15300	2400	21
Sri Lanka	1060324	1317	35399
St Lucia	170000	40	10
St Vincent and the Grenadines	13091	25	13
Sudan	1000000	184	657
Sweden	0	2800	7
Syrian Arab Rep	235000		80
Tajikistan	400000	204	73
Tanzania, United Republic of	2000000	458	56
Thailand	3500000	1000	8345
Tonga	87000	51	9
Tunisia	30000	36	17
Uganda	153500	3	388
Ukraine	300000	1000	38
United Kingdom	340000	5900	15
United States	3000010	50000	88
Uruguay	119200	500	12
Vanuatu	188000	449	100
Vietnam	3504412	1430	622
Yemen	461542	400	713
Zimbabwe	5000000	200	299

Notes: This table reports the cutoff points at 99th percentile in number of people affected, deaths, and economic damage. The distribution is calculated by country and considers all the major shocks that affected the country from 1999 to 2019.

Table Ia. Thresholds of Country Income. Source: The World Bank

Threshold of Country Income	As of July 2019, \$ GNI Per Capita
Low income	<1,026
Lower-middle income	1,026-3,995
Upper-middle income	3,996-12,375
High income	> 12,375

Notes: This table presents the levels of country income considering the gross net income per capita. The World Bank determines these categories. More information is available at <https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined>.

Table II. List of Institutional Disruptions in the Period 2007-2019

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$ Million)	Killed
Malaysia	2007	Flood	General flood	2007-0021		137,533	605	17
Liberia	2007	Flood	General flood	2007-0404		17,000	-	1
Angola	2007	Flood	General flood	2007-0027		40,000	-	105
Solomon Islands	2007	Earthquake	Tsunami	2007-0127		2,384	-	52
Mali	2007	Flood	Flash flood	2007-0293		41,603	-	9
Netherlands	2007	Storm	Extratropical cyclone	2007-0019	Kyrrill	-	550	7
Slovenia	2007	Storm		2007-0458		1,050	292	6
St Lucia	2007	Storm	Tropical cyclone	2007-0360	Dean	-	40	1

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$ Million)	Killed
Bangladesh	2007	Storm	Tropical cyclone	2007-0556	Sidr	8,978,541	2,300	4,234
Mexico	2007	Flood	General flood	2007-0521		1,600,000	3,000	22
Bangladesh	2007	Flood	General flood	2007-0311		13,771,380	100	1,110
United Kingdom	2007	Flood	General flood	2007-0278		340,000	4,000	7
Belgium	2007	Storm	Extratropical cyclone	2007-0019	Kyrill	2	450	2
Peru	2007	Earthquake	Earthquake	2007-0362		658,331	600	593
Uruguay	2007	Flood	General flood	2007-0183		119,200	45	2
Oman	2007	Storm	Tropical cyclone	2007-0164	Gonu	20,000	3,900	76
Burundi	2007	Flood	General flood	2007-0028		23,000	-	4
Marshall Islands	2008	Flood	Storm surge	2008-0583		600	-	-
Yemen	2008	Flood	Flash Flood	2008-0499		25,064	400	90
Antigua and Barbuda	2008	Storm	Tropical cyclone	2008-0604	Omar	25,800	-	-
Philippines	2008	Storm	Tropical cyclone	2008-0249	Fengshen	4,785,460	285	644
Myanmar	2008	Storm	Tropical cyclone	2008-0184	Nargis	2,420,000	4,000	138,366
Kyrgyz Rep	2008	Earthquake		2008-0454		1,197	-	74
China	2008	Earthquake	Earthquake	2008-0192		45,976,596	85,000	87,476
Ukraine	2008	Flood	General Flood	2008-0306		224,725	1,000	38
Kazakhstan	2008	Flood	General Flood	2008-0095		13,000	130	1
Panama	2008	Flood	Flash Flood	2008-0409		545	-	16
United States	2008	Flood	General Flood	2008-0627		11,000,148	10,000	24
Brazil	2008	Flood	General Flood	2008-0549		1,500,015	750	151
Senegal	2009	Flood	General Flood	2009-0344		264,000	-	6
China	2009	Flood	General Flood	2009-0292		39,372,000	1,000	90
Tonga	2009	Earthquake	Tsunami	2009-0420		507	10	9
Uruguay	2009	Flood	General Flood	2009-0531		22,000	-	12
Tunisia	2009	Flood	Flash Flood	2009-0412		8	-	17
Indonesia	2009	Earthquake	Earthquake	2009-0421		2,501,798	2,200	1,195
Mongolia	2009	Flood	General Flood	2009-0269		15,000	-	26
Samoa	2009	Earthquake	Tsunami	2009-0420		5,585	150	143
Benin	2009	Flood	General Flood	2009-0243		60,238	-	7
Saudi Arabia	2009	Flood	General Flood	2009-0522		10,000	900	161
Burkina Faso	2009	Flood	General Flood	2009-0444		151,000	150	9
Italy	2009	Earthquake	Earthquake	2009-0136		56,000	2,500	295
Costa Rica	2009	Earthquake	Earthquake	2009-0002		128,618	200	31
Philippines	2009	Storm	Tropical cyclone	2009-0414	Ondoy, Ketsana	4,901,763	237	501
Côte d' Ivoire	2009	Mass Movement	Landslide	2009-0223		10,006	-	27
Namibia	2009	Flood	General Flood	2009-0092		350,000	-	92
Central African Republic	2009	Storm	Local storm	2009-0064		2,472	-	3
Pakistan	2010	Flood	Flash Flood	2010-0341		20,359,496	9,500	1,985
St Lucia	2010	Storm	Tropical cyclone	2010-0571	Tomas	1,000	1	10
Portugal	2010	Flood	General Flood	2010-0068		618	1,350	43
Hong Kong	2010	Storm	Tropical cyclone	2010-0332	Chanthu	15,000	-	1
Barbados	2010	Storm	Tropical cyclone	2010-0571	Tomas	2,500	-	-
Haiti	2010	Earthquake	Earthquake	2010-0017		3,700,000	8,000	222,570
Uganda	2010	Mass Movement	Landslide	2010-0084		12,795	-	388
St Vincent and the Grenadines	2010	Storm	Tropical cyclone	2010-0571	Tomas	6,100	25	-
Ghana	2010	Flood	General Flood	2010-0246		7,500	-	45
Gambia The	2010	Flood	General Flood	2010-0516		17,767	-	1
China	2010	Mass Movement	Landslide	2010-0377		47,200	759	1,765
Panama	2010	Flood	General Flood	2010-0666		24,610	-	13
Central African Republic	2010	Flood	General Flood	2010-0381		1,585	-	3
Poland	2010	Flood	General Flood	2010-0193		100,000	3,080	16
Kenya	2010	Flood	General Flood	2010-0285		70,000	-	100
Hungary	2010	Flood	General Flood	2010-0193		2,000	440	1
Tajikistan	2010	Flood	General Flood	2010-0175		6,708	204	73
Chile	2010	Earthquake	Earthquake	2010-0091		2,671,556	30,000	562
Montenegro	2010	Flood	General Flood	2010-0619		5,000	-	-

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$ Million)	Killed
Guinea	2010	Flood	General Flood	2010-0526		40,411	-	1
Jamaica	2010	Storm	Tropical cyclone	2010-0501	Nicole	2,506	150	15
China	2010	Earthquake	Earthquake	2010-0169		112,000	500	2,968
Sri Lanka	2011	Flood	General Flood	2011-0024		1,060,324	200	47
United States	2011	Storm	Tropical cyclone	2011-0328	Irene	3,700,000	7,300	46
Japan	2011	Earthquake	Tsunami	2011-0082		368,820	210,000	19,846
Brazil	2011	Flood	General Flood	2011-0014		45,000	1,000	900
Thailand	2011	Storm	Tropical cyclone	2011-0272		1,000,000	47,000	18
Haiti	2011	Storm	Tropical cyclone	2011-0328	Irene	1,544	-	2
China	2011	Flood	General Flood	2011-0227		67,900,000	6,400	467
Norway	2011	Storm	Local storm	2011-0486		500	-	4
Puerto Rico	2011	Storm	Tropical cyclone	2011-0328	Irene	2,271	500	1
United States	2011	Storm	Local storm	2011-0172		1,150	14,000	176
Lesotho	2011	Flood	General Flood	2011-0043		5,000	-	26
Bahamas	2011	Storm	Tropical cyclone	2011-0328	Irene	10,000	40	
Bhutan	2011	Earthquake	Earthquake	2011-0351		20,016	-	1
Ireland	2011	Flood	General Flood	2011-0453		600	325	2
United States	2011	Storm	Local storm	2011-0145		17,200	11,000	354
Spain	2011	Earthquake	Earthquake	2011-0159		15,300	200	10
New Zealand	2011	Earthquake	Earthquake	2011-0068		301,500	15,000	181
Burundi	2011	Storm	Local storm	2011-0065		50	-	12
Dominican Rep	2011	Storm	Tropical cyclone	2011-0328	Irene	37,000	30	4
Samoa	2012	Storm	Tropical cyclone	2012-0498	Evan	12,703	133	12
United States	2012	Storm	Tropical cyclone	2012-0410	Sandy	8,120,000	50,000	54
Comoros	2012	Flood	General Flood	2012-0113		65,137	5	4
United States	2012	Forest fire	Forest fire	100		-	338	93
Bulgaria	2012	Flood	General Flood	2012-0033		37,950	4	5
South Africa	2012	Flood	General Flood	2012-0469		125,000	200	13
United States	2012	Storm	Tropical cyclone	2012-0313		60,000	6,500	1
Russian Federation	2012	Flood	Flash Flood	2012-0213		31,410	600	172
Haiti	2012	Storm	Tropical cyclone	2012-0313	Isaac	8,007	-	13
Italy	2012	Earthquake	Earthquake	2012-0142		11,050	15,800	7
Philippines	2012	Storm	Tropical cyclone	2012-0500	Bopha	6,246,664	898	1,901
Georgia	2012	Flood	Flash Flood	2012-0165		100,018	3	5
China	2012	Flood	General Flood	2012-0292		1,000,000	8,000	151
China	2013	Earthquake	Earthquake	2013-0116		2,198,785	8,500	198
United States	2013	Terrorist attack	Terrorist attack	101		264	58,000	3
St Lucia	2013	Flood	General Flood	2013-0531		170,000	-	6
Germany	2013	Flood	General Flood	2013-0205		6,350	12,900	4
Sweden	2013	Storm	Extratropical cyclone	2013-0517	Xavier	3,125,500	-	7
Portugal	2013	Storm	Local storm	2013-0155		3,967	-	1
St Vincent and the Grenadines	2013	Flood	General Flood	2013-0531		13,091	-	13
Paraguay	2013	Storm	Local storm	2013-0408		50,000	25	-
Israel	2013	Storm	Local storm	2013-0524	Alexa	2,003,000	-	4
Mali	2013	Flood	General Flood	2013-0310		34,700	-	37
United States	2013	Storm	Local storm	2013-0142		450	6,700	29
United States	2013	Forest fire	Forest fire	102		878,000	900	92
Armenia	2013	Storm	Local storm	2013-0194		64,000	60	-
Philippines	2013	Flood	General Flood	2013-0274		3,096,422	2,190	31
Botswana	2013	Flood	General Flood	2013-0031		4,210	-	12
India	2013	Storm	Tropical cyclone	2013-0401		13,230,000	17,000	47
Russian Federation	2013	Flood	General Flood	2013-0278		34,135	1,000	-
Argentina	2013	Flood	General Flood	2013-0119		350,000	1,300	59
Czech Rep	2013	Flood	General Flood	2013-0205		1,300,000	829	15
Thailand	2013	Flood	General Flood	2013-0431		3,500,000	482	61
Mauritius	2013	Flood	Flash Flood	2013-0079		82	-	11
Uganda	2013	Flood	General Flood	2013-0197		25,445	3	13
United States	2013	Flood	General Flood	2013-0354		21,900	57,900	9
Philippines	2013	Storm	Tropical cyclone	2013-0433	Haiyan, Yolanda	16,106,807	10,000	7,986
Canada	2013	Flood	General Flood	2013-0190		100,000	5,700	4

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$ Million)	Killed
Cambodia	2013	Flood	General Flood	2013-0380		1,500,000	500	200
Cameroon	2014	Flood	Riverine flood	2014-0400		250,000	-	-
Poland	2014	Extreme temperature	Cold wave	2014-0030		-	-	78
Liberia	2014	Epidemic	Epidemic	106		-	53,000	11,308
Bosnia and Herzegovina	2014	Flood	Riverine flood	2014-0164		1,000,000	437	25
Croatia	2014	Flood	Riverine flood	2014-0164		7,116	-	3
Bulgaria	2014	Storm	Convective storm	2014-0404		40	545	1
Australia	2014	Storm	Convective storm	2014-0475		52,539	1,000	-
Slovenia	2014	Extreme temperature	Severe winter conditions	2014-0046		50,000	-	1
Sierra Leone	2014	Epidemic	Epidemic	106		-	53,000	11,308
Malaysia	2014	Flood	Riverine flood	2014-0494		230,000	284	17
Australia	2014	Extreme temperature	Heat wave	2014-0010		-	-	139
Marshall Islands	2014	Flood	Coastal flood	2014-0097		360	-	-
Guinea	2014	Epidemic	Epidemic	106		-	53,000	11,308
Congo	2014	Flood	Flash flood	2014-0432		4,750	15	154
Serbia Montenegro	2014	Flood	Riverine flood	2014-0164		49,600	2,048	51
Kiribati	2014	Flood	Coastal flood	2014-0097		220	-	-
India	2014	Flood	Riverine flood	2014-0343		275,000	16,000	298
Guyana	2015	Flood	Coastal flood	2015-0313		199,000	-	-
Egypt	2015	Extreme temperature	Heat wave	2015-0342		66	-	110
Malawi	2015	Flood	Riverine flood	2015-0011		638,645	390	278
Nepal	2015	Earthquake	Ground movement	2015-0144		5,639,722	5,174	8,831
Iraq	2015	Flood	Flash flood	2015-0485		65,000	-	58
Congo	2015	Flood	--	2015-0549		180,000	-	-
Vanuatu	2015	Storm	Tropical cyclone	2015-0093	Pam	188,000	449	11
Kiribati	2015	Storm	Tropical cyclone	2015-0093	Pam	1,500	-	-
Ghana	2015	Flood	--	2015-0217		5,000	12	25
Bahamas	2015	Storm	Tropical cyclone	2015-0479	Joaquin	6,710	90	33
Ecuador	2015	Volcanic activity	Lava flow	2015-0361	Cotopaxi	800,000	-	-
United States	2015	Flood	Flash flood	2015-0212		12,000	12,600	32
Egypt	2015	Storm	Convective storm	2015-0605		-	100	6
Micronesia	2015	Storm	Tropical cyclone	2015-0105	Maysak	35,000	11	5
Sierra Leone	2015	Flood	--	2015-0436		24,303	-	10
Belgium	2015	Extreme temperature	Heat wave	2015-0410		-	-	410
Lebanon	2015	Storm	Convective storm	2015-0002	Huda	1,000,000	-	2
Kyrgyz Rep	2015	Earthquake	Ground movement	2015-0512		16,780	12	-
Solomon Islands	2015	Storm	Tropical cyclone	2015-0093	Pam	44,096	-	-
Georgia	2015	Flood	Flash flood	2015-0227		10,320	23	40
Guinea	2015	Flood	--	2015-0480		29,628	-	9
Solomon Islands	2015	Storm	Tropical cyclone	2015-0281	Raquel	400	2	9
United States	2016	Flood	--	2016-0292		70,000	13,000	13
Uganda	2016	Flood	Riverine flood	2016-0130		10,000	3	-
Bahamas	2016	Storm	Extra-tropical storm	2016-0355	Matthew	-	600	-
Jamaica	2016	Storm	Extra-tropical storm	2016-0355	Matthew	125,000	-	-
United States	2016	Storm	Convective storm	2016-0010	Jonas, Snowzilla	85,000,016	5,550	50
Fiji	2016	Storm	Tropical cyclone	2016-0041	Winston	350,000	600	44
Netherlands	2016	Storm	Convective storm	2016-0211		-	844	-
China	2016	Flood	--	2016-0241		60,000,000	22,000	289
United States	2016	Flood	Flash flood	2016-0124		21,000	4,500	9
Ethiopia	2016	Flood	Flash flood	2016-0186		490,000	-	100
Dominican Rep	2016	Flood	Riverine flood	2016-0423		1,792,000	-	15
Haiti	2016	Storm	Extra-tropical storm	2016-0355	Matthew	2,100,439	2,000	546
Rwanda	2016	Landslide	Landslide	2016-0164		4,000	-	54
Ecuador	2016	Earthquake	Ground movement	2016-0117		389,364	2,000	672
United States	2016	Terrorist attack	Terrorist attack	104		102	385	93

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$ Million)	Killed
Italy	2016	Earthquake	Ground movement	2016-0313		4,854	5,000	296
Benin	2016	Epidemic	Bacterial disease	2016-0448	Cholera	281	-	9
Japan	2016	Earthquake	Ground movement	2016-0107		120,800	20,000	9
Israel	2016	Wildfire	Land fire	2016-0442		60,137	520	-
Dominican Rep	2016	Storm	Extra-tropical storm	2016-0355	Matthew	-	-	-
Egypt	2016	Storm	Convective storm	2016-0359		32,572	25	26
Tanzania	2016	Earthquake	Ground movement	2016-0329		139,601	458	17
United States	2016	Storm	Extra-tropical storm	2016-0355	Matthew	3,000,104	10,000	49
Saint Kitts and Nevis	2017	Storm	Tropical cyclone	2017-0381	Irma	-	20	-
United States	2017	Storm	Tropical cyclone	2017-0383		3,500,000	95,000	12
Puerto Rico	2017	Storm	Tropical cyclone	2017-0381	Irma	-	-	2
Puerto Rico	2017	Storm	Tropical cyclone	2017-0383	Maria	750,000	68,000	64
Belarus	2017	Extreme temperature	Severe winter conditions	2017-0010		50,539	-	43
Hong Kong	2017	Storm	Tropical cyclone	2017-0352	Hato	156	756	-
United States	2017	Storm	Tropical cyclone	2017-0362	Harvey	582,024	95,000	88
Guatemala	2017	Earthquake	Ground movement	2017-0382		3,601	-	-
Burkina Faso	2017	Epidemic	Viral disease	2017-0480	Dengue	9,029	-	18
Vietnam	2017	Storm	Tropical cyclone	2017-0422	Damrey, Ramil	4,330,000	1,000	123
United States	2017	Terrorist attack	Terrorist attack	107		3,015,000	1,500	59
Mexico	2017	Earthquake	Ground movement	2017-0382		1,200,250	2,300	98
Montenegro	2017	Wildfire	Forest fire	2017-0297		200	-	-
Portugal	2017	Wildfire	Forest fire	2017-0176		704	232	64
Haiti	2017	Storm	Tropical cyclone	2017-0381	Irma	40,092	-	1
Albania	2017	Extreme temperature	Severe winter conditions	2017-0010		-	-	6
Mexico	2017	Earthquake	Ground movement	2017-0387		256,000	6,000	369
Dominican Rep	2017	Storm	Tropical cyclone	2017-0383	Maria	26,000	63	5
Vietnam	2017	Storm	Tropical cyclone	2017-0352	Hato	1	1,430	1
Peru	2017	Flood	--	2017-0084		1,800,505	3,100	184
Thailand	2017	Flood	Riverine flood	2017-0006		1,800,000	1,000	96
United States	2017	Storm	Tropical cyclone	2017-0381	Irma	70,000	57,000	58
Australia	2017	Storm	Tropical cyclone	2017-0105	Debbie	45,000	2,700	12
Dominica	2017	Storm	Tropical cyclone	2017-0383	Maria	71,393	1,456	64
Sudan	2017	Epidemic	Bacterial disease	2017-0379		30,762	-	657
Niger (the)	2017	Flood	--	2017-0370		206,513	10	56
Croatia	2017	Storm	Convective storm	2017-0408		3,500	161	-
Sierra Leone	2017	Landslide	Mudslide	2017-0343		11,916	30	1,102
Antigua and Barbuda	2017	Storm	Tropical cyclone	2017-0381	Irma	1,400	250	1
Bahamas	2017	Storm	Tropical cyclone	2017-0381	Irma	-	300	1500
United States	2017	Wildfire	Land fire	2017-0434		3,450,000	28,000	93
Barbados	2017	Storm	Tropical cyclone	2017-0381	Irma	-	400	1
Dominican Rep	2017	Storm	Tropical cyclone	2017-0381	Irma	6,300	5,000	-
Mauritius	2018	Storm	Tropical cyclone	2018-0029	Berguitta	30,000	-	-
United States	2018	Storm	Tropical cyclone	2018-0373		10,055,000	23,000	92
Tunisia	2018	Flood	Flash flood	2018-0364		30,000	36	6
Rwanda	2018	Flood	Flash flood	2018-0104		26,051	-	24
Papua New Guinea	2018	Earthquake	Ground movement	2018-0055		544,300	61	145
Lao P Dem Rep	2018	Storm	Tropical cyclone	2018-0305	Bebinca	615,145	225	-
Sweden	2018	Wildfire	Forest fire	2018-0224		-	3,100	-
United States	2018	Storm	Tropical cyclone	2018-0342		3,150,000	35,000	53
Tonga	2018	Storm	Tropical cyclone	2018-0042	Gita	87,000	-	-
United States	2018	Wildfire	Forest fire	2018-0409	Camp Fire	5,150,000	16,500	88
Japan	2018	Flood	--	2018-0190		1,500,102	9,500	246
Nigeria	2018	Flood	--	2018-0365		1,922,332	275	199
Lao P Dem Rep	2018	Flood	--	2018-0222		13,100	-	136
Lebanon	2018	Storm	Convective storm	2018-0047		-	-	15
Côte d' Ivoire	2018	Flood	--	2018-0185		25,000	-	20
Lithuania	2018	Extreme temperature	Cold wave	2018-0061		-	-	5

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$ Million)	Killed
India	2018	Flood	Flash flood	2018-0295		23,220,000	2,852	504
Marshall Islands	2018	Storm	Tropical cyclone	2018-0469	Penny	-	-	-
Latvia	2018	Wildfire	Forest fire	2018-0224		-	-	-
Canada	2018	Extreme temperature	Heat wave	2018-0195		-	-	70
Rwanda	2018	Landslide	Landslide	2018-0208		12	28	18
Indonesia	2018	Earthquake	Tsunami	2018-0352		209,025	1,450	4,340
Guatemala	2018	Volcanic activity	Pyroclastic flow	2018-0168	Volcan de Fuego	1,714,414	-	461
Botswana	2018	Flood	--	2018-0103		4,225	-	-
Spain	2019	Flood	--	2019-0413		3,500	2,400	6
United States	2019	Storm	Tropical cyclone	2019-0412		3,080,000	45,000	2
Bahamas	2019	Storm	Tropical cyclone	2019-0412		3,000,000	4,600	115
Malawi	2019	Flood	--	2019-0101		975,672	-	60
Luxembourg	2019	Storm	Convective storm	2019-0388		1,519	-	-
Paraguay	2019	Flood	Riverine flood	2019-0245		310,595	-	-
South Sudan	2019	Flood	Flash flood	2019-0285		234,800	-	3
India	2019	Flood	--	2019-0449		22,000,000	-	100
China	2019	Storm	Tropical cyclone	2019-0387	Lekima	108,000	10,000	72
South Africa	2019	Flood	--	2019-0176		1,000	50	73
Tanzania	2019	Storm	Tropical cyclone	2019-0165	Kenneth	2,000,000	-	-
Libya	2019	Flood	--	2019-0224		20,030	7	4
Iran Islam Rep	2019	Flood	--	2019-0125		10,001,076	2,500	70
Zimbabwe	2019	Storm	Extra-tropical storm	2019-0110	Idai	270,000	-	299
Mozambique	2019	Storm	Extra-tropical storm	2019-0110	Idai	1,851,500	2,000	602
Comoros	2019	Storm	Tropical cyclone	2019-0165	Kenneth	345,311	-	8
Albania	2019	Earthquake	Ground movement	2019-0444		4,608	45	-
South Sudan	2019	Wildfire	--	2019-0189		12	-	50
Syrian Arab Rep	2019	Flood	--	2019-0137		235,000	-	2
Japan	2019	Storm	Tropical cyclone	2019-0492	Hagibis	390,000	-	86

Notes: This table lists the disruptions that ranked at or above the 99th percentile of impacts in either category—number of people affected, deaths, or economic damage—between 2007 and 2019, inclusive. The impact distributions are calculated by country and considers all the shocks from 1999 to 2019.

MNE and Affiliate Data

We relied on Bureau van Dijk's Orbis Database for MNE- and affiliate-level data. The sample contains the 2,000 largest global publicly traded firms as of December 2020. In order to select the 2,000 largest firms, we applied the screening criteria in Orbis for: 1) active firms, 2) publicly listed, and 3) with revenues over USD \$4.2 billion. These screens resulted in a total of 2,000 MNEs from a broad range of industries, headquartered in 63 countries, and with a median total revenue of USD \$9.2 billion and median total number of employees of 24,500.

Orbis data sometimes contains subsidiaries that do not have ownership-identifying information in the shareholder data. Therefore, a mass downloading of the 2,000 MNE subsidiary data yields many subsidiaries with no ownership identifiers. Pulling each MNE's subsidiaries separately allows for assigning the correct MNE identifier to each subsidiary without loss of observations. Therefore, we screened for the subsidiaries of each MNE individually, selecting subsidiaries that meet one of the following criteria: 1) Ultimately owned by a company of the selected group which is a Global Ultimate Owner; 2) Ultimately owned by a company of the selected group which is a Domestic Ultimate Owner; 3) Directly or totally owned by a company of the selected group with a minimum of 5 percent to a maximum of 100 percent ownership; or 4) Owned by a company of the selected group with an unknown percentage.

The database contained 545,664 subsidiaries belonging to the 2,000 MNEs, of which 470,867 were currently active and only 229,632 had recent operational accounts over our sample window. The proportion of Orbis entities with revenue and employee data over our sample window is 37.7 percent and 33.8 percent, respectively.

A major part of the task was cleaning the affiliate data. Using data from the Orbis Ownership database, we found that the 545,664 entities had over 8.5 million entity-shareholder-year observations. Orbis contains separate identifiers and ownership percentages for the global ultimate owner (GUO), direct ultimate owner (DUO), controlling shareholder (CSH), and shareholders. We relied on the shareholder ownership information to track ownership percentage changes over time. The Orbis Ownership database is updated with information when there is a change in ownership. As a consequence, there are gaps in ownership information between years of updating. For entities with gaps between years of the same owner, we filled in missing ownership data with the most recent prior percentage of ownership reported. For entities that did not have a shareholder ownership percentage associated with the MNE identifier code, we relied on the global ultimate owner, the controlling shareholder, or direct shareholder as long as the owner identification code matched the MNE identification code and the ownership percentage was not missing. The global ultimate owner ownership percentages are static in the Orbis database, equal to ownership as of 2019. Therefore, we had to check whether the subsidiary entered the corporate group during our sample window for all of these affiliates.

In some cases, Orbis provides no ownership percentage, but the affiliates are categorized into independence ratings based on ownership percentage (e.g. B, C, and D ratings). We took the median value of the ownership range for the independence ratings for these firms. When information on subsidiary ownership was not available or provided conflicting information, we validated ownership using information from public filings and reports.

A total of 11,112 subsidiaries had more than one MNE owner according the Orbis database. In examining the data, there were a number of cases where MNEs make financial investments without exerting control over the subsidiary, particularly in the case of private equity firms and institutional investors. A team of research assistants cleaned these data, assigning ownership to the MNE that aligned with the GUO, DUO, or CSH Orbis data. If the controlling ownership could not be directly matched, ownership was assigned to

the MNE with the largest percentage ownership of at least 25 percent. The final sample was composed of 10,874 subsidiaries with multiple MNE owners and 534,790 subsidiaries with only one MNE owner.

We used information on subsidiary incorporation dates and legal changes from the Orbis database to code when subsidiaries entered or exited the multinational firm group. For example, we searched the legal changes in the Orbis database for keywords associated with [“merger,” “ownership added: parent,” “the company has merged with,” “ownership changed from shareholder to parent company”] for acquisitions of the subsidiary and [“liquidate,” “Deregistration,” “Cessation of activity,” “Insolvency proceedings,” “Bankruptcy,” “Dissolved”] for dissolutions and spin offs.

A total of 119 of the publicly listed MNEs were part of a larger conglomerate group (e.g. Hitachi High Technologies Corporation and Hitachi Construction Machinery Co., Ltd. are publicly listed but also part of Hitachi Ltd.) or were acquired during our sample period. We rolled these MNEs up into their larger corporate group based on the appropriate legal event date.

Eight MNEs did not have affiliates in the Orbis database. As a result, 1,891 MNEs compose the final sample of MNEs with economic importance information.

We hired independent researchers to verify the accuracy of the Orbis MNE affiliate data. Using a randomly selected set of 20 MNEs, the researchers checked the MNE affiliates and each affiliate’s entry into the MNE and exit from the MNE across the sample years of 2010 to 2019. Subsidiary information was verified using the following sources:

- 1) Public filings and reports made by the firm such as 10-ks, 20-Fs, annual reports, etc.;
- 2) MNE websites; and
- 3) Internet searches

The researchers documented whether they could confirm MNE ownership, the entry and exit dates, and ownership percentages. For some affiliates, no available information on the affiliate could be found outside of the Orbis database. For the affiliates that could be verified, 3.4% of observations had conflicting information. A total of 0.8% had different entry and exit dates, and 2.6% had different ownership percentages due to Orbis coding the affiliate based on ownership category, and one affiliate was located in a country different from that listed in the Orbis database (Estonia versus Slovakia).

ROBUSTNESS AND TEST OF CONFOUNDERS

Sample at the 75th and 90th Percentile Severity Cutoffs

We tested the sensitivity of the results to the 75th and 90th percentile of severity of disaster. At the 75th percentile of severity, there are 1,402 shocks that affected 157 countries. Applying a 90th percentile cutoff for severity resulted in 639 shocks that affected 150 countries. Table III contains the results for the different cutoffs.

Table III. Economic Importance of the Country to the Firm and Donations to Disruptions at the 75th and 90th Percentile Cutoffs

Variables	USD Donation Amount (ln)	
	(1) 75 th Percentile	(2) 90 th Percentile
H1: Economic Importance	34.399*	56.556***
	(20.105)	(21.311)
H2: EI x Dominant MNE Index	4.911***	7.551***
	(1.831)	(1.991)
H3: EI x Host-Country Public Aid (ln)	-1.343*	-2.106***
	(0.705)	(0.743)
H3: EI x Foreign Public Aid (ln)	0.334***	0.368***
	(0.072)	(0.077)
H4: EI x Regulatory Quality	2.313***	1.318**
	(0.505)	(0.603)
Dominant MNE Index	-1.160**	-1.477**
	(0.523)	(0.663)
Host-Country Public Aid (ln)	0.288***	0.114
	(0.053)	(0.090)
Foreign Public Aid (ln)	-0.016	-0.028
	(0.016)	(0.026)
Regulatory Quality	-0.018	0.346
	(0.210)	(0.285)
Firm Controls	YES	YES
Country Controls	YES	YES
Event Controls	YES	YES
Firm, Industry, Country by Event, Year Firm Fixed Effects	YES	YES
Observations	2,651,182	1,208,349
MNEs	1,891	1,891
Countries	150	157
Disruptions	1,402	635

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. For model (1), institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 75th percentile in the countries that they affected. Model (2) presents analyses with institutional disruptions whose impacts ranked at the 90th percentile. See text for sample definition and construction. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Partial-Model Results

Table IV. Partial Models of the Effect of the Economic Importance of the Country on Donations to Disruptions

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	0.326*** (0.021)	2.712*** (0.480)	0.195*** (0.016)
H2: EI x Dominant MNE Index	0.428*** (0.028)		
H3: EI x Host-Country Public Aid (ln)		-0.066*** (0.016)	
H3: EI x Foreign Public Aid (ln)		-0.026*** (0.001)	
H4: EI x Regulatory Quality			0.434*** (0.013)
Dominant MNE Index	-0.005 (0.008)		
Host-Country Public Aid (ln)		0.002*** (0.001)	
Foreign Public Aid (ln)		-0.000 (0.000)	
Regulatory Quality			-0.008*** (0.001)
Firm Controls	YES	YES	YES
Country Controls	YES	YES	YES
Event Controls	YES	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	NO
Constant	0.049*** (0.005)	-0.012 (0.016)	0.048*** (0.005)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations to factors that are necessary for market operations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05.

Alternative Predictor Variables

In robustness models, we use alternative measures of economic importance based on revenues, total assets, and employees. We do not use them as main explanatory variables as, arguably, it may reduce construct validity. For instance, revenue can overrepresent some industries and some types of affiliates, such as sales subsidiaries. It only accounts for the demand side of the market and it does not capture the relevance of the country affiliate as a supplier of inputs for the firm.

Moreover, Orbis has substantial missing data for these variables. Addressing missing data with listwise deletion or mean substitution would foster the risk of obtaining biased estimates, increasing Type II errors,

and underestimating correlations and coefficient weights. To address this, we start by analyzing missingness patterns and find no systematic divergence on the completely observed variables between those with missing data and those with available data. In other words, the hypothesis that data are missing completely at random cannot be rejected. Then, we use two methods to impute data:

1. For firm-level data, we expand using Chebyshev polynomials because they can arguably approximate most functional forms (Kolarici and Vakratsas 2015). We opted for a third-order polynomial based on the Bayesian information criterion after considering expansions up to the 20th degree.
2. For country-level data, we apply multiple-input bootstrapping algorithm for time-series-cross-sectional data as explained by Blackwell *et al.* (2017). This form of imputation accounts for smooth time trends, changes across cross-sectional variables, and time and space correlations, and it is susceptible to integrating scant knowledge to specific cells when available. A review of how this method can produce more accurate imputation particularly for macro level data than traditional procedures can be found in Honaker and King (2010).

Table V. Alternative Measures of Economic Importance of the Country to the Firm and Donations to Disruptions

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
H1: Economic Importance (Assets)	1.364*** (0.305)			
H2: EI (Assets) x Dominant MNE Index	0.134*** (0.033)			
H3: EI (Assets) x Host-Country Public Aid (ln)	-0.049*** (0.011)			
H3: EI (Assets) x Foreign Public Aid (ln)	0.006*** (0.001)			
H4: EI (Assets) x Regulatory Quality	0.196*** (0.013)			
H1: Economic Importance (Revenue)		1.306*** (0.309)		
H2: EI (Revenue) x Dominant MNE Index		0.132*** (0.034)		
H3: EI (Revenue) x Host-Country Public Aid (ln)		-0.047*** (0.011)		
H3: EI (Revenue) x Foreign Public Aid (ln)		0.007*** (0.001)		
H4: EI (Revenue) x Regulatory Quality		0.202*** (0.013)		
H1: Economic Importance (Employees)			1.772*** (0.312)	
H2: EI (Employees) x Dominant MNE Index			0.131*** (0.034)	
H3: EI (Employees) x Host-Country Public Aid (ln)			-0.063*** (0.011)	
H3: EI (Employees) x Foreign Public Aid (ln)			0.006*** (0.001)	
H4: EI (Employees) x Regulatory Quality			0.203*** (0.013)	
H1: Economic Importance (Combined)				0.723*** (0.154)
H2: EI (Combined) x Dominant MNE Index				0.068***

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
H3: EI (Combined) x Host-Country Public Aid (ln)				(0.017) -0.026***
H3: EI (Combined) x Foreign Public Aid (ln)				(0.005) 0.003***
H4: EI (Combined) x Regulatory Quality				(0.001) 0.106***
				(0.006)
Dominant MNE Index	0.149*** (0.009)	0.158*** (0.009)	0.165*** (0.009)	0.145*** (0.009)
Host-Country Public Aid (ln)	-0.016*** (0.001)	-0.016*** (0.001)	-0.015*** (0.001)	-0.016*** (0.001)
Foreign Public Aid (ln)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Regulatory Quality	-0.009*** (0.003)	-0.009*** (0.003)	-0.009*** (0.003)	-0.010*** (0.003)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	-0.490*** (0.036)	-0.488*** (0.036)	-0.489*** (0.036)	-0.491*** (0.036)
Observations	501,115	501,115	501,115	501,115
MNEs	1,891	1,891	1,891	1,891
Countries	129	129	129	129
Disruptions	265	265	265	265

Notes: This table reports regression estimates for the relation between the alternative constructions of economic importance of the country for a firm and donations in the aftermath of disruptions. Each explanatory variable uses the share of affiliates in the affected country adjusted by ownership and is calculated with a third-order Chebyshev polynomial expansion on an additional explanatory variable. In Model 1, the explanatory variable is the share of assets; Model 2, the share of revenue; Model 3, the share of employees. Model 4 expands on affiliates and the three other predictors. See text for additional variable definitions and constructions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Do Headquarters Units Sufficiently Explain the Size of the Effects?

We face the concern that that the MNE is substantially more likely to donate when headquarters units are in the affected country than it otherwise would donate when there are just affiliates in the country. The concern is that this difference sufficiently explains the significance of economic importance. To address this concern, we run our models excluding donations when the MNE responded to disruptions in countries where at least one headquarters is located. We use the classification of headquarters affiliates from Orbis to distinguish headquarter country locations.

Table VI. The Effect of Economic Importance of the Country on the Magnitude of Donations Sample Excluding Donations of MNEs to Disruptions when the Affected Country has Headquarters Affiliates

Variables	USD Donation Amount (ln) (1)
H1: Economic Importance	24.150*** (1.834)
H2: EI x Dominant MNE Index	4.197*** (1.102)
H3: EI x Host-Country Public Aid (ln)	-1.625*** (0.703)
H3: EI x Foreign Public Aid (ln)	0.328*** (0.068)
H4: EI x Regulatory Quality (Percentile Rank)	2.348*** (0.485)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Firm Fixed Effects	Yes
Observations	499,804
MNEs	1,891
Countries	128
Disruptions	265

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. The affiliates classified as “headquarters” were excluded to test the robustness of the effect of economic importance on the prediction of donations. The classification comes from Orbis. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Country Income Level

We examine whether the effects are driven by level of country income and employ the World Bank’s classification of country groups for low, lower-middle, upper-middle, and high-income countries (The World Bank, 2021). For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more (The World Bank 2021). We performed split sample analysis for each group.

Table VII. Classification of Disruption Countries by Income Level

Low income	Lower-middle income	Upper-middle income	High income
Burkina Faso	Angola	Albania	Antigua and Barbuda
Burundi	Bangladesh	Argentina	Australia
Central African Republic	Benin	Armenia	Bahamas
Ethiopia	Bhutan	Belarus	Barbados
Gambia	Cambodia	Bosnia and Herzegovina	Belgium
Guinea	Cameroon	Botswana	Canada
Haiti	Comoros	Brazil	Chile
Liberia	Congo	Bulgaria	Croatia
Malawi	Côte d' Ivoire	China	Czech Rep
Mali	Egypt	Costa Rica	Germany
Mozambique	Ghana	Dominica	Hong Kong
Niger	India	Dominican Rep	Hungary
Rwanda	Kenya	Ecuador	Ireland
Sierra Leone	Kiribati	Fiji	Israel
South Sudan	Kyrgyz Rep	Georgia	Italy
Sudan	Lao P Dem Rep	Guatemala	Japan
Syrian Arab Rep	Lesotho	Guyana	Latvia
Tajikistan	Micronesia Fed States	Indonesia	Lithuania
Uganda	Mongolia	Iran Islam Rep	Luxembourg
Yemen	Myanmar	Iraq	Mauritius
	Nepal	Jamaica	Netherlands
	Nigeria	Kazakhstan	New Zealand
	Pakistan	Lebanon	Norway
	Papua New Guinea	Libya	Oman
	Philippines	Malaysia	Panama
	Senegal	Marshall Islands	Poland
	Solomon Islands	Mexico	Portugal
	Sri Lanka	Montenegro	Puerto Rico
	Tanzania	Namibia	Saint Kitts and Nevis
	Tunisia	Paraguay	Saudi Arabia
	Ukraine	Peru	Slovenia
	Vanuatu	Russian Federation	Spain
	Vietnam	Samoa	Sweden
	Zimbabwe	Serbia Montenegro	United Kingdom
		South Africa	United States
		St Lucia	Uruguay
		St Vincent and the Grenadines	
		Thailand	
		Tonga	

Table VIII. Economic Importance of the Country to the Firm and Donations to Disruptions by Country-Income Level

Variables	Low Income	Lower- Middle Income	Upper- Middle Income	High Income
H1: Economic Importance	187.829*** (51.743)	65.226*** (15.072)	8.213*** (1.933)	7.821*** (1.428)
H2: EI x Dominant MNE Index	12,598.580** (6,098.939)	305.478*** (72.737)	0.710*** (0.059)	0.711*** (0.110)
H3: EI x Host-Country Public Aid (ln)	0.010 (0.012)	2.930*** (0.537)	-0.289*** (0.069)	-0.276*** (0.050)
H3: EI x Foreign Public Aid (ln)	-0.206 (4.738)	-0.410*** (0.142)	0.011*** (0.003)	0.018*** (0.004)
H4: EI x Regulatory Quality	1.269*** (0.042)	0.035*** (0.008)	0.114*** (0.004)	0.480*** (0.029)
Dominant MNE Index	73.875 (55.621)	-0.130 (0.509)	0.765 (1.003)	-0.045*** (0.014)
Host-Country Public Aid (ln)	-2.931 (4.417)	-0.017*** (0.003)	-0.010*** (0.002)	-0.044 (0.028)
Foreign Public Aid (ln)	-6.848 (5.368)	-0.012*** (0.004)	-0.000 (0.001)	-0.003*** (0.001)
Regulatory Quality	0.015*** (0.004)	-0.030*** (0.005)	-0.012** (0.005)	-0.042*** (0.007)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	4.583 (4.019)	0.020 (0.075)	-0.700*** (0.071)	-0.463*** (0.146)
Observations	73,749	107,787	147,498	172,081
MNEs	1,891	1,891	1,891	1,891

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper-middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more. Source: The World Bank (2021), retrieved on March 28, 2021: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

The results indicate that in lower-income countries there is no evidence of a crowding out effect of public aid in the donation of economically connected MNEs. This aligns with evidence that the financial gap for relief and recovery from large shocks for lower-income countries is substantial (Becerra et al. 2014, 2015, High-Level Panel on Humanitarian Financing 2016). Combined with the comparatively large coefficient of economic importance, the results indicate that economically connected MNEs in lower-income countries have high incentives to help the country market recover regardless of the contribution from public sources (because the public resources are rarely sufficient).

For lower-middle-income countries, we observe that economically connected MNEs reduce their contribution when they perceive substantial foreign aid. This result is consistent with studies that indicate

that the financial gap for these countries is the lowest (Becerra et al. 2014, High-Level Panel on Humanitarian Financing 2016). In other words, economically connected MNEs estimate that foreign aid will be an important funding resource. On the other hand, the impact of host-country public aid is positively associated with the donation for economically connected MNEs. This effect may be driven by the perceived need when the host-country must give.

For upper-middle-income and high-income countries, the results are consistent with our baseline analysis. Funding from the host-country has a substantial crowding out effect on giving by economically connected MNEs. On the other hand, the outpouring of foreign public aid is positively associated with the donations of economically connected MNEs. This is aligned with MNEs perceiving a greater degree of disruption when there is more foreign public aid. In fact, appeals for emergency aid, administrated at the global level by multilateral agencies, are rarely issued for upper-middle and high-income countries. The exceptions are for fat-tailed disruptions, which are captured by our statistics. This means that appeals for foreign aid are informative of the expected magnitude of the impacts. They signal to managers the need for resources for relief and recovery.

Coarsened Exact Matched Sample

We applied coarsened exact matching (CEM) (Iacus *et al.* 2011) to balance the baseline propensity to donate between the treatment (i.e., firms with at least one affiliate in the affected country) and the control groups (i.e., firms with no affiliates in the affected country). The matching uses variables that the extant literature has identified as potential drivers of corporate philanthropy: ROA, Tobin's q, total assets, total revenue, number of employees, R&D Intensity, advertising and administrative expenses, consumer orientation, and industry.

We used no-replacement and targeted a treatment-to-control ratio of 1:10 but tested up to 1:2 for robustness. The L1 statistic, a comprehensive measure of imbalance between the treatment and control groups, is the sum of absolute differences across the multivariate histogram that has the following form:

$$L(t, c) = \frac{1}{2} \sum_{i..lk} |t_{i..lk} - c_{i..lk}| \quad 1$$

where $t_{i..lk}$ is the relative frequency of the categorical variables for the firms in the treatment group and $c_{i..lk}$ is the corresponding 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.

Table IX. L1 Statistic Coarsened-Exact Matched Sample Analysis

Variables	L1 Original	L1 Matched
ROA	.281	.057
Tobin's q	.475	.183
Total Assets (ln)	.612	.240
Total Revenue (ln)	.216	.036
Number of Employees (ln)	.597	.116
R&D Intensity	.854	.487
Advertising and Administrative Expenses	.890	.501
Consumer Orientation	.198	0.000
Industry (SIC)	.074	0.000

Table IX indicates the improved balance for each variable in the matched sample. We re-estimate our analysis using the CEM matched sample in Table X below.

**Table X. The Effect of Economic Importance of the Country on the Magnitude of Donations
Coarsened-Exact Matched Sample
Treatment: The MNE has at least one affiliate in the affected country
[Predicted Variable: USD Donation Amount (ln)]**

Variables	Random Effects	Fixed Effects
H1: Economic Importance	19.493*** (1.609)	19.105*** (1.516)
H2: EI x Dominant MNE Index	98.010*** (4.714)	97.772*** (4.584)
H3: EI x Host-Country Public Aid (ln)	-5.001*** (0.418)	-4.991*** (0.408)
H3: EI x Foreign Public Aid (ln)	0.193*** (0.002)	0.189*** (0.002)
H4: EI x Regulatory Quality (Percentile Rank)	0.036*** (0.001)	0.031*** (0.001)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Event Controls	Yes	Yes
Firm fixed effects	No	Yes
Time fixed effects	No	Yes
Matched Pairs	483	483
Adjusted R-squared		0.891

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. The firm sample is matched using a coarsened exact logarithm on ROA, Tobin's q, total assets, total revenue, number of employees, R&D Intensity, advertising and administrative expenses, consumer orientation, and industry. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Is it the Pursuit of Reputation?

To test for the possibility that MNEs' pursuit of reputational capital sufficiently explains variance in donations, we calculated a Janis-Fadner coefficient of imbalance (JFC)—a widely used variable of media reputation (see Lamin and Zaheer 2012, Love et al. 2017 for surveys in the organization literature). Our specific variable is the annual net pre-disaster media coverage sentiment score for each firm. We use natural language processing to quantify the tone or sentiment of media reports in Factiva mentioning each MNE in our sample in a period of one year before the start date of the disruption. The JFC shows the proportion of negative versus positive articles and is calculated as follows:

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

where, e = annual number of positive media reports pertaining to the firm; c = annual number of negative media reports, and $t = e+c$. Our analyses thus consider firms with a JFC greater than zero as having positive reputations, and those with a JFC less than zero as having a negative reputation.

We first enter reputation into a model that excludes economic importance and find, consistent with prior literature, reputation is positive and significantly associated with donations. We then add economic importance and no longer find support for reputation.

Table XI. Reputation as a Driver of Donations by MNEs

Variables	USD Donation Amount (ln)	
	Only Reputation	Reputation & Economic Importance
Economic Importance		1.446*** (0.224)
Reputation	1.982* (1.188)	1.506 (1.180)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Event Controls	Yes	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes	Yes
Observations	501,115	501,115
Number of MNEs	1,891	1,891
Countries	129	129
Disruptions	265	265

Notes: This table reports regression estimates for the effect of firm reputation on donations by MNEs in countries affected by disruptions that are economically important for the firm. See text for sample definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

As an additional validation, we explore the predictive power of reputation on the likelihood of donating toward market factors. We substitute economic importance with our reputation variable in the previous specification. The coefficient of such variable is not statistically significant.

Table XII. Reputation as a Driver of Donations Aimed at Restoring Factors Necessary for Market Functioning

Variables	Likelihood of Donating Toward Market Factors	
		(1)
Reputation		1.005 (0.008)
Reputation x Dominant MNE Index		0.846 (0.208)
Reputation x Host-Country Public Aid (ln)		1.000 (0.000)
Reputation x Foreign Public Aid (ln)		1.000 (0.000)
Reputation x Regulatory Quality		1.012 (0.009)
Firm Controls		Yes
Country Controls		Yes
Event Controls		Yes
Firm, Industry, Country by Event, Year Fixed Effects		Yes
Observations		501,115
MNEs		1,891
Countries		129

Likelihood of Donating Toward Market Factors	
Variables	(1)
Disruptions	265

Notes: The table reports logit regression estimates for the effect of firm reputation on the likelihood of donating with the aim of restoring factors necessary for market functioning. See text for variable definitions and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Is it the Pursuit of Market Standing?

A long-standing argument in the nonmarket literature is that corporations engage in philanthropy to increase their market performance. The strength of this motive is inversely proportional to market standing. Therefore, one expectation is that low-standing organizations should donate relatively large amounts because the marginal utility of such strategies is higher for them than for higher-standing firms (Eichholtz *et al.* 2010, Liang and Renneboog 2017, Muller and Kräussl 2011, Porter and Kramer 2002, Servaes and Tamayo 2013). To address this potential confounder, we proxied market standing by the rank of the MNE by firm revenue the year before the disruption. The coefficient of an interaction with *economic importance* indicates that the donations from economically connected MNEs fall with every standard-deviation decrease in *market standing*.

Table XIII. The Effect of Market Standing on the Donations of Economically Connected MNEs

Variables	USD Donation Amount (ln)	(1)
EI x Market Standing	-0.000***	(0.000)
Economic Importance	0.745***	(0.016)
Market Standing	-0.000	(0.000)
Firm Controls		Yes
Country Controls		Yes
Event Controls		Yes
Firm, Industry, Country by Event, Year Fixed Effects		Yes
Observations		501,115
MNEs		1,891
Countries		129
Disruptions		265

Notes: This table reports regression estimates for the effect of the market standing of the firm (measured by revenue) on the donations by MNEs in countries affected by disruptions that are economically important for the firm. See text for variable definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Is it the Pursuit of Political Favors?

Another prediction is that organizations construct their nonmarket behavior in accordance with signals coming from influential local government actors (Luo and Chung 2013, Marquis and Qian 2013, Zhang *et al.* 2016, Zhang and Luo 2013). Managers acting strategically invest in government transferences (e.g., operation privileges) to improve their market standing [i.e., rent-seeking and special interest groups may

develop (Olson 1971)]. Under this argument, when the domestic government allocates aid, managers will increase their giving to seek its preference and capture public transferences (Zhang *et al.* 2016, Zhang and Luo 2013). Following this logic, the analyses for H3 systematically reject the likelihood of such a motive being a part of the studied donations.

Is it the Employee's Altruism or Reciprocity?

Firms may donate in response to social preferences from internal stakeholders. For instance, the reciprocal motives of employees may motivate the philanthropic behavior of MNEs (Charness and Rabin 2002, Fehr and Fischbacher 2002, Small and Simonsohn 2008). The risk of this confounder is important in our setting given that research has shown that people react more strongly to shock-related losses than to chronic conditions (Small 2010). We test this motive and find that the coefficient of the interaction of *employee-driven donation* with *economic importance* is statistically significant and negative, suggesting that when our studied MNEs donated following an initiative by employees, the donation amount was significantly lower than when not. We find a similar direction when using donations aimed at restoring the markets necessary for market functioning as outcome variable.

Table XIV. The Effect of the Employees' Incentives on the Donations of Economically Connected MNEs

Variables	(1) USD Donation Amount (ln)	(2) Donations for Market Factors (ln)
EI x Employee-Driven Donation	-0.200 (0.624)	-1.270*** (0.220)
Economic Importance	1.485*** (0.221)	1.418* (0.734)
Employee-Driven Donation	-0.982*** (0.162)	0.178 (0.386)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Event Controls	Yes	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes	Yes
Observations	501,115	501,115
MNEs	1,891	1,891
Countries	129	129
Disruptions	265	265

Notes: This table reports regression estimates for the effect of the origin of the donation being the employees of the company on the donations by MNEs in countries affected by disruptions that are economically important for the firm. In Model 1, the outcome variable is the log of donation amounts; in Model 2, the log of donations made exclusively toward restoring factors necessary for market functioning. See text for variable definitions and sample construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

To further test the argument that business decision makers donate to satisfy altruistic motives, we incorporate a ratio of *human to economic loss*, operationalized as the number of deaths divided by economic damage. The measure captures the relative humanitarian damage. Results indicate that the amount of donation decreases in the interaction of *human to economic loss* with *economic importance*. The result is consistent with the skewness of donations to institutional disruptions with substantial economic costs vis-à-vis human impacts across the events in the period 1997 to 2019.

Table XV. The Effect of the Ratio of Number of Deaths to Economic Damage on the Donations of Economically Connected MNEs

Variables	USD Donation Amount (ln) (1)
EI x Human to Economic Loss	-0.087*** (0.013)
Economic Importance	0.590*** (0.014)
Human to Economic Loss	-0.003 (0.011)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes
Observations	315,797
MNEs	1,891
Countries	81
Disruptions	167

Notes: This table reports regression estimates for the relation between the ratio of number of deaths to the economic damage of a disruption and donations by MNEs in countries affected by disruptions that are economically important for the firm. See text for variable definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Is it Media Salience?

Studies have shown the influence of media on humanitarian aid and that this influence is heterogeneous across events and skewed to some type of disasters (e.g., earthquakes) and countries (e.g., higher income) (Eisensee and Strömberg 2007, Franks 2013). For some institutional disruptions, economic importance may have a negligible effect because of the magnitude of news coverage. Events such as the 2017 Hurricane Maria in Puerto Rico and the 2011 earthquake and tsunami in Japan were certain to receive firm aid irrespective of the economic importance of the country to the MNE. We thus followed (Stromberg 2007) and reran the analyses with only disruptions that had a probability of being in the news of 50 percent and lower. The magnitude and direction of the estimates held.

**Table XVI. The Effect of Economic Importance of the Country on the Magnitude of Donations
Sample Restricted to Events with a Probability of Being in the News of 50 Percent and Lower**

Variables	USD Donation Amount (ln) (1)
H1: Economic Importance	18.705*** (1.713)
H2: EI x Dominant MNE Index	5.382*** (1.855)
H3: EI x Host-Country Public Aid (ln)	-0.377*** (0.079)
H3: EI x Foreign Public Aid (ln)	0.352*** (0.075)
H4: EI x Regulatory Quality	2.017*** (0.509)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes
Observations	173,972
MNEs	1,891
Countries	42
Disruptions	92

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected and whose probability of being shown in mass media was 50 percent and lower. See text for sample construction. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Is it Social Pressure Coming from Local Presence?

Firms are embedded in societal arrangements that foster normative pressure for philanthropy on the geographically proximate firm (Marquis, Davis, and Glynn, 2013; Zhang and Luo, 2013) and may donate for the approval of the local community [i.e., social license to operate (Boutilier and Thomson, 2011; Wilburn and Wilburn, 2011)]. The MNE's physical presence may be a simpler explanation, and economic importance would be a second-order measure captured by differentiating firms based on geographic presence. We test this by substituting our predictor with *physical presence*, a binary variable taking value "1" when the firm has at least one affiliate in the country. Appendix Table XVII shows that its coefficient is negative and significant, consistent with work that suggests that firms present in a country struck by a major disaster will engage in scarce giving (Tilcsik and Marquis, 2013). Given that physical presence weights all locations equally, this result reconciles with existing work and thus implies that not considering the strategic value of affiliates is econometrically important. It suggests that the mechanism driving MNE philanthropy in the aftermath of institutional disruptions is more complex than local presence alone and our measure captures such complexity.

Table XVII. The Effect of Physical Presence on the Magnitude of Donations to Disruptions

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	-0.420*** (0.060)	-0.135** (0.061)	-0.276*** (0.068)
H2: EI x Dominant MNE Index	0.168*** (0.011)	0.197*** (0.013)	0.183*** (0.017)
H3: EI x Host-Country Public Aid (ln)	0.016*** (0.002)	0.007*** (0.002)	0.014*** (0.003)
H3: EI x Foreign Public Aid (ln)	0.004*** (0.001)	0.000 (0.001)	-0.001* (0.001)
H4: EI x Regulatory Quality	0.027*** (0.006)	-0.004 (0.006)	-0.044*** (0.007)
Dominant MNE Index	0.001* (0.001)	-0.017*** (0.001)	-0.013 (6.107)
Host-Country Public Aid (ln)	-0.003*** (0.000)	-0.002*** (0.000)	0.001 (2.932)
Foreign Public Aid (ln)	-0.027*** (0.002)	-0.001 (0.003)	-0.033 (124.043)
Regulatory Quality	-0.420*** (0.060)	-0.135** (0.061)	-0.276*** (0.068)
Firm Controls	NO	YES	YES
Country Controls	NO	YES	YES
Event Controls	NO	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	0.048** (0.019)	-0.375*** (0.037)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports regression estimates for the relation between the physical presence of the firm and donations in the aftermath of disruptions. See text for sample definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Is it Inequity or Poverty Aversion?

Firms may allocate resources for the goal of reducing financial disparity (Camerer and Fehr 2005, Fehr *et al.* 2006). If this preference dominated restoring economic institutions, MNE philanthropy would be comparatively greater in countries with high levels of poverty where economic inequality is pervasive. To test this argument, we regress an interaction of *economic importance* and *poverty* using the poverty headcount ratio at \$3.20 a day (2011 PPP) (as a percentage of population) from the World Bank's World Development Indicators (WDI) (see Anand and Sen 2000). We find that MNEs in the sample donated in a lower magnitude to poorer countries than to higher-income countries.

Table XVIII. The Effect of Equity and Poverty Aversion on the Donations of Economically Connected MNEs

Variables	USD Donation Amount (ln) (1)
EI x Poverty Gap	-0.043*** (0.003)
Economic Importance	-0.000 (1.705)
Poverty Gap	0.711*** (0.013)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes
Observations	444,385
MNEs	1,891
Countries	114
Disruptions	235

Notes: This table reports regression estimates for the relation between the country's poverty headcount (percentage of population living below the poverty line of \$3.20 a day) and donations by MNEs in countries affected by disruptions that are economically important for the firm. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

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- What basic question does your research answer?

Which firms will be substantial donors in the aftermath of institutional disruptions such as natural disasters, terrorist attacks, and epidemics?

- Please describe the primary purpose/findings of your article in 3 sentences or less. Please write as if explaining to someone without a background in science/research/etc.

We identify the factors driving company philanthropy in helping to resolve societal issues from large disruptions such as natural disasters, terrorist attacks, and epidemics. We find that the economic importance of a country market for the firm, moderated by country market concentration, public aid, and the country's regulatory quality, strongly predicts which firms will donate in the aftermath of disruptions. Monopolistic firms are comparatively large donors and act as an economic stop-loss mechanism during large disruptions.

- What is the most shocking/groundbreaking finding in your work? Please include both qualitative and quantitative answers.

The results pose an interesting paradox on the economic value of monopolistic firms. It is commonly held that monopolistic firms seek to influence institutions to enhance their position and restrict competition. However, we find that large, monopolistic firms are substantial philanthropic contributors that are critical for the country during institutional disruptions that overwhelm the financial and operational capacity of governments.

- Please provide 2 quotes we can attribute to you about your work that best capture the novelty and impact of your research.

“This study brings information that can help public agencies to harness the power of business toward global recovery from large disasters in an organized fashion. Given the rising funding gap in relief and recovery and the costs of disasters, the increasing participation of companies in such area has important implications for economic development”

“Multinational enterprises with local operations in a country affected by disasters can become catalysts for a more efficient response that helps the country recover comparatively fast.”

Article Implications

- What is the impact of your research to the world/community?

The costs of large disruptions such as natural disasters, terrorist attacks, and epidemics have increased six-fold since 1990, outpacing government ability to fund recovery. Firms are playing an increasingly crucial role in helping to alleviate the growing financial gap. We hope that our study can help government and multilateral agencies to predict the outpouring from firms toward relief and recovery. Collectively, our findings provide insight into contextual determinants that affect the firm incentives to donate. This can help stimulate and coordinate the engagement of firms for overcoming challenges from disruptions worldwide.

Firms donate less when they are faced with greater inefficiencies, bureaucracy, and logistical complexity due to low regulatory quality. For these countries, an implication of our results is that augmenting the quality of market-oriented institutions may facilitate greater support from firms when disruptions strike.

- Please describe in 3 sentences or less the takeaway(s) of your research.
 1. Despite being likely to incur extensive direct damages, economically connected firms are substantial donors in response to disruptions. These firms aim to restore factors that are essential for the market to function, such as infrastructure and labor markets, and the strength of the market restoration motive is positively associated with the economic importance of the affected country to the firm.
 2. Large monopolistic multinational firms are critical for the country during institutional disruptions that overwhelm the financial and operational capacity of governments.
 3. Firms donate less when economically connected firms are faced with greater inefficiencies, bureaucracy, and logistical complexity due to low regulatory quality. For these countries, an implication of our results is that augmenting the quality of market-oriented institutions may facilitate greater MNE support when disruptions strike.

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-
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Introduction

The past decade has brought substantial attention in the field of organization science to understand the motivations underlying for-profit organizations' involvement in addressing large societal issues (Cabral *et al.*, 2019; George *et al.*, 2016; Luo and Kaul, 2019). An extensive literature studies company philanthropy towards chronic societal problems under stable institutional contexts (e.g. poverty reduction and inadequate education and healthcare) (Bénabou and Tirole, 2010; Lev *et al.*, 2010). Yet, an increasingly important societal issue stems from what we term *institutional disruptions*—the severe and systemic, yet sudden, unpredictable, and temporary breakdown of market-oriented institutions. Market-oriented institutions are the intangible and physical factors necessary for business activities (Acemoglu *et al.*, 2005; Chakrabarti *et al.*, 2011; Coase, 1998; Dutt *et al.*, 2016). They include transportation and communication systems, product, capital, and labor markets, market intermediaries, and regulatory and enforcement systems (Acemoglu *et al.*, 2005; Chakrabarti *et al.*, 2011; Chan *et al.*, 2008; Dutt *et al.*, 2016; Khanna and Palepu, 1997). Phenomena such as epidemics, natural disasters, and terrorist attacks disrupt country market-oriented institutions. They halt firms' ability to obtain inputs or sell due to the destruction of infrastructure and purchasing power (Boehm *et al.*, 2019; Cavallo *et al.*, 2014; Oetzel and Oh, 2014), drop productivity because employees lost housing, schooling, or health status (Altay and Ramirez, 2010), suspend regulatory and enforcement systems (Copeland, 2005; Garrett and Tetlow, 2006), cancel investments due to the impact on financial intermediaries (Hosono *et al.*, 2016), and create environmental uncertainty (Bloom *et al.*, 2018a; Kozeniauskas *et al.*, 2018).

Since the turn of the 21st century, multinational enterprises (MNEs) have become the fastest-growing sector worldwide in funding recovery from such events, outpacing governments, multilateral agencies, and individual charity (High-Level Panel on Humanitarian Financing, 2016). Considering that they can create poverty traps and hamper economic development (Baker and Bloom, 2013; Barro, 2009; Weitzman, 2011), understanding MNE motivations to donate in the aftermath of institutional disruptions is crucial for fostering philanthropic behaviors and coordinating resources for recovery.

Scholars thus far have applied motives widely tested under stable institutional contexts to explain philanthropy after such events. That is, firms donate to meet social preferences such as altruism or reciprocity (Morgan and Tumlinson, 2019) or pursue strategic considerations such as to accumulate reputational capital (Muller and Kräussl, 2011), hedge the firm against political risk (Zhang, Marquis, and Qiao, 2016), or comply with social norms or pressure (Luo, Zhang, and Marquis, 2016; Tilcsik and Marquis, 2013; Zhang and Luo, 2013). A handful of studies suggest that the organization's geographical locations affect the connection with stakeholders and generate normative and political motivations to donate (Bertrand *et al.*, 2020; Marquis and Qian, 2014; Zhang and Luo, 2013). These approaches have deepened our understanding of company philanthropy. Nevertheless, by building on the importance of the firm's locations with an economic rationale, we suggest that institutional disruptions provide a context that makes salient a different, previously not studied motive: restoring the market.

We theorize that institutional disruptions reveal the strategic value of a country's market for firms. Company performance relies on the market-oriented institutions in the countries in which it operates (Chittoor *et al.*, 2009; Khanna and Palepu, 1997; Toulan, 2002), and disruptions increasingly explain performance volatility and survival for firms with operations in the affected country (Aghion *et al.*, 2017; Baker and Bloom, 2013). We argue that the larger the economic importance of a country for the MNE (i.e., the extent to which selling, buying, or renting inputs, final products or services, or hiring human capital in the country market explains its performance), the greater the shock to firm performance and thus the organizational incentive to allocate resources toward the country's market recovery. Consequently, a measure of the relative economic importance of a country market for MNEs can identify which firms will donate when disruption strikes.

We inform our theory with interviews of business decision-makers from S&P 500 firms.ⁱ Drawing on existing research on firm costs and benefits of non-market decisions, we expect the baseline relationship will be moderated by the potential for substitute sources of funding and the nature of the market institutions (Ferrell, Liang, and Renneboog, 2016; Kaul and Luo, 2017; Luo and Kaul, 2019; Morgan and Tumlinson,

2019). Countries use three alternative sources for funding recovery: business organizations, public aid coming from the state power and foreign governments, and individual charity (High-Level Panel on Humanitarian Financing, 2016). Among these sources, studies show that individual charity is comparatively hard to track, and employees tend to contribute to the organizational fund via matching programs (Andreoni, 2006; Morgan and Tumlinson, 2019; White and Lang, 2012). Therefore, we focus on other corporate donors and public aid as alternative sources of non-market substitutes for funding recovery. When the pool of firms capable of participating is small, the cost of foregoing nonmarket action is considerable (Bonardi, Hillman, and Keim, 2005; Schuler, Rehbien, and Cramer, 2002). We thus hypothesize that the average donation of economically connected MNEs rises with the index of dominant MNEs in the country. A country's recent history of substantial public expenditure fosters the expectation that public agencies will fund recovery (Acemoglu *et al.*, 2005) and thus reduces the strategic value of donating. We propose that the philanthropy of MNEs with economically important operations in the affected country decreases in the expected outpouring of public aid.

Finally, the nature of market institutions is affected by the country's quality of governance for resources allocated to market-oriented institutions (Dorobantu, Kaul, and Zelner, 2017; Zhang *et al.*, 2016). Low regulatory quality increases the cost of restoring the country market because of bureaucratic delays and because agencies often underinvest in factors critical for economic rebuilding or overinvest in nonessential areas (Ballesteros and Gatignon, 2019; Bertrand *et al.*, 2020). Accordingly, we expect economically-connected MNE donations will increase with country regulatory quality.

To empirically test the hypotheses, we construct the Global Database of Disaster Responses. The database covers reported monetary and in-kind donations from firms, governments, multinational agencies, and non-governmental organizations reported in news media to the relief and recovery of all disasters from 1990 to 2019. We identify shocks that meet the characteristics of institutional disruptions to select our event panel. Specifically, we consider 265 epidemics, natural disasters, and terrorist attacks that have sudden and systemic impacts (Baker and Bloom, 2013; Bloom *et al.*, 2018a; Kozeniauskas *et al.*, 2018) ranking in the

top one percentile of damage (Cavallo *et al.*, 2013) over the last 30 years in the 129 countries that they affected. Using Orbis firm data, we focus on the 2,000 largest public MNEs (by revenue) at the international level and their affiliates worldwide. We construct a time-varying, pair-specific measure linking ownership-weighted MNE operations, as well as alternative measures using assets, employees, and revenue, to countries to operationalize the relative economic importance of country markets for each MNE.

Consistent with the strategic motive of donating to restore the country market, the analyses provide systematic and robust empirical evidence that the economic importance of a country market to the MNE is positively associated with its philanthropic response in the aftermath of disruptions. The effect is significantly moderated by the theorized constructs that influence the costs and benefits of donating for country market recovery. Crucially, our data indicate that MNE donations often target factors that are critical for market-oriented institutions functioning. We exploit variation in donation reports using natural language processing to identify donations that explicitly state the allocation of cash and in-kind resources toward these key factors with consistent findings.

The results survive the inclusion of a battery of fixed effects and time-variant firm-, country-, and event-specific variables, including the standard measures of other major alternative explanations of company philanthropy such as reputational capital, pressure by the host-country government, market growth, media visibility, inequity and poverty aversion, and the altruistic motivations of employees. We also apply a matching technique to produce estimates that de facto condition on the possibility of self-selection of MNEs into countries with specific exposure to disruptions or proneness to receive aid and find consistent results.

Notably, this study on MNEs' decisions to donate complements research on philanthropic outcomes that indicate that firm giving is effective in speeding economic recovery. Between 2003 and 2013, countries that received a substantial share of aid from MNEs with operations in the affected country showed rebounds of the annual growth rate of the Human Development Index of up to 200 percent higher than for counterfactual affected countries with lower aid from MNEs (Ballesteros, Useem, and Wry, 2017).

We contribute to the nonmarket literature by bringing attention to a different underlying motive of company philanthropy. A market restoration motive leads to predictions that diverge from the extant literature. Specifically, existing research suggests that organizations with operations in an affected country are likely to incur substantial damages and, therefore, will engage in scarce giving in the aftermath of large shocks (Crampton and Patten, 2008; Tilcsik and Marquis, 2013). In contrast, using a comprehensive database across countries and time, we find systematic evidence that MNEs with economically important operations in the country market are the largest donors in the context of institutional disruptions. When the factors underpinning the functioning of market-oriented institutions are absent, focusing on the organization's operations can be insufficient for reinstating performance. Moreover, whereas existing literature predicts that firms are incentivized to donate more in competitive markets (Bénabou and Tirole, 2006; Godfrey, Merrill, and Hansen, 2009; Mellahi *et al.*, 2015), markets with low regulatory quality (Hornstein and Zhao, 2018; Zhang and Luo, 2013), and with government actors to garner stakeholder favor (Bertrand *et al.*, 2020; Godfrey *et al.*, 2009; Henisz, Dorobantu, and Nartey, 2013), our findings indicate that companies donate comparatively less in highly competitive country markets, in countries with low regulatory quality, and with government actors. This highlights the idiosyncrasies of the goal to restore the country market when market-oriented institutions are disrupted.

We distinguish the concept of institutional disruptions and its relevance to nonmarket behavior. The concept may help to delineate better the challenges that firms face, and the possible strategies that firms may use to address them. Institutional disruptions are ubiquitous to emerging and developed economies alike and are distinct from the long-lasting or permanent absence of market-based institutions (voids) in emerging market countries (Doh *et al.*, 2017; Dutt *et al.*, 2016; Khanna and Palepu, 1997). Our analyses consistently indicate that this theoretical distinction is meaningful. For instance, the overlap between private and public interests in concentrated country markets appears to be substantially greater during institutional disruptions. Monopolistic firms seem to act as a stop-loss mechanism when disruptions overwhelm the capacity of governments. We observe this across levels of economic and institutional development.

Finally, we contribute to the literature on shocks by formally characterizing them based on temporality, suddenness and unexpectedness, severity, and pervasiveness. Existing research on shocks considers one or several of the characteristics but does not formalize all four.ⁱⁱ For instance, studies have focused on expectedness and severity (Dye, Eggers, and Shapira, 2014), frequency (Oetzel and Oh, 2021, 2014), and severity and pervasiveness (Klüppel, Pierce, and Snyder, 2018; Muller and Kräussl, 2011). Our framework allows for the combined study of different events such as terrorist attacks, natural disasters, and epidemics and enables us to differentiate which shocks will be disruptive rather than produce evolutionary changes for testable predictions on firm outcomes and behavior.

Much prior work focuses on how firms seek to mitigate or prevent exposure to country risks or uncertainty shocks through, for example, avoiding disaster-prone countries or eliminating problematic affiliates (Oetzel and Oh, 2014; Pek *et al.*, 2018) and examines how shocks may deter firm survival (Aghion *et al.*, 2017; Alfaro and Chen, 2012), affect organizational change (Christianson *et al.*, 2009), and learning (Lampel, Shamsie, and Shapira, 2009). Our study identifies how the economic importance of the country to the MNE and country conditions can lead to MNEs responding by restoring the institutional context and thereby become key actors in helping overcome societal issues around the world.

Theory and Hypotheses

Market-Oriented Institutions and Firm Operations

Markets are “institutions that facilitate the exchange of goods” (Coase, 1988: 7). We follow the seminal conceptualization of institutions as “humanly devised constraints that structure political, economic and social interactions” (North, 1991: 97). Market-oriented institutions combine to create interlocking activities that shape business in the country market (Nelson, 1995). They entail not only product, capital, and labor markets, but also market intermediaries, physical infrastructure, and regulatory and enforcement systems (Acemoglu *et al.*, 2005; Chakrabarti *et al.*, 2011; Chan *et al.*, 2008; Coase, 1988; Dutt *et al.*, 2016; Khanna and Palepu, 1997). Market-oriented institutions affect firm costs of exchange and production (Chakrabarti *et al.*, 2011; Cuervo-Cazurra and Dau, 2009; Hoskisson *et al.*, 2000) and firm ability to transact or operate

(Dutt *et al.*, 2016; Mair and Marti, 2009). Underpinning the functioning of market-oriented institutions is the presence of tangible and intangible factors that allow market transactions to occur. When these factors disappear, become damaged, or destroyed, there is a breakdown in market-oriented institutions.

Traditionally, researchers have studied the absence or evolution of market-oriented institutions with two broad streams of scholarship (Acemoglu *et al.*, 2005; Chan *et al.*, 2008). On the one hand, the chronic absence of goods for country market operation, also referred to as *institutional voids*, creates market failures (Khanna and Palepu, 1997). When factors such as communication, transport, and energy infrastructure, skilled labor, intermediaries, and contract enforcement mechanisms are absent, firms face substantial operational and transactional frictions (Chan *et al.*, 2008; Doh *et al.*, 2017; Khanna and Palepu, 1997). These frictions impede firms from accessing the resources and agents necessary for economic activities and have significant organizational and performance implications. Consequently, firms with the relevant resources often internalize activities, and those without such resources may not be able to or may choose to not operate in the country market (Doh *et al.*, 2017; Dutt *et al.*, 2016; Khanna and Palepu, 1997).

On the other hand, scholarship on evolutionary changes to market-oriented institutions studies permanent alterations. The institutional changes are mainly due to slow evolving socioeconomic and political processes but may (more rarely) be punctuated changes (Klüppel *et al.*, 2018; Newman, 2000; Peng, 2003). Punctuated changes include upheavals (Newman 2000), transitions (Chittoor *et al.*, 2009; Peng, 2003; Steensma *et al.*, 2005), and traumatic shocks (Klüppel *et al.*, 2018).ⁱⁱⁱ Institutional upheavals and transitions are rapid and comprehensive changes that enduringly alter the systems and underlying factors for the competitive landscape of a country's market (Newman, 2000; Peng, 2003). Traumatic shocks, such as war, change institutions so that they affect firm strategy and structure decades or even centuries after (Klüppel *et al.*, 2018). The radical changes lead firms to adjust their operations to fit the new institutional environment and survive (Klüppel *et al.*, 2018).

The literature is not explicit about institutional disruptions. We posit that disruptions are different from existing concepts of institutional voids and evolutionary changes in four cardinal ways:

Short-lived Temporality. In contrast to the persistent shifts from evolutionary changes and chronic absence from voids, disruptions are temporary deviations from the status quo. Although there may be some adjustments in norms like building codes, most institutions return to a similar level after an institutional disruption (Bloom *et al.*, 2018a; Kozeniauskas *et al.*, 2018; Useem, Kunreuther, and Michel-Kerjan, 2015).

The transient nature is driven by the phenomena behind institutional disruptions developing and disappearing in days, yet, leaving a wake of destruction whose length of restoration may be substantial. For essential goods, such as education and housing, repair often comes within weeks (Tomasini and Van Wassenhove, 2009). For others, such as transportation infrastructure, rebuilding may take several years (Ballesteros and Kunreuther, 2018). For instance, it took nearly three months to restore the water system in Japan after the Tohoku earthquake (Ballesteros, 2019). In contrast, the displacement and malfunctioning of labor markets after U.S. Hurricane Katrina lasted over two years (Deryugina, Kawano, and Levitt, 2018).

Suddenness and Unexpectedness. For institutional voids or evolutionary changes, checks and balances and due processes using macro variables facilitate assessing challenges from the lack of or underdeveloped market-oriented institutions (Henisz, 2000). Decision-makers can assess country attractiveness (Berry, Guillén, and Zhou, 2010) and adjust their organizations' structures and strategies (Chittoor *et al.*, 2009; Toulan, 2002) to the evolving institutional context (Flores and Aguilera, 2007; Wu and Chang, 2014). For institutional upheavals, transitions, and traumatic shocks, the changes typically take two to three years to unfold (Newman, 2000), providing firms time to adjust their operations.

Conversely, institutional disruptions are highly unpredictable and characterized by rapid drops in the functioning or availability of factors necessary for operation. In this sense, traditional measures of country risk and development are often poor indicators of the resilience of market-oriented institutions against disruptions (Ballesteros *et al.*, 2017). To illustrate, before the Tōhoku disaster that resulted in the largest economic damage from one event in history, scientists calculated a zero probability that a hundred-foot tsunami could hit Japan (Ferris and Solis, 2013), and many firms believed that the Japanese economy barely would be affected (Kunreuther and Useem, 2018). The CEO of a chemical company explained: "...*We got*

together all of our leaders and we had them work through three different scenarios using data from the government on what they would do...we had those plans in place... (The loss) turned out to be a lot worse.”

High Severity. Whereas evolutionary changes often target improved market-oriented institutions, disruptions entail significant destruction in the affected country. For instance, in the U.S., the Federal Emergency Management Agency calculates that 40 percent of businesses do not reopen after experiencing a natural disaster, and 90 percent go bankrupt within a year if they do not resume operations in a week (FEMA, 2015). The disruptions result in an extensive loss in connectivity with stakeholders (Alfaro and Chen, 2012) and, more broadly, the provision of products and services (Bloom *et al.*, 2018a). The 2010 Chile and 2011 Japan earthquakes and tsunamis, for instance, destroyed respectively 32 percent and 17 percent of goods supply for at least two months (Cavallo *et al.*, 2014).

There is systematic evidence that these events explain economic development, and one key mechanism through which this occurs is drops in productivity (Altay and Ramirez, 2010; Bloom, 2009). In practical terms, organizations face reductions in the ability of their labor force to work at the same level. Not only are employees or their family members often direct victims and their residencies affected, which implies that they must relocate, but they may also suffer the loss of their children’s school or the transportation systems to commute. Crucially, this affects employees of both business and government organizations. As a municipal official commented on the 2010 Chile earthquake, *“there was no light, we had no water, no staff, the city disappeared, officials disappeared...There was absolutely no one.”* The magnitude of the consequences was ubiquitous in our interviews. After the Japanese 2011 earthquake and tsunami, a manager of a logistics company stated, *“(The firm is) worried about roads, trains, airports. Things that get produced going to be delayed an also the materials to produce them. Everyone is going to miss their numbers.”*

Pervasiveness. Scholars traditionally situate institutional voids in lower-income countries or emerging economies (Doh *et al.*, 2017; Khanna and Palepu, 1997) and evolutionary changes in transitional economies (Banalieva, Eddleston, and Zellweger, 2015; Peng, 2003; Toulan, 2002). Conversely, institutional disruptions spread across economic and institutional development levels, with costlier shocks affecting

medium- and high-income countries (High-Level Panel on Humanitarian Financing, 2016). MNEs increasingly acknowledge this ubiquity in our interviews. The head of operational risks of a bank indicated that “*Before the terrorist attacks (of 9/11 in the U.S.) there was a sense that things happen in places like Nigeria, but they don't happen in places like New York City.*”

The effects of institutional disruptions are systemic at the country level. Interdependencies transmit shocks across industries and regions. For example, Thailand, which manufactures one-third of the world's hard-disk drives and is a production hub for car makers, experienced a flood in 2011 that damaged or destroyed the facilities of more than 14,000 businesses. Companies such as Apple, Toyota, and Ford that relied on operations or suppliers in the country had to suspend or delay production due to part shortages and inability to access alternative sources of parts. The effect on financial intermediaries is similarly problematic. To illustrate, after the Tōhoku earthquake, 11.4 percent of firms operating in Japan indicated that their bank could not operate (Miyakawa and Hosono, 2014), causing otherwise undamaged firms to have significantly smaller investment (Hosono *et al.*, 2016).

Donations as a Nonmarket Response to Institutional Disruptions

Significant changes in market-oriented institutions affect firm performance and survival, motivating them to act in response (Chittoor *et al.*, 2009; Toulan, 2002). Firms can react by altering their governance structures to fit the institutional environment or by transforming the institutional environment (Dorobantu *et al.*, 2017; Williamson, 1998). A vast literature focuses on firms matching their governance structures to the institutional environment (Williamson, 1991, 1998). Nevertheless, institutional economists have long acknowledged that firms should first work on getting the institutional environment right (first-order economizing) and then select the best governance structure based on the institutions (second-order economizing) (Williamson, 1998). As discussed below, the four characteristics of institutional disruptions are crucial to understanding MNE response to restore market-oriented institutions.

More specifically, the temporal nature of disruptions attenuates incentives to change the supply chain, alter governance structures, or exit the country market. Organizations benefit from close proximity, inter-firm asset specialization, and relationships developed over time with their exchange partners (Dyer, 1996; Elfenbein and Zenger, 2014). Switching suppliers can be expensive and create a loss of valuable relational capital (Elfenbein and Zenger, 2014). Additionally, exiting the country market often is not an attractive option given the access to customers, resources, or local knowledge (Alcácer and Chung, 2007, 2014). Consequently, these are often costly or undesirable strategic responses to disruptions.

The abruptness and ambiguity of disruptions often yield prevention and coping mechanisms unfeasible or ineffective. For instance, despite over 75 percent of the firms that we interviewed indicating that they had routines for threat identification and prioritization against disruptions, they noted that the relevant required information for planning is mostly unavailable and inaccurate. Moreover, although over the last 20 years firms have had sophisticated instruments to hedge catastrophe losses (e.g. index-based insurance such as catastrophe bonds), the financial impact of these shocks has skyrocketed, resulting in an uncovered magnitude of hazard (Kunreuther and Useem, 2018).

The multi-faceted and pervasive nature of disruptions means that firms often need to consider strategic actions beyond their operations. Additionally, the high-consequence incentivizes decision-makers to allocate resources to mitigate the impact on firm performance. Although firms may lobby governments to distribute public aid for country market recovery, such indirect strategies are lengthy to unfold (Cohen and Werker, 2008). This can be costly as the firm waits for restoration.^{iv} Donations can be a direct and effective means of transforming a disrupted institutional context.

Our database provides accounts of this motive. In response to the 2011 Thailand flood, Honda Motor Company donated \$3.7 million and 200 engines for the Thai government to provide power in areas so that customers, businesses, and government organizations could function. Another case is when Hurricane Katrina severely damaged Royal Dutch Shell's large operations in the Gulf of Mexico. The company helped rebuild public facilities and assist agencies, including the New Orleans Police and Justice Foundation's

housing initiative for police, fire, and emergency medical staff. Additionally, Shell provided \$45 million in support for its employees and “*made getting them back to work a priority*” (Ballesteros, 2019).

At the same time, given the uncertainty of institutional disruptions, this type of philanthropy is rarely budgeted. The firm must often face the opportunity cost of deferring country investments or cancelling previously planned social projects (Ballesteros, Wry, and Useem, 2018). Corporations regularly re-allocate resources from previously approved causes that account for their annual social responsibility budget or even more. Take the case of Pfizer, which donated \$47 million in the aftermath of the 2004 Indian Ocean tsunami, or many times the combined annual social expenditure in the eight affected countries.

Given the opposing forces of the need to recover the country market and the opportunity costs of philanthropy, a central question is what affects when an MNE becomes a contributor towards recovery. Donating to restore the elements necessary for market-oriented institutions to function is a nonmarket strategy that helps to reestablish the institutional context. Firms are motivated to influence their institutional environment based on the costs they face and their perceived benefits from the nonmarket strategy (Ahuja and Yayavaram, 2011; Bonardi *et al.*, 2005; Dorobantu *et al.*, 2017; Schuler and Rehbein, 1997). In the context of disruptions, we follow this cost-benefit logic for predicting which MNEs will donate. As elaborated in the discussion section, the cost-benefit logic, albeit intuitive, leads to predictions for MNE donations that differ from extant work.

The Economic Importance of Countries and the Philanthropy of MNEs after Disruptions

A decisive determinant of the strategic value of donating to restore the country market is the economic importance of the country to the firm. MNEs with a large proportion of their performance explained by the focal country will suffer greater financial consequences than a similar one without such connection (Aghion *et al.*, 2017; Alfaro and Chen, 2012). MNEs with economically important operations in the affected country experience reductions in sales due to loss of consumer purchasing power, in productivity because of injury to employees or their families, in the ability to produce products or services because of infrastructure

damage, and in production scales because of shut down of suppliers and shortages of public services (Kunreuther and Useem, 2018). For these firms, the costs of not restoring the country market are extensive.

One might expect firms with economically important operations to focus their resources on restoring their facilities and engage in scarce giving (Tilcsik and Marquis, 2013). Economic concerns constrain company philanthropy, and the disruption instills fiscal pressure on the firm. Additionally, affected non-profits create a broken infrastructure for philanthropic giving (Ballesteros and Gatignon, 2019).

Conversely, firms without economically important operations in the affected country may be motivated to donate. Company giving often is driven by the satisfaction of social preferences such as altruism, reciprocity, and homophily (e.g., Charness and Rabin, 2002; Fehr and Fischbacher, 2002; Small and Simonsohn, 2008). Additionally, large shocks frequently receive substantial global media attention, which offers the prospect, for instance, to foster a public image of philanthropy (Eisensee and Strömberg, 2007). To illustrate, the 2010 Haitian earthquake was covered extensively in the media. Without Haiti being economically important, worldwide media coverage creates a global opportunity for firms to generate reputational capital (see, e.g., Godfrey, 2005). Altogether, the costs to MNEs experiencing the disruption combined with the motivations to donate of those not experiencing it suggests that MNEs with greater economic importance in the affected country will be less likely to donate after an institutional disruption.

Contrary to this prospect, we argue that these firms will be the *largest* donors for several reasons. First, institutional disruptions have a systemic impact. Thus, although a firm may be able to rebuild its operations, the lack of factors necessary for market-oriented institutions to function means that it still may not achieve pre-disruption performance levels until they are reestablished. For instance, the 2011 Tōhoku disaster extensively damaged three Toyota factories, destroyed Japanese ports and the power supply. Consequently, even if Toyota rebuilt its plants, it would not be able to operate fully. Its suppliers could not supply components without power, nor could it ship its automobiles or supply auto parts to its international manufacturing facilities until the ports were restored (Forbes, 2011). Toyota donated power supply systems

to ease power shortages in the country and paid full salary to their employees to help its suppliers start producing again (Rodríguez and Sanchez, 2012).

Second, firms are motivated to provide financial resources to minimize the spillover effects across affiliates (Gopalan *et al.*, 2007) and are more likely to respond where the impact of existing institutions on the firm's business is greater (Hadani and Schuler, 2013; Hillman, Keim, and Schuler, 2004). Affiliates of strategic importance are likely to receive support from top management in response to institutional changes because the impact is material to the firm (Gubbi, Aulakh, and Ray, 2015). Our interviewees frequently refer to this idea. A manager of a manufacturing firm commented, "*The situation in Thailand was very different from Japan following the earthquake in an important way. When the impact (hit) a size of our business that was much greater, we immediately mobilized resources... We knew that if it escalated, it will be bad for us because a larger supply chain disruption... in this case a component sourcing from Thailand.*" Likewise, the vice president of a British mining company remarked on the 2010 Chilean earthquake: "*Chile is [our] number one copper producer and that represents a big part of our business... so we mobilized...*"

Third, this type of philanthropy has immediate financial payoffs. MNEs with large host-country operations are more efficient at identifying areas instrumental for country market functioning, providing capital faster than traditional sources of aid, and assisting rebuilding efforts towards recovery, which reduces the cost of philanthropy (Ballesteros *et al.*, 2017; Kunreuther and Useem, 2018). For example, the mining company above used their technology and machinery for restoration, commenting: "*the first action, to clean the roads... and allow communication and transportation systems to be restored.*" By taking these actions, not only could the firm start transacting again, but also its customers and suppliers could operate and thus it helped reinstate the country market system. Consequently, the benefits extend beyond the focal donation and are proportional to the economic importance of the country to the MNE. Thus:

Hypothesis 1 (H1): The greater the economic importance of a country for the firm, the greater its donation in response to an institutional disruption.

As previously discussed, we expect that the country dominant MNE Index, public aid, and regulatory quality will be three contextual elements that moderate the baseline relationship.

Dominant MNE Index. Firm share of benefits and costs from influencing market-oriented institutions depends not only on where the business impact is greatest, but also on the presence of other firms able to participate (Bonardi *et al.*, 2005; Schuler and Rehbein, 1997; Schuler *et al.*, 2002; Schuler, 1996). A country's index of dominant MNEs reflects the concentration of large firms in the country. When the country is highly competitive, that is when there are a large number of players with sizeable country market shares, the costs of changing the institutional environment may be divided across more firms capable of contributing (Bonardi *et al.*, 2005; Schuler and Rehbein, 1997; Schuler *et al.*, 2002; Schuler, 1996). To illustrate, the costs of restoring the factors necessary for the labor market to return to work after the 2011 Tōhoku disaster could be spread across many large MNEs located in Japan.

In practical terms, the managers that we interviewed discussed how in deciding how much to donate in an economically important country, they look to the presence of large firms in the country such as Coca Cola, Microsoft, Mitsubishi, Tata, Toyota, and Volkswagen. When the country has relatively few large firms, the MNE perceives its contribution as necessary and increases its donations to ensure sufficient funds for recovery.

Ceteris paribus, the smaller the number of firms holding a significant share of the country market, the greater the strategic value of restoration for firms with economically important operations. Monopolistic firms realize comparatively large proportions of the benefits from restoring market-oriented institutions (Bonardi *et al.*, 2005; Ferrell *et al.*, 2016; Luo and Kaul, 2019). After the 2010 Chilean earthquake, managers from a large mining company reflected that the company's operations accounted for approximately three percent of Chile's GDP to emphasize the marginal relevance of operative interruptions. The firm donated \$10 million on rebuilding. For monopolistic firms, the cost-benefit of company giving approximates private investments. These firms can capture comparatively large value from the capital injected to restore the country market. Therefore:

Hypothesis 2 (H2): The Dominant MNE Index positively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Public Aid. Public actors traditionally play an essential role in managing societal issues (Cabral *et al.*, 2019; George *et al.*, 2016; Quelin *et al.*, 2019). In the case of institutional disruptions, public relief and recovery come from the host country and foreign governments and multilateral agencies, such as the United Nations' Office for the Coordination of Humanitarian Affairs (UNOCHA) (High-Level Panel on Humanitarian Financing, 2016).^v Thus, host-country public aid and foreign public aid are two distinct sources of aid that MNEs consider in donating. A recent history of substantial host-country and foreign public aid to restore human welfare, damaged infrastructure, and other factors necessary for market-oriented institutions fosters an expectation by firms that public aid will fund the country's recovery.

There is evidence at the individual level that public intervention crowds out philanthropy (Andreoni, 2006). We hypothesize that a similar relationship operates at the organizational level because public aid brings the benefits of country market restoration to the MNE without incurring the costs of giving.

Conversely, when host-country and foreign public agencies do not mobilize resources in sufficient magnitude, MNEs with high economic importance are more likely to deem firm resources as costs critical for achieving country market restoration. This argument is captured by a vice president of a soft-drink manufacturer when explaining his company's philanthropic engagement after the 2011 disaster in 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." MNEs with high economic importance in the affected country will donate more after a disruption when they believe that its economic magnitude outstrips public resources.

Hypothesis 3a (H3a): Host-country public aid negatively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Hypothesis 3b (H3b): Foreign public aid negatively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Regulatory Quality. A country's quality of governance influences the materialization of incentives to engage in nonmarket strategies (Aguilera *et al.*, 2007; Dorobantu *et al.*, 2017; Ferrell *et al.*, 2016; Zhang *et al.*, 2016). Government commitment or ability to formulate and implement policies to permit and promote private sector development, referred to as regulatory quality (Kaufmann, Kraay, and Mastruzzi, 2011), is critical for creating and maintaining market-oriented institutions. High regulatory quality enables the swift use and dedicated allocation of resources towards factors necessary for economic activity. It, therefore, enhances the comparative benefits of firm donations towards the recovery of country markets.

On the other hand, low regulatory quality increases the costs of donating. In such case, the process of rebuilding can be substantially impeded by lower government commitment, ability, or red tape (Becerra, Cavallo, and Noy, 2014). Even if the MNE uses its efforts and resources to rebuild directly, the logistical complexity from regulations and controls reduces the efficiency of such efforts (Ballesteros and Gatignon, 2019). Countries with low regulatory quality have more market regulations, protections, and controls (Kaufmann *et al.*, 2011), which reduces MNE ability to respond because of bureaucracy and bottlenecks for permitted organizations to perform restoration activities. Some of our interviewees noted these problems after the Chilean earthquake in 2010 when companies were encouraged to contribute to recovery directly through the government's ministries. Firms soon realized that government inefficiencies mired the delivery of funds. As one manager stated, "*we were worried that the public system would take forever to apply resources to the emergency...and that, for sure, led firms to think twice about donating.*"

Donations are more likely to be diverted or suffer leakages before reaching the target areas. For example, reports suggest that the government's misuse of aid may be behind the lengthy recovery of Haiti from the 2010 earthquake (Useem *et al.*, 2015). Country officials demanded cuts of donations to clear customs and held up goods at borders to force payment (Farny, Kibler, and Down, 2019).

Thus, low regulatory quality deters donations from economically connected MNEs because decision-makers fear that resources will be delayed or not well spent, which increases the relative cost of giving. In such environments, skepticism abounds as to whether the benefits of donations will materialize as one survivor of the Haiti earthquake commented, “*there might be some more money (from the donors), but those who need it won’t receive it*” (Farny *et al.*, 2019). We summarize our last hypothesis as follows:

Hypothesis 4 (H4). Country regulatory quality positively moderates the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

Empirical Strategy

Data

Company philanthropy. We built the Global Database of Disaster Responses using automated Boolean searches and natural language processing in Python. The database contains information on reported cash and in-kind donations from organizations (firms, governments, multinational agencies, and non-governmental actors) for the relief and recovery of every major disaster that affected the world from 1990-2019. The Boolean searches in Factiva, Google, and Lexis Nexis 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 and resulted in over 2,310,000 reports. We made the reports computationally tractable with differential language analysis and code information on the donor organization, the characteristics of the donation (i.e., in-kind, monetary or both, amount, currency, and timing), the initiator within the firm (i.e., employees or top management), and the target of the donation (i.e. essential goods, factors for the market, etc.). The database covers 96,858 donations from 40,170 firms from 84 countries of origin.

The online Appendix (<https://institutionaldisruptions.com/>) contains the detailed procedures for data collection and coding, including the strategies to monetize in-kind donations and convert non-U.S. dollar

reports.^{vi} It also describes the independent assessments of data quality and checks with third-party sources, including UNOCHA.

Firm-level data. Internationally large corporations account for over 90 percent of the growth in the participation of firms on disaster aid (Ballesteros *et al.*, 2017; Kunreuther and Useem, 2018). We rely on the largest 2,000 publicly traded MNEs by total revenue at the international level from Orbis to cover a representative sample of these firms. The MNEs had a total of 545,664 affiliates over the 2007-2019 period.

A major task was cleaning the ownership of the MNE affiliates for entry and exit into the MNE due to mergers, acquisitions, dissolutions, and spinoffs. We use shareholder and legal event data from the Orbis database to code changes in ownership over time. Where data were missing, or conflicting information was provided in the database, we cross-checked the data with public filings, corporate websites, and internet searches. Procedural details are in the online Appendix.

Disruption-level data. We pulled data on all shocks from the International Disaster Database (EM-DAT) from the Centre for Research on the Epidemiology of Disasters that is supported by the World Health Organization.^{vii} EM-DAT is a comprehensive international database on catastrophes.^{viii} For each shock, we obtained data on human and economic loss from the UNOCHA and the reinsurance company Swiss RE.

Country-level data. We gathered data on country aid and regulatory quality from the World Bank World Development Indicators (WDI) and the World Bank Worldwide Governance Indicators (WGI), respectively.^{ix} We also used these databases for country-level control variables.

Measures

Institutional Disruptions. The validity of analyzing company philanthropy in the context of institutional disruptions requires identifying sudden and unpredictable shocks that created systemic and severe losses in the country market. First, we follow Baker and Bloom (2013) that show that large terrorist attacks and natural catastrophes are associated with abnormal levels of market volatility and significantly

explain country GDP growth. Barro (2009) also includes epidemics as phenomena with several times more welfare costs for countries than frequent economic fluctuations. Additionally, large epidemics, natural disasters, and terrorist attacks tend to have systemic impacts on the country market (Aghion *et al.*, 2017; Bloom *et al.*, 2018a; Kozeniauskas *et al.*, 2018).

We then adopt the 30-day criterion between the start and end dates consistent with Ballesteros *et al.* (2017) for sudden shocks. Finally, to characterize severity, we calculate the percentile distribution for each variable separately: deaths, affected people, and economic damage. The percentile distribution of each variable was calculated by country for all shocks reported between 1997 and 2019 in EM-DAT, which uses a minimum degree of impacts to record events. We use percentiles because the mean and standard deviations are inefficient location statistics given the skewness of the historic impact distribution.^x We choose shocks that rank at the 99th percentile in the affected country in any of the three impact areas (i.e., deaths, affected people, or economic damage; Cavallo *et al.* 2013) to capture severe shocks for the country. We test the sensitivity of the results to the 75th and 90th percentiles.

Our firm-level data covers the period 2007-2019 that had 4,273 shocks worldwide. From these, 3,822 passed the 30-day criterion. At the 99th percentile of severity, there are 265 shocks that affected 129 countries that represent the four levels of country income.^{xi} The robustness tests with impact cutoffs at the 75th and 90th percentiles are available in Table III of the online Appendix together with the identification procedure and the severity cutoffs by country.

Dependent Variable

The dependent variable *Donation* is a continuous variable of the total U.S. dollar amount donated, logged for the analyses. We further refined the internal validity of our measure with *Donations Toward Market Factors*. We calculate the variable by summing donations whose reports explicitly indicate the company targeting the factors underpinning the functioning of market-oriented institutions. The factors

include rebuilding transportation, communication, power, and other infrastructure, and goods necessary for labor country market functioning, such as housing for displaced workers (see online Appendix for details).

The refined measure enables us to more closely uncover our theorized mechanism of restoring the country market. We also use it to test alternative explanations, such as the pursuit of reputation. We, however, do not use it as our primary variable because companies self-select to report the target of the donations.

Independent Variables

Economic Importance. Measuring the economic importance of a country to the MNE is not trivial given the combined impact of the idiosyncratic characteristics of affiliates that affect their strategic value and data constraints. For instance, measures based on revenue may strongly represent sales and underrepresent production affiliates. In contrast, measures based on employees and assets may underrepresent the strategic value of highly automated affiliates that employ few people. These measures largely reflect the demand side of the market rather than both the supply and demand side. While industry and country-level fixed effects can mitigate some of these concerns, there are substantial missing data for affiliate-level revenues, employees, and assets in databases. Although there is greater database coverage of the existence of affiliates than of their financial and operational metrics, a measure of economic importance based on the proportion of MNE affiliates in a country assumes an equal strategic value for each affiliate.

To operationalize a country's economic importance to a focal MNE, we start with the proportion of total affiliates owned by the MNE in the affected country. The international business literature has consistently identified the geographical dispersion of company affiliates as a determinant of corporate performance (see, e.g., Alfaro *et al.*, 2018; Andersson, Forsgren, and Holm, 2002; Berry, 2014; Bloom, Sadun, and Reenen, 2018b; Flores and Aguilera, 2007). We adjust the measure by the MNE's ownership percentage of each affiliate because the strategic value of country-specific performance for the firm rises in ownership. For countries where the MNE has no operations, economic importance equals zero.^{xii}

Economic importance, k , of country c to firm f at year t , ranges from 0 (low) to 1 (high) and has the following form:

$$(1) \quad k_{ct}^f = f(\sigma_c^f),$$

where

$$\sigma_c^f = \frac{\sum_0^n (\text{affiliate in country } c * \% \text{ ownership})}{\sum_0^w (\text{affiliate} * \% \text{ ownership})};$$

n is the number of firm affiliates in country and w is the number of firm affiliates in the world in the year of the disruption.

We test alternative explanatory variables with individual and combined polynomial expansions for affiliate revenues, assets, and employees (Table 4).^{xiii} Additionally, we run models excluding headquarter affiliates (Table VI in the online Appendix) and a measure not adjusting for ownership (omitted). The results were qualitatively consistent across these alternative measures.

We analyze missing data patterns and found no systematic divergence on the completely observed variables between those with missing data and those with available data. In other words, the hypothesis that data are missing completely at random cannot be rejected. To deal with missing data for these variables, a polynomial expansion can approximate the complete data. We use a multiple-input bootstrapping algorithm to address missing data that accounts for smooth time trends, changes across cross-sectional variables, and time and space correlations and integrates scant knowledge to specific cells when available (Honaker and King, 2010). This form of multiple imputations was used because addressing missing data with listwise deletion or mean substitution would foster the risk of obtaining biased estimates, increasing Type II errors, and underestimating correlations and coefficient weights.^{xiv} We expand using Chebyshev polynomials because they can arguably approximate most functional forms (Kolsarici and Vakratsas, 2015). We opted for a third-order polynomial based on the Bayesian information criterion after considering expansions up to the 20th degree.

Using our base estimation model, we examine the overall MNE donations-economic importance elasticities of the various operationalizations and find that it is greater for the ownership-weighted proportion of MNE affiliates in a country than for the alternative measures. Moreover, dividing the ratio of

the coefficient of the independent variable by the linear prediction results in a higher overall prediction effect. The analyses suggest that economic importance based on the proportion of ownership-weighted MNE affiliates is the best linear unbiased estimator. We therefore first employ it as a baseline measure of economic importance.

Of note, our measure offers a conservative estimate of the economic importance of a country to the MNE in two ways. First, MNEs with no ongoing operations that plan to expand to the country soon may have a comparatively high incentive to donate. Likewise, firms that plan to exit the country may have a reduced incentive to donate. Given that we calculate this variable on the year of the disruption, the donation of firms with these two strategies should reduce the statistical significance of our predictor. Second, this variable does not include sporadic commercial activity. Consequently, it is likely that the number of donors with some economic activity with the affected country is higher than what the analyses reflect.

Moderators. For H2, *Dominant MNE Index* is a Herfindahl-Hirschman Index (HHI) calculated at the country-level as the sum of squares of the proportion of revenues of the largest five firms in the focal country in the year of the institutional disruption. This variable provides a normalized value of firms with large shares of the country market. It ranges from zero to one, with larger values indicating greater dominant MNEs in the country market. The raw data source is Orbis.

For H3a and H3b, according to the literature on aid and disaster management, the average foreign net official development assistance and official aid, and the country's average gross national expenditure explain the availability of foreign and host-country resources towards disruptions, respectively (Becerra *et al.*, 2014; Cavallo *et al.*, 2013). When a disruption occurs, a firm may not know precisely how much general funding will be provided before it donates. Yet, the firm can form an estimate based on recent history. Therefore, to avoid reverse causality and capture the information available when making the donation decision, we use data from the two years before the event occurs. We construct *Foreign public aid* with the average of foreign net official development assistance and official aid for disasters in the two years

preceding the disruption. *Host-country public aid* is the average value of gross national expenditure in current U.S. dollars in the previous two years.

For H4, we use *regulatory quality* from the World Bank Worldwide Governance Indicators (WGI).^{xv} The variable ranges from -2.5 to 2.5 and “captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development” (Kaufmann *et al.*, 2011: 4).

Controls. In our most stringent specification, we use firm (i.e., MNE), affiliate industry (or simply “industry”), country-event, and year fixed effects that absorb all time-invariant donor and industry-specific effects and account for path-dependency of aid and year idiosyncrasies via year fixed effects. Country-event fixed effects are included because disruptions often affect different countries, particularly in some regions of the world, such as the Asian Pacific and Central America. Therefore, the shock data are naturally nested by country-event. Estimation vectors contain a battery of time-variant variables that influence company philanthropy. At the firm level, return on assets (*ROA*) and *Tobins' q*, both winsorized at 5 percent, and logs of *total assets*, *total revenue*, *number of employees* proxy for performance and size, which may affect the firm’s capacity to donate and the existence of disruption-specific resources (Ballesteros and Gatignon, 2019; Flammer, Hong, and Minor, 2019; Liang and Renneboog, 2017; Patten, 2008). Research and development intensity (*R&D intensity*) and *advertising and administration* expenditures (logged) may determine intangible resources, such as reputation and visibility, that are behind the capacity to accrue rents from philanthropy (Servaes and Tamayo, 2013).^{xvi} To address *donor fatigue*, we include the number of MNE donations made within the previous year (Andreoni, 2006). Orbis categorizes affiliates’ main activities into four categories: retail, service, manufacturing, and wholesale. We include *business-to-consumer*, measured as a binary indicator set equal to one when the MNE’s main activity is retail or services, because it may entail a different propensity to donate (Marquis and Tilcsik, 2016). All these variables are lagged by one year.

At the country level, we include logs of *GDP* adjusted for purchasing power parity in current USD; *trade* as a percentage of GDP, *population*, percentage of *urban population*, and land *area* (km²). These variables may skew shock exposure, the functioning of market-oriented institutions, and the availability of aid (Acemoglu *et al.*, 2005; Becerra, Cavallo, and Noy, 2015; Cavallo *et al.*, 2013; Kahn, 2005). We account for a measure of *control of corruption* that indexes “perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests” (Kaufmann *et al.*, 2011). The data come from the WDI and the WGI and are lagged by one year.

At the event level, we gather data from EM-DAT, UNOCHA FTS, and SwissRe to control for *disruption type* (e.g., terrorist attacks, epidemics, floods, earthquakes, etc.) because global philanthropy may be biased to some events (Eisensee and Strömberg, 2007), and logs of the *number of deaths* and *people affected* (i.e., displaced and injured) and *economic damage* to control for the magnitude of events (Cavallo *et al.*, 2013). The number of shocks in any given year may decrease the likelihood that a disruption receives donations (Eisensee and Strömberg, 2007). We include logs of the number of *disruptions in the country* and *worldwide* in the year before the focal disruption. Finally, we control for other *news pressure* that may crowd out aid by using the average of the median number of minutes a news broadcast devotes to the top three news segments in a day over the 40 days after the disaster date (Stromberg, 2007).

Our baseline method uses models of the following form:

$$(2) \quad \ln(1+\text{donation}_{fcd}) = \beta_0 + \beta_1(\text{economic importance}_{fcd}) + \beta_2(\text{e.i.}_{fcd} \times \text{dominant MNE index}_{cd}) + \beta_3(\text{e.i.}_{fcd} \times \text{host-country public aid}_{cd}) + \beta_4(\text{e.i.}_{fcd} \times \text{foreign public aid}_{cd}) + \beta_5(\text{e.i.}_{fcd} \times \text{regulatory quality}_{cd}) + \mu_f + \delta_c + \gamma_d + \varepsilon_{fcd}$$

where *f* is firm, *c* is country and *d* is event, e.i. is economic importance, and μ is a vector of firm, δ is a vector of country, and γ is a vector of event controls. ε_{fcd} is the error term. We apply generalized least squares with random effects (the p-value for the Hausman test is 0.1037).

Results

Tables 1 and 2 contain descriptive statistics and correlations, respectively. Panel A in Table 1 presents information at the MNE level. The average company in our sample has 57,695 employees, \$82.8 billion in total assets, and \$19.9 billion in revenue. Panel B presents country-level data. The average GDP of the affected countries was \$740.6 billion. The mean proportion of GDP explained by trade is 87.2. On average, sample countries have a level of regulatory quality of -0.01, close to the midpoint of zero on the scale. Similarly, countries have mean control of corruption of -0.09, which is comparatively close to the midpoint. Panel C presents disruption-level data. The 265 events have mean impacts of 2,105 deaths, 2.0 million people affected, and \$5.5 billion in economic damage. The vast majority of these disruptions are caused by floods and storms, with earthquakes the next most common event.

Approximately 31.4 percent of the MNEs in our sample are donors. For each event during our sample period, the average contribution by MNE donors totals \$858 thousand. There are a large number of firms that do not donate to a given event. As shown in Panel D, which contains the MNE-Country-Event variables, the average donation is \$5 thousand once we consider non-donors. The high maximum value of \$54 million and standard deviation of \$220 thousand indicate that the distribution of donations has a long right tail. Similarly, economic importance has a right-skewed distribution. There are a number of countries where many MNEs are not located, such as Vanuatu or Mali, which receive a zero for economic importance. Thus, the mean is 0.04, with a standard deviation of 0.15 and a maximum of 1.0.

Table 2 contains the pairwise correlations for our theorized variables. The data indicate a positive correlation between economic importance and the donated amount. Regulatory quality and foreign public aid are negatively correlated ($r=-.365$), consistent with relatively large foreign aid being provided to countries with low quality of institutions. Host-country public aid, on the other hand, tends to move in the same direction as regulatory quality. Given that higher-income countries explain high levels of regulatory quality, this correlation aligns with data showing that the share of government aid tends to be relatively large in these countries (Becerra *et al.*, 2014). Table IV in the online Appendix contains the partial models with the hypothesized interaction effects.

[INSERT Tables 1 and 2 ABOUT HERE]

Table 3 contains the full theorized model adding incrementally more demanding sets of control variables and fixed effects. Model 1 displays the results for the model without controls. We include time-varying controls in Model 2. Model 3 incorporates firm, industry, country-event, and year fixed effects. We discuss the baseline specification findings that have firm, country, and event controls (Model 2).

The coefficient for economic importance remains positive and significant across specifications. These results indicate that the economic importance of the country is an underlying factor for MNE donations in the aftermath of institutional disruptions.^{xvii} A one-unit increase in economic importance of the country for the MNE raises the average donation of 5 thousand (considering nondonors) to over \$11 million, which makes the impact economically significant.

The observed magnitude of the link between economic importance and donations is strongly affected by two aspects. First, we focus on the largest MNEs at the international level whose operations tend to be highly geographically diversified. A one-unit increase in the economic importance of a country for the MNE are extraordinary for these firms. Second, our sample includes a large portion of nondonors, which provides stability and robustness to the estimates and makes the elasticity of the studied relationship pronounced. This empirical strategy of considering a representative sample of firms and including nondonors extends the literature given that previous work has limited analyses to donor companies.

Regarding the interactions, in line with H2, the results suggest that the dominant MNE index positively moderates MNE donations for economically connected firms. Country markets have many large firms on average in our sample, with a mean value of 0.01. Holding everything else constant at the mean level of the interaction, a one-unit increase in the dominant MNE index is associated with 68 percent larger donations from MNEs for which the affected country is economically important.

We find mixed results for the interaction of public aid and economic importance on MNE philanthropy. On the one hand, we observe a non-complete crowding-out effect. As hypothesized in H3a, at the means, a one-percent increase of host-country aid is associated with 25.4 percent smaller donations for economically connected MNEs. Contrary to our expectations, however, a one percent increase in foreign public aid is correlated with 1.4 percent larger donations from MNEs for which the country market is economically important. This result could be driven by MNEs perceiving the amount of foreign aid as a signal of the country's resilience. The greater the amount of resources that the country receives from abroad, the lower the resilience and the greater the perceived need for firm resources. To further delve into this association, we run the analysis by country income group and present the results in Table VIII in the Appendix.^{xviii} As discussed in detail in the Appendix, the results highlight that when countries do not have sufficient resources for recovery, there is no crowding-out effect for public aid.

For H4, the level of regulatory quality of the country appears to be a significant factor when MNEs with economically important operations in the country decide to donate after institutional disruptions. The results consistently indicate that the average giving by these firms rises in regulatory quality. At the mean, a one-unit increase in the affected country's regulatory-quality index is associated with an increase in donations from economically connected MNEs of about 46.6 percent (see Model 2 in Table 3).

[INSERT Table 3 ABOUT HERE]

We employ the alternative measures of economic importance. Table 4 reports the baseline random-effects model with firm, country, and event controls using a measure of economic importance based on assets (Model 1), revenue (Model 2), employees (Model 3). Model 4 uses the combined expansion on assets, revenue, and employees. The results are qualitatively comparable.

[INSERT Table 4 ABOUT HERE]

Donations to Toward Market Factors. We next examine whether economic importance is predictive of donations explicitly targeting the restoration of factors necessary for market-oriented institutions to function in Table 5. Model 1 includes economic importance without interaction effects and incorporates firm, country, and event controls. Model 2 adds the interaction effects, and Model 3 includes firm, industry, country by event, and year fixed effects. The results indicate that holding everything else constant at the mean, a one-unit increase in the economic importance of the country for the MNE increases its donations toward country market factors by 79 percent (Model 2).

[INSERT Table 5 ABOUT HERE]

Robustness

Matched Sample. One concern is that given the geographical (and, thus, political and socioeconomic) heterogeneity of countries exposed to disruptions, firms with a similar propensity to donate may self-select to specific institutional environments. This can introduce bias in the estimation because philanthropy and economic importance may be moving in the same direction as unobservable variables (e.g., disruption-risk aversion). To mitigate this risk, we applied *coarsened exact matching* (CEM) (Iacus, King, and Porro, 2011) to balance the baseline propensity to donate between the treatment (i.e., firms with at least one affiliate in the affected country) and the control groups (i.e., firms with no affiliates). The matching uses variables that the extant literature has identified as impacting company philanthropy: *ROA, Tobins'q, total assets, total revenue, number of employees, R&D Intensity, advertising and administrative expenses, consumer orientation, and industry*. While we cannot rule out the existence of all unobservable effects, and therefore are careful in our discussion, the results are qualitatively unaffected by this procedure (see Table X in the Appendix at <https://institutionaldisruptions.com/>).

Controlling for Omitted Variables and Confounders

Other Strategic Considerations

Is it the Pursuit of Reputation? A stream of research suggests that decision-makers engage in philanthropy to boost their firms' reputation (Exley, 2018). Muller and Kräussl (2011), for instance, proxy reputation for social irresponsibility with the number of concerns in the database Kinder, Lydenberg, and Domini and find that negative scores are associated with a relatively high likelihood of donating in the aftermath of Hurricane Katrina.

To explore the possibility that MNEs' pursuit of reputation explains variance in donations, we calculate a Janis-Fadner coefficient of imbalance (JFC)—a widely used variable of media reputation (see Zhang, 2016 for a survey). We use natural language processing to quantify the tone of media reports in Factiva, mentioning each MNE in our sample in a period of one year before the start date of the disruption. Table XI in the online Appendix, which also contains the procedural description, shows that reputation becomes statistically insignificant when the model includes *economic importance*. Interaction of the two variables, whose effect is sizeable ($p < 0.01$), indicates that the economic importance of the country to the MNE is a precondition for the pursuit of reputation. This suggests that economic importance mediates the effects of the quest for reputation on donating in this context.

As an additional validation, we explore the predictive power of reputation on the likelihood of donating toward factors necessary for market-oriented institutions to function. We substitute economic importance with our reputation variable in the specification of Table 3. The coefficient of such a variable is not statistically significant (Table XII in the online Appendix).

Is it the Pursuit of Market Standing? An established argument in the non-market literature is that corporations engage in philanthropy to enhance their market position. The strength of this motive is inversely proportional to country market standing. Therefore, one expectation is that low-standing organizations should donate relatively large amounts because the marginal utility of such strategies is higher for them than for higher-standing firms (Eichholtz, Kok, and Quigley, 2010; Liang and Renneboog, 2017; Muller and Kräussl, 2011; Porter and Kramer, 2002; Servaes and Tamayo, 2013). To address this potential confounder, we proxy market standing by the rank of the MNE in the country by firm revenue

the year before the disruption. The coefficient of interaction with *economic importance* indicates that the donations from economically connected MNEs fall with every standard-deviation decrease in *market standing* (see Table XII in the Appendix).

Is it the Pursuit of Political Favors? Another prediction is that firms construct their non-market behavior in accordance with signals coming from influential government actors (Luo and Chung, 2013; Marquis and Qian, 2013; Zhang and Luo, 2013; Zhang *et al.*, 2016). Under this argument, when the domestic government allocates aid, firms will increase their giving to seek its preference and capture political favors for rent-seeking opportunities (Zhang and Luo, 2013; Zhang *et al.*, 2016). The analyses for H3a systematically reject the likelihood of such a motive being a part of the studied donations.

Social Preferences

Is it Altruism or Reciprocity? Firms may donate in response to social preferences from internal stakeholders. For instance, the reciprocal motives of employees may foster the philanthropic behavior of MNEs (Charness and Rabin, 2002; Fehr and Fischbacher, 2002; Small and Simonsohn, 2008). The risk of this confounder is essential in our setting, given that research has shown that people react more strongly to shock-related losses than to chronic conditions (Small, 2010). We test this motive and find that the interaction of *employee-driven donation* with *economic importance* is statistically significant and negative (Table XIV in the Appendix), suggesting that when MNEs donated following an initiative by employees, the donation amount was significantly lower than when not.

To further test the argument that business decision-makers donate to satisfy altruistic motives, we incorporate a ratio of *human to economic loss*, operationalized as the number of deaths divided by economic damage. The measure captures the relative humanitarian damage. Results indicate that the amount of donation decreases in the interaction of *human to economic loss* with *economic importance* (Table XV in the Appendix). The result is consistent with the skewness of donations to institutional disruptions with

substantial economic costs vis-à-vis human impacts across the events in the period 1997 to 2019 as documented in the Appendix.

Is it Media Salience? Studies have shown that media can influence humanitarian aid, but its influence is heterogeneous across events and skewed to some type of disasters (e.g., earthquakes) and countries (e.g., higher income) (Eisensee and Strömberg, 2007; Franks, 2013). For some institutional disruptions, economic importance may be correlated with countries that receive a sizeable magnitude of news coverage. Events such as the 2017 Hurricane Maria in Puerto Rico and the 2011 earthquake and tsunami in Japan were certain to receive firm aid due to media coverage. We thus follow Stromberg, (2007) and run analyses with only disruptions that had a probability of being in the news of 50 percent and lower. The magnitude and direction of the estimates hold (Table XVI in the online Appendix).

Is it Social Pressure Coming from Local Presence? Firms are embedded in societal arrangements that foster normative pressure for philanthropy on the geographically proximate organization (Marquis, Davis, and Glynn, 2013; Zhang and Luo, 2013) and may donate for the approval of the local community [i.e., social license to operate (Boutilier and Thomson, 2011; Wilburn and Wilburn, 2011)]. The firm's physical presence may be a simpler explanation, and economic importance would be a second-order measure captured by differentiating firms based on geographic presence. We test this argument by substituting our predictor with *physical presence*, a binary variable taking value "1" when the firm has at least one affiliate in the focal country. Table XVII in the online Appendix shows that the coefficient of this variable is negative and significant. This finding is consistent with work that suggests that firms present in a country struck by a major disaster will engage in scarce giving (Tilcsik and Marquis, 2013). Given that physical presence provides an equal weight for all locations, this result reconciles with existing work and thus implies that not considering the strategic value of affiliates is econometrically important. The results suggest that the mechanism driving MNE philanthropy in the aftermath of institutional disruptions is more complex than local presence alone and that our measure captures such complexity.

Is it Inequity or Poverty Aversion? Firms may allocate resources to reduce financial disparity (Camerer and Fehr, 2005; Fehr, Naef, and Schmidt, 2006). If this preference dominated restoring market-oriented institutions, MNE philanthropy would be comparatively greater in countries with high poverty levels where economic inequality is pervasive. To test this argument, we regress an interaction of *economic importance* and *poverty* using the poverty headcount ratio at \$3.20 a day (2011 PPP) (as a percentage of population) from the WDI (see Anand and Sen 2000). We find that MNEs in the sample donated in a lower magnitude to more impoverished countries than to higher-income countries (Table XVIII in the Appendix).

Discussion and Conclusion

This study investigates how the economic importance of a country market for the MNE spurs its philanthropy in the aftermath of institutional disruptions. Situated at the intersection of scholarly work on the drivers of organizational nonmarket behavior and on organizational response to the institutional environment (Aguilera and Grøgaard, 2019; Ahuja and Yayavaram, 2011; Bonardi, 2004; Chittoor, Kale, and Puranam, 2015; Doh *et al.*, 2017), this paper responds to calls for research that integrates these independent literatures (Dorobantu *et al.*, 2017).

Contribution to the Nonmarket Literature on Company Philanthropy

We theorize that company philanthropy in the aftermath of institutional disruptions is driven by a motive that has not been studied thus far: restoring the country market. Organizations with operations in an affected country are likely to incur substantial damages. Therefore, extant studies predict that these firms will engage in scarce giving in the aftermath of large shocks (Crampton and Patten, 2008; Tilcsik and Marquis, 2013). We replicate the results of extant work and find a negative relationship with a physical presence. However, once we consider the economic importance of firm locations, we find that MNEs facing the prospect of performance shocks, due to the economic importance of the affected country to the firm, allocate resources to help its recovery.

Prior work on company philanthropy emphasizes that donors pursue firm-specific benefits such as reputation (Muller and Kräussl, 2011) and political favors (Bertrand *et al.*, 2020). Our study introduces a strategic motive whose benefits are a public good (i.e. it is not firm-specific). That is, it can be difficult to disentangle firm benefits from restoring the market from those received by other organizations and society at large. The public nature means that others also have incentives to contribute to recovery. Consequently, a cost-benefit approach for the economic importance, tempered by the alternative sources of funding and the nature of the market institutions, provides insight into when firms will find it beneficial to contribute rather than rely on others to provide the public good.

A key implication is that our moderator predictions differ from those in the extant literature. For instance, a prevailing logic is that firms in competitive country markets have greater incentives to engage in philanthropy because the potential returns to firm differentiation are larger when there are fewer dominant firms (Bénabou and Tirole, 2006). Accordingly, if there is a country market demand for nonmarket behavior, firms will engage in such behavior with the hope of achieving or sustaining a competitive advantage (Bertrand *et al.*, 2020; Kaul and Luo, 2017; Liang and Renneboog, 2017). Conversely, our findings show that companies in highly competitive country markets tend to donate comparatively less since other firms can contribute.

Similarly, studies predict that firms use philanthropy to foster stakeholder relationships by aligning their giving with the interests of influential host-country actors and generate firm political favors (Bertrand *et al.*, 2020), particularly when such giving occurs in countries with low institutional development (Hornstein and Zhao, 2018; Zhang and Luo, 2013). In contrast, we find that firms give less when the host country can provide resources for recovery and find a strong positive link between donation magnitudes and regulatory quality. The results underscore the importance of understanding the motive for restoring the market in the aftermath of institutional disruptions as firm behavior differs from commonly studied behaviors under stable contexts.

More broadly, the results suggest that the motives of pursuing reputation, meeting social pressures, achieving market standing or media attention, or satisfying reciprocal and altruistic goals do not replicate the explanatory power of the economic importance of a country to the MNE after institutional disruptions. Although company philanthropy toward institutional disruptions may still result in a warm glow or rents via a signal of product quality and willingness to pay, the robustness analyses indicate that the economic importance of restoring country markets may mediate strategic considerations and social preferences.

Our results connect with theories on the importance of communities for “organizations in a global age” (Marquis and Battilana, 2009: 283). While the existing literature considers how firms imitate other organizations in their community (Marquis and Tilcsik, 2016) and how headquarters social embeddedness and other links with local stakeholders foster social and political pressures that activate firm giving (Luo and Chung, 2013), it has not explored the effect of differences in the economic importance of the geographic location to the firm. The analyses show that such a measure can help illuminate the conditions and mechanisms under which organizations with a worldwide presence will be likely to respond to local causes.

Finally, this study adds to the literature on international nonmarket strategy (Aguilera *et al.*, 2006; Dorobantu *et al.*, 2017). Traditionally, company giving is evaluated within countries or with a few single-country events which has constrained our understanding of how differences in the institutional environment affect firm engagement in societal issues. The longitudinal dataset alleviates the risks of measurement error and omitted-variable bias that have been a concern for observational studies (Liang and Renneboog, 2017).

Contribution to the Literature on Organizational Responses to the Institutional Environment

We also contribute to the theoretical and empirical literature that examines the firm response to the institutional environment (see, e.g., Aguilera and Grøgaard 2019, Ahuja and Yayavaram 2011, Doh et al. 2017, Dutt et al. 2016, Khanna and Palepu 1997, Peng 2003). We formalize the concept of institutional disruptions based on the four characteristics of temporality, suddenness and unexpectedness, severity, and pervasiveness. Despite extensive research on the enduring absence of country market-based institutions

(i.e., voids) and evolutionary institutional changes (Chan *et al.*, 2008; Doh *et al.*, 2017; Klüppel *et al.*, 2018; Peng, 2003), the concept of institutional disruptions has yet to be fully developed. Systematic attention to this context is particularly pertinent to the study of MNEs that are increasingly exposed to a wide range of disruptions vis-à-vis domestic firms. Interestingly, the country markets that have experienced substantial growth in the last three decades, such as China and India, also top the list in terms of exposure to large shocks. The characteristics of disruptions are key to understanding why MNEs increasingly allocate resources toward country market restoration. Considering the trends of globalization and economic integration, the strategic value of these country markets for international business makes exiting or avoiding shock-prone locations an economically unattractive option.

Institutional disruptions are a temporary form of institutional void. Firms in the face of the chronic absence of market-oriented institutions fill such voids through bringing activities within their organizational boundaries and/or operate business models to function as market intermediaries (Doh *et al.*, 2017; Dutt *et al.*, 2016; Khanna and Palepu, 1997). For instance, business incubators help create and develop markets, and they are providing their services in return for an equity stake in the businesses (Dutt *et al.*, 2016). The results indicate that, in the face of a temporary absence across levels of economic development, firms employ philanthropic nonmarket strategies to reinstate market-oriented institutions.

The findings offer a fresh perspective of how organizations affect institutional development. A large literature studies how organizations may seek to influence public policy for market-oriented institutions that benefit the organization at the expense of social welfare (Ahuja and Yayavaram, 2011; Bertrand *et al.*, 2020). We propose that MNEs donate their resources and therefore influence institutions in a fundamentally different way. Firm action toward country market recovery may have substantial positive implications (Ballesteros and Gatignon, 2019; Ballesteros *et al.*, 2017; High-Level Panel on Humanitarian Financing, 2016). Donations to restore country market-oriented institutions are the opposite of starvation strategies used by firms to constrain the resources for such institutions (Ahuja and Yayavaram, 2011) by directly

providing resources to rebuild them. We offer an empirical test for theoretical work on when firms will use a nonmarket strategy that creates a social benefit (Alessi, 1975; Douthett, 1972; Kaul and Luo, 2017).

This study points to the importance of the quality of country market institutions for garnering firm donations for recovery. The results of our supplementary analysis by country income level suggest that regulatory quality is crucial in lower-income countries for economically connected MNEs to donate. When economically connected firms are faced with greater inefficiencies, bureaucracy, and logistical complexity due to low regulatory quality, their incentives to donate are tempered. For these countries, an implication of our results is that augmenting the quality of market-oriented institutions may facilitate greater MNE support when disruptions strike.

Our findings suggest that institutional disruptions are a context in which the goals of some organizations are more closely aligned with society. For instance, the results pose an interesting paradox on the economic value of monopolistic firms. A vast literature suggests that firms with large shares of the country market seek to influence institutions to enhance their profits, maintain voids, and restrict competition (Bonardi *et al.*, 2005; Gawande and Bandyopadhyay, 2000; Hillman *et al.*, 2004; Schuler *et al.*, 2002). However, our study provides evidence that monopolistic firms have substantial incentives to contribute after disruptions. Altogether, the findings indicate that large MNEs are critical for the country during institutional disruptions that overwhelm the financial and operational capacity of governments.

Limitations and Future Research

Important limitations and boundary conditions remain. First, we restrict the analyses to large, publicly-traded firms. Although this type of organization accounted for nearly 90 percent of the recorded corporate donations over the observed period (and, thus, selection bias is mitigated), future research may explore whether the philanthropy of smaller or private firms may follow different mechanisms. Second, our theory and empirics are at the country level, whereas some disruptions may be regional. Our method of identifying large shocks with systemic effects at the 99th percentile of severity increases the construct validity of

institutional disruptions. While our econometric analysis provides a conservative approach, a promising avenue of investigation will be the use of more fine-grained data to study the impact of more localized disruptions. Third, following our understanding of the phenomenon, we calculate the HHI at the country market. We acknowledge that this measure is often used for industry concentration. While our operationalization is consistent with the information provided by interviewees, future research may explore the industry-level sensitivity of donations. Fourth, we focus on donations as a nonmarket response and do not examine strategic alternatives. An interesting extension would analyze the tradeoffs of market and nonmarket strategies, such as choosing to exit the country versus donating in response to institutional disruptions. Finally, our measure of economic importance does not include exports and imports and sporadic economic activity not represented by company affiliates. Our findings thus underestimate the effect of economic importance. Future consideration of intra- and inter-firm trade can provide meaningful insights on international interdependencies.

Practical Contributions

Through influencing economic activity, institutions affect the welfare of the constituents in society (Coase, 1960) and have often been viewed as central causes and/or solutions to societal issues (Mair and Marti, 2009; Vakili and McGahan, 2016). Given the tremendous social and economic impact of disruptions (Baker and Bloom, 2013; Barro, 2009; Weitzman, 2011), the role of MNEs in responding to them has important implications for society. During the World Humanitarian Summit in 2016, the United Nations highlighted the need to formalize firm participation to help close the growing financial gap of disaster costs (High-Level Panel on Humanitarian Financing, 2016). Public aid has been unable to keep pace with the economic costs of shocks that have increased six-fold since 1990 (Ballesteros et al. 2017). We hope that our study can help government and multilateral agencies to predict the outpouring from firms toward relief and recovery. Collectively, our findings inform on the contextual determinants that affect the MNE incentives underlying this action. This can help stimulate and coordinate the engagement of firms for overcoming challenges from disruptions worldwide.

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Tables

Table 1. Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Min	Max
<i>Panel A. Multinational Enterprise</i>					
Return on Assets	1,891	4.21	4.14	-16.84	32.05
Tobin's Q	1,891	0.85	0.82	0.01	6.47
Total Assets	1,891	82,800,000	249,300,000	246,034	2,899,000,000
Total Revenue	1,891	19,940,000	30,530,000	1,346,000	471,900,000
Number of Employees	1,891	57,695	83,246	214	2,202,000
R&D Intensity	1,891	2.97	4.14	-0.06	35.56
Advertising & Admin Expenses	1,891	8,603,000	15,730,000	20,275	119,800,000
Business to Consumer	1,891	0.44	0.41	0.00	1.00
Donor Fatigue	1,891	0.06	0.26	0.00	2.69
<i>Panel B. Country</i>					
Dominant MNE Index	129	0.01	0.07	0.00	0.74
Regulatory Quality	129	-0.01	0.97	-2.00	2.00
GDP (PPP current international)	129	740,600,000,000	2,274,000,000,000	198,200,000	18,050,000,000,000
Population	129	50,000,000	170,100,000	52,045	1,351,000,000
Trade (% of GDP)	129	87.20	54.98	0.00	391.00
Urban Population (%)	129	54.10	23.43	10.50	100.00
Control of Corruption	129	-0.09	1.00	-2.00	2.00
Area (km ²) (ln)	129	12.129	2.807	5	17
Disruptions in Country	129	0.74	0.14	0.69	1.50
<i>Panel C. Event</i>					
Home-Country Public Aid	265	2,271,000,000,000	5,307,000,000,000	244,200,000	20,660,000,000,000
Foreign Public Aid	265	336,600,000	526,400,000	0	2,997,000,000
Earthquake	265	0.11	0.32	0.00	1.00
Epidemic	265	0.02	0.15	0.00	1.00
Extreme Temperature	265	0.03	0.18	0.00	1.00
Flood	265	0.40	0.49	0.00	1.00
Forest Fire	265	0.01	0.09	0.00	1.00
Landslide	265	0.01	0.11	0.00	1.00
Mass Movement	265	0.01	0.11	0.00	1.00
Storm	265	0.35	0.48	0.00	1.00
Terrorist Attack	265	0.01	0.11	0.00	1.00
Volcanic Activity	265	0.01	0.09	0.00	1.00
Wildfire	265	0.03	0.17	0.00	1.00
Number of Deaths	265	2,105	16,983	0	222,570
Number of People Affected	265	2,033,000	8,842,000	0	85,000,000
Economic Damage (USD Million)	265	5,515	18,732	0	210,000
Disruptions Worldwide	265	29.06	12.25	14.00	57.00
News Pressure	265	9.24	3.56	0.00	18.50
<i>Panel D. MNE-Country-Event</i>					
Donation	501,115	5,116	219,707	0	54,000,000
Factors for Market (binary)	501,115	0.17	0.37	0.00	1.00
Economic Importance	501,115	0.04	0.15	0.00	1.00

Notes: Each subheading provides the level of aggregation of the data presented in that part of the table. Panel A provides summary statistics for our analyses based on the dataset of the 2,000 largest multinational enterprises (MNEs) at the international level across the 2007-2019 period. Panel B summarizes data when the countries were affected by institutional disruptions. Panel C shows the epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected in the 12-year period. Panel D shows the dependent and two independent variables for the full dataset. Economic importance is based on the share of affiliates that the MNE has in a country in any given year, adjusted by proportion of ownership. Factors for market represents donations whose reports explicitly state the MNE allocating resources to areas instrumental to restore market-oriented institutions functioning. The data in this table are summarized in original units. We log-transform large covariates in the analyses. Please see the text for further details on variable definitions and construction.

Variables	Observations	Mean	Standard Deviation	Min	Max
<i>Panel A. Multinational Enterprise</i>					
Return on Assets	1,891	4.21	4.14	-16.84	32.05
Tobin's Q	1,891	0.85	0.82	0.01	6.47
Total Assets	1,891	82,800,000	249,300,000	246,034	2,899,000,000
Total Revenue	1,891	19,940,000	30,530,000	1,346,000	471,900,000
Number of Employees	1,891	57,695	83,246	214	2,202,000
R&D Intensity	1,891	2.97	4.14	-0.06	35.56
Advertising & Admin Expenses	1,891	8,603,000	15,730,000	20,275	119,800,000
Customer Orientation	1,891	0.44	0.41	0.00	1.00
Donor Fatigue	1,891	0.06	0.26	0.00	2.69
<i>Panel B. Country</i>					
Market Concentration	129	0.01	0.07	0.00	0.74
Regulatory Quality	129	-0.01	0.97	-2.00	2.00
GDP (PPP current international)	129	740,600,000,000	2,274,000,000,000	198,200,000	18,050,000,000,000
Population	129	50,000,000	170,100,000	52,045	1,351,000,000
Trade (% of GDP)	129	87.20	54.98	0.00	391.00
Urban Population (%)	129	54.10	23.43	10.50	100.00
Control of Corruption	129	-0.09	1.00	-2.00	2.00
Disruptions in Country	129	0.74	0.14	0.69	1.50
<i>Panel C. Event</i>					
Local Public Aid	265	2,271,000,000,000	5,307,000,000,000	244,200,000	20,660,000,000,000
Foreign Public Aid	265	336,600,000	526,400,000	0	2,997,000,000
Earthquake	265	0.11	0.32	0.00	1.00
Epidemic	265	0.02	0.15	0.00	1.00
Extreme Temperature	265	0.03	0.18	0.00	1.00
Flood	265	0.40	0.49	0.00	1.00
Forest Fire	265	0.01	0.09	0.00	1.00
Landslide	265	0.01	0.11	0.00	1.00
Mass Movement	265	0.01	0.11	0.00	1.00
Storm	265	0.35	0.48	0.00	1.00
Terrorist Attack	265	0.01	0.11	0.00	1.00
Volcanic Activity	265	0.01	0.09	0.00	1.00
Wildfire	265	0.03	0.17	0.00	1.00
Number of Deaths	265	2,105	16,983	0	222,570
Number of People Affected	265	2,033,000	8,842,000	0	85,000,000
Economic Damage (USD Million)	265	5,515	18,732	0	210,000
Disruptions Worldwide	265	29.06	12.25	14.00	57.00
News Pressure	265	9.24	3.56	0.00	18.50
<i>Panel D. MNE-Country-Event</i>					
Donation	501,115	857,751	2,714,000	0	54,000,000
Factors for Market (binary)	501,115	0.17	0.37	0.00	1.00
Economic Importance	501,115	0.04	0.15	0.00	1.00

Table 2. Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Donated Amount (ln)	1.000					
(2) Economic Importance	0.108	1.000				
(3) Dominant MNE Index	0.080	0.666	1.000			
(4) Host-Country Public Aid (ln)	0.066	0.572	0.838	1.000		
(5) Foreign Public Aid (ln)	-0.011	-0.086	-0.171	-0.180	1.000	
(6) Regulatory Quality	0.026	0.249	0.363	0.449	-0.365	1.000

Notes: This table reports pairwise correlations for the theoretical model. Donation amount is the logged dollar amount of donations. Economic importance is the share of affiliates that the MNE has in a country in any given year, adjusted by proportion of ownership. Regulatory quality is based on the perception of the government commitment and/or ability to formulate and implement policies to permit and promote private sector development, referred to as regulatory quality (Kaufmann et al. 2011). Foreign public aid is the logged value of the average of net official development assistance and official aid received in current US dollars in the two years preceding the disaster. Host-country public aid is operationalized as the logged average value of gross national expenditure in current US dollars in the two years preceding the disaster. The study analyses the donations of the largest 2,000 multinational enterprises at the international level in the aftermath of 265 epidemics, natural disasters, and terrorist attacks that affected 129 countries from 2007 to 2019, inclusive.

Table 3. Economic Importance of the Country for the Firm and Donations to Disruptions

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	5.420*** (0.647)	7.239*** (0.649)	4.971*** (0.681)
H2: EI x Dominant MNE Index	0.349*** (0.064)	0.681*** (0.064)	0.561*** (0.068)
H3a: EI x Host-Country Public Aid (ln)	-0.189*** (0.023)	-0.254*** (0.023)	-0.178*** (0.024)
H3b: EI x Foreign Public Aid (ln)	0.015*** (0.002)	0.014*** (0.002)	0.015*** (0.003)
H4: EI x Regulatory Quality	0.573*** (0.020)	0.466*** (0.021)	0.489*** (0.025)
Dominant MNE Index	-0.037*** (0.009)	-0.027*** (0.010)	-0.005 (0.012)
Host-Country Public Aid (ln)	0.007*** (0.001)	-0.015*** (0.001)	-0.009 (6.108)
Foreign Public Aid (ln)	-0.002*** (0.000)	-0.002*** (0.000)	0.001 (2.933)
Regulatory Quality	-0.034*** (0.002)	-0.016*** (0.003)	0.003 (123.876)
Firm Controls	NO	YES	YES
Country Controls	NO	YES	YES
Event Controls	NO	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	-0.081*** (0.017)	-0.535*** (0.036)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports regression estimates for the relationship between the economic importance of a country for a firm and donations in the aftermath of institutional disruptions. The database includes the largest 2,000 MNEs at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the

countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05.

Table 4. Alternative Measures of Economic Importance of the Country to the Firm and Donations to Disruptions

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
H1: Economic Importance (Assets)	1.364*** (0.305)			
H2: EI (Assets) x Dominant MNE Index	0.134*** (0.033)			
H3a: EI (Assets) x Host-Country Public Aid (ln)	-0.049*** (0.011)			
H3b: EI (Assets) x Foreign Public Aid (ln)	0.006*** (0.001)			
H4: EI (Assets) x Regulatory Quality	0.196*** (0.013)			
H1: Economic Importance (Revenue)		1.306*** (0.309)		
H2: EI (Revenue) x Dominant MNE Index		0.132*** (0.034)		
H3a: EI (Revenue) x Host-Country Public Aid (ln)		-0.047*** (0.011)		
H3b: EI (Revenue) x Foreign Public Aid (ln)		0.007*** (0.001)		
H4: EI (Revenue) x Regulatory Quality		0.202*** (0.013)		
H1: Economic Importance (Employees)			1.772*** (0.312)	
H2: EI (Employees) x Dominant MNE Index			0.131*** (0.034)	
H3a: EI (Employees) x Host-Country Public Aid (ln)			-0.063*** (0.011)	
H3b: EI (Employees) x Foreign Public Aid (ln)			0.006*** (0.001)	
H4: EI (Employees) x Regulatory Quality			0.203*** (0.013)	
H1: Economic Importance (Combined)				0.723*** (0.154)
H2: EI (Combined) x Dominant MNE Index				0.068*** (0.017)
H3a: EI (Combined) x Host-Country Public Aid (ln)				-0.026*** (0.005)
H3b: EI (Combined) x Foreign Public Aid (ln)				0.003*** (0.001)
H4: EI (Combined) x Regulatory Quality				0.106*** (0.006)
Dominant MNE Index	0.149*** (0.009)	0.158*** (0.009)	0.165*** (0.009)	0.145*** (0.009)
Host-Country Public Aid (ln)	-0.016*** (0.001)	-0.016*** (0.001)	-0.015*** (0.001)	-0.016*** (0.001)
Foreign Public Aid (ln)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Regulatory Quality	-0.009*** (0.003)	-0.009*** (0.003)	-0.009*** (0.003)	-0.010*** (0.003)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES

Variables	USD Donation Amount (ln)			
	(1)	(2)	(3)	(4)
	Assets	Revenue	Employees	Combined
Event Controls	YES	YES	YES	YES
Constant	-0.490*** (0.036)	-0.488*** (0.036)	-0.489*** (0.036)	-0.491*** (0.036)
Observations	501,115	501,115	501,115	501,115
MNEs	1,891	1,891	1,891	1,891
Countries	129	129	129	129
Disruptions	265	265	265	265

Notes: This table reports regression estimates for the relationship between the alternative constructions of economic importance of the country for a firm and donations in the aftermath of disruptions. Each explanatory variable uses the share of affiliates in the affected country adjusted by ownership and is calculated with a third-order Chebyshev polynomial expansion on an additional explanatory variable. In Model 1, the explanatory variable is the share of assets; Model 2, the share of revenue; Model 3, the share of employees. Model 4 expands on affiliates and the three other predictors. See text for additional variable definitions and constructions. The database includes the largest 2,000 MNEs at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Economic Importance of the Country for the Firm and Donations Aimed at Restoring Factors Necessary for Market Functioning

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	0.092*** (0.004)	0.790*** (0.280)	0.738** (0.298)
H2: EI x Dominant MNE Index		0.049* (0.028)	0.029 (0.030)
H3a: EI x Host-Country Public Aid (ln)		-0.028*** (0.010)	-0.026** (0.010)
H3b: EI x Foreign Public Aid (ln)		0.005*** (0.001)	0.004*** (0.001)
H4: EI x Regulatory Quality		0.102*** (0.009)	0.106*** (0.011)
Dominant MNE Index		-0.003 (0.004)	0.006 (0.005)
Host-Country Public Aid (ln)		-0.000 (0.001)	0.005 (2.662)
Foreign Public Aid (ln)		-0.000*** (0.000)	0.001 (1.278)
Regulatory Quality		-0.000 (0.001)	-0.004 (54.072)
Firm Controls	YES	YES	YES
Country Controls	YES	YES	YES
Event Controls	YES	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	-0.138*** (0.016)	-0.125*** (0.017)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports random effects regression estimates for the relationship between the economic importance of a country for a firm and donations to factors that are necessary for market functioning in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$.

Endnotes

ⁱ We conducted 148 unstructured interviews with business decision makers such as chief financial officers, risk managers, and other employees from 102 S&P 500 firms on their firms' strategies and actions dealing with disasters and terrorist attacks and their consequences. The interviews occurred over the five-year period between 2012 and 2017 and covered a broad range of MNEs across industry sector and size (see online Appendix at <https://institutionaldisruptions.com/> for details).

ⁱⁱ In the economics literature on shocks, scholars have studied uncertainty shocks based on volatility and have described their systemic and temporal nature (Aghion *et al.*, 2017; Bloom, 2009; Kozeniaskas *et al.*, 2018). However, uncertainty shocks can differ in their severity and the extent to which they are expected. Other scholars have differentiated shocks based on their unexpectedness and the magnitude of their impact (see, e.g., Barro 2009), but these shocks may also have lasting impact rather than temporal effects.

ⁱⁱⁱ Punctuated changes may result in pre-existing market-oriented institutions disappearing, such as that experienced in Central and Eastern European countries during the upheaval from communistic to market-based economies, but they ultimately result in a radically new, permanent institutional state (Newman, 2000).

^{iv} Lobbying activities for market-oriented institutions often take years to achieve outcomes (Hillman and Keim 1995).

^v Host-country public aid primarily is sourced from the national governments and allocated to multilateral agencies or to local governments who in turn distribute the funds. Given that our measure of institutional disruption is based on the most severe, high-magnitude shocks, we expect the national government to intervene and be the primary contributor.

^{vi} Less than one percent of the donations in the sample required converting goods to donation market values.

^{vii} Institution supported by the World Health Organization that represents a comprehensive international database on catastrophes. Events included in the International Disaster Database must meet at least one of the following criteria: 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/>.

^{viii} Despite being the most used disaster database in empirical studies, EM-DAT has pervasive data inaccuracies and missingness. A substantial part of our work was dedicated to collect disruptions and we received critical assistance from UNOCHA and Swiss Re. We conducted independent checks for data accuracy (see the Appendix at <https://institutionaldisruptions.com/>).

^{ix} The World Development Indicators database contains internationally compatible statistics on 1,600 time-series indicators for 217 economies and more than 40 country groups. The database is compiled by the World Bank.

^x Regarding severity, using impact thresholds as scholars in the organizational literature have done, see for example Tilsick and Marquis (2013), is not functional in our case given the longitudinal and international nature of our setting. The degree of disruption associated with human and material losses is necessarily country specific.

^{xi} <https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined>.

^{xii} Including observations with zero economic importance to the MNE reduces selection bias (Heckman, 1979).

^{xiii} Revenue and employees were not our first choice because these measures may skew the results towards certain types of firms and operations, such as sales affiliates.

^{xiv} 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 Blackwell et al (2017).

^{xv} 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 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 (Kaufmann *et al.*, 2011).

^{xvi} Orbis does not separate advertising and marketing from general and administrative expenditures. Therefore, we relied on the full measure of advertising and general and administrative expenses for our control variable.

^{xvii} We apply the Freedman-Lane semi-partialling method and find smaller standard errors than linear models, indicating that our main estimation is conservative.

^{xviii} We would like to thank the anonymous reviewer for this suggestion.

Institutional Disruptions and the Philanthropy of Multinational Enterprises

Appendix

Description of the Study

This paper studies philanthropy by multinational enterprises (MNEs) during institutional disruptions—the sudden and unexpected, temporary, and systemic breakdowns in economic institutions. The central argument is that, under institutional disruptions, MNEs aim to restore factors that are essential for market functioning, such as infrastructure and labor markets, and the strength of this motive rises in the economic importance of the affected country to the MNE. Analyses of donations from 2,000 MNEs headquartered in 63 countries in the aftermath of 265 major epidemics, natural disasters, and terrorist attacks affecting 129 countries suggest that the economic importance of the country to the firm strongly explains donations. Dominant MNE Index, public aid, and the country's regulatory quality moderate this effect. These associations are robust to a matching method, a vector of firm-, country-, and event-specific time-varying and -constant variables, and confounders such as reputation, altruism, media salience, and market standing. They offer evidence that company philanthropy in the aftermath of institutional disruptions may deviate from predicted behavior under stable conditions. The results contest the expectation that philanthropy rises in market competition. We find that monopolistic firms are comparatively large donors and may act as a stop-loss during large disruptions.

Keywords: institutional economics, institutional disruptions, grand challenges, philanthropy, multinational enterprises

Procedures

Global Database of Disaster Responses

We coordinated a collaborative five-year project with researchers in the business school and department of computer and information science of a university in the United States to build, arguably, the largest database on disaster aid at the international level. The dataset covers monetary and in-kind donation from firms, governments, multinational agencies, and non-governmental organizations reported in news media to relief and recovery from all major disasters that affected the world from 1990 to 2019. The coded data of corporate aid comprise 96,858 donations from 40,170 firms from 84-headquarters countries to 4,706 natural disasters that hit 208 countries in the period 2003-2019.

Collecting Data. We used the following procedure to track disaster donations:

1. We obtained data on epidemic outbreaks, natural disasters, terrorist attacks and technological accidents from a variety of sources. First, we used the International Disaster Database (EM-DAT) from the Centre for Research on the Epidemiology of Disasters that register disasters based on the

following criteria: 10 or more people killed, 100 or more people affected, a declaration of a state of emergency, or a call for international aid. Further information at <http://www.emdat.be/>. Second, to overcome the data inaccuracies and missing data in EM-DAT, we obtained data from the reinsurance company Swiss Re and the Financial Tracking System (FTS) from the United Nations Office for Coordination of Humanitarian Affairs (UNOCHA).

2. We automated code in Python to identify disaster donations in news reports using Factiva, Google, and Lexis Nexis. The search range was within a year from the official start date. A story is relevant for our database if the headline or body is in the results of a Boolean search that has the combination of the affected country, the type of the disaster, and in some cases, the name of the disaster. Specifically, the Boolean combinations are as follows:
 - a. The affected country.
 - b. Event. Derivations of:
 - i. Epidemic: “pandemic” OR “epidemic”
 - ii. Mass movement: “landslide” OR “avalanche” OR “rockfall” OR “subsidence”
 - iii. Earthquake: “seismic” OR “quake” OR “earthquake” OR “tsunami”
 - iv. Flood: “flood”
 - v. Storm: “storm” OR “typhoon” OR “cyclone” OR “hurricane” OR “tornado”
 - vi. Volcano: “volcano” OR “volcanic” OR “eruption”
 - vii. Technological accident: “accident” OR “explosion”
 - viii. Terrorism: “terrorist” OR “attack”
 - c. Action. Derivations of: “donation” OR “donate” OR “donated” OR “donating” OR “pledge” OR “pledged” OR “pledging” OR “give” OR “gave” OR “given” OR “giving.”
 - d. Disaster name, when available.

An example of a Boolean combination is: [03/11/2011-03/11/2012]; (“Japan” or “Japanese” or “Japan’s” or “Japans”¹) and (“tsunami” or “earthquake” or “quake” or “disaster”) and (“donation” or “donate” or “pledge” or “pledging” or “give” or “gave” or “given” or “giving”).

3. To make over 2,310,000 electronic reports computationally tractable, we apply differential language analysis using *JavaScript Object Notation* (i.e., *JSON* and *AJAX*) to parse the data. We code the following fields by article:
 - a. Actor: Entity making the donation.
 - b. Actual donation.
 - i. In case of in-kind donations, the characteristics of the product or service were recorded (e.g., 1,000 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 liter 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.
 - ii. In case of donations reported in a currency different than the dollar, they were converted using the currency exchange rate of the day of the donation.
 - c. Donations Toward Market Factors.

¹ There were spelling mistakes in some articles.

- i. The donation reports were coded for whether the target was associated with factors that underpin the functioning of the market. For instance, if the donation report states that the company donated for “power”, “generators”, “communication”, “airport”, “transport”, “roadways”, “emergency housing”, “rebuilding”, “restoring”, “reconstruction”, “schools”, etc., the donation would receive a one, and a zero otherwise.
- d. Employee-driven donation. When the news article mentioned that the donation was an initiative of the employees (and, for example, the company is matching whatever the employees collected), a binary variable took value 1.
- e. Direct Impact: When the news article mentioned that the disaster affected the organization physically in any way (e.g., corporate assets such as buildings were damaged) and/or employees were injured, a binary variable took value 1.
- f. 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 make the report to be included in the outcome), the search was qualified with the following filtering process:
 - i. The name of the country had to be within 50 words of the type of the disaster or the word “disaster.”
 - ii. Entities and the act of donating were parsed:
 - 1. 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).
 - iii. The verb identifying the act of donating had to be within 30 words of an entity

Assessing the Quality of Data. We used the followed procedure to check the accuracy of the data collected:

1. We 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. About 60 percent of these errors were associated with monetizing the in-kind value of donations, with less than 8% of the donations were incorrectly marked. The rest of sample of discrepancies were due to missing data on the nature of donor’s business.
2. We run another random draw excluding previously evaluated cases and the researchers repeated the analysis. No other discrepancies were found.
3. We extended the search period to three years after the event. Less than 0.0001 percent (or two donation reports) of the donation reports were made after one year. This is consistent with studies reporting that most company giving to shocks come within two months after the event start date.
4. We compared our data with third-party sources:
 - a. 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 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.

- b. We worked with staff members of the United Nations Office for Coordination of Humanitarian Affairs (UNOCHA) to compare our database with the Financial Tracking System (FTS). This is a global database that records self-reported international humanitarian aid for different humanitarian crises.² The FTS covered about seven percent of our firm donations and 65 percent of our government and NGO donations.
 - c. The U.S. Chamber of Commerce Foundation maintains Disaster Corporate Aid Trackers that are self-reported records for company response to disasters that focus on U.S. firms.³ Their data start in 2010 for selected disasters, particularly in the U.S., and account for 11 percent of our database.
5. We hired research assistants to run another set of random checks in 2020 for all the data in the database and did not find any discrepancy.

² 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>.

³ These data are available at <https://www.uschamberfoundation.org/corporate-aid-trackers>.

Institutional Disruptions

To ensure internal validity of the analyses with the concept of institutional disruption, we focus on sudden and unpredictable, temporary shocks that created severe and systemic losses in the country market. The following were the steps taken to select disruptions:

1. Baker and Bloom (2013) show that large terrorist attacks and natural catastrophes are associated with abnormal levels of market volatility and significantly explain GDP growth. Barro (2009) also includes epidemics as phenomena that have several times more welfare costs than frequent economic fluctuations. Accordingly, we identify large epidemics, natural disasters, and terrorist attacks as shocks whose effects are systemic to the country market (Aghion et al. 2017, Bloom et al. 2018, Kozeniauskas et al. 2018).
2. We collected data on these disruptions from different sources.
 - 2.1 We start by pulling all the data on shocks from the EM-DAT from the Centre for Research on the Epidemiology of Disasters that is supported by the World Health Organization and represents a comprehensive international database on catastrophes. EM-DAT records a shock if it meets at least one of the following criteria: 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/>.
 - 2.2 There are 4,273 shocks in the period 2007-2019 in the EM-DAT database. For each shock, we obtained data on human and economic loss from the United Nations Office for Coordination of Humanitarian Affairs (UNOCHA) and the reinsurance company Swiss RE.
3. We build on Ballesteros and Gatignon (2019) to capture suddenness and unpredictability and select shocks whose end date is within 30 days of the start date. Close to 90 percent of firm responses to these shocks come within eight weeks of the start date when environmental uncertainty and causal ambiguity are high (Ballesteros and Kunreuther 2018, Bloom 2009). There are 3,822 events that classify as sudden shocks.
4. To meet a stringent characterization of severity, we calculate the percentile distribution separately for each of the three variables of deaths, affected people, and economic damage by country for all disasters reported between 1997 and 2019 in EM-DAT. We use percentiles because the mean and standard deviations are inefficient location statistics given the skewness of the historic distribution of consequences.
 - 4.1 Following previous work that classifies disasters based on their impacts, we focus on severity values at the 99th percentile (Cavallo et al. 2013), and test the sensitivity at the 75th and 90th percentiles. Shocks that were in the 99th percentile of any one of the three separate percentile distributions of deaths, affected people, and economic damage were included as a severe disruption. See Table I for the cutoffs of each variable by country.
 - 4.2 At the 99th percentile of severity, there are 265 disruptions. Our analyses thus cover 129 countries representing the four levels of country income according to the World Bank as seen Graph below. Refer to <https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined> for information on how the World Bank defines these groups.

Table I. 99th Percentiles by Country

Country	Affected	Damage (\$Million)	Killed
Albania	125000	45	6
Angola	1420000	10	105
Antigua and Barbuda	25800	250	2
Argentina	350000	3400	59
Armenia	64000	60	4
Australia	52539	2700	139
Bahamas	10000	1000	33
Bangladesh	8978541	2300	1110
Barbados	2500	5	1
Belarus	50539	33	43
Belgium	1200	450	410
Benin	60238		9
Bhutan	20016		200
Bosnia and Herzegovina	1000000	437	25
Botswana	4225		12
Brazil	1500015	1000	900
Bulgaria	37950	545	17
Burkina Faso	151000	150	18
Burundi	23000		12
Cambodia	3448053	500	347
Cameroon	250000		57
Canada	100000	5700	70
Central African Republic	33919		3
Chile	2671556	30000	562
China	39400000	8000	762
Comoros	345311	5	8
Congo	180000	15	3559
Costa Rica	128618	200	31
Cote d Ivoire	25000		27
Croatia	7116	161	3
Czech Rep	1300000	2400	29
Dominica	71393	1456	64
Dominican Rep	1792000	1982	688
Ecuador	800000	2000	672
Egypt	32572	100	110
Ethiopia	490000	5	498
Fiji	350000	600	44
Gambia The	17767		3
Georgia	100018	350	40
Germany	330108	12900	27
Ghana	1000000	12	45
Guatemala	1714414	988	1513
Guinea	40411		9
Guyana	199000		10
Haiti	3700000	8000	222570
Hong Kong	15000	756	80
Hungary	90700	440	8
India	22000000	16000	9843
Indonesia	618486	4452	4340

Country	Affected	Damage (\$Million)	Killed
Iran Islam Rep	10000000	2500	26796
Iraq	65000	1	58
Ireland	600	325	8
Israel	2003000	520	15
Italy	56000	15800	296
Jamaica	350000	595	15
Japan	390000	210000	246
Kazakhstan	36626	130	48
Kenya	2600000	350	100
Kiribati	1500		0
Kyrgyzstan	16780	12	74
Lao P Dem Rep	615145	225	136
Latvia	0	325	6
Lebanon	1000000		15
Lesotho	5000		26
Liberia	17000		10
Libya	20030	7	4
Lithuania	0	30	5
Luxembourg	1519	31	0
Malawi	975672	390	278
Malaysia	230000	605	80
Mali	41603		37
Marshall Islands	600		0
Mauritius	30000	50	11
Mexico	1600000	6000	274
Micronesia Fed States	35000	11	47
Mongolia	264000	0	26
Montenegro	5000		0
Mozambique	1851500	2000	602
Myanmar	2420000	4000	138366
Namibia	350000	8	92
Nepal	5639722	5174	8831
Netherlands	2000	844	7
New Zealand	301500	15000	181
Niger (the)	1131300	10	84
Nigeria	1922332	275	200
Norway	1500	130	4
Oman	20000	3900	76
Pakistan	20400000	9500	1985
Panama	24610	72	16
Papua New Guinea	544300	61	2182
Paraguay	310595	25	55
Peru	1800505	3100	593
Philippines	4785460	2190	1619
Poland	100000	3080	78
Portugal	3967	1350	64
Puerto Rico	750000	68000	64
Russia	330613	1000	172
Rwanda	26051	28	54
Saint Kitts and Nevis	0	20	0

Country	Affected	Damage (\$Million)	Killed
Samoa	12703	150	143
Saudi Arabia	13000	900	161
Senegal	264000	41	165
Serbia Montenegro	49600	2048	51
Sierra Leone	24303	30	1102
Slovenia	50000	292	6
Solomon Islands	44096	2	52
South Africa	125000	1200	73
South Sudan	234800		50
Spain	15300	2400	21
Sri Lanka	1060324	1317	35399
St Lucia	170000	40	10
St Vincent and the Grenadines	13091	25	13
Sudan	1000000	184	657
Sweden	0	2800	7
Syrian Arab Rep	235000		80
Tajikistan	400000	204	73
Tanzania, United Republic of	2000000	458	56
Thailand	3500000	1000	8345
Tonga	87000	51	9
Tunisia	30000	36	17
Uganda	153500	3	388
Ukraine	300000	1000	38
United Kingdom	340000	5900	15
United States	3000010	50000	88
Uruguay	119200	500	12
Vanuatu	188000	449	100
Viet Nam	3504412	1430	622
Yemen	461542	400	713
Zimbabwe	5000000	200	299

Notes: This table reports the cutoff points at 99th percentile in number of people affected, deaths, and economic damage. The distribution is calculated by country and considers all the major shocks that affected the country from 1999 to 2019.

Table Ia. Thresholds of Country Income. Source: The World Bank

Threshold of Country Income	As of July 2019, \$ GNI Per Capita
Low income	<1,026
Lower-middle income	1,026 - 3,995
Upper-middle income	3,996 - 12,375
High income	> 12,375

Notes: This table presents the levels of country income considering the gross net income per capita. The World Bank determines these categories. More information is available at <https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined>.

Table II. List of Institutional Disruptions in the Period 2007-2019

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$Million)	Killed
Malaysia	2007	Flood	General flood	2007-0021		137,533	605	17
Liberia	2007	Flood	General flood	2007-0404		17,000	-	1
Angola	2007	Flood	General flood	2007-0027		40,000	-	105
Solomon Islands	2007	Earthquake	Tsunami	2007-0127		2,384	-	52
Mali	2007	Flood	Flash flood	2007-0293		41,603	-	9
Netherlands	2007	Storm	Extratropical cyclone	2007-0019	Kyrrill	-	550	7
Slovenia	2007	Storm		2007-0458		1,050	292	6
St Lucia	2007	Storm	Tropical cyclone	2007-0360	Dean	-	40	1

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$Million)	Killed
Bangladesh	2007	Storm	Tropical cyclone	2007-0556	Sidr	8,978,541	2,300	4,234
Mexico	2007	Flood	General flood	2007-0521		1,600,000	3,000	22
Bangladesh	2007	Flood	General flood	2007-0311		13,771,380	100	1,110
United Kingdom	2007	Flood	General flood	2007-0278		340,000	4,000	7
Belgium	2007	Storm	Extratropical cyclone	2007-0019	Kyrrill	2	450	2
Peru	2007	Earthquake	Earthquake	2007-0362		658,331	600	593
Uruguay	2007	Flood	General flood	2007-0183		119,200	45	2
Oman	2007	Storm	Tropical cyclone	2007-0164	Gonu	20,000	3,900	76
Burundi	2007	Flood	General flood	2007-0028		23,000	-	4
Marshall Islands	2008	Flood	Storm surge	2008-0583		600	-	-
Yemen	2008	Flood	Flash Flood	2008-0499		25,064	400	90
Antigua and Barbuda	2008	Storm	Tropical cyclone	2008-0604	Omar	25,800	-	-
Philippines	2008	Storm	Tropical cyclone	2008-0249	Fengshen	4,785,460	285	644
Myanmar	2008	Storm	Tropical cyclone	2008-0184	Nargis	2,420,000	4,000	138,366
Kyrgyzstan	2008	Earthquake		2008-0454		1,197	-	74
China	2008	Earthquake	Earthquake	2008-0192		45,976,596	85,000	87,476
Ukraine	2008	Flood	General Flood	2008-0306		224,725	1,000	38
Kazakhstan	2008	Flood	General Flood	2008-0095		13,000	130	1
Panama	2008	Flood	Flash Flood	2008-0409		545	-	16
United States	2008	Flood	General Flood	2008-0627		11,000,148	10,000	24
Brazil	2008	Flood	General Flood	2008-0549		1,500,015	750	151
Senegal	2009	Flood	General Flood	2009-0344		264,000	-	6
China	2009	Flood	General Flood	2009-0292		39,372,000	1,000	90
Tonga	2009	Earthquake	Tsunami	2009-0420		507	10	9
Uruguay	2009	Flood	General Flood	2009-0531		22,000	-	12
Tunisia	2009	Flood	Flash Flood	2009-0412		8	-	17
Indonesia	2009	Earthquake	Earthquake	2009-0421		2,501,798	2,200	1,195
Mongolia	2009	Flood	General Flood	2009-0269		15,000	-	26
Samoa	2009	Earthquake	Tsunami	2009-0420		5,585	150	143
Benin	2009	Flood	General Flood	2009-0243		60,238	-	7
Saudi Arabia	2009	Flood	General Flood	2009-0522		10,000	900	161
Burkina Faso	2009	Flood	General Flood	2009-0444		151,000	150	9
Italy	2009	Earthquake	Earthquake	2009-0136		56,000	2,500	295
Costa Rica	2009	Earthquake	Earthquake	2009-0002		128,618	200	31
Philippines	2009	Storm	Tropical cyclone	2009-0414	Ondoy, Ketsana	4,901,763	237	501
Cote d'Ivoire	2009	Mass Movement	Landslide	2009-0223		10,006	-	27
Namibia	2009	Flood	General Flood	2009-0092		350,000	-	92
Central African Republic	2009	Storm	Local storm	2009-0064		2,472	-	3
Pakistan	2010	Flood	Flash Flood	2010-0341		20,359,496	9,500	1,985
St Lucia	2010	Storm	Tropical cyclone	2010-0571	Tomas	1,000	1	10
Portugal	2010	Flood	General Flood	2010-0068		618	1,350	43
Hong Kong	2010	Storm	Tropical cyclone	2010-0332	Chanthu	15,000	-	1
Barbados	2010	Storm	Tropical cyclone	2010-0571	Tomas	2,500	-	-
Haiti	2010	Earthquake	Earthquake	2010-0017		3,700,000	8,000	222,570
Uganda	2010	Mass Movement	Landslide	2010-0084		12,795	-	388
St Vincent and the Grenadines	2010	Storm	Tropical cyclone	2010-0571	Tomas	6,100	25	-
Ghana	2010	Flood	General Flood	2010-0246		7,500	-	45
Gambia The	2010	Flood	General Flood	2010-0516		17,767	-	1
China	2010	Mass Movement	Landslide	2010-0377		47,200	759	1,765
Panama	2010	Flood	General Flood	2010-0666		24,610	-	13
Central African Republic	2010	Flood	General Flood	2010-0381		1,585	-	3
Poland	2010	Flood	General Flood	2010-0193		100,000	3,080	16
Kenya	2010	Flood	General Flood	2010-0285		70,000	-	100
Hungary	2010	Flood	General Flood	2010-0193		2,000	440	1
Tajikistan	2010	Flood	General Flood	2010-0175		6,708	204	73
Chile	2010	Earthquake	Earthquake	2010-0091		2,671,556	30,000	562
Montenegro	2010	Flood	General Flood	2010-0619		5,000	-	-

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$Million)	Killed
Guinea	2010	Flood	General Flood	2010-0526		40,411	-	1
Jamaica	2010	Storm	Tropical cyclone	2010-0501	Nicole	2,506	150	15
China	2010	Earthquake	Earthquake	2010-0169		112,000	500	2,968
Sri Lanka	2011	Flood	General Flood	2011-0024		1,060,324	200	47
United States	2011	Storm	Tropical cyclone	2011-0328	Irene	3,700,000	7,300	46
Japan	2011	Earthquake	Tsunami	2011-0082		368,820	210,000	19,846
Brazil	2011	Flood	General Flood	2011-0014		45,000	1,000	900
Thailand	2011	Storm	Tropical cyclone	2011-0272		1,000,000	47,000	18
Haiti	2011	Storm	Tropical cyclone	2011-0328	Irene	1,544	-	2
China	2011	Flood	General Flood	2011-0227		67,900,000	6,400	467
Norway	2011	Storm	Local storm	2011-0486		500	-	4
Puerto Rico	2011	Storm	Tropical cyclone	2011-0328	Irene	2,271	500	1
United States	2011	Storm	Local storm	2011-0172		1,150	14,000	176
Lesotho	2011	Flood	General Flood	2011-0043		5,000	-	26
Bahamas	2011	Storm	Tropical cyclone	2011-0328	Irene	10,000	40	
Bhutan	2011	Earthquake	Earthquake	2011-0351		20,016	-	1
Ireland	2011	Flood	General Flood	2011-0453		600	325	2
United States	2011	Storm	Local storm	2011-0145		17,200	11,000	354
Spain	2011	Earthquake	Earthquake	2011-0159		15,300	200	10
New Zealand	2011	Earthquake	Earthquake	2011-0068		301,500	15,000	181
Burundi	2011	Storm	Local storm	2011-0065		50	-	12
Dominican Rep	2011	Storm	Tropical cyclone	2011-0328	Irene	37,000	30	4
Samoa	2012	Storm	Tropical cyclone	2012-0498	Evan	12,703	133	12
United States	2012	Storm	Tropical cyclone	2012-0410	Sandy	8,120,000	50,000	54
Comoros	2012	Flood	General Flood	2012-0113		65,137	5	4
United States	2012	Forest fire	Forest fire	100		-	338	93
Bulgaria	2012	Flood	General Flood	2012-0033		37,950	4	5
South Africa	2012	Flood	General Flood	2012-0469		125,000	200	13
United States	2012	Storm	Tropical cyclone	2012-0313		60,000	6,500	1
Russia	2012	Flood	Flash Flood	2012-0213		31,410	600	172
Haiti	2012	Storm	Tropical cyclone	2012-0313	Isaac	8,007	-	13
Italy	2012	Earthquake	Earthquake	2012-0142		11,050	15,800	7
Philippines	2012	Storm	Tropical cyclone	2012-0500	Bopha	6,246,664	898	1,901
Georgia	2012	Flood	Flash Flood	2012-0165		100,018	3	5
China	2012	Flood	General Flood	2012-0292		1,000,000	8,000	151
China	2013	Earthquake	Earthquake	2013-0116		2,198,785	8,500	198
United States	2013	Terrorist attack	Terrorist attack	101		264	58,000	3
St Lucia	2013	Flood	General Flood	2013-0531		170,000	-	6
Germany	2013	Flood	General Flood	2013-0205		6,350	12,900	4
Sweden	2013	Storm	Extratropical cyclone	2013-0517	Xavier	3,125,500	-	7
Portugal	2013	Storm	Local storm	2013-0155		3,967	-	1
St Vincent and the Grenadines	2013	Flood	General Flood	2013-0531		13,091	-	13
Paraguay	2013	Storm	Local storm	2013-0408		50,000	25	-
Israel	2013	Storm	Local storm	2013-0524	Alexa	2,003,000	-	4
Mali	2013	Flood	General Flood	2013-0310		34,700	-	37
United States	2013	Storm	Local storm	2013-0142		450	6,700	29
United States	2013	Forest fire	Forest fire	102		878,000	900	92
Armenia	2013	Storm	Local storm	2013-0194		64,000	60	-
Philippines	2013	Flood	General Flood	2013-0274		3,096,422	2,190	31
Botswana	2013	Flood	General Flood	2013-0031		4,210	-	12
India	2013	Storm	Tropical cyclone	2013-0401		13,230,000	17,000	47
Russia	2013	Flood	General Flood	2013-0278		34,135	1,000	-
Argentina	2013	Flood	General Flood	2013-0119		350,000	1,300	59
Czech Rep	2013	Flood	General Flood	2013-0205		1,300,000	829	15
Thailand	2013	Flood	General Flood	2013-0431		3,500,000	482	61
Mauritius	2013	Flood	Flash Flood	2013-0079		82	-	11
Uganda	2013	Flood	General Flood	2013-0197		25,445	3	13
United States	2013	Flood	General Flood	2013-0354		21,900	57,900	9
Philippines	2013	Storm	Tropical cyclone	2013-0433	Haiyan, Yolanda	16,106,807	10,000	7,986
Canada	2013	Flood	General Flood	2013-0190		100,000	5,700	4
Cambodia	2013	Flood	General Flood	2013-0380		1,500,000	500	200

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$Million)	Killed
Cameroon	2014	Flood	Riverine flood	2014-0400		250,000	-	-
Poland	2014	Extreme temperature	Cold wave	2014-0030		-	-	78
Liberia	2014	Epidemic	Epidemic	106		-	53,000	11,308
Bosnia and Herzegovina	2014	Flood	Riverine flood	2014-0164		1,000,000	437	25
Croatia	2014	Flood	Riverine flood	2014-0164		7,116	-	3
Bulgaria	2014	Storm	Convective storm	2014-0404		40	545	1
Australia	2014	Storm	Convective storm	2014-0475		52,539	1,000	-
Slovenia	2014	Extreme temperature	Severe winter conditions	2014-0046		50,000	-	1
Sierra Leone	2014	Epidemic	Epidemic	106		-	53,000	11,308
Malaysia	2014	Flood	Riverine flood	2014-0494		230,000	284	17
Australia	2014	Extreme temperature	Heat wave	2014-0010		-	-	139
Marshall Islands	2014	Flood	Coastal flood	2014-0097		360	-	-
Guinea	2014	Epidemic	Epidemic	106		-	53,000	11,308
Congo	2014	Flood	Flash flood	2014-0432		4,750	15	154
Serbia Montenegro	2014	Flood	Riverine flood	2014-0164		49,600	2,048	51
Kiribati	2014	Flood	Coastal flood	2014-0097		220	-	-
India	2014	Flood	Riverine flood	2014-0343		275,000	16,000	298
Guyana	2015	Flood	Coastal flood	2015-0313		199,000	-	-
Egypt	2015	Extreme temperature	Heat wave	2015-0342		66	-	110
Malawi	2015	Flood	Riverine flood	2015-0011		638,645	390	278
Nepal	2015	Earthquake	Ground movement	2015-0144		5,639,722	5,174	8,831
Iraq	2015	Flood	Flash flood	2015-0485		65,000	-	58
Congo	2015	Flood	--	2015-0549		180,000	-	-
Vanuatu	2015	Storm	Tropical cyclone	2015-0093	Pam	188,000	449	11
Kiribati	2015	Storm	Tropical cyclone	2015-0093	Pam	1,500	-	-
Ghana	2015	Flood	--	2015-0217		5,000	12	25
Bahamas	2015	Storm	Tropical cyclone	2015-0479	Joaquin	6,710	90	33
Ecuador	2015	Volcanic activity	Lava flow	2015-0361	Cotopaxi	800,000	-	-
United States	2015	Flood	Flash flood	2015-0212		12,000	12,600	32
Egypt	2015	Storm	Convective storm	2015-0605		-	100	6
Micronesia	2015	Storm	Tropical cyclone	2015-0105	Maysak	35,000	11	5
Sierra Leone	2015	Flood	--	2015-0436		24,303	-	10
Belgium	2015	Extreme temperature	Heat wave	2015-0410		-	-	410
Lebanon	2015	Storm	Convective storm	2015-0002	Huda	1,000,000	-	2
Kyrgyzstan	2015	Earthquake	Ground movement	2015-0512		16,780	12	-
Solomon Islands	2015	Storm	Tropical cyclone	2015-0093	Pam	44,096	-	-
Georgia	2015	Flood	Flash flood	2015-0227		10,320	23	40
Guinea	2015	Flood	--	2015-0480		29,628	-	9
Solomon Islands	2015	Storm	Tropical cyclone	2015-0281	Raquel	400	2	9
United States	2016	Flood	--	2016-0292		70,000	13,000	13
Uganda	2016	Flood	Riverine flood	2016-0130		10,000	3	-
Bahamas	2016	Storm	Extra-tropical storm	2016-0355	Matthew	-	600	-
Jamaica	2016	Storm	Extra-tropical storm	2016-0355	Matthew	125,000	-	-
United States	2016	Storm	Convective storm	2016-0010	Jonas, Snowzilla	85,000,016	5,550	50
Fiji	2016	Storm	Tropical cyclone	2016-0041	Winston	350,000	600	44
Netherlands	2016	Storm	Convective storm	2016-0211		-	844	-
China	2016	Flood	--	2016-0241		60,000,000	22,000	289
United States	2016	Flood	Flash flood	2016-0124		21,000	4,500	9
Ethiopia	2016	Flood	Flash flood	2016-0186		490,000	-	100
Dominican Rep	2016	Flood	Riverine flood	2016-0423		1,792,000	-	15
Haiti	2016	Storm	Extra-tropical storm	2016-0355	Matthew	2,100,439	2,000	546
Rwanda	2016	Landslide	Landslide	2016-0164		4,000	-	54
Ecuador	2016	Earthquake	Ground movement	2016-0117		389,364	2,000	672
United States	2016	Terrorist attack	Terrorist attack	104		102	385	93

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$Million)	Killed
Italy	2016	Earthquake	Ground movement	2016-0313		4,854	5,000	296
Benin	2016	Epidemic	Bacterial disease	2016-0448	Cholera	281	-	9
Japan	2016	Earthquake	Ground movement	2016-0107		120,800	20,000	9
Israel	2016	Wildfire	Land fire	2016-0442		60,137	520	-
Dominican Rep	2016	Storm	Extra-tropical storm	2016-0355	Matthew	-	-	-
Egypt	2016	Storm	Convective storm	2016-0359		32,572	25	26
Tanzania	2016	Earthquake	Ground movement	2016-0329		139,601	458	17
United States	2016	Storm	Extra-tropical storm	2016-0355	Matthew	3,000,104	10,000	49
Saint Kitts and Nevis	2017	Storm	Tropical cyclone	2017-0381	Irma	-	20	-
United States	2017	Storm	Tropical cyclone	2017-0383		3,500,000	95,000	12
Puerto Rico	2017	Storm	Tropical cyclone	2017-0381	Irma	-	-	2
Puerto Rico	2017	Storm	Tropical cyclone	2017-0383	Maria	750,000	68,000	64
Belarus	2017	Extreme temperature	Severe winter conditions	2017-0010		50,539	-	43
Hong Kong	2017	Storm	Tropical cyclone	2017-0352	Hato	156	756	-
United States	2017	Storm	Tropical cyclone	2017-0362	Harvey	582,024	95,000	88
Guatemala	2017	Earthquake	Ground movement	2017-0382		3,601	-	-
Burkina Faso	2017	Epidemic	Viral disease	2017-0480	Dengue	9,029	-	18
Viet Nam	2017	Storm	Tropical cyclone	2017-0422	Damrey, Ramil	4,330,000	1,000	123
United States	2017	Terrorist attack	Terrorist attack	107		3,015,000	1,500	59
Mexico	2017	Earthquake	Ground movement	2017-0382		1,200,250	2,300	98
Montenegro	2017	Wildfire	Forest fire	2017-0297		200	-	-
Portugal	2017	Wildfire	Forest fire	2017-0176		704	232	64
Haiti	2017	Storm	Tropical cyclone	2017-0381	Irma	40,092	-	1
Albania	2017	Extreme temperature	Severe winter conditions	2017-0010		-	-	6
Mexico	2017	Earthquake	Ground movement	2017-0387		256,000	6,000	369
Dominican Rep	2017	Storm	Tropical cyclone	2017-0383	Maria	26,000	63	5
Vietnam	2017	Storm	Tropical cyclone	2017-0352	Hato	1	1,430	1
Peru	2017	Flood	--	2017-0084		1,800,505	3,100	184
Thailand	2017	Flood	Riverine flood	2017-0006		1,800,000	1,000	96
United States	2017	Storm	Tropical cyclone	2017-0381	Irma	70,000	57,000	58
Australia	2017	Storm	Tropical cyclone	2017-0105	Debbie	45,000	2,700	12
Dominica	2017	Storm	Tropical cyclone	2017-0383	Maria	71,393	1,456	64
Sudan	2017	Epidemic	Bacterial disease	2017-0379		30,762	-	657
Niger (the)	2017	Flood	--	2017-0370		206,513	10	56
Croatia	2017	Storm	Convective storm	2017-0408		3,500	161	-
Sierra Leone	2017	Landslide	Mudslide	2017-0343		11,916	30	1,102
Antigua and Barbuda	2017	Storm	Tropical cyclone	2017-0381	Irma	1,400	250	1
Bahamas	2017	Storm	Tropical cyclone	2017-0381	Irma	-	300	1500
United States	2017	Wildfire	Land fire	2017-0434		3,450,000	28,000	93
Barbados	2017	Storm	Tropical cyclone	2017-0381	Irma	-	400	1
Dominican Rep	2017	Storm	Tropical cyclone	2017-0381	Irma	6,300	5,000	-
Mauritius	2018	Storm	Tropical cyclone	2018-0029	Berguitta	30,000	-	-
United States	2018	Storm	Tropical cyclone	2018-0373		10,055,000	23,000	92
Tunisia	2018	Flood	Flash flood	2018-0364		30,000	36	6
Rwanda	2018	Flood	Flash flood	2018-0104		26,051	-	24
Papua New Guinea	2018	Earthquake	Ground movement	2018-0055		544,300	61	145
Lao P Dem Rep	2018	Storm	Tropical cyclone	2018-0305	Bebinca	615,145	225	-
Sweden	2018	Wildfire	Forest fire	2018-0224		-	3,100	-
United States	2018	Storm	Tropical cyclone	2018-0342		3,150,000	35,000	53
Tonga	2018	Storm	Tropical cyclone	2018-0042	Gita	87,000	-	-
United States	2018	Wildfire	Forest fire	2018-0409	Camp Fire	5,150,000	16,500	88
Japan	2018	Flood	--	2018-0190		1,500,102	9,500	246
Nigeria	2018	Flood	--	2018-0365		1,922,332	275	199
Lao P Dem Rep	2018	Flood	--	2018-0222		13,100	-	136
Lebanon	2018	Storm	Convective storm	2018-0047		-	-	15
Cote d Ivoire	2018	Flood	--	2018-0185		25,000	-	20
Lithuania	2018	Extreme temperature	Cold wave	2018-0061		-	-	5

Country	Year	Type	Subtype	Number	Name	Affected	Damage (\$Million)	Killed
India	2018	Flood	Flash flood	2018-0295		23,220,000	2,852	504
Marshall Islands	2018	Storm	Tropical cyclone	2018-0469	Penny	-	-	-
Latvia	2018	Wildfire	Forest fire	2018-0224		-	-	-
Canada	2018	Extreme temperature	Heat wave	2018-0195		-	-	70
Rwanda	2018	Landslide	Landslide	2018-0208		12	28	18
Indonesia	2018	Earthquake	Tsunami	2018-0352		209,025	1,450	4,340
Guatemala	2018	Volcanic activity	Pyroclastic flow	2018-0168	Volcan de Fuego	1,714,414	-	461
Botswana	2018	Flood	--	2018-0103		4,225	-	-
Spain	2019	Flood	--	2019-0413		3,500	2,400	6
United States	2019	Storm	Tropical cyclone	2019-0412		3,080,000	45,000	2
Bahamas	2019	Storm	Tropical cyclone	2019-0412		3,000,000	4,600	115
Malawi	2019	Flood	--	2019-0101		975,672	-	60
Luxembourg	2019	Storm	Convective storm	2019-0388		1,519	-	-
Paraguay	2019	Flood	Riverine flood	2019-0245		310,595	-	-
South Sudan	2019	Flood	Flash flood	2019-0285		234,800	-	3
India	2019	Flood	--	2019-0449		22,000,000	-	100
China	2019	Storm	Tropical cyclone	2019-0387	Lekima	108,000	10,000	72
South Africa	2019	Flood	--	2019-0176		1,000	50	73
Tanzania	2019	Storm	Tropical cyclone	2019-0165	Kenneth	2,000,000	-	-
Libya	2019	Flood	--	2019-0224		20,030	7	4
Iran Islam Rep	2019	Flood	--	2019-0125		10,001,076	2,500	70
Zimbabwe	2019	Storm	Extra-tropical storm	2019-0110	Idai	270,000	-	299
Mozambique	2019	Storm	Extra-tropical storm	2019-0110	Idai	1,851,500	2,000	602
Comoros	2019	Storm	Tropical cyclone	2019-0165	Kenneth	345,311	-	8
Albania	2019	Earthquake	Ground movement	2019-0444		4,608	45	-
South Sudan	2019	Wildfire	--	2019-0189		12	-	50
Syrian Arab Rep	2019	Flood	--	2019-0137		235,000	-	2
Japan	2019	Storm	Tropical cyclone	2019-0492	Hagibis	390,000	-	86

Notes: This table lists the disruptions that ranked at or above the 99th percentile of impacts in either category—number of people affected, deaths, or economic damage—between 2007 and 2019, inclusive. The impact distributions are calculated by country and considers all the shocks from 1999 to 2019.

MNE and Affiliate Data

We relied on Bureau van Dijk's Orbis Database for MNE- and affiliate-level data. The sample contains the 2,000 largest global publicly traded firms as of December 2020. In order to select the 2,000 largest firms, we applied the screening criteria in Orbis for: 1) active firms, 2) publicly listed, and 3) with revenues over USD \$4.2 billion. These screens resulted in a total of 2,000 MNEs from a broad range of industries, headquartered in 63 countries, and with a median total revenue of USD \$9.2 billion and median total number of employees of 24,500.

Orbis data sometimes contains subsidiaries that do not have ownership identifying information in the shareholder data and therefore a mass downloading of the 2000 MNE subsidiary data yields many subsidiaries with no ownership identifiers. Pulling each MNE's subsidiaries separately allows for assigning the correct MNE identifier to each subsidiary without loss of observations. Therefore, we screened for the subsidiaries of each MNE individually, selecting subsidiaries that meet one of the following criteria: 1) Ultimately owned by a company of the selected group which is a Global Ultimate Owner; 2) Ultimately owned by a company of the selected group which is a Domestic Ultimate Owners; 3) Directly or totally owned by a company of the selected group with a minimum of five percent to a maximum of 100 percent ownership; or 4) Owned by a company of the selected group with an unknown percentage.

The database contained 545,664 subsidiaries belonging to the 2,000 MNEs, of which 470,867 were currently active and only 229,632 had recent operational accounts over our sample window. The proportion of Orbis entities with revenue and employee data over our sample window is 37.7 percent and 33.8 percent, respectively.

A major part of the task was cleaning the affiliate data. Using data from the Orbis Ownership database, we found that the 545,664 entities had over 8.5 million entity-shareholder-year observations. Orbis contains separate identifiers and ownership percentages for the global ultimate owner, direct ultimate owner, controlling shareholder, and shareholders. We relied on the shareholder ownership information to track ownership percentage changes over time. The Orbis Ownership database is updated with information when there is a change in ownership. As a consequence, there are gaps in ownership information between years of updating. For entities with gaps between years of the same owner, we filled in missing ownership data with the most recent prior percentage of ownership reported. For entities that did not have a shareholder ownership percentage associated with the MNE identifier code, we relied on the global ultimate owner, the controlling shareholder, or direct shareholder as long as the owner identification code matched the MNE identification code and the ownership percentage was not missing. The global ultimate owner ownership percentages are static in the Orbis database, equal to ownership as of 2019. Therefore, we had to check whether the subsidiary entered the corporate group during our sample window for all of these affiliates.

In some cases, Orbis provides no ownership percentage, but the affiliates are categorized into independence ratings based on ownership percentage (e.g. B, C, and D ratings). We took the median value of the ownership range for the independence ratings for these firms. When information on subsidiary ownership was not available or provided conflicting information, we validated ownership using information from public filings and reports.

A total of 11,112 subsidiaries had more than one MNE owner according the Orbis data base. In examining the data, there were a number of cases where MNEs make financial investments without exerting control over the subsidiary, particularly in the case of PE firms and institutional investors. A team of RAs cleaned these data, assigning ownership to the MNE that aligned with the GUO, DUO, or CSH Orbis Data. If the controlling ownership could not be directly matched, ownership was assigned to the MNE with the largest

percentage ownership of at least 25%. The final sample was composed of 10,874 subsidiaries with multiple MNE owners and 534,790 subsidiaries with only one MNE owner.

We used information on subsidiary incorporation dates and legal changes from the Orbis database to code when subsidiaries entered or exited the multinational firm group. For example, we searched for keywords associated with ['Merger', 'ownership added: parent', 'the company has merged with', 'ownership changed from shareholder to parent company'] for acquisitions of the subsidiary and ['liquidate', 'Deregistration', 'Cessation of activity', 'Insolvency proceedings', 'Bankruptcy', 'Dissolved',] for dissolutions and spin offs.

A total of 119 of the publicly listed MNEs were part of a larger conglomerate group (e.g. Hitachi High Technologies Corporation and Hitachi Construction Machinery Co., Ltd. are publicly listed but also part of Hitachi Ltd.) or acquired during our sample period. We rolled these MNEs up into their larger corporate group based on the appropriate legal event date.

Eight MNEs did not have affiliates in the Orbis database. As a result, 1,891 MNEs compose the final sample of MNEs with economic importance information.

ROBUSTNESS AND TEST OF CONFOUNDERS

Sample at the 75th and 90th Percentile Severity Cutoffs

We tested the sensitivity of the results to the 75th and 90th percentile of severity of disaster. At the 75th percentile of severity, there are 1,402 shocks that affected 157 countries. Applying a 90th percentile cutoff for severity resulted in 639 shocks that affected 150 countries. The table below contains the results for the different cutoffs.

Table III. Economic Importance of the Country to the Firm and Donations to Disruptions at the 75th and 90th Percentile Cutoffs

Variables	USD Donation Amount (ln)	
	(1) 75 th Percentile	(2) 90 th Percentile
H1: Economic Importance	34.399*	56.556***
	(20.105)	(21.311)
H2: EI x Dominant MNE Index	4.911***	7.551***
	(1.831)	(1.991)
H3: EI x Host-Country Public Aid (ln)	-1.343*	-2.106***
	(0.705)	(0.743)
H3: EI x Foreign Public Aid (ln)	0.334***	0.368***
	(0.072)	(0.077)
H4: EI x Regulatory Quality	2.313***	1.318**
	(0.505)	(0.603)
Dominant MNE Index	-1.160**	-1.477**
	(0.523)	(0.663)
Host-Country Public Aid (ln)	0.288***	0.114
	(0.053)	(0.090)
Foreign Public Aid (ln)	-0.016	-0.028
	(0.016)	(0.026)
Regulatory Quality	-0.018	0.346
	(0.210)	(0.285)
Firm Controls	YES	YES
Country Controls	YES	YES
Event Controls	YES	YES
Firm, Industry, Country by Event, Year Firm Fixed Effects	YES	YES
Observations	2,651,182	1,208,349
MNEs	1,891	1,891
Countries	150	157
Disruptions	1,402	635

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. For model (1), institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 75th percentile in the countries that they affected. Model (2) presents analyses with institutional disruptions whose impacts ranked at the 90th percentile. See text for sample definition and construction. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Partial-Model Results

Table IV. Partial Models of the Effect of the Economic Importance of the Country on Donations to Disruptions

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	0.326*** (0.021)	2.712*** (0.480)	0.195*** (0.016)
H2: EI x Dominant MNE Index	0.428*** (0.028)		
H3: EI x Host-Country Public Aid (ln)		-0.066*** (0.016)	
H3: EI x Foreign Public Aid (ln)		-0.026*** (0.001)	
H4: EI x Regulatory Quality			0.434*** (0.013)
Dominant MNE Index	-0.005 (0.008)		
Host-Country Public Aid (ln)		0.002*** (0.001)	
Foreign Public Aid (ln)		-0.000 (0.000)	
Regulatory Quality			-0.008*** (0.001)
Firm Controls	YES	YES	YES
Country Controls	YES	YES	YES
Event Controls	YES	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	NO
Constant	0.049*** (0.005)	-0.012 (0.016)	0.048*** (0.005)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations to factors that are necessary for market operations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05.

Alternative Predictor Variables

In robustness models, we use alternative measures of economic importance based on revenues, total assets, and employees. We do not use them as main explanatory variables as, arguably, it may reduce construct validity. For instance, revenue can overrepresent some industries and some types of affiliates, such as sale subsidiaries and only accounts for the demand side of the market and it does not capture the relevance of the country affiliate as a supplier of inputs for the firm.

Moreover, Orbis has substantial missing data for these variables. Addressing missing data with listwise deletion or mean substitution would foster the risk of obtaining biased estimates, increasing Type II errors, and underestimating correlations and coefficient weights. To address this, we start by analyzing missingness patterns and find no systematic divergence on the completely observed variables between those with

missing data and those with available data. In other words, the hypothesis that data are missing completely at random cannot be rejected. Then, we use two methods to impute data:

1. For firm-level data, we expand using Chebyshev polynomials because they can arguably approximate most functional forms (Kolsarici and Vakratsas 2015). We opted for a third-order polynomial based on the Bayesian information criterion after considering expansions up to the 20th degree.
2. For country-level data, we apply multiple-input bootstrapping algorithm for time-series-cross-sectional data as explained by Blackwell et al. (2017). This form of 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 macro level data than traditional procedures can be found in Honaker and King (2010).

Table V. Alternative Measures of Economic Importance of the Country to the Firm and Donations to Disruptions

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
H1: Economic Importance (Assets)	1.364*** (0.305)			
H2: EI (Assets) x Dominant MNE Index	0.134*** (0.033)			
H3: EI (Assets) x Host-Country Public Aid (ln)	-0.049*** (0.011)			
H3: EI (Assets) x Foreign Public Aid (ln)	0.006*** (0.001)			
H4: EI (Assets) x Regulatory Quality	0.196*** (0.013)			
H1: Economic Importance (Revenue)		1.306*** (0.309)		
H2: EI (Revenue) x Dominant MNE Index		0.132*** (0.034)		
H3: EI (Revenue) x Host-Country Public Aid (ln)		-0.047*** (0.011)		
H3: EI (Revenue) x Foreign Public Aid (ln)		0.007*** (0.001)		
H4: EI (Revenue) x Regulatory Quality		0.202*** (0.013)		
H1: Economic Importance (Employees)			1.772*** (0.312)	
H2: EI (Employees) x Dominant MNE Index			0.131*** (0.034)	
H3: EI (Employees) x Host-Country Public Aid (ln)			-0.063*** (0.011)	
H3: EI (Employees) x Foreign Public Aid (ln)			0.006*** (0.001)	
H4: EI (Employees) x Regulatory Quality			0.203*** (0.013)	
H1: Economic Importance (Combined)				0.723*** (0.154)
H2: EI (Combined) x Dominant MNE Index				0.068*** (0.017)
H3: EI (Combined) x Host-Country Public Aid (ln)				-0.026*** (0.005)

Variables	USD Donation Amount (ln)			
	(1) Assets	(2) Revenue	(3) Employees	(4) Combined
H3: EI (Combined) x Foreign Public Aid (ln)				0.003*** (0.001)
H4: EI (Combined) x Regulatory Quality				0.106*** (0.006)
Dominant MNE Index	0.149*** (0.009)	0.158*** (0.009)	0.165*** (0.009)	0.145*** (0.009)
Host-Country Public Aid (ln)	-0.016*** (0.001)	-0.016*** (0.001)	-0.015*** (0.001)	-0.016*** (0.001)
Foreign Public Aid (ln)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Regulatory Quality	-0.009*** (0.003)	-0.009*** (0.003)	-0.009*** (0.003)	-0.010*** (0.003)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	-0.490*** (0.036)	-0.488*** (0.036)	-0.489*** (0.036)	-0.491*** (0.036)
Observations	501,115	501,115	501,115	501,115
MNEs	1,891	1,891	1,891	1,891
Countries	129	129	129	129
Disruptions	265	265	265	265

Notes: This table reports regression estimates for the relation between the alternative constructions of economic importance of the country for a firm and donations in the aftermath of disruptions. Each explanatory variable uses the share of affiliates in the affected country adjusted by ownership and is calculated with a third-order Chebyshev polynomial expansion on an additional explanatory variable. In Model 1, the explanatory variable is the share of assets; Model 2, the share of revenue; Model 3, the share of employees. Model 4 expands on affiliates and the three other predictors. See text for additional variable definitions and constructions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Do Headquarters Units Sufficiently Explain the Size of the Effects?

We face the concern that that the MNE is substantially more likely to donate when headquarters units are in the affected country than it otherwise would donate when there are just affiliates in the country. The concern is that this difference sufficiently explains the significance of economic importance. To address this concern, we run our models excluding donations when the MNE responded to disruptions in countries where at least one headquarters is located. We use the classification of headquarters affiliates from Orbis to distinguish headquarter country locations.

Table VI. The Effect of Economic Importance of the Country on the Magnitude of Donations Sample Excluding Donations of MNEs to Disruptions when the Affected Country has Headquarters Affiliates

Variables	USD Donation Amount (ln) (1)
H1: Economic Importance	24.150*** (1.834)
H2: EI x Dominant MNE Index	4.197*** (1.102)
H3: EI x Host-Country Public Aid (ln)	-1.625*** (0.703)
H3: EI x Foreign Public Aid (ln)	0.328*** (0.068)
H4: EI x Regulatory Quality (Percentile Rank)	2.348*** (0.485)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Firm Fixed Effects	Yes
Observations	499,804
MNEs	1,891
Countries	128
Disruptions	265

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. The affiliates classified as ‘headquarters were excluded to test the robustness of the effect of economic importance on the prediction of donations. The classification comes from Orbis. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Country Income Level

We examine whether the effects are driven by level of country income and employ the World Bank’s classification of country groups for low, lower-middle, upper-middle, and high-income countries (The World Bank, 2021). For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more (The World Bank 2021). We performed split sample analysis for each group.

Table VII. Classification of Disruption Countries by Income Level

Low income	Lower middle income	Upper middle income	High income
Burkina Faso	Angola	Albania	Antigua and Barbuda
Burundi	Bangladesh	Argentina	Australia
Central African Republic	Benin	Armenia	Bahamas
Ethiopia	Bhutan	Belarus	Barbados
Gambia	Cambodia	Bosnia and Herzegovina	Belgium
Guinea	Cameroon	Botswana	Canada
Haiti	Comoros	Brazil	Chile
Liberia	Congo	Bulgaria	Croatia
Malawi	Cote d Ivoire	China	Czech Rep
Mali	Egypt	Costa Rica	Germany
Mozambique	Ghana	Dominica	Hong Kong
Niger	India	Dominican Rep	Hungary
Rwanda	Kenya	Ecuador	Ireland
Sierra Leone	Kiribati	Fiji	Israel
South Sudan	Kyrgyzstan	Georgia	Italy
Sudan	Lao P Dem Rep	Guatemala	Japan
Syrian Arab Rep	Lesotho	Guyana	Latvia
Tajikistan	Micronesia Fed States	Indonesia	Lithuania
Uganda	Mongolia	Iran Islam Rep	Luxembourg
Yemen	Myanmar	Iraq	Mauritius
	Nepal	Jamaica	Netherlands
	Nigeria	Kazakhstan	New Zealand
	Pakistan	Lebanon	Norway
	Papua New Guinea	Libya	Oman
	Philippines	Malaysia	Panama
	Senegal	Marshall Islands	Poland
	Solomon Islands	Mexico	Portugal
	Sri Lanka	Montenegro	Puerto Rico
	Tanzania	Namibia	Saint Kitts and Nevis
	Tunisia	Paraguay	Saudi Arabia
	Ukraine	Peru	Slovenia
	Vanuatu	Russia	Spain
	Viet Nam	Samoa	Sweden
	Zimbabwe	Serbia Montenegro	United Kingdom
		South Africa	United States
		St Lucia	Uruguay
		St Vincent and the Grenadines	
		Thailand	
		Tonga	

Table VIII. Economic Importance of the Country to the Firm and Donations to Disruptions by Country-Income Level

Variables	Low- Income	Lower- Middle- Income	Upper- Middle- Income	High- Income
H1: Economic Importance	187.829*** (51.743)	65.226*** (15.072)	8.213*** (1.933)	7.821*** (1.428)
H2: EI x Dominant MNE Index	12,598.580** (6,098.939)	305.478*** (72.737)	0.710*** (0.059)	0.711*** (0.110)
H3: EI x Host-Country Public Aid (ln)	0.010 (0.012)	2.930*** (0.537)	-0.289*** (0.069)	-0.276*** (0.050)
H3: EI x Foreign Public Aid (ln)	-0.206 (4.738)	-0.410*** (0.142)	0.011*** (0.003)	0.018*** (0.004)
H4: EI x Regulatory Quality	1.269*** (0.042)	0.035*** (0.008)	0.114*** (0.004)	0.480*** (0.029)
Dominant MNE Index	73.875 (55.621)	-0.130 (0.509)	0.765 (1.003)	-0.045*** (0.014)
Host-Country Public Aid (ln)	-2.931 (4.417)	-0.017*** (0.003)	-0.010*** (0.002)	-0.044 (0.028)
Foreign Public Aid (ln)	-6.848 (5.368)	-0.012*** (0.004)	-0.000 (0.001)	-0.003*** (0.001)
Regulatory Quality	0.015*** (0.004)	-0.030*** (0.005)	-0.012** (0.005)	-0.042*** (0.007)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	4.583 (4.019)	0.020 (0.075)	-0.700*** (0.071)	-0.463*** (0.146)
Observations	73,749	107,787	147,498	172,081
MNEs	1,891	1,891	1,891	1,891

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more. Source: The World Bank (2020). Retrieved on March 28, 2021 <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

The results indicate that in lower-income countries there is no evidence of a crowding out effect of public aid in the donation of economically connected MNEs. This aligns with evidence that the financial gap for relief and recovery from large shocks for lower income countries is substantial (Becerra *et al.*, 2014, 2015; High-Level Panel on Humanitarian Financing, 2016). Combined with the comparatively large coefficient of economic importance, the results indicate that economically connected MNEs in lower income countries have high incentives to help the country market recover regardless of the contribution from public sources (because the public resources are rarely sufficient).

For lower-middle income countries, we observe that economically connected MNEs reduce their contribution when they perceive substantial foreign aid. This result is consistent with studies that indicate

that the financial gap for these countries is the lowest (Becerra *et al.*, 2014; High-Level Panel on Humanitarian Financing, 2016). In other words, economically connected MNEs estimate that foreign aid will be an important funding resource. On the other hand, the impact of host-country public aid is positively associated with the donation for economically connected MNEs. This effect may be driven by the perceived need when the host-country must give.

For upper-middle income and high-income countries, the results are consistent with our baseline analysis. Funding from the host-country has a substantial crowding out effect on giving by economically connected MNEs. On the other hand, the outpouring of foreign public aid is positively associated with the donation of economically connected MNEs. This is aligned with MNEs perceiving a greater degree of disruption when there is more foreign public aid. In fact, appeals for emergency aid, administered at the global level by multilateral agencies, are rarely issued for upper-middle and high-income countries. The exceptions are for fat-tailed disruptions, which are captured by our statistics. This means that appeals for foreign aid are informative of the expected magnitude of the impacts. They signal to managers the need for resources for relief and recovery.

Coarsened-Exact Matched Sample

We applied coarsened exact matching (CEM) (Iacus *et al.* 2011) to balance the baseline propensity to donate between the treatment (i.e., firms with at least one affiliate in the affected country) and the control groups (i.e., firms with no affiliates in the affected country). The matching uses variables that the extant literature has identified as potential drivers of corporate philanthropy: ROA, Tobins'q, total assets, total revenue, number of employees, R&D Intensity, advertising and administrative expenses, consumer orientation, and industry.

We used no-replacement and targeted a treatment-to-control ratio of 1:10 but tested up to 1:2 for robustness. The L1 statistic, a comprehensive measure of imbalance between the treatment and control groups, is the sum of absolute differences across the multivariate histogram that has the following form:

$$L(t, c) = \frac{1}{2} \sum_{i..ik} |t_{i..ik} - c_{i..ik}| \quad 1$$

where $t_{i..ik}$ is the relative frequency of the categorical variables for the firms in the treatment group and $c_{i..ik}$ is the corresponding 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.

Table IX. L1 Statistic Coarsened-Exact Matched Sample Analysis

Variables	L1 Original	L1 Matched
ROA	.281	.057
Tobins'q	.475	.183
Total Assets (ln)	.612	.240
Total Revenue (ln)	.216	.036
Number of Employees (ln)	.597	.116
R&D Intensity	.854	.487
Advertising and Administrative Expenses	.890	.501
Consumer Orientation	.198	0.000
Industry (SIC)	.074	0.000

Table 5 indicates the improved balance for each variable in the matched sample. We re-estimate our analysis using the CEM matched sample in Table 6 below.

**Table X. The Effect of Economic Importance of the Country on the Magnitude of Donations
Coarsened-Exact Matched Sample
Treatment: The MNE has at least one affiliate in the affected country
[Predicted Variable: USD Donation Amount (ln)]**

Variables	Random Effects	Fixed Effects
H1: Economic Importance	19.493*** (1.609)	19.105*** (1.516)
H2: EI x Dominant MNE Index	98.010*** (4.714)	97.772*** (4.584)
H3: EI x Host-Country Public Aid (ln)	-5.001*** (0.418)	-4.991*** (0.408)
H3: EI x Foreign Public Aid (ln)	0.193*** (0.002)	0.189*** (0.002)
H4: EI x Regulatory Quality (Percentile Rank)	0.036*** (0.001)	0.031*** (0.001)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Event Controls	Yes	Yes
Firm fixed effects	No	Yes
Time fixed effects	No	Yes
Matched Pairs	483	483
Adjusted R-squared		0.891

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. The firm sample is matched using a coarsened exact logarithm on ROA, Tobins'q, total assets, total revenue, number of employees, R&D Intensity, advertising and administrative expenses, consumer orientation, and industry. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Is it the Pursuit of Reputation?

To test for the possibility that MNEs' pursuit of reputational capital sufficiently explains variance in donations, we calculated a Janis-Fadner coefficient of imbalance (JFC)—a widely used variable of media reputation (see Lamin and Zaheer 2012, Love et al. 2017 for surveys in the organization literature). Our specific variable is the annual net pre-disaster media coverage sentiment score for each firm. We use natural language processing to quantify the tone or sentiment of media reports in Factiva mentioning each MNE in our sample in a period of one year before the start date of the disruption. The JFC shows the proportion of negative versus positive articles and is calculated as follows:

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

where, e = annual number of positive media reports pertaining to the firm; c = annual number of negative media reports, and t = e+c. Our analyses thus consider firms with a JFC greater than zero as having positive reputations, and those with a JFC less than zero as having a negative reputation.

We first enter reputation into a model that excludes economic importance and find, consistent with prior literature, reputation is positive and significantly associated with donations. We then add economic importance and no longer find support for reputation.

Table XI. Reputation as a Driver of Donations by MNEs

Variables	USD Donation Amount (ln)	
	Only Reputation	Reputation & Economic Importance
Economic Importance		1.446*** (0.224)
Reputation	1.982* (1.188)	1.506 (1.180)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Event Controls	Yes	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes	Yes
Observations	501,115	501,115
Number of MNEs	1,891	1,891
Countries	129	129
Disruptions	265	265

Notes: This table reports regression estimates for the effect of firm reputation on donations by MNEs in countries affected by disruptions that are economically important for the firm. See text for sample definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

As an additional validation, we explore the predictive power of reputation on the likelihood of donating toward market factors. We substitute economic importance with our reputation variable in the previous specification. The coefficient of such variable is not statistically significant.

Table XII. Reputation as a Driver of Donations Aimed at Restoring Factors Necessary for Market Functioning

Variables	Likelihood of Donating Toward Market Factors	(1)
Reputation		1.005 (0.008)
Reputation x Dominant MNE Index		0.846 (0.208)
Reputation x Host-Country Public Aid (ln)		1.000 (0.000)
Reputation x Foreign Public Aid (ln)		1.000 (0.000)
Reputation x Regulatory Quality		1.012 (0.009)
Firm Controls		Yes
Country Controls		Yes
Event Controls		Yes
Firm, Industry, Country by Event, Year Fixed Effects		Yes
Observations		501,115
MNEs		1,891
Countries		129
Disruptions		265

Notes: The table reports logit regression estimates for the effect of firm reputation on the likelihood of donating with the aim of restoring factors necessary for market functioning. See text for variable definitions and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Is it the Pursuit of Market Standing?

A long-standing argument in the nonmarket literature is that corporations engage in philanthropy to increase their market performance. The strength of this motive is inversely proportional to market standing. Therefore, one expectation is that low-standing organizations should donate relatively large amounts because the marginal utility of such strategies is higher for them than for higher-standing firms (Eichholtz et al. 2010, Liang and Renneboog 2017, Muller and Kräussl 2011, Porter and Kramer 2002, Servaes and Tamayo 2013). To address this potential confounder, we proxied market standing by the rank of the MNE by firm revenue the year before the disruption. The coefficient of an interaction with *economic importance* indicates that the donations from economically connected MNEs fall with every standard-deviation decrease in *market standing*.

Table XIII. The Effect of Market Standing on the Donations of Economically Connected MNEs

Variables	USD Donation Amount (ln) (1)
EI x Market Standing	-0.000*** (0.000)
Economic Importance	0.745*** (0.016)
Market Standing	-0.000 (0.000)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes
Observations	501,115
MNEs	1,891
Countries	129
Disruptions	265

Notes: This table reports regression estimates for the effect of the market standing of the firm (measured by revenue) on the donations by MNEs in countries affected by disruptions that are economically important for the firm. See text for variable definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Is it the Pursuit of Political Favors?

Another prediction is that organizations construct their nonmarket behavior in accordance with signals coming from influential local government actors (Luo and Chung 2013, Marquis and Qian 2013, Zhang et al. 2016, Zhang and Luo 2013). Managers acting strategically invest in government transferences (e.g., operation privileges) to improve their market standing [i.e., rent-seeking and special interest groups may develop (Olson 1971)]. Under this argument, when the domestic government allocates aid, managers will increase their giving to seek its preference and capture public transferences (Zhang et al. 2016, Zhang and

Luo 2013). Following this logic, the analyses for H3 systematically reject the likelihood of such motive being a part of the studied donations.

Is it the Employee's Altruism or Reciprocity?

Firms may donate in response to social preferences from internal stakeholders. For instance, the reciprocal motives of employees may motivate the philanthropic behavior of MNEs (Charness and Rabin 2002, Fehr and Fischbacher 2002, Small and Simonsohn 2008). The risk of this confounder is important in our setting given that research has shown that people react more strongly to shock-related losses than to chronic conditions (Small 2010). We test this motive and find that the coefficient of the interaction of *employee-driven donation* with *economic importance* is statistically significant and negative suggesting that when our studied MNEs donated following an initiative by employees, the donation amount was significantly lower than when not. We find a similar direction when using donations aimed at restoring the markets necessary for market functioning as outcome variable.

Table XIV. The Effect of the Employees' Incentives on the Donations of Economically Connected MNEs

Variables	(1)	(2)
	USD Donation Amount (ln)	Donations for Market Factors (ln)
EI x Employee-Driven Donation	-0.200 (0.624)	-1.270*** (0.220)
Economic Importance	1.485*** (0.221)	1.418* (0.734)
Employee-Driven Donation	-0.982*** (0.162)	0.178 (0.386)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Event Controls	Yes	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes	Yes
Observations	501,115	501,115
MNEs	1,891	1,891
Countries	129	129
Disruptions	265	265

Notes: This table reports regression estimates for the effect of the origin of the donation being the employees of the company on the donations by MNEs in countries affected by disruptions that are economically important for the firm. In Model 1, the outcome variable is the log of donation amounts; in Model 2, the log of donations made exclusively toward restoring factors necessary for market functioning. See text for variable definitions and sample construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

To further test the argument that business decision makers donate to satisfy altruistic motives, we incorporate a ratio of *human to economic loss*, operationalized as the number of deaths divided by economic damage. The measure captures the relative humanitarian damage. Results indicate that the amount of donation decreases in the interaction of *human to economic loss* with *economic importance*. The result is consistent with the skewness of donations to institutional disruptions with substantial economic costs vis-à-vis human impacts across the events in the period 1997 to 2019.

Table XV. The Effect of the Ratio of Number of Deaths to Economic Damage on the Donations of Economically Connected MNEs

Variables	USD Donation Amount (ln) (1)
El x Human to Economic Loss	-0.087*** (0.013)
Economic Importance	0.590*** (0.014)
Human to Economic Loss	-0.003 (0.011)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes
Observations	315,797
MNEs	1,891
Countries	81
Disruptions	167

Notes: This table reports regression estimates for the relation between the ratio of number of deaths to the economic damage of a disruption and donations by MNEs in countries affected by disruptions that are economically important for the firm. See text for variable definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Is it Media Salience?

Studies have shown the influence of media on humanitarian aid and that this influence is heterogeneous across events and skewed to some type of disasters (e.g., earthquakes) and countries (e.g., higher income) (Eisensee and Strömberg 2007, Franks 2013). For some institutional disruptions, economic importance may have a negligible effect because of the magnitude of news coverage. Events such as the 2017 Hurricane Maria in Puerto Rico and the 2011 earthquake and tsunami in Japan were certain to receive firm aid irrespective of the economic importance of the country to the MNE. We thus followed (Stromberg 2007) and reran the analyses with only disruptions that had a probability of being in the news of 50 percent and lower. The magnitude and direction of the estimates held.

**Table XVI. The Effect of Economic Importance of the Country on the Magnitude of Donations
Sample Restricted to Events with a Probability of Being in the News of 50 Percent and Lower**

Variables	USD Donation Amount (ln) (1)
H1: Economic Importance	18.705*** (1.713)
H2: EI x Dominant MNE Index	5.382*** (1.855)
H3: EI x Host-Country Public Aid (ln)	-0.377*** (0.079)
H3: EI x Foreign Public Aid (ln)	0.352*** (0.075)
H4: EI x Regulatory Quality	2.017*** (0.509)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes
Observations	173,972
MNEs	1,891
Countries	42
Disruptions	92

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected and whose probability of being shown in mass media was 50 percent and lower. See text for sample construction. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Can the Effect Be Captured by a Measure of Physical Presence?

Studies have shown that media can influence humanitarian aid, but its influence is heterogeneous across events and skewed to some type of disasters (e.g., earthquakes) and countries (e.g., higher income) (Eisensee and Strömberg 2007, Franks 2013). For some institutional disruptions, economic importance may be correlated with countries that receive a sizeable magnitude of news coverage. Events such as the 2017 Hurricane Maria in Puerto Rico and the 2011 earthquake and tsunami in Japan were certain to receive firm aid due to media coverage. We thus follow Stromberg, (2007) and run analyses with only disruptions that had a probability of being in the news of 50 percent and lower. The magnitude and direction of the estimates hold.

Table XVII. The Effect of Physical Presence on the Magnitude of Donations to Disruptions

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	-0.420*** (0.060)	-0.135** (0.061)	-0.276*** (0.068)
H2: EI x Dominant MNE Index	0.168*** (0.011)	0.197*** (0.013)	0.183*** (0.017)
H3: EI x Host-Country Public Aid (ln)	0.016*** (0.002)	0.007*** (0.002)	0.014*** (0.003)
H3: EI x Foreign Public Aid (ln)	0.004*** (0.001)	0.000 (0.001)	-0.001* (0.001)
H4: EI x Regulatory Quality	0.027*** (0.006)	-0.004 (0.006)	-0.044*** (0.007)
Dominant MNE Index	0.001* (0.001)	-0.017*** (0.001)	-0.013 (6.107)
Host-Country Public Aid (ln)	-0.003*** (0.000)	-0.002*** (0.000)	0.001 (2.932)
Foreign Public Aid (ln)	-0.027*** (0.002)	-0.001 (0.003)	-0.033 (124.043)
Regulatory Quality	-0.420*** (0.060)	-0.135** (0.061)	-0.276*** (0.068)
Firm Controls	NO	YES	YES
Country Controls	NO	YES	YES
Event Controls	NO	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	0.048** (0.019)	-0.375*** (0.037)	0.000 (0.000)
Observations	501,115	501,115	501,115
MNEs	1,891	1,891	1,891
Countries	129	129	129
Disruptions	265	265	265

Notes: This table reports regression estimates for the relation between the physical presence of the firm and donations in the aftermath of disruptions. See text for sample definition and construction. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

Is it Inequity or Poverty Aversion?

Firms may allocate resources for the goal of reducing financial disparity (Camerer and Fehr 2005, Fehr et al. 2006). If this preference dominated restoring economic institutions, MNE philanthropy would be comparatively greater in countries with high levels of poverty where economic inequality is pervasive. To test this argument, we regress an interaction of *economic importance* and *poverty* using the poverty headcount ratio at \$3.20 a day (2011 PPP) (as a percentage of population) from the WDI (see Anand and Sen 2000). We find that MNEs in the sample donated in a lower magnitude to poorer countries than to higher-income countries.

Table XVIII. The Effect of Equity and Poverty Aversion on the Donations of Economically Connected MNEs

Variables	USD Donation Amount (ln) (1)
EI x Poverty Gap	-0.043*** (0.003)
Economic Importance	-0.000 (1.705)
Poverty Gap	0.711*** (0.013)
Firm Controls	Yes
Country Controls	Yes
Event Controls	Yes
Firm, Industry, Country by Event, Year Fixed Effects	Yes
Observations	444,385
MNEs	1,891
Countries	114
Disruptions	235

Notes: This table reports regression estimates for the relation between the country's poverty headcount (percentage of population living below the poverty line of \$3.20 a day) and donations by MNEs in countries affected by disruptions that are economically important for the firm. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

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April 17, 2021

TO: Professor Aguilera and three anonymous reviewers
Organization Science

FROM: Co-authors, Manuscript OS-MS-18-11632.R3, "Institutional Disruptions and the Philanthropy of Multinational Firms"

RE: Response to the editor's and reviewers' 3rd round comments.

Dear Professor Aguilera,

Enclosed, please find the revised manuscript (OS-MS-18-11632.R2) entitled "Institutional Disruptions and the Philanthropy of Multinational Firms" that we respectfully resubmit for consideration at *Organization Science*.

Thank you for the opportunity to revise the manuscript further. We greatly appreciate your and the reviewers' encouragement and constructive feedback on underscoring the counter-intuitiveness of the hypotheses, bolstering the theory, and clarifying the empirics.

In revising the manuscript, we diligently followed your guidance and adding or modifying analyses or text to consider each comment and suggestion from both you and the reviewers. Below is a summary of the main changes to the paper.

Summary of Main Revisions in Response to Editorial & Reviewer Comments

1. **Tightening the Theory.** Following the recommendations from you and the reviewers, we clarified our terminology and now define "market-oriented institutions" in the first paragraph of the introduction. We explicitly position our discussion of market-oriented institutions using North (1991), Nelson (1995), Acemoglu et al. (2005), Dutt et al. (2016), and Chakrabarti et al. (2011) (on pages 6-7 of the revised manuscript). We specify that our constructs and theory are at the country level; as indicated, the phenomenon informs this. We now foreshadow our moderators in the introduction and rely on the MNE cost-benefit analysis of a non-market decision as a conceptual umbrella to tie the moderators together as you suggested. Finally, we further highlight the counter-intuitiveness of hypothesis 1 and elaborate on our contribution in the introduction.
2. **Clarifying the Empirics.** Adhering to your comments and in response to Reviewer 3's and Reviewer 4's comments, we moved the table on the alternative dependent variables from the Appendix into the main body of the manuscript. We also provide additional analysis of the different country income levels per your and Reviewer 2's comments.

We performed all analyses requested by Reviewer 3 and 4 and provide tables in the review letter and discuss the econometric and statistical considerations regarding the information these analyses provide. As you know, throughout the entire review process, the various scenarios, robustness tests, alternative samples, alternative measures of the constructs, and other analyses have yielded qualitatively consistent results.

We intend to make this data publicly available for the benefit of other scholars. In the prospect that the review team prefer to have access to this data for the exclusive purpose of the review, please notify us, and we will request the funding agency's permission to release access.

3. **Theorizing on the Direction of Host-Country and Foreign Public Aid.** Following your and the reviewers' guidance, we now include separate hypotheses for host-country and foreign

public aid, which result in individual betas for the two sources of public aid. We then discuss the different directions of the associations for the results. The interpretation of the findings is motivated by our past professional experience on disaster management and the interviews with business decision makers. To delve into the association further, we conducted an analysis grouped by country income per your and Reviewer 2's recommendation.

In addressing the comments from you and the reviewers, we erred on responsiveness, which has extended the paper's length. We are more than happy to shorten the paper as you and the reviewers see fit.

The appendix for the manuscript can be accessed online via <https://institutionaldisruptions.com/>.

We express our gratitude to you and the review team for your constructive comments and guidance on the revision. All of your feedback has helped us to sharpen the contribution and significantly improve the theoretical development and empirics of the paper. The following provides a point-by-point response to each item raised.

Sincerely,

The Authors

Response to Comments from the Editor

I continue to find the overall research question interesting and important, particularly as it has subsidiaries as unit of analysis and embarks in a cross-national comparison. It is also clearly written and straightforward. I think we are all aware that you are studying a complex setting and that you have taken my and the reviewers' comments very seriously.

*I would like to give you the opportunity to address the remaining concerns, and therefore I am pleased to invite you to revise your manuscript and respond to the reviewers' comments. Once you send the revise manuscript, **I will make a final editorial decision. I consider this a minor revision**, not because there is not quite a bit to do, but because I believe what needs to be done is doable.*

It is clear that you have devoted a lot of work by expanding the data, coding the targets of economic donations whenever available, corroborating the presence of subsidiaries across different countries, working on the theoretical argument, to highlight the main ones. You will see that the reviewers' comments are quite consistent with each other, and I would like you to address every single comment in your revision. Bellow, I highlight some of the main tasks moving forward, and you will see that at times I offer my view on reviewers' comments.

Thank you for your encouragement. We are glad that you find the research question interesting and important, the theory straightforward, and recognize the effort we invested in handling each comment from you and the reviewers carefully. We diligently address each comment in this revision, closely adhering to your recommendations.

1. Motivation (particularly of H1): all three reviewers raise this point. I think if you are able to respond to Reviewer 3 #1, you are in good shape. I like the cost-benefit analysis Can you tell us a bit more of why this is not commonsensical? As Reviewer 2 notes, shouldn't the pre-shock economic conditions matter? And whether this was an emerging markets or a developed country?

We appreciate Reviewer 3 providing a suggestion on how to address the common-sense nature of Hypothesis 1. The motivation of our study is partially fueled by extant important work focusing on alternative motivations.

First, social preferences such as altruism, reciprocity, and homophily arguably explain why firms without economic importance in a disrupted country will donate (e.g., Charness and Rabin, 2002; Fehr and Fischbacher, 2002; Small and Simonsohn, 2008).

In fact, employees' altruistic motivations often lead donations and, for such reason, we test this alternative explanation. For instance, one of our interviewees noted that *"If you are a large, international brand, it has become part and parcel of doing business in a globalized world. The altruistic motivations are driven by employees. Employees want to work for a company that seeks to respond in these instances, and a key way to ensure that a company can attract the best talent is to have a disaster response program (...) There is peer pressure to do so. I was told that many companies ask what other companies in the country are giving before they set an amount to contribute to a disaster."*

In the case of the altruistic motivations by employees, we find that this type of giving tends to be lower than the mean value. That is, donations that follow the strategic considerations of restoring the market are substantially larger.

Additionally, large shocks frequently receive substantial global media attention, which offers the prospect, for instance, to foster a public image of philanthropy (Eisensee and Strömberg 2007). To illustrate, the 2010 Haitian earthquake was covered extensively in the media. Without Haiti being

economically important, the firm has an incentive to donate because the worldwide media coverage creates a global opportunity to generate reputational capital (see, e.g., Godfrey, 2005).

Conversely, one might expect firms with economically important operations in an affected country to focus their resources on restoring their facilities and engage in scarce giving (Tilcsik and Marquis 2013). Economic concerns constrain company philanthropy, and the disruption instills fiscal pressure on the firm. Additionally, affected non-profits that suffer damage from the disruption create a broken infrastructure for philanthropic giving (Ballesteros and Gatignon 2019). Altogether, the economic costs to MNEs experiencing the disruption combined with the motivations to donate for those not experiencing it suggests that MNEs with high economic importance will be less likely to donate in response to an institutional disruption.

In response to your and the reviewers' comments, we added a discussion on these reasons in the section for hypothesis 1.

For the cost-benefit analysis (and related with the counter-predictions for Hypothesis 1 above), many motivations for corporate philanthropy stem from social preferences. The cost-benefit approach is less evident from these alternative perspectives. In response, we mention on page 13 and elaborate in the discussion section that the cost-benefit logic, albeit intuitive, leads to predictions for donations that differ from extant work (see pages 34-35). In contrast with prior work that emphasizes that corporate donors pursue firm-specific benefits such as reputation (Muller and Kräussl 2011) and political favors (Bertrand et al. 2020), our study introduces a strategic motive whose benefits are a public good (i.e. it is not firm-specific). It can be difficult to disentangle firm benefits from restoring the market from those received by other organizations and society at large. The public nature means that others also have motivations to restore it. Consequently, a cost-benefit approach for the economic importance, tempered by the alternative sources of funding and the nature of the market institutions, yields insight into when firms will find it beneficial to contribute rather than rely on others to provide the public good.

You and Reviewer 2 raise a good point about the pre-shock level of development. Per your comments, we ran the analysis by country income group and present the results in Table VIII in the online Appendix (The World Bank 2021) (see table below). The results highlight that when countries do not have sufficient resources for recovery, public aid does not present the well documented crowding-out effect on the private provision of public goods.

We find that the results are qualitatively consistent with our baseline analysis for our other theorized variables across all country income groups. We address the analysis on page 28 of the manuscript and discuss the results for public aid in detail in the Appendix.

Table I. Economic Importance of the Country to the Firm and Donations to Disruptions by Country-Income Level

Variables	Low	Lower-Middle	Upper-Middle	High
H1: Economic Importance	187.829*** (51.743)	65.226*** (15.072)	8.213*** (1.933)	7.821*** (1.428)
H2: EI x Dominant MNE Index	12,598.580** (6,098.939)	305.478*** (72.737)	0.710*** (0.059)	0.711*** (0.110)
H3: EI x Host-Country Public Aid (ln)	0.010 (0.012)	2.930*** (0.537)	-0.289*** (0.069)	-0.276*** (0.050)
H3: EI x Foreign Public Aid (ln)	-0.206 (4.738)	-0.410*** (0.142)	0.011*** (0.003)	0.018*** (0.004)
H4: EI x Regulatory Quality	1.269***	0.035***	0.114***	0.480***

	(0.042)	(0.008)	(0.004)	(0.029)
Dominant MNE Index	73.875	-0.130	0.765	-0.045***
	(55.621)	(0.509)	(1.003)	(0.014)
Host-Country Public Aid (ln)	-2.931	-0.017***	-0.010***	-0.044
	(4.417)	(0.003)	(0.002)	(0.028)
Foreign Public Aid (ln)	-6.848	-0.012***	-0.000	-0.003***
	(5.368)	(0.004)	(0.001)	(0.001)
Regulatory Quality	0.015***	-0.030***	-0.012**	-0.042***
	(0.004)	(0.005)	(0.005)	(0.007)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	4.583	0.020	-0.700***	-0.463***
	(4.019)	(0.075)	(0.071)	(0.146)
Observations	73,749	107,787	147,498	172,081
MNEs	1,891	1,891	1,891	1,891

Notes: This table reports regression estimates for the relationship between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 MNEs at the international level. For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower-middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper-middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more.

Source: The World Bank (2020). <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

2. *Reviewer 2 raises multiple issues about your overall theory. This reviewer is right that you could be a bit more careful with the language and to go deeper in your discussion of institutions. It seems to be the North/Acemoglu is your institutional space.*

Thank you for raising this point. We clarified our terminology and now define “market-oriented institutions” in the first paragraph of the introduction. We explicitly position our discussion of market-oriented institutions using North (1991), Nelson (1995), Acemoglu et al. (2005), Dutt et al. (2016), and Chakrabarti et al. (2011) and go deeper into the discussion of institutions on pages 6-7 of the revised manuscript). We specify that our constructs and theory are at the country level. As indicated, the phenomenon informs this.

We sought to discuss institutional disruptions and the differences with extant work across the four characteristics because it is an essential part of the paper. Indeed, a previous comment in the review process indicated how this motivates another contribution of the paper (and we fully agree).

We reviewed the section on the four characteristics to shorten it as Reviewer 2 suggested. If you or the Reviewer have specific suggestions of what can be removed for each factor to reduce the length or prefer that we create a table to save space, we will do so.

We hope you find the theory much improved.

3. *A challenge in the theoretical front end is that the three moderators need further justification. One possible conceptual umbrella is to tie these moderators to the MNC cost-benefit analysis of a non-market decision (to fund) given the nature of the market institutions which include industry*

competition and regulatory quality, and conceptualize public aid as a potential non-market complement substitute of corporate funding. Other suggestions to improve this are to foreshadow them in your front end, and then when you discuss them preceding the formal hypotheses articulate how they relate each of them more explicitly to economic institutions.

This suggestion greatly guided our revision. We followed your guidance and now draw on MNE cost-benefit analysis of a non-market decision as a conceptual umbrella for our moderators (see pages 2 and 12). We foreshadow the moderators on page 2 and specify that other corporate donors and public aid are potential alternative sources of funding and regulatory quality is an essential factor for the nature of market institutions.

Additionally, we are more explicit about how each theorized construct relates to market-oriented institutions in the hypotheses section.

4. *Reviewer 4 asks you about issues (#8-10) that you have addressed in your manuscript, I would encourage you to make sure it is clear.*

We enhanced the salience of each of these elements in the manuscript.

5. *Examples. I was the one who encouraged you to rely more on your interviews and include illustrative examples. I believe this makes your manuscript easier to read and also more interesting. It also introduces more face validity. The challenge is that sometimes these illustrative examples get you into trouble as Reviewer 4 points out in his/her #4(to some degree) and 3 and Reviewer 3, #2. I suggest you fix/change the ones the reviewers bring up and revise all the other ones.*

We have adjusted the use of caselets and quotes. For example, we previously used the case of Cisco's donation magnitude to illustrate the economic importance of the phenomenon. Given your and Reviewer 4's comments, we removed it from the manuscript.

In addition to building strongly on our past professional experience, this paper was inspired by the information from interviews with business decision makers.

Of note, we focus on caselets that provide insights into why firms contribute to country market recovery. If we relied on examples of the MNE destruction of assets, the insights would indicate the private benefit of rebuilding the company and not necessarily for the broader market system. Importantly, our examples in the revised manuscript match our theory, align with our operationalization of the measure of donations for factors that restore the functioning of the market, and respond directly to requests in a prior round of revisions that we incorporate such elements to demonstrate face validity. In fact, some of them are from the text immediately surrounding the donation numbers for our dependent variable. Moreover, we rely on examples to illustrate the activation of the theoretical constructs in the relevant sections of the manuscript.

For instance, hypothesis 1 is about the economic importance of the country market to the MNE. In that section of the paper, we use the example of a manufacturing firm where the manager states, "...When the impact (hit) a size of our business that was much greater, we immediately mobilized resources..." Likewise, we employ a British mining company example where the manager stated, "Chile is [our] number one copper producer and that represents a big part of our business... so we mobilized..." We hope this clarifies the relevance of the examples used.

Following Reviewer 2's comments on the levels of analysis, we removed caselets in the manuscript that were local or global (related to the COVID-19 pandemic).

6. *There are still important issues on the empirical side. To begin, I agree with Reviewer 3 #a that since you have more nuanced operationalizations of subsidiary presence, you should use those in your main results.*

Per your and Reviewer 3's guidance, we included Appendix Table V in the manuscript, as Table 4.

As Reviewer 3 recommended, we also added additional arguments on the limitations of the constructs (see page 21). We agree with Reviewer 3 that finding the right operationalization is far from trivial given the combined impact of the idiosyncratic characteristics of affiliates that affect the strategic value for the MNE and data constraints. Of note, in a past round, we reacted to your concern that variables such as the number of employees and assets could misrepresent the strategic value of affiliates. The excellent example that you raised was a highly automated subsidiary that employs few people. We indicate this to Reviewer 3 in response to the corresponding comment.

We perform a comparative evaluation of the different operationalizations of economic importance. Using our base estimation model (equation 2), we examine the overall MNE donations-economic importance elasticities of the various operationalizations and find that it is greater for the ownership-weighted proportion of MNE affiliates in a country than for the other measures based on assets, employees, and/or revenues. Moreover, dividing the ratio of the coefficient of the independent variable by the linear prediction results in a higher overall prediction effect. The analyses suggest that economic importance based on the ownership-weighted proportion of MNE affiliates in a country is the best linear unbiased estimator (BLUE) (see discussion on pages 22-23).

7. *Please kindly address ALL the Empirical comments raised by Reviewers 3 and 4.*

We have diligently addressed all of the empirical comments raised by Reviewers 3 and 4 (please see responses to each below).

8. *Finally, as you can see reviewers are surprised by your separation of public aid into local and foreign. It might be best to first show total public aid and introduce the two categories. I actually find it interesting. I encourage you to give it a bit more thought of why the effects on corporate funding go in opposite directions.*

We fully concur. We have had the opportunity to present the study to audiences focused on public and institutional economics, and this finding has been of substantial interest.

Our theoretical logic predicts that both host-country public aid and foreign public aid would reduce the perceived need of the MNE to fund recovery. However, the measures are based on different factors that firms reference for donating and therefore, we cannot empirically combine them into one public aid measure. According to the literature on aid and disaster management, the average foreign net official development assistance and official aid and the country's average gross national expenditure explain the availability of foreign and host-country resources towards disruptions, respectively (Becerra et al. 2014, Cavallo et al. 2013). Therefore, we operationalize them separately.

To address your and the Reviewers' comments, we created two sub-hypotheses (H3a and H3b) that predict that host-country public aid and foreign public aid, respectively, negatively moderate the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

We then explain that the result could be driven by MNEs perceiving the amount of foreign aid as a signal of the country's lack of resilience. The greater the amount of resources that the economy receives from abroad, the lower the resilience and the greater the perceived need for firm resources.

To further delve into this association, we run the analysis by country income group (The World Bank 2021) and present the results in Table VIII in the online Appendix. We then provide an extended discussion in the Appendix on the results for public aid based on income group.

Specifically, in lower-income countries, we do not find evidence of a crowding-out effect of public aid in the donation of economically connected MNEs. This aligns with evidence that the financial gap for relief and recovery from large shocks for lower-income countries is substantial (Becerra et al. 2014, 2015, High-Level Panel on Humanitarian Financing 2016). Combined with the comparatively large coefficient of economic importance, the results indicate that economically connected MNEs in lower-income countries have high incentives to help the country market recover regardless of the contribution from public sources (because the public resources are rarely sufficient).

We observe that economically connected MNEs reduce their contribution when they perceive substantial foreign aid for lower-middle-income countries. This result is consistent with studies that indicate that the financial gap for these countries is the lowest (Becerra et al. 2014, High-Level Panel on Humanitarian Financing 2016). In other words, economically connected MNEs estimate that foreign aid will be an essential funding resource. On the other hand, the impact of host-country public aid is positively associated with the donation for economically connected MNEs. This effect may be driven by the perceived need when the host country must give.

For upper-middle-income and high-income countries, the results are consistent with our baseline analysis. Funding from the host country has a substantial crowding-out effect on giving by economically connected MNEs. On the other hand, the outpouring of foreign public aid is positively associated with the donation of economically connected MNEs. This is aligned with MNEs perceiving a greater degree of disruption when there is more foreign public aid. Appeals for emergency aid, administrated at the global level by multilateral agencies, are rarely issued for upper-middle and high-income countries. The exceptions are for fat-tailed disruptions, which are captured by our statistics. This means that appeals for foreign aid are informative of the expected magnitude of the impacts. They signal to managers the need for resources for relief and recovery.

We detail the results to the analysis in the Appendix but are more than happy to move the discussion from the Appendix to the body of the manuscript if you deem it appropriate.

Table II. Economic Importance of the Country to the Firm and Donations to Disruptions by Country-Income Level

Variables	Low	Lower-Middle	Upper-Middle	High
H1: Economic Importance	187.829*** (51.743)	65.226*** (15.072)	8.213*** (1.933)	7.821*** (1.428)
H2: EI x Dominant MNE Index	12,598.580** (6,098.939)	305.478*** (72.737)	0.710*** (0.059)	0.711*** (0.110)
H3: EI x Host-Country Public Aid (ln)	0.010 (0.012)	2.930*** (0.537)	-0.289*** (0.069)	-0.276*** (0.050)
H3: EI x Foreign Public Aid (ln)	-0.206 (4.738)	-0.410*** (0.142)	0.011*** (0.003)	0.018*** (0.004)
H4: EI x Regulatory Quality	1.269*** (0.042)	0.035*** (0.008)	0.114*** (0.004)	0.480*** (0.029)
Dominant MNE Index	73.875 (55.621)	-0.130 (0.509)	0.765 (1.003)	-0.045*** (0.014)
Host-Country Public Aid (ln)	-2.931	-0.017***	-0.010***	-0.044

	(4.417)	(0.003)	(0.002)	(0.028)
Foreign Public Aid (ln)	-6.848	-0.012***	-0.000	-0.003***
	(5.368)	(0.004)	(0.001)	(0.001)
Regulatory Quality	0.015***	-0.030***	-0.012**	-0.042***
	(0.004)	(0.005)	(0.005)	(0.007)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	4.583	0.020	-0.700***	-0.463***
	(4.019)	(0.075)	(0.071)	(0.146)
Observations	73,749	107,787	147,498	172,081
MNEs	1,891	1,891	1,891	1,891

Notes: This table reports regression estimates for the relationship between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 MNEs at the international level. For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more.

Source: The World Bank (2020). <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

We are incredibly grateful for all of the time and effort that you invested in this manuscript. Your comments have been constructive in highlighting the counter-intuitive nature of the hypotheses, providing an overarching framework for the moderators, and detailing the empirics.

Response to Comments from Reviewer 4

The revised version has improved in clarity. However, there are still lot of problems concerning theoretical contribution and empirical rigor. I will detail them below:

We are glad that you see the new version improved. In this revision, we diligently worked to address each of your points. We hope that you find the paper strengthened in terms of its contribution and empirics.

1. Though the main rationale of MNE contribution after disasters---restoring the market---is convincing, the problem is that such an explanation is somewhat self-evident. After I read the paper, “so what” emerges in my mind frequently. So it is better for the authors to go deep to highlight the theoretical significance of this explanation.

We appreciate you raising the need to make the “so what” salient in the paper. Given your comment and following the guidance from the Editor and Reviewer 3, we now include the counterfactual argument for H1 to underscore why H1 is not as evident as it might seem (see the response to Editor Comment 1 above).

The revised manuscript also now highlights the theoretical and practical importance in the second paragraph of the introduction. Given that disruptions can create poverty traps and hamper economic development (Baker and Bloom 2013, Barro 2009, Weitzman 2011), understanding MNE motivations to donate is crucial for predicting and fostering such philanthropic behaviors and coordinating resources for recovery.

The theoretical significance of our paper stems from the motivation to restore the market yielding predictions that diverge from extant research. Per your comment, we added a discussion of the diverging predictions on page 5 and elaborated on our contribution in the introduction and discussion sections of the manuscript.

2. Similarly, some hypotheses are also self-evident and not novel. For example, if restoring market operation is the case, then MNE’s market concentration will naturally positively affect its effort. And H3 and H4 are also self-intuitive.

We explain our theory in a simple, intuitive manner that reflects the information provided by managers in interviews. We now foreshadow before the hypotheses (see page 12) that the cost-benefit logic, albeit intuitive, leads to predictions for MNE donations that differ from extant work. In contrast with prior work that emphasizes that corporate donors pursue firm-specific benefits such as reputation (Muller and Kräussl 2011) and political favors (Bertrand et al. 2020), our study introduces a strategic motive whose benefits are a public good (i.e. it is not firm-specific). That is, it can be difficult to disentangle firm benefits from restoring the market from those received by other organizations and society at large. The public nature means that others also have motivations to restore it. Consequently, a cost-benefit approach for the economic importance, tempered by the alternative sources of funding and the nature of the market institutions, yields insight into when firms will find it beneficial to contribute rather than rely on others to provide the public good.

In the revised manuscript, per comment 1 above, we highlight how our baseline hypothesis is different from the existing literature. As the mechanism motivating firm donations is distinct (market restoration), theorizing the effects of the moderators on the mechanism is novel. Importantly, as made salient in the discussion section, the hypotheses for dominant MNE Index, public and foreign aid, and regulatory quality are counter to existing predictions in the literature on corporate philanthropy. Specifically:

For hypothesis 2, scholars in the non-market literature have theorized that engaging in non-market strategies to differentiate oneself can be an essential means of enhancing firm performance when markets are competitive (Flammer 2015). Thus, the baseline expectation in the non-market literature is that firm giving would be greater and more frequent in competitive rather than in monopolistic markets (Bénabou and Tirole 2006, Godfrey et al. 2009, Mellahi et al. 2015). In contrast, we theorize that firms with economically important operations will donate more when the index of dominant MNEs in the country is high.

Hypotheses 3a and 3b predict that firms will contribute less when host-country and foreign public aid can fund recovery. This hypothesis is counter to existing research that suggests that the benefits of donating are not diluted by the provision of giving from other government or business organizations. In fact, by giving with governments, prior research suggests that the firm may develop political capital for favorable policies and contracts and create a risk-management mechanism against stakeholder opportunistic behavior (Baker et al. 2002, Godfrey et al. 2009, Henisz et al. 2013).

For H4, we specify that because we are taking an economic perspective, our prediction that firms will donate more in countries with high regulatory quality is contrary to other predictions arising from political favor. Prior research has indicated greater giving in contexts with relatively low institutional quality. For example, in a study of cross-border charitable giving by US corporate foundations, Hornstein and Zhao (2018) find that the foundations give more in host countries with relatively the low rule of law and higher corruption, especially when they require stronger connections with local stakeholders (Hornstein and Zhao 2018).

We address this comment by adding a paragraph on page 5 of the introduction on the diverging predictions and elaborating in the discussion section how our study yields novel predictions and findings.

3. For H4 (regulatory quality), though it is consistent with the institutional argument in the literature, it is not consistent with the rationale raised in this paper. If restoring market operation is the key underlying motive of MNE donation, then they would contribute to (or they will directly participate in) the efforts of restoring infrastructure no matter of the regulatory quality. In addition, regulatory quality may affect the efficient and transparent usage of donation (and thus the confidence of MNEs in donation), but it may not directly affect the direct effort of market restoration after disasters. Thinking of China, its regulatory quality may not be high, but its efficiency in restoring market is highly efficient.

Thank you for raising this point. Underpinning our theory for all four hypotheses is the cost-benefit framework for non-market strategies. Thus, firms with high economic importance will weigh the benefits they receive from market restoration against the costs of achieving it (see, e.g., page 12).

Countries with low regulatory quality have more market regulations, protections, and controls (Kaufmann et al., 2011), which reduces MNE ability to respond because of bureaucracy and bottlenecks for permitted organizations to perform restoration activities. Even if the MNE employs its efforts and resources to rebuild directly, existing research on the outcomes of donations indicates that the logistical complexity from low institutional quality reduces the efficiency of such efforts (Ballesteros and Gatignon 2019). Therefore, the marginal benefit of donating is smaller the lower the regulatory quality of the country.

We agree with you that China is remarkable in its ability to mobilize. However, it is an anomaly. The measure of regulatory quality is well established as a predictor of outcomes that are essential not only in the literature on aid and risk management but also in the literature on political economy. As the Editor and Reviewer 2 have pointed out, the institutional environment should be an essential factor.

To address your comment, we discuss the bureaucracy and bottlenecks that firms face in directly rebuilding and added the citation to Ballesteros and Gatignon (2019)'s study. We hope this makes the consistency of our theory and the hypothesis more salient.

4. *Though the paper tries to rule out various alternative explanations, I am still not convinced. For just one example, the paper mentions that “Cisco gave \$50 million toward the recovery of the Chinese market from the 2008 earthquake, which was three times its annual social budget in China.” This is problematic since 2008 earthquake in China did not cause disruption of market institutions considering that the earthquake occurred in remote areas. Cisco’s donation was more out of pressure instead of restoring market (or its own) operation.*

We appreciate you raising this point. We used Cisco as an example of the size of donations for the importance of understanding the factors that drive MNE donations. Considering your comment, we removed this example from the manuscript.

5. *Relatedly, the paper needs to more clearly describe how MNEs’ donation helps to restore market operation. If restoring the market is the key mechanism, then why don’t they directly participate in restoring or repairing the infrastructure such as transportation and communication, particularly when the market importance is high and regulatory quality is low?*

We provide examples of firms directly participating in restoring and repairing the market on page 11 with the Honda Motor Company and Royal Dutch Shell, page 13 with Toyota, and page 14 with a large mining company. Our data captures the value of donations when firms used their own time and efforts for things such as restoring the labor force, transportation systems, communication, and power. As discussed and addressed in response to your comment 3 above, direct participation can get weighed down by bureaucratic approvals and logistical complexity in low regulatory quality countries.

We do not empirically test firm choice to directly versus indirectly restore the market as it is beyond the scope of our paper. To address this point, we now include a reference to Ballesteros and Gatignon (2019)'s study on the different modes of giving that firms use that finds that the efficiency of direct effort towards market restoration is lower in countries with low institutional quality in the hypothesis for regulatory quality.

6. *The definition is “institutions” is still confusing. The paper currently includes both “intangible and physical factors”. For me, it seems that physical factors such as communication, transportation, energy infrastructure, education, water system, etc. are the main disruptions after disasters. But the paper frequently mentions intangible part of institutions such as “Organizational Strategic Responses to the Institutional Context”; “the institutional changes as slow evolving socioeconomic and political processes”; “intermediaries, and contract enforcement mechanisms are absent, firms face substantial operational and transactional frictions”; “Regulatory quality is critical for the creation and maintenance of economic institutions”, etc. I don’t think that such kind of institutions are disrupted by disasters.*

We appreciate you raising this point. In our interviews, managers often focused on the intangible elements. For instance, the Vice President at the British mining company Anglo American who led the response to the 2010 Chilean earthquake and Tsunami explained that there was a significant portion of their workforce who were not coming to work because the schools were destroyed and they had to stay home to take care of their children. Anglo American used its resources to rebuild the schools and roads and remove the debris so that the workforce could return.

Systematic evidence shows that large disruptions explain economic development, and one key mechanism that this occurs is through drops in productivity (Altay and Ramirez 2010, Bloom 2009). In practical terms, organizations face reductions in the ability of their labor force to work at the same level. Not only are employees or their family members often direct victims and their residencies affected, which imply that they must relocate, but they may also suffer the loss of the schools for their children or the transportation systems to commute. Crucially, this affects employees of both business and government organizations. As a municipal official commented on the 2010 Chile earthquake, *“there was no light, we had no water, no staff, the city disappeared, officials disappeared... There was absolutely no one.”*

Thank you for raising this point. To address your comment, we added a discussion on page 9. We hope this makes it more evident.

7. Relatedly, I don't think that using “institutional disruption” to refer to disasters adds any value to the paper. The four characteristics that the paper identified as “institutional disruptions” are actually the features of natural disasters. As a matter of fact, the events that the paper covers are mainly natural disasters (floods, storms, earthquakes), and only terrorist attacks do not belong to this category.

The reason why we do not refer to institutional disruptions as natural disasters is threefold. First, natural disasters vary in their consequences and frequency and, therefore, can affect different types of institutional changes (please see a typology of institutional change that we constructed in Figure 1 below to exemplify this point). Second, the theoretical concept of institutional disruption is conceptually vital as it provides a clear focal point (market-oriented institutions and the factors underpinning their functioning) for the issues that firms face and sheds light on the strategies that firms may use to resolve those issues. A natural disaster is a bit more diffuse a concept, whose motive for donations may range from other strategic considerations, such as reputation (Muller and Kräussl 2011) to social preferences, such as altruism (Small 2010), and whose solutions may be broader or differ from restoring the market. Third, institutional disruptions may be driven by different fat-tail shocks, not only natural disasters. Indeed, in our study, there are terrorist attacks and epidemics.

Thus, our argumentation and study are not about a specific source but instead are about a context characterized by a combination of the high severity, unexpectedness, pervasiveness, and short temporality in the dis-functioning of institutions.

In response, we expand our discussion on our contribution to the shock literature in both the introduction and the discussion sections.

Figure 1: Typology of Institutional Change

		Severity of Change		Causes of Change: - Exogenous Natural Changes - Social
		Low	High	
Temporality of Change	Permanent	<p><u>Institutional Evolution</u> Slowly evolving, long-lasting changes to economic institutions. - Lobbying - Political Action - Grassroots - Resource Depletion - Gradual changes in the natural environment</p>	<p><u>Institutional Shock</u> Rapid, discontinuous, permanent change to economic institutions. - War - Regime Changes - Institutional Transitions - Colonialization - Pandemics</p>	
	Non-Permanent	<p><u>Institutional Disturbance</u> Temporary limited reduction in economic institutions. - Non-severe disasters - Large events - Holidays and customs</p>	<p><u>Institutional Disruption</u> Severe and systemic, yet sudden and unpredictable breakdown of economic institutions. - Severe Natural Disasters - Terrorist Attacks - Epidemics</p>	

8. *Is it possible to differentiate the different impact of different shocks? For example, epidemics, natural disasters, and terrorist attacks may have different impact. Particularly, terrorist attacks may not directly cause the large scale of disruption of infrastructure. Then what does restoring market mean in the case of terrorist attacks?*

We agree that these events differ. Therefore, we control for differences in the natural logarithms of the number of deaths, the number of affected people (i.e., displaced and injured), and economic damage. We also account for idiosyncrasies in the types of shocks (i.e., terrorist attacks, epidemics, floods, earthquakes, volcanos, etc.) by controlling for the type of disaster (see the discussion of control variables). Finally, as discussed on page 20, our operationalization restricts our analysis to events in the 99th percentile (and thus those with severe country impact).

9. *Relatedly, is it possible to go deep to explore how MNEs respond differently to different impact (in terms of deaths, affected people, and economic damage) of epidemics, natural disasters, and terrorist attacks?*

We conceptualize different types of disasters based on our theoretical construct of institutional disruptions (see page 20). The extant literature provides no clear pointer on essential categories other than research that demonstrates that these shocks explain economic growth (Baker and Bloom 2013, Barro 2009). Given your comments, we extended our discussion of the importance of our conceptualization of institutional disruptions for shocks in the introduction.

As a means of differentiating disruptions with different extent of humanitarian versus economic damage, we use the ratio of *human to economic loss*, calculated as the number of deaths divided by economic damage. As indicated on page 31, we find that the amount of donation decreases in the interaction of human to economic loss with economic importance (see Table XV in the Appendix). The result is consistent with the skewness of MNE donations to institutional disruptions with substantial relative economic costs across the events in the period 1997 to 2019.

While a deep dive into the differences would be interesting, it is beyond the scope possible for this paper.

10. *The paper claims that “the effects of institutional disruptions are systemic at country level”.*

This is not true for many disasters. Though in the limitation part, the paper mentioned that disruption maybe regional and should be addressed in the future, I think that the paper can somewhat control the impact of disruption. For example, controlling the size of the country or using the percentage of people affected, etc.

We control for these factors in the manuscript. Please see the description of the control variables and Table 1.

11. *There are lot of errors in empirical part. I just list several of them:*

a). In the paper, “57,535 employees, \$85.1 billion in total assets, and \$20.3 billion in revenue”; but in table 1, they are “79,720,000; 79720000; 19,650,000”, etc. How comes?

Thank you for pointing out the discrepancy. We fixed it in the revision. We confirm that Table 1 of the revised manuscript is correct, and the numbers in the text match the table.

b). there are some absolute numbers in the tables, such as Advertising & Admin Expenses, GDP, Local public aid, foreign public aid, etc. I am not sure whether it is necessary to present absolute numbers. And there are also different scales of measurements. For example, the above mentioned variables are measured by dollars, but Economic Damage is measure by USD Million. More critically, I don't know how these absolute numbers (with different scales) are treated in regression analysis: are they still treated as raw numbers (or with different scales, some by dollars, some by million)?

As customary, every variable is presented in the summary statistics table in the original units, which requires denomination abbreviations for presentation. Similarly, we follow standard practices, and therefore large-magnitude covariates are log-transformed as specified in the manuscript. We added a note in Table 1 to clarify this point.

c). Economic importance, market concentration, local public aid have very high correlation (table 2), as high as 0.838. This raised multicollinearity problem. It seems that the paper does not address this problem.

You are looking at pair-wise correlations whose direction and magnitude does not necessarily persist in the correlations produced by panel regression. There is no multicollinearity problem in our regressions other than the control variable industry in the most stringent specification.

The different specifications that we run, including those using alternative measures for the covariates, help mitigate the risk of multicollinearity.

We now discuss on page 26 that, given the high correlations, Table IV in the Appendix contains the partial models with the hypothesized interaction relationships entered one at a time before combining them into one model. The results for the theorized relationships in the partial models are significant and in the expected directions.

d). And there are lot of inconsistencies between the text and table, and between tables. For example, correlation coefficients are different in table 2 and the full correlation table. So I am not sure this is just caused by carelessness.

The difference between the full correlation table and the correlation table shown in Table 2 of the manuscript is that one is derived from the full dataset. The other is based on the estimation sample. The full correlation table was in response to your comment in the response letter and not included elsewhere. In general, given the longitudinal nature of the database, functional correlations are better illustrated by the output tables. Simple pairwise correlations are not really informative.

To address your concern, we carefully reviewed all numbers in the manuscript to ensure that the referenced numbers reflect the final empirical tables.

Thank you for providing feedback on our manuscript. Your comments have been instrumental in making salient the importance and contribution of the paper and clarifying the empirics.

Response to Comments from Reviewer 2

Again, I very much appreciate the efforts you undertook to revise your paper and to take the editor's and the reviewers' comments into account. I still believe that the idea behind the paper, i.e. the positioning of corporate philanthropy in the context of institutional disruptions, can make a contribution. But unfortunately, after reading the new version several times, I am not sure that the paper in its revised version does enough to reveal it, given the issues with regard to a thorough theory development (and thus, a well-thought positioning of the paper). The major problems I have is that the paper in its revised form (1) lacks significantly theoretical clarity about its major concepts, (2) mixes/is not clear about levels of analysis, which leads, then, to (3) confusion about how theoretical claims and empirical strategy go together. Let me try to explain and at the same time provide again some suggestions that might help further improving the paper.

We appreciate your comments and constructive guidance on improving the clarity of the main theoretical concepts, the levels of analysis, and the match between the theory and the empirics. We followed your recommendations and hope that you find the revised version of the manuscript much stronger.

1. *The paper focuses on institutional disruptions after major shocks, i.e. on breakdowns of economic institutions. If the paper shall be framed in the context of a breakdown of economic institutions, it is crucial to clarify which tradition of institutional economics to follow, as this would guide the entire paper (as the editor in her last letter clarified). Instead, the paper in its current form lacks, I must say entirely, a clear definition of economic institutions (which is the core concept of the paper), because it fails to position itself in and apply effectively the relevant literature; it does not go much beyond "name dropping". "A firm's performance relies on the economic institutions in the countries in which it operates (Coase 1960, North 1990, Williamson 1985)..." (p.2). Williamson (1996) in his outstanding book pointed to the differences of the two related streams of institutional economics. North and colleagues speak about the "rules of the game", as they operate at the level of the institutional environment, thus defining institutions as "humanly devised constraints [including both informal norms and formal rules] that structure political, economic and social interactions" (North, 1991:97). Williamson complements this view by focusing on the more micro-analytic level, i.e. the institutions of governance: market, hierarchy, hybrids. My guess is that the paper focuses on the institutional environment, thus, following North. However, this is not clear at all. At the moment, unfortunately, I do not know what the paper means when it speaks about economic institutions.*

Thank you for this comment, as it helped us to ground the theory more clearly. We moved our definition of economic institutions from page 5 to the first paragraph of the introduction to make it salient to the reader. Per your comment 2 below, we now more precisely refer to it as “market-oriented” institutions. In the first paragraph of the manuscript, we define market-oriented institutions as “the intangible and physical factors necessary for business activities (Acemoglu et al., 2005; Chakrabarti et al., 2011; Coase, 1998; Dutt et al., 2016). They include transportation and communication systems, product, capital, and labor markets, market intermediaries, and regulatory and enforcement systems (Acemoglu et al., 2005; Chakrabarti et al., 2011; Chan et al., 2008; Dutt et al., 2016; Khanna and Palepu, 1997).”

We also revised the theory section to root it in the existing literature better. As described in the first paragraph of the theory section, markets are “institutions that facilitate the exchange of goods” (Coase 1988, p. 7). We follow the seminal conceptualization of institutions as “humanly devised constraints that structure political, economic and social interactions” (North 1991, p. 97). Market-oriented institutions combine to create interlocking activities that shape business in the country market (Nelson 1995). They entail not only product, capital, and labor markets but also market intermediaries, physical infrastructure, and regulatory and enforcement systems (Acemoglu et al. 2005, Chakrabarti et al. 2011, Chan et al. 2008, Coase 1988, Dutt et al. 2016, Khanna and Palepu 1997). Market-oriented institutions affect firm costs of exchange and production (Chakrabarti et al. 2011, Cuervo-Cazurra and Dau 2009, Hoskisson et al. 2000), and firm ability to transact or operate (Dutt et al. 2016, Mair and Marti 2009). Underpinning the functioning of market-oriented institutions is the presence of tangible and intangible factors that allow market transactions to occur. When these factors disappear, become damaged, or destroyed, there is a breakdown in market-oriented institutions.

2. *Following up on this, the paper defines institutional disruptions as “severe and systemic, yet sudden, unpredictable, and temporary breakdown of economic institutions” (p.1). Given the overall interest of the paper, i.e. corporate philanthropy as an instrument to save the market, it is not clear to me, on which type of institutional disruptions the papers focuses. On the entire institutional landscape? But would this make sense in the light of the moderating factors, which are tied to (functioning) country-level governmental and regulatory institutions (I will come back later to that under point 6b)? Instead, for example, Dutt et al. (2016, often cited in the paper), focuses on commercial institutions, which are formal and informal institutions that support business activity, such as capital markets, banking regulations, legal systems, educational systems, and labor markets. In fact, the empirical measurement of donations seem to go into this direction. Having said this, the paper might benefit from re-positioning it along these lines.*

You are correct that we were drawing on Dutt et al. (2016) in that we are focused on the formal and informal institutions that support business activities, which aligns with our operationalization. We had referred to it as “economic institutions” in the manuscript because “commercial” typically relates to commerce and the economic institutions that we are interested in span commercial, manufacturing, and other business activities. To address your concern about economic institutions being too broad a term, we refer to the concept as “market-oriented institutions” in the revised manuscript.

Per your recommendation on positioning the paper, we moved the definition from page 5 to page 1 and define market-oriented institutions in the first paragraph as “the intangible and physical factors necessary for business activities (Acemoglu et al., 2005; Chakrabarti et al., 2011; Coase, 1998; Dutt et al., 2016). They include transportation and communication systems, product, capital, and labor markets, market intermediaries, and regulatory and enforcement systems (Acemoglu et al., 2005; Chakrabarti et al., 2011; Chan et al., 2008; Dutt et al., 2016; Khanna and Palepu, 1997).”

3. *A good part of the theory (from p.6 onwards) is dedicated to justifying the theoretical concept of institutional disruptions, claiming that “literature is not explicit about institutional disruptions“ (p.6), suggesting “short lived temporality”, “suddenness and unexpectedness”, “high severity”, “pervasiveness” are unique characteristics. It is right that these factors are different from evolutionary changes of institutions. However, how do these factors really differ from received literature characterizing big shocks? This part can be significantly shortened. It does not serve, in my view, to justify “institutional disruptions”.*

We appreciate you raising the need to distinguish our conceptualization of institutional disruptions from existing research on shocks. We now have a paragraph in the introduction that specifies how our conceptualization is distinct.

It is critical to consider the four characteristics for understanding the binding constraint that business organizations face when deciding how to respond to large shocks. As discussed in the section “Donations as a Nonmarket Response to Institutional Disruptions”, the four characteristics are essential because they enable us to differentiate which shocks will be disruptive rather than produce evolutionary changes for testable predictions on company outcomes and behavior.

More specifically, the temporal nature of disruptions attenuates incentives to change the supply chain, alter governance structures, or exit the country market. The abruptness and ambiguity of disruptions often yield prevention and coping mechanisms unfeasible or ineffective. The multi-faceted and pervasive nature of disruptions means that firms often need to consider strategic actions beyond their operations. Additionally, their high-consequence incentivizes decision-makers to allocate resources to mitigate the impact on firm performance.

Prior work focuses on how firms seek to mitigate or prevent exposure to country risks, or uncertainty shocks through, for example, avoiding disaster-prone countries or eliminating problematic affiliates (Oetzel and Oh 2014, Pek et al. 2018) and examines how shocks may deter firm survival (Aghion et al. 2017, Alfaro and Chen 2012), affect organizational change (Christianson et al. 2009), and learning (Lampel et al. 2009). Our study predicts which MNEs will respond by donating to restore the institutional context.

We sought to discuss institutional disruptions and the differences with extant work across the four characteristics because it is an essential part of the paper. Indeed, a previous comment in the review process indicated how this fuels another contribution of the paper (and we fully agree). We reviewed the section on the four characteristics to reduce it as you requested. If you have specific suggestions of what can be removed for each factor to reduce the length or prefer that we create a table to save space, we will do so.

4. *Having said all this, however, the paper measures empirically, at the end, shocks (natural disasters, terror attacks, etc.). Although the paper claims that it includes only major shocks in the empirical model, still, there is the assumption behind that all these various shocks lead to a major breakdown of (whatever) institutions (country wide?). Can you justify this?*

In the first paragraph, we build our theory for institutional disruptions on existing research that have documented that shocks disrupt factors that institutional scholars consider market-oriented institutions. As discussed in the first paragraph of the introduction, market-oriented institutions are defined as the intangible and physical factors necessary for market operations, such as transportation and communication systems, product, capital, and labor markets, market intermediaries, and regulatory and enforcement systems (Acemoglu et al. 2005, Chakrabarti et al. 2011, Chan et al. 2008,

Dutt et al. 2016, Khanna and Palepu 1997). Existing research on shocks such as natural disasters, epidemics, and terrorist attacks have established that they have a significant country-level impact. Specifically, systematic evidence shows that large shocks explain country economic development (Altay and Ramirez 2010, Bloom 2009), and the country-level impact is driven by the shocks halting firms' ability to obtain inputs or sell due to the destruction of infrastructure and purchasing power (Boehm et al. 2019, Cavallo et al. 2014, Oetzel and Oh 2014), dropping productivity because employees lost housing, schooling, or health status (Altay and Ramirez 2010), suspending regulatory and enforcement systems (Copeland 2005, Garrett and Tetlow 2006), and cancelling investments due to the impact on financial intermediaries (Hosono et al. 2016) and creating environmental uncertainty (Bloom et al. 2018, Kozeniauskas et al. 2018).

We discuss in the operationalization of institutional disruptions that empirically, we follow Baker and Bloom (2013) that show that large terrorist attacks and natural catastrophes are associated with abnormal levels of market volatility and significantly explain country GDP growth. Barro (2009) also includes epidemics as phenomena that have several times more welfare costs for countries than frequent economic fluctuations. Additionally, large epidemics, natural disasters, and terrorist attacks tend to have systemic impacts on the country market (Aghion et al. 2017, Bloom et al. 2018, Kozeniauskas et al. 2018). To characterize severity, we calculate the percentile distribution for each variable separately: deaths, affected people, and economic damage. The percentile distribution of each variable was calculated by country for all shocks reported between 1997 and 2019 in the International Disaster Database (EM-DAT), which uses a minimum degree of impacts to record events. We choose shocks that rank at the 99th percentile in the country that they affected in any of the three impact areas (i.e., deaths, affected people, or economic damage; Cavallo et al. 2013) to capture severe shocks for the country and test the sensitivity to the 75th and 90th percentiles.

As you can see, the country-level effect is supported by existing empirical research on the impacts of shocks and our operationalization to capture only the most severe country events.

a. Moreover, how can you justify that the shocks you are including in the empirical strategy (natural disasters, terror attacks, pandemics, etc.) all are comparable with regard to the institutional disruptions they cause? In other words, can a natural disaster (you mention as an example the hurricane Katrina), which typically has a limited geographic impact, have the same institutional disruptive impact then a country-wide, even globally spreading, pandemic (you mention as an example the recent Covid-19)? Would it not be better to concentrate on one kind of shock? Would they also have the same disruptive effect across countries?

We focus our construct on a very tight definition of institutional disruption and include fixed effects for type of shock and controls for the number of deaths, number of people affected, economic damage and country land area in our analyses, which alleviates comparability concerns. As described on pages 19-20, our operationalization follows work that shows that large terrorist attacks and natural catastrophes are associated with abnormal levels of market volatility and significantly explain country GDP growth (Baker and Bloom 2013). Barro (2009) also includes epidemics as phenomena that have several times more welfare costs for countries than frequent economic fluctuations. Additionally, large epidemics, natural disasters, and terrorist attacks tend to have systemic impacts on the country market (Aghion et al. 2017, Bloom et al. 2018, Kozeniauskas et al. 2018). We then adopt the 30-day criterion between the start and end dates consistent with (Ballesteros et al. 2017) for sudden shocks. Finally, to characterize severity, we calculate the percentile distribution for each variable separately: deaths, affected people, and economic damage. We choose shocks that rank at the 99th percentile in the country that they affected in any of the three impact areas (i.e., deaths, affected people, or economic damage; Cavallo et al. 2013) to capture severe shocks for the country.

Our first submission was limited to natural disasters and yielded consistent results. By conceptualizing and operationalizing institutional disruptions according to the four characteristics, we can systematically study firm response to shocks. This allows us to show the robustness of the main relationship and covariates across various contexts, which still fall into the definition of institutional disruptions. Our analysis provides consistent robust results on the predictive power of economic importance across different countries, contexts, and years. It helps us to address empirical concerns that have affected extant work and test for alternative explanations.

As an aside, the coverage of the database provides a contribution to the literature on company philanthropy.

Our econometric analysis provides a conservative approach to the measure of the relationship. The more narrowly we measure and capture the geographic impact of the shock on the local market institutions, the more significant our results should become.

We discuss these factors now in the introduction for our contribution and in the discussion section.

b. Part of the problem is the fact that it is unclear how country/market/community effects are theoretically (and later empirically) distinguished (see point 6).

Thank you for raising this area of confusion. We focus on the country level. We revised our terminology to consistently refer to it as the “country-market” rather than referring to it interchangeably as the country or market (which we had defined at the country level). Our empirical measures are all at the country level, consistent with our theorized variables of interest. By applying consistent wording throughout, we believe that the manuscript reads much clearer.

5. Throughout the entire new version of the paper, there is the claim on the “different, previously not studied motive: restoring the market” (p.2). I am concerned about this very strong claim, as I believe that received studies (e.g. Dutt et al., 2016, Tilcsik and Marquis 2013, both cited in the paper) similarly base their logic on an economic rationale, such as helping with developing business capabilities and supply chains, improving market structures, etc., which clearly relates to what is here called “restoring the market”. Having said this, can you clarify better what is novel about H1 (please see also point 6)?

We appreciate your comment, which helped us refine our discussion on our contribution. Dutt et al.’s study focuses on business incubators that fill institutional voids, not corporate philanthropy. While the business incubators help create and develop markets, they are doing so for environments characterized by the chronic absence of market-oriented institutions and are providing their services in return for an equity stake in the businesses. Therefore, it is conceptually distinct from corporate philanthropy, which is the literature to which we contribute. In fact, our study contributes to the literature on institutional voids in that we extend it to acute contexts of institutional disruptions that can occur across levels of country income and institutional development. Per your comment we elaborate on this in the discussion section of the revised manuscript.

Further, the mechanism theorized by Tilcsik and Marquis (2013) is not an economic mechanism but rather a social mechanism – based on the “sense of connection between the people that make up the firm and those affected by the disaster, which in turn leads to ‘pressure on the company to respond.’” (Tilcsik and Marquis 2013, p. 117). Therefore, our contribution is distinct from these studies, as mentioned in the third paragraph of the introduction.

We elaborate below in point 6 (next response) how our theory is contrary to Tilcsik and Marquis (2013), and therefore novel.

6. *The paper (p.11) claims to make, by hypothesizing that economically affected MNCs would donate more in times of major shocks, a contrary theoretical claim compared to the one of Tilcsik and Marquis (2013), who found that major natural disasters would hinder corporate giving. However, I am not sure that this is the right way to put it. As far as I understand, their paper investigates community-level impacts, i.e. a firm's behavior (=corporate giving), which is embedded (=headquartered) in the community the event hits. Your paper takes a different approach, as it is about the area where the MNC has placed its major economic activity, which is straightforward argument (see point 5). The example illustrates my concerns I have throughout the paper, i.e. that there is no or not enough attention given to carefully disentangling the different levels of analysis from a theoretical point of view.*

Pages 117-118 of Tilcsik and Marquis (2013) clearly state that the economic damage caused by large scale disasters is expected to harm firms and therefore preclude them from philanthropy. They also state that because of this direct impact on firms, a broader or international response to the disaster will occur where others will respond instead. Their argument is aligned with our discussion on page 13. We have inserted below a direct quote of Tilcsik and Marquis (2013) for your convenience. Here is what they state:

“The negative effects of disasters may offset the above-described mechanisms. First, because disasters cause significant physical and economic damage, they may limit the philanthropic capacity of local firms. As Crampton and Patten (2008: 863) argued, “even in the wake of catastrophic events, corporate philanthropic giving is constrained by economic concerns.” As a result, local firms may be more preoccupied with the impact of the disaster on their operations than with philanthropic disaster response, as was the case, for example, during Hurricane Katrina (see Muller and Kraussl, 2011). More important, even if a locally headquartered firm has few local facilities, there are compelling reasons to expect a reduction in charitable giving. In particular, major disasters may compromise not only the philanthropic capacity of individual firms but also the overall philanthropic infrastructure of the community. If a major disaster causes the key nonprofit partners of local firms to dissolve or to suspend their activities, the community network of local philanthropy—through which donations normally flow—may be severely damaged. For example, nearly half a year after Hurricane Katrina, the majority of nonprofits in the area were still not fully operational; many of these organizations lost physical assets and staff, as well as board members that used to connect them to local firms. As a result, many local nonprofits—the primary recipients of donations by locally headquartered firms—remained largely incapacitated and unable to raise or use donations for months to come (Auer and Lampkin, 2006). Moreover, concerns about particularly damaging disasters may be elevated to a national or even international level, leading to philanthropic response from well beyond the affected community (Muller and Whiteman, 2009). In that case, as a wider group assumes responsibility for the philanthropic response, the pressure on local organizations to champion rebuilding efforts lessens.”

They then go on to hypothesize that “Our discussion above suggests that the answer may depend on the magnitude of the disaster. The more damaging a disaster, the more likely it is to undermine the local philanthropic infrastructure and to attract a philanthropic response from outside the community. Thus, while the most damaging disasters will have a negative effect on local firms’ philanthropic contributions, smaller-scale disasters will leave the philanthropic network of the community intact and put local firms at the forefront of disaster response....As implied in our discussion of hypothesis 2, however, the most damaging disasters likely create relatively weaker public pressures on local firms to increase their philanthropic spending, so the strength of such pressures, and firms’ sensitivity to them, will be less relevant than for positive event effects. Thus, we focus our discussion of moderators on positive event effects, which stem from mega-events and *small-scale* disasters.”

They predict for their hypothesis 2 that: “The effect of natural disasters on the philanthropic contributions of locally headquartered firms will depend on the severity of damage caused. Highly destructive disasters will have a negative effect; relatively less damaging disasters will have a positive effect.”

Although they hypothesize about headquarters and we theorize about economic importance and control for headquarters, one could argue that headquarters tend to be the most economically important country locations for MNEs.

Regarding the level of analysis, we restrict our shocks to disasters that have a severe country-level impact. Nothing in Tilcsik and Marquis' (2013) theory suggests that a country-level severe disaster would yield a different response. Of note, we conducted interviews with large MNEs that donated and were directly harmed by the disasters. These firms indicated that while they incurred substantial direct economic damage (and thus incurred the local community effect), they would not be able to fully recover unless the market was restored and therefore chose to donate.

We hope this discussion provided by Tilcsik and Marquis (2013) clarifies that they predict that firms will not donate for large-scale disasters (which our paper focuses on) – particularly due to the economic impact on the firm. Therefore, our theory is contrary to their expectation.

a. The paper permanently switches between economically important market and economically important country and even to local geographic levels (see also point 7a). What is it what the authors are interested in? Given the focus on institutional disruptions, identifying this level of analysis is crucial.

We apologize for the confusion. Our theoretical concepts and measures are all at the country level. We revised our terminology throughout the manuscript to clarify it.

b. Still, it seems the authors are interested in the geographical setting of the economic activity of the MNC. This is my assumption however, as I am not entirely sure about it. However, it is not clear, if there is a distinction between the level of economic/institutional development, i.e. if the (economically important) shock area is in a developed or emerging country. At p.4 the paper makes the point that the disruptions are ubiquitous to emerging and developed countries. True, across the world such shocks are terrible events, but should not there be a theoretical argument that it makes a difference, if the area of “most important economic importance” which is hit by a shock is located, say in US or in a developing country? In other words, the quality level of economic institutions pre-shock differ, and so might the impact and particularly the public aid and regulatory quality post shock (two of your moderating factors) differ (see e.g. Dutt et al., 2016).

You raise a good point about the level of development. Per your comment, we ran the analysis by country income group (The World Bank 2021) and present the results in Table VIII in the online Appendix (see table below). We find that the results are qualitatively consistent with our baseline analysis for economic importance, dominant MNE index, and regulatory quality across all country income groups. For public aid, the results highlight that there is no crowding out effect when countries do not have sufficient resources for recovery.

Specifically, in lower-income countries, we do not find evidence of a crowding-out effect of public aid in the donation of economically connected MNEs. This aligns with evidence that the financial gap for relief and recovery from large shocks for lower-income countries is substantial (Becerra et al. 2014, 2015, High-Level Panel on Humanitarian Financing 2016). Combined with the comparatively large coefficient of economic importance, the results indicate that economically connected MNEs in

lower-income countries have high incentives to help the country market recover regardless of the contribution from public sources (because the public resources are rarely sufficient).

We observe that economically connected MNEs reduce their contribution when they perceive substantial foreign aid for lower-middle-income countries. This result is consistent with studies that indicate that the financial gap for these countries is the lowest (Becerra et al. 2014, High-Level Panel on Humanitarian Financing 2016). In other words, economically connected MNEs estimate that foreign aid will be an essential funding resource. On the other hand, the impact of host-country public aid is positively associated with the donation for economically connected MNEs. This effect may be driven by the perceived need when the host country must give.

For upper-middle-income and high-income countries, the results are consistent with our baseline analysis. Funding from the host country has a substantial crowding-out effect on giving by economically connected MNEs. On the other hand, the outpouring of foreign public aid is positively associated with the donation of economically connected MNEs. This is aligned with MNEs perceiving a greater degree of disruption when there is more foreign public aid. Appeals for emergency aid, administrated at the global level by multilateral agencies, are rarely issued for upper-middle and high-income countries. The exceptions are for fat-tailed disruptions, which are captured by our statistics. This means that appeals for foreign aid are informative of the expected magnitude of the impacts. They signal to managers the need for resources for relief and recovery.

Thank you for this suggestion. We point to the analysis on page 28 of the manuscript and discuss the results for public aid in detail in the Appendix. We are happy to move the discussion to the body of the manuscript if you deem it appropriate.

Table III. Economic Importance of the Country to the Firm and Donations to Disruptions by Country-Income Level

Variables	Low- Income	Lower- Middle- Income	Upper- Middle- Income	High- Income
H1: Economic Importance	187.829*** (51.743)	65.226*** (15.072)	8.213*** (1.933)	7.821*** (1.428)
H2: EI x Dominant MNE Index	12,598.580** (6,098.939)	305.478*** (72.737)	0.710*** (0.059)	0.711*** (0.110)
H3: EI x Host-Country Public Aid (ln)	0.010 (0.012)	2.930*** (0.537)	-0.289*** (0.069)	-0.276*** (0.050)
H3: EI x Foreign Public Aid (ln)	-0.206 (4.738)	-0.410*** (0.142)	0.011*** (0.003)	0.018*** (0.004)
H4: EI x Regulatory Quality	1.269*** (0.042)	0.035*** (0.008)	0.114*** (0.004)	0.480*** (0.029)
Dominant MNE Index	73.875 (55.621)	-0.130 (0.509)	0.765 (1.003)	-0.045*** (0.014)
Host-Country Public Aid (ln)	-2.931 (4.417)	-0.017*** (0.003)	-0.010*** (0.002)	-0.044 (0.028)
Foreign Public Aid (ln)	-6.848 (5.368)	-0.012*** (0.004)	-0.000 (0.001)	-0.003*** (0.001)
Regulatory Quality	0.015*** (0.004)	-0.030*** (0.005)	-0.012** (0.005)	-0.042*** (0.007)

Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	4.583 (4.019)	0.020 (0.075)	-0.700*** (0.071)	-0.463*** (0.146)
Observations	73,749	107,787	147,498	172,081
MNEs	1,891	1,891	1,891	1,891

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower-middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper-middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more. Source: The World Bank (2020). <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

As such, from a theoretical point of view (which later translates into the empirical measurement), it is not clear to me how the paper is positioned, at which level(s) of analysis the theory tries to contribute and what exactly the paper claims (or does not claim). The examples given (through interview data or by examples of shocks in the data) do not help clarifying: Sometimes the shocks seem to have a global, sometimes a country-level or a more local magnitude, which should make a difference with regard to the disruption of institutions and the impacted “market” (“country”?) of economic activity of the firm. Sometimes the firm seems to be headquartered in the area of shock (which might explain donor activity, a la Tilcsik and Marquis, 2013), sometimes not, sometimes the area of interest is in developing countries, sometimes not. We do not know. In other words and taken together with the problems identified under points 1 and 2, it seems the paper too often compares apples with oranges, leaving the reader confused about the theoretical reasoning behind and about the positioning of the paper. I am aware of the empirical controls and tests that follow, but here we are at the theory level.

We apologize for the confusion. We clarify that our theory and constructs are at the country level. We removed the examples of the COVID-19 pandemic since it has become a global phenomenon, and our theory is at the country level. We also replaced examples where the MNE was also headquartered in the country location with alternative ones where the MNE is not headquartered in the country location. We kept the Toyota example on page 13 because it nicely demonstrated Toyota’s need for the broader system to be restored and its actions taken to restore those factors. Of note, the headquarter country is frequently the most economically important country market for MNEs, and thus it is not disconnected from our theory. As you acknowledge, our analysis controls for headquarter locations.

c. Minor: At p. 5 the paper claims: “Our study identifies firm characteristics and country conditions under which MNEs respond...” H1 hypothesizes ONE firm-level factor, i.e. the magnitude of economic activity in a certain area, or did I miss something?

Thank you for this point. We revised this sentence to state that “Our study identifies how the economic importance of the country to the MNE and country conditions ...”

7. *Turning to the moderating factors, it is still not clear to me why they were selected. In other words, why is it of theoretical interest to introduce them into the debate?*

Thank you for raising the need to clarify our theoretical framework. Following the advice of the Editor in Comment 3, we draw on the MNE cost-benefit analysis of a non-market decision as our baseline framework that suggests that MNEs decisions will be impacted by the potential of a non-market substitute for corporate funding and the nature of the market institutions (Ferrell et al. 2016, Kaul and Luo 2017, Luo and Kaul 2019, Morgan and Tumlinson 2019). Countries use three alternative sources for funding recovery: business organizations, public aid coming from the state power and foreign governments, and individual charity (High-Level Panel on Humanitarian Financing 2016). Among these sources, studies show that individual charity is comparatively hard to track, and employees tend to contribute to the organizational fund via matching programs (Andreoni 2006, Morgan and Tumlinson 2019, White and Lang 2012). Therefore, we focus on other corporate donors and public aid as alternative sources of non-market substitutes for funding recovery. The nature of market institutions is affected by the country’s quality of governance for resources allocated to market-oriented institutions (Dorobantu et al. 2017, Zhang et al. 2016). We thus also study the moderating effects of country regulatory quality. Hence, we theorize that public aid, dominant MNE index, and regulatory quality will be three contextual factors that moderate the baseline relationship.

We foreshadow them on page 2 to help clarify upfront why the moderators were selected. We hope you find the framework much improved.

a. *Market concentration is usually defined as the number of competitors in one industry/market. However (and here the issues with mixing the levels of analysis becomes evident again), empirically it is simply measured by the five biggest firms in the country. This is a different story, it has nothing to do with the market of the focal firm. In fact, in answering to Reviewer 4, the authors write: “For instance, in deciding how much to donate in an economically important market a multinational firm like Coca Cola looks to the presence of large firms in the market such as Mitsubishi, Volkswagen, Toyota, Microsoft, Tata, etc.” Coca cola does not compete at its market with VW or Microsoft. I apologize, but I simply do not get what is meant here.*

We appreciate you pointing out this area of confusion, which we believe is driven by using the term “Market.” We reflected on your comment and those made by the other reviewers and renamed the construct “Dominant MNE Index”, which we believe matches our theory and empirical operationalization for the effects of the share of dominant MNEs in the host country that are capable of donating for recovery. In interviews, managers discussed large MNEs in the country as a central factor in assessing whether they should contribute (see page 15 of the manuscript). We are open to any suggestions that you might have for a better term for this theoretical concept.

b. *For the remaining two moderators, regulatory quality and magnitude of public aid, I wonder what is surprising behind the theoretical reasoning so far? In fact, the puzzling results for the magnitude of public aid seem to suggest that there is a more complex argument behind, which again could differ, e.g., depending on the economic development of the shock area (see also point 6b).*

We explain our theory in a simple, intuitive manner that reflects the information provided by managers in interviews. We now foreshadow before the hypotheses (see page 12) that the cost-benefit logic, albeit intuitive, leads to predictions for MNE donations that differ from extant work. The mechanism motivating firm donations is distinct, and therefore the predictions for the moderators are

different from extant work. In contrast with prior research that emphasizes that corporate donors pursue firm-specific benefits such as reputation (Muller and Kräussl 2011) and political favors (Bertrand et al. 2020), our study introduces a strategic motive whose benefits are a public good (i.e. it is not firm-specific). That is, it can be difficult to disentangle firm benefits from restoring the market from those received by other organizations and society at large. The public nature means that others also have motivations to restore it. Consequently, a cost-benefit approach for the economic importance, tempered by the alternative sources of funding and the nature of the market institutions, yields insight into when firms will find it beneficial to contribute rather than rely on others to provide the public good.

For H4, we specify that because we are taking an economic perspective, our prediction that firms will donate more in countries with high regulatory quality is contrary to other predictions arising from political favor. Prior research has indicated greater giving in contexts with relatively low institutional quality. For example, in a study of cross-border charitable giving by US corporate foundations, Hornstein and Zhao (2018) find that the foundations give more in host countries with relatively low rule of law and higher corruption, especially when they require stronger connections with local stakeholders (Hornstein and Zhao 2018).

Hypotheses 3a and 3b predict that firms will contribute less when host-country and foreign public aid can fund recovery. This hypothesis is counter to existing research that suggests that the benefits of donating are not diluted by the provision of giving from other government or business organizations. In fact, by giving with governments, prior research suggests that the firm may develop political capital for favorable policies and contracts and create a risk-management mechanism against stakeholder opportunistic behavior (Baker et al. 2002, Godfrey et al. 2009, Henisz et al. 2013).

We address this comment by adding a paragraph in the introduction on the diverging predictions and elaborating in the discussion section how our study yields novel expectations and findings.

Thank you for suggesting that we examine the complexity behind public aid by examining the level of development. As mentioned in response to comment 6b above, we ran the analysis by country income group and present the results in Table VIII in the online Appendix. The results highlight that there is no crowding out effect for public aid when countries do not have sufficient resources for recovery. We detail the results to the analysis in the Appendix but are more than happy to move the discussion from the Appendix to the body of the manuscript if you deem it appropriate.

c. I might have missed it, but I could not find in the theory section an argument for a distinction between foreign and local aid. Why do you distinguish empirically between foreign and local aid, but not theoretically?

You raise a good point. Our theoretical logic predicts that both host-country public aid and foreign public aid would reduce the perceived need of the MNE to fund recovery. However, the measures are based on different factors that firms reference for donating and therefore, we cannot empirically combine them into one public aid measure. According to the literature on aid and disaster management, the average foreign net official development assistance and official aid, and the country's average gross national expenditure explain the availability of foreign and local resources towards disruptions, respectively (Becerra et al. 2014, Cavallo et al. 2013). Therefore, we operationalize them separately.

To address your comment, we created two sub-hypotheses (H3a and H3b) that predict that host-country public aid and foreign public aid, respectively, negatively moderate the relationship between the economic importance of a country to the MNE and its donations in response to an institutional

disruption. We now clarify that these are two distinct factors that firms assess in the hypothesis section.

8. *I find the presentation of the data sources and measures rather confusing. It starts with the explanation of two variables, then introduces at length the interview process, and then it goes back to variable measurement. I would suggest to first explaining the data sources, then the measurement of the variables. Also, I would suggest to streamline this section. Explanations like teaming up with a US university, searching databases and finally finding Orbis convincing, etc. might be of less interest.*

Thank you for this comment. We followed your recommendation and restructured the section first to explain the data sources and then the measurement of the variables. We also streamlined the section by removing the parts that you highlight are less critical.

9. *Given the importance given to the interviews in the data section, I wonder what the interviews serve for in the current form of the paper, beside some anecdotal evidence. Please do not get me wrong, I appreciate the effort of conducting the interviews. But at the moment, there is a mismatch of importance given in the data section and actual use of them in the paper. Also, in the paper, there is a few times mentioned that the interviews are “the cornerstones” of the hypotheses development. Should not theory assume this role?*

This is a good point. To address it, we reduced the description of the interviews and moved it to endnote 1. We also removed references to interviews being “the cornerstones” of hypotheses development.

10. *I very much appreciate the efforts done for a convincing empirical strategy (including the robustness checks). However, I would kindly like to ask to reflect on the empirics in the light of the theoretical issues raised above. Depending on the positioning of the paper, it might be a good idea to focus empirically on one type of shock (e.g. natural disasters) and carefully disentangle locations of MNCs and the economically relevant areas under shock.*

We reciprocate appreciation as your feedback has guided us in this endeavor. We discuss your theoretical concern above in the responses to your comments and reflected on the merits of including different types of shocks (please see the response to your Comment 4a). In addition to these ideas, the comprehensiveness of the data allows us to include countries that traditionally are neglected in the analyses of company philanthropy.

As we have built on your and the rest of the review team’s suggestions, we believe our empirics offer the depth of the studied relationship. Notably, we show how the explanatory power of the economic importance of a country for the MNE for firm donations survives the range of distribution of the shock impacts.

We will be happy to implement alternative statistical approaches if you think we can meet the goals of the study more effectively.

11. *Why do you call the controls “customer orientation” and “donor fatigue”? Whereas you measure retail/service in the first case (also non retail/service companies can be customer oriented), the second seem to capture prior donations of a company, which is, if not mistaken, well established in literature (differently to donor fatigue).*

Thank you for your comment. Our terminology for customer orientation aligns with extant literature. In response to your concern, we relabeled it as “business-to-consumer” and state in the manuscript

that Orbis categorizes each subsidiary's activity into the four categories of retail, service, manufacturing, or wholesale. Manufacturing and wholesale activities are aligned with business-to-business, and retail and service are aligned with business-to-consumer activities. Of note, our regressions have consistently accounted for industry at the 4-digit industry code, which captures any nuance related to the business-to-business or business-to-consumer orientation of the subsidiary.

We use donor fatigue because it was suggested in the review process by another reviewer. The concept of donor fatigue is established in the literature (Andreoni 2006). Per your comment, we now provide the reference in the manuscript when we introduce the variable.

12. *I wonder why you measure donor fatigue as number of donations (see variables explanations in the paper), not US\$?*

This is a great point for discussion. In addition to the referred variable, we control the number of events by country and at the global level by year. The three measures are used to operationalize donor fatigue in the literature on the drivers of humanitarian aid (see, for example, Turrini et al. 2020 for a survey).

In our setting, the average magnitude of donations varies substantially by country-event pair. It may not capture the argued marginally increasing effect of previous contributions that decreases willingness to donate for the next event.

If you perceive that we need to use a different approach, please let us know, and we will be happy to incorporate it.

13. *It is written at p. 21, end of first (longer) paragraph, that the control variables are lagged by one year. In the next paragraph, referring to country-level controls, it is said they "are lagged", but it is not specified by how long. Can you please clarify?*

We now specify that the country-level controls are lagged by one year.

14. *Regarding the discussion, I feel it needs more development. I got confused by the back and forth of introducing anecdotal evidence as "our data", beside the empirical evidence from the paper. Also, I do not understand what "Literature on Organizational Strategic Responses to the Institutional Context" (p. 31) shall be, the paper aims to contribute. In the light of the theoretical issues raised, sentences like "we have formalized the concept of institutional disruptions" (p. 32) might need a refinement.*

We revised the discussion section and eliminated the back and forth between anecdotes and data. We re-titled the section from "*Literature on Organizational Strategic Responses to the Institutional Context*" to "*Literature on Organizational Responses to the Institutional Context*." We also provide references in this section that we contribute to the theoretical and empirical literature that examines firm response to the institutional environment (see, e.g., Aguilera and Grøgaard 2019, Ahuja and Yayavaram 2011, Doh et al. 2017, Dutt et al. 2016, Khanna and Palepu 1997, Peng 2003).

Following your earlier comments, we revised the manuscript to clarify our contribution. We more fully specify how existing work has not formalized the four characteristics of disruptions, and therefore is a contribution of our study. A key implication of the four characteristics is that the impact on organizations differ from other types of institutional contexts and will influence firm response. More specifically, the temporal nature of disruptions attenuates incentives to change the supply chain, alter governance structures, or exit the country market. The abruptness and ambiguity of disruptions often yield prevention and coping mechanisms unfeasible or ineffective. The multi-faceted and

pervasive nature of disruptions means that firms often need to consider strategic actions beyond their operations. Additionally, their high-consequence incentivizes decision-makers to allocate resources to mitigate the impact on firm performance. Our study identifies how, in the context of institutional disruptions, the economic importance of the country to the MNE and country conditions can lead to MNEs responding by donating to restore the institutional context.

We hope that you find the revised discussion section strengthened.

Thank you for your constructive feedback on the revised manuscript. Your comments have been instrumental in further developing our theory and improving the clarity of the main theoretical concepts, the levels of analysis, and the match between the theory and the empirics. We hope you find the revised manuscript considerably improved.

Response to Comments from Reviewer 3

Thanks for your responses to our comments. Some reiteration of previous comments and new ones follow:

1. The obviousness of hypotheses: your rebuttal to my comment that hypotheses are obvious goes through the lines of "nobody in this literature has done it." That is not a satisfying answer. Could you come up with a scenario under which a MNE would not be more likely to donate in a country that is unimportant for its operations? If the answer is no, then your hypothesis is evident (which may explain why no one has written a paper about it). What is not apparent is why an MNE would help more a country with little importance for its performance; that would be a sign of remarkable altruism.

We appreciate you raising this point and providing a suggestion on how to address it. Satisfaction of social preferences such as altruism, reciprocity, and homophily is why firms without economic importance in a disrupted country will donate (e.g., Charness and Rabin, 2002; Fehr and Fischbacher, 2002; Small and Simonsohn, 2008). Employees lead the altruistic motivations for firm donations. One of our interviewees noted that *"If you are a large, international brand, it has become part and parcel of doing business in a globalized world. The altruistic motivations are driven by employees. Employees want to work for a company that seeks to respond in these instances, and a key way to ensure that a company can attract the best talent is to have a disaster response program (...) There is peer pressure to do so. I was told that many companies ask what other companies in the country are giving before they set an amount to contribute to a disaster."* In the case of the altruistic motivations by employees, we find that this type of giving tends to be lower than the mean value. That is, donations that follow the strategic considerations of restoring the market are substantially larger.

Additionally, donations sometimes follow that large shocks frequently receive substantial global media attention, which offers the prospect, for instance, to foster a public image of philanthropy (Eisensee and Strömberg 2007). To illustrate, the 2010 Haitian earthquake was covered extensively in the media. Without Haiti being economically important, the firm has an incentive to donate because the worldwide media coverage creates a global opportunity to generate reputational capital (see, e.g., Godfrey, 2005).

Conversely, one might expect firms with economically important operations in an affected country to focus their resources on restoring their facilities and engage in scarce giving (Tilcsik and Marquis 2013). Economic concerns constrain company philanthropy, and the disruption instills fiscal pressure on the firm. Additionally, affected non-profits that suffer damage from the disruption create a broken

infrastructure for philanthropic giving (Ballesteros and Gatignon 2019). Altogether, the economic costs to MNEs experiencing the disruption combined with the motivations to donate for those not experiencing it suggests that MNEs with high economic importance will be less likely to donate in response to an institutional disruption.

In response to your comment, we added a discussion on these reasons in the section for hypothesis 1. Thank you for this suggestion, as we believe it has helped elucidate the falsifiability of this hypothesis.

2. Misleading examples: many of your examples are related to disasters affecting value chains and then damaging operations for the MNEs (locally and globally). Nevertheless, your measurement of economic importance is far away from value chains. I strongly recommend matching the examples and anecdotes to what you actually measure.

Your comment led us to reflect on our examples. In a prior review round, the Editor requested that we bring in examples for face validity on why firms want to restore the country market. We, therefore, focus on caselets that provide insights into understanding firm motivation for country market recovery. If we relied on examples of the MNE destruction of assets, the insights would indicate the private benefit of rebuilding the company and not necessarily for the broader market system. Importantly, our examples align with our operationalization of the measure of donations for factors that restore the functioning of the market. In fact, some of the examples are from the text directly surrounding the donation numbers for our dependent variable. Moreover, this paper was inspired by the information from interviews with managers.

We employ caselets to demonstrate each theoretical construct in the relevant sections of the manuscript. For instance, hypothesis 1 is about the economic importance of the country market to the MNE. In that section of the paper, we use the example of a manufacturing firm where the manager states, “...When the impact (hit) a size of our business that was much greater, we immediately mobilized resources...”. Likewise, we employ a British mining company example where the manager stated, “Chile is [our] number one copper producer and that represents a big part of our business... so we mobilized...”

We hope this clarifies the relevance of the examples used.

3. Weak measurement of economic importance: Your preferred measurement of economic importance is misleading. Some issues with it:

o Your cutoff for ownership is low; most studies in FDI look for majority-controlled subsidiaries. You may even want to explore whether the amount donated depends on the level of ownership. That may help to build credibility in your results.

Thank you for raising this point. Page 22 describes how our measure uses the percentage of MNE ownership. In the various rounds of revisions, we have employed different cut-off levels with consistent results. As you rightly note, the percentage ownership provides credibility that the results are robust across ownership levels. It also provides a complete account of MNE affiliates. Thus, we have chosen to rely on it for the manuscript.

o It is not clear what the % ownership variable in the denominator of equation 1 means. I think % ownership in the numerator represents the ownership of a subsidiary in a given country by its ultimate parent but in the denominator? Is it the mean average ownership for a firm across countries?

Thank you for highlighting this. The numerator is each subsidiary multiplied by its percentage ownership and then summed for the focal country of interest. The denominator is each subsidiary multiplied by its percentage of ownership and then summed for all MNE subsidiaries globally. Therefore, the measure reflects the ownership-weighted proportion of MNE affiliates in a country. To address your comment, we revised the equation to the following to make it more transparent:

$$\sigma_c^f = \frac{\sum_0^n (\text{affiliate in country } c * \% \text{ ownership})}{\sum_0^w (\text{affiliate} * \% \text{ ownership})};$$

n is the number of firm affiliates in country and w is the number of firm affiliates in the world in the year of the disruption.

o Including countries where the MNE has no operations is not right. It creates observations with no information (see more on this in comment 5) and, although it may not affect your preferred measurement of economic importance (more of this in following bulletin point), it is not conceptually sound.

As this comment overlaps with Comment 5, please see the response to Comment 5 below.

o The idea that presence equals importance is not defensible under the international business literature. In the appendix, you offer alternative measurements based on assets, sales, and employees in countries. You dismissed these alternative measures as inferior because (1) revenue can overrepresent some industries and some affiliates (sales subsidiaries), and (2) they account only for the demand side of the market. On the first argument, industry effects are taken care of by your industry controls. It is also easy to control for tax-heaven locations (where revenues tend to accumulate disproportionately) that can bias the results. The second point is not very strong. Your preferred variable does not capture the demand and supply sides at all (comment 2 above). These large multinationals rely on a heavy and extended network of outside suppliers across the world.

o I strongly recommend that you use % of assets (or employees, or sales) of country C among all countries that company X operates in. The problem is that the data are not readily available (you use some data imputation mechanisms in the appendix, you can apply those, but you should present regressions with and without any data imputation to ensure the methods do not drive your results. You may also want to show regressions with different levels of ownership cutoffs.

To be more explicit, Table V should be your main table (with imputing data), offer some robustness checks without imputation, and be more humble on what you can actually show, e.g., you are capturing importance from the demand side. Capturing the supply side requires data that you do not have. Pretending that ownership captures both is misleading (see comment 2).

Per your and the Editor's guidance, we included Appendix Table V in the manuscript, now referred to as Table 4.

As you recommend, we expanded the discussion on the limitations of the constructs (see page 21). We agree with you that finding the right operationalization is far from trivial given the combined impact of the idiosyncratic characteristics of affiliates that affect the strategic value for the MNE and data constraints. In a past round, we reacted to the Editor's concern that variables such as the number of employees and assets could misrepresent the strategic value of affiliates. The excellent example

that the Editor raised was a highly automated subsidiary that employs few people. Of note, across the various operationalizations of economic importance that we have applied throughout the review process, the results remain qualitatively consistent.

We ran the robustness analysis using no data imputation for the combined measure of economic importance (based on revenue, employees and affiliates) and assets (as you mention), and the results hold (see table below). If you would like us to include it in the Appendix, we will. We did not add it because of space constraints for an already long document.

We perform a comparative evaluation of the different operationalizations of economic importance. Using our base estimation model (equation 2), we examine the overall MNE donations-economic importance elasticities of the various operationalizations and find that it is greater for the ownership-weighted proportion of MNE affiliates in a country than for the various alternative measures based on assets, employees, and/or revenues. Moreover, dividing the ratio of the coefficient of the independent variable by the linear prediction results in a higher overall prediction effect. The analyses suggest that economic importance based on the ownership-weighted proportion of MNE affiliates in a country is the best linear unbiased estimator (BLUE) (see discussion on page 23).

**Table IV. The Effect of Economic Importance of the Country on the Magnitude of Donations
Alternative Predictor with Listwise Deletion
[Predicted Variable: USD Donation Amount (ln)]**

Variables	Revenue, Employees, and Affiliates	Assets
H1: Economic Importance	8.801*** (3.017)	5.408** (3.400)
H2: EI x Dominant MNE Index	32.581** (16.437)	31.828** (15.645)
H3: EI x Host-Country Public Aid (ln)	-0.310 (0.384)	0.412 (0.306)
H3: EI x Foreign Public Aid (ln)	4.899*** (1.871)	5.408 (3.400)
H4: EI x Regulatory Quality (Percentile Rank)	0.414*** (0.051)	0.503*** (0.093)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Event Controls	Yes	Yes
Observations	402,182	401,179
Number of MNEs	1,562	1,534

Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, * p<0.1.

4. *Unusual use of fixed effects: you responded to my comment that it was strange that you could estimate significant effects on time-invariant country variables – such as surface – by dropping them from your specification. Let me be more explicit in the message: coefficients for country-invariant variables should not have been viable to estimate with a country fixed-effect model. There is not a variation.*

This issue, and your response to it, made me pay more attention to your choice of fixed effects, which are defined as firm-country and country-time (according to page 4) and firm-industry country-event (according to equation 2, page 22.) In your tables, you mention firm, industry, country by event, and year fixed effects (4 sets). On page 21, you say the same. Which one is the set that you actually use? What is the rationale behind them? What is the heterogeneity that is left to estimate the coefficients?

An example of why I find your choice of fixed effects confusing: assuming that equation 2 shows the most precise definition of what you actually do, I'm puzzled by why you need country-event fixed effects? Is an event affecting multiple countries? If so, how often does that happen? Aren't values for event-fixed effects the same as for country-fixed effects within an event? So what heterogeneity is used to estimate the event-related to coefficients since values are the same within an event?

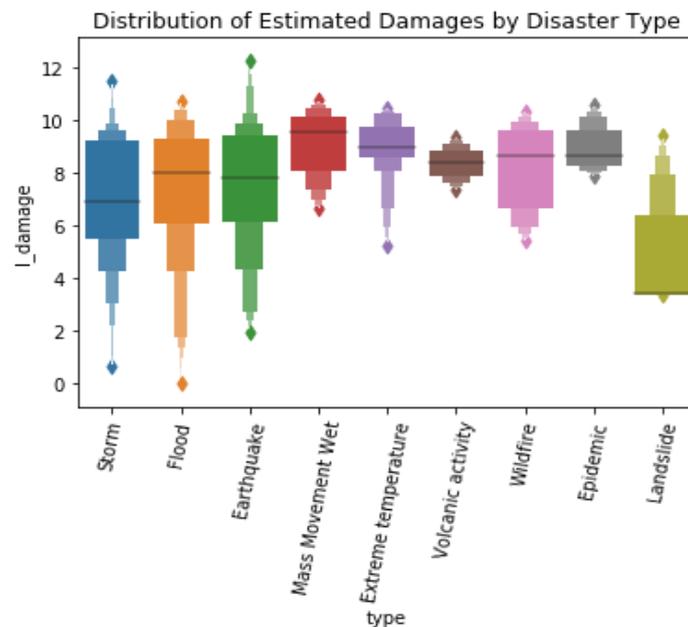
Let me be more precise: your specification – using event-fixed effects – is similar to multinomial logit (the main difference is that your dependent variable is continuous and not binary). The variation to identify coefficients comes from actors reacting differently to the same event, so why are you using event characteristics? You already homogenize a lot of the events by taking those at the 99% severity tier.

We apologize that our previous response created confusion. Our data is nested by country-event. Disruptions often affect different countries. This is particularly characteristic of some regions of the world, such as the Asian Pacific and Central America. Accordingly, we now explain in the manuscript on page 24, the shock data are naturally nested by country-event. For example, disaster databases report that Indian Ocean Tsunami is one single event. It is the concatenation with the seven countries that it affected that represents the distribution of impacts by country.

Our main specification uses random effects. For the random-effects specifications, we include vectors of firm, country, and event controls (see revision on page 25). We then incorporate firm (i.e., MNE), affiliate industry, country-event, and year fixed effects in a random-effects estimation. We do not include time-constant variables in the models that incorporate fixed effects.

Limiting to the 99th percentile reduces but does not eliminate variation in the characteristics of the events. See, for example, the distribution of estimated damages in the graph below.

The reference in the introduction regarding fixed-effects referred to the most stringent combination that we had estimated. However, we have edited the write-up to reflect the tables to avoid confusion. Thank you for pointing this out. We hope you find the revised description of our analysis and fixed effects much clearer.



5. *What is the real number of observations you have? You create observations even when the firm is not present in a market. That inflates artificially the number of observations in your sample that may overestimate your results' significance by increasing sample size. Besides statistical problems, I see conceptual issues with this approach. First, the reasons behind firms' decision to shy away from a market may also drive how much to donate. I don't see any value from confounding location and donation choices. Second, what are the odds of an MNE in countries where they don't operate according to your conceptual framework? Zero. It may be interesting to identify whether it happens in your sample at all, which may mean that MNEs are altruistic (or that the country is an essential part of its supply chain). I strongly recommend that your estimates are conditional on MNEs operating in a country, thus separating location choices from donation choices.*

We respectfully disagree. Limiting the sample to countries with an economic importance for an MNE different from zero would raise the risk of selection bias and, then, omitted-variable bias. It would produce the opposite effect that you suggest, we would overestimate the effect of the explanatory variable, and we may end up documenting a spurious relationship. Please see Heckman (1979) for a discussion on the bias it would cause.

Balancing the panel allows us to offer a conservative measure of the association of economic importance and donations. For instance, the regressions include contributions by companies in the aftermath of disruptions that affected countries in which they did not have operations. Arguably, these donations followed alternative motives and particularly social preferences, such as altruism, test the explanatory power of the independent variable. Accordingly, getting rid of these observations, an approach that has been often used in existing work in the organizational literature will inflate the coefficient of economic importance.

In response to your request, we ran the analyses on the sample of observations where the MNE has economic importance greater than zero (see table below). The results are consistent with our main set of results. As expected, the coefficient for economic importance is larger than for our main results.

Table V. Economic Importance of the Country for the Firm and Donations to Disruptions Conditional to a Focal Multinational Firm Having Operations in the Studied Country

Variables	USD Donation Amount (ln)		
	(1)	(2)	(3)
H1: Economic Importance	6.218*** (1.183)	8.126*** (1.167)	6.259*** (1.400)
H2: EI x Dominant MNE Index	0.528*** (0.121)	0.871*** (0.118)	1.099*** (0.148)
H3: EI x Host-Country Public Aid (ln)	-0.221*** (0.041)	-0.292*** (0.041)	-0.227*** (0.049)
H3: EI x Foreign Public Aid (ln)	0.014*** (0.005)	0.026*** (0.004)	0.018*** (0.006)
H4: EI x Regulatory Quality	0.656*** (0.039)	0.511*** (0.042)	0.489*** (0.049)
Dominant MNE Index	-0.132*** (0.025)	-0.079** (0.034)	-0.515* (0.309)
Host-Country Public Aid (ln)	0.027*** (0.004)	-0.046*** (0.017)	0.510 (0.523)
Foreign Public Aid (ln)	-0.003*** (0.001)	-0.009*** (0.001)	0.036* (0.021)
Regulatory Quality	-0.081*** (0.011)	-0.101*** (0.015)	-0.202 (0.267)
Firm Controls	NO	YES	YES
Country Controls	NO	YES	YES
Event Controls	NO	YES	YES
Firm, Industry, Country by Event, Year Fixed Effects	NO	NO	YES
Constant	-0.584*** (0.108)	-0.590*** (0.206)	0.000 (0.000)
Observations	104,987	104,987	104,987
MNEs	1,879	1,879	1,879

Notes: This table reports regression estimates for the relationship between the economic importance of a country for a firm and donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. Institutional disruptions are epidemics, natural disasters, and terrorist attacks whose impacts rank at the 99th percentile in the countries that they affected. The data are constrained to cases when the MNE has an economic importance greater than zero (0) in the affected country. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05.

Other issues related to what constitutes an independent observation need further attention. First, some countries will be of economic importance (when correctly defined as assets, sales, or employee size) to multiple MNEs. Are those independent observations? For example, China is of economic importance for most MNEs that I'm aware of. In an event happening in China, you will have many MNEs with high values of economic importance. The country doesn't change, the event doesn't change, and you may have some small donated amount variations. Are those really independent observations? Shouldn't you adjust your estimates (cluster them as I suggested in the previous set of comments?).

Second, some countries have multiple events in short periods. Concentration measurements wouldn't change much; economic importance is likely to be very stable (MNEs don't get in and out of countries that easily). Does a new event really bring further information, or is it a repeated observation?

Both issues could be taken care of with a thoughtful specification with clear sets of fixed effects and clustering of error terms. It may be there in the paper right now, but I have problems identifying it.

We very much agree with your comment on the correlated nature of giving by company, and your suggestions in the past round were reflected in the previously submitted version.

As per the discussion in the previous round, the panels are nested at the firm-country-event level. Given the structure of our data, countries do not repeat across time. We do not have a natural way to cluster firm by country. One can artificially nest countries in all panels, but this would not be structural zeros.

Additionally, standard errors are argued correlated across countries. The investments of an MNE operations in one country will affect its operations in other countries. In fact, this is at the essence of our argumentation. Economic integration centers on a within-MNE across country correlation. And thus, clustering MNE by country will most surely correlate the regressors of the theoretical model (economic integration and the interactions) with the errors.

In any case, clustering at the MNE level offers a more conservative estimate of the standard error than the lower level MNE-country. Clustering the error by MNE and applying our most stringent model with the firm, industry, country by event, year fixed effects, account for the potential confounder you mention. For additional certainty, we bootstrapped the errors with 50 repetitions and the original correlations in our theoretical model survive this specification.

Given your concern, one can also model a non-longitudinal regression of the form:

```
regress l_donation econ_import EI_concen EI_for_pubaid EI_loc_pubaid EI_regqual concentration
for_pubaid loc_pubaid regqual $Firm $Country $Event i.id i.case i.year i.sicprimary, vce(cluster
countryXfirm)
```

This strategy, of course, comes at the expense of not addressing heterogeneity with a panel model. The results are qualitatively similar.

On the other hand, we account for the fact that the frequency of large disruptions varies by country and year by controlling for the number of events at the country and at the global level in a given year.

The dynamic nature of disruptions vis-à-vis the comparative stability of company investment and the country market adds to the robustness of the measures. As we explain for the explanatory variable:

“First, MNEs with no ongoing operations that plan to expand to the country soon may have a comparatively high incentive to donate. Likewise, firms that plan to exit the country may have a reduced incentive to donate. Given that we calculate this variable on the year of the disruption, the donation of firms with these two strategies should reduce the statistical significance of our predictor. Second, this variable does not include sporadic commercial activity. Consequently, it is likely that the number of donors with some economic activity with the affected country is higher than what the analyses reflect.”

6. *Presentation of results: Best practice in presenting interaction effects introduces them one at a time (as you do in Table II in the appendix. I think that should be the format for your main table. Even more, I would introduce the interaction effects after the main effects are shown. In that way, a reader may be more capable of understanding any potential collinearity issue that arises from the interaction (please see Kalnins, "Type I Errors of Interaction Effects Due to Collinearity of Primary Terms" Academy of Management Perspectives 2019)*

We did not include the partial model table in the main body as we already have five tables included in the manuscript and we will need to meet the journal guideline page constraints. However, if you think it is pertinent, we are happy to add it. In the revised manuscript on page 26 we refer the readers to the partial model table in the Appendix.

Of importance, we do not have quadratic terms in our interactions, which is discussed to raise the risk of false positives by the article you reference. As per our understanding of the article's points, and more importantly, the different specifications that we run, including alternative measures for the covariates, help mitigate the risk of multicollinearity. The analyses provide coefficients of the same sign and significance for the highly correlated variables. Generally, our regressions were not indicative of multicollinearity in the main theoretical framework.

7. *Herfindahl index: I think all reviewers have issues with the hypothesis related to concentration and how it is operationalized. I encourage the authors to reconsider its use or, at least, be very careful in identifying the limitations of their analysis in this area. Your measurement is not standard, it is not clear what you are measuring by taking firms across industries, and your cutoff of 5 firms, regardless of the size of the market, is problematic.*

We reflected on your and the other reviewers' concerns regarding this variable and believe that a lot of the confusion stems from using the term "Market." We, therefore, renamed the construct "Dominant MNE Index", which we believe matches both our theory and empirical operationalization for the effects of the share of dominant MNEs in the host country that are capable of donating for recovery. In interviews, managers discussed large MNEs in the country as a central factor in assessing whether they should contribute (see page 15 of the manuscript). We are open to any suggestions that you might have for a better term for this theoretical concept.

Regarding the cutoff, using five of the largest firms is a norm for calculating Herfindahl indexes. Herfindahl indexes can be defined at various levels: scholars have defined it at four-digit industry codes, more broadly at two- or one-digit codes, and some at the country level.

Per your recommendation, we also identify the concerns for this construct in the limitations section.

8. *Why separate foreign and local public aid? The conceptual development of H3 doesn't address why we should consider those forms of public aid. It is a surprise to the readers that the authors actually pursue that bifurcation. What is behind that decision? It is also surprising that the results go in different directions. The authors do little to explain that conflicting evidence. With no ex-ante reasons to expect differences between both types of aid and not ex-post explanations of why the differences emerge, what is the purpose of having this hypothesis?*

You raise a good point. Our theoretical logic predicts that both host-country public aid and foreign public aid would reduce the perceived need of the MNE to fund recovery. However, the measures are based on different factors that firms reference for donating and therefore, we cannot empirically combine them into one public aid measure. According to the literature on aid and disaster management, the average foreign net official development assistance and official aid, and the country's average gross national expenditure explain the availability of foreign and local resources towards disruptions, respectively (Becerra et al. 2014, Cavallo et al. 2013). Therefore, we operationalize them separately.

To address your comment, we created two sub-hypotheses (H3a and H3b) that predict that host-country public aid and foreign public aid, respectively, negatively moderate the relationship between the economic importance of a country to the MNE and its donations in response to an institutional disruption.

In the results section, we explain that the result could be driven by MNEs perceiving the amount of foreign aid as a signal of the degree of the lack of resilience of the country economy. The greater the amount of resources that the economy receives from abroad, the lower the resilience and the greater the perceived need for firm resources. To further delve into this association, we run the analysis by country income group (The World Bank 2021) and present the results in Table VIII in the online Appendix. We then provide an extended discussion in the Appendix on the results for public aid based on income group.

Specifically, in lower-income countries, we do not find evidence of a crowding-out effect of public aid in the donation of economically connected MNEs. This aligns with evidence that the financial gap for relief and recovery from large shocks for lower-income countries is substantial (Becerra et al. 2014, 2015, High-Level Panel on Humanitarian Financing 2016). Combined with the comparatively large coefficient of economic importance, the results indicate that economically connected MNEs in lower-income countries have high incentives to help the country market recover regardless of the contribution from public sources (because the public resources are rarely sufficient).

We observe that economically connected MNEs reduce their contribution when they perceive substantial foreign aid for lower-middle-income countries. This result is consistent with studies that indicate that the financial gap for these countries is the lowest (Becerra et al. 2014, High-Level Panel on Humanitarian Financing 2016). In other words, economically connected MNEs estimate that foreign aid will be an essential funding resource. On the other hand, the impact of host-country public aid is positively associated with the donation for economically connected MNEs. This effect may be driven by the perceived need when the host country must give.

For upper-middle-income and high-income countries, the results are consistent with our baseline analysis. Funding from the host country has a substantial crowding-out effect on giving by economically connected MNEs. On the other hand, the outpouring of foreign public aid is positively associated with the donation of economically connected MNEs. This is aligned with MNEs perceiving a greater degree of disruption when there is more foreign public aid. Appeals for emergency aid, administrated at the global level by multilateral agencies, are rarely issued for upper-middle and high-income countries. The exceptions are for fat-tailed disruptions, which are captured by our statistics. This means that appeals for foreign aid are informative of the expected magnitude of the impacts. They signal to managers the need for resources for relief and recovery.

We do not incorporate the discussion in the main body of the text due to space constraints. We are more than happy to include it if you deem appropriate.

Table VI. Economic Importance of the Country to the Firm and Donations to Disruptions by Country-Income Level

Variables	Low- Income	Lower- Middle- Income	Upper- Middle- Income	High- Income
H1: Economic Importance	187.829*** (51.743)	65.226*** (15.072)	8.213*** (1.933)	7.821*** (1.428)
H2: EI x Dominant MNE Index	12,598.580** (6,098.939)	305.478*** (72.737)	0.710*** (0.059)	0.711*** (0.110)
H3: EI x Host-Country Public Aid (ln)	0.010 (0.012)	2.930*** (0.537)	-0.289*** (0.069)	-0.276*** (0.050)
H3: EI x Foreign Public Aid (ln)	-0.206	-0.410***	0.011***	0.018***

	(4.738)	(0.142)	(0.003)	(0.004)
H4: EI x Regulatory Quality	1.269***	0.035***	0.114***	0.480***
	(0.042)	(0.008)	(0.004)	(0.029)
Dominant MNE Index	73.875	-0.130	0.765	-0.045***
	(55.621)	(0.509)	(1.003)	(0.014)
Host-Country Public Aid (ln)	-2.931	-0.017***	-0.010***	-0.044
	(4.417)	(0.003)	(0.002)	(0.028)
Foreign Public Aid (ln)	-6.848	-0.012***	-0.000	-0.003***
	(5.368)	(0.004)	(0.001)	(0.001)
Regulatory Quality	0.015***	-0.030***	-0.012**	-0.042***
	(0.004)	(0.005)	(0.005)	(0.007)
Firm Controls	YES	YES	YES	YES
Country Controls	YES	YES	YES	YES
Event Controls	YES	YES	YES	YES
Constant	4.583	0.020	-0.700***	-0.463***
	(4.019)	(0.075)	(0.071)	(0.146)
Observations	73,749	107,787	147,498	172,081
MNEs	1,891	1,891	1,891	1,891

Notes: This table reports regression estimates for the relation between the economic importance of a country for a firm on donations in the aftermath of institutional disruptions. The database includes the largest 2,000 multinational enterprises (MNEs) at the international level. For the current 2021 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,035 or less in 2019; lower middle-income economies are those with a GNI per capita between \$1,036 and \$4,045; upper middle-income economies are those with a GNI per capita between \$4,046 and \$12,535; high-income economies are those with a GNI per capita of \$12,536 or more. Source: The World Bank (2020).

<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>. The period is 2007-2019. Standard errors are clustered by MNE and reported in parentheses, indicating *** p<0.01, ** p<0.05, *p<0.10.

Thank you for taking the time to provide thoughtful comments on our revision. Your guidance on addressing the counter-intuitiveness of the baseline hypotheses and on clarifying our empirical approach were instrumental for developing the manuscript.

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