Studies in Comparative International Development
https://doi.org/10.1007/s12116-023-09400-4

Testing the Drivers of Corporate Environmentalism in Vietnam

Edmund J. Malesky[1] · **Quynh Nguyen**[2,3]

Accepted: 25 August 2023
© The Author(s) 2023

Abstract

What motivates private firms' willingness to invest in green technologies and environmentally friendly operations? Some emphasize enhanced government regulation and enforcement, while others point to the greater potential of societal pressure. In this study, we use a survey experiment with more than 10,000 firms in Vietnam to test which type of stakeholder pressure has the strongest impact on domestic and foreign business leaders' intention to invest in green operations. We find that the effectiveness of stakeholder pressure is conditioned by the firms' target markets. Foreign investors are more susceptible than domestic firms to intensive regulatory pressure. Accounting for export orientation, however, we find that the most amenable policy targets for regulatory pressure are foreign firms aiming to sell in the Vietnamese domestic market.

Keywords Corporate environmentalism · Stakeholder pressure · Survey experiment · Emerging markets

For Approval

Introduction

National governments and international organizations emphasize the essential role of the private sector in transforming economic systems and reversing unsustainable global trends. The 2030 Agenda for Sustainable Development Goal 12, for example, encourages companies to adopt sustainable practices and integrate sustainability

An early version of the empirical write-up was published as a working paper in Chapter 3 of the Provincial Competitiveness Index 2020 report (https://pcivietnam.vn/en/publications/2020-pci-full-report-ct187), which is not peer-reviewed and only released in Vietnam.

✉ Quynh Nguyen
quynh.nguyen@wyssacademy.org

[1] Department of Political Science, Duke University, Durham, NC, USA

[2] Wyss Academy for Nature, University of Bern, Bern, Switzerland

[3] Institute of Political Science, University of Bern, Bern, Switzerland

information into their reporting cycle. The Addis Ababa Action Agenda takes this further and encourages greater accountability by the private sector to embrace business models that minimize negative social and environmental impact. Especially in emerging economies, where much of the world's future demand for energy and infrastructure will be located, there is recognition of the central role that private firms play in promoting green growth and climate action. Businesses can directly transform their operations and practices to reduce their impact on pollution and habitat degradation. The private sector can also contribute indirectly as a valuable source of finance for investments in low-carbon, climate-resilient infrastructure and a source of innovation in clean technologies and resource efficiency. The critical question, however, is under what conditions do firms and businesses engage in environmentally sustainable activities.

The literature on stakeholder pressure for sustainable economic development generally distinguishes between "public" and "private politics" as two broad approaches to motivating behavioral change among firms (Baron 2014). Public politics refers to the pressure exercised by government agencies in the form of legislation, regulation, and enforcement. In contrast, private politics denotes various forms of activism by NGOs, such as media campaigns and coordinated boycotts.

There are trade-offs with each approach, especially in low-income countries with limited government resources. On the one hand, regulatory enforcement can be managed directly by the country's political leadership and therefore has the benefit of efficiency. On the other hand, increased regulation is expensive, requiring a significant investment in the scale and technical capacity of environmental regulators. Societal pressure is clearly less expensive for the state authorities and investors but also has more uncertain outcomes, because it hinges upon the ability of non-state actors to access adequate information on business' environmental behavior and upon consumers to respond by reducing their consumption of goods and services from dirty businesses. By testing the relative impact of these two incentives directly against one another, our study addresses the question of whether more government regulation is needed to bring about change in firms' green intentions or whether there is more room for "self-regulation," when firms respond more strongly to pressures by non-state actors, including NGOs and citizens' demands (Malhotra et al. 2019).

A number of studies have examined the impact of different types of stakeholder inducements on corporate environmental strategies and practices (e.g., Darnall et al. 2010; Delmas and Toffel 2004; Papagiannakis et al. 2019). However, this work has mainly focused on testing the individual effect of either public or private pressure on firms' behavior. Some studies show that the pressure of public politics has a positive impact on corporate sustainability action, whereas others find that NGO campaigns have positive outcomes on firms' environmental behavior. Rarely have the two impetuses been tested against one another. Thus, while the existing evidence from previous research raises important insights and starting points, there is no conclusive evidence as to which accountability mechanism firms are most responsive. However, answering this question has critical policy implications for host governments.

To address this gap, we conducted survey experiments as part of the Provincial Competitiveness Index (PCI) survey of domestic and foreign investors (PCI-FDI) in

For Approval

Vietnam[1] between August and October 2020. Our sample consists of 8633 domestic and 1561 foreign firms from 42 different countries that are currently invested in Vietnam. Our design allows us to directly compare the relative importance of public and private politics mechanisms on firms' sustainability action rather than simply testing whether public or private politics mechanisms have an effect at all (compared to a state in which no such pressure exists). Specifically, putting these two types of stakeholder pressure in a horse race, we examine which type has the strongest impact on firms' willingness to invest in environmental upgrading. Furthermore, in addition to testing the influence of regulatory and societal pressures from NGOs and consumers on corporate environmentalism, we examine how important firm characteristics, such as firm size, export market, ownership structure, and firms' environmental risk perception, moderate this relationship.

Looking at both the extensive margin of whether firms invested any money at all and the intensive margin of how much they spent, we find that foreign investors are more susceptible to intensive regulatory pressure. Seventy-four percent of foreign businesses that received the regulatory treatment expressed a willingness to expend greater resources on environmental upgrading, compared to 67% of firms that received the societal pressure treatment (a 7 percentage point average treatment effect (ATE) that is significant at the $p < 0.05$ level). Taking advantage of nationally representative data to extrapolate to the population of foreign investors in Vietnam, this implies greener investments in about 1700 firms with $20.6 billion in invested capital. On an extensive margin, these businesses would spend roughly $1600 per month in environmentally friendly expenditures. By contrast, we find no difference for domestic investors; 68% expressed a willingness to invest in new environmental equipment and processes, regardless of treatment. We also do not find evidence for change with respect to the intensive margin—the increase in the share of operating costs that foreign and domestic firms were willing to spend to increase the environmental cleanliness of their operations.

Disaggregating our analysis by whether firms' primary customers are citizens and businesses in Vietnam or customers outside the country, who are reached through export, we find that the effects on the extensive margin (the firm's willingness to pay for environmental upgrading) are most pronounced for foreign firms seeking to access the domestic market and domestic firms pursuing export. However, the type of stakeholder pressure that matters most varies between the two groups. Domestic-oriented foreign firms, because of their visibility and size, are more likely to respond to the regulatory pressure treatment (ATE = 8.2 percentage points). By contrast, export-oriented domestic firms, because they are concerned about selling to consumers with Western values, are more likely to be influenced by the societal pressure treatment (ATE = 3.21 percentage points).

Contrary to our expectations, we find that firms' subjective and objective vulnerability to climate risk does not influence the effects of regulatory or societal pressure. The higher the climate risk to a firm's particular business, the more likely they

[1] https://pcivietnam.vn/en/publications/survey-questionnaires

For Approval

are to upgrade, but this effect is not enhanced by additional societal or governmental pressure.

We contribute to the existing literature on the impact of stakeholder pressure on corporate environmental practices in several ways. First, previous work on questions of regulatory compliance has involved in-depth case studies of a few firms or cross-national studies of aggregate investment and environmental measures. While both approaches have their strengths, the designs also have well-known shortcomings in understanding these phenomena. On the one hand, case studies have tended to focus on large, highly visible firms, which can overlook the motivations of smaller actors, whose actions also greatly contribute to pollution and climate change. Similarly, studies focusing on a single sector such as the hotel industry (Céspedes-Lorente et al. 2003), papermaking (He et al. 2018), or tourism (Le et al. 2006) provide useful insights, but idiosyncrasies of a particular sector, such as industrial organization, market structure, or management practices, make it difficult to generalize to other arenas. On the other hand, cross-national designs can be weakened by unobserved heterogeneity. Socioeconomic, cultural, and institutional differences at the country level can be highly correlated with investment and compliance decisions confounding the ability to isolate causal pathways. Moreover, legal differences across countries can be extremely large, making it difficult to generalize about the implications of specific regulatory mechanisms.

Our large-*n* experimental design within a single emerging market covering all of Vietnam's 63 provinces and a broad representation of economic sectors and individual industries at the four-digit level allows us to hold national-level variables constant while leveraging on theoretically relevant spatial and sectoral variation. Indeed, our findings emphasize the importance of the characteristics of the firms, which are at the receiving end of stakeholder pressures for corporate environmentalism. Specifically, the impact of regulatory versus societal pressures on firms' likelihood to invest in environmentally friendly operations depends significantly on their targeted customer base, suggesting that "one-size-fits-all" solutions are unlikely to generate widespread shifts in firms' willingness to engage in sustainable action.

Second, with the exception of a handful of studies,[2] the majority of work has been limited to analyses of firms operating in developed countries. However, the theorized dynamics of the impact of stakeholder pressure can depend strongly on the local regulatory framework and state enforcement capacity, which differ dramatically between developed and developing economies. Thus, by studying the influence of state versus NGO and consumer pressure on firms' intentions for environmental upgrading in Vietnam, we test the empirical validity of existing theoretical frameworks on the impact of social pressure on corporate environmental practice beyond advanced industrialized countries.

Our final contribution is methodological. We pre-registered our hypotheses, outcome variable measurements, and model specifications with the Evidence in Governance and Politics (EGAP) network before the survey was conducted and data was

[2] For China, see He et al. 2018. For a study of Indian firms, see Singh et al. 2014.

For Approval

collected.[3] Upon receiving the PCI data, we strictly followed these procedures to assure readers that our analysis choices, especially in regard to sub-group effects, were strictly driven by the underlying theories we wished to test when we designed the survey experiment.

Theory

From an economic standpoint, firms' decisions about whether to implement environmental measures are driven by considerations of the net benefit of the activity. A number of studies demonstrate that firms can gain significant competitive advantage from environmentally responsible business conduct through cost savings from environmental innovation and sustainable supply chain management.[4] In addition, corporate environmental action has also been shown to create stronger consumer relationships (Distelhorst and Locke 2018; Hainmueller et al. 2015; Malesky and Mosley 2018) and attract more productive employees, who are willing to accept lower salaries (Hedblom et al. 2019).

On the cost side, firms do not only incur implementation costs, regulatory compliance costs, and opportunity costs from forgone benefits from investment in another activity, but they may also incur costs from non-implementation of environmental practices in the face of social pressure to do so. For instance, non-compliance with government regulations may lead to the potential loss of a firm's investment license, while a lack of response to demands by activist groups to act green can engender reputational costs.

The debate on the role of stakeholders in instigating corporate environmentalism has generated a rich literature, which generally distinguishes between social pressure through public and private politics; "public" refers to pressure from government regulation, and "private" refers to pressure for social change demanded by NGOs and social activists.

The Pressure of Public Politics

Firms are embedded in the broader regulatory environment of the state in which they operate.[5] Thus, coercive pressures from government, regulators, and legal policies on firms' environmental strategies are considered to be among the most important factors influencing corporate environmental actions (Wang et al. 2020; see also Henriques and Sadorsky 1996; Dasgupta et al. 1998). For example, it is widely assumed

[3] An anonymous version of the pre-analysis plan (PAP) can be found here. ~~Please note that the related survey experiment in Myanmar was dropped due the ongoing civil conflict~~ https://www.dropbox.com/s/evrqeh9kra29epl/20200707_CorporateGreen_PAP.pdf?dl=0

[4] See Brekke and Pekovic (2018) for a comprehensive review.

[5] At a more abstract level, firms can be described as organizations that are embedded in a specific institutional context, in which they face various institutional pressures. Organizational responses to such pressures vary depending on the institutional context and the firms' characteristics (Greenwood et al. 2014).

For Approval

that variation in regulation and regulatory enforcement accounts for differences in environmental performance by regulated businesses.

Scholars broadly differentiate between command-and-control regulation (direct regulation) and incentive-based regulation (voluntary regulation) with each arguably generating different incentive structures for corporate environmental action (Williams 2012; Lopez-Gamero et al. 2010). In this study, we focus on direct regulation, which is the more dominant form of environmental regulation in our study site of Vietnam. This type of pressure compels firms to adopt green practices through means such as regulatory inspections and fines and penalties for non-compliance. Typically, the government exerts pressure on firms with the issuance of environmental regulations, through which they seek to promote firms' environmental practices with administrative power and to urge them to adjust their environmental strategies (Wang et al. 2020).

While firms' compliance with environmental regulations is often attributed to the need to avoid penalties for non-compliance, the corporate social responsibility (CSR) literature presents additional motives that drive firms to respond positively to state pressure. These include signaling, preemption, and innovation.

The signaling model suggests that more efficient firms might voluntarily overcomply with existing regulations to signal that compliance is manageable and not overly costly (Denicoló, 2008). This anticipation aims to influence the introduction of more stringent regulations by poorly informed governments, potentially creating a competitive advantage for firms with better compliance records (Urpelainen 2011). Alternatively, the regulatory preemption theory posits that firms engage in voluntary pollution abatement to preempt potential future regulations, thereby avoiding the complexities of the political process and achieving welfare gains (Maxwell and Decker 2006; Maxwell and Lyon 2008). Another perspective, the *properly designed regulations* hypothesis asserts that well-crafted, stringent regulations can stimulate firms to adopt resource-efficient practices, foster innovation, and ultimately enhance competitiveness and profits (Porter and van der Linde 1995).

While these explanations offer insights into potential mechanisms, the nature of experimental design limits our ability to test these mechanisms directly. Our focus remains on establishing the causal impact of different types of stakeholder pressure on firms' intentions to engage in sustainable upgrading. Our first hypothesis reads as follows:

> Hypothesis 1: Public politics pressure (direct regulation) by the government is likely to increase firms' willingness to invest in more environmentally friendly operations.

For Approval

The Pressure of Private Politics

For regulatory pressure to have a meaningful impact on firms' behavior, strong and well-established institutions are required (Campbell 2007). Yet, in many countries, especially low-income and emerging markets, the government lacks the regulatory and governance framework to enforce its laws (Blackman 2010). Indeed, in Vietnam,

effective implementation of the existing environmental laws has been hampered by limited human and financial capacity and inconsistency and contradictions within the laws, as well as ambiguous responsibilities of the involved government agencies (Schulte 2016). In such a context, non-regulatory, external pressure exercised by civil society actors and consumers may have a stronger impact on firms' environmental strategies. Especially in the domain of environmental protection, activists have increasingly resorted to private politics tactics to induce behavioral change by business actors (Reid and Toffel 2009).

Although citizens and civil society actors, such as non-governmental organizations (NGOs), lack the authority and instruments to subject firms to sanctions and legal punishment for unsustainable behavior, they may still be able to impose considerable costs on firms. For example, NGOs can impact the reputation of the company through indirect mechanisms, such as public protests and environmental litigation (Sharma and Henriques 2005). In addition, NGOs can also have a direct effect on the economic performance of firms by calling on consumers to boycott certain firms or products (Horbach et al. 2012). In sum, firms may be encouraged to accommodate social pressure for corporate environmental action in order to avoid these reputational and economic costs.

Conversely, firms may also stand to benefit by responding to social pressure. Focusing on consumer preferences and decisions, the green consumerism literature underlines market-based explanations for firms' willingness to engage in environmental actions (Maxwell and Decker 2006). Green consumer models see voluntary environmental initiatives as an attractive way to differentiate firms' products. Assuming that citizens have heterogeneous preferences, some might be willing to buy greener products, while others would opt for a regular product. Hence, firms can offer environmentally friendly produced goods to reach out to consumers with green preferences. As a result of this product differentiation, producers can reduce the price competition and attract green consumers willing to pay a price premium (Maxwell and Decker 2006: 435). Reflecting on the pressure that can be brought by civil society groups, we hypothesize that.

> Hypothesis 2: Private politics pressure by NGOs and consumers is likely to increase firms' willingness to invest in environmentally friendly operations.

That said, there are also reasons to believe that the lack of strong regulatory institutions in developing countries may lower the effectiveness of pressure from non-state stakeholders on firms' environmental intentions.

First, environmental NGOs and advocacy groups do not have a strong presence and are relatively weak in developing countries (Wehrmeyer and Mulugetta 1999). In Vietnam, while the number of foreign NGOs and Vietnamese NGOs has increased substantially since the "Doi Moi" reforms in the late 1980s, and environmental protests have increased in frequency and importance, NGOs are not independent, and the government continues to hold a tight grip on their operations (Nguyen and Datzberger 2018). To obtain a permit to operate in Vietnam, foreign and local NGOs must undergo a lengthy legal process, through which the government seeks to ensure that the organization is not threatening.

For Approval

Second, the impact of indirect measures by NGOs, such as protests or boycotts, rests on the assumption that these measures provide public information about the firms' environmental performance, thereby encouraging consumers and other stakeholders to act (Blackman 2010). This mechanism relies critically on the free flow of information in the society under question. However, in many developing countries, the free flow of information is severely restricted as reflected in the limitation of free speech and free press. In the latest World Press Freedom Index, Vietnam is ranked at 175th place (out of 180).

Third, NGOs and advocacy groups can overreact leading to false alarms and ambiguous messaging. NGOs often have their own agendas, which may not perfectly align with broader societal goals. This fact has been emphasized by work on the democratic deficit, illustrating that NGOs and civil society organizations often purport to speak for the broader public even though they themselves are not democratically selected, and therefore sometimes lack the same accountability and formal mandate of government actors (Papadopoulos 2003).

For Approval

Moderating Effects of Firm Characteristics

In what follows, we test the relative impact of public versus private politics pressure on firms' willingness to engage in environmental upgrading. We expect different types of firms to react differently to regulatory and societal pressures. In particular, while some firms are more likely to be targeted by public politics driven by government regulations, others may be more subjected to NGO campaigns. In this study, we focus on three firm characteristics that may generate different forms of targeting and responsiveness by targeted firms: (1) ownership structure, (2) customer base, and (3) environmental risk exposure.

On the one hand, while foreign firms, especially larger ones, are more visible and may be subject to more inspections by host country regulators, they can threaten the host government by relocating their operations and investments to a different jurisdiction. They can also sue domestic governments for the costs of new regulation in international tribunals through investor-state dispute settlement (ISDS). In contrast, domestic firms do not possess this powerful bargaining instrument and tend to be much more dependent on establishing sound relations with the government, especially in a non-democratic context like Vietnam with less frequent changes of political leadership. As a result, domestic firms may be more responsive to direct coercive pressure by the government than foreign firms.

On the other hand, foreign firms suffer a "liability of foreignness" (Hymer 1976) . They are more easily identifiable by regulators, less familiar with the business and political conditions of the local market, less likely to have elite connections to avoid regulatory burdens (Zaheer 1995), and ultimately more responsive to the costly regulatory pressures exerted by local authorities (Eden and Miller 2004).

Hypothesis 3: The effect of regulatory pressure on domestic firms will be greater than for foreign firms (outside options hypothesis).

Hypothesis 4: The effect of regulatory pressure on foreign firms will be greater than for domestic firms (liability of foreignness hypothesis).

Additionally, we expect the salience of stakeholder pressure to vary with firms' exposure to foreign markets. Exporting firms need to not only comply with the regulations of the foreign market, but also with the consumer preferences in these markets. Especially when exporting their products to developed country markets, which typically have more stringent environmental regulations and a more environmentally conscious consumer base, firms are more likely to be sensitive to societal pressure to upgrade their corporate environmental practices (Prakash 2000; Vogel 2009).[6]

Hypothesis 5: The effect of societal pressure on exporters will be greater than for firms selling to the domestic market.

Finally, regardless of the type of stakeholder pressure, we expect firms' willingness to act green to increase when they perceive the environmental risk to their business to be severe. In the past 5 years, Vietnam has experienced a large number of expensive environmental events including the leakage of chemical waste into the Eastern Sea, salination in the Mekong Delta, and landslides and flooding in central Vietnam. These events hurt many businesses by damaging facilities, products, and equipment. They also disrupted sales due to supply chain breakdowns or declining demand for the product. Companies engaged in tourism or accommodation suffered from declining visitors, while companies selling to international markets faced increasing consumer wariness about the health and safety of their products. We therefore predict that firms that perceive high environmental risks are more likely to be responsive to both types of stakeholder pressure than firms that consider environmental degradation to pose no/lower risks to the firm's operations.

Hypothesis 6: Responsiveness to regulatory pressure is conditioned by exposure to environmental risk.

For Approval

Data and Methodology

We inserted a randomized experiment into the environmental module of the PCI and PCI-FDI surveys of (1) 8633 domestic firms in all 63 Vietnamese provinces and (2) 1561 foreign firms from 42 different countries in the 21 Vietnamese provinces with the greatest concentrations of foreign investment.[7] In response to the

[6] Moreover, exporting to developed markets also promises higher markups, which may incentivize firms to engage in product differentiation in order to benefit from a higher price premium for their environmentally friendly product. Malesky and Mosley (2018) make a similar argument with regards to firms' motives to engage in upgrading labor standards.

[7] Appendix 4 presents a series of balance tests, using inverse probability weights to correct for differences in provincial population sizes and response rates. The table demonstrates that the randomization was successful in that the two treatment groups are balanced on the main variables and other potential confounders. This also demonstrates that any potential non-response bias was not associated with treatments.

emerging environmental pressures that have accompanied Vietnam's economic growth, which has averaged over 6% annually since 1990, the central political leadership has issued numerous laws, decrees, and circulars aimed at managing its environmental challenges and ensuring the sustainable development of its emerging economy. The main challenge for Vietnamese central and local authorities is to identify what policy steps are necessary to encourage businesses to take these complicated and expensive steps in the interest of meeting these ambitious targets and enhancing sustainable development in Vietnam.

We implemented our survey experiments in collaboration with the Vietnamese Chamber of Commerce and Industry (VCCI). Both the PCI and PCI-FDI surveys are mail-out surveys. In both surveys, we employed a stratified random sampling strategy within each of the surveyed provinces with strata based on the age (entered before or after 2010), broad sector (agriculture, manufacturing, services, natural resources), and investment type (sole proprietorship, limited liability company, joint-stock company, joint venture, 100% foreign-owned) of the firm. The uncorrected response rate for the PCI surveys was about 32%, although after correcting for incorrect addresses and contact information, the adjusted response rate is usually about 50%. About 70% of surveys are answered by the owner, CEO, or top manager with the rest completed by other high managers or financial officers. The fact that the top decision-makers answer the survey guarantees a high degree of accuracy and knowledge about the specific questions asked in the survey.

Information Treatments

To examine the impact of different types of stakeholder pressure on firms' willingness to engage in corporate environmentalism, we randomly assigned survey respondents to information treatments. Specifically, the treatments consist of short texts, which either emphasize government-induced or civil society and consumer-induced pressure for sustainable action. Comparing the two allows us to determine which type of information is more influential for firms' green upgrading motivations. The treatment texts read as follows:

Form A	Form B
Regulatory pressure (RegPress)	Societal pressure (SocPress)
The national government has announced stricter environmental laws (i.e., environmental impact assessments for new investment projects, compliance review of environmental regulations). These laws involve high penalties, including the withdrawal of firm's business license in case of violation	A non-state organization in Vietnam has begun to publish a green list, ranking individual firms on the size of their environmental impact and classifying firms (including SMEs) as either green champions or dirty polluters. This ranking will be released to customers, who may make purchasing decisions based on a firms' environmental reputation

For Approval

Outcome Variables

After reading the information, respondents were asked (a) whether they would be willing to invest and, if so, (b) how much money they would be willing to invest (as a share of their company's operating costs) in upgrading their firm's environmental performance. Thus, we use two variables to measure firms' responsiveness to government and civil society pressure, respectively: (1) the firm's willingness to pay for environmental upgrading (Any spending), and (2) the share of operating costs (in percent) the firm is willing to invest in environmental upgrading (Share).[8]

Any spending is coded as 1 if the firm checked any value in the scale greater than zero and 0 otherwise. This provides us with an extensive margin for upgrading. We measure *Share* using a 5-point scale ranging from 0% (0) to over 10% (4). This provides the intensive margin, the size of the potential investment. If the two types of stakeholder pressures have a differential impact on firms' willingness to engage in environmental upgrading, we should observe significant differences in the reported willingness (Any spending) and the amount (Share) reported between the two groups.[9]

Stratification and Blocking Variables

As noted earlier, both surveys use two-stage sampling strategies, where a subnational administrative level (the province) is the primary sampling unit. Firms located within these units are likely to interact as well as have similar interactions with local regulatory officials, workers, and citizens. Consequently, the errors between firms within sampling units are likely to be correlated, violating the independent and identically distributed (i.i.d.) assumptions of the linear model. In other words, each draw of a new firm from the underlying sample within each unit provides less information than a purely random draw. To address this problem, we cluster standard errors at the provincial level.

Once primary sampling units are selected, firm sampling and assignment to treatment conditions were performed using stratified random sampling to ensure balance in critical covariates and reduce sampling error (Bruhn and McKenzie 2009). The strata are based on firm age, broad sector, and legal form.[10] Following Bruhn and McKenzie (2009), all estimations include fixed effects for the blocking variables used in the sampling process. The main regression estimates employ inverse probability weights to correct for differences in provincial population sizes and response rates

For Approval

[8] All hypotheses and both outcome variables were pre-registered.

[9] For question wording of all variables used in analysis, see Online Appendix 1, descriptive statistics are available in Appendix 2 and bivariate correlations in Appendix 3.

[10] While employment size is another potential candidate, it is strongly correlated with legal form. For this reason, we did not stratify our sample based on employment size, but use it as a pre-treatment control variable in all our model specifications.

For Approval

Table 1 Error correction and strata/blocking variables used in analysis

Adjustment	VN-domestic	VN-foreign
Clustered standard errors (primary sampling unit)	Province	Province
Survey weights (inverse probability weighting)	Yes	Yes
Sector (1. natural resources, 2. manufacturing, 3. construction, 4. wholesale/retail, 5. other services)	Yes	Yes
Age (1. entered before 2014 Investment Law, 2. entered after 2014 Investment Law)	Yes	Yes
Legal form (1. sole proprietorship, 2. limited liability company, 3. joint-stock company, 4. joint venture, 5. 100% foreign-owned)	Yes	Yes

and permit the calculation of nationally representative estimates.[11] Table 1 below provides a list of the blocking variables and coding that are used in the analysis.

Heterogeneous Treatment Effects

As stated in hypotheses 3–6, we expect certain firm characteristics to moderate the impact of stakeholder pressure on firms' willingness to engage in environmental upgrading. To test hypotheses 3 and 4, we use a dichotomous measure for ownership. *Foreign* is coded as 1 if a firm is registered as a foreign company and answered the PCI-FDI survey (FDI = 1). In contrast, firms that are registered as a domestic firm and answered the PCI survey are coded as 0. We probe the moderating effect of the firm's exposure to foreign markets (hypothesis 5) based on the firms' reported customer base, which we then collapse into a dichotomous variable (*Export*). Firms that are partly or exclusively engaging in exporting to the home country (only applicable in the PCI-FDI sample), exporting to a third country, or exporting indirectly through an overseas buyer or larger foreign company are coded as 1 and 0 otherwise.[12] Unfortunately, too few domestic firms in the PCI survey export, and the surveys do not provide adequate information about the final destination markets of the domestic firms' exports to allow for distinction between developed and developing export markets.[13] However, we argue that firms that engage in exporting are more likely to be responsive to societal pressure because exporting raises the probability of exposure to foreign demands, as at least some of the exports will go to foreign (and developed) countries.

Finally, testing hypothesis 6 requires a measure of the firm's perceived environmental risk. To measure environmental risk exposure, we use two measures. First, *environmental damage* is a continuous variable indicating the (logged) economic loss (in VND) due to environmental disaster(s) suffered by the firm in the previous year. Second, *environmental impact* is the firm's answer on a 10-point scale of environmental risk pioneered in the Rockefeller Foundation's City Resilience Index of climate change.[14] The measure is recoded such that a higher score indicates more skepticism about the impact of climate change on the firm's business.

We collected all this information from questions in the survey prior to the administration of the survey experiment. Question wording of all survey items used in the main analysis is included in Table 1 of the Appendix.

For AEPro v.1

[11] We are grateful to an anonymous reviewer for suggesting this correction. However, two notes are in order. First, survey weights were not registered in our pre-analysis plan but were added as part of the review process. Second, we do not use survey weights in Table 4 due to insufficient provincial population sizes in the export-oriented investor subgroups, leading to bias in treatment effect sizes. In these estimates, we cannot claim a national population effect, implying external validity, but can still claim internal validity between treatment and control group samples, due to random assignment and covariate balance among firms in these assignment conditions.

[12] An analysis of foreign firms' exports to developed versus developing countries is included in the online appendix.

[13] In the Vietnam foreign firm sample, respondents were asked to report the name of the country it is exporting to if it is not the home country of the firm. Thus, to test the developed country hypothesis, we will rely on the PCI-FDI survey.

[14] https://www.rockefellerfoundation.org/report/city-resilience-index-2/

Estimation Strategy

To test our hypotheses, we estimate both average treatment effect (ATE) as well as provide a formal test of the information treatment in a regression framework, including a set of control variables and clustered standard errors.

Difference-in-means

Given the successful random assignment, we can estimate the average treatment effect (ATE) as follows:

$$\alpha_{\text{ATE}} = \text{E}\left[\text{Y}_{\text{Reg.}} - Y_{\text{Soc.}}\right] = \text{E}\left[Y|D = \text{RegPress}\right] - E[Y|D = \text{SocPress}] \quad (1)$$

where Y denotes our outcome variable of interest and D indicates whether the respondent was assigned to the government pressure text (RegPress) or to the NGO pressure text (SocPress). We then use a two-sample t-test to evaluate whether there is a significant difference between the means of our two treatment groups. We reject null hypothesis 0: $\alpha_{\text{ATE}} = 0$ against alternative hypothesis 1:$\alpha_{\text{ATE}} \neq 0$ at the 5% significance level if $|t| > 1.96$.

Regression analysis

To ensure consistency across specifications with and without interaction effects, we use a linear regression model with robust standard errors (u) clustered at the primary sampling unit (p) level and inverse probability weights. Firms are indexed by i. As noted above, we pre-registered two outcome variables (y) to capture the intensive margin (1 = any investment) and the extensive margin (5-point scale of investment share). The constant α_0 depicts the average green investment for firms receiving the SocPress, whereas α_1 provides the ATE of the RegPress over and above the effect of the SocPress. As discussed above, we include fixed effects for the relevant blocking variables, including broad sector (γ), age (χ), and legal form (φ). In sensitivity tests, we substitute entry year fixed effects, which range from 1996 to 2019, for the dichotomous measure of firm age, and we replace broad sector with more fine-grained two-digit sector fixed effects based on the fourth revision of the International Standard Industrial Classification (ISIC) coding scheme. We also control for firm size, including the number of employees to date (in 2020) (*Labor*) which we consolidate to a 5-point scale ranging from fewer than 5 (1) to over 200 workers (5). As a second measure of size, we use firms' reported equity capital (*Equity*). Firms indicated the amount of their investment size to date (in 2020) on a 1–5-point scale. This measure ranges from under 0.5 billion VND (equivalent to $25,000 USD) (1) to above 10 billion VND equivalent to $500,000 USD) (5).[15]

$$y_{ip} = \alpha_o + \alpha_1 \text{RegPress}_{ip} + \gamma_{ip} + \chi_{ip} + \varphi_{ip} + u_{ip} \quad (2)$$

[15] Additional sensitivity tests control for equity size on a 5-point scale in Appendices 6A-6c.

For Approval

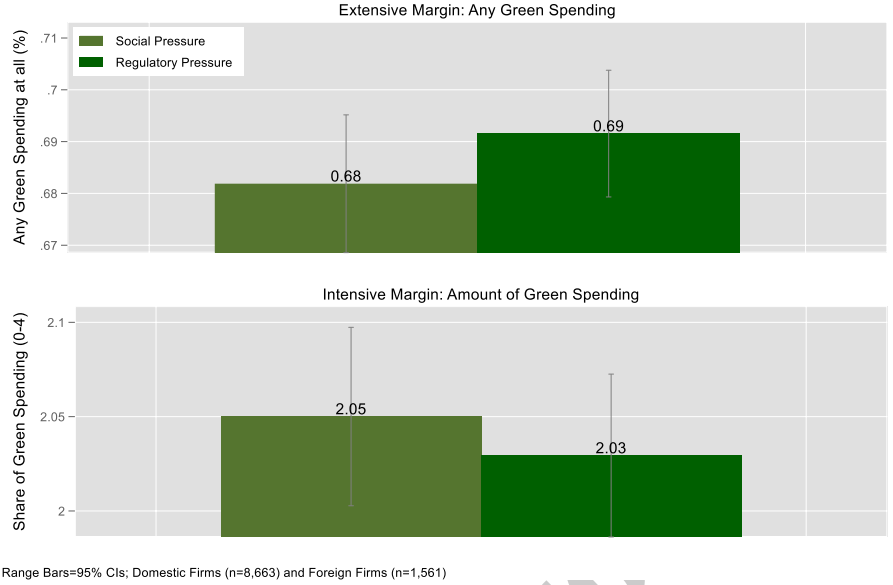

Fig. 1 Difference-in-means by regulatory pressure

We use OLS regressions based on Eq. 2 to estimate heterogeneity in treatment effects among firm subgroups, where we regress our outcome variable on treatment status as well as interaction terms of the treatment variable and the covariate of interest.

Results

Figure 1 provides the simple difference-in-means for the extensive and intensive margins on the pooled sample of foreign and domestic firms. As is clear, there is no significant difference between the regulatory and societal pressure on the decision to invest. Sixty-nine percent of firms that receive the regulatory treatment claimed that they would be likely to spend more on green upgrades, but this was not significantly more than the 68% recorded for firms receiving the societal pressure treatment. Similarly, the average spending for both treatment groups was about 2% of operating costs and not marginally different from one another.

These findings are confirmed by multiple regression analysis, controlling for labor size, sector fixed effects (both broad and two-digit), and age fixed effects (both dichotomous and individual entry year) (see Table 2). The two different models for each outcome variable show that the null results remain even after moving to more detailed specifications of the control variables, using the license year instead of the categorical measure of age and using the two-digit industry over the broad sector.

In sum, in the pooled sample, we find no significant differences in firm intentions from the different forms of stakeholder pressure. Below, we explore why this

For Appr

Table 2 Effect of regulatory pressure on any environmental spending

Dependent variable	Any green spending = 1		Amount of green spending (0–4)	
	(1)	(2)	(3)	(4)
Regulatory pressure = 1	0.019	0.018	0.004	0.001
	(0.018)	(0.018)	(0.060)	(0.058)
Labor size (1–6)	0.009	0.012^	−0.025	−0.008
	(0.006)	(0.006)	(0.020)	(0.021)
Constant	0.622***	0.299***	1.937***	1.129***
	(0.026)	(0.080)	(0.084)	(0.280)
Categorical age FE	Yes	No	Yes	No
Broad sector FE	Yes	No	Yes	No
Legal form FE	Yes	Yes	Yes	Yes
License year FE	No	Yes	No	Yes
2-digit ISIC FE	No	Yes	No	Yes
Observations	9367	9266	9367	9266
Clusters	63	63	63	63
R-squared	0.004	0.019	0.008	0.020
RMSE	0.460	0.458	1.651	1.648

Linear models with inverse probability weights based on share of total enterprises in province. Robust standard errors, clustered at province level

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\wedge}p < 0.1$

For Approval

one-size-fits-all approach may be ill-suited for businesses with very different customers and business cultures.

Heterogenous effects

To estimate the potential heterogenous treatment effect across domestic versus foreign firms, stated in hypotheses 3 and 4, we estimate the following regression model (Eq. 3), which includes the interaction between RegPress and Foreign:

$$y_{ip} = a_0 + a_1 \text{RegPress} + a_2 \text{Foreign} + a_3 \text{RegPress}_{ip} * \text{Foreign}_{ip} + y_{ip} + \chi_{ip} + \varphi_{ip} + u_{ip} \tag{3}$$

Table 3 reports the results. Models 1 and 2 show the results for the extensive margin (Any spending). Models 3 and 4 report the results for the intensive margin (Share). We include a set of firm characteristics variables (employment size, age, and sector fixed effects) to account for the fact that while assignment to our information treatment is random, a firm's ownership structure is not, and foreign firms might differ significantly from domestic firms on a number of structural characteristics that we care about. As above, models 1 and 3 differ from models 2 and 4 in the specificity of the control variables. Models 1 and 3 use broad categories for age and sector, whereas models 2 and 4 use the actual entry year and two-digit ISIC code.

Table 3 Conditional effect of FDI and regulatory pressure on environmental spending

Dependent variable	Any green spending = 1		Amount of green spending (0–4)	
	(1)	(2)	(3)	(4)
Regulatory pressure = 1	0.016	0.015	− 0.005	− 0.005
	(0.019)	(0.019)	(0.063)	(0.061)
FDI = 1	− 0.043	− 0.052	− 1.100***	− 1.127***
	(0.035)	(0.034)	(0.114)	(0.105)
RegPressure*FDI	0.064*	0.071*	0.205*	0.210*
	(0.032)	(0.033)	(0.085)	(0.091)
Labor size (1–6)	0.010^	0.012^	0.018	0.031
	(0.006)	(0.006)	(0.020)	(0.020)
Constant	0.625***	0.295***	2.058***	0.967***
	(0.027)	(0.078)	(0.090)	(0.233)
Categorical age FE	Yes	No	Yes	No
Broad sector FE	Yes	No	Yes	No
Legal form FE	Yes	Yes	Yes	Yes
License year FE	No	Yes	No	Yes
2-digit ISIC FE	No	Yes	No	Yes
Observations	9367	9266	9367	9266
Clusters	63	63	63	63
R-squared	0.005	0.019	0.018	0.029
RMSE	0.460	0.458	1.642	1.640

Linear models with inverse probability weights based on share of total enterprises in province. Robust standard errors, clustered at province level

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, ^$p < 0.1$

For Approval

In line with the "liability of foreignness" logic of hypothesis 4, we find that foreign firms are significantly more likely than domestic firms to respond to regulatory pressure. The effect of the regulatory treatment leads to about a 7.1 percentage point greater likelihood of spending on green activities among foreign firms than domestic firms. Similarly, the share of resources the firms are likely to spend is 0.21 points higher among foreign firms on the 0-to-4-point scale.[16] As Appendix 9 illustrates, this figure indicates that regulatory pressure induces a 6-point increase in those willing to spend over 2% of their operating costs on environmentally friendly activities (38% versus 32%), a 4.3-point increase in those willing to spend over 5% (15.6% versus 11.3%), and a 0.4-point increase in those willing to spend over 10% of operating costs (5.4% versus 4.8%).

These changes are quite large and meaningful from a policy perspective. To put these estimates in perspective, at the time of the survey, Vietnam had 36,278 active FDI projects with a total registered capital of $439 billion USD (MPI 2022) and average monthly operating costs (in the manufacturing sector) of about $79,280 per

[16] Appendix 9 displays the change in the probability of falling into different values of the Likert scale for our measure of the intensive margin.

month (Nguyen 2022). Therefore, basing our estimates on the nationally representative estimates, a 7.1 percentage point change in the extensive margin implies that enhanced regulatory pressure would lead to greening investments in about 1701 foreign businesses worth about $30 billion USD. On the intensive margin, in the relatively dirty industrial sectors, we estimate that 697 foreign operations would spend an additional $1586 per month on green investments, 176 foreign businesses would increase spending by $3964 per month, and 70 operations would spend $7928 more per month. The clear policy conclusion for Vietnamese decision-makers is that enhanced regulatory pressure can motivate substantial green spending among a large number of foreign firms but will have little to zero effect among domestic firms. Keeping in mind that the average government regulator in Vietnam is paid a base salary of about $73 per month, a small increase in regulatory manpower could yield a significant environmental impact in the foreign sector (VNA 2022). For domestic firms, however, there appears to be no difference between the utility of societal versus regulatory pressure.

An important caveat of the above estimates is that they assume that regulatory pressure will not crowd out other investment activities or deter FDI entry. There is an open debate in the literature on globalization about whether green regulations might lead to greater outflows of investment to pollution havens (Eskeland and Harrison 2003). Thus, our calculations, which rely on the existing stock of foreign investors, should be treated as an upper bound.

As noted in hypothesis 5, societal pressure may be more effective among firms hoping to access foreign markets, where consumers may be willing to pay attention to environmental standards in their purchasing decisions. We examine the extent to which firms' exposure to foreign markets affects their responsiveness to different types of external pressure to pursue environmental upgrading by estimating the following regression:

$$\begin{aligned} y_{ip} =& a_0 + a_1 \text{RegPress} + a_2 \text{Export} + a_3 \text{FDI}_{ip} + a_4 \text{RegPress}_{ip} * \text{Export}_{ip} \\ &+ a_5 \text{RegPress}_{ip} * \text{FDI}_{ip} + a_6 \text{RegPress}_{ip} * \text{FDI}_{ip} * \text{Export}_{ip} + \chi_{ip} + \varphi_{ip} + u_{ip} \end{aligned} \tag{4}$$

The unadjusted results are reported in Fig. 2 where we label non-exporters as domestic and foreign firms, respectively, while firms that export are called domestic and foreign exporters. Full regressions are reported in Table 4, where we include categorical age, broad sector, legal form fixed effects, and cluster standard errors at the primary sampling unit level.

Figure 2 shows that the effects on the extensive margin are most pronounced for foreign firms seeking to access the domestic market and domestic firms pursuing export. However, the type of stakeholder pressure that matters most varies between the two groups. Domestic-oriented foreign firms, because of their visibility and size, are more likely to respond to the regulatory pressure treatment (ATE = 8.2 percentage points versus 4.6 percentage points for foreign exporters). By contrast, export-oriented domestic firms, because they are concerned about selling to overseas consumers who may be willing to pay higher prices for green produce, are more likely to be influenced by the societal pressure treatment (ATE = 3.21 versus 0.8

For Approval

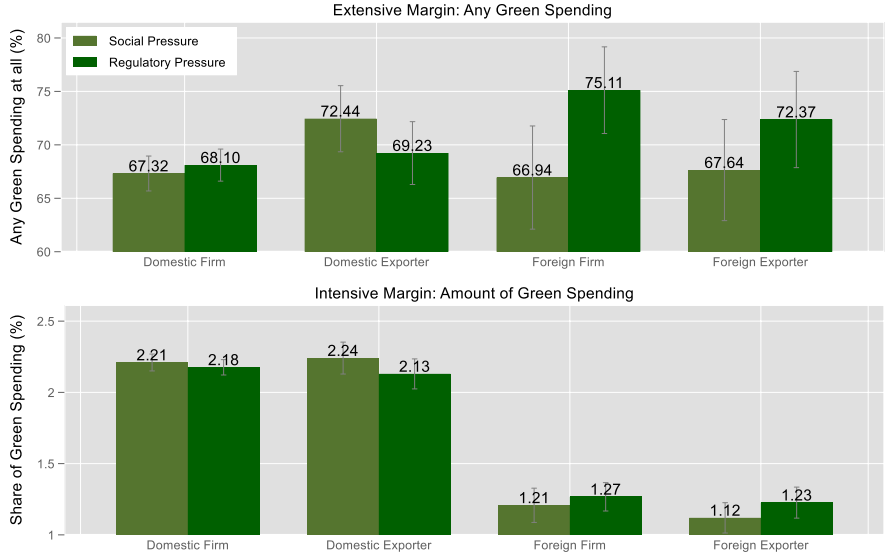

Fig. 2 Difference-in-means by regulatory pressure, ownership type, and export orientation

percentage points for domestic-oriented domestic firms). Again, we do not see any effects on the intensive margin.

The results are confirmed in the more rigorous regression specification (Table 4). Domestic exporters are most likely to be influenced by societal pressure, whereas foreign firms respond more aggressively to enhanced regulatory pressure.

Finally, in hypothesis 6, we predicted that firms that are more exposed to environmental risk are likely to show greater responsiveness to any type of pressure to engage in environmental upgrading. To test this claim, we run the following regressions:

$$y_{ip} = a_0 + a_1 \text{RegPress} + a_2 \text{Env.Impact} + a_3 \text{RegPress}_{ip} * \text{Env.impact}_{ip} + y_{ip} + \chi_{ip} + \varphi_{ip} + u_{ip} \quad (5)$$

In Fig. 3, we use the binning estimator suggested by Hainmueller et al. (2019) to estimate the effect of the interaction term between our treatment and firms' assessment of risk from environmental disasters on our measures of environmental upgrading for both foreign and domestic firms. To this end, we use STATA's interflex commands to ensure that the core theoretical assumptions of the interaction effect are upheld, including (1) effect sizes changing at a constant rate and (2) common support across the moderator.

The results of the interaction analysis are clear. Firms' assessment of climate risk does not influence the effect of regulatory or societal pressure on their decisions to upgrade. This can be seen most clearly by the range bars depicting 95% confidence intervals on the plots of low (L), medium (M), and high (H) levels of climate risk assessments by firms. Notice that in each of the four panels, the L, M, and H range

For Appro

Table 4 Conditional effects of FDI, export orientation, and regulatory pressure on environmental spending

Dependent variable	Any green spending = 1		Amount of green spending (0–4)	
	(1)	(2)	(3)	(4)
Regulatory pressure = 1	0.011	0.010	− 0.026	− 0.030
	(0.015)	(0.015)	(0.050)	(0.051)
Domestic exporter (DDE) = 1	0.041*	0.042*	0.001	0.000
	(0.019)	(0.020)	(0.069)	(0.069)
Foreign firm (FDI) = 1	− 0.017	− 0.030	− 1.028***	− 1.038***
	(0.032)	(0.031)	(0.093)	(0.106)
Foreign exporter (FDE) = 1	− 0.014	− 0.022	− 1.143***	− 1.165***
	(0.037)	(0.034)	(0.086)	(0.088)
RegPressure*DDE	− 0.044*	− 0.046*	− 0.084	− 0.085
	(0.022)	(0.022)	(0.079)	(0.079)
RegPressure*FDI	0.076*	0.080*	0.099	0.093
	(0.030)	(0.032)	(0.091)	(0.095)
RegPressure*FDE	0.033	0.041	0.141	0.136
	(0.041)	(0.037)	(0.088)	(0.095)
Labor size (1–6)	0.009	0.010^	0.027	0.035^
	(0.006)	(0.006)	(0.017)	(0.018)
Constant	0.641***	0.300^	2.095***	0.956*
	(0.023)	(0.159)	(0.079)	(0.437)
Categorical age FE	Yes	No	Yes	No
Broad sector FE	Yes	No	Yes	No
Legal form FE	Yes	Yes	Yes	Yes
License year FE	No	Yes	No	Yes
2-digit ISIC FE	No	Yes	No	Yes
Observations	9367	9266	9367	9266
Clusters	63	63	63	63
R-squared	0.005	0.019	0.019	0.030
RMSE	0.460	0.458	1.642	1.640

Linear models with robust standard errors, clustered at province level. Inverse probability weights were not used due to bias caused by small national and provincial sample sizes of foreign exporters

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, ^$p < 0.1$

For Approval

bars overlap. This means that the average treatment effect of regulatory pressure does not significantly differ at different levels of climate risk.

These findings are consistent with the results from the fully specified regression models. Table 5 presents the results from the regression analysis, where we control for firm size and performance, categorical age, broad sector, and legal form fixed effects, as well as clustered standard errors at the primary sampling unit level. We obtain the same findings for our objective measure of firms' exposure

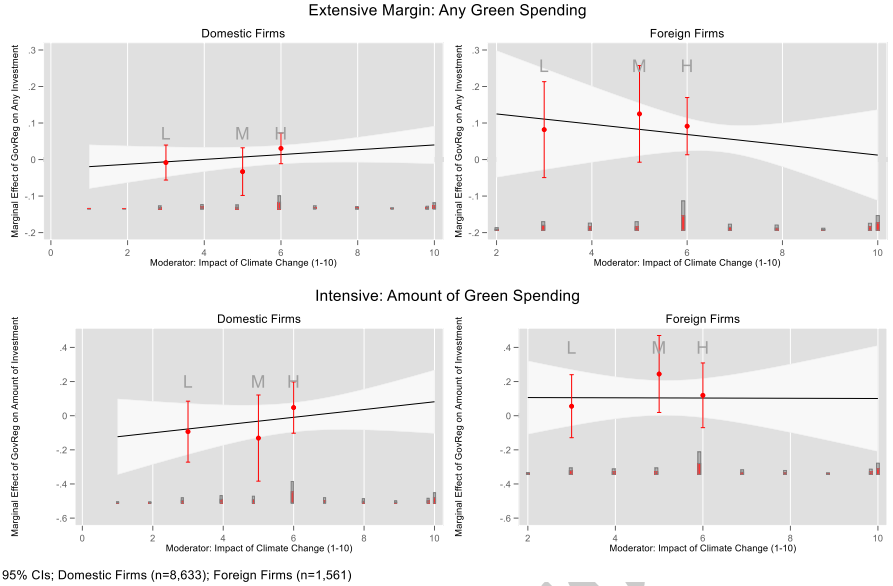

Fig. 3 Interaction between regulatory pressure and environmental risk on green upgrading

to environmental risk (*environmental damage*) using firms' logged economic loss caused by environmental disasters.[17]

In sum, contrary to our expectations, we find that firms' objective and subjective exposure to climate risk does not influence their susceptibility to regulatory or societal pressure. The higher the climate risk to a firm's particular business, the more likely they are to upgrade, but this effect is not enhanced by additional social pressure.

Discussion

In our main analysis, we find that the impact of stakeholder pressure is moderated by the firms' target markets. Foreign investors are more affected than domestic firms by intensive regulatory pressure. Accounting for the target destination of goods, however, we find that the most amenable policy targets for regulatory pressure are foreign firms seeking market access within Vietnam. In this section, we address a few methodological concerns and threats to inference.

First, it is possible that firms' responsiveness to stakeholder pressures might depend on their existing level of compliance with environmental regulations. A firm's decision to comply with a regulation depends in part on the expected cost associated with non-compliance (Drake and Lust 2016). Drawing on the

[17] See Appendix 5 and 5b for the table and figure demonstrating null results for environmental damage.

For Appr

Table 5 Regulatory pressure conditioned by climate change impact

Dependent variable	Any green spending = 1				Amount of green spending (0–4)			
	Only FDI		Only Domestic		Only FDI		Only domestic	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Regulatory pressure = 1	0.171	0.223^	−0.092	−0.085	0.063	0.212	−0.397	−0.373
	(0.104)	(0.122)	(0.073)	(0.071)	(0.217)	(0.303)	(0.280)	(0.264)
Climate impact (1–10)	−0.001	−0.003	−0.012	−0.011	−0.029	−0.020	−0.072*	−0.068*
	(0.016)	(0.017)	(0.008)	(0.007)	(0.034)	(0.039)	(0.032)	(0.030)
RegPressure*Impact	−0.014	−0.023	0.020^	0.018^	0.017	−0.005	0.069	0.065
	(0.015)	(0.018)	(0.011)	(0.010)	(0.031)	(0.047)	(0.042)	(0.039)
Labor size (1–6)	0.011	0.013	0.002	0.002	0.025	0.027	−0.007	−0.008
	(0.008)	(0.009)	(0.007)	(0.007)	(0.031)	(0.029)	(0.030)	(0.028)
Performance (1–8)	−0.008	−0.013	0.009	0.010	−0.034	−0.005	0.015	0.020
	(0.026)	(0.021)	(0.006)	(0.006)	(0.037)	(0.040)	(0.023)	(0.022)
Constant	0.691***	0.947***	0.744***	1.162***	1.479***	0.844^	2.669***	3.814***
	(0.132)	(0.176)	(0.049)	(0.177)	(0.286)	(0.408)	(0.233)	(0.613)
Categorical age FE	Yes	No	Yes	No	Yes	No	Yes	No
Broad sector FE	Yes	No	Yes	No	Yes	No	Yes	No
Legal form FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
License year FE	No	Yes	No	Yes	No	Yes	No	Yes
2-digit ISIC FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1098	1070	6874	6874	1098	1070	6874	6874
Clusters	22	22	63	63	22	22	63	63
R-squared	0.022	0.109	0.006	0.024	0.015	0.095	0.006	0.022
RMSE	0.425	0.413	0.435	0.433	1.123	1.089	1.608	1.604

Linear probability model with inverse probability weights based on share of total enterprises in province. Robust standard errors, clustered at province level

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\wedge}p < 0.1$

For Approval

literature, we expect that firms that have demonstrated previous compliance with environmental regulations are in general more receptive to regulatory pressure, as these are most likely to be businesses that perceive the expected cost of non-compliance with environmental regulations to outweigh the cost of compliance. To test this idea, we create a baseline level of willingness to comply with environmental regulations by using a question from the PCI about whether a firm had submitted an environmental impact assessment (EIA) report in the past. EIAs are technically required for all new investments and construction, but many firms fail to comply. In our sample, only 42% of all firms and 40% with new investment or construction projects have submitted an EIA report. Those that do are both more likely to be responsive to additional regulatory requests and more knowledgeable about the potential environmental effects of their operations. Using this information, we ran a sub-group analysis. Firms that submitted an EIA are coded as 1 and 0 otherwise. The results (Appendix 8) show that, indeed, firms' existing level

of environmental compliance is positively associated with greater spending on environmental operations among foreign firms. However, there are no statistically significant differences in experimental treatment effects between firms that submitted an EIA report and those that did not. This suggests that firms recalibrate and reweigh the cost of compliance and non-compliance each time they face a new environmental regulation rather than blindly adopt the same approach (compliance or non-compliance) based on past behavior.

Finally, with an experimental setup such as ours, it can be difficult to map the stated intentions from an artificial prime onto actual behaviors. Future work on panel data is necessary to test whether the effects of our treatments or external measures of public and private pressure encourage firms to take costly green expenditures in the real world. However, recent developments suggest that our experiment is not artificial and that green expenditures are indeed increasing in Vietnam every year. Firms in Vietnam had a good sense of the extent and cost of green expenditures when they sat down to answer the questionnaire, which is critical for assessing the face validity of our estimates. The findings from the Ministry of Natural Resources (MONRE)'s Provincial Environmental Protection Index (PEPI) allow us to do some benchmarking of firms' stated intentions to spend resources on environmental upgrading in our survey experiment against firms' real-world behavior.[18] For example, in 2021, 95% of business establishments generating a minimum of 50 m^3 of wastewater a day had a wastewater treatment system in place that meets environmental technical regulations. Similarly, across all 63 provinces of Vietnam, an average of 74% of industrial zones, processing zones, and high-tech parks had a centralized wastewater treatment system in place that meets environmental technical regulations. While we do not claim that these overall positive developments are in any way attributable to the findings from our survey experiment, they do indicate that our findings are broadly in line with real-world trends in Vietnam.

For Approval

Conclusion

A common challenge in developing countries is how to encourage economic growth by creating a business climate that is suitable for business growth and innovation while encouraging those same businesses to adhere to environmental standards that protect the health and safety of citizens. Scholars studying these efforts have recommended two forms of stakeholder pressure that might encourage such firm behavior: enhanced regulatory pressure through inspections and fines or enhanced societal pressure through NGO transparency about environmental behavior to potential consumers. While a great deal of work has studied these approaches separately, they have yet to be tested directly against one another. Moreover, previous work has not analyzed whether the different approaches might work differently based on the target firms' types.

[18] MONRE, 2022. https://www.monre.gov.vn/Pages/chi-so-pepi-2021-da-phan-anh-mot-cach-tuong-doi-toan-dien-ket-qua-bvmt-cua-cac-tinhthanh-pho.aspx, accessed March 20, 2023.

Our survey experiment takes place in Vietnam, where the leadership has issued a number of new policies which reflect ambitions for promoting sustainable development in the country. A key part of this plan requires individual foreign and domestic investors to adopt more environmentally friendly technology, processes, and management practices. Additional environmental goals were taken up by the Vietnam National Assembly when it passed the revised Law on Environmental Protection in 2020 and attempted to achieve sustainable economic growth through more streamlined and targeted regulations. However, while these policy initiatives and regulations offer broad targets and big ambitions, they leave unspecified details of how to achieve these goals.

In this study, we test the relative effectiveness of two different approaches to encourage this expensive and potentially risky behavior by firms with important policy implications. First, developing country governments can pass stringent environmental legislation and enforcement procedures, which we refer to as the *regulatory pressure* mechanism. Second, developing country leaders can transparently publicize their goals but outsource monitoring and publication of environmental upgrading to non-state actors, allowing market forces to punish negligent firms through NGO and civil society activism, such as media campaigns and coordinated boycotts. We refer to this as the *societal pressure* mechanism.

We find that the most effective policy varies by actor. As scholars in the liability of foreignness literature would predict, foreign investors are more susceptible to intensive regulatory pressure. Our estimates imply that 1700 firms with $20.6 billion in invested capital would spend an additional $1600 per month in environmentally friendly expenditures. When compared to the average monthly salary of an environmental inspector of $72 per month, it is clear that significant environmental gains could be generated from a few additional hires in environmental enforcement. However, there is no difference in the effects of the two approaches on domestic firms. Once we account for export orientation, however, we find that the most amenable policy targets for regulatory pressure are foreign firms, who wish to sell in the Vietnamese domestic market. These firms are both more visible and more likely to engage in preemptive upgrading as a way of signaling to leaders that regulation is useful. Moreover, by doing so, they may also wish to create an entry barrier for domestic competitors and other foreign firms attempting to enter. By contrast, the best target for societal pressure is domestic firms that wish to sell abroad, because they are concerned about selling to overseas consumers with potentially stronger environmental values.

The bottom line is that there is not a one-size-fits-all approach to encourage environmental upgrading. Enhanced regulatory effort on domestic firms will not pay the same dividends as it does for foreign firms and comes with significantly more costs to inspect the numerous, diffuse, and small domestic firms. At the same time, for ambitious domestic firms hoping to reach international markets, societal pressure will be an extremely effective force in motivating green upgrading.

Political leaders are increasingly emphasizing the role of the private sector in the battle against climate change. Engaging the private sector is especially important in emerging markets, a thriving hub of economic activity on the one hand and one of the most vulnerable regions to climate change on the other hand.

For Approval

Previous research has outlined various mechanisms underlying firms' responsiveness to stakeholder pressure to act green. Testing these rationales deserves greater attention in future research. Focusing on the firms' motives to comply with regulatory and/or societal pressure to act green provides us with a better understanding of the incentive structures that are required to instigate corporate environmentalism. Similarly, building on the "properly designed regulation" hypothesis by Porter and van der Linde (1995), future research should study the impact of different design features of environmental regulations on firms' willingness to adopt environmental upgrading and innovation.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12116-023-09400-4.

Funding Open access funding provided by University of Bern

Data Availability The data that support the findings of this study are openly available at https://dataverse.harvard.edu/dataverse/emalesky.

Declarations

Research Involving Human Participants and/or Animals We consulted extensively with the IRB of Duke University who determined that our study did not need ethical approval (Protocol 2018–0621).

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest This study uses firm survey data collected in the Provincial Competitiveness Index Vietnam project (PCI Vietnam). The PCI Vietnam is funded by USAID. Edmund Malesky served as paid consultant to USAID on the sampling and implementation of the survey.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

For Approval

References

Baron, David P. 2014. Self-regulation in private and public politics. *Quarterly Journalof Political Science* 9 (2): 231–267.

Blackman, A. 2010. Alternative pollution control policies in developing countries. *Review of Environmental Economics and Policy* 4 (2): 234–253.

Brekke, Kjell A., and Sanja Pekovic. 2018. Why are firms environmentally responsible? A review and assessment of the main mechanisms. *International Review of Environmental and Resource Economics* 12 (4): 355–398.

Bruhn, M., and D. McKenzie. 2009. In pursuit of balance: Randomization in practice in development field experiments. *American Economic Journal: Applied Economics* 1 (4): 200–232.

Campbell, J. 2007. Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy of Management Review* 32 (3): 946–967.

CECODES, VFF-CRT, RTA & UNDP. 2020. ***The 2019 Viet Nam governance and Public Administration Performance Index (PAPI): measuring citizens' experiences.*** A joint policy research paper by the Centre for Community Support and Development Studies (CECODES), Centre for Research and Training of the Viet Nam Fatherland Front (VFF CRT), Real-Time Analytics, and United Nations Development Programme (UNDP). Ha Noi, Viet Nam.

Céspedes-Lorente, J., J. De Burgos-Jiménez, and M.J. Álvarez-Gil. 2003. Stakeholders' environmental influence. An empirical analysis in the Spanish hotel industry. *Scandinavian Journal of Management* 19: 333–358.

Darnall, N., I. Henriques, and P. Sadorsky. 2010. Adopting proactive environmental strategy: The influence of stakeholders and Firm Size. *Journal of Management Studies* 47 (6): 1072–1094.

Dasgupta, Susmita, Benoit Laplante, and Nlandu Mamingi. 1998. Pollution and capital markets in developing countries. *Journal of Environmental Economics and Management* 42 (3): 310–335.

Delmas, M., and M. Toffel. 2004. Stakeholders and environmental management practices: An institutional framework. *Business Strategy and the Environment* 13: 209–222.

Denicoló, V. 2008. A signaling model of environmental overcompliance. *Journal of Economic Behavior & Organization* 68: 293–303.

Distelhorst, Greg, and Richard M. Locke. 2018. Does compliance pay? Social standards and firm-level trade. *American Journal of Political Science* 62 (3): 695–711.

Drake, David F., and Robin L. Lust. 2016. Ignore, avoid, abandon, and embrace: what drives firm responses to environmental regulation? In: Atasu, A. (ed.) *Environmentally responsible supply chains.* Springer Series in Supply Chain Management, vol 3. Springer. 199–222.

Druckman, J.N., and J. Valdes. 2019. How private politics alters legislative responsiveness. *Quarterly Journal of Political Science* 14 (1): 115–130.

Eden, L., and S.R. Miller. 2004. *"Distance matters: Liability of foreignness, institutional distance and ownership strategy", In Theories of the multinational enterprise: Diversity, complexity and relevance*. New York: Emerald Group Publishing Limited.

Eskeland, G.S., and A.E. Harrison. 2003. Moving to greener pastures. Multinationals and the pollution haven hypothesis. *Journal of Development Economics* 70 (1): 1–23.

Greenwood, R., C.R. Hinings, and D. Whetten. 2014. Rethinking institutions and organizations. *Journal of Management Studies* 51: 1206–1220.

Hainmueller, Jens, Michael J. Hiscox, and Sandra Sequeira. 2015. Consumer demand for fair trade: Evidence from a multistore field experiment. *The Review of Economics and Statistics* 97 (2): 242–256.

Hainmueller, J., J. Mummolo, and Y. Xu. 2019. How much should we trust estimates from multiplicative interaction models? Simple tools to improve empirical practice. *Political Analysis* 27 (2): 163–192.

He, Z.X., W.X. Shen, Q. Li, S.C. Xu, B. Zhao, R.Y. Long, and H. Chen. 2018. Investigating external and internal pressures on corporate environmental behavior in papermaking enterprises of China. *Journal of Cleaner Production* 172: 1193–1211.

Hedblom, Daniel, Brent R. Hickman, and John A. List. 2019. Toward an understanding of corporate social responsibility: theory and field experimental evidence (working paper No. 26222. *National Bureau of Economic Research.*

Henriques, I., and P. Sadorsky. 1996. The determinants of an environmentally responsive firm: An empirical approach. *Journal of Environmental Economics and Management* 30: 381–395.

Horbach, J., C. Rammer, and K. Rennings. 2012. Determinants of eco-innovations by type of environmental impact-the role of regulatory push/pull, technology push and market pull. *Ecological Economics* 78: 112–122.

Hymer, S.H. 1976. *The international operations of national firms: A study of direct foreign investment*. Cambridge, MA: MIT Press.

Le, Y., S. Hollenhorst, C. Harris, W. McLaughlin, and S. Shook. 2006. Environmental management: A study of Vietnamese hotels. *Annals 682 of Tourism Research* 33, 545–567.

Lopez-Gamero, M.D., J.F. Molina-Azorín, and E. Claver-Cortes. 2010. The potential of environmental regulation to change managerial perception, environmental management, competitiveness and financial performance. *Journal of Cleaner Production* 18: 963–974.

Malesky, E., and L. Mosley. 2018. Chains of love? Global production and the firm-level diffusion of labor standards. *American Journal of Political Science* 62 (3): 712–728.

Malhotra, N., B. Monin, and M. Tomz. 2019. Does private regulation preempt public regulation? *American Political Science Review* 113 (1): 19–37.

Maxwell, J.W., and C.S. Decker. 2006. Voluntary environmental investment and responsive regulation. *Environmental & Resource Economics* 33: 425–439.

For Approval

Maxwell, J.W., and T.P. Lyon. 2008. Corporate social responsibility and the environment: A theoretical perspective. *Review of Environmental Economics and Policy* 2 (2): 240–260.
Ministry of Planning and Investment (MPI). 2022. Report on foreign direct investment in 2022. Hanoi, Vietnam, December 26, 2022. < https://www.mpi.gov.vn/en/Pages/tinbai.aspx?idTin=56367&idcm=122>. Accessed March, 25, 2023.
Nguyen, D. 2022. Vietnam operating costs among Asia's lowest: report. *VNExpress International,* January 11, 2022. < https://e.vnexpress.net/news/business/data-speaks/vietnam-operating-costs-among-asia-s-lowest-report-4414957.html>. Accessed March, 25, 2024.
Nguyen, T.D., and S. Datzberger. 2018. *Environmentalism and authoritarian politics in Vietnam. A new frontier of civil society activism? Transnational Institute.* https://www.tni.org/en/publication/environmentalism-and-authoritarian-politics-in-vietnam. 7 May.
Papadopoulos, Y. 2003. Cooperative forms of governance: Problems of democratic accountability in complex environments. *European Journal of Political Research* 42 (4): 473–501.
Papagiannakis, G., I. Voudouris, S. Lioukas, and G. Kassinis. 2019. Environmental management systems and environmental product innovation: The role of stakeholder engagement. *Business Strategy and the Environment* 28 (6): 939–950.
Porter, M., and C. van der Linde. 1995. Toward a new conception of the environment competitiveness relationship. *Journal of Economic Perspective* 9 (4): 97–118.
Prakash, A. 2000. *Greening the firm: The politics of corporate environmentalism*. Cambridge, UK: Cambridge University Press.
Reid, Erin M., and Michael W. Toffel. 2009. Responding to public and private politics: Corporate disclosure of climate change strategies. *Strategic Management Journal* 30: 1157–1178.
Schulte, W. 2016. How contradictory laws are contributing to Vietnam's growing environmental crisis. *Asia Environmental Governance Blog.* http://asia-environment.vermontlaw.edu/2016/10/06/how-contradictory-laws-are-contributing-to-vietnams-growing-environmental-crisis/. October 6.
Sharma, S., and I. Henriques. 2005. Stakeholder influences on sustainability practices in the Canadian forest products industry. *Strategic Management Journal* 26: 159–180.
Singh, N., J. Suresh, and P. Sharma. 2014. Determinants of proactive environmental management practices in Indian firms: An empirical study. *Journal of Cleaner Production* 66: 469–478.
Urpelainen, J. 2011. Frontrunners and laggards: The strategy of environmental regulation under uncertainty. *Environmental Resource Economics* 50: 325–346.
Vietnam News Agency (VNA). 2022. Base salary for public sector workers to increase from July 2023. Vietnam+, November 11, 2022. < https://en.vietnamplus.vn/base-salary-for-public-sector-workers-to-increase-from-july-2023/243712.vnp#:~:text=Hanoi%20(VNA)%20%E2%80%93%20The%20National,11%20during%20its%20fourth%20session.> Accessed March 25, 2023.
Vogel, D. 2009. *Trading up: Consumer and environmental regulation in a global economy*. Harvard University Press.
Wang, L., L. Weian, and Q. Lujun. 2020. Stakeholder pressures and corporate environmental strategies: A meta-analysis. *Sustainability* 12: 1172.
Wehrmeyer, W., and Y. Mulugetta, eds. 1999. *Growing pains: Environmental management in developing countries*. Sheffield, UK: Greenleaf Publishing.
Williams, C.R. 2012. Growing state-federal conflicts in environmental policy: The role of market-based regulation. *Journal of Public Economics* 96: 1092–1099.
Zaheer, S. 1995. Overcoming the liability of foreignness. *Academy of Management Journal* 38 (2): 341–436.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Edmund J. Malesky is the Director of the Duke Center for International Development and a Professor of Political Economy at Duke University. His research interests are economic governance, authoritarian institutions, and firm-state interactions. He is the lead researcher for the USAID-funded Provincial Competitiveness Index.

Quynh Nguyen is associate professor of Environmental Governance and Global Development at the Wyss Academy for Nature at the University of Bern. Her research interests are at the intersection of environmental politics, international political economy, public opinion and political psychology.

For Approval