



## Fish or steel? New evidence on the environment-economy trade-off in developing Vietnam

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### ABSTRACT

Trade and investment have contributed to the improvement of living standards in developing countries, but have also put severe pressure on natural environments. How do citizens in low-income countries manage this trade-off between economic growth and environmental protection? Using a discrete choice experiment conducted as part of three large, face-to-face nationally representative surveys of Vietnamese citizens (N=>12,500 respondents per wave), we find that prospective economic benefits increase public support for investment projects, whereas potential environmental harm resulting from investment decreases the public appetite for them. When economic and environmental factors are considered jointly, our results point to the existence of an environmental risk threshold. Environmental costs beyond that threshold lead citizens to reject investment projects, even when they generate considerable economic benefits. Our results challenge the theory that individuals in low-income countries prioritize development over environmental protection, and have implications for political leaders in designing their countries' future investment policies.

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*"You have to decide whether to catch fish and shrimp, or to build a modern steel industry (...) you cannot choose both."* – Chou Chun Fan, Formosa Steel.

### 1. Introduction

Economic integration, through trade and investment liberalization, has proven a powerful means for developing countries to promote growth. At the same time, however, increasing environmental pressures have accompanied this process. Policymakers in developing countries therefore face a trade-off between potential developmental benefits versus environmental quality in steering economic policies. In scholarly debates, the economy-environment trade-off is prominently modelled by the Environmental Kuznets Curve (EKC), which depicts the relationship between economic growth and environmental degradation as an inverted U-shape (Grossman & Krueger, 1995). A critical assumption underlying the EKC is that people in developing countries or regions prioritize material well-being over environmental ameni-

ties, and therefore accept pollution as a side effect of economic growth.

Some policymakers have used the EKC framework to promote the idea of a "Grow first, clean up later" strategy (Dasgupta et al., 2002). This is reflected in an allegedly tongue-in-cheek internal memo by former World Bank Chief Economist Lawrence Summers, in which he encouraged the increased migration of "dirty industries" to less developed countries. As a justification, Summers noted that demand for environmental quality is characterized by high income elasticity, implying that growth in environmental awareness responds quickly to changes in individual income, and is therefore least pronounced in developing countries.<sup>1</sup> This logic influenced the decision to award exemptions for developing countries to the 1997 Kyoto Protocol on the grounds that developed countries had already passed through their high-pollution eras, and in so doing, were historically responsible for the global build-up of greenhouse gases (Brumfiel, 2002). Drafters of the protocol conceded that emission restrictions might hinder countries' ability to reach the development levels of their predecessors - an idea also served as a guiding principle in the subsequent Paris Agreement (Pauw, Mbeva, & van Asselt, 2019).

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<sup>1</sup> Cited in Guha and Alier (2013).

Understanding citizens' preferences with regards to the trade-off between economic growth and environmental protection is especially relevant in an emerging economy like Vietnam. Foreign direct investment (FDI) flows accounted for 6.3% of Vietnam's gross domestic product (GDP) in 2017, among the highest ratios in the world. At the same time, increased environmental pressure on health and livelihoods has accompanied the economic transition. For example, a recent study showed that air pollution killed four times as many people as traffic accidents in Vietnam (40,000 versus 10,000) (Le, 2017). These trends are consistent with a number of studies that find that foreign investment harms the environment. Specifically, it is argued that international investment may be driven toward countries with lower environmental standards (typically lower-income, developing countries), as firms seek to relocate to "pollution havens," i.e. countries with weaker environmental regulations to lower production costs and achieve higher returns without concern about regulatory standards (Aklin & Michaël, 2016; Cole & Matthew, 2004; Mani & Wheeler, 1998).

However, public concerns about the environment are rapidly gaining traction in Vietnam. This was most vividly demonstrated in the "Formosa disaster" of 2016 with reports of millions of dead fish washing onto the beaches of Vietnam's central coastline, caused by a toxic industrial waste spill from the Taiwanese company, Formosa-Ha Tinh Steel mill. In response to the incident, a Formosa spokesperson initially indicated that the country had to choose between "fish or steel,"<sup>2</sup> implying that Vietnam could not enjoy economic growth without sacrificing the environment. Immediately, in response, thousands of people across the country took to the streets to protest under the slogan "*I choose fish!*," despite the eminent risk of arrest or physical violence by police forces.<sup>3</sup> Importantly, the Formosa protests are part of a growing series of public demonstrations over environmental issues in Vietnam (Nguyen & Datzberger, 2018).

The current Vietnamese government appears responsive to such concerns. Deputy Prime Minister Pham Binh Minh recently announced that Vietnam will be selective in licensing FDI based on criteria of efficiency, advanced technology, and environmental friendliness (Thuy, 2020). Similarly, a Central Committee resolution (50-NQ/TW (August 20, 2019)) acknowledges the lack of selectivity in the government's current practices of choosing investment projects and aims to "halt expanding or extending operations for projects using outdated technology, potentially causing environmental pollution and the depletion of natural resources."

From a purely economic perspective, these government responses are surprising, as Vietnam's per capita GDP is only 2,600 US-\$ per year - less than a quarter of Malaysia's and half of Thailand's, its neighbors and competitors in Southeast Asia. Are Vietnamese citizens really willing to sacrifice future job opportunities and revenue that a more all-embracing approach to FDI would bring at this stage in its development? More poignantly, when faced with a trade-off between growth and a clean environment, are citizens in developing countries like Vietnam truly ready to "choose fish"?

We answer these questions by using unique public opinion data from three nationally representative, annual face-to-face surveys of Vietnamese citizens in 2017, 2018, and 2019 with more than 12,500 respondents in each wave (N(total)=37,623 respondents). To study the impact of environmental consequences on individuals' economic decision-making, we employed a conjoint survey (discrete choice) experiment. In the conjoint, we asked respondents to compare the profiles of two businesses and select which of the two they would rather see their provincial government grant

an investment license. Their selection of Firm A versus Firm B serves as the main outcome variable in our analysis. Varying the economic benefits and the environmental costs associated with each business, allows us to observe how respondents' investor choices were influenced by these considerations.

To the best of our knowledge, this is the first study to empirically model how environmental factors affect individuals' investment policy preferences when there is a potential trade-off. We find evidence that the conventional thinking on the trade-off between economic growth and environmental protection provides an important but limited understanding of the way individuals in developing countries weigh development and environmental considerations; the environment is far more important to their calculus than previously understood.

We consistently find that while economic impact matters for people's economic preferences, citizens are not blindly prioritizing economic goals over environmental quality. Our results show that respondents' investor preferences are most strongly driven by the perceived potential environmental consequences of the investment. Specifically, the larger the potential environmental costs, the less likely respondents were to support the business' investment license application. When there is a direct trade-off between economic benefits and environmental protection, citizens display a stronger preference for green investments. While individuals are tolerant of some environmental damage in exchange for jobs or other economic benefits, there is a clear threshold beyond which people are unwilling to tolerate greater environmental costs regardless of the size of economic benefits. In addition, we find that this preference for environmental quality remains consistent across different groups in society.

While we had the unique opportunity to conduct this large-scale survey experiment in Vietnam, we believe our theories and results are relevant to other emerging markets that are experiencing similar benefits and externalities from global integration today. To demonstrate this point, we exploit both longitudinal and sub-national variation within the country. Our results are consistent across three different years of surveys, indicating that the pro-environmental answers are not simply a response to the Formosa crisis. Studying sub-national variation across Vietnam's diverse 63 provinces, we find no statistically significant differences between localities with high amounts of FDI and those with low FDI, those with large amounts of economic activity and much poorer locations, and those with high exposure to environmental degradation and those that remain relatively pristine. We also reflect on the generalizability of our analysis to other developing countries in the conclusion.

## 2. Individuals' Preferences Toward Foreign Investment

Trade and investment are important pillars of economic liberalization. However, while myriad studies exist that examine the determinants of individuals' trade policy preferences, research on citizens' investment policy preferences is limited. The bulk of existing work employs standard economic models of international trade to identify winners and losers from global integration and then extrapolates predictions about individuals' trade policy preferences from these distributional effects (e.g., Mayda & Rodrik, 2005; Rho & Tomz, 2017).

Although these theories of trade preference formation are not logically limited to trade, there are important nuances in how individuals view trade and foreign investment, respectively. For instance, while the implications of free trade are much broader and therefore more difficult to grasp, the specific benefits and losses of an investment project are typically more visible to citizens. In addition to the economic outcomes, individuals have more

<sup>2</sup> Cited in Paddock (2016).

<sup>3</sup> According to Paddock (2016), more than 500 people were detained during the Formosa protests.

information about the investment, such as the investor's country of origin, sector, or economic history, to form conclusions about the overall effect of the investment project. Finally, while most studies on mass attitudes toward trade are concerned with trade in manufactured goods; foreign investment includes a vast range of additional market activities, including services, extraction of natural resources, and infrastructure construction (Pandya, 2016). Foreign investment projects, therefore, have far-reaching implications on the host country's economy, society, and natural environment. Nevertheless, the existing scholarship has predominantly studied how the economic benefits of the investment and specific features of the investor influence individuals' investment policy preferences. We extend existing explanations of mass attitudes toward foreign investment by arguing that citizens' investment policy preferences are also largely affected by the potential environmental consequences of the investment.

Building off the predictions of international trade theories, studies have tested the influence of the hypothesized local labor market effects of foreign investment on mass attitudes toward foreign investment. At the core of these economic models is the idea that individuals who gain from the investment will be supportive of the investment project, while people who are hurt by the investment proposal will oppose it (Pandya, 2010; Pinto, 2013; Kaya & Walker, 2012). Specifically, individuals with higher educational attainment and private sector employment experience are more optimistic about the impact of multinational enterprises (MNEs). Other scholars find that labor market uncertainty affects preferences over FDI among workers (Scheve & Slaughter, 2001). More recent studies have begun to assess how individuals evaluate FDI proposals in terms of their potential benefits for the economy, most prominently domestic job creation. For instance, Jensen and Lindstädt (2013) demonstrate that respondents are more supportive of foreign investment when it is explicitly linked to job creation. Li and Zeng (2017) provide evidence that large investments that create more local jobs are more likely to be endorsed by citizens.

Turning to the environment, despite the large body of scholarship investigating the scientific impact of FDI on environmental outcomes (e.g., Cole, Elliott, & Zhang, 2017), there is a paucity of research on the impact of environmental considerations on mass attitudes toward FDI. Even in the richer literature on individual trade policy preferences, only a few studies have examined the impact of environmental aspects on public opinion. For example, studying Swiss voters' preferences, Bechtel, Bernauer, and Meyer (2012) detect a negative relationship between citizens' green preferences and their support for trade liberalization. In contrast, using survey data from Vietnam, Bernauer and Nguyen (2015) find respondents' reported concern for the environment and individuals' support for trade liberalization to be positively correlated. In their conjoint analysis, Spilker et al. (2016) demonstrate that individuals prefer to enter into preferential trade agreements with countries that have strong environmental standards. In sum, the findings from these studies are suggestive that environmental considerations play some role in citizens' economic decision-making.

It follows from this brief review of existing research on public attitudes toward investment projects that individually, both economic and environmental factors have an effect on individuals' investment policy preferences. Economic benefits increase public support for an investment. Conversely, environmental harm associated with the investment decreases public support.

### 2.1. The Economy-Environment Trade-off

While the individual effects are straightforward, research has yet to establish the *relative* importance of economic versus environmental factors on individual investment policy preferences.

This line of inquiry was anticipated by Inglehart, who wrote: "the crunch comes when a difficult choice is needed between roads or trees, dams or endangered species, to burn fossil fuels that may lead to global warming or to remain nonindustrialized" (Inglehart, 1995, 59). Indeed, a number of studies demonstrate that citizens in low-income countries display considerable concern about the state of the natural environment (White & Hunter, 2009; Hao & Feng, 2016; Fairbrother, 2013). In this section, we argue that Inglehart's "crunch" has now materialized for many developing countries due to a convergence of three global trends. We suggest that these forces are making citizens less willing to accept environmental degradation in exchange for future economic benefits.

First, environmental problems in today's developing countries are becoming more salient, which is prompting citizens to be more sensitive to their consequences. In particular, we argue that growing health concerns have led citizens to be wary of the economic benefits of new investment (Guha & Alier, 2013). As citizens are directly exposed to environmental problems, the environmental externalities of new investments are no longer viewed as just a threat to quality of life, but as a fundamental threat to human health (Franzen & Meyer, 2009). For example, air pollution presents a major problem for much of developing and emerging countries. According to a study by the World Health Organization (WHO), air pollution is responsible for more premature deaths than AIDS, malaria, breast cancer or tuberculosis (WHO, 2013). This contradicts the notion of environmental preferences being primarily a post-materialist value that individuals can only attend to once their basic needs, such as access to food, clean water and shelter, are satisfied (Inglehart, 1997; Maslow, 1943). Moreover, Stern and Nicholas (2008) notes that damage caused by pollution and environmental problems are more obvious today. Arguably, Stern's point is even more true in developing countries today than over a decade ago, when his reports were seen as more speculative and debatable.

Second, citizens in developing countries may hold green preferences because environmental degradation threatens their traditional livelihoods. A number of studies have sought to estimate the economic costs of environmental harms. For instance, as early as 1996, Smil (1996) put the annual economic losses from environmental degradation and health and productivity losses caused by pollution in Chinese cities at between 5.5 and 9.8 percent of gross national product (GNP). In Vietnam, the site of our research, the rice industry was under serious threat in the wake of the 2010 drought. Rice exports fell 24.9% from the previous year and revenues also dropped by 6.8% (Minh, 2010). A report by the United Nations Development Programme (UNDP) estimates that, by 2030, 45% of the land in the Mekong Delta will be exposed to salt-water intrusion and crop damage, leading Vietnam's rice productivity to fall by as much as 9% (Das, 2009). These significant economic costs show that the economic harm from environmental problems is significant and may even undo some of the welfare increases from economic development.

Third, sectoral shifts in the drivers of economic growth are contributing to changing preferences regarding the environment (Rodrik, 2016). Due to automation and the trade dominance of China, many developing countries are prematurely replacing manufacturing income with income from services, which accounts for 10.4% of global GDP and produces 319 million jobs (WTTC, 2019). A particular source of growth has been tourism. Even in Vietnam, where manufacturing exports continue to grow, 28% of the population is employed in services, such as wholesale/retail trade, restaurants, and hotels. Tourism accounts for 22.4 billion USD (9.2% of GDP) and 4 million jobs (7.4% of total employment) (WTTC, 2019). Pollution, of course, directly threatens incomes from service jobs in the tourism sector by harming natural landmarks and increasing the discomfort and inconveniences of travel. Many ser-

vice sectors depend on a clean environment for continued prosperity, putting environmental quality and protection at least on par with other basic material goals.

Estimating the relative importance of each of the three global trends is beyond the scope of this project. Here, we simply seek to establish the outcome predicted by all three patterns that given their direct effects on health and welfare, individuals in less affluent societies do not prioritize economic over environmental benefits. We predict in hypothesis three (H3) below that citizens in developing countries are likely to fear environmental degradation more than they value the potential economic benefits of new investments. Along the way, we test the separate effects of the economic (H1) and environmental (H2) implications on citizens' support for new investment.

[H1] *On average, the greater the economic gains associated with the investment, the more likely are citizens to support the investment.*

[H2] *On average, the greater the environmental costs associated with the investment, the less likely are citizens to support the investment.*

[H3] *When confronted with a trade-off between economic and environmental benefits, on average, individuals' investment policy preferences are more strongly influenced by environmental than economic considerations.*

### 3. Research Design

To test our hypotheses, we rely on a large governance survey completed between May and August in 2017, 2018, and 2019. The Vietnam Provincial Governance and Public Administration Performance Index (PAPI) survey, conducted annually since 2011 by the UNDP, measures perceived governance quality in Vietnam's 63 provinces.<sup>4</sup> Because the goal is to generate a representative sample at the provincial level, the PAPI surveys a large number of respondents in each province. The survey is conducted on tablets through face-to-face interviews. Respondents are selected from all 63 provinces. Below the provincial level, sampling is clustered at the district, commune, and village levels using probability proportion-to-size selection (PPS) procedures to select the units. At the village-level, stratified random sampling is used to select individual respondents. The response rates for the three surveys ranged between 83 and 87 per cent. The design of our conjoint experiment was almost identical in all three surveys with some minor modifications, which we discuss below.

#### 3.1. Conjoint Experiment

To validate the relative importance of each of the hypothesized factors on individuals' investment policy preferences, we used a conjoint framework. A key theoretical and empirical challenge for political scientists and policymakers is to understand and identify citizens' multidimensional preferences behind a single policy choice (e.g., Bansak et al., 2021; Horiuchi, Smith, & Yamamoto, 2018). Specifically, in our context, when a respondent selects one investor over another, what are the dimensions of the investment project that are important to that single choice? We believe that the conjoint framework is a helpful tool to tease out this underlying multidimensionality of individuals' policy preferences. In addition, the conjoint can help us address concerns about social desirability bias in standard surveys, because it provides shielding for respondents (Hainmueller, Hopkins, & Yamamoto, 2014; Coutts et al., 2011). Instead of simply asking whether respondents think that environmental protection should be prioritized over economic

growth, in the conjoint, respondents can make a choice (i.e., select an investor) without having to reveal the motivation behind their choice.

In our conjoint, respondents were presented with the profiles of two investors who are applying for an investment license in their local area. The investor profiles varied along different dimensions, which align with our alternative hypotheses and which we describe in detail below. After comparing the investors, respondents selected the investor they would rather see being granted an investment license by local leaders. The main outcome variable for our analysis is which investor they choose.

We regress the choice of investor A or B on the covariates in the conjoint allowing us to determine the relationship between the environmental and economic attributes of each firm and the probability of selection. In addition to analyzing the marginal effect of the economic and environmental consequences of the investment proposal on respondents' investor policy preferences, we also control for the impact of specific investor characteristics that influence individuals' attitudes toward investment (Li & Zeng, 2017). Accordingly, we control for the ownership, the sector, and the national origin of the investor, which enter as additional randomized attributes in our design.

The design of our conjoint is displayed in Table 1.<sup>5</sup> We randomized ten features of a prospective investment into the respondent's locality. We included two additional economic benefits to the local economy (local sourcing and tax revenues), and one environmental attribute (waste generation) in the 2018 and 2019 conjoints. With the inclusion of these attributes, we ensure that we have an equal number of three environmental and three economic attributes in the description of the businesses. More importantly, in the 2017 conjoint experiment, we were restricted to pitting past environmental violations against future job generation. Consequently, the effect of job creation may have been dampened due to the uncertainty over the materialization of the eventual economic benefit. However, with the inclusion of uncertainty regarding future environmental costs, as reflected in the waste generation attribute, we can alleviate such concerns. In addition, focusing on only job creation tends to underplay the economic benefits of an investment for respondents who already have secure employment. By adding local sourcing, we tap into the spillover possibilities of new investment. Through the addition of revenue creation, we allow respondents to think about redistribution in the form of public services.

Furthermore, our selection of conjoint attributes addresses two additional concerns. First, since the levels of the attribute on business' environmental history are described as whether the business has ever been "cited for environmental violation causing damage to 100 or 1,000 households," there is a risk that our results inadvertently pick up loss aversion, which describes people's tendency to overemphasize losses with respect to equivalent gains (Kahneman, 1979). To ensure that our results are not solely driven by a survey framing effect caused by this psychological tendency, we introduced the attribute "Green Certificate" in 2018 and 2019. To address the "Not In My Backyard" (NIMBY) phenomenon, in an expansion of our conjoint design in 2019, we vary the geographical locations in which the investment project is supposed to be implemented - i.e., from respondents' immediate district to more distant locations in the same province. We discuss the findings from these alternative interpretations of our results in a sub-section of the "Results" called "Mitigating Survey Design Effects".

Except for the attribute "Ownership", each of our conjoint attributes has three levels. In selecting the attribute levels, we took several steps to ensure that they reflected a realistic description of

<sup>4</sup> Space constraints prevent a full description of the survey methodology, but more detail can be found at <http://papi.org.vn/eng/>.

<sup>5</sup> We append the original wording of the conjoint question in Vietnamese and English in Section A.1 of the Appendix.

**Table 1**  
Conjoint Attributes and Corresponding Levels.

Attribute	Attribute Levels
Jobs	100 jobs 1,000 jobs 10,000 jobs
Tax revenue <sup>a</sup>	2 billion VND 20 billion VND 200 billion VND
Local sourcing <sup>a</sup>	2 billion VND 20 billion VND 200 billion VND
Waste	100 households 300 households 1,000 households
Green certification	Does not possess a "green certificate" Is applying for a "green certificate" Possesses a "green certificate"
Environmental history	Never been cited for environmental violation Cited for environmental violation causing damage to 100HHs Cited for environmental violation causing damage to 1,000HHs
Origin	Vietnam Developed FIE Developing FIE
Ownership	Private State-owned
Sector	Food processing <sup>b</sup> Electronics Mining
Tax incentive <sup>c</sup>	None 5 per cent 10 per cent
Location <sup>d</sup>	Home district Neighboring district District 30 km away

Notes: (a) Attribute added in 2018 and 2019. (b) Replaced with "Vacation resort" in 2018 and 2019. (c) Attribute excluded in 2018. (d) Attribute added in 2019.

investment projects in Vietnam without placing too much cognitive burden on respondents. First, we carefully selected the attribute levels in close consultation with a research organization under the Vietnam Union of Science and Technology (VUSTA). Second, we opted for describing the economic benefits and some of the environmental costs associated with the investment in absolute numbers rather than using percentages. Previous PAPI surveys demonstrated that absolute numbers are usually easier for individuals to grasp. In addition, we chose the economic scales in such a way that they align with the income dimensions reported in the PAPI survey. Finally, while the numbers we selected may sound bizarrely large (i.e., "funny money") in the US or European context, in Vietnam, thinking in terms of billions of Vietnamese Dong (VND; e.g., 2 billion VND = 87,000 USD), especially when people think about investments, is a common procedure to which the majority of Vietnamese citizens is highly accustomed. Indeed, newspapers and television often discuss investment in these denominations.<sup>6</sup> We are aware that such an approach may introduce differential treatment effects, depending on the respondent's local context. For example, 2 billion VND in tax income may be perceived differently by a respondent from a financially disadvantaged province than a respondent from a more prosperous province. As shown below, however, when comparing the effects of the attribute levels across different provinces, we do not find heterogeneous effects, indicating that this bias was minimal.

<sup>6</sup> Like Van Halen's 'no brown M&Ms' strategy, our goal is to present the investment in as realistic a manner as possible in order to identify which details truly stand out for the reader (Ganz, 2012).

While all attribute levels were fully randomized to generate a description of an investor, the order of the attributes remained the same for all respondents. Specifically, the description first provides some background information about the investor (ownership structure, origin and sector), then introduces the prospective economic benefits of the investment (employment, tax contribution, contribution from local sourcing), before talking about the environmental costs associated with the investment (environmental history, waste generation, green certification). We acknowledge that having the information about the environmental implications appear last may introduce "recency bias." However, again, in designing the investor profile description we aimed to have as much of a natural narrative as possible in order to avoid putting too much cognitive burden on the part of respondents, especially among those with low educational attainment. To do this, we tried to mirror the way Vietnamese mass media typically report upon these investment projects.<sup>7</sup> Moreover, introducing the environmental consequences first risks overemphasizing this information (relative to the other features), as it is highly artificial to talk about investment projects this way. Thus, a more salient survey risk was "acquiescence," the concern that respondents could be primed by the environmental attributes to decide before completing the passage.

After being presented with the profiles of two investors, we asked respondents "Which of these businesses would you most like to see your province grant approval to commence their investment project?" to measure their preferences about the hypothetical investor profiles they were just presented with. This constitutes our outcome variable *Investor choice*, which is a binary choice between Investor A or B. Thus, in our conjoint, we have *m* respondents<sup>8</sup> (*m* = 12,605 (in 2019), 12,610 (in 2018), and 12,408 (in 2017)) presented with *c* (*c* = 1) forced choice decision task, each involving *d* (*d* = 2) alternative profiles of investors. Each profile consists of a vector of *i* (*i* = 10) attributes (e.g., sector) that describes the investor profile, each composed of *k* (*k* = 3) alternatives (e.g., mining, electronics, food processing), which can vary across attributes. The experiment thus generates a dataset with  $N = m * c * d$  (in 2019:  $12605 * 1 * 2 = 25,210$ , (in 2018:  $12,610 * 1 * 2 = 25,220$ , (in 2017:  $12,408 * 1 * 2 = 24,816$  observations of discrete choice outcome, *Y<sub>n</sub>*).

To put this in less statistical terms, in 2019, 12,650 respondents chose to answer the conjoint survey. Each respondent was given a choice between two firms that vary in the ten characteristics that were randomly assigned to them. For Firm A, we created an outcome variable that took the value of 1 if the investor choice was that firm and 0 otherwise. For firm B, we did the same. Thus, for each respondent, our dataset has two stacked observations - one for Firm A, which includes the *Investor choice* outcome variable (*y*) and the associated ten characteristics (*X*) and one for Firm B, which also includes *y* and *X*. This leads to a total number of respondent-choice observations (*n*) of 25,210. When we regress *y* on *X*, it allows us to estimate the relationship between the ten firm characteristics and firm choice, permitting direct observation of whether environmental or economic considerations are important in their decision.

### 3.2. Estimation Strategy

Because all attribute levels were fully randomized without constraints, we can estimate Average Marginal Component Effects

<sup>7</sup> See the following newspaper article from Vietnam News for an example: <https://vietnamnews.vn/environment/298517/gia-lai-opposes-hydro-power-plant.html#r8HsoF7pHlPcfUvF.97>.

<sup>8</sup> About 11% of the respondents (1,505 in 2019, 1,109 in 2018, and 1,689 respondents from the 2017 wave) did not answer this question. We dropped these respondents from the analysis.

(AMCEs) using a linear regression framework (OLS) as suggested by Hainmueller, Hopkins, and Yamamoto (2014).<sup>9</sup> Accordingly, we regress the selection  $Y_{ij}$  of the firm  $j$  by respondent  $i$  on its characteristics. The model is as follows:

$$y(\text{InvestorChoice})_{ij} = \beta_1 * (\text{EconomicImpact})_{ij} + \beta_2 * (\text{EnvironmentalImpact})_{ij} + \beta_3 * X_{ij} + \epsilon_{ij}$$

The key independent variables are the conjoint attributes describing the economic and the environmental impact of the prospective investment.  $X$  is a matrix of the randomized investor features shown in Table 1. We thus interpret the AMCEs based on the OLS coefficients for each of the variables as the impact of that investor trait *relative* to the other characteristics in the likelihood of investor selection. The conjoint framework, therefore, allows us to estimate the effects of individual investor characteristics, such as the effect of the investor's past environmental records on *Investor choice*, while allowing our survey participants to also explicitly take into account other attributes of the investor that might influence their evaluations of the hypothetical investor.

Following the conventions in the literature, we cluster standard errors (SE) at the respondent level. We evaluate statistical significance using a t-test based on a graphical display of the 95% confidence interval that is equal to  $\beta_{tj} \pm 1.96(SE)$ . When that 95% confidence interval includes zero, we consider the coefficient size to be not statistically different from zero and thus not correlated with the respondent's choice of investor A or B. When the 95% does not cross zero, we deem the covariate to be statistically significant and therefore correlated with the selection.

In the following section, we will mainly focus on presenting and discussing the results from our 2019 conjoint experiment. As we demonstrate below, however, the results are highly consistent across the three survey waves.

## 4. Results

To test Hypotheses 1 and 2, we estimate the AMCEs of the economic and environmental attributes. Fig. 1 plots the results for the 2019 wave. Consistent with the predictions from the economic models, we find that economic considerations, such as job creation and tax contribution, have a statistically significant effect on respondents' evaluation of the investment project. People are more likely to endorse the business' investment license application when it has a large economic impact. An investment that creates 10,000 jobs is 4.4 percentage points more likely to receive support than an investment that promises to create 100 jobs. Similarly, the results indicate that prospective tax contributions from the investment also have a positive effect on individuals' support for the investment. An investment that generates 200 billion VND is 2.4 percentage points more likely to be selected for an investor license than a business that generates 2 billion VND in tax income for the respondent's local area. However, beyond a certain level of economic gains, additional benefits resulting from the investment do not significantly attract more public support. For example, as shown by the overlapping 95% confidence intervals in Fig. 1, 10,000 new jobs is not significantly more attractive to respondents than 1,000 jobs.

Consistent with H2, the results show that in addition to economic factors, environmental considerations have a very strong effect on people's evaluation of the attractiveness of an investor. Asked what type of investor respondents would rather see granted

an investment license, respondents' preferences are strongly driven by the investor's environmental record. In particular, if the business has had a history of violating environmental regulations, this significantly decreases the respondent's acceptance. For example, violations of environmental regulations that caused damage to 100 households decrease people's willingness to support the business' license application by 24 percentage points. Environmental offences that created greater damage further reduces the respondents' support for granting an investment license. Specifically, compared to a business that has not committed any environmental offences, a business that has been previously cited for environmental violations that caused damage to 1,000 households, has a whopping 28.7 percentage points decreased probability of selection.

Moreover, we observe that citizens' attitude toward prospective investors are also largely affected by the amount of waste the investment is likely to generate. Heavy polluters that generate waste comparable to 1,000 households over the year are 9.3 percentage points less likely to receive support for their license application than their less polluting counterparts. Importantly, these findings give us confidence that our results are not driven by respondents' concern about the certainty of the implications of the investment; citizens' investment preferences are not only significantly influenced by the business' past environmental performance, but also by information about the future environmental consequences of the investment.

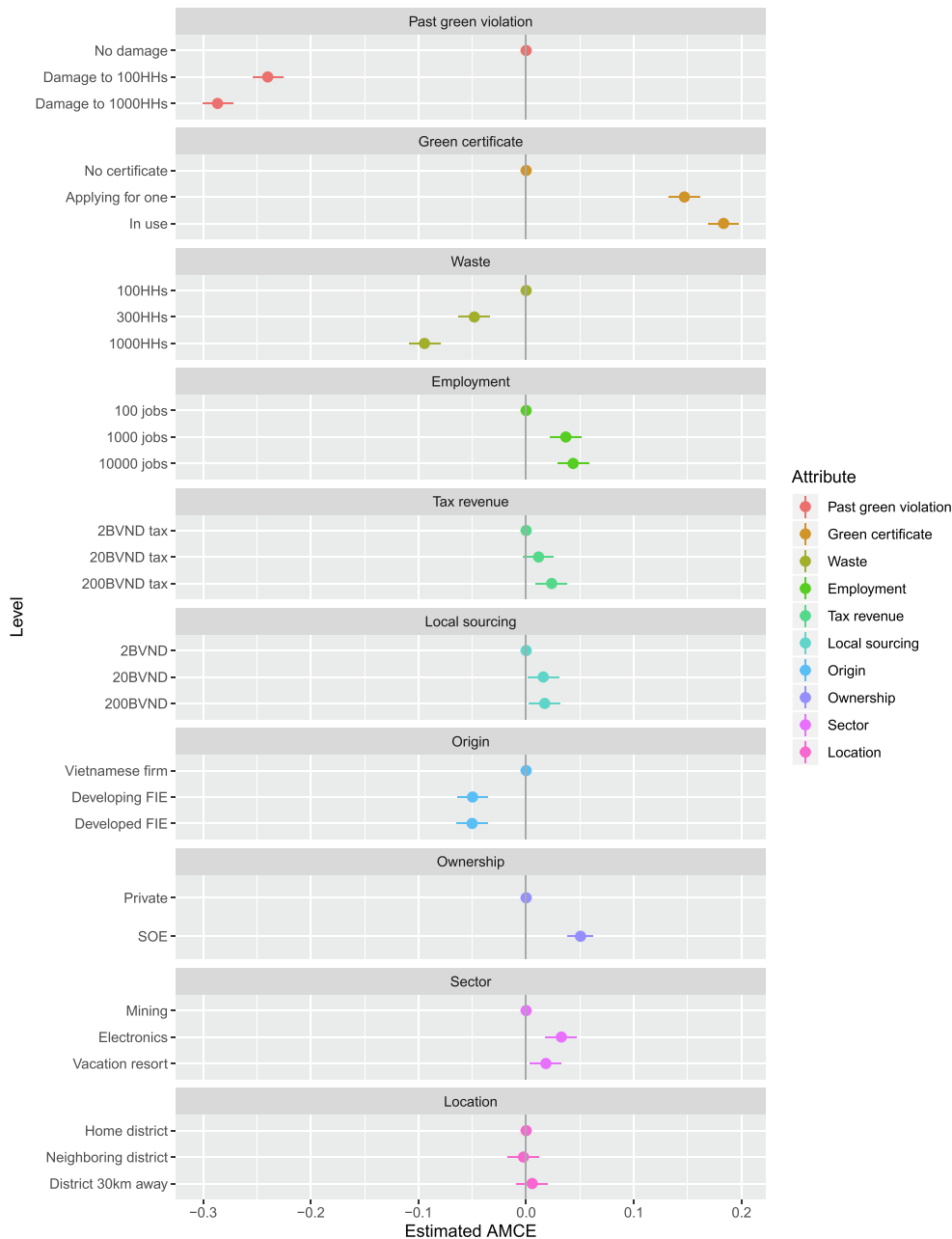
Finally, we find investors' commitment to act green to improve citizens' views of the investor. For instance, the mere intention to apply for a green certificate, which implies that the prospective firm will employ operations that reduce environmental pressure, increases respondents' support for the firm's application for an investment license by 14.6 percentage points over no application. An ongoing commitment to apply procedures that minimize environmental damage in its operations also significantly increases people's willingness to grant the business an investment license. Compared to a business that does not follow any certified procedures in its production, a business that possesses a green certificate enjoys a 18.6 point higher probability of obtaining public support. The green certificate result is critical, because, unlike the other environmental criteria, it does not overtly prime damage in the minds of the respondents.

### 4.1. Discussion

These results are consistent with H1 and H2. As expected economic factors, such as job, and revenue, creation all increase support for investment projects among citizens. However, the findings also demonstrate a significant and sizable effect of the environmental impact of the investment that has been insufficiently accounted for in existing research on public opinion on FDI. Citizens are wary of investments by firms that have problematic environmental histories, generate a lot waste, and do not possess (and are not applying for) certificates that demonstrate a commitment to environmental standards. A key difference between the economic and environmental results is that we observe threshold effects for the economy but not the environment. Citizens do not demonstrate statistically greater support for large economic gains than medium benefits. By contrast, support decreases for each level of environmental danger on all three measures.

Table A2 in the Appendix presents the AMCEs for all three survey waves and shows that the economic, environmental and investor-specific characterizations of the prospective investor have similar effects on the investment preferences of Vietnamese citizens in all three years. This consistency over time is important, because it demonstrates the reliability of our survey instrument. Our results are not an artifact of a single draw from the underlying

<sup>9</sup> OLS is preferred because it is less susceptible to over-fitting with multiple covariates (Egami & Imai, 2018; Hainmueller, Hopkins, & Yamamoto, 2014). However, our results are also robust to logit and probit estimations, see Table A3 in the Appendix.



**Fig. 1.** AMCEs on Citizens' Investor Choice (2019 Wave). *Note:* The dots represent the estimates of the effect of randomly assigned investor characteristics on the probability of endorsing a business in its application for an investment license. The bars indicate 95 percent confidence intervals. Points without bars indicate the reference category for a given dimension.

population of Vietnamese citizens. Even with a slightly changed question and totally different random samples, our analyses deliver substantively similar conclusions.

#### 4.2. Testing Hypothesis 3: The Trade-Off between the Environment and the Economy

The previous analysis demonstrates that when considered separately, citizens approve of investment projects that accrue economic benefits and dislike investments that generate environmental harm. But these separate effects are naive, as they do not consider the joint effect of the two attributes. One might argue, for example, that investors can mitigate the negative effects of environmental damage through increased economic benefits.

While this may have been the case historically, in H3 above, we argue that current global trends lead us to hypothesize that when forced to confront a trade-off, citizens in developing countries will be unwilling to accept environmental degradation in exchange for greater economic benefits.

We estimate the effects of the environmental attributes, conditional on the number of jobs generated by the investment, by computing the marginal means as opposed to computing conditional ACMEs as suggested by [Leeper, Hobolt, and Tilley \(2019\)](#).<sup>10</sup> Marginal means are the column and row mean outcomes for each attri-

<sup>10</sup> Previous studies have typically compared AMCEs that are calculated separately for subgroups of respondents to detect such heterogeneous treatment effects in the conjoint framework.

bute level, averaging across all other attributes (Leeper, Hobolt, & Tilley, 2019, 4). The reason why we use marginal means instead of AMCEs for this trade-off analysis is that the AMCE, as shown in Table A2 and Fig. 1, is relative to the baseline category that is left out for estimation. Thus, interpretations of AMCEs are sensitive to the choice of the baseline category. Marginal means circumvent this problem by providing the probability that a respective profile is chosen given this attribute level is present.

The results from our conditional marginal means analysis are plotted in Fig. 2 and show the probability of endorsing a business in its application for an investor license for each level of the environmental attributes across 100 jobs (in red), 1,000 jobs (in green) and 10,000 jobs (in blue).<sup>11</sup> Because all attribute levels in our conjoint are randomly assigned, pairwise differences between two marginal means for a given attribute (in this case, between different numbers of jobs created by the investment proposal) have a direct causal interpretation. Given our forced-choice design with two alternatives, we can directly interpret the estimated conditional marginal means as probabilities.<sup>12</sup>

We insert a line at 0.5 in each panel to denote when the probability of selecting the project is significantly above or below 50 percent. This means that, similar to a vote choice between two candidates, in instances when the mean values are larger than 0.5, this can be interpreted as indicating majority support for the investor with the particular attributes at hand. 95% confidence intervals around the 0.5 threshold are calculated using the same procedure as in Figure 1.

The first thing to notice is that support for the investment is higher when the environmental impact is the least pronounced across all levels of job creation (100, 1,000, and 10,000 jobs). However, Fig. 2 shows that when the investor description suggests that the investment is likely to incur some environmental costs, preferences for the investment differ depending on the number of jobs created.<sup>13</sup>

For example, when the investment generates waste equivalent to the amount of waste generated by 100 households (lower panel), investments that create 1,000 and 10,000 jobs, generate support for the investment of 0.57 and 0.58 respectively, which are both significantly above 0.5. In contrast, when the investor only creates 100 jobs, waste generation at the level of 100 households, respondents' support for the investment is 0.51, not significantly above 0.5. At the highest level of waste generation (equivalent to 1,000 households), we find that a majority of respondents reject the investment regardless of the number of jobs that materialize. Even if the project generates 10,000 jobs, less than half of the

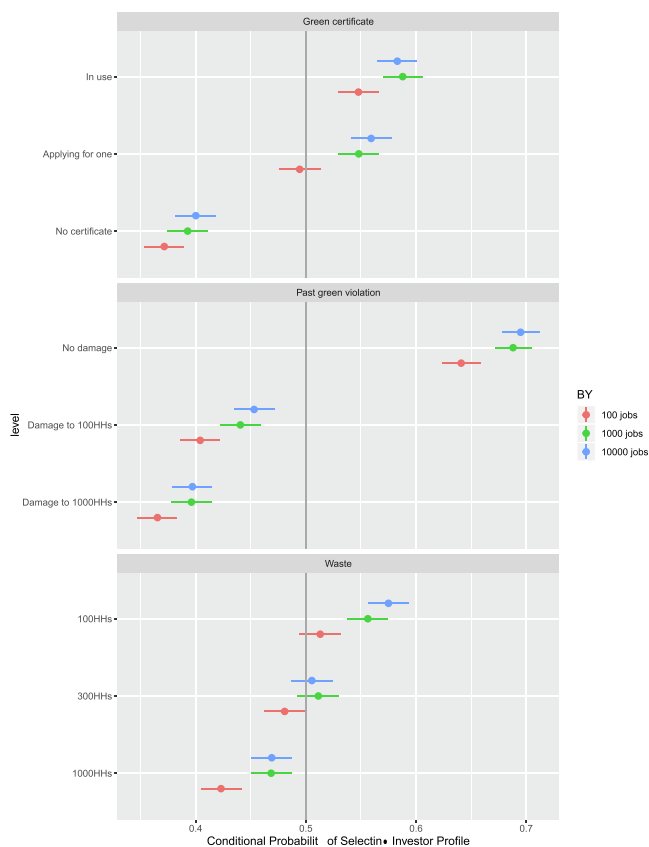


Fig. 2. Conditional Marginal Means of Environmental Attributes. Note: The dots represent the conditional marginal means of the environmental attributes on the probability of endorsing a business in its application for an investor license across 100, 1,000 and 10,000 jobs. The bars indicate 95 percent confidence intervals.

respondents supports it (0.47), which is significantly below the 0.5 threshold.<sup>14</sup>

What about the other two environmental attributes? Looking at environmental history, we find that businesses that have been cited for environmental violations which caused damage to 100 households and 1,000 households, respectively, have support that is significantly less than 0.5. However, respondents evaluate businesses, which have caused some environmental damage, but create more jobs, less negatively than investments that create fewer employment opportunities.

With regards to the effect of environmental certificates, the results indicate that the lack of a green certificate significantly reduces public support for the business' license application across all three levels of job generation. While the results from the unconditional analysis (see Fig. 1) showed that the mere intention by businesses to apply for an environmental certificate significantly increases citizens' endorsement of the investors' license application, the findings from this conditional analysis provides a more nuanced picture. Businesses that do not have their operations certified, but are only in the process of applying for a green certificate

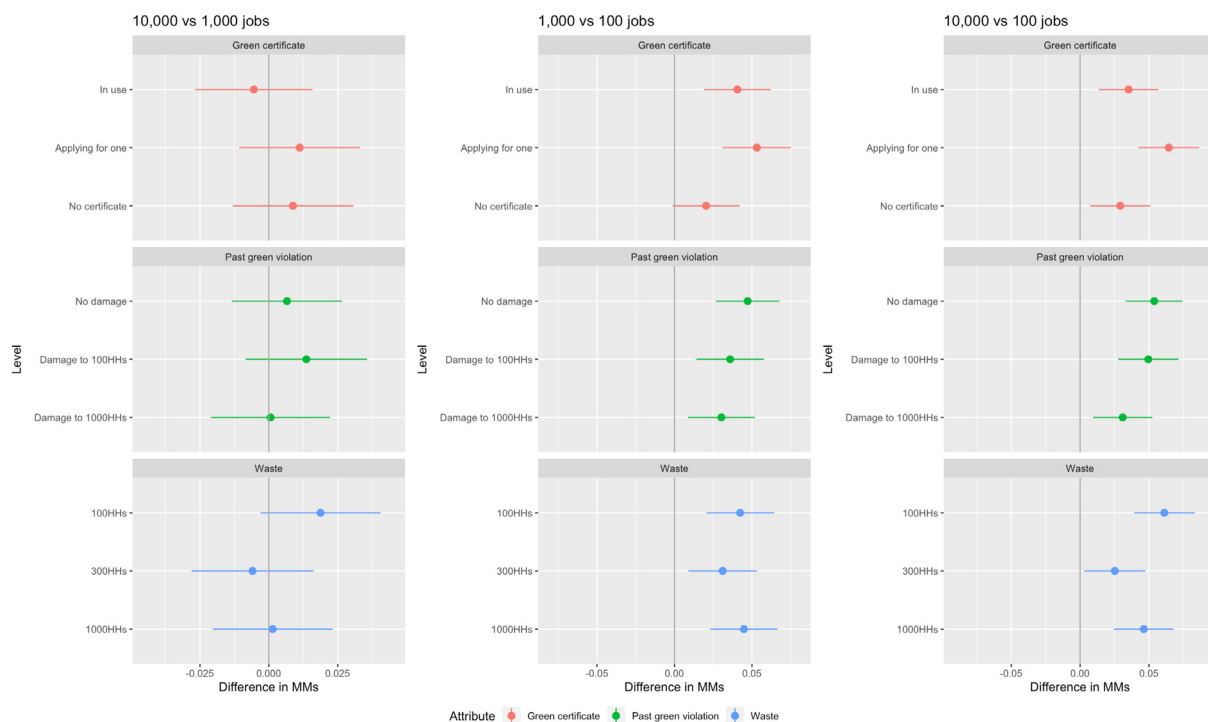
<sup>11</sup> Conditional marginal means and their differences for the full set of attributes are shown in Table A4 of the Appendix.

<sup>12</sup> See also Leeper's explanation for the interpretation of marginal mean on his website which introduces the statistical package for the marginal means analysis (crrreg) which was formally published in Political Analysis (Leeper, Hobolt, & Tilley, 2019): "These represent the mean outcome across all appearances of a particular conjoint feature level, averaging across all other features. In forced choice conjoint designs with two investor profiles per choice task, MMs by definition average 0.5 with values above 0.5 indicating features that increase profile favorability and values below 0.5 indicating features that decrease profile favorability." <https://cran.r-project.org/web/packages/crrreg/vignettes/Introduction.html>.

<sup>13</sup> In Table A1 of the Appendix, we present the cell means for our environmental attributes at the three levels of our employment attribute (100, 1,000 and 10,000 jobs). We find that the attributes with the smallest environmental footprint (in use, no damage, waste equivalent to 100HHs), always receive a majority of support (i.e., >0.5), regardless of the employment size of the project. By contrast, the attributes with greatest footprint (no certificate, damage to 1000HHs, waste equivalent to 1000HHs) receive less than a majority of support even if they are expected to maximize economic gains by creating 10,000 jobs.

<sup>14</sup> We also examine the marginal means of the environmental attributes conditioned by the remaining two economic benefits (tax income and income from local sourcing). The results, plotted in the Appendix in Tables A5 and A6, indicate that the amount of tax contribution and the income from local sourcing also have a limited offsetting effect on the negative impact of environmental harm on citizens' investment preferences. However, the differences in the marginal means of the environmental attributes across these different levels of economic attributes are not statistically significant. These results may be attributed to the fact that the number of jobs is a much more salient economic benefit for most people than the income (through tax or sourcing of local services and goods) investments generate.





**Fig. 3.** Differences in Conditional Marginal Means of Environmental Attributes. *Note:* The dots represent the difference in conditional marginal means of the environmental attributes on the probability of endorsing a business in its application for an investor license across 100, 1,000 and 10,000 jobs. The bars indicate 95 percent confidence intervals.

are indeed likely to be selected, but only if they create 1,000 and 10,000 jobs, respectively. When they only create 100 jobs, support is significantly below 0.5.

We explore the conditional effects of the environment more systematically in Fig. 3, where we plot the difference in the conditional marginal means between levels of job creation. The left panel shows how the conditional marginal mean of the environmental attributes differs between respondents exposed to 10,000 and 1,000 jobs, while the middle and right panels depict these differences between 1,000 and 100 jobs and between 10,000 and 100 jobs, respectively. The solid gray line marks zero differences between the conditional marginal means. The left panel shows that the differences in marginal means of the environmental attributes between 10,000 and 1,000 jobs cross the gray line and are therefore not statistically different from zero at the 0.05 level. However, in the remaining panels (10,000 versus 100 and 1,000 versus 100), we find that, except for one instance, all the differences in marginal means are statistically significant.

#### 4.2.1. Discussion

We have demonstrated that the positive effects of economic growth on investment choice diminish as environmental risk increases. Citizens always favor firms that create more jobs when the environmental impact is minimal. However, as the environmental impact increases, the overall support for the investment declines. For example, at the highest level of waste, a majority of citizens would vote against the project, even if it created 10,000 jobs. Moreover, at high and medium levels of waste, citizens become indifferent between medium (1,000) and large (10,000) job creators. 9,000 additional jobs do not significantly increase support for waste-producing projects. Yet, waste production does not eliminate all support for employment creation. Even at the highest levels of waste, citizens prefer medium and large job creators to small investment projects of 100 jobs by about 4 percentage points. We find similar results for investors' environmental

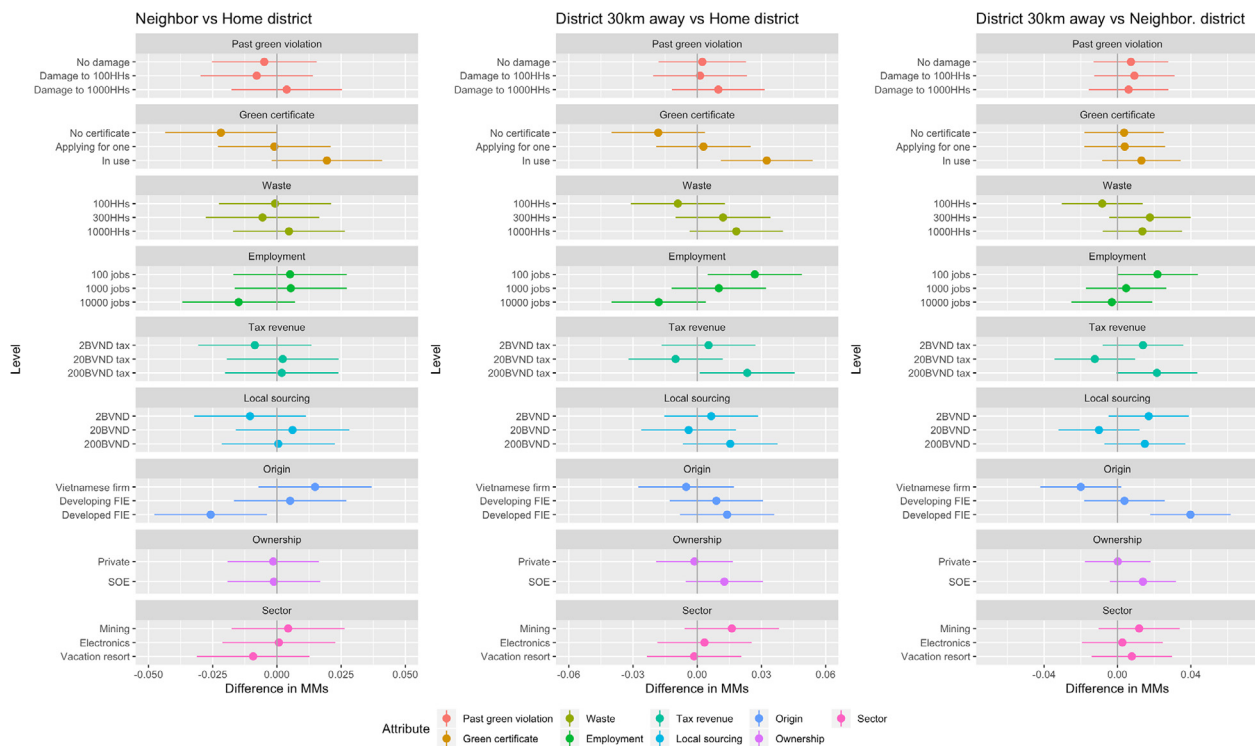
history and green certification. Importantly, these results suggest that investors can neutralize the environmental costs with the economic benefits they generate through their investments to some degree. However, there is a clear limit to this strategy: The greater the environmental costs associated with the investment, the less likely citizens are willing to trade-off environmental quality for economic gains.

#### 4.3. Mitigating survey design effects

Given the nature of environmental harm, there are alternative interpretations of the effect of the environmental attributes, particularly the environmental history treatment, on individuals' investment preferences.

The first possibility is that our results reflect loss aversion rather than people's sincere concern for the environment. Especially when we compare the relative importance of our economic benefits, which are described as "gains," the relatively weaker effect of the economic attribute may simply be due to fears about future costs. To make sure our results do not solely reflect a framing effect in the survey, we introduced the "Green Certificate" treatment in 2018 and 2019. As shown in Table 1, the levels of this conjoint attribute are not framed in terms of loss or gains. The results displayed in Fig. 1 demonstrate that the substantive effects for this positive attribute are very similar to those of historical environmental damage and waste. While it is possible to interpret the green certificate as insurance against damage, this is very different from the types of frames considered by Kahneman (1979).

A second potential alternative reading of the strong sensitivity to environmental impact of the investment on respondents' investor selection could reflect a widespread NIMBY mentality. That is, the respondent may be favorable toward dirty investments, they just want them to be located physically distant from their home. Not accounting for this potential bias, could lead us to overestimating the environmental preferences of the population. Including the



**Fig. 4.** Differences in Conditional Marginal Means (By Location). *Note:* The dots represent the difference in conditional marginal means of the environmental attributes on the probability of endorsing a business in its application for an investor license across respondents' home district, neighboring district and a district 30 km far away. The bars indicate 95 percent confidence intervals.

location attribute in 2019 allowed us to capture potential moderating effects of the NIMBY logic. As Fig. 4 shows, preferences for the environment are consistent across the different investment locations. The one exception is that respondents are marginally more concerned about waste in their home districts. Overall, these findings are consistent with the qualitative lessons from the widespread protests in response to the Formosa scandal across Vietnam, even in areas not affected by the scandal.

Third, when faced with a trade-off, the degree to which individuals prioritize environmental over economic benefits may depend on respondents' socioeconomic characteristics, experience with environmental degradation, or the specific macroeconomic and environmental conditions of their local area. To examine heterogeneous treatment effects, we conducted a number of subgroup analyses in Section A.8 of the Appendix. Overall, we observe very few instances of significant differences in the effect of the environmental attributes on investor preference between a large number of subgroups at the individual and province level, suggesting that the way citizens weigh environmental costs and economic benefits appears to be strikingly consistent across different social strata.

#### 4.3.1. Discussion

This section considered three potential threats to our conclusions based on the way people interact psychologically with survey experiments, including loss aversion, NIMBY, and economic and environmental exposure. To address those concerns we added additional features to our experiment in later waves of the survey. We find that respondents react similarly to an environmental variable that is not framed in terms of a loss, and that results do not vary by proximity to the potential investment. In addition, we find that the observed trade-off is consistent across a wide variety of different sub-groups, which implies that respondents are sociotropic in their evaluations of environmental damage and are not simply considering their personal or local conditions. More broadly,

subgroup consistency demonstrates that our results are not biased by the particular collection of individuals or location surveyed by PAPI. In sum, having addressed these three concerns, we can feel more confident in concluding that our results demonstrate sincere environmental concerns and are not an artefact of our research design.

### 5. Conclusion

In light of the open conflict between economic growth and environmental protection that policymakers in developing countries face, we ask how do citizens in developing countries want their governments to strike the balance. Existing studies demonstrate that public opinion is key to the implementation of adequate policy responses to address environmental challenges (Anderson, Böhmelt, & Ward, 2017; Weaver, 2008). For governments to consider taking action against environmental degradation, there first needs to be widespread awareness and concern about the environment among the wider public. Focusing on the impact of environmental aspects on individuals' investment policy preferences, we probe the first step in the salience-policy linkage in this study.

We argue and find that individuals' evaluations of an investment are strongly influenced by the environmental costs associated with an investment. This is not to say that economic considerations are not relevant to individuals' investment preferences. To the contrary, our results show that economic considerations indeed have a strong influence on mass attitudes toward investment. Citizens in Vietnam are keen to reap the economic benefits of an investment even when these benefits come at some expense to the environment. However, once the environmental costs exceed a threshold level, citizens are willing to forego the economic benefits from the investment to avoid such a level of damage. In addition, the results from our subgroup analyses indi-

cate that the importance of environmental consequences of any investment project cuts across social cleavages.

In sum, our findings challenge a common logic in discussion of both economic development and international environment agreements that individuals in developing countries are too poor to care about the environment, and are therefore unwilling to support policies that prioritize the environment. Instead, our results offer a more nuanced picture of the ways citizens evaluate the alleged trade-off between economic growth and environmental protection. Citizens in today's low-income countries may not possess the same post-materialist motives as their counterparts in advanced industrialized countries, however, we find that there is a significant level of concern and apprehension about environmental degradation among the Vietnamese public. For policymakers, our results suggest that they will have to be more selective in the types of investment they permit to operate within their countries. Allowing investments that are highly lucrative, but pose considerable harm to the environment is likely to risk large-scale protests and discontentment among the population.

Our main objective in this paper was to empirically examine how individuals decide between economic growth, but at the cost of lower environmental quality, and environmental quality, but at the cost of slowing growth in the short run. This is the critical question faced by many emerging countries and their societies. Rapid growth in developing and emerging markets has been accompanied by severe environmental degradation that, if left unchallenged, may eventually constrain growth. Although our analyses are based on data from one country, we believe that Vietnam's recent development is representative of the trade-off between economic growth and environmental degradation. Similar to other countries in the region, Vietnam has experienced remarkable growth. Vietnam's 2018 GDP growth (7.1%) was just slightly above the average (6.4%) of developing and emerging Asia countries (IMF, 2019). Vietnam is also increasingly witnessing environmental problems that have emerged as a result of the economic transition. On the 2018 Environmental Performance Index (EPI), Vietnam had an overall score of 46.96, just a couple places below the average score of 48.61 for the whole set of developing and emerging Asian countries (EPI, 2018).

Thus, we believe that the lessons we draw from our findings in this study can be generalized to other emerging countries that find themselves on a similar development trajectory. In fact, we ran the exact same conjoint we conducted in Vietnam on The Asia Founda-

tion's Myanmar Business Environment Index (MBEI) survey of 4,870 owners and managers of small and medium size enterprises (SMEs) in Myanmar in 2018 to test the extent to which our results travel beyond the Vietnamese context. The result, plotted in Fig. A1, are highly consistent with the findings from our Vietnamese sample. Importantly, the Myanmar results show that even when we extend our analysis to another group of actors (business owners instead of respondents), we find similar evidence of the environmental threshold.

#### **CRedit authorship contribution statement**

**Quynh Nguyen:** Conceptualization, Methodology, Software, Validation, Formal analysis, Writing - original draft, Writing - review & editing, Visualization. **Edmund Malesky:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing - original draft, Writing - review & editing, Project administration.

#### **Declaration of Competing Interest**

The conjoint survey experiment employed in this study was added to an annual survey that has been conducted by the United Nations Development Programme and Vietnam Union of Science and Technology since 2009 (<http://papi.org.vn/eng/>). Edmund Malesky served as paid consultant to UNDP on the sampling and implementation of the survey.

#### **Acknowledgement**

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## Appendix A

“Fish or Steel? New Evidence on the Environment-Economy Trade-off in Developing Vietnam”

### A.1. Question Wording of Conjoint Experiment

#### Vietnamese version

D308 Tôi xin được hỏi ý kiến ông/bà về tình huống sau. Giả sử hiện có hai doanh nghiệp xin cấp phép đầu tư vào huyện/quận/thành phố của ông/bà.

Doanh nghiệp A/Doanh nghiệp B là một doanh nghiệp [Tư nhân/Nhà nước] đến từ [Việt Nam/Quốc gia phát triển/Quốc gia đang phát triển]. Doanh nghiệp này có kế hoạch hoạt động trong lĩnh vực [nghỉ dưỡng/điện tử/khai thác mỏ]. Doanh nghiệp này có kế hoạch hoạt động tại [Huyện/Quận nơi ông/bà đang sinh sống/Huyện/quận bên cạnh huyện/quận nơi ông/bà đang sinh sống/Huyện/quận cách nơi ông/bà đang sinh sống khoảng 30km]. Doanh nghiệp này sẽ tuyển dụng [100 nhân công/1,000 nhân công/10,000 nhân công] nhân công địa phương, đóng góp tổng tiền thuế là [2 tỉ VNĐ/20 tỉ VNĐ/200 tỉ VNĐ] cho ngân sách địa phương, và thu mua nguyên vật liệu đầu vào từ địa phương với tổng trị giá [2 tỉ VNĐ/20 tỉ VNĐ/200 tỉ VNĐ]. Doanh nghiệp này [Chưa bao giờ có tai tiếng về vi phạm quy định về môi trường/Đã từng có tai tiếng về vi phạm quy định về môi trường, gây ảnh hưởng tiêu cực tới 100 hộ dân/Đã từng có tai tiếng về vi phạm quy định về môi trường, gây ảnh hưởng tiêu cực tới 1.000 hộ dân] Lượng rác doanh nghiệp này thải ra tương đương lượng rác do [100/300/1000] hộ dân thải ra. Doanh nghiệp này [ĐÃ CÓ “chứng chỉ Xanh”/CHƯA CÓ “chứng chỉ Xanh”, /ĐANG XIN CẤP “chứng chỉ Xanh”].

Theo ý kiến của mình, ông/bà mong muốn doanh nghiệp nào sẽ được chọn cấp phép đầu tư tại huyện/quận/thành phố của mình?

- Doanh nghiệp A
- Doanh nghiệp B
- Không biết

#### English version

D308 Now I would like to discuss with you the following scenarios. Two businesses have applied for licenses to invest in the province where you live.

Business A/Business B is a [private/state-owned] business from [Vietnam/Developed FIE/Developing FIE] that plans to operate in [Vacation resort/Electronics/Mining]. This business plans to invest in [your home district/a neighboring district/a district 30km away]. It will employ [100/1,000/10,000] local workers, contribute [2BVND/20BVND/200BVND] to the provincial budget in taxes, and purchase [2BVND/20BVND/200BVND] in goods and services from local companies. The firm has [Never been cited for environmental violations/Previously been cited for environmental violation causing damage to 100HHs/Previously been cited for environmental violation causing damage to 1000HHs]. It will generate an annual waste amount as much of that generated by [100/300/1000] households. The firm [Does not possess a “green certificate”/Is applying for a “green certificate”/Possesses a “green certificate”].

Which of these businesses would you most like to see your local leaders grant approval to commence their investment project?

- Business A
- Business B
- Don't know

A.2. Conditional Cell Means of Investor Choice

**Table A1**  
Cell Means of Investor Choice Conditional on Environmental Attributes and Job Levels.

		Employment		
		100 jobs	1000 jobs	10000 jobs
Green certificate	No certificate	0.371	0.392	0.401
	Applying for one	0.495	<b>0.548</b>	<b>0.56</b>
	In use	<b>0.547</b>	<b>0.588</b>	<b>0.582</b>
Green violation	No damage	<b>0.642</b>	<b>0.688</b>	<b>0.694</b>
	Damage to 100HHs	0.404	0.44	0.453
	Damage to 1000HHs	0.366	0.397	0.397
Waste	100HHs	<b>0.514</b>	<b>0.556</b>	<b>0.575</b>
	300HHs	0.481	<b>0.512</b>	<b>0.506</b>
	1000HHs	0.423	0.467	0.469

A.3. Average Marginal Component Effects

**Table A2**  
Estimated AMCEs on Investor Choice.

		Dependent variable: Investor choice		
		2019	2018	2017
Violation: Damage to 100HHs	-0.240*** (0.007)	-0.238*** (0.007)	-0.273*** (0.007)	
Violation: Damage to 1000HHs	-0.287*** (0.007)	-0.283*** (0.007)	-0.352*** (0.007)	
Certificate: Applying for one	0.146*** (0.007)	0.138*** (0.007)	0.152*** (0.007)	
Certificate: In use	0.183*** (0.007)	0.195*** (0.007)	0.210*** (0.007)	
Waste: 300HHs	-0.048*** (0.007)	-0.039*** (0.007)		
Waste: 1000HHs	-0.093*** (0.007)	-0.095*** (0.007)		
Employment: 1000 jobs	0.037*** (0.007)	0.025*** (0.007)	0.029*** (0.007)	
Employment: 10000 jobs	0.044*** (0.007)	0.046*** (0.007)	0.065*** (0.007)	
Tax revenue: 20 BVND	0.012 (0.007)	0.027*** (0.007)		
Tax revenue: 200 BVND	0.024*** (0.007)	0.037*** (0.007)		
Local sourcing: 20 BVND	0.015** (0.007)	0.009 (0.007)		
Local sourcing: 200 BVND	0.017** (0.007)	0.018** (0.007)		
Tax incentive: 5% cut			0.017** (0.007)	
Tax incentive: 10% cut			0.031*** (0.007)	
Origin: Developing FIE	-0.050*** (0.007)	-0.065*** (0.007)	-0.062*** (0.007)	
Origin: Developed FIE	-0.051*** (0.007)	-0.055*** (0.007)	-0.058*** (0.007)	
Ownership: SOE	0.050*** (0.006)	0.046*** (0.006)	0.042*** (0.007)	
Ownership: Unknown			0.005 (0.007)	
Sector: Electronics	0.033*** (0.007)	0.041*** (0.007)	0.051*** (0.007)	
Sector: Vacation resort	0.018** (0.007)	0.023*** (0.007)		
Location: Neighboring district	-0.002 (0.007)			
Location: District 30 km away	0.005 (0.007)			
Sector: Food processing			0.055***	

(continued on next page)

Table A2 (continued)

	Dependent variable: Investor choice		
	2019	2018	2017
Constant	0.551*** (0.013)	0.547*** (0.013)	(0.007) 0.522*** (0.011)
Observations	25,210	25,220	24,798
R <sup>2</sup>	0.103	0.105	0.134
Adjusted R <sup>2</sup>	0.102	0.104	0.133
Residual Std. Error	0.474 (df = 25190)	0.473 (df = 25202)	0.466 (df = 24783)
F Statistic	152.092*** (df = 19; 25190)	173.945*** (df = 17; 25202)	273.008*** (df = 14; 24783)

Note: \*p < 0.1; \*\*p < 0.05; \*\*\*p < 0.01

A.4. Average Marginal Component Effects - Myanmar

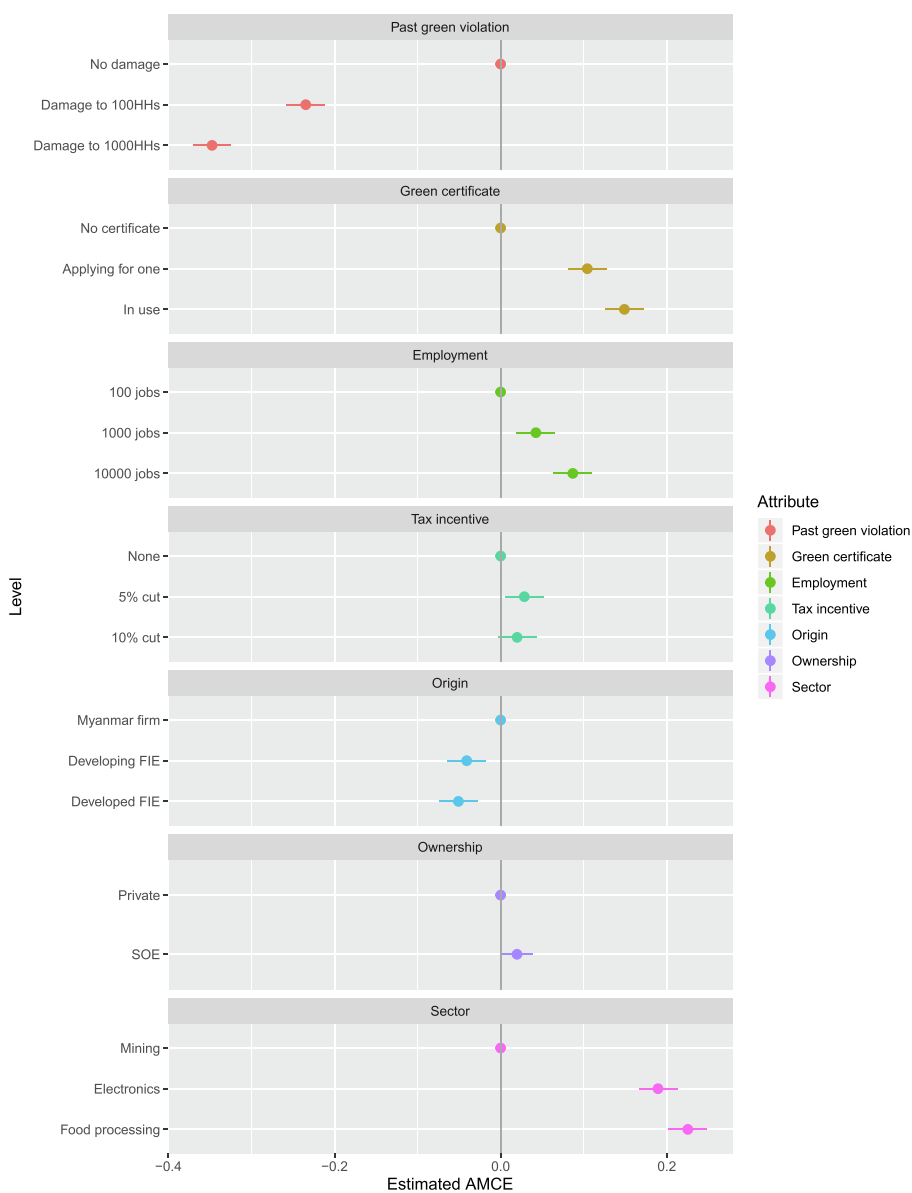


Fig. A1. AMCEs on Investor Choice (Myanmar). Note: Sample consists of 4,870 owners and managers of small and medium size enterprises (SMEs) in Myanmar. Like the PAPI, the MBEI survey employs a two-stage sampling strategy with PPS sampling of three to five townships per state and then stratified sampling of individual businesses within each township. Surveys were also conducted using tablets in the local language of the respondent. The dots represent the estimates of the effect of randomly assigned investor characteristics on the probability of endorsing a business in its application for an investment license. The bars indicate 95 percent confidence intervals. Points without bars indicate the reference category for a given dimension.

A.5. Comparison between OLS, Logit and Probit Estimation

**Table A3**  
Effect of Investor Attributes on Investor Choice.

	Dependent variable: Investor choice		
	OLS (1)	Logistic (2)	Probit (3)
Employment: 1000 jobs	0.037*** (0.007)	0.164*** (0.033)	0.100*** (0.020)
Employment: 10000 jobs	0.044*** (0.007)	0.194*** (0.033)	0.118*** (0.020)
Tax revenue: 20BVND tax	0.012 (0.007)	0.051 (0.033)	0.031 (0.020)
Tax revenue: 200BVND tax	0.024*** (0.007)	0.106*** (0.033)	0.065*** (0.020)
Local sourcing: 20BVND	0.016** (0.007)	0.071** (0.033)	0.044** (0.020)
Local sourcing: 200BVND	0.017** (0.007)	0.077** (0.033)	0.047** (0.020)
Waste: 300HHs	-0.048*** (0.007)	-0.213*** (0.033)	-0.131*** (0.020)
Waste: 1000HHs	-0.094*** (0.007)	-0.420*** (0.033)	-0.257*** (0.020)
Green violation: Damage to 100HHs	-0.240*** (0.007)	-1.036*** (0.033)	-0.639*** (0.020)
Green violation: Damage to 1000HHs	-0.287*** (0.007)	-1.237*** (0.033)	-0.762*** (0.020)
Green certificate: Applying for one	0.147*** (0.007)	0.649*** (0.033)	0.398*** (0.020)
Green certificate: In use	0.183*** (0.007)	0.809*** (0.033)	0.496*** (0.020)
Origin: Developing FIE	-0.050*** (0.007)	-0.222*** (0.033)	-0.135*** (0.020)
Origin: Developed FIE	-0.050*** (0.007)	-0.224*** (0.033)	-0.137*** (0.020)
Ownership: SOE	0.050*** (0.006)	0.224*** (0.027)	0.138*** (0.016)
Sector: Electronics	0.033*** (0.007)	0.146*** (0.033)	0.089*** (0.020)
Sector: Vacation resort	0.018** (0.007)	0.082** (0.033)	0.050** (0.020)
Location: Neighboring district	-0.002 (0.007)	-0.011 (0.033)	-0.006 (0.020)
Location: District 30 km away	0.006 (0.007)	0.025 (0.033)	0.017 (0.020)
Constant	0.551*** (0.013)	0.211*** (0.059)	0.131*** (0.036)
Observations	25,110	25,110	25,110
R <sup>2</sup>	0.103		
Adjusted R <sup>2</sup>	0.102		
Log Likelihood		-16,059.640	-16,060.400
Akaike Inf. Crit.		32,159.290	32,160.790
Residual Std. Error	0.474 (df = 25090)		
F Statistic	151.219*** (df = 19; 25090)		

Note: \*p < 0.1; \*\*p < 0.05; \*\*\*p < 0.01

## A.6. Conditional marginal means and differences in marginal means

**Table A4**  
Conditional Marginal Means and their Differences (By Number of Jobs).

	Conditional marginal means			Differences in marginal means		
	100 jobs	1000 jobs	10000 jobs	10,000 vs 1,000 jobs	10,000 vs 100 jobs	1,000 vs 100 jobs
Past green violation						
No damage	<b>0.641</b>	<b>0.688</b>	<b>0.694</b>	0.007	<b>0.054</b>	<b>0.047</b>
Damage to 100HHs	<b>0.404</b>	<b>0.440</b>	<b>0.453</b>	0.014	<b>0.050</b>	<b>0.036</b>
Damage to 1000HHs	<b>0.366</b>	<b>0.397</b>	<b>0.397</b>	0.001	<b>0.031</b>	<b>0.030</b>
Green certificate						
No certificate	<b>0.371</b>	<b>0.392</b>	<b>0.401</b>	0.009	<b>0.029</b>	<b>0.020</b>
Applying for one	0.495	<b>0.548</b>	<b>0.560</b>	0.011	<b>0.064</b>	<b>0.053</b>
In use	<b>0.547</b>	<b>0.588</b>	<b>0.582</b>	-0.005	<b>0.035</b>	<b>0.041</b>
Waste						
100HHs	0.514	<b>0.556</b>	<b>0.575</b>	0.019	<b>0.061</b>	<b>0.042</b>
300HHs	<b>0.481</b>	0.512	0.506	-0.006	<b>0.025</b>	<b>0.031</b>
1000HHs	<b>0.423</b>	<b>0.467</b>	<b>0.469</b>	0.001	<b>0.046</b>	<b>0.045</b>
Tax revenue						
2BVND tax	<b>0.458</b>	0.500	0.505	0.005	<b>0.047</b>	<b>0.042</b>
20BVND tax	<b>0.468</b>	0.514	0.519	0.006	<b>0.051</b>	<b>0.045</b>
200BVND tax	0.490	<b>0.521</b>	<b>0.524</b>	0.003	<b>0.034</b>	<b>0.032</b>
Local sourcing						
2BVND	<b>0.453</b>	0.491	0.514	<b>0.023</b>	<b>0.061</b>	<b>0.038</b>
20BVND	0.489	0.512	<b>0.523</b>	0.010	<b>0.033</b>	<b>0.023</b>
200BVND	<b>0.475</b>	<b>0.531</b>	0.512	-0.019	<b>0.037</b>	<b>0.056</b>
Origin						
Vietnamese firm	0.496	<b>0.560</b>	<b>0.543</b>	-0.017	<b>0.047</b>	<b>0.064</b>
Developing FIE	<b>0.450</b>	0.494	0.509	0.015	<b>0.059</b>	<b>0.044</b>
Developed FIE	<b>0.470</b>	0.484	0.497	0.013	0.026	<b>0.013</b>
Ownership						
Private	<b>0.447</b>	0.487	0.492	0.005	<b>0.045</b>	<b>0.040</b>
SOE	0.498	<b>0.536</b>	<b>0.540</b>	0.004	<b>0.042</b>	<b>0.038</b>
Sector						
Mining	<b>0.463</b>	0.482	0.503	0.021	0.040	<b>0.018</b>
Electronics	0.484	<b>0.534</b>	<b>0.528</b>	-0.006	<b>0.044</b>	<b>0.050</b>
Vacation resort	0.469	<b>0.519</b>	<b>0.518</b>	-0.001	<b>0.049</b>	<b>0.050</b>
Location						
Home district	<b>0.461</b>	0.506	<b>0.527</b>	0.021	0.066	<b>0.045</b>
Neighboring district	<b>0.466</b>	0.512	0.512	0.000	0.046	<b>0.045</b>
District 30km away	0.488	0.517	0.509	-0.007	0.021	<b>0.028</b>

Note: Estimates that are statistically significant at the .05 level are in bold.

**Table A5**  
Conditional Marginal Means and their Differences (By Amounts of Tax Contribution).

	Conditional marginal means			Differences in marginal means		
	200BVND tax	20BVND tax	2BVND tax	200 vs 20BVND	20 vs 2BVND	200 vs 2BVND
Past green violation						
No damage	<b>0.682</b>	<b>0.676</b>	<b>0.665</b>	0.006	0.012	0.017
Damage to 100HHs	<b>0.441</b>	<b>0.436</b>	<b>0.419</b>	0.005	0.017	0.022
Damage to 1000HHs	<b>0.409</b>	<b>0.380</b>	<b>0.372</b>	0.029	0.008	<b>0.037</b>
Green certificate						
No certificate	<b>0.391</b>	<b>0.392</b>	<b>0.380</b>	-0.001	0.012	0.012
Applying for one	<b>0.556</b>	<b>0.528</b>	<b>0.520</b>	0.027	0.008	0.036
In use	<b>0.580</b>	<b>0.577</b>	<b>0.561</b>	0.004	0.015	0.019
Waste						
100HHs	<b>0.557</b>	<b>0.553</b>	<b>0.536</b>	0.004	0.017	0.021
300HHs	0.509	0.494	0.495	0.015	0.000	0.014
1000HHs	<b>0.469</b>	<b>0.457</b>	<b>0.434</b>	0.012	0.023	0.035
Employment						
100 jobs	0.490	<b>0.468</b>	<b>0.458</b>	0.021	0.010	0.032
1000 jobs	<b>0.521</b>	0.514	0.500	0.008	0.014	0.021
10000 jobs	0.524	0.519	0.505	0.005	0.014	0.019
Local sourcing						
2BVND	0.493	0.489	<b>0.475</b>	0.005	0.014	0.018
20BVND	<b>0.523</b>	0.515	0.487	0.008	0.028	0.036
200BVND	<b>0.520</b>	0.498	0.501	0.021	-0.003	0.018
Origin						
Vietnamese firm	<b>0.536</b>	<b>0.545</b>	0.517	-0.009	0.027	0.019



Table A5 (continued)

	Conditional marginal means			Differences in marginal means		
	200BVND tax	20BVND tax	2BVND tax	200 vs 20BVND	20 vs 2BVND	200 vs 2BVND
Developing FIE	0.495	<b>0.482</b>	<b>0.478</b>	0.013	0.004	0.017
Developed FIE	0.505	<b>0.477</b>	<b>0.469</b>	0.027	0.008	0.036
Ownership						
Private	0.489	<b>0.476</b>	<b>0.461</b>	0.013	0.015	0.027
SOE	<b>0.535</b>	<b>0.525</b>	0.515	0.010	0.010	0.020
Sector						
Mining	0.491	0.487	<b>0.470</b>	0.003	0.017	0.021
Electronics	<b>0.534</b>	0.513	0.499	0.021	0.014	0.035
Vacation resort	0.510	0.501	0.494	0.010	0.007	0.016
Location						
Home district	0.503	0.503	0.489	0.000	0.014	0.014
Neighboring district	0.505	0.505	<b>0.480</b>	0.000	0.025	0.025
District 30km away	<b>0.527</b>	0.493	0.494	0.034	-0.001	0.032

Note: Estimates that are statistically significant at the .05 level are in bold.

Table A6

Conditional Marginal Means and their Differences (By Amounts of Local Sourcing Income).

	Conditional marginal means			Differences in marginal means		
	200BVND	20BVND	2BVND	200 vs 20BVND	20 vs 2BVND	200 vs 2BVND
Past green violation						
No damage	<b>0.683</b>	<b>0.677</b>	<b>0.663</b>	0.007	0.013	0.020
Damage to 100HHs	<b>0.436</b>	<b>0.448</b>	<b>0.413</b>	-0.011	0.035	0.024
Damage to 1000HHs	<b>0.391</b>	<b>0.391</b>	<b>0.380</b>	0.000	0.011	0.011
Green certificate						
No certificate	<b>0.390</b>	<b>0.391</b>	<b>0.383</b>	0.000	0.008	0.008
Applying for one	<b>0.537</b>	<b>0.544</b>	<b>0.523</b>	-0.007	0.022	0.014
In use	<b>0.585</b>	<b>0.581</b>	<b>0.552</b>	0.005	0.029	0.033
Waste						
100HHs	<b>0.555</b>	<b>0.549</b>	<b>0.542</b>	0.006	0.007	0.013
300HHs	0.508	0.509	<b>0.482</b>	-0.001	0.028	0.027
1000HHs	<b>0.458</b>	<b>0.466</b>	<b>0.435</b>	-0.008	0.031	0.023
Employment						
100 jobs	<b>0.475</b>	<b>0.489</b>	0.453	-0.014	0.037	0.022
1000 jobs	<b>0.531</b>	0.512	0.491	0.019	0.021	<b>0.040</b>
10000 jobs	0.512	<b>0.523</b>	0.514	-0.011	0.009	-0.002
Tax revenue						
2BVND tax	0.501	0.487	<b>0.475</b>	0.014	0.012	0.026
20BVND tax	0.498	0.515	0.489	-0.017	0.026	0.010
200BVND tax	<b>0.520</b>	<b>0.523</b>	0.493	-0.003	0.029	0.026
Origin						
Vietnamese firm	<b>0.541</b>	<b>0.543</b>	0.514	-0.002	0.028	0.026
Developing FIE	0.500	0.484	<b>0.471</b>	0.017	0.013	0.029
Developed FIE	<b>0.479</b>	0.498	<b>0.474</b>	-0.019	0.024	0.005
Ownership						
Private	0.490	<b>0.476</b>	<b>0.460</b>	0.014	0.015	0.030
SOE	<b>0.524</b>	<b>0.540</b>	0.511	-0.017	0.029	0.012
Sector						
Mining	0.484	0.499	<b>0.465</b>	-0.015	0.035	0.020
Electronics	<b>0.522</b>	<b>0.529</b>	0.496	-0.007	0.033	0.026
Vacation resort	0.512	0.496	0.497	0.017	-0.001	0.015
Location						
Home district	0.501	0.507	0.487	-0.006	0.020	0.014
Neighboring district	0.502	0.514	<b>0.477</b>	-0.012	0.037	0.025
District 30km away	0.517	0.503	0.494	0.013	0.010	0.023

Note: Estimates that are statistically significant at the .05 level are in bold.

A.7. Additional Tests of Hypothesis 3

To examine the second aspect of H3, we test whether the negative effect of the environmental risk remains robust as the economic benefits of the investment increase. As in the analysis

above, we estimate the marginal means and their differences for the economic attributes conditional upon the environmental history of the business; i.e., to what extent the firm has been cited for causing environmental damage in the past. The results are presented in Figs. A2 and A3; marginal means and their differences for the full set of attributes are shown in Table A7.

The results in Fig. A2 suggest that at no or very low levels of environmental risks (i.e., when the investor has never been cited for any environmental misconduct in the past), any level of economic benefit results in a positive effect on the citizens' support for the investment project. However, as soon as there is an environmental risk involved, as indicated by the past environmental performance of the investing business, this significantly reduces respondents' support for the investor's license application. At any level of environmental damage, a majority of citizens would reject the investment.

As shown in Fig. A3, the differences in the conditional marginal means are statistically significant across all levels of environmental history of the business. Thus, in contrast to Figs. 2 and 3, citizens are never indifferent between different levels of environmental damage. Regardless of the number of jobs created, they always significantly prefer marginal increases in the cleanliness of the investment project.

We also conduct the same analysis using our remaining two attributes of environmental impact: green certification (Table A8) and waste generation (Table A9) and find very similar results. We find that independent of the level of economic benefits resulting from the investment, respondents consistently show a stronger preference for clean investments.

Overall, these additional tests lend further empirical support for H3 with some important qualifications. The results suggest that, on the one hand, citizens tolerate some environmental costs in exchange for economic growth. On the other hand, there is a threshold level of environmental impact that a majority of citizens are willing to accept that differs by the specific economic attribute. Beyond that threshold, individuals have a clear preference for environmental quality and are willing to forego the economic benefits of the investment. At higher levels of economic benefits, the effect

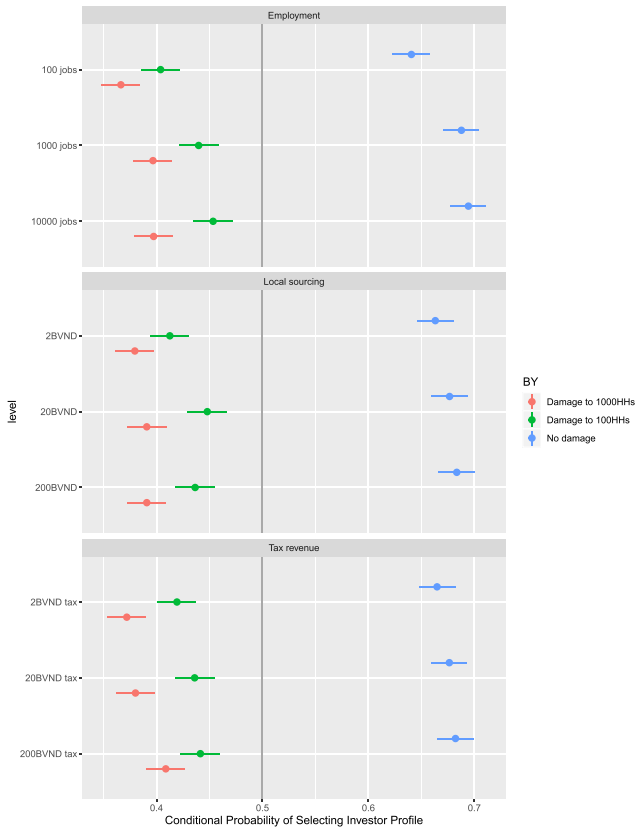


Fig. A2. Conditional Marginal Means of Economic Attributes.

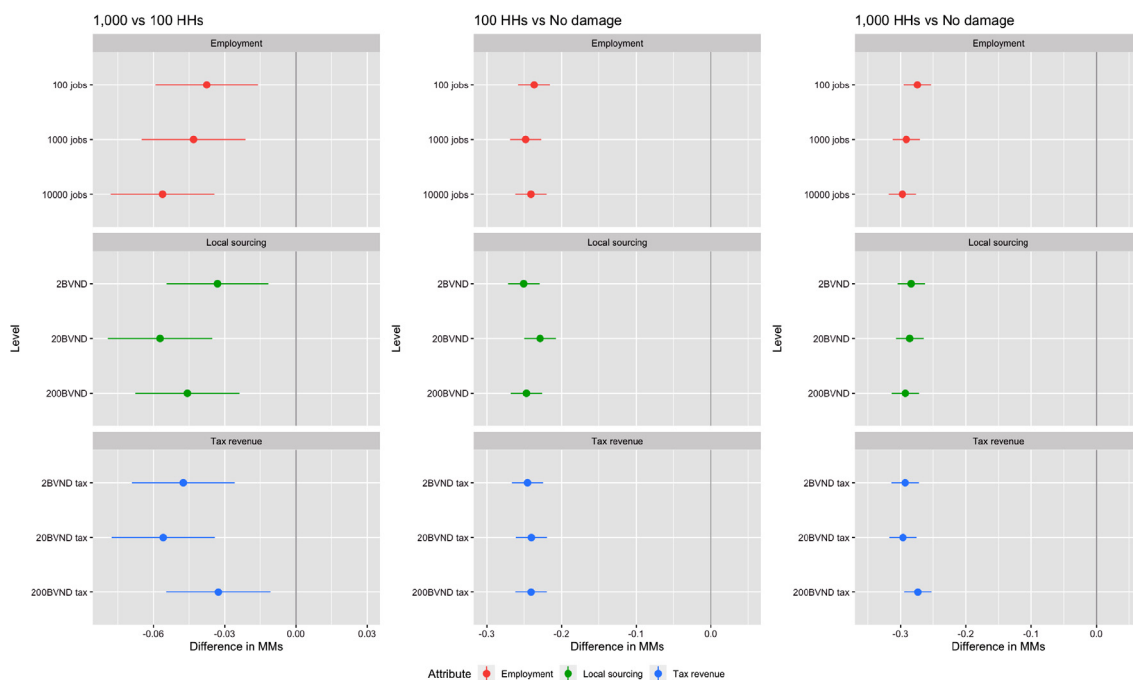


Fig. A3. Differences in Conditional Marginal Means of Economic Attributes.

**Table A7**  
Conditional Marginal Means and their Differences (By Past Green Violation).

	Conditional marginal means			Differences in marginal means		
	No damage	Damage to 100HHs	Damage to 1000HHs	None vs Damage to 100HHs	Damage to 100 vs 1000HHs	None vs Damage to 1000HHs
Green certificate						
No certificate	<b>0.564</b>	<b>0.310</b>	<b>0.286</b>	<b>0.254</b>	0.024	<b>0.278</b>
Applying for one	<b>0.710</b>	<b>0.470</b>	<b>0.418</b>	<b>0.240</b>	<b>0.052</b>	<b>0.293</b>
In use	<b>0.743</b>	0.514	<b>0.453</b>	<b>0.229</b>	<b>0.061</b>	<b>0.290</b>
Waste						
100HHs	<b>0.717</b>	<b>0.480</b>	<b>0.438</b>	<b>0.237</b>	<b>0.042</b>	<b>0.279</b>
300HHs	<b>0.688</b>	<b>0.429</b>	<b>0.377</b>	<b>0.259</b>	<b>0.052</b>	<b>0.312</b>
1000HHs	<b>0.618</b>	<b>0.390</b>	<b>0.346</b>	<b>0.228</b>	<b>0.043</b>	<b>0.272</b>
Employment						
100 jobs	<b>0.641</b>	<b>0.404</b>	<b>0.366</b>	<b>0.237</b>	<b>0.037</b>	<b>0.274</b>
1000 jobs	<b>0.688</b>	<b>0.440</b>	<b>0.397</b>	<b>0.248</b>	<b>0.043</b>	<b>0.291</b>
10000 jobs	<b>0.694</b>	<b>0.453</b>	<b>0.397</b>	<b>0.241</b>	<b>0.056</b>	<b>0.297</b>
Tax revenue						
2BVND tax	<b>0.665</b>	<b>0.419</b>	<b>0.372</b>	<b>0.246</b>	<b>0.047</b>	<b>0.293</b>
20BVND tax	<b>0.676</b>	<b>0.436</b>	<b>0.380</b>	<b>0.240</b>	<b>0.056</b>	<b>0.296</b>
200BVND tax	<b>0.682</b>	<b>0.441</b>	<b>0.409</b>	<b>0.241</b>	0.033	<b>0.273</b>
Local sourcing						
2BVND	<b>0.663</b>	<b>0.413</b>	<b>0.380</b>	<b>0.251</b>	0.033	<b>0.284</b>
20BVND	<b>0.677</b>	<b>0.448</b>	<b>0.391</b>	<b>0.229</b>	<b>0.057</b>	<b>0.286</b>
200BVND	<b>0.683</b>	<b>0.436</b>	<b>0.391</b>	<b>0.247</b>	<b>0.046</b>	<b>0.293</b>
Origin						
Vietnamese firm	<b>0.709</b>	<b>0.469</b>	<b>0.414</b>	<b>0.240</b>	<b>0.055</b>	<b>0.295</b>
Developing FIE	<b>0.665</b>	<b>0.404</b>	<b>0.377</b>	<b>0.261</b>	0.027	<b>0.288</b>
Developed FIE	<b>0.650</b>	<b>0.424</b>	<b>0.371</b>	<b>0.226</b>	<b>0.053</b>	<b>0.279</b>
Ownership						
Private	<b>0.654</b>	<b>0.402</b>	<b>0.364</b>	<b>0.252</b>	<b>0.038</b>	<b>0.290</b>
SOE	<b>0.695</b>	<b>0.463</b>	<b>0.410</b>	<b>0.232</b>	<b>0.052</b>	<b>0.285</b>
Sector						
Mining	<b>0.658</b>	<b>0.418</b>	<b>0.367</b>	<b>0.240</b>	<b>0.051</b>	<b>0.291</b>
Electronics	<b>0.693</b>	<b>0.444</b>	<b>0.403</b>	<b>0.250</b>	<b>0.041</b>	<b>0.291</b>
Vacation resort	<b>0.672</b>	<b>0.435</b>	<b>0.391</b>	<b>0.237</b>	<b>0.044</b>	<b>0.281</b>
Location						
Home district	<b>0.675</b>	<b>0.434</b>	<b>0.382</b>	<b>0.241</b>	<b>0.052</b>	<b>0.293</b>
Neighboring district	<b>0.670</b>	<b>0.426</b>	<b>0.386</b>	<b>0.244</b>	<b>0.040</b>	<b>0.284</b>
District 30km away	<b>0.678</b>	<b>0.436</b>	<b>0.392</b>	<b>0.242</b>	<b>0.043</b>	<b>0.285</b>

Note: Estimates that are statistically significant at the .05 level are in bold.

of the environmental attributes persists. For the highest levels of environmental threat, no matter how large the economic benefits the investment is likely to bring, a majority of citizens will still reject the investment. The symmetrical relationship is also visible; at higher levels of environmental risks, the positive effect of the economic benefits significantly decreases. In sum, we have empirical support for both sides of our H3 that developing country citizens favor the environment over growth when they are forced to choose.

*A.8. The economy-environment trade-off across subgroups*

Of course, the degree to which individuals prioritize environmental over economic benefits may also depend on respondents' socioeconomic characteristics or experience with environmental degradation, or the specific macroeconomic and environmental conditions of their local area. Indeed, discussions of EKC and post-materialism both anticipate that wealthier individuals should be the most environmentally conscious. Building on this literature, we select a number of covariates to test for potential treatment heterogeneity.

First, we consider important respondent characteristics that can influence the way individuals evaluate the economy-environment trade-off. Previous research on public environmental concern suggests that variation in environmental awareness and apprehension can be explained by self-interest, as well as value- and knowledge-based factors.<sup>15</sup> Self-interest based explanations posit that when

people are poor, they simply cannot afford to care about the environment, because all of their efforts are spent on satisfying their basic needs such as food, shelter, physical security, etc. (Inglehart, 1995; Maslow, 1943; van Liere & Dunlap, 1980). Thus, we should expect the environmental attributes to have a stronger impact on the investment preferences of high-income individuals than on the preferences of low-income respondents. In value-based explanations, gender is found to be an important predictor of public environmental concern (Dietz, Stern, & Guagnano, 1998; Liu, Vedlitz, & Shi, 2014). The gender gap in public environmental concern has been explained by socialization theory, which attributes different value formation processes to men and women which leads women to express stronger green preferences than men. Hence, women should evaluate investments with high environmental impact more negatively than their male counterparts. Within knowledge-based explanations, some existing studies argue that exposure and direct experience of environmental challenges make individuals more aware and concerned about the environment (Alkon & Wang, 2018; Egan & Mullin, 2016). Accordingly, since city residents typically live in places that are more exposed to environmental degradation, their investment preferences should be impacted more strongly by the environmental costs incurred by any investment project.

Second, individuals' concern about the environment may be more strongly driven by collective-level sociotropic conditions than personal-level egotropic considerations. To this end, we examine subgroup preferences across different levels of economic benefits resulting from the investment and province-level characteristics. Similar to the mechanism underlying the impact of personal economic conditions, some scholars argue that under

<sup>15</sup> For a review of within country determinants, see Liu and Mu (2016).

**Table A8**  
Conditional Marginal Means and their Differences (By Green Certificate).

	Conditional marginal means			Differences in marginal means		
	In use	Applying for one	No certificate	In use vs Applying	Appying vs None	In use vs None
Past green violation						
No damage	<b>0.743</b>	<b>0.710</b>	<b>0.564</b>	<b>0.032</b>	<b>0.146</b>	<b>0.179</b>
Damage to 100HHs	<b>0.514</b>	<b>0.470</b>	<b>0.310</b>	<b>0.043</b>	<b>0.160</b>	<b>0.204</b>
Damage to 1000HHs	<b>0.453</b>	<b>0.418</b>	<b>0.286</b>	<b>0.035</b>	<b>0.132</b>	<b>0.167</b>
Waste						
100HHs	<b>0.620</b>	<b>0.598</b>	<b>0.425</b>	<b>0.022</b>	<b>0.172</b>	<b>0.194</b>
300HHs	<b>0.575</b>	<b>0.527</b>	<b>0.390</b>	<b>0.048</b>	<b>0.137</b>	<b>0.185</b>
1000HHs	<b>0.524</b>	<b>0.482</b>	<b>0.348</b>	<b>0.042</b>	<b>0.134</b>	<b>0.176</b>
Employment						
100 jobs	<b>0.547</b>	0.495	<b>0.371</b>	<b>0.052</b>	<b>0.124</b>	<b>0.176</b>
1000 jobs	<b>0.588</b>	<b>0.548</b>	<b>0.392</b>	<b>0.039</b>	<b>0.157</b>	<b>0.196</b>
10000 jobs	<b>0.582</b>	<b>0.560</b>	<b>0.401</b>	<b>0.023</b>	<b>0.159</b>	<b>0.182</b>
Tax revenue						
2BVND tax	<b>0.561</b>	0.520	<b>0.380</b>	<b>0.042</b>	<b>0.140</b>	<b>0.182</b>
20BVND tax	<b>0.577</b>	<b>0.528</b>	<b>0.392</b>	<b>0.048</b>	<b>0.136</b>	<b>0.184</b>
200BVND tax	<b>0.580</b>	<b>0.556</b>	<b>0.391</b>	<b>0.025</b>	<b>0.164</b>	<b>0.189</b>
Local sourcing						
2BVND	<b>0.552</b>	<b>0.523</b>	<b>0.383</b>	<b>0.029</b>	<b>0.140</b>	<b>0.170</b>
20BVND	<b>0.581</b>	<b>0.544</b>	<b>0.391</b>	<b>0.036</b>	<b>0.153</b>	<b>0.190</b>
200BVND	<b>0.585</b>	<b>0.537</b>	<b>0.390</b>	<b>0.048</b>	<b>0.147</b>	<b>0.195</b>
Origin						
Vietnamese firm	<b>0.613</b>	<b>0.577</b>	<b>0.405</b>	<b>0.037</b>	<b>0.172</b>	<b>0.208</b>
Developing FIE	<b>0.552</b>	0.519	<b>0.378</b>	<b>0.033</b>	<b>0.141</b>	<b>0.175</b>
Developed FIE	<b>0.555</b>	0.509	<b>0.381</b>	<b>0.046</b>	<b>0.128</b>	<b>0.174</b>
Ownership						
Private	<b>0.551</b>	0.510	<b>0.359</b>	<b>0.041</b>	<b>0.151</b>	<b>0.191</b>
SOE	<b>0.596</b>	<b>0.560</b>	<b>0.417</b>	<b>0.036</b>	<b>0.143</b>	<b>0.179</b>
Sector						
Mining	<b>0.570</b>	0.517	<b>0.356</b>	<b>0.053</b>	<b>0.161</b>	<b>0.214</b>
Electronics	<b>0.585</b>	<b>0.550</b>	<b>0.409</b>	<b>0.035</b>	<b>0.141</b>	<b>0.176</b>
Vacation resort	<b>0.564</b>	<b>0.537</b>	<b>0.399</b>	<b>0.027</b>	<b>0.138</b>	<b>0.165</b>
Location						
Home district	<b>0.556</b>	<b>0.534</b>	<b>0.401</b>	<b>0.022</b>	<b>0.133</b>	<b>0.154</b>
Neighboring district	<b>0.575</b>	<b>0.533</b>	<b>0.379</b>	<b>0.042</b>	<b>0.154</b>	<b>0.196</b>
District 30km away	<b>0.588</b>	<b>0.537</b>	<b>0.383</b>	<b>0.051</b>	<b>0.154</b>	<b>0.205</b>

Note: Estimates that are statistically significant at the .05 level are in bold.

**Table A9**  
Conditional Marginal Means and their Differences (By Waste).

	Conditional marginal means			Differences in marginal means		
	100HHs	300HHs	1000HHs	100 vs 300HHs	300 vs 1000HHs	100 vs 1000HHs
Past green violation						
No damage	0.717	0.688	0.618	0.029	0.070	0.099
Damage to 100HHs	0.480	0.429	0.390	0.051	0.039	0.090
Damage to 1000HHs	0.438	0.377	0.346	0.061	0.030	0.092
Green certificate						
No certificate	0.425	0.390	0.348	0.035	0.042	0.077
Applying for one	0.598	0.527	0.482	0.071	0.045	0.116
In use	0.620	0.575	0.524	0.045	0.051	0.095
Employment						
100 jobs	0.514	0.481	0.423	0.033	0.058	0.091
1000 jobs	0.556	0.512	0.467	0.044	0.044	0.089
10000 jobs	0.575	0.506	0.469	0.069	0.037	0.106
Tax revenue						
2BVND tax	0.536	0.495	0.434	0.041	0.061	0.102
20BVND tax	0.553	0.494	0.457	0.058	0.038	0.096
200BVND tax	0.557	0.509	0.469	0.048	0.040	0.088
Local sourcing						
2BVND	0.542	0.482	0.435	0.060	0.046	0.106
20BVND	0.549	0.509	0.466	0.040	0.043	0.083
200BVND	0.555	0.508	0.458	0.047	0.050	0.097
Origin						
Vietnamese firm	0.583	0.531	0.484	0.053	0.046	0.099
Developing FIE	0.536	0.488	0.432	0.048	0.056	0.103
Developed FIE	0.527	0.480	0.444	0.047	0.037	0.084
Ownership						
Private	0.525	0.476	0.426	0.049	0.049	0.099

Table A9 (continued)

	Conditional marginal means			Differences in marginal means		
	100HHs	300HHs	1000HHs	100 vs 300HHs	300 vs 1000HHs	100 vs 1000HHs
SOE	0.573	0.523	0.480	0.049	0.043	0.092
Sector						
Mining	0.528	0.482	0.438	0.046	0.043	0.090
Electronics	0.576	0.506	0.464	0.070	0.043	0.112
Vacation resort	0.541	0.510	0.457	0.032	0.052	0.084
Location						
Home district	0.552	0.497	0.445	0.054	0.052	0.106
Neighboring district	0.551	0.492	0.450	0.059	0.042	0.101
District 30 km away	0.543	0.509	0.464	0.033	0.046	0.079

Note: Estimates that are statistically significant at the .05 level are in bold.

broader economic hardship individuals prioritize short-term economic needs (Kahn & Kotchen, 2011; Kachi, Bernauer, & Gampfer, 2015). Conversely, when economic conditions improve, individuals' willingness to suffer short-term policy costs to manage long-term environmental risks increases. Thus, we would expect that provinces with higher incomes should have stronger green preferences. Relatedly, it could be argued that Vietnam is in a somewhat exceptional position, as it has more than enough foreign investment and can afford the luxury of being very picky in the projects that it lets in. Other developing countries may be less in a position to prioritize the environment, and must instead accept anything that would plausibly bring economic development, even if it is environmentally costly. According to the "more than enough" logic, individuals who live in areas that enjoy high levels of inward investment, should be more willing or able to forego economic benefits for environmental quality. Finally, individuals who live in provinces that are more exposed to environmental

degradation may have a stronger preference for the environment.

We first study heterogeneous treatments effects across individual-level characteristics, including potential differences between high and low-income respondents, females and males, and urban versus rural residents. To account for sociotropic considerations, we compare differences between individuals living in provinces with high and low GDP, those attracting high levels of foreign investment capital, and provinces that experience high levels of air pollution versus those that are less severely polluted. We present the differences in conditional marginal means for the main effects presented in Fig. 1 in Figs. A4 and A5.

Overall, we observe very few instances of significant differences in the effect of the environmental attributes on investor preference between our specified subgroups, suggesting that the way citizens weigh environmental costs and economic benefits (here, job creation) appears to be strikingly consistent across different societal groups.

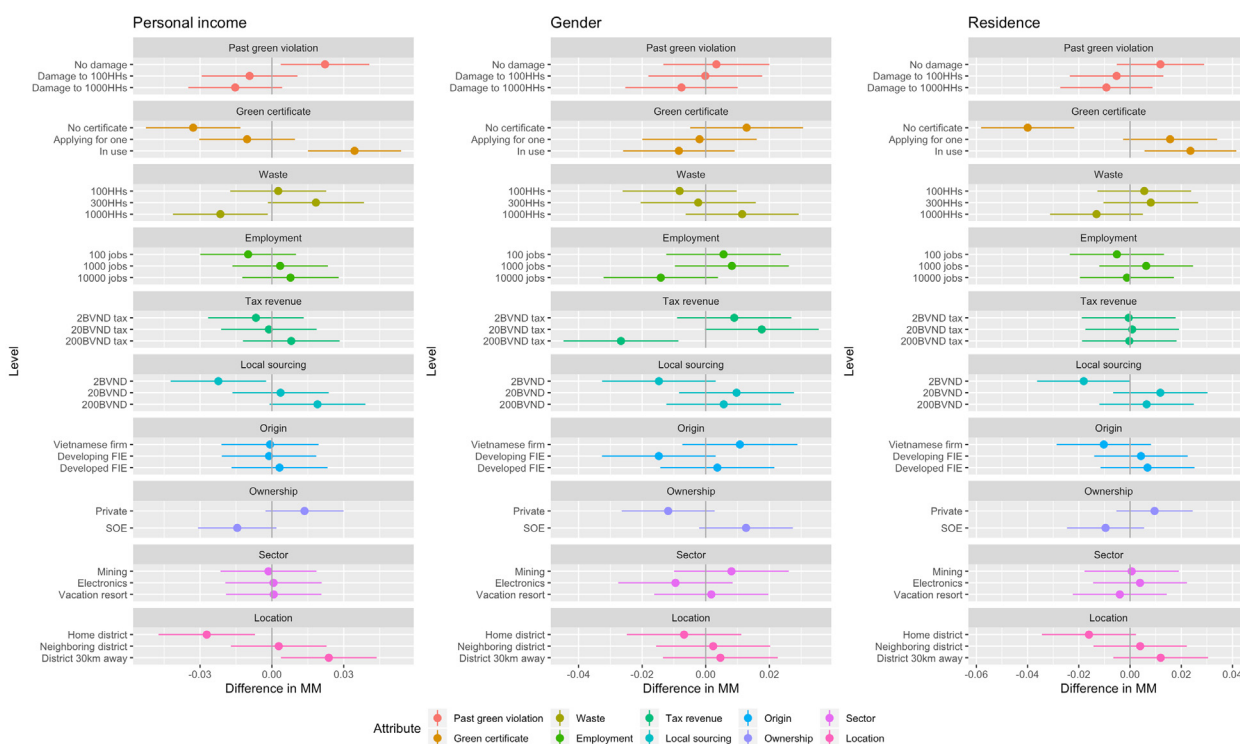
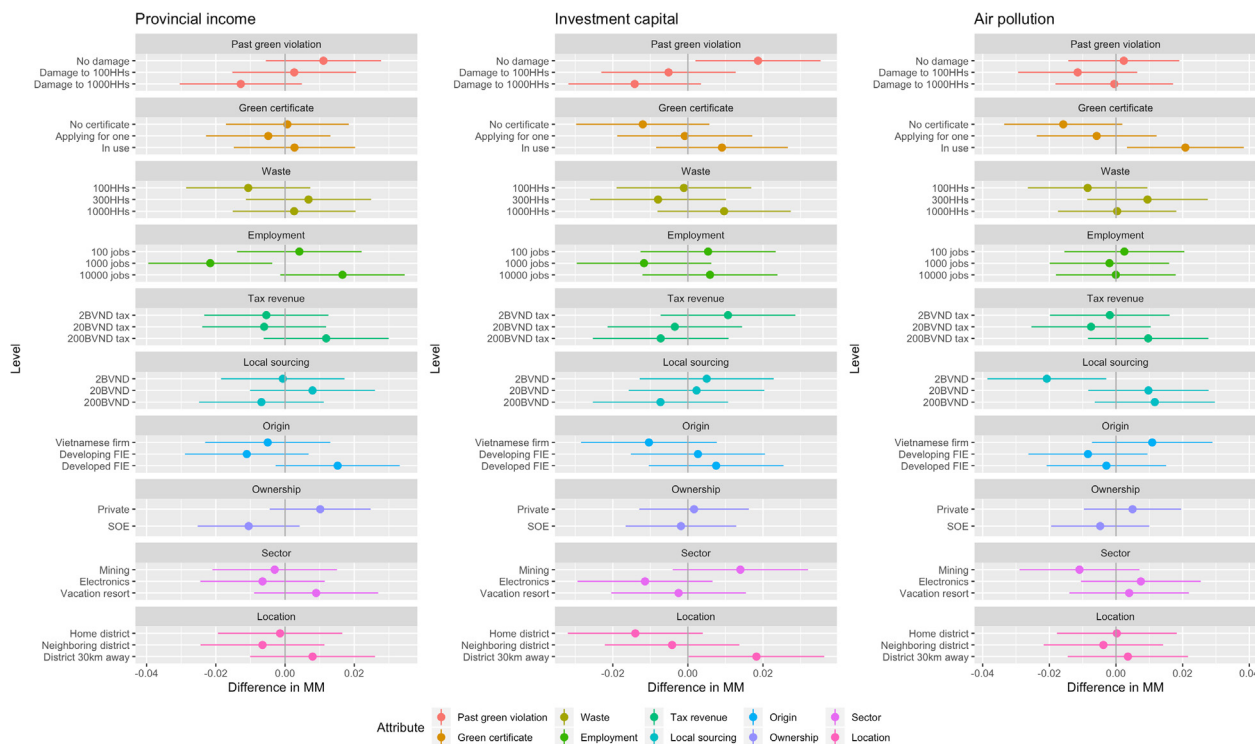


Fig. A4. Subgroup Analysis of Individual-Level Covariates, Differences in Conditional Marginal Means for the Main Effects. Note: The dots represent the difference in marginal means between high and low-income respondents, females and males and urban and rural respondents, respectively. The bars indicate 95 percent confidence intervals (C.I.).



**Fig. A5.** Subgroup Analysis of Province-Level Covariates, Differences in Conditional Marginal Means for the Main Effects. *Note:* The dots represent the difference in marginal means between high and low-income provinces, high and low investment capital provinces and provinces with high and low levels of air pollution (PM2.5 level), respectively. The bars indicate 95 percent confidence intervals (C.I.).

**References**

Aklin, Michaël (2016). Re-exploring the trade and environment nexus through the diffusion of pollution. *Environmental and Resource Economics*, 64, 663–682.

Alkon, Meir, & Wang, Erik H (2018). Pollution lowers support for china's regime: quasi-experimental evidence from Beijing. *The Journal of Politics*, 80, 327–331.

Anderson, Brilé, Böhmelt, Tobias, & Ward, Hugh (2017). Public opinion and environmental policy output: a cross-national analysis of energy policies in Europe. *Environmental Research Letters*, 12 114011.

Bansak, Kirk, Hainmueller, Jens, Hopkins, Daniel, Yamamoto, Teppei, Druckman, James, & Green, Donald (2021). Conjoint survey experiments. *Advances in Experimental Political Science*, 19.

Bechtel, Michael M., Bernauer, Thomas, & Meyer, Reto (2012). The green side of protectionism: Environmental concerns and three facets of trade policy preferences. *Review of International Political Economy*, 19, 837–866.

Bernauer, Thomas, & Nguyen, Quynh (2015). Free trade and/or environmental protection?. *Global Environmental Politics*, 15, 105–129.

Brumfiel, Geoff (2002). Developing nations take initiative on greenhouse gases. *Nature*, 419, 869.

Cole, Matthew A (2004). Trade, the pollution haven hypothesis and the environmental Kuznets curve: examining the linkages. *Ecological Economics*, 48, 71–81.

Cole, Matthew A, Elliott, Robert JR, & Zhang, Liyun (2017). Foreign direct investment and the environment. *Annual Review of Environment and Resources*, 42, 465–487.

Coutts, Elisabeth, & Jann, Ben (2011). Sensitive questions in online surveys: Experimental results for the randomized response technique (RRT) and the unmatched count technique (UCT). *Sociological Methods & Research*, 40, 169–193.

Das, Nihar Ranjan (2009). Human development report 2007/2008 fighting climate change: human solidarity in a divided world, UNDP, New York. *Social Change*, 39, 154–159.

Dasgupta, Susmita, Laplante, Benoit, Wang, Hua, & Wheeler, David (2002). Confronting the environmental Kuznets curve. *Journal of Economic Perspectives*, 16, 147–168.

Dietz, Thomas, Stern, Paul C., & Guagnano, Gregory A. (1998). Social structural and social psychological bases of environmental concern. *Environment and Behavior*, 30, 450–471.

Egami, Naoki, & Imai, Kosuke (2018). Causal interaction in factorial experiments: Application to conjoint analysis. *Journal of the American Statistical Association*.

Egan, Patrick J, & Mullin, Megan (2016). Recent improvement and projected worsening of weather in the United States. *Nature*, 532, 357.

EPI, 2018. EPI Report 2018. <https://epi.envirocenter.yale.edu/epi-report-2018>. [Online; accessed 13-February-2020].

Fairbrother, Malcolm (2013). Rich people, poor people, and environmental concern: Evidence across nations and time. *European Sociological Review*, 29, 910–922.

Franzen, Axel, & Meyer, Reto (2009). Environmental attitudes in cross-national perspective: A multilevel analysis of the ISSP 1993 and 2000. *European Sociological Review*, 26, 219–234.

Ganz, Robert, 2012. The Truth About Van Halen And Those Brown M&Ms.. NPR, February 14, 2012.

Grossman, Gene M, & Krueger, Alan B (1995). Economic growth and the environment. *The Quarterly Journal of Economics*, 110, 353–377.

Guha, Ramachandra, & Alier, Joan Martinez (2013). *Varieties of environmentalism: essays North and South*. Routledge.

Hainmueller, Jens, Hopkins, Daniel J., & Yamamoto, Teppei (2014). Causal inference in conjoint analysis: Understanding multidimensional choices via stated preference experiments. *Political Analysis*, 22, 1–30.

Hao, Feng (2016). A panel regression study on multiple predictors of environmental concern for 82 countries across seven years. *Social Science Quarterly*, 97, 991–1004.

Ho, Minh, 2010. UPDATE 2-Vietnam rice exports drop, demand seen from March. Reuters, February 26, 2010.

Horiuchi, Yusaku, Smith, Daniel M., & Yamamoto, Teppei (2018). Measuring voters' multidimensional policy preferences with conjoint analysis: Application to Japan's 2014 election. *Political Analysis*, 26, 190–209.

IMF, 2019. World Economic Outlook: Global Manufacturing Downturn, Rising Trade Barriers. <https://www.imf.org/en/Publications/WEO/Issues/2019/10/01/world-economic-outlook-october-2019>. [Online; accessed 13-February-2020].

Inglehart, Ronald (1995). Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS. Political Science & Politics*, 28, 57–72.

Inglehart, Ronald (1997). *Modernization and postmodernization: Cultural, economic, and political change in 43 societies*. Princeton University Press.

Jensen, Nathan M, & Lindstädt, René, 2013. Globalization with whom: Context-dependent foreign direct investment preferences. Working Paper.

Kachi, Aya, Bernauer, Thomas, & Gampfer, Robert (2015). Climate policy in hard times: Are the pessimists right?. *Ecological Economics*, 114, 227–241.

Kahn, Matthew E., & Kotchen, Matthew J. (2011). Business cycle effects on concern about climate change: the chilling effect of recession. *Climate Change Economics*, 2, 257–273.

Kahneman, Daniel (1979). Prospect theory: An analysis of decisions under risk. *Econometrica*, 47, 278.

Kaya, Ayse, & Walker, James T. (2012). The legitimacy of foreign investors: Individual attitudes toward the impact of multinational enterprises. *Multinational Business Review*, 20, 266–295.

Le, Viet Phu, 2017. Health and Economic Effects of Air Pollution in Vietnam. Working Paper.

- Leeper, Thomas J., Hobolt, Sara, & Tilley, James (2019). Measuring subgroup preferences in conjoint experiments. *Political Analysis*.
- Li, Xiaojun, & Zeng, Ka (2017). Individual preferences for FDI in developing countries: Experimental evidence from China. *Journal of Experimental Political Science*, 4, 195–205.
- van Liere, Kent D., & Dunlap, Riley E. (1980). The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations and Empirical Evidence. *Public Opinion Quarterly*, 44, 181–197.
- Liu, Xincheng, & Mu, Ren (2016). Public environmental concern in China: Determinants and variations. *Global Environmental Change*, 37, 116–127.
- Liu, Xincheng, Vedlitz, Arnold, & Shi, Liu (2014). Examining the determinants of public environmental concern: Evidence from national public surveys. *Environmental Science & Policy*, 39, 77–94.
- Mani, Muthukumara, & Wheeler, David (1998). In search of pollution havens? Dirty industry in the world economy, 1960 to 1995. *The Journal of Environment & Development*, 7, 215–247.
- Maslow, Abraham Harold (1943). A theory of human motivation. *Psychological review*, 50, 370.
- Mayda, Anna Maria, & Rodrik, Dani (2005). Why are some people (and countries) more protectionist than others?. *European Economic Review*, 49, 1393–1430.
- Nguyen, Thieu-Dang, & Datzberger, Simone (2018). The environmental movement in Vietnam: A new frontier of civil society activism? *Transnational Institute. Challenging Authoritarianism Series*, 4, 1–17.
- Paddock, Richard C., 2016. Toxic Fish in Vietnam Idle a Local Industry and Challenge the State. *New York Times*, June 8, 2016.
- Pandya, Sonal S. (2010). Labor markets and the demand for foreign direct investment. *International Organization*, 64, 389–409.
- Pandya, Sonal S. (2016). Political economy of foreign direct investment: Globalized production in the twenty-first century. *Annual Review of Political Science*, 19, 455–475.
- Pauw, Pieter, Mbeva, Kennedy, & van Asselt, Harro (2019). Subtle differentiation of countries' responsibilities under the Paris Agreement. *Palgrave Communications*, 5, 1–7.
- Pinto, Pablo M. (2013). *Partisan Investment in the Global Economy*. Cambridge University Press.
- Rho, Sungmin, & Tomz, Michael (2017). Why Don't Trade Preferences Reflect Economic Self-Interest?. *International Organization*, 71, S85–S108.
- Rodrik, Dani (2016). Premature deindustrialization. *Journal of Economic Growth*, 21, 1–33.
- Scheve, Kenneth F., & Slaughter, Matthew J. (2001). What determines individual trade-policy preferences. *Journal of International Economics*, 54, 267–292.
- Smil, Vaclav, 1996. Environmental problems in China: estimates of economic costs. East-West Center Special Reports 5.
- Spilker, Gabriele, Bernauer, Thomas, & Umana, Victor (2016). Selecting partner countries for preferential trade agreements: Experimental evidence from Costa Rica, Nicaragua, and Vietnam. *International Studies Quarterly*, 60, 706–718.
- Stern, Nicholas (2008). The economics of climate change. *American Economic Review*, 98, 1–37.
- Thuy, Ngoc, 2020. Vietnam remains selective in attracting FDI projects.
- Weaver, Alicia A. (2008). Does protest behavior mediate the effects of public opinion on national environmental policies? A simple question and a complex answer. *International Journal of Sociology*, 38, 108–125.
- White, Michael J., & Hunter, Lori M. (2009). Public perception of environmental issues in a developing setting: Environmental concern in coastal Ghana. *Social Science Quarterly*, 90, 960–982.
- WHO, Geneva, 2013. WHO methods and data sources for global causes of death 2000–2011.
- WTTTC, 2019. Viet Nam: 2019 Annual Research: Key Highlights. <https://www.wtttc.org/economic-impact/country-analysis/league-table-summaries/>. [Online; accessed 13-September-2019].