

# Location matters: Valuing firm-specific nonmarket risk in the global mining industry

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## Abstract

**Research summary:** Using collective action and social movement theory, we investigate the potential incentives and ability of stakeholders to engage in collective action that can increase firm-specific nonmarket risk of mining companies. We argue that proximity to the nearest environmentally sensitive water source increases the probability that local stakeholders will take collective actions that impose material costs on the focal mine. We hypothesize that stock markets recognize this nonmarket risk and apply a discount on announcements related to mines located near such areas, and that these risks are moderated by the type of mineral, the nature of the water source, and the strength of host country institutions. Using a unique data set and an event study method, we find support for most of our arguments.

**Managerial summary:** We argue that mines located near environmentally sensitive water sources are subject to nonmarket risks arising from the potential collective actions of local stakeholders and their allies. Stakeholder mobilization can impose material costs on a mine in the form of delays, regulatory hurdles, and

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closure. We find that stock markets recognize these nonmarket risks and apply a discount on announcements by mining companies whose mines are located near environmentally sensitive water sources, particularly rivers. However, we also find that investor reaction is stronger in countries with strong institutions that support collective action. Thus, nonmarket risk management is important even in countries that are typically characterized by low political and institutional risks. We discuss the degree to which these results can be generalized beyond mining.

#### KEY WORDS

collective action, institutions, mining, nonmarket risk, social movements

## 1 | INTRODUCTION

Firm-specific nonmarket risks arise from a variety of social, political, and environmental events that can impose material costs on a firm (Doh, Lawton, & Rajwani, 2012; Lawton, McGuire, & Rajwani, 2013). Research on nonmarket risks has for the most part focused on political and institutional risks (Henisz & Zelner, 2012; Holburn & Zelner, 2010; Lawton et al., 2013; Werner, 2017), but there is increasing evidence that stakeholder mobilization through social movements can materially affect a focal firm (de Bakker, den Hond, King, & Weber, 2013; Dorobantu, Henisz, & Nartey, 2017; Henisz, Dorobantu, & Nartey, 2014; King & Soule, 2007), making the management of such stakeholders a critical feature of corporate strategy.

In this study, we use the theory of collective action (Olson, 1965; Ostrom, 2000) together with the theory of social movements (Davis, Morrill, Rao, & Soule, 2008; Kriesi, 2004; McAdam, McCarthy, & Zald, 1996) as applied to stakeholders (King, 2008) to argue that the potential for localized negative externalities created when a firm located near environmentally sensitive water sources provides both the incentive and ability for local stakeholders to engage in collective action to prevent such externalities. We apply this logic to the global mining industry and argue that collective action, based on fear of scarcity and contamination of water, is more likely the closer a mine is to an environmentally sensitive water source, and that the threat from collective action constitutes a potential firm-specific nonmarket risk. Previous studies examine the impact of stakeholder groups that have already formed in response to a firm's actions (Dorobantu, Henisz, et al., 2017; Godfrey, Merrill, & Hansen, 2009; McDonnell, King, & Soule, 2015; Vasi & King, 2012), we examine the *ex ante* conditions under which they are likely to form and take action to prevent the potential negative effects of a firm's actions.

We use collective action theory to analyze the *incentives* for groups to act. The theory of collective action (Olson, 1965) suggests that within a group, the possibility of collective action is limited by the free rider problem. We argue that the localized negative externality of mining activities (Shapiro, Hobdari, & Oh, 2018) concentrates costs and thereby increases the incentive to undertake collective action. In addition, because the externality often affects traditional local

communities, the incentive to collective action is further increased because shared values and interests solidify trust and reciprocity, which in turn limits free riding (Ostrom, 2000; Rowley & Moldoveanu, 2003).

We elaborate on this argument using social movement theory to evaluate the *ability* of groups to undertake collective action. Social movement theory typically focuses on specific forms of collective action, often but not exclusively associated with groups undertaking actions outside of institutional or organizational channels (Snow, Soule, & Kriesi, 2004). However, it has also been applied more generally to collective action by stakeholders of various kinds organizing both within and outside of existing institutional structures (King, 2008; McAdam et al., 2010), with firms often being the targets. Social movement theory points to three critical mechanisms that facilitate collective action (Giordono, Boudet, Karmazina, Taylor, & Steel, 2018; King, 2008; McAdam et al., 1996). These are the ability to mobilize resources (mobilizing structures); the strength and accessibility of government (political opportunities); and the ability to frame issues so as to mobilize not only the local community but also more distant communities and supportive stakeholders (framing structures).

Drawing on the experience of the global mining industry, we develop and test four hypotheses focusing on mine location, both within and across countries. First, we argue that mines located near environmentally sensitive water sources are subject to cost-increasing collective actions by local stakeholders. We argue, in particular, that the potential for mines to inflict damage on local water supplies and to compete for scarce water resources creates a stronger incentive to engage in collective action, and in addition enhances the ability to mobilize complementary institutions including government and the courts, and to frame issues to attract media and NGO attention. We therefore hypothesize that mine location within a country, measured in terms of proximity to the nearest significant water source, adjusted for the degree of risk to water quantity and quality, increases firm-specific nonmarket risk so that stock markets respond negatively to announcements related to mines located near such areas.

We consider three different factors moderating the effect of mine location. We first argue that the effect of mine location is moderated by the nature of the ore being mined. Specifically, we hypothesize that gold mines carry more *ex ante* risk than other mines because the technology associated with gold mining requires extensive use of water and increases risks of water contamination. We then argue that the type of the nearest water source also matters, and we thus distinguish mines located near rivers from those located near lakes. We argue that mines located near rivers are subject to greater risk because rivers extend the number of affected communities, thus increasing the probability of diffused collective action.

Finally, we consider differences across countries and institutional contexts. We develop a specific measure of institutional context based on the capacity of a country's institutions to support collective action and social movements, and we argue that collective action that imposes costs on companies is more likely in countries where such institutions are *strong*. Drawing on both social movement theory and institutional theory, we suggest that when government access freedom of the press and the judicial system are strong, collective action is better tolerated, and stakeholders are better able to access relevant resources, including government resources. Thus, we hypothesize that stock markets' negative response associated with within-country mine proximity *increases* in host countries with strong institutions that support collective action.

To test our hypotheses, we construct a unique data set that includes exact measures of mine location in each country, and these are matched to the proximity of the nearest significant water source, as defined by the World Wide Fund for Nature (WWF) (Lehner & Döll, 2004) and the World Resources Institute (WRI) (Gassert, Luck, Landis, Reig, & Shiao, 2014). We employ

an event study methodology to measure potential firm-specific nonmarket risks. On balance, our results strongly indicate that stock markets impose a discount on announcements made by companies whose mines are located nearer to environmentally sensitive water sources, notably rivers, and the effect is stronger when the relevant institutional context of the country is stronger.

This study contributes in a number of ways to the analysis of nonmarket and institutional risk in both the international business strategy and nonmarket strategy literature studies. First, we contribute to the literature on nonmarket risk arising from stakeholder actions by using collective action and social movement theory to provide a theoretically grounded framework for evaluating the *potential* incentives and abilities for stakeholders to act. In particular, we organize our analysis around the possibility of localized negative externalities presented by mines located near at-risk water sources. Second, we add to the relatively small number of management and business studies that specifically examine nonmarket risk related to stakeholder actions in the context of social and environmental issues where firm-imposed negative externalities can be important (Dorobantu, Henisz, et al., 2017; Dorobantu & Odziemkowska, 2017; Henisz et al., 2014), while also responding to the call to introduce cross national institutional differences into the literature (Davis et al., 2008; Hawn, Chatterji, & Mitchell, 2018; Mellahi, Frynas, Sun, & Siegel, 2016).

Finally, our approach extends and integrates the international business strategy and non-market strategy literature studies with respect to institutional risks. The two literature studies both take a transaction cost approach to institutional risk, suggesting that transaction costs are higher in weaker institutional environments, leading to greater nonmarket institutional risk (Beugelsdijk, Ambos, & Nell, 2018; Dorobantu, Kaul, & Zelner, 2017; Mudambi et al., 2018). We focus on nonmarket risks that arise from the potential of firms to impose negative externalities on communities. This leads us to conclude that nonmarket risks are *higher* in countries with strong institutions supporting collective action, suggesting a more nuanced approach to nonmarket risk across countries.

## 2 | LITERATURE AND HYPOTHESES

### 2.1 | Literature review

We use the theories of collective action and social movements to argue that potential localized negative externalities can create conditions under which local stakeholders engage in potential collective actions that would impose significant costs on a focal firm. Collective action is typically defined by actions taken by a group with shared interests, whose actions are meant to further those interests (e.g., King, 2008; Olson, 1965). Social movements are closely related in that they are organized groups of outsiders that act to consciously promote a shared interest through collective action that includes both institutional and extra-institutional actions (Dorobantu & Odziemkowska, 2017). Social movement theory therefore examines “the conditions under which collective action by outsiders to dominant societal institutions emerges and facilitates access to those institutions, allowing outsiders to potentially affect social and political change” (King, 2008, p.23). In the present context, outsiders are understood to be external stakeholders, who are in some way affected by the actions of a focal firm, and seek, through collective action to influence or change those actions (Davis et al., 2008; den Hond & de Bakker, 2007; Rowley & Moldoveanu, 2003).

Olson (1965) provides the classic analysis of collective action and suggests that collective action within a group is difficult because of the free rider problem. That is, if collective action involves the provision of a public good to members, there is an incentive for rational individuals not to join the group, because they can enjoy the benefits without incurring the costs of membership. Under these conditions, the incentive to join a group is low and collective action becomes difficult (McAdam & Boudet, 2012). We do, however, observe that groups not only form, but their actions can have significant impacts on target organizations (Bartley & Child, 2014; Dorobantu, Kaul, et al., 2017; King & Soule, 2007). There are several explanations as to how, despite the obstacles, collective action occurs.

Olson (1965) himself recognized the boundary conditions surrounding his argument, and therefore suggested that the incentive to form a group is higher when the group is relatively small, because the costs of organizing and coordinating the group are lower. Thus, smaller, localized groups are more likely to organize and be effective. Although Olson tended to emphasize individual self-interest, Ostrom (2000) pointed to the social dimensions of groups, arguing that collective action also requires social cooperation, which is more likely when people are involved in long-term relationships and embedded in networks with strong social norms. Although the approach is different, it is reasonable to conclude that this analysis also suggests that the incentive for collective action is higher in smaller groups embedded in local communities where rules, norms, trust, and reciprocity enhance the benefits of collective action (Agrawal, 2014; Ostrom, 2000).

The social movement literature (Hargrave & Van de Ven, 2006; King, 2008; McAdam et al., 1996) builds on these arguments and suggests three factors that increase the likelihood of collective action: mobilizing structures; political opportunities; and framing structures. Mobilizing structures include the factors that support or limit social movements (McCarthy & Zald, 1977), including the ability to access external support and the degree to which authorities limit group formation. Political opportunities include the political and institutional structures (Gamson & Meyer, 1996; Kriesi, 2004) that provide access to open governments with the capacity to undertake relevant supportive actions. Framing structures promote shared definitions and identification with the issue, so as to mobilize both the local community and more distant communities (Bach & Blake, 2016; Benford & Snow, 2000). Thus, the literature suggests that when local communities are threatened in some way by the actions of a company, the probability of collective action increases due to the strength of local networks and access to complementary stakeholders such as governments, the courts, the media, and NGOs (Giordono et al., 2018; King, 2008).

Although there is a considerable literature on collective action and social movements, there are few studies that explicitly link collective action to nonmarket risk across institutional contexts (Davis et al., 2008; Mellahi et al., 2016). To our knowledge, it is still the case that cross-national studies looking at market responses to nonmarket risk, and in particular nonmarket risk related to stakeholder actions, are rare (Hawn et al., 2018). Recently, Dorobantu and Odziemkowska (2017) examine the effects of institutional differences among Canadian communities, and point to the need to extend the analysis across borders. Within the social movement literature, there are few cross-country studies that examine the impact of collective action on firms (Kirchherr, Charles, & Walton, 2016; McAdam et al., 2010).

## 2.2 | Context: Global mining industry

In this study, we apply these ideas to the global mining industry. We focus on mining because there is considerable evidence that the extractive industries have relatively unique

characteristics (Shapiro et al., 2018), including the perception that mining companies pose greater environmental risks than other companies (King & Soule, 2007). Mining projects are often located in remote and environmentally sensitive areas around the world, dictated by mineral availability, and their environmental impacts can have significant localized effects on communities (Aragón & Rud, 2016; Aragón-Correa, Marcus, & Hurtado-Torres, 2016; Berman, Couttenier, Rohner, & Thoenig, 2017; Dorobantu & Odziemkowska, 2017). Thus, the environmental and social impacts of mining are large and increasing, resulting in conflicts with local communities and other stakeholders that in turn impose costs on the companies (Andrews et al., 2017; Davis & Franks, 2014; Stevens, Kooroshy, Lahn, & Lee, 2013). Environmental and social risks act in combination with create potentially costly firm-specific nonmarket risks for mining companies, as communities mobilize to oppose their activities (Andrews et al., 2017; Franks et al., 2014; Mutti, Yakovleva, Vazquez-Brust, & Di Marco, 2012).

In addition, mining projects are large and have long gestation periods as they progress along a value chain from geoscience research to exploration, mine planning and construction, mine development and operation, and closure (Davis & Franks, 2014). These long gestation periods can take decades, are typically complex, and are associated with potential environmental and social risks at each stage (Davis & Franks, 2014). At any (or each) stage, opportunities arise for local stakeholders to take collective action, and companies are likely to interact with multiple stakeholders to deal with complex social and environmental issues at each stage of the value chain. The outcomes of these interactions can be both difficult to forecast and costly to the firm (Berman et al., 2017; Kemp & Owen, 2013).

Although mining can affect communities and the environment in various ways, we choose to focus on water for several related reasons. First, mining activities are known to have particularly significant effects on local water supplies (Bebbington & Williams, 2008; Ossa-Moreno et al., 2018). Mines not only use large amounts of water, potentially competing with local users, but they can also damage the water supply through discharges involving tailings, mercury, and cyanide (Mudd, Northey, & Werner, 2017). Thus, NGOs such as the WWF identify water pollution as one of the most serious ecological threats, with mining specifically identified as a cause of water pollution.<sup>1</sup> Second, access to water (and sanitation) is recognized by the United Nations (UN) as a human right (Kemp, Bond, Franks, & Cote, 2010), because lack of access to safe, sufficient, and affordable water and sanitation constitutes a threat to human health and dignity.<sup>2</sup> The World Bank notes water scarcity as a problem affecting 40% of the world's population<sup>3</sup> and protection of water resources is covered under a number of UN Sustainable Development Goals (SDGs)(Wendling, Emerson, Esty, Levy, & de Sherbinin, 2018). For these reasons, we establish our hypotheses focusing on water.

## 2.3 | Mining location

Our argument is that proximity to an environmentally sensitive water source increases the potential for a mine to impose environmental damage on, or compete for, resources valued by local communities, and this in turn provides an incentive and ability to engage in collective action that may impose significant costs on the focal mine. We therefore argue that mine

<sup>1</sup>[http://wwf.panda.org/knowledge\\_hub/teacher\\_resources/webfieldtrips/water\\_pollution/](http://wwf.panda.org/knowledge_hub/teacher_resources/webfieldtrips/water_pollution/).

<sup>2</sup><http://www.unwater.org/water-facts/human-rights/>.

<sup>3</sup><http://www.worldbank.org/en/topic/waterresourcesmanagement>.

proximity to an environmentally sensitive water source is a proxy measure for the potential nonmarket risks associated with stakeholder collective action and is identified as such by stock markets.

The environmental science literature emphasizes that the proximity of mining sites to environmentally sensitive areas is important because of the direct impact of mining operations on surrounding environments (e.g., Erftemeijer & Lewis, 2006; Schmitt et al., 2007). Water ecosystems have been identified as being particularly vulnerable (Ossa-Moreno et al., 2018; World Resources Institute, 2010). Thus, mines located close to environmentally sensitive water sources are more likely to have the potential to damage local water supplies, or to compete for scarce water resources, with consequent effects on local communities, including farmers and fishermen. Moreover, because mining communities or communities near mines tend to be relatively small and in remote areas of many countries (Veiga, Scoble, & McAllister, 2001), and because water is so critical to human health and economic welfare (Bebbington & Williams, 2008), the effects of the potential negative externality are strong and concentrated on a relatively small number of people. Furthermore, recent studies suggest that as technology has improved, mining has moved into even more remote areas with small communities (Conde & Le Billon, 2017). Therefore, the concentrated localized costs and the size of the affected groups provide strong incentives for collective action, limiting the free-rider problem.

In addition, we argue that these same local communities also meet the criteria for the ability to engage in collective action, as set out in the social movement literature. There is general evidence that within a local community impacted by mining, members are socially cohesive, with high levels of involvement and interaction (Wright & Bice, 2017). Thus, local communities surrounding mining sites are likely to have robust community networks, particularly when facing some external threat. In addition, the degree of social cohesion may increase when the affected communities are indigenous groups with distinctive cultures (Hanna, Langdon, & Vanclay, 2016), which is becoming increasingly true as mining activities become more remote (Conde & Le Billon, 2017).

Thus, because their numbers are relatively small, and because they are often traditional or indigenous communities with strong norms (O'Faircheallaigh, 2013), it is easier to access and motivate neighbors to act and the ability to engage in collective action is also increased. Moreover, because of the internationally recognized importance of water as a natural resource and its links to human rights and sustainable development, water disputes can be framed in a way that permit local communities to both access the political system and develop a strong network of relevant stakeholders, including the media and NGOs (Rowley, 1997). In so doing, they can impose significant reputation costs on a focal mining company (King & Soule, 2007).

In the mining industry, the direct costs arising from collective action arise primarily through the ability of stakeholders to impose project delays, shutdowns, and closures (Franks et al., 2014). The delays and shutdowns may be caused by protests that block access to the mine or through more institutional means including political and legal injunctions. When there are conflicts over these resources, both communities and NGOs may put pressure on governments to strengthen regulations (such as more stringent environment impact assessments) and more closely monitor mining operations in ways that delay temporarily, or permanently suspend, operations (Stevens et al., 2013). In addition, communities may engage in legal action to stop or delay the project, to seek redress for access to land, or to find early evidence of polluting activity (Stevens et al., 2013, p. 26). These actions may occur even before the mine is in operation but can continue into the operation phase. Thus, the nature of the mining life cycle affords

stakeholder multiple political opportunities to engage in collective action, with the possibility of imposing costly delays at each stage.

Franks et al. (2014, p. 6) and Stevens et al. (2013, p. 27) provide numerous examples of mining projects that were delayed or abandoned because of various conflicts arising from the project. In addition to delays and shutdowns, collective action may inflict reputational damage on the focal firm. In general, firms that pose potential threats to the environment, and in particular areas known to be environmentally sensitive, are subject to reputation risk (Hart, 1995). We argue that this is particularly true in the case of mines that pose potential risks to water sources. Disputes over water can be framed so as to both engage a wide variety of supportive stakeholders and impose reputational damage on mining companies that are seen to threaten water supplies.

Thus, as noted by Paredes (2016), although mining operations have been extended into more remote communities, the capacity of these communities to engage with networks around the world has increased, in part because of social media (Hodges & Stocking, 2016). We suggest that this ability is more likely when the issue can be framed around human rights, resource scarcity, and threats to human health, as is the case with water. Thus, following social movement theory, we argue that mines located near environmentally sensitive water sources are not only more likely to become involved in disputes with local communities, but that these communities have multiple political opportunities to engage, and are able to mobilize strong support among national and global NGOs, who in turn provide access to global media coverage that may impact the reputation of the firm.

We therefore conclude that mines located in closer proximity to environmentally sensitive water sources are subject to potential nonmarket risks arising from conflict with local stakeholders that can create project delays and temporary or permanent mine closures, and the conflict also poses a threat to the value of the firm's intangible assets (reputation). We emphasize that these potential costs associated with stakeholder action can be incurred at every stage of the mining life cycle (Franks et al., 2014; Stevens et al., 2013), so that each stage, including the pre-production stage, constitutes a potential mobilization point for stakeholders.

We illustrate these points using the case of Barrick Gold.<sup>4</sup> Barrick Gold (TSX, NYSE: ABX), headquartered in Canada, is one of the largest gold mining companies in the world with mining operations in North and South America, Africa, and Papua New Guinea. Barrick developed the huge Pascua Lama mining project high in the Andes, at an altitude of some 5,000 m. The project is set in a remote and environmentally sensitive mountain highland among ancient glaciers with the potential to impact waterways and mountain wetlands. The area holds gold and silver reserves that are among the largest in the world. Exploration for the project began in 1994, after Barrick acquired the assets of Lac Minerals Corporation. In 2006, the plan was approved by Chile's regulatory commission with more than 400 conditions, many of which reflected the concerns of local stakeholders *including protection of the glaciers and other water sources*. Construction began in 2009 but was halted in 2013. The project remains on hold as of 2019.

The case illustrates the importance of collective action by local communities, and the various ways in which collective action can occur. Opposition to the project was immediate and centered around water and the nearby glaciers. Water was critical to farmers in the Huasco Valley, downstream from Pascua Lama in the Atacama Desert, including in particular the Diaguita, an indigenous group legally recognized by the Chilean government in 2006. Local communities,

<sup>4</sup>The material related to Barrick is taken in large part from Smith and McCormick (2014) with updates from MINING.com (<http://www.mining.com/>) and various news sources such as Reuters.

notably the Diaguita, faced with potential threats to their water sources, began to organize to halt the project. Their actions included protests, judicial challenges, and regulatory interventions, including one at the InterAmerican Commission on Human Rights. In addition to adding conditions to the original 2006 permit, pressure and legal action resulted in Barrick being fined US\$16 million in 2013 for noncompliance with requirements to protect the glaciers and water sources. At the same time, the Diaguita launched another court case, arguing that the company had failed to protect its environmental and human rights, which resulted in a court-ordered suspension of construction activity. Later in that year, Barrick, under heavy financial pressure, suspended the project. Although Barrick has indicated that it would consider restarting the project, it continues to meet resistance, including in the Chilean courts and by international NGOs. In addition, after the suspension, Barrick was subject to an US class action lawsuit accusing the company of misrepresenting the status of Pascua Lama in disclosures to investors, and agreed to pay US\$140 million in settlement. The resulting reputational damage may make it difficult for Barrick to obtain future funding for the project. As these events unfolded and escalated, project costs rose from an original US\$3 billion, to over US\$8.5 billion. Ultimately Barrick wrote down the value of the project by roughly US\$6 billion. Its share price in 2012 was C\$55 and fell to C\$8.43 in 2015. As of December 2019, it was trading in the C\$20 range.

Thus, this case demonstrates the incentive to collective action created by a localized negative externality related to water and experienced by an indigenous community with strong community values. The community was able to mobilize itself and other communities to protest the presence of the mine using a variety of mechanisms, including legal and regulatory interventions, as well as by appeals to other external stakeholders including NGOs.

In summary, and as the Barrick case illustrates, we argue that the proximity of a mine to an environmentally sensitive water source increases the potential nonmarket risks of mining companies. The critical importance of water as a shared resource, and its relation to human health and livelihood, creates a strong incentive for local stakeholders to take collective action against a focal mine. The risks therefore arise from the potential costs associated with delays, suspensions, or cancellations of projects or operating mines, and from potential reputational risks, all the result of stakeholder collective action. These potential costs, although different, can occur at any stage of the mine life cycle, and thus announcements indicating that a mine is about to enter a new phase provides new information to markets. This leads to:

**Hypothesis 1** *The more proximate is a mine to an environmentally sensitive water source, the more stock markets will discount any announcement bringing a mine closer to full operation or any announcement that will expand current output.*

## 2.4 | Type of mineral

In general, the environmental impacts of mining operations differ significantly by ore type and grade, mineral composition, mining methods (e.g., open pit vs. underground), and technology (Durucan, Korre, & Munoz-Melendez, 2006). In the same vein, the impact on water, the most important resource in mining operations (Ossa-Moreno et al., 2018), also differs based on these factors, which are largely determined by the type of mineral being mined. Thus, the probability of social disputes and conflicts involving mining companies and communities may vary according to the nature of the mineral being mined (Durucan et al., 2006).

Gold mining has been identified as having the greatest impact on water resources (Kumah, 2006) based on both the quantity of water consumed during production and the use of cyanide to remove impurities during processing. Several studies provide evidence that gold mining consumes more water than other minerals (Mudd, 2008; Northey, Haque, Lovel, & Cooksey, 2014). This is mainly due to mineral grade; generally, the lower the grade, the more water consumed during extraction and gold ore shows the greatest long-term decline in grade among minerals studied (Mudd, 2008; Northey et al., 2014). In addition to low ore grade, Mudd (2008) found that gold mining has the lowest water efficiency, meaning that gold mines consume more water per tonne of ore than do other minerals. High levels of water consumption by gold mines can therefore be a particular threat to water security in local communities by increasing competition for scarce water resources. It was in fact water scarcity concerns surrounding a gold mine that led El Salvador to ban all mining activity in that country (Palumbo & Malkin, 2017).

In addition to competing for scarce water resources, gold mining can pollute local water resources, because it uses chemicals such as cyanide to process gold ore, which carries with it the risk of toxic pollution for the soil and groundwater (Hilson & Monhemius, 2006). Potential social and environmental damage results from the possibility of leaching into water sources during the process and/or leaking and spillage from tailings storage areas. For example, in 2000, a cyanide spill at the Baia gold mine in Romania resulted from the collapse of a tailings dam (Cunningham, 2005). Cyanide spilled into local rivers and flowed into the Danube, the second largest river in Europe, and subsequently into the Black Sea. As a consequence, approximately 1,200 t of fish were killed throughout Romania and six other countries and Hungary suffered massive water contamination (Cunningham, 2005).

Thus, we conclude that gold mining may present a special threat to water resources, and the likelihood of collective action therefore increases when the focal mine is a gold mine. Accordingly, we propose:

**Hypothesis 2** *The negative announcement effects of a mining property's proximity to an environmentally sensitive water source will increase (i.e., be more negative) when the focal mine is a gold mine.*

## 2.5 | Water source

The nearest significant water source to a mine could be a river or a lake. We argue that the negative impacts of mining operations on rivers and lakes are not the same, nor are the potential responses of affected communities. These differences arise from a fundamental distinction between rivers and lakes: mobility. As rivers flow, pollutants from mining operations spread across heterogeneous communities, with resultant implications for the possibility and effects of collective action (Bebbington & Williams, 2008). In particular, any collective action begun by the community most affected by the focal mine may diffuse across other communities as water flows downstream. Diffused collective action can enhance both the mobilization of resources and the effectiveness of framing structures related to the focal mine.

The diffusion of a collective action across heterogeneous communities is more likely when they share grievances (McCarthy & Zald, 1977; Rowley & Moldoveanu, 2003). Thus, when the expected values and payoffs of a potential collective action overlap among communities, the communities have an interest-based motive to jointly mobilize (Rowley & Moldoveanu, 2003).

In this case, the spread of the negative externality from the focal mine can create a shared grievance among communities along the river that diffuses the possibility of collective action to more distant downstream communities. In addition, the negative externality creates interdependence among communities facilitating diffusion through a bandwagon effect (Hargrave & Van de Ven, 2006), which may begin with mimic behavior by more proximate communities (Soule, 1997). The participation of more communities then applies pressure on others to participate in a broader movement, limiting free riding across communities (Soule, 1997; Tarrow, 1998).

As collective action diffuses, generating a cumulated bandwagon effect (della Porta & Diani, 1999; Gavious & Mizrahi, 2001), a critical mass can be created, increasing the potential for success (Gavious & Mizrahi, 2001; Hargrave & Van de Ven, 2006; Oliver & Marwell, 1988). In addition to increasing political opportunities, the larger the group size, the more the attention from the media (Myers, 2000). Once sufficient media attention is captured, public attention also surges (Markus, 1987). Enhanced media access and public attention increase the ability for social movements to frame the issues and attract broader stakeholder support (Gamson & Meyer, 1996).

We therefore conclude that the potential for collective action increase when such action can diffuse to other communities and stakeholders, and this is more likely when the affected water source is a river. Thus, the potential costs to a focal mine will be greater if the nearest significant environmentally sensitive water source is a river:

**Hypothesis 3** *The negative announcement effects of a mining property's proximity to an environmentally sensitive water source will increase (i.e., be more negative) when the water source is a river.*

## 2.6 | Host country institutions

The mining industry is global, and mines are located in a large number of countries with considerable institutional variation (Shapiro et al., 2018). There seems to be agreement in both the international business strategy and social movement literature studies that it is important to match the measures of institutional difference employed to the underlying theoretical structure and specific context being examined (Beugelsdijk et al., 2018; Gamson & Meyer, 1996). For the purposes of this study, we examine institutional differences across countries that might strengthen or weaken the incentives and ability to engage in collective action, within the context of the global mining industry. The very existence of the mine, and in our case its proximity to significant water resources, represents a potential threat to the community, providing an incentive to organize. However, the ability to organize may be quite different across institutional contexts (McAdam et al., 2010).

We argue that the ability of local stakeholders to engage in effective collective action is stronger in countries with institutions that support movement mobilization (mobilizing structures), access to political channels (political opportunity), and freedom of information including a free press (framing structures). These correspond to the critical success factors identified in the social movements literature discussed earlier (King, 2008; McAdam et al., 1996; McAdam et al., 2010). Thus, although there are a large number of dimensions that can define institutional differences across countries, we focus on those that are most likely to support collective action by relevant stakeholders in the context of the mining industry.

It is generally understood that mining activity relies on both a legal license to operate (LLO) and a social license to operate (SLO) (Owen & Kemp, 2013; Prno & Slocombe, 2012), and both

provide opportunities for collective action because both provide various legal, political, and social avenues for external stakeholders to impose costs on focal firms (Franks et al., 2014). We argue that these opportunities are greater in countries with institutions that better support collective actions.

The LLO can impose a large number of regulatory requirements on a mine, often revisited or revised at various stages of the mining cycle, and this provides stakeholders with a number of opportunities to take actions that impose delay or closure costs on mines (Stevens et al., 2013). In essence, they provide greater political access to local stakeholders because they have more points of potential contact with the regulatory authorities (Kriesi, 2004; McAdam et al., 2010). For example, the existence and strict enforcement of Environmental Impact Assessments creates the potential for local stakeholders to participate in, and influence the outcome of, regulatory hearings. In addition, the very existence of these regulations provides a strong signal to stakeholders that corporations are vulnerable to collective action (King, 2008). Thus, in countries with stronger legal systems and better channels for political access, the probability of institutional collective action increases, and with it the degree of nonmarket risk.

However, mines also require an SLO, and this too creates the conditions for collective action, both institutional and noninstitutional. The term SLO generally refers to the need for mining companies to ensure community acceptance of their presence. We suggest that obtaining an SLO is costlier in countries with institutions that provide affected local stakeholders with stronger mechanisms to oppose mining companies, including access to the media and the courts, thus strengthening their bargaining position (Dorobantu & Odziemkowska, 2017; McAdam et al., 2010). In addition, countries with accessible political systems typically promote inclusion of civil society in decision-making processes, again providing stakeholders with more voice, including the right to protest, guaranteed by laws protecting freedom of speech, assembly, and association. Such protests may become translated into project delays and legal costs, thus increasing nonmarket risks (Dorobantu & Odziemkowska, 2017; Franks et al., 2014), or into the costly provision of local public goods and community infrastructure (Dorobantu, Kaul, et al., 2017; Marquis & Raynard, 2015; Shapiro et al., 2018). Thus, we argue that an SLO is costlier to obtain in countries with strong legal institutions and accessible political institutions, which better allow affected stakeholders to impose costly delays and infrastructure costs on firms.

We have earlier noted that collective action may inflict reputational damage on the focal firm (Henisz et al., 2014). Mining companies affecting water resources can be particularly vulnerable when their actions are heavily scrutinized by the media and NGOs. The ability to frame disputes around environmental issues in general, and water in particular, will depend on access to media, both national and international (Paredes, 2016). Both Gamson and Meyer (1996) and Kriesi (2004) single out the media as an important element in defining the opportunity structure for collective action, and this may be even more true in the age of social media (Hodges & Stocking, 2016). A free press also makes it easier for stakeholders to access relevant information about firms and makes it more difficult for the firms to conceal or suppress negative information. Thus, we argue that in countries where freedom of the press is more strongly protected, the resources available for collective action are increased, in part because the issues become legitimized through a free press. In particular, in countries with a strong and free press, potential stakeholders outside the focal country are more likely to be aware of events within it, which can enhance the reputational damage inflicted on the firm. We conclude that the probability of collective action in the mining industry is more likely in countries with strong legal institutions, accessible political institutions, and freedom of the press.

All of these arguments are present in the Barrick case, as discussed earlier. It is important to emphasize that Barrick is one of the largest gold miners in the world, and suspending its

operations is not something to be taken lightly. It is also important to note that Barrick was not the only company affected in this way in Chile. Another example, in the same time period, is Canada's Kinross Gold Corporation (TSX, NYSE: KGC), the world's fifth largest gold miner, which operated the largest gold mine in Chile. The mine accounted for about 15% of Chilean gold production and some 8% of Kinross' global production. Concerned about water quality, local communities had been demonstrating because these local communities used the same water source as the mine. Chile's environmental regulator, following regulatory hearings, closed the water system linked to the Maricunga mine, which forced the mine to shut down. Reuters reported that similar demonstrations across the country had influenced the government to become stricter regarding environmental regulations. After the company suspended operations at Maricunga because of the environmental concerns raised by the Chilean regulator, some of its Chilean assets were sold in 2017 to Goldcorp (TSX: G; NYSE: GG).<sup>5</sup>

We suggest that the institutional environment in Chile supported these outcomes. In general, Chile has a relatively accessible governance and institutional environment, particularly with respect to mining. The strength of resource governance can be evaluated by a variety of policies ranging from revenue royalties to environmental regulations. For example, the Natural Resource Governance Institute (NRGI) publishes a Resource Governance Index that ranks 81 countries according to their governance of the oil, gas, and mining sectors. In the 2016 rankings, Norway ranks first with respect to oil and gas, while Chile ranks first with respect to mining. Thus, Chile has a strong governance and institutional environment, at least with respect to resource governance. However, it is important to note that the NRG also includes measures of the broad "enabling environment," which includes measures such as voice and accountability, rule of law, and open data. In addition, Chile joined the OECD in 2010, and thus became subject to OECD environmental guidelines and reporting standards (OECD, 2016). It is perhaps no accident that it was just after this that the Barrick decision was made. More specifically, this example suggests that in countries with institutions that support stakeholder inclusion and mobilization, political accessibility, and opportunities, a strong legal system providing enforcement by the courts, and information accessibility, focal firms face increased potential nonmarket risks relative to countries with weaker institutions.

In short, we argue that when a mine is located close to a significant water source in a country with strong institutions supporting collective action, the potential nonmarket environmental and social risks increase. Hence,

**Hypothesis 4** *The negative announcement effects of a mining property's proximity to an environmentally sensitive water source will increase (i.e., be more negative) when host country institutions support collective action.*

### 3 | METHODS

#### 3.1 | Sample and data

We built a unique data set beginning with data on mining sites around the world, their locations, and announcements regarding their operations. These were obtained from the SNL Metals & Mining Database, which provides detailed information about the operational and financial activities of

<sup>5</sup><http://www.kinross.com/news-and-investors/news-releases/press-release-details/2017/Kinross-completes-sale-of-Cerro-Casale-interest/default.aspx>.

the mining industry around the globe. The database has been widely used in academic research and is regarded as a comprehensive and reliable one (Murguía, Bringezu, & Schaldach, 2016). From the database, we collected data on announcements that bring a mine closer to production or increased production, and therefore to positive or enhanced revenues.<sup>6</sup> As such they are expected to have positive announcement effects, other things equal. We focus on these events, which are nonenvironmental, to measure potential environmental risk.

By matching the SNL Metals & Mining Database with Bloomberg data, we were able to identify and download 3,247 announcements by 1,997 mining sites from 1,131 mining companies that were listed on NYSE (USA), NYSE MKT (USA), TSX (Canada), TSV (Canada), AIMLSE (UK), and ASX (Australia). We selected these stock markets because they are the most important in the world for listing mining companies and covered more than 85% of the mining companies in our sample data. Of these 3,247 announcements, only 23% of total announcements (745) were positive and nonenvironmental events. After eliminating confounding events, nonpositive and environmental events, and mining sites with minority ownership, and accounting for missing values (largely financial data), the final sample consists of 303 announcements by 234 mining sites from 209 companies in 37 countries between 2013 and 2016, when the event window is 6 days [-1, +4].

We used the WWF's *Global Lakes and Wetlands Database* (GLWD, Level 3) (Lehner & Döll, 2004) to define water sources on a global scale. We then combined GLWD with WRI's *Aqueduct Global Maps Data* (Aqueduct), which includes indicators of water quantity and water quality (Gassert et al., 2014), to measure water risk-adjusted proximity, that is, the degree of both quantity and quality water risk weighted by distance, which we note is an inverse measure of distance. We used the World Banks' *World Governance Indicators* (WGI), Reporters Without Borders' *World Press Freedom Index* (WPFI), and World Economic Forum's *Global Competitiveness Index* (GCI) to measure institutions supporting collective actions. We combined the Voice and Accountability score from WGI, WPFI, and the Judicial Independence score from GCI to create a single index. We also collected other information at the mining site level including the UN World Population Prospects Adjusted Population Density under the *Gridded Population of the World* (GPW) to measure population density surrounding mining sites, and *Global Mosaics of the Standard MODIS Land Cover Type Data* (MODIS) published by the University of Maryland to measure proximity from mining sites to built-up areas. Financial data for the mining companies that owned the relevant mining sites were obtained from Bureau van Dijk's *ORBIS* database.

Finally, we collected country-level political, environmental, and economic information from the *Database of Political Institutions* (DPI) 2017, *Environmental Performance Index* (EPI) 2016 created by Yale University, Columbia University, and the World Economic Forum, *Artisanal and Small-Scale Mining Knowledge Sharing Archive* (ASM Inventory) provided by artisanalmining.org, as well as the World Bank's *World Development Indicators* (WDI). Geographic distance between host (mining sites) and home (mining companies) countries was drawn from the Lauder Institute, University of Pennsylvania, and cultural distance between host and home countries was measured by using the Kogut and Singh (1988) method. Data for robustness tests using proximity to other protected ecological areas and leisure sites were obtained from *World Database on Protected Areas* (WDPA) published by the UN Environment Program (Bertzky & Stoll-Kleemann, 2009); croplands from MODIS; and excluded ethnic

<sup>6</sup>The events include announcements of a feasibility study (started, completed, and expansion); construction (project started, financing obtained, permitting completed, and construction underway); and production (preproduction, production started, and production expanded).

groups from *Geo-referencing Ethnic Power Relations* (GeoEPR) from the Swiss Federal Institute of Technology in Zurich.

### 3.2 | Event study

A general approach to analyzing the effect of nonmarket risks on firm performance, and the one taken in this study, is to use the event study method to measure stock market responses to specific discrete events or announcements. The event study approach examines the degree to which the stock market responds negatively (positively) to negative (positive) announcements regarding events associated with the firm, and thus in principle avoids interpretation problems associated with confounding events. Our use of the event study methodology assumes that stock markets price fully all available relevant information. Further, we make no specific assumptions about information asymmetry or any other market imperfection. Markets aggregate the available information and prices reflect this aggregation (Lo, 2007). Therefore, the market response to any event or announcement represents unanticipated changes. In addition, the information available to mining analysts will, we believe, alert them to water issues and their relation to communities. For example, major consulting firms evaluate risks in the mining industry and water risks feature prominently in those reports (Deloitte, 2018; EY, 2014).

We emphasize that potential risks from proximity are likely to be felt at all stages of the mining cycle (Franks et al., 2014; Stevens et al., 2013), and announcements that the firm is entering a new stage provide new and relevant information regarding both potential future revenues and costs. Thus, efficient capital markets will evaluate all new and existing information and adjust security prices to reflect the cost and revenue prospects for the firm (Lo, 2007). Announcements that bring the mine closer to production or increased production bring it closer to earning revenues (or greater revenues), and in this respect are positive but may also change the investors' perception of potential costs arising from negative externalities (King & Soule, 2007). Thus, costs associated with negative externalities may be re-evaluated at each stage depending on the ability and incentives for collective action. Efficient markets will, therefore, balance the potential revenue gains against the potential costs at each stage of the mining cycle. This balancing may provide more weight to the possibility of loss if investors are loss averse.

We applied the multimarket event study method to calculate the stock returns of the mining companies around the dates on which the relevant mining events occurred. First, we estimated the normal returns ( $\tilde{R}$ ) of the mining companies for each of their events using their stock prices within an estimation window of between 150 days before an event date and 31 days before an event date (i.e.,  $[-150, -31]$ ). Second, we computed the abnormal returns (AR) to a company, obtained by subtracting predicted return from the actual return of a mining company. A positive AR implies that an event has an unexpected positive impact on a company's stock return and vice versa.

### 3.3 | Measures

#### 3.3.1 | Dependent variable

Our dependent variable, cumulative abnormal return (CAR), is calculated by summing the ARs during an event window. We computed CAR for 6-day ( $[-1, +4]$ ) and 2-day ( $[0, +1]$ ) windows. CAR reflects the total impact of an event on a company's stock price.

### 3.3.2 | Independent variables

Our first independent variable is water risk-adjusted proximity between a mining site and a water source. We used Geographic Information System (ArcGIS) to compute this variable by measuring the shortest Euclidean distance from a mining site's location to the nearest water source (either river or lake) based on GLWD and by extracting the indices of physical water risk in terms of water quantity and water quality, both of which range from 0 to 5, from Aqueduct. Water risk-adjusted proximity is measured as the sum of the two Aqueduct indices of water quantity and water quality divided by the log of Euclidean distance and is standardized.

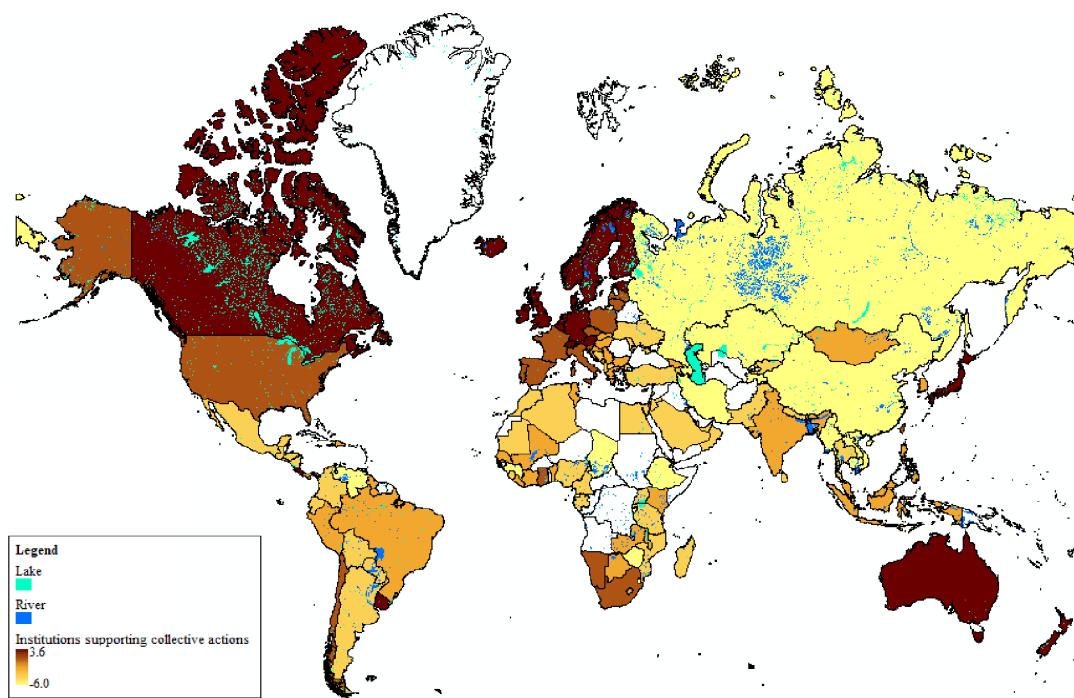
The rest of our independent variables are the moderators in Hypotheses 2–4. Our first moderator is a dummy variable indicating whether a mining site is a gold mine based on the primary mineral commodity extracted during mining operations as reported in the SNL Metals & Mining Database. Our second moderator is a dummy variable indicating whether the nearest water source to a mining site is a river (including freshwater marsh, where drinking water is accessible) as opposed to other types of water source, such as lakes and reservoirs, categorized in GLWD.

Our third moderator, institutions supporting collective actions, is measured as the sum of three standardized variables, including WGI's Voice and Accountability, Reporters Without Borders' WPFI, which is reverse coded because the raw value of WPFI denotes 0 as the freest and 100 as the least free, and GCI's Judicial Independence. We based these measures on the social movement literature (Hargrave & Van de Ven, 2006; King, 2008; McAdam et al., 1996), which as discussed above suggests three factors that increase the likelihood of collective action: mobilizing structures; political opportunities; and framing structures. Voice and Accountability is a proxy for mobilizing structure, which is measured by the extent to which a country's citizens are able to participate in selecting their government as well as freedom of expression, freedom of association, and a free media. Judicial Independence is a proxy for political opportunities, which is measured by the degree to which the judicial system of a country is independent from the influences of the government, individuals, or companies. World Press Freedom Index (WPFI) is a proxy for framing structures, which is measured by media freedom based on an evaluation of pluralism, independence of the media, quality of legislative framework, and safety of journalists in each country and region.

Figure 1 maps the level of institutions supporting collective actions and the water sources (rivers and lakes) in each country.

### 3.3.3 | Control variables

We included variables to control for both event- and site-specific factors including population density surrounding mining sites, proximity to built-up areas, revenue changes during the event window, changes in operating expenses, and dummy variables for the production stage and mine type. We also included company-specific control variables including the log of the mining company's total managed assets, book-to-market ratio, log of leverage, percentage of ownership, and a dummy for foreign ownership. Finally, we included country-specific control variables including EPI's water and sanitation index, political particularism from DPI, extent of artisanal and small-scale mining, log of land size, log of gross domestic product (GDP), percentage of metal exports, geographic and cultural distances between the host countries and the home countries of the mining companies, and fixed effects for the home country of the mining



**FIGURE 1** Water sources and institutions supporting collective actions. Note: White areas in the map represent countries whose values are missing in at least one of three scores composing institutions supporting collective actions (i.e., WGI's Voice and Accountability, Reporters Without Borders' World Press Freedom Index, and GCI's Judicial Independence) [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

companies and the year of the mining events. These variables are explained in detail in Online Supplementary Appendix.

### 3.4 | Estimation

Because our data have a nested structure (mining locations within a host country), we estimated the impact of water risk-adjusted proximity as well as the moderating effects of gold mine, river, and institutions on CAR using a multilevel random effect panel regression with heteroskedasticity robust standard errors clustered at the host country level to determine whether mining companies that operate near significant water sources were penalized by stock markets. We also used the number of events by event type and host country as the weight for the lower level of the multilevel regression model, and the number by host country for the higher level, to correct for the differences in probabilities of occurrence for different event types conditional on different host countries.<sup>7</sup> When testing moderating effects, we created interaction terms using mean-centered variables.

<sup>7</sup>In our multilevel model, since the events of the mining locations comprise the lower level, and the host countries of the mining locations comprise the higher level, the scaling of weights by event type is considered for each host country.

## 4 | RESULTS

The summary statistics and correlation matrix of the variables for the sample of 303 events are presented in Table 1. The variance inflation factor (VIF) test shows that the model VIF is 4.46 with fixed effects and 3.14 without fixed effects. Multicollinearity is thus not a concern in our analysis. On average, the sampled events led to an increase in about 1.3 and 2.1% of CAR over the 6-day and 2-day event windows, respectively, which may not be considered large, but does include the negative effects that constitute the subject of this study.

The main results of the fixed-effects multilevel panel regressions for our sample are shown in Table 2. We provided results in Columns 1 to 5 for a 6-day event window ( $[-1, +4]$ ) and in Columns 6 to 10 for a 2-day event window ( $[0, +1]$ ).

For both  $[-1, +4]$  and  $[0, +1]$ , water risk-adjusted proximity significantly lowers CAR ( $\beta = -0.0336$ ,  $SE = 0.0127$ ,  $p = .008$ , see Column 2;  $\beta = -0.0290$ ,  $SE = 0.0091$ ,  $p = .001$ , see Column 7). The statistical results support Hypothesis . Although the moderating effect of gold mine is insignificant ( $\beta = 0.0145$ ,  $SE = 0.0116$ ,  $p = .211$ , see Column 3;  $\beta = 0.0121$ ,  $SE = 0.0104$ ,  $p = .243$ , see Column 8), the moderating effect of river is significant and negative ( $\beta = -0.0528$ ,  $SE = 0.0097$ ,  $p = .0000$ , see Column 4;  $\beta = -0.0534$ ,  $SE = 0.0051$ ,  $p = .0000$ , see Column 9). Moreover, the strength of institutions negatively and significantly moderates the negative relationship between the proximity to a water source and CAR ( $\beta = -0.0065$ ,  $SE = 0.0026$ ,  $p = .012$ , see Column 5;  $\beta = -0.0059$ ,  $SE = 0.0022$ ,  $p = .007$ , see Column 10). These results support Hypotheses 3 and 4 but do not support Hypothesis .

The direct effect of water risk-adjusted proximity shows that any positive impact of an announcement by a mining company is attenuated when its mining site is located near an environmentally sensitive water source. Based on the results in Column 2 of Table 2, an increase in water risk-adjusted proximity (meaning the mine is closer to the water source) by 1 SD will lower the CAR of the 6-day window by 3.4%, which is equivalent to 21.7% of the SD of the CAR. Water risk-adjusted distance proximity is economically as important as the effect of book-to-market ratio, which is frequently used as a predictor of stock returns in the event study literature (Brown & Warner, 1985). A 1 SD increase in the book-to-market ratio will increase the CAR of the 6-day window by 3.34%, which is equivalent to 21.3% of the SD of the CAR. These results underscore the importance of potential nonmarket risks in the context of mining operations near environmentally sensitive water sources.

Although the moderating effect of a gold mine is not economically meaningful, a river's moderating effect is substantial. When water risk-adjusted proximity is high (mean value plus 1 SD), a mine will lose about 5% of its stock returns if it locates close to a river. On the other hand, when water risk-adjusted proximity is low (mean value minus 1 SD), the mine will gain about 5% stock returns if it locates close to a river. This suggests that in some cases, a mine may be located near a river with low water risk, allowing the company to use the resource without potential conflict.

The moderating effect of institutions on the relationship between water risk-adjusted proximity and CAR implies that a mining company operating in a country where voice and accountability, press freedom, and judicial independence are *strong* will experience an abnormal decrease in its stock return for an announced operational event at a mine if the mine is located *near* a *significant* environmentally sensitive water source. Figure 2 illustrates the results from the 6-day event window ( $[-1, +4]$ ). According to the results, a 1 SD increase of water risk-adjusted proximity will lower the CAR of the 6-day window by 3.89%, which is equivalent to 24.77% of the SD of the CAR in a country with strong institutions supporting collective actions

**TABLE 1** Summary statistics and correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1 6-Day stock returns [-1, +4]													
2 2-Day stock returns [0, +1]	0.710												
3 (Water) risk-adjusted proximity	-0.053	-0.107											
4 Institutions supporting collective actions	-0.008	0.048	-0.279										
5 Population density	-0.082	-0.081	0.046	-0.273									
6 Proximity to built-up area	-0.009	-0.076	0.247	-0.291	0.116								
7 River (dummy)	0.001	0.055	-0.423	0.174	0.011	-0.116							
8 Gold mine (dummy)	0.044	0.029	0.015	-0.014	-0.017	-0.009	-0.139						
9 Production stage	0.020	-0.007	0.130	-0.155	-0.072	0.049	-0.143	0.065					
10 Revenue change by primary commodity	0.036	0.025	-0.025	0.024	-0.018	-0.018	-0.056	0.050	-0.039				
11 Operating expense growth	-0.089	-0.056	0.024	-0.179	0.115	0.061	-0.009	0.009	-0.024	-0.003			
12 Assets (log)	-0.005	-0.080	0.159	-0.131	-0.070	-0.004	-0.193	0.053	0.332	-0.110	0.004		
13 Book-to-market ratio	0.101	0.190	0.119	-0.040	0.028	-0.103	0.063	-0.005	0.006	-0.022	-0.053	0.114	
14 Leverage (log)	-0.020	0.112	0.089	-0.035	0.018	-0.174	0.152	-0.109	-0.165	-0.018	0.009	-0.075	0.241
15 Foreign company (dummy)	0.045	0.001	0.260	-0.710	0.267	0.243	-0.178	-0.027	0.089	-0.092	0.284	0.091	0.077
16 Ownership percentage	0.048	0.030	-0.026	0.015	-0.166	-0.043	-0.113	0.034	-0.021	0.132	-0.014	0.011	-0.126
17 Importance of water in the host country	0.049	-0.017	0.064	0.593	-0.293	-0.025	-0.214	0.135	0.055	0.038	-0.394	0.065	-0.118
18 Political particularism	0.020	-0.004	-0.037	0.518	-0.238	0.144	0.179	0.023	0.006	0.091	-0.244	-0.157	-0.170
19 Size of artisanal small mining	-0.108	0.001	-0.178	-0.264	0.137	0.030	0.228	0.012	-0.042	-0.008	0.401	-0.056	0.015

**TABLE 1** (Continued)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
20 Land size (log)	0.001	0.017	-0.153	0.463	-0.402	-0.201	-0.011	0.030	0.051	0.084	-0.134	-0.057	-0.147
21 GDP (log)	0.054	0.022	0.232	-0.235	0.103	0.154	-0.319	-0.051	0.117	-0.142	-0.101	0.011	-0.034
22 Percentage of metal export	-0.030	0.042	-0.243	0.380	-0.225	-0.130	0.521	-0.181	-0.014	-0.096	-0.118	-0.061	0.020
23 Geographic distance (log)	0.021	0.000	0.167	-0.627	0.236	0.164	-0.060	-0.094	0.058	-0.113	0.311	0.118	0.098
24 Cultural distance	0.051	-0.041	0.108	-0.775	0.319	0.206	-0.145	0.004	0.151	-0.121	0.125	0.100	0.036
Mean	0.013	0.021	-0.004	0.408	0.237	-0.553	0.611	0.439	0.363	-0.097	7.650	11.373	1.113
SD	0.157	0.127	1.014	2.609	0.788	0.488	0.497	0.482	1.953	8.965	2.589	1.164	
Variable	14	15	16	17	18	19	20	21	22	23	24		
15 Foreign company (dummy)	0.139												
16 Ownership percentage	0.039	-0.124											
17 Importance of water in the host country	-0.248	-0.577	0.035										
18 Political particularism	-0.141	-0.499	0.038	0.586									
19 Size of artisanal small mining	0.147	0.358	0.042	-0.385	-0.610								
20 Land size (log)	-0.190	-0.553	0.077	0.505	0.576	-0.450							
21 GDP (log)	-0.237	0.112	-0.083	0.063	0.129	-0.273	0.205						
22 Percentage of metal export	0.078	-0.365	0.017	0.365	0.098	-0.068	0.166	-0.239					
23 Geographic distance (log)	0.169	0.939	-0.127	-0.539	-0.613	0.404	-0.571	0.018	-0.246				
24 Cultural distance	-0.036	0.658	-0.046	-0.514	-0.465	0.293	-0.559	0.162	-0.250	0.601			
Mean	14.802	0.541	91.216	85.463	0.983	0.572	14.869	28.540	18.390	1.171	0.710		
SD	37.725	0.499	16.493	21.888	0.947	1.471	1.449	1.735	14.522	1.149	0.995		

Abbreviation: GDP, gross domestic product.

**TABLE 2** Impact of water risk-adjusted proximity on CAR

Event window	[-1, +4]				[0, +1]				(10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
(Water) risk-adjusted proximity	-0.0336 (0.0127)	-0.0402 (0.0171)	0.0065 (0.0093)	-0.0214 (0.0108)	-0.0290 (0.0091)	-0.0346 (0.0104)	0.0111 (0.0053)	-0.0180 (0.0070)	
(water) risk-adjusted proximity × gold mine	0.0145 (0.0116)				0.0121 (0.0104)				
(water) risk-adjusted proximity × river		-0.0528 (0.0097)				-0.0534 (0.0051)			
(water) risk-adjusted proximity × I_CA			-0.0065 (0.0026)						-0.0059 (0.0022)
Institutions supporting collective actions (I_CA)	0.0155 (0.0091)	0.0168 (0.0099)	0.0221 (0.0112)	0.0248 (0.0126)	0.0094 (0.0066)	0.0018 (0.0068)	0.0030 (0.0064)	0.0074 (0.0057)	0.0098 (0.0065)
Population density	-0.0259 (0.0143)	-0.0296 (0.0157)	-0.0313 (0.0158)	-0.0237 (0.0153)	-0.0276 (0.0143)	-0.0082 (0.0100)	-0.0117 (0.0098)	-0.0132 (0.0097)	-0.0054 (0.0097)
Proximity to built-up area	-0.0058 (0.0116)	-0.0012 (0.0093)	-0.0006 (0.0099)	0.0024 (0.0101)	0.0006 (0.0087)	-0.0153 (0.0134)	-0.0105 (0.0111)	-0.0101 (0.0117)	-0.0078 (0.0116)
River (dummy)	0.0250	0.0087	0.0081	0.0028	0.0105	0.0284	0.0147	0.0143	0.0091 (0.0106)
Gold mine (dummy)	0.0511 (0.0113)	0.0440 (0.0105)	0.0479 (0.0150)	0.0461 (0.0106)	0.0445 (0.0107)	0.0249 (0.0109)	0.0187 (0.0108)	0.0217 (0.0129)	0.0193 (0.0107)
Production stage	-0.0106 (0.0064)	-0.0102 (0.0088)	-0.0115 (0.0092)	-0.0179 (0.0065)	-0.0114 (0.0083)	0.0106 (0.0037)	0.0108 (0.0365)	0.0098 (0.0351)	0.0096 (0.0274)
Revenue change by primary commodity	0.0089 (0.0045)	0.0073 (0.0055)	0.0071 (0.0058)	0.0076 (0.0055)	0.0073 (0.0053)	-0.0065 (0.0039)	-0.0062 (0.0053)	-0.0099 (0.0058)	-0.0105 (0.0049)
Operating expense growth	-0.0003 (0.0015)	0.0007 (0.0018)	0.0006 (0.0017)	0.0006 (0.0019)	-0.0022 (0.0009)	-0.0014 (0.0010)	-0.0015 (0.0010)	-0.0020 (0.0010)	-0.0014 (0.0009)
Assets (log)	0.0064 (0.0038)	0.0082 (0.0047)	0.0084 (0.0050)	0.0087 (0.0048)	0.0083 (0.0046)	-0.0012 (0.0009)	0.0005 (0.0020)	0.0008 (0.0021)	0.0005 (0.0020)

TABLE 2 (Continued)

Event window	[-1,+4]					[0,+1]				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Book-to-market ratio	0.0264 (0.0056)	0.0287 (0.0076)	0.0288 (0.0073)	0.0316 (0.0062)	0.0292 (0.0075)	0.0313 (0.0060)	0.0334 (0.0075)	0.0336 (0.0071)	0.0362 (0.0062)	0.0340 (0.0076)
Leverage (log)	-0.0007 (0.0003)	-0.0005 (0.0002)	-0.0005 (0.0003)	-0.0006 (0.0003)	-0.0004 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0004)
Foreign company (dummy)	0.1246 (0.0920)	0.1623 (0.1127)	0.1522 (0.1117)	0.1479 (0.1068)	0.1518 (0.1096)	0.0346 (0.0399)	0.0694 (0.0429)	0.0629 (0.0422)	0.0503 (0.0380)	0.0592 (0.0418)
Ownership percentage	0.0018 (0.0004)	0.0020 (0.0005)	0.0019 (0.0005)	0.0021 (0.0005)	0.0020 (0.0005)	0.0013 (0.0002)	0.0014 (0.0003)	0.0014 (0.0003)	0.0016 (0.0003)	0.0015 (0.0004)
Importance of water in the host country	-0.0025 (0.0011)	-0.0018 (0.0013)	-0.0019 (0.0013)	-0.0020 (0.0013)	-0.0027 (0.0015)	-0.0011 (0.0007)	-0.0004 (0.0008)	-0.0005 (0.0008)	-0.0006 (0.0008)	-0.0013 (0.0009)
Political particularism	0.0125 (0.0230)	0.0169 (0.0258)	0.0182 (0.0260)	0.0014 (0.0241)	0.0214 (0.0250)	0.0036 (0.0138)	0.0070 (0.0143)	0.0082 (0.0140)	-0.0083 (0.0123)	0.0110 (0.0139)
Size of artisanal small mining	-0.0152 (0.0080)	-0.0193 (0.0088)	-0.0189 (0.0089)	-0.0161 (0.0088)	-0.0171 (0.0082)	0.0083 (0.0070)	0.0049 (0.0068)	0.0053 (0.0069)	0.0082 (0.0084)	0.0071 (0.0063)
Land size (log)	-0.0219 (0.0191)	-0.0352 (0.0222)	-0.0354 (0.0223)	-0.0238 (0.0199)	-0.0263 (0.0215)	-0.0120 (0.0137)	-0.0235 (0.0154)	-0.0235 (0.0153)	-0.0120 (0.0130)	-0.0152 (0.0142)
GDP (log)	0.0187 (0.0060)	0.0226 (0.0053)	0.0220 (0.0054)	0.0184 (0.0062)	0.0228 (0.0057)	0.0135 (0.0052)	0.0171 (0.0043)	0.0166 (0.0041)	0.0127 (0.0051)	0.0172 (0.0047)
Percentage of metal export	-0.0001 (0.0012)	-0.0000 (0.0013)	-0.0001 (0.0012)	0.0006 (0.0013)	-0.0001 (0.0012)	0.0000 (0.0008)	0.0001 (0.0007)	0.0001 (0.0007)	0.0007 (0.0007)	-0.0000 (0.0006)
Geographic distance (log)	-0.0423 (0.0351)	-0.0566 (0.0422)	-0.0538 (0.0426)	-0.0485 (0.0421)	-0.0512 (0.0429)	0.0019 (0.0153)	-0.0111 (0.0149)	-0.0092 (0.0147)	-0.0111 (0.0148)	-0.0058 (0.0151)
Cultural distance	0.0200 (0.0364)	-0.0023 (0.0410)	0.0005 (0.0394)	0.0052 (0.0388)	0.0078 (0.0374)	-0.0281 (0.0268)	-0.0454 (0.0269)	-0.0429 (0.0259)	-0.0390 (0.0230)	-0.0369 (0.0226)
Mine type fixed dummy	Included									
Year fixed dummy	Included									

**TABLE 2** (Continued)

Event window Model	[-1,+4]				[0,+1]					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Home country fixed dummy	Included	Included								
Log of random-effects parameter										
Country (level 2)	-32.56 (102.21)	-31.67 (5.44)	-26.75 (112.80)	-27.92 (69.00)	-31.27 (4.88)	-28.25 (97.04)	-30.03 (95.59)	-26.71 (68.41)	-27.3109 (82.7820)	-27.4260 (98.0824)
Mine (level 1)	-1.9752 (0.0391)	-1.9003 (0.0389)	-1.9913 (0.0390)	-1.9978 (0.0396)	-1.9924 (0.0379)	-2.1926 (0.0857)	-2.2101 (0.0783)	-2.2112 (0.0788)	-2.2224 (0.0846)	-2.2128 (0.0786)
Log-likelihood	8,792.8	9,031.9	9,047.2	9,150.4	9,064.4	12,361.8	12,641.4	12,658.4	12,836.9	12,684.0
AIC	-17,513.5	-17,989.9	-18,020.4	-18,226.8	-18,054.7	-24,649.7	-25,208.8	-25,242.7	-25,599.9	-25,293.9
N	303	303	303	303	303	308	308	308	308	308

*Note:* Estimation window is [-150, -31]. Estimated using a multilevel random-effects model nested within host countries. Mine type, year, and home country fixed effects are included, but not reported here. Robust standard errors are in parentheses.

Abbreviations: AIC, akaike information criterion; GDP, gross domestic product.

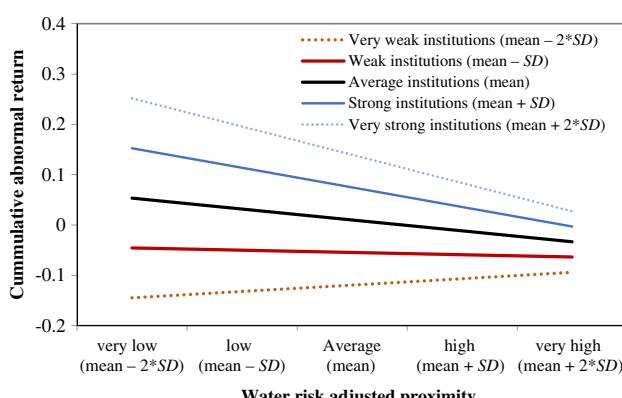
such as Australia, Canada, and United Kingdom, while it will lead to negligible change (lower by 0.45%) in the CAR in a country with weak institutions (mean – 1 SD) such as Peru, Philippines, and Tanzania. The magnitude of the decrease in CAR will be much larger for countries with even stronger institutions (mean + 2 SDs) such as the Nordic countries and New Zealand. Countries with very weak institutions (mean – 2 SDs) such as China, Colombia, and Russia have slightly positive returns when the mine locates close to a water source. This implies that in the absence of strong institutions, stock markets do not perceive firm-specific nonmarket risks, and indeed view the access to proximate water positively for that reason. Overall, the economic magnitudes of our findings also provide strong support for Hypothesis . For the 2-day event window ([0, +1]), we provide the illustration of moderating effect in Online Supplementary Appendix.

Both the statistical results in Table 2 and the economic magnitudes in Figure 2 suggest that stock markets do account for potential risks associated with the location of mining sites, and the effects vary by the level of strength of institutions. Put differently, when a mine locates distant from an environmentally sensitive water source, overall CARs are higher for countries with strong institutions than for countries with weak institutions. Thus, although strong institutions of host countries overall provide positive premia, when mining operations are one step close to production or increased production, the premia dissipate when potential risks associated with mining operations are very high (high proximity) such that CARs become lower for countries with strong institutions compared with countries with weak institutions. Thus, markets impose higher penalties for firms operating in countries with strong institutions than in countries with weak institutions.

In Figure 3, we spatially estimated Model 5 in Table 2 using the information on water risk-adjusted proximity, institutions supporting collective actions, and CAR from the [−1, +4] event window as of 2015 and projected on a map by using ArcGIS. Figure 3 shows that the mining sites that are associated with positive (negative) CAR generally are in countries where the strength of institutions supporting collective action is strong (weak). This result is consistent with the notion that firms operating in countries with weak institutions are penalized more than those operating in countries with strong institutions, a result consistent with the non-market and international business literatures.

However, Figure 3 also shows the differences in CARs corresponding to water risk-adjusted proximity within each country. In countries with strong institutions supporting collective action, such as Australia, Canada, and the United States, while most mining sites are associated with positive CARs, some sites that face high water risks are associated with less positive or

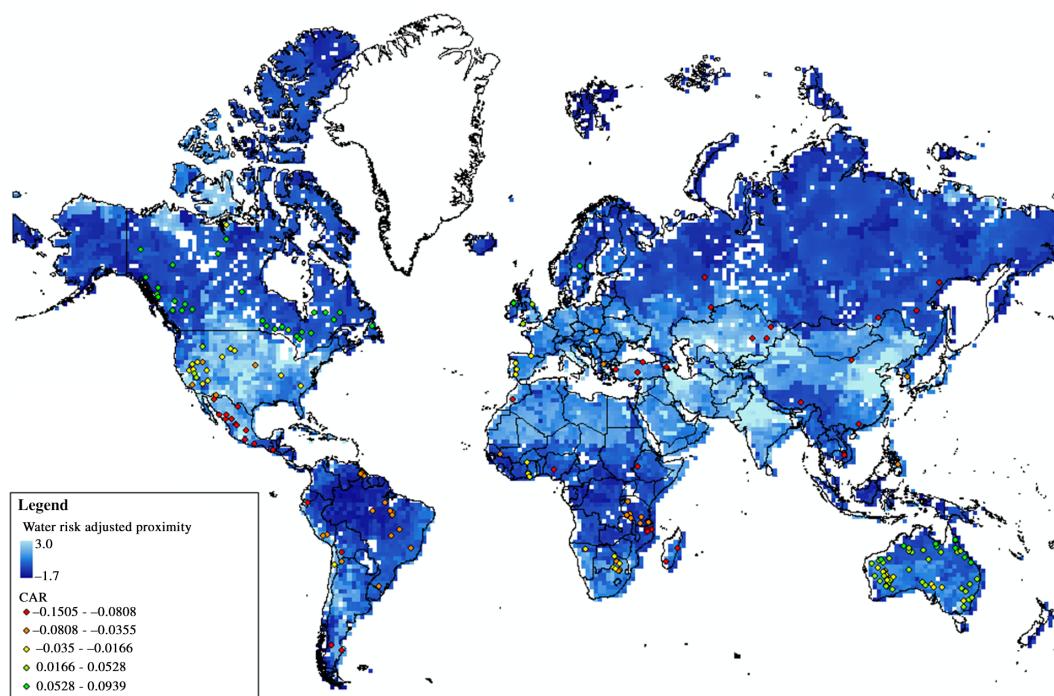
**FIGURE 2** The moderating effects of institutions supporting collective actions (6 days CAR). Note: Estimation window is [−150, −31]. Based on the results in Column 5 of Table 2 [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]



negative CARs. In countries with average institutions, such as South Africa and Spain, while all of the mining sites experience lower CARs than countries with strong institutions, CARs are more negative for sites with higher water risk-adjusted proximity. In countries with weak institutions, such as Tanzania and Peru, CARs are negative with negligible change at different levels of water risk. Countries with even weaker institutions, such as China and Russia, show about the same pattern. Thus, in countries with non-supportive institutions, there is little variance in CARs, which would be consistent with the idea that collective actions do not impose material costs on the companies in countries that are less supportive of collective actions regardless of the project locations. Put differently, collective actions may occur in countries with less supportive institutions, but they are not likely successful because mobilizing structures, political opportunities, and framing structures are weak. In some countries like China and Russia, collective action may occur, but government agencies and regulators may not at all be influenced by any collective action and do not suspend or halt projects that potentially damage water resources. For the results from the 2-day event window ( $[0, +1]$ ; Model 10 in Table 2), we provide the map in Online Supplementary Appendix.

#### 4.1 | Robustness checks

To test the robustness of our main results, we performed several additional tests. These robustness check results and further discussion are available in a separate Online



**FIGURE 3** Water risk-adjusted proximity and cumulative abnormal return (6 days event window for calculating CAR). Note: Estimation window is  $[-150, -31]$ . Based on the results in Column 5 of Table 2. Institutions as of 2015 are used. White areas in the map represent water sources, except for Greenland, of which water risk values are missing in Aqueduct [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

Supplementary Appendix. None of these robustness check results are inconsistent with our main results. Here, we highlight the most important results. First, considering that mining may put not only water sources but also other ecological, environmental, and socioeconomic activities at risk, we computed the proximity (unweighted) between the focal mine and various other environmentally sensitive sites such as protected ecological and leisure areas and included them as variables in the model. We find almost no evidence that proximity between the focal mine, and these areas are significant with the exception of leisure sites in the two-day event window.

Second, we conducted subgroup analysis by stages in the mining life cycle and by population density. We found that the direct effect of water risk-adjusted proximity and its interaction with river and institutions are negative and stronger in the feasibility study stage than in the construction and production stages. These results are consistent with those reported in Franks et al. (2014). We also show that the direct effect of water risk-adjusted proximity is negative and significant for both low and medium population density samples, but not for the high population density sample. These results are consistent with Olson's (1965) boundary condition on collective action: smaller and localized groups are more likely to organize and be effective. However, the water risk-adjusted proximity interactions with institutions are negative only for the medium population density sample.

## 5 | DISCUSSION AND CONCLUSIONS

We have argued that nonmarket risk, which we associate with potential stakeholder collective action, is higher when a mine is located closer to an environmentally sensitive water source, where "environmentally sensitive" is defined by quantity and quality of water risk associated with that source. We use proximity as a theoretically grounded proxy for unobservable non-market risk potential and rely on stock market responses to measure it. Our results are consistent and robust in suggesting that stock markets do apply a discount to mine announcements that bring a mine located near an environmentally sensitive water source closer to production or expansion.

We ground our empirical results on a model that assumes that the possibility of collective action begins with the local community affected by the focal mine. We argue that when negative externalities are localized, and when local stakeholder groups share similar values and interests, free rider problems are minimized. However, the social movements literature points out that collective action by social movements is relatively rare (McAdam & Boudet, 2012), and so we consider the mechanisms that promote effective collective action. These mechanisms include the resources to engage in mobilization, and access to the complementary institutions (political and social) that support collective action. We suggest that mining operations with the potential to affect the quantity and quality of water sources are more likely to provide the incentives and ability to engage in effective collective action.

Although we used collective action and social movement theory as a theoretical lens, our empirical analysis is undertaken from the perspective of investors. We have argued that investors respond to nonmarket risks associated with potential collective action directed at a focal mine. These actions could impose costs on the firm in the form of delays, disruptions, or closure. This is different from the concerns of relevant stakeholders who, according to one definition, consider successful collective action as one that results in changes in corporate behavior (King, 2008; Vasi & King, 2012). Although we took an investor's perspective and did not measure successful collective action, our approach is consistent with King (2008, p. 41) who

proposed that investor reaction is a mediator between collective action and the ultimate success of the collective action in changing a company's behavior.

Our study contributes to the broad literature on nonmarket risk in an international context. We extend the nonmarket strategy literature by examining the impact of cross national institutional differences, a recognized gap in the literature (Davis et al., 2008; Doh et al., 2012; Mellahi et al., 2016), particularly in the case of event studies on sustainability that are often undertaken within a single jurisdiction (Hawn et al., 2018). We use collective action and social movement theory to justify mine location as a proxy for the incentive and ability of stakeholders' mobilization, which poses a potential nonmarket risk to mines. Our reliance on stock markets to measure the potential firm-specific nonmarket risk and our clear identification of the importance of cross-country institutional heterogeneity are all components of this contribution. A feature of the literature on nonmarket risk in general, and the specific case of socio-environmental risk, is that scholars have relied on past observations regarding stakeholder conflicts (Giordono et al., 2018; Henisz et al., 2014; Hiatt, Grandy, & Lee, 2015; Vasi & King, 2012) or environmental incidents (Busch, Bauer, & Orlitzky, 2016). Estimating nonmarket risks in this way requires a sufficient number of observations so that potential or future risks can be estimated using past events (Oetzel & Oh, 2014). However, collective action by stakeholders directed against a specific company at a specific location can be rare, making it difficult to forecast future risk. We have therefore proposed the use of proximity to water as a measure of potential nonmarket risk and examined some of boundary conditions that allow realistic forecasts of future risk for a specific firm in a given location.

Our results are robust in supporting the hypothesis that mine proximity to environmentally sensitive water sources is taken into account by stock markets. We have argued that water sources may have unique environmental consequences, noting the special status of water as a human right and a scarce resource. Water tends to be a shared resource with common property and at times public goods characteristics and as such may be more prone to conflict. An important implication of our results is that there may be important differences in the social and environmental risks associated with proximity to other sites such as croplands, protected ecological areas, and leisure sites. When we control for the proximity of the mine to such non-water sites, we find no evidence that markets apply similar discounts to mines located near those sites. It is therefore possible that the relatively unique nature of water resources encourages and facilitates collective action and it is therefore important to carefully specify the underlying characteristics of the resources that are potential sources of conflict, the degree to which they encourage groups to mobilize, and the nature of access to political and social structures.

In a cross-national setting, we argue that in countries with strong institutions, which support collective action, the conditions for effective stakeholder collective action are more salient, and that, therefore, firms in these countries face *higher* degrees of potential nonmarket risk. Indeed, we find that mines located in countries where such institutions are stronger face larger risk premia, suggesting in turn that in such countries the ability of stakeholder groups to engage in successful collective action is enhanced by these institutions. In this case, strong institutions are ones that protect the ability of groups to organize and mobilize, provide access to the courts, regulatory authorities and political processes, and assure the dissemination of information through the media.

Our results with respect to institutions stand in contrast to those obtained in both the international business and nonmarket strategy literature studies. The international business literature is rooted in transaction cost economics and suggests that spatial transaction costs and their associated risks increase in countries with weak institutions, imposing transactional uncertainty

(Globerman & Shapiro, 2003; Mudambi et al., 2018). The institutional approach to nonmarket strategy, also rooted in transaction cost economics, but not necessarily in an international context, arrives at a similar conclusion (Dorobantu, Kaul, et al., 2017). Thus, analyses based on institutional theory and transaction cost economics tend to conclude that weaker institutions increase transactional uncertainty and thus are associated with nonmarket risk. In addition to the imposition of transactions costs, countries with weaker institutions firms cannot rely on external institutional capacity to help them respond to external threats (Holburn & Zelner, 2010; Oh & Oetzel, 2011).

We extend both the international business and nonmarket strategy literatures by focusing on socioenvironmental issues using a different theoretical lens. Using social movement theory, we focus on nonmarket risks that arise from the potential of firms to impose negative externalities on communities. This leads us to conclude that nonmarket risks are *higher* in countries with strong institutions supporting collective action. In such countries, firms face a higher probability that they will be affected by collective actions that impose material costs on the firm. Although we rely on collective action and social movement theory to arrive at this conclusion, our analysis is consistent with a neo-institutional approach to nonmarket strategy (Doh et al., 2012). The neo-institutional perspective explicitly considers the interaction of firms with their external stakeholders as part of the institutional context (Doh et al., 2012). Rather than beginning with the view that firms respond to external institutional pressures, both social movement theory and neo-institutional theory consider that the actions of firms can create institutional pressures, including the possibility of collective action. In our case, the result is that such pressures are greater in stronger institutional environments.

Our results provide consistent support for the hypothesis that in countries with strong institutions that support collective action, firm-specific nonmarket risk for mining companies is *higher*. Thus, our analysis and our results suggest a more nuanced approach to assessing non-market risk in an international context. In particular, we suggest that the more explicit attention be given to the theoretical lens through which the problem is being analyzed. At least in the area of the socioenvironmental risk we analyze, stronger institutions are not associated with lower firm-specific nonmarket risk. Accordingly, it is important for future researchers to be careful in using broad measures of country risk to apply to all firm decisions, including location decisions. Specifically, the definition of country risk should be carefully matched to the nature of the relevant investment, the contextual characteristics of industry, and the theoretical framework through which it is analyzed.

Our empirical results also point to the existence of other boundary conditions that can affect the incentive and ability of local stakeholders to engage in effective collective action. We find that when the nearest water source is a river, stock market responses are more negative, which we would attribute in part to the increased possibility that collective actions may diffuse along the river, and could involve a network of interacting stakeholders (Hargrave & Van de Ven, 2006; Rowley, 1997). The results are also consistent with the idea that collective action is more likely when population density is not high, as free-riding is reduced in relatively smaller groups. However, we find no evidence that markets respond differently to announcements made by gold miners, despite the evidence that gold mining may have a unique impact on the availability and quality of the water supply. One possible explanation is that although gold may impose social costs in terms of water, the value of gold per unit extracted is also high, so that the value of the gold per unit of risk is not different from other minerals. In addition, the positive revenue benefits may spill over to the local communities, reducing the incentive to take action against the gold mine.

We employ an event study methodology, which assumes that stock markets assimilate all relevant information, and that this information is available to both investors and firms. However, even if all parties agree on the nature and extent of the risk, this does not mean that there are clear and unambiguous strategies for risk mitigation. Risk mitigation is a complex problem. Although dimensions of the immediate problem (proximity to water sources) are readily observable, and agreed upon, the exact nature, mix, and timing of risk mitigation strategies will vary across firms with different levels of success. In the absence of a definitive risk mitigation approach, neither firms nor markets are able to forecast the success of any particular strategy.

The range of potential risk mitigation strategies is illustrated in recent studies (Dorobantu, Kaul, et al., 2017; Hiatt et al., 2015; Eesley, DeCelles, and Lenox (2016)Eesley, Decelles & Lenox, 2016; Nartey, Henisz, & Dorobantu, 2018). Both Hiatt et al. (2015) and Eesley et al. (2016)) point out that firm strategies depend on the tactics chosen by activists, creating a range of possible outcomes. Dorobantu, Kaul, et al. (2017) identify a wide range of strategies that firms might choose and suggest that additive strategies are useful in addressing collective action problems related to activist stakeholders (p. 121–122). Additive strategies supplement existing institutional structures with new, voluntary, and decentralized ones and can encompass CSR activities.

There is evidence that mining firms have taken a variety of additive measures including proactive investments in new water technologies to reduce their impact on water sources (Leonida, 2019), and thus benefit both the firm and the community. However, such investments take time, and there is no general consensus on the effectiveness of different technologies. At the same time, proactive measures directed at the community to provide public goods (Marquis & Raynard, 2015), which may or may not be related to the original externality, have also been pursued. In addition, the provision of such community infrastructure in pursuit of a “social license to operate” (SLO) can itself be both time consuming, expensive, and not applicable across all locations (Shapiro et al., 2018), thus further raising costs. Davis and Franks (2014) suggest that there is only limited evidence regarding the success of such initiatives.

Thus, firms face choices regarding the appropriate stakeholder strategy, a choice that can be difficult when resources are limited. This was illustrated by Nartey et al. (2018), who suggest trade-offs between high- and low-status stakeholder management strategies. In our case, mining companies in the early stages may focus on high-status stakeholders such as politicians, governments, or regulatory agencies as it is important for companies to receive LLO and meet regulatory requirements. Such a stakeholder management strategy may increase the investors' valuation of nonmarket risks of collective actions from low-status stakeholders such as communities and NGOs although the effectiveness of the strategy may depend on institutional environments (Nartey et al., 2018). Although we do not observe collective action, our evidence suggests that investors also believe that stakeholder mobilization is higher in early stages, but only for countries with strong institutions supporting collective action. Our results are consistent with the view that high-status stakeholder management strategies are more effective in weaker institutional environments.

Finally, our results are based on the mining industry, which may have unique characteristics that separate it from other industries (Shapiro et al., 2018). However, our analysis is likely relevant for any projects that have long investment cycles and/or impose localized negative externalities that affect local communities, such as pipelines (McAdam et al., 2010), dams (Kirchherr et al., 2016), and wind turbines (Giordono et al., 2018). Thus, our analysis is likely to apply beyond the mining industry to include other extractive and energy projects, and large infrastructure projects. In these cases, collective action may or may not be related to water, but

we speculate that its unique characteristics make successful collective action more likely when water is involved. At the same time, disputes over water may result in collective action, even outside of these industries. For example, after low rainfall during the monsoon in 2016, more than a million vendors in Southern India boycotted Coca-Cola and Pepsi products because they exploited and threatened limited water resources in the region (Doshi, 2017). This case suggests that collective action may occur in other industries when communities compete with companies over the usage rights of resources. Thus, our findings may apply to any industry that competes with communities to use valuable public goods or common pool resources.

## 5.1 | Limitations and future research

First, we consider a model in which collective action is initiated by local groups and facilitated by access to complementary political, social, and media institutions. Although we believe that this view is supported by anecdotal and case study evidence, and that we have taken care to define institutional strength to reflect this view, it is true that causality remains an important question for future research, as is the question of how these elements interact. For example, it may be the case that media pressures and public opinion create strong political incentives for governments to impose stringent regulations that impose costs on firms. Similarly, causality may begin not with collective action, but with a strong regulatory resource regime that in turn encourages collective action. It is quite likely that establishing causality will be difficult, but more evidence that stakeholders mobilize against mining companies when they see potential environmental damages in proximate water sources would be a useful first step. Even if causality can be established, it is not clear whether all complementary institutions are necessary for success, and in what degree. Again, future research should be directed to this question.

Second, our analysis has relied on the theory of collective action and social movements to infer the nature and source of nonmarket risk. However, we do not actually observe collective action nor do we explicitly model the complex interaction between firms, investors, and stakeholders. There may well be other ways to attack the complexity of potential nonmarket risk and in particular risk mitigation strategies by explicitly examining these interactions.

## 6 | CONCLUSION

We conclude that stock markets apply a discount to otherwise positive announcements by mining companies whose mines are located near environmentally sensitive water sources, particularly rivers, and the negative response is even stronger when the mines are located in countries with strong institutions that support collective action. We have argued that proximity to water sources is a proxy for the potential nonmarket risks created by localized negative environmental externalities, which in turn are associated with both the incentive and ability for local stakeholders to engage in collective action to prevent the negative externalities. Moreover, we extend the analysis across host country institutional environments and suggest that institutional context matters in terms of market valuation of potential environmental and social risks. Contrary to other analyses of nonmarket risk, in the specific case that we examine, mines located near environmentally sensitive water sources in countries with *strong* institutions are more likely to have their announcements discounted by stock markets, that is, firm-specific nonmarket risk

associated with social and environmental concerns may be quite different from those associated with political concerns.

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## REFERENCES

- Agrawal, A. (2014). Studying the commons, governing common-pool resource outcomes: Some concluding thoughts. *Environmental Science and Policy*, 36, 86–91.
- Andrews, T., Elizalde, B., Le Billon, P., Oh, C.H., Reyes, D., & Thomson, I. (2017). *The rise in conflict associated with mining operations: What lies beneath?* Vancouver, Canada: Canadian International Resources and Development Institute.
- Aragón, F. M., & Rud, J. P. (2016). Polluting industries and agricultural productivity: Evidence from mining in Ghana. *The Economic Journal*, 126(597), 1980–2011.
- Aragón-Correa, J. A., Marcus, A., & Hurtado-Torres, N. (2016). The natural environmental strategies of international firms: Old controversies and new evidence on performance and disclosure. *The Academy of Management Perspectives*, 30(1), 24–39.
- Bach, D., & Blake, D. J. (2016). Framed or get framed: A critical role of issue framing in nonmarket management. *California Management Review*, 58(3), 66–87.
- Bartley, T., & Child, C. (2014). Shaming the corporation: The social production of targets and the anti-sweatshop movement. *American Sociological Review*, 79(4), 653–679.
- Bebbington, A., & Williams, M. (2008). Water and mining conflicts in Peru. *Mountain Research and Development*, 28(3), 190–196.
- Benford, R. D., & Snow, D. A. (2000). Framing processes and social movements: An overview and assessment. *Annual Review of Sociology*, 26(1), 611–639.
- Berman, N., Couttenier, M., Rohner, D., & Thoenig, M. (2017). This mine is mine! How minerals fuel conflicts in Africa. *American Economic Review*, 107(6), 1564–1610.
- Bertzky, M., & Stoll-Kleemann, S. (2009). Multi-level discrepancies with sharing data on protected areas: What we have and what we need for the global village. *Journal of Environmental Management*, 90(1), 8–24.
- Beugelsdijk, S., Ambos, B., & Nell, P. C. (2018). Conceptualizing and measuring distance in international business research: Recurring questions and best practice guidelines. *Journal of International Business Studies*, 49(9), 1113–1137.
- Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: The case of event studies. *Journal of Financial Economics*, 14(1), 3–31.
- Busch, T., Bauer, R., & Orlitzky, M. (2016). Sustainable development and financial markets old paths and new avenues. *Business & Society*, 55(3), 303–329.
- Conde, M., & Le Billon, P. (2017). Why do some communities resist mining projects while others do not? *The Extractive Industries and Society*, 4(3), 681–697.
- Cunningham, S. A. (2005). Incident, accident, catastrophe: Cyanide on the Danube. *Disasters*, 29, 99–128.
- Davis, G. F., Morrill, C., Rao, H., & Soule, S. A. (2008). Introduction: Social movements in organizations and markets. *Administrative Science Quarterly*, 53(3), 389–394.

- Davis, R., & Franks, D.M. (2014). Costs of company-community conflict in the extractive sector. In *Corporate Social Responsibility Initiative Report No. 66*, Cambridge, MA: Harvard Kennedy School.
- de Bakker, F. G. A., den Hond, F., King, B., & Weber, K. (2013). Social movements, civil society and corporations: Taking stock and looking ahead. *Organization Studies*, 34(5–6), 573–593.
- della Porta, D., & Diani, M. (1999). *Social movements: An introduction*. Oxford, U.K.: Blackwell.
- Deloitte. (2018). Tracking the trends 2018. The top 10 issues shaping mining in the year ahead. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-er-ttt-report-2018.pdf>.
- den Hond, F., & de Bakker, F. G. (2007). Ideologically motivated activism: How activist groups influence corporate social change activities. *Academy of Management Review*, 32(3), 901–924.
- Doh, J. P., Lawton, T. C., & Rajwani, T. (2012). Advancing nonmarket strategy research: Institutional perspectives in a changing world. *Academy of Management Perspectives*, 26(3), 22–39.
- Dorobantu, S., Henisz, W. J., & Nartey, L. J. (2017). Not all sparks light a fire: Stakeholder and shareholder reactions to critical events in contested markets. *Administrative Science Quarterly*, 62(3), 561–597.
- Dorobantu, S., Kaul, A., & Zelner, B. (2017). Nonmarket strategy research through the lens of new institutional economics: An integrative review and future directions. *Strategic Management Journal*, 38(1), 114–140.
- Dorobantu, S., & Odziemkowska, K. (2017). Valuing stakeholder governance: Property rights, community mobilization, and firm value. *Strategic Management Journal*, 38(13), 2682–2703.
- Doshi, V (2017). India traders boycott Coca-Cola for “straining water resources”. The Guardian <https://www.theguardian.com/world/2017/mar/01/indian-traders-boycott-coca-cola-for-straining-water-resources>.
- Durucan, S., Korre, A., & Munoz-Melendez, G. (2006). Mining life cycle modelling: A cradle-to-gate approach to environmental management in the minerals industry. *Journal of Cleaner Production*, 14(12–13), 1057–1070.
- Eesley, C., DeCelles, K. A., & Lenox, M. (2016). Through the mud or in the boardroom: Examining activist types and their strategies in targeting firms for social change. *Strategic Management Journal*, 37(12), 2425–2440.
- Erfemeijer, P. L., & Lewis, R. R. R. (2006). Environmental impacts of dredging on seagrasses: A review. *Marine Pollution Bulletin*, 52(12), 1553–1572.
- EY. (2014). Business risks facing mining and metals 2014–2015.
- Franks, D. M., Davis, R., Bebbington, A. J., Ali, S. H., Kemp, D., & Scurreah, M. (2014). Conflict translates environmental and social risk into business costs. *Proceedings of the National Academy of Sciences*, 111(21), 7576–7581.
- Gamson, W. A., & Meyer, D. S. (1996). Framing political opportunity. In D. McAdam, J. D. McCarthy, & M. N. Zald (Eds.), *Comparative perspectives on social movements: Political opportunities, mobilizing structures, and cultural framings* (pp. 275–290). Cambridge: Cambridge University Press.
- Gassert, F., Luck, M., Landis, M., Reig, P., & Shiao, T. (2014). *Aqueduct global maps 2.1: Constructing decision-relevant global water risk indicators*. Washington, DC: World Resources Institute (WRI).
- Gavious, A., & Mizrahi, S. (2001). A continuous time model of the bandwagon effect in collective action. *Social Choice and Welfare*, 18(1), 91–105.
- Giordono, L. S., Boudet, H. S., Karmazina, A., Taylor, C. L., & Steel, B. S. (2018). Opposition “overblown”? Community response to wind energy siting in the Western United States. *Energy Research & Social Science*, 43, 119–131.
- Globerman, S., & Shapiro, D. (2003). Governance infrastructure and U.S. foreign direct investment. *Journal of International Business Studies*, 34(1), 19–39.
- Godfrey, P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. *Strategic Management Journal*, 30(4), 425–445.
- Hanna, P., Langdon, E. J., & Vanclay, F. (2016). Indigenous rights performativity and protest. *Land Use Policy*, 50, 490–506.
- Hargrave, T. J., & Van de Ven, A. H. (2006). A collective action model of institutional innovation. *Academy of Management Review*, 31(4), 864–888.
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4), 986–1014.
- Hawn, O., Chatterji, A. K., & Mitchell, W. (2018). Do investors actually value sustainability? New evidence from investor reactions to the Dow Jones sustainability index (DJSI). *Strategic Management Journal*, 39(4), 949–976.

- Henisz, W. J., Dorobantu, S., & Nartey, L. J. (2014). Spinning gold: The financial returns to stakeholder engagement. *Strategic Management Journal*, 35(12), 1727–1748.
- Henisz, W. J., & Zelner, B. A. (2012). Strategy and competition in the market and nonmarket arenas. *The Academy of Management Perspectives*, 26(3), 40–51.
- Hiatt, S. R., Grandy, J. B., & Lee, B. H. (2015). Organizational responses to public and private politics: An analysis of climate change activists and U.S. oil and gas firms. *Organization Science*, 26(6), 1769–1786.
- Hilson, G., & Monhemius, A. (2006). Alternatives to cyanide in the gold mining industry: What prospects for the future? *Journal of Cleaner Production*, 14(12–13), 1158–1167.
- Hodges, H. E., & Stocking, G. (2016). A pipeline of tweets: Environmental movements' use of twitter in response to the keystone XL pipeline. *Environmental Politics*, 25(2), 223–247.
- Holburn, G. L., & Zelner, B. A. (2010). Political capabilities, policy risk, and international investment strategy: Evidence from the global electric power generation industry. *Strategic Management Journal*, 31(12), 1290–1315.
- Kemp, D., Bond, C. J., Franks, D. M., & Cote, C. (2010). Mining, water and human rights: Making the connection. *Journal of Cleaner Production*, 18(15), 1553–1562.
- Kemp, D., & Owen, J. R. (2013). Community relations and mining: Core to business but not "core business". *Resources Policy*, 38(4), 523–531.
- King, B. G. (2008). A social movement perspective of stakeholder collective action and influence. *Business & Society*, 47(1), 21–49.
- King, B. G., & Soule, S. A. (2007). Social movements as extra-institutional entrepreneurs: The effect of protests on stock price returns. *Administrative Science Quarterly*, 52(3), 413–442.
- Kirchherr, J., Charles, K. J., & Walton, M. J. (2016). Multi-causal pathways of public opposition to dam projects in Asia: A fuzzy set qualitative comparative analysis (fsQCA). *Global Environmental Change*, 41, 33–45.
- Kogut, B., & Singh, H. (1988). The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 19(3), 411–432.
- Kriesi, H. (2004). Political context and opportunity. In D. Snow, S. Soule, & H. Kriesi (Eds.), *The Blackwell companion to social movements* (pp. 67–90). Oxford, UK: Blackwell.
- Kumah, A. (2006). Sustainability and gold mining in the developing world. *Journal of Cleaner Production*, 14 (3–4), 315–323.
- Lawton, T., McGuire, S., & Rajwani, T. (2013). Corporate political activity: A literature review and research agenda. *International Journal of Management Reviews*, 15(1), 86–105.
- Lehner, B., & Döll, P. (2004). Development and validation of a global database of lakes, reservoirs and wetlands. *Journal of Hydrology*, 296(1–4), 1–22.
- Leonida, C. (2019). Water in mining: Every drop counts. *Engineering and Mining Journal*, 220(9), 40–43.
- Lo, A. W. (2007). Efficient markets hypothesis. In L. Blume & S. Durlauf (Eds.), *The new palgrave: A dictionary of economics* (2nd ed.). New York: Palgrave McMillan.
- Markus, M. L. (1987). Toward a "critical mass" theory of interactive media: Universal access, interdependence and diffusion. *Communication Research*, 14(5), 491–511.
- Marquis, C., & Raynard, M. (2015). Institutional strategies in emerging markets. *The Academy of Management Annals*, 9(1), 291–335.
- McAdam, D., & Boudet, H. (2012). *Putting social movements in their place: Explaining opposition to energy projects in the United States, 2000–2005*. Cambridge, U.K.: Cambridge University Press.
- McAdam, D., Boudet, H. S., Davis, J., Orr, R. J., Scott, W., & Levitt, R. E. (2010). "Site fights": Explaining opposition to pipeline projects in the developing world. *Sociological Forum*, 25, 401–427.
- McAdam, D., McCarthy, J. D., & Zald, M. N. (1996). Introduction: Opportunities, mobilizing structures, and framing processes. In D. McAdam, J. D. McCarthy, & M. N. Zald (Eds.), *Comparative perspectives on social movements: Political opportunities, mobilizing structures, and cultural framings*. Cambridge, U.K.: Cambridge University Press.
- McCarthy, J. D., & Zald, M. N. (1977). Resource mobilization and social movements: A partial theory. *American Journal of Sociology*, 82(6), 1212–1241.
- McDonnell, P., King, B. G., & Soule, S. A. (2015). A dynamic process model of private politics: Activist targeting and corporate receptivity to social challenges. *American Sociological Review*, 80(3), 654–678.

- Mellahi, K., Frynas, J. G., Sun, P., & Siegel, D. (2016). A review of the nonmarket strategy literature: Toward a multi-theoretical integration. *Journal of Management*, 42(1), 143–173.
- Mudambi, R., Li, L., Ma, X., Makoni, S., Qian, G., & Boschma, R. (2018). Zoom in, zoom out: Geographic scale and multinational activity. *Journal of International Business Studies*, 49, 929–941.
- Mudd, G., Northey, S. A., & Werner, T. (2017). *Water use and risks in mining*. Columbia University: Report to Columbia Water Center, Earth Institute.
- Mudd, G. M. (2008). Sustainability reporting and water resources: A preliminary assessment of embodied water and sustainable mining. *Mine Water and the Environment*, 27(3), 136–144.
- Murguía, D. I., Bringezu, S., & Schaldach, R. (2016). Global direct pressures on biodiversity by large-scale metal mining: Spatial distribution and implications for conservation. *Journal of Environmental Management*, 180, 409–420.
- Mutti, D., Yakovleva, N., Vazquez-Brust, D., & Di Marco, M. H. (2012). Corporate social responsibility in the mining industry: Perspectives from stakeholder groups in Argentina. *Resources Policy*, 37(2), 212–222.
- Myers, D. J. (2000). The diffusion of collective violence: Infectiousness, susceptibility, and mass media networks. *American Journal of Sociology*, 106(1), 173–208.
- Nartey, L. J., Henisz, W. J., & Dorobantu, S. (2018). Status climbing vs. bridging: Multinational stakeholder engagement strategies. *Strategy Science*, 3(2), 367–392.
- Northey, S., Haque, N., Lovel, R., & Cooksey, M. (2014). Evaluating the application of water footprint methods to primary metal production systems. *Minerals Engineering*, 69, 65–80.
- OECD. (2016). *OECD environmental performance reviews: Chile 2016*. Paris, France: OECD.
- Oetzel, J., & Oh, C. H. (2014). Learning to carry the cat by the tail: Firm experience, disasters, and multinational subsidiary entry and expansion. *Organization Science*, 25(3), 732–756.
- O'Faircheallaigh, C. (2013). Extractive industries and indigenous peoples: A changing dynamic? *Journal of Rural Studies*, 30, 20–30.
- Oh, C.H., & Oetzel, J. (2011). Multinationals' response to major disasters: How does subsidiary investment vary in response to the type of disaster and the quality of country governance? *Strategic Management Journal*, 32 (6), 658–681.
- Oliver, P. E., & Marwell, G. (1988). The paradox of group size in collective action: A theory of the critical mass. *II. American Sociological Review*, 53(1), 1–8.
- Olson, M. (1965). *The logic of collective action: Public goods and the theory of groups*. Cambridge, MA: Harvard University Press.
- Ossa-Moreno, J., McIntyre, N., Ali, S., Smart, J. C., Rivera, D., Lall, U., & Keir, G. (2018). The hydro-economics of mining. *Ecological Economics*, 145, 368–379.
- Ostrom, E. (2000). Collective action and the evolution of social norms. *Journal of Economic Perspectives*, 14(3), 137–158.
- Owen, J. R., & Kemp, D. (2013). Social licence and mining: A critical perspective. *Resources Policy*, 38, 29–35.
- Palumbo, G., & Malkin, E. (2017). El Salvador, prizing water over gold, bans all metal mining. *New York Times*. Retrieved from <https://www.nytimes.com/2017/03/29/world/americas/el-salvador-prizing-water-over-gold-bans-all-metal-mining.html>.
- Paredes, M. (2016). The glocalization of mining conflict: Cases from Peru. *The Extractive Industries and Society*, 3 (4), 1046–1057.
- Prino, J., & Slocombe, D. S. (2012). Exploring the origins of “social license to operate” in the mining sector: Perspectives from governance and sustainability theories. *Resources Policy*, 37(3), 346–357.
- Rowley, T. I., & Moldoveanu, M. (2003). When will stakeholder groups act? An interest-and identity-based model of stakeholder group mobilization. *Academy of Management Review*, 28(2), 204–219.
- Rowley, T. J. (1997). Moving beyond dyadic ties: A network theory of stakeholder influences. *Academy of Management Review*, 22(4), 887–910.
- Schmitt, C. J., Whyte, J. J., Roberts, A. P., Annis, M. L., May, T. W., & Tillitt, D. E. (2007). Biomarkers of metals exposure in fish from lead-zinc mining areas of Southeastern Missouri, USA. *Ecotoxicology and Environmental Safety*, 67(1), 31–47.
- Shapiro, D., Hobdari, B., & Oh, C. H. (2018). Natural resources, multinational enterprises and sustainable development. *Journal of World Business*, 53(1), 1–14.

- Smith, N.C., & McCormick, E. (2014). *Barrick gold corporation: Perfect storm at Pascua Lama*. INSEAD. Retrieved from [https://centres.insead.edu/social-innovation/what-we-do/documents/INSEADSocialInnovationCentre6021-Barrick\\_Gold-CS-EN-0-06-2014-award-w.pdf](https://centres.insead.edu/social-innovation/what-we-do/documents/INSEADSocialInnovationCentre6021-Barrick_Gold-CS-EN-0-06-2014-award-w.pdf).
- Snow, D. A., Soule, S. A., & Kriesi, H. (2004). Mapping the terrain. In D. A. Snow, S. A. Soule, & H. Kriesi (Eds.), *The Blackwell companion to social movements* (pp. 3–17). Oxford, UK: Blackwell.
- Soule, S. A. (1997). The student divestment movement in the United States and tactical diffusion: The shanty-town protest. *Social Forces*, 75(3), 855–882.
- Stevens, P., Kooroshy, J., Lahn, G., & Lee, B. (2013). *Conflict and coexistence in the extractive industries*. London: Chatham House.
- Tarrow, S. G. (1998). *Power in movement: Social movements and contentious politics* (3rd ed.). New York: Cambridge University Press.
- Vasi, I. B., & King, B. G. (2012). Social movements, risk perceptions, and economic outcomes: The effect of primary and secondary stakeholder activism on firms' perceived environmental risk and financial performance. *American Sociological Review*, 77(4), 573–596.
- Veiga, M. M., Scoble, M., & McAllister, M. L. (2001). Mining with communities. *Natural Resources Forum*, 25, 191–202.
- Wendling, Z.A., Emerson, J.W., Esty, D.C., Levy, M.A., & de Sherbinin, A. (2018). *2018 environmental performance index*. Yale Center for Environmental Law & Policy. Retrieved from <https://epi.envirocenter.yale.edu/downloads/epi2018policymakerssummaryv01.pdf>.
- Werner, T. (2017). Investor reaction to covert corporate political activity. *Strategic Management Journal*, 38(12), 2424–2443.
- World Resources Institute. (2010). Think solutions. World Resources Institute. Retrieved from [http://pdf.wri.org/wri\\_annual\\_report\\_2010.pdf](http://pdf.wri.org/wri_annual_report_2010.pdf).
- Wright, S., & Bice, S. (2017). Beyond social capital: A strategic action fields approach to social license to operate. *Resources Policy*, 52, 284–295.

## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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