Public Perceptions of Code Enforcement and Safer Buildings in Latin America and the Caribbean

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Abstract: Well-designed and properly enforced building codes save lives in hazard events like major earthquakes and hurricanes. Yet around the world, in "developed" and "developing" countries alike, code enforcement is not often on people's minds, even in high-risk areas. How do the citizens of Latin America and the Caribbean value the implementation of building codes? And how do they view the effectiveness and integrity of government enforcement of these regulations? Analyzing 2014 survey data from 12 Latin American and Caribbean countries, the authors first explore cross-national differences in attitudes toward code enforcement and safer construction practices. Next, they use factor analysis to assess whether or not public attitudes about code enforcement, corruption, and the value of safer buildings are conceptually distinct. Finally, the authors use multilevel modeling to test a series of hypotheses regarding public support for safer construction practices. They find that expectations about corruption and code enforcement do shape the value that people place on safer construction. Living in an earthquake- or hurricane-prone country, however, does not, all else being equal, affect people's support for safer, if costlier, buildings.
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Introduction

When a major natural hazard event, like an earthquake or a hurricane, strikes a highly populated area, that area's pre-event building standards are an important factor in determining whether the event will ultimately be remembered as an emergency, a disaster, or a catastrophe [for the distinctions see Holguín-Veras et al. (2014), Quarantelli (2006, 2000, 1987), and Wachtendorf et al. (2010)]. However, the hazard-appropriateness and stringency of building codes are seldom perceived by the public—in the pre-event period, at least—as urgent public policy issues. This lack of issue salience is one reason why communities remain (or become) vulnerable to hazards.

Of course, codes in and of themselves are simply paper exercises if they are not systematically enforced (UNISDR 2017). As Daniell (2015, p. 10) notes in a global survey of seismic codes specifically, "not only the quality of the ... code is important but also its enforcement, adherence, and lack of corruption." Weak building code compliance is often revealed only in the aftermath of hazard events, particularly in more recently industrialized or "developing" areas like Latin America and the Caribbean (LAC). Indeed, major hazard events in the LAC region (including, among recent disasters, the 2017 Puebla–Mexico City earthquake) have time and again made tragically visible—not only to researchers and policymakers but also to citizens—the lack of code enforcement. Given the thousands of lives and billions of dollars at stake, public perceptions of building codes and support for safer construction merit sustained scholarly attention.

Examination of this issue revolves around the following questions: How are building code compliance and enforcement viewed by the citizens of Latin American and Caribbean countries? What factors shape whether or not people believe in the efficacy and integrity of building code enforcement? And why might some citizens, but not others, support more stringent construction practices?

In an initial attempt to answer these questions, data from the 2014 wave of the AmericasBarometer, a state-of-the-art cross-national biennial survey conducted by Vanderbilt University's Latin American Public Opinion Project (LAPOP), were analyzed. The data were drawn from 12 Latin American and Caribbean countries with varying levels of earthquake and hurricane risk. Specifically, LAPOP surveyed perceptions of (1) code enforcement, (2) corruption in code enforcement, and (3) tradeoffs between improved building safety on the one hand and increased building costs on the other. To the best of our knowledge, this article is the first systematic cross-national study of perceptions of code compliance and the value of safer buildings in the LAC region. As such, in addition to the findings presented here, the descriptive statistics establish a useful baseline for future studies—particularly research conducted in the aftermath of major hazard events in the region.

The LAC region was selected for analysis because it is composed of a heterogeneous set of populations and has been the site

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of many major earthquakes and hurricanes (as well as volcanic eruptions, floods, landslides, droughts, and wildfires). Indeed, according to EM-DAT (the consensus Emergency Events Database maintained by the Centre for Research on the Epidemiology of Disasters at the Université Catholique de Louvain), just since the year 2000 the LAC region has seen more than 260,000 people killed, nearly 2.5 million injured, and 1.4 million rendered homeless by these so-called "natural" disasters [see Hewitt (1983, 1995), O'Keefe et al. (1976), Smith (2006), and Wisner et al. (2012) for debates about this terminology]. As explained in the following section, the existing scholarly literature tells conflicting stories about the impact of experiencing a disaster firsthand, or even living in a high-risk area, on citizens' views on risk reduction.

Focusing on LAC as a region is also illustrative because risk mitigation policies there are complicated by issues of corruption and state capacity [see Blake and Morris (2009), Morris and Blake (2010), Tulchin and Espach (2000), and Warf and Stewart (2016), inter alia]. Corruption, in particular, is perceived by LAC region citizens to be a serious and growing problem. In its October 2017 profile of the region, Transparency International cited survey data showing majorities of the region's citizens believing that corruption was on the rise—and that their governments were doing a poor job combatting it (Transparency International 2017).

Finally, the LAC region—though a "developing" region, part of the Global South—includes countries with a variety of different economic profiles. According to the Word Bank's categories, LAC includes low, lower middle, upper middle, and high income countries.

Political Culture and the Politics of Disaster: A Review of the Literature

A growing body of scholarly work addresses what might generally be called the *politics of disaster*. In the United States, this research area rapidly intensified following Hurricane Katrina in 2005, but it is not entirely new [see Olson (2000) and Barnhart (1925), inter alia]. The next few pages summarize existing scholarship in one area of disaster research within political science: the ways that public opinion shapes, and is shaped by, disasters. This review of the literature covers four overlapping bodies of scholarship. One focuses on risk mitigation and disaster response as government performance. Another looks at enforcement of, and corruption in, risk mitigation policies like building codes. A third set of scholarly works analyzes public support for disaster preparedness and risk mitigation. Finally, a fourth body of research focuses more narrowly on the ways that perceiving risk and/or experiencing hazard events might shape attitudes toward risk mitigation.

Note that, although the focus of the analysis presented here is on disaster *risk mitigation* (i.e., reducing long-term risk to people and property from hazards), we also draw insights from research on individual and collective disaster *preparedness* (i.e., increasing the functional ability to respond to, and recover from, a hazard).

Risk Mitigation and Disaster Response as Government Performance

The scholarly literature on the United States tells us that the public tends to be more critical of disaster response efforts than of (even inadequate) government risk mitigation policies (Arceneaux and Stein 2016; Gasper and Reeves 2011; Reeves 2011). Furthermore, Healy and Malhorta (2009, p. 388) found that US "voters significantly reward disaster relief spending [i.e., response and recovery], holding the incumbent presidential party accountable for actions taken after a disaster. In contrast, voters show no response at all, on average, to preparedness spending, even though investing in preparedness produces a large social benefit." [On the electoral incentives driving strategic disaster preparedness spending in the US, see Sainz-Santamaria and Anderson (2013)].

It is also known that the ways that US citizens judge the effectiveness of disaster responses, assign credit and blame, and—crucially—reward or punish politicians at the ballot box are shaped by many of the same factors that shape perceptions of government performance in "normal" times. [On continuity in New Orleans' politics after Huricane Katrina, for example, see Lay (2009). On the negligible political impact of floods in Calgary, Canada, see Bodet et al. (2016)].

Within Latin America, however, one study (Carlin et al. 2014a) found that Chile's 2010 earthquake and tsunami unleashed criticism of incumbents, decreased support for municipal government, and negatively influenced support for democratic values and norms. [For comparison of post-disaster public opinion in El Salvador, Chile, and Haiti, see Carlin et al. (2014b).]

The broader corpus of comparative research on this topic also offers mixed results. For example, a cross-national study of ten European disasters found that they had no significant effects on political trust or satisfaction with government performance (Albrecht 2017). Another study, of India, concluded that voters reward incumbent politicians for responding to disasters—but only if the event occurs less than one year prior to an election (Cole et al. 2012). In Pakistan, major flooding was found to decrease citizens' assessments of local leaders (Akbar and Aldrich 2016). In China, however, a major earthquake instead *polarized* trust in local government, with both very high and very low levels increasing (Han et al. 2011).

Building Codes: Enforcement and Corruption

Lack of building code enforcement and corrupt practices in code enforcement can have deadly consequences (Anbarci et al. 2005; Escaleras et al. 2007). Indeed, Ambraseys and Bilham (2011) estimated that 83% of all deaths from building collapses in earthquakes around the world over the last 30 years have occurred in countries that are anomalously corrupt (i.e., more corrupt than expected for their level of per capita income). What is more, the construction sector is almost uniquely ripe for graft and fraud:

> Corruption takes the form of bribes to subvert inspection and licensing processes, and of covert activities that reduce costs and thereby compromise the quality of structures. The assembly of a building, from the pouring of foundations to the final coat of paint, is a process of concealment. (Ambraseys and Bilham 2011, p. 153)

Of the LAC region specifically, Chavez et al. (2012) remind us that even where sophisticated regulations representing best practice codes are in place, their effective enforcement by local authorities cannot be taken for granted. State capacity in the LAC region varies greatly both across and within countries (Luna and Soifer 2017). And even where local authorities appear to be eliciting compliance with regulations, compliance may be wholly superficial. As one LAPOP researcher reported anecdotally from a very at-risk city in the region:

> the *alcaldía* [municipal government] only worries about getting paid the construction/renovation fee. They will not inspect the floor plans or the quality of the materials. This means that you can get all the permits and everything, and still have a very unsafe house. (Personal communication from María Fernanda Boidi to Elizabeth Zechmeister, November 29, 2013)

Since building code enforcement in Latin America and the Caribbean is subject to problems of both corruption and weak state capacity, it seemed plausible, even likely, to be *perceived* as such by its citizens—and that those perceptions might, in turn, affect public attitudes toward risk mitigation. Indeed, Donahue and Miller (2006) found that support for disaster preparedness policies in the USA, and willingness to pay for those policies, were contingent upon citizen evaluations of public safety personnel and their trust in those service providers. Similarly, Donahue (2014) confirmed that perceptions of government efficiency can influence support for community disaster preparedness spending. Although the previously cited research focuses on preparedness rather than risk mitigation, a similar causal process may affect mitigation policies like building codes. Keefer et al. (2011) found that incentives to invest in "quake-proof" construction regulations are lower in countries that are poorer, less institutionalized, or more corrupt—even if those countries experience frequent earthquakes. [As Kahn (2005) concluded, democracies and countries with higher-quality institutions have, all else being equal, lower casualty rates from disasters.]

Public Support for Risk Mitigation

As mentioned previously, to the extent that the general public thinks of disasters, the focus tends to be on what happens after an extreme event, not before. Why is this so?

Analyzing data from a 1971 statewide poll on public support for seismic safety in California, Meltsner (1978) concluded that the general population was largely "indifferent" to the earthquake hazard. He then argued that this was, in fact, quite understandable: earthquakes were relatively rare, the odds of being killed or injured in one were low, and people faced a large number of more pressing worries. Individuals' lack of preparation for disasters "may be rational given that disasters are relatively rare events" (Donahue et al. 2014, p. 106*S*).

What is more, because it is narrowly rational to be individually ill-prepared, individuals rely on the state to mitigate risk (Kenny 2009). Donahue (2014) found that a substantial majority in the United States is willing to pay for household *and* community disaster preparedness via personal spending and taxation, albeit at levels lower than would be expected given the generalized support expressed for such policies (see also Donahue et al. 2008).

Most of the time, disaster preparedness and risk mitigation are issues with little salience among the general publics of most countries. People have multiple problems or issues to worry about on a day-to-day basis, and the long-term risks posed by underdesigned or poorly constructed buildings is not one of them. A possible exception, however, may come when a disaster serves as a *focusing event* (Birkland 1997, 1998) and reveals failures and deficiencies in building design and/or construction. At that point the issue may become much more salient, for a time at least, among larger segments of the general public. [Becker et al. (2017) found that even indirect or vicarious experiences with disasters can increase its issue salience.] And as Kingdon (1984, 1995) suggested, shifts in public opinion can contribute to the opening of a *policy window*, the opportunity to change public policy (in this case, better—or better enforced—building codes).

Hazard Risk Perception and Attitudes toward Risk Mitigation

Do people who have experienced a disaster or live in hazard-prone places indeed view risk mitigation policies, like stricter building codes, differently? A common-sense argument might be that people who have experienced a disaster firsthand, were in close proximity to one, or who otherwise feel personally connected to a disaster, might change their views, at least temporarily, on issues like risk mitigation and preparedness. These hypotheses have received some support. Baker's (1977) study of Hurricane Eloise concluded that public support for strengthening building codes was "extremely high" in affected communities in the immediate aftermath of the storm, and increased even further 6 and 12 months later. Beatley and Brower (2008) found that residents of areas affected by Hurricane Diana were more supportive of mitigation programs—regardless of their own personal losses from the storm—than were residents of more distant areas.

On seismic risk specifically, Meli and Alcocer (2004, p. 39) asserted that there are "periods of hyperreceptivity [to building code enforcement] immediately following severe earthquakes." Likewise, Prater and Lindell (2000, p. 75) argued that

> people's concerns when their household is recovering from a disaster are different from the issues [normally] dominating their attention . . . . Thus, an experienced disaster is a powerful way to start the policy process moving. Even a disaster that has occurred within a neighboring community . . . especially one that is perceived to be similar in its hazard vulnerability, can provide a very powerful agenda setting effect.

Indeed, Lavell (1994) made a similar argument about the effects that a disaster in one LAC country can have on the public policies of neighboring countries within the region.

Yet this agenda setting effect may be short-lived. One study in the wake of a powerful and damaging 1989 earthquake in Northern California found that residents' heightened concerns about seismic hazard had almost completely dissipated within just three months of the event (Pennebaker and Harber 1993). And several scholars have found that experiencing a major disaster *increases* individually risky behaviors in the aftemath of the event (Norris et al 2002, inter alia).

A related body of literature asks whether, short of experiecing a disaster firsthand, residents of areas known to be *at risk* for a particular kind of hazard event will be more apt to spend their own money on preparedness and to support public policies mitigating risk. Neumayer et al. (2014) argued that the probability and expected magnitude of a natural hazard event in an area—what they call *disaster propensity*—incentivizes the enforcement of mitigation measures. Keefer et al. (2011) found that earthquake mortality is lower in countries with higher earthquake propensity, precisely because it "pays" to invest in and enforce life-saving construction practices.

However, as noted previously, extreme events like earthquakes and hurricanes may not be at the top of most people's minds, even in areas where they occur frequently (Lindell and Prater 1999; Prater and Lindell 2000). A study of the devastating April 2009 earthquake in L'Aquila, Italy, suggested that residents perceived only a moderate level of seismic risk, despite the fact that the area is historically earthquake-prone and had experienced multiple foreshocks in the months leading up to the 2009 disaster (Marincioni et al. 2012). Recall, too, Meltsner's (1978) uncovering of "indifference" to disaster in California, a state with high seismic risk that had—by the 1970s—already debated and adopted some high-profile seismic safety policies.

The psychology of risk assessment is complicated. May (2004) deployed the concepts of *anchoring* and *adjustment*, arguing that individuals' assessments of seismic risk, and the monetary value they place on reducing that risk, depend very much on initial cost expectations and how new costs are framed vis-à-vis that baseline. Hurley and Corotis (2014) similarly argued that, beyond a simple

calculus of cost and probability, perceptions of hazard risk are shaped by psychological factors like dread and familiarity. Västfjäll et al. (2014) noted that being prompted to think about a disaster elicited higher perceptons of risk. Wachinger et al. (2013) found that risk perception is enhanced by an individual's ability to recall (or even imagine) the damage caused by previous hazard events; paradoxically, perceived risk may be diminished by high levels of trust in the authorities to mitigate those risks. And Albright and Crow (2016) concluded that personally experiencing flood damage increases expectations of future flood risk, but living nearby while averting damage lulls people into complacency and actually *decreases* the perception of risk.

A similarly complex calculus shapes what people in hazard-prone areas around the world are willing to pay for preparedness and risk mitigation. Lin et al. (2008) showed that, in Taiwan, victims of recent floods and landslides perceived higher levels of risk than the general public but were also, counterintuitively, *less* willing to adopt risk mitigation measures. Brilly and Polic (2005) revealed that residents of a Slovenian town that experienced flooding had a heightened perception of flood risk and were willing to spend money on individual preparedness but *not* on government regulations or risk mitigation efforts.

This jumble of competing arguments and findings led one scholar to sensibly conclude that "while change sometimes occurs after disasters, there are also a myriad of structural and cultural forces that keep people from considering or embracing change both before and after a disaster. People are not necessarily more open to new ideas after a disaster. Nor are they necessarily more closed, either" (Passerini 2000, p. 70).

Although there has been no study to date on the impacts of hazard risk (or of experiencing an actual disaster event) on attitudes toward building codes, enforcement, or disaster risk reduction generally in Latin America and the Caribbean, findings from the United States and elsewhere suggest that we should be cautious about presuming that people living in earthquake-prone countries would necessarily be more supportive of stronger and better-enforced building codes or safer (if also more expensive) construction practices.

Hypotheses and Data

The analysis presented here centers on the interrelations between three attitudinal measures: expectations that building codes will be enforced; expectations of corruption in building code enforcement; and willingness to spend money on safer construction practices. The first step was to explore these three variables across the LAC region. The next was to assess the distinctiveness of these three attitudes using factor analysis techniques. The final task was to employ multivariate regression-style modeling to test the following hypotheses, which the existing literature, outlined previously, led us to consider:

H1: Citizens who expect that building codes will be enforced will be more willing to spend on safer construction.

H2: Citizens who expect building code enforcement to be corrupt will be less willing to spend on safer construction.

H3a: Citizens of countries with higher levels of earthquake risk will be more willing to spend on safer construction in the future.

H3b: Citizens of countries with higher levels of hurricane risk will be more willing to spend on safer construction in the future.

As noted previously, most of the data derive from the 2014 wave of the LAPOP AmericasBarometer survey. We analyze data from 12 countries: the Bahamas ($n = 3{,}429$), Barbados ($n = 3{,}828$), Belize ($n = 1{,}534$), Chile ($n = 1{,}571$), the Dominican Republic ($n = 1{,}520$), Ecuador ($n = 1{,}512$), Honduras ($n = 1{,}561$), Mexico ($n = 1{,}578$), Nicaragua ($n = 1{,}547$), Suriname ($n = 4{,}000$), Trinidad and Tobago ($n = 4{,}207$), and Uruguay ($n = 1{,}512$). The selection of the 12 countries was arbitrary: LAPOP included the three questions about disaster risk only where there was available space on a national survey instrument. However, these 12 countries represent a range of different sub-regions, levels of development, and past experiences with disasters.

The three variables of interest were:

- *Expected enforcement of building codes* ("[On] a 1-to-7 scale, where 1 is 'Not at all' and 7 is 'A lot,' how likely is it that people in your neighborhood would be punished by authorities for ... building or renovating a house without a license or permit?")
- *Expected corruption in code enforcement* ("And, still using the same 1-to-7 scale, if people in your neighborhood were to build or renovate a house, how likely do you think it is that they would be asked to pay a bribe to get a license or permit, or to ignore the construction altogether?")
- *Valuing safer construction* ("In your opinion, what should be given higher priority: safer construction of homes or avoiding cost increases?")

The models also included, as controls, a standard set of individual-, community-, and country-level variables. Individual-level control variables included demographic characteristics as well as personal attitudes and beliefs. The demographic variables were age, gender, ethnicity/race, income, and education. Attitudinal variables were interpersonal trust, *external political efficacy* (a citizen's sense that "[t]hose who govern this country are interested in what people like me think"), *internal political efficacy* (a citizen's sense that he or she "understand[s] the most important political issues of this country"), trust in municipal government (the level most likely to be implementing and enforcing building codes), personal experience with corruption, evaluation of the country's economic performance, and assessment of one's own personal economic situation. Relevant characteristics of the respondent's community included the population size of the town or municipality and its status as urban vs. rural.

The key country-level variables modeled here—per H3—were seismic and cyclonic risk: the prevalence and destructiveness of past experiences with major earthquakes and hurricanes (as indicators of future risk). The source for these data is EM-DAT, the Emergency Events Database identified previously. Although seismic events and hurricanes are not the only types of hazards that these 12 LAC countries face, the mitigation of risk from earthquakes or hurricanes (or in some countries, both) has informed the development of building codes across the entire region.

The seismic risk variable was operationalized in two different ways: one includes only countries at high risk from earthquakes; the other also includes countries at moderate risk. Chile, Ecuador, Mexico, and Nicaragua are categorized as high risk. Based on EM-DAT data, between 1960 and 2014 these four countries each had more than five major "Earthquake—Ground movement" events and more than 5,000 earthquake-related deaths. Countries at moderate risk were Honduras (four major events, nine deaths) and the Dominican Republic (one major event, three deaths). The remaining countries in our sample suffered zero deaths from ground movement events during the 54 years covered by EM-DAT, and were thus categorized as low risk.

Similarly, the hurricane risk variable was operationalized in two different ways: one includes only countries at high risk from tropical cyclones; the other also includes countries at moderate risk. Mexico, Nicaragua, Honduras, and the Dominican Republic are categorized as high risk. Based on EM-DAT data, between 1960

and 2014 these four countries each had 18 or more "Storm—Tropical cyclone" events—major hurricanes—and more than 1,000 hurricane-related deaths. Countries at moderate risk were the Bahamas, Belize, and Trinidad and Tobago. Four of the five remaining countries in our sample experienced zero major hurricanes during the 54 years covered by EM-DAT, and were thus categorized as low risk. (So was Barbados, with six tropical cyclones but relatively little damage and only one death attributed to hurricanes during this entire period.)

As a check on model specifications, models featuring country dummy variables instead of these country-level disaster risk variables were also run (the "a" and "b" models in Tables 2–5), to account for the effects of unobserved characteristics of different countries, i.e., contextual traits other than earthquake and hurricane risk.

Descriptive Statistics

Countries with high average levels of expected enforcement of building codes (Fig. 1) included some surprises, like Ecuador and Honduras, which score relatively poorly on indices of regulatory quality and government effectiveness (see, e.g., Kaufmann et al. 2010). Also unexpected were Trinidad and Tobago, Uruguay, and Chile—which tend to rank highly within the region for regulatory quality and government effectiveness—falling at the lower end of the scale.

Average expected corruption scores (Fig. 2) were more in line with expectations but still featured a few surprises. Uruguay, Barbados, and Chile—countries ranked among the least corrupt in the LAC region by Transparency International's (2013) Corruption Perceptions Index (CPI)—are at the low end, but so is Nicaragua, with a CPI rank among the *most* corrupt in the region (Transparency International 2013). In addition, survey respondents in the Bahamas, which scored as highly as Chile in the 2013 CPI, were the *most* likely to believe that their neighbors would be asked for a bribe for permitting or construction.

Mean scores for valuing safer construction (Fig. 3) were highest in Chile, followed by Nicaragua, Uruguay, and the Dominican Republic. Countries where respondents, on average, prioritized lower costs rather than building safer homes include Belize, Bahamas, and Suriname. It should be noted that the gap between countries at the high and low ends of this scale is particularly wide: respondents in countries on the high end were, on average, more than twice as safety-minded as those in the countries on the low end.

We suspected that this tradeoff between improved safety and increased cost might also vary, across countries, based on the level of risk to be mitigated. Two particularly deadly types of hazards—the risks of which might be mitigated by safer, better-regulated construction—are earthquakes and hurricanes. We therefore took response means for valuing safer construction in Chile, Ecuador, Mexico, and Nicaragua—all with high levels of seismic risk—and compared them to countries with moderate or low levels of seismic risk (Fig. 4). We also compared response means for countries at high risk from hurricanes (Mexico, Honduras, Nicaragua, and the Dominican Republic) and compared them to countries with moderate or low levels of hurricane risk (Fig. 5).

The value that citizens place on risk-mitigating construction practices *appears* to vary substantially based on the risk profile of their country. At least in these bivariate analyses, people in countries with histories of more frequent and damaging earthquakes or hurricanes seem more willing to prioritize safer construction over cost savings.

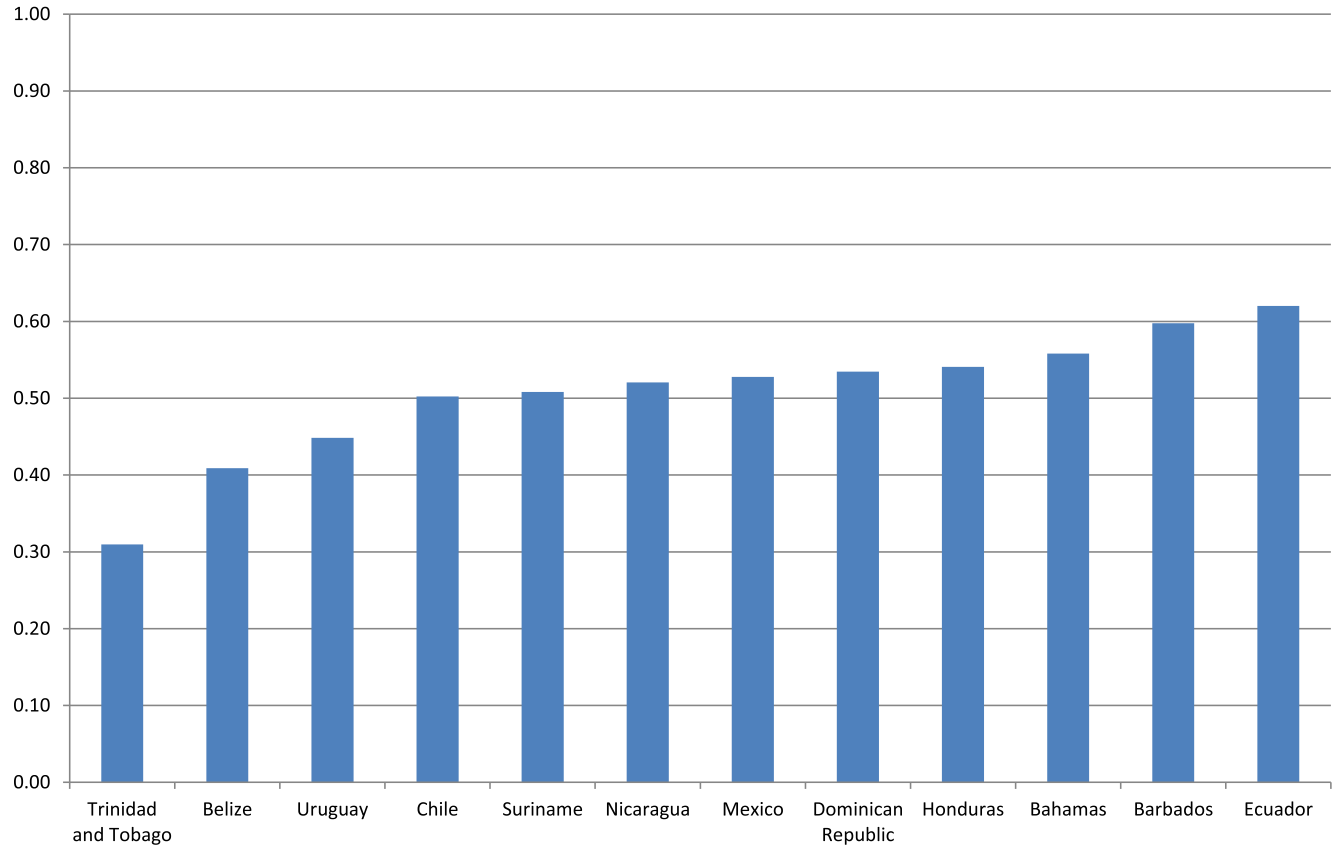

Fig. 1. Expected enforcement of building codes, by country.

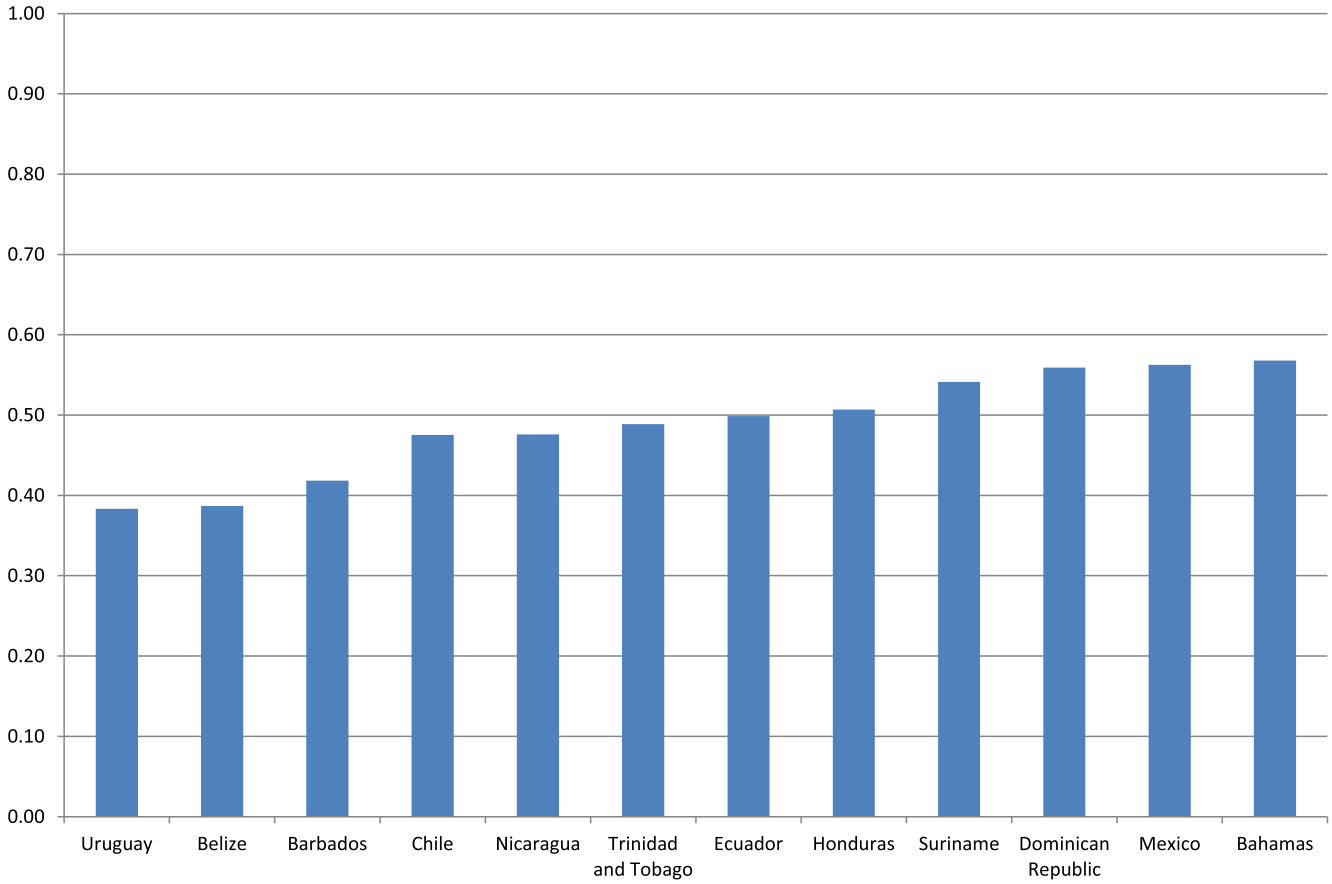

Fig. 2. Expected corruption in code enforcement, by country.

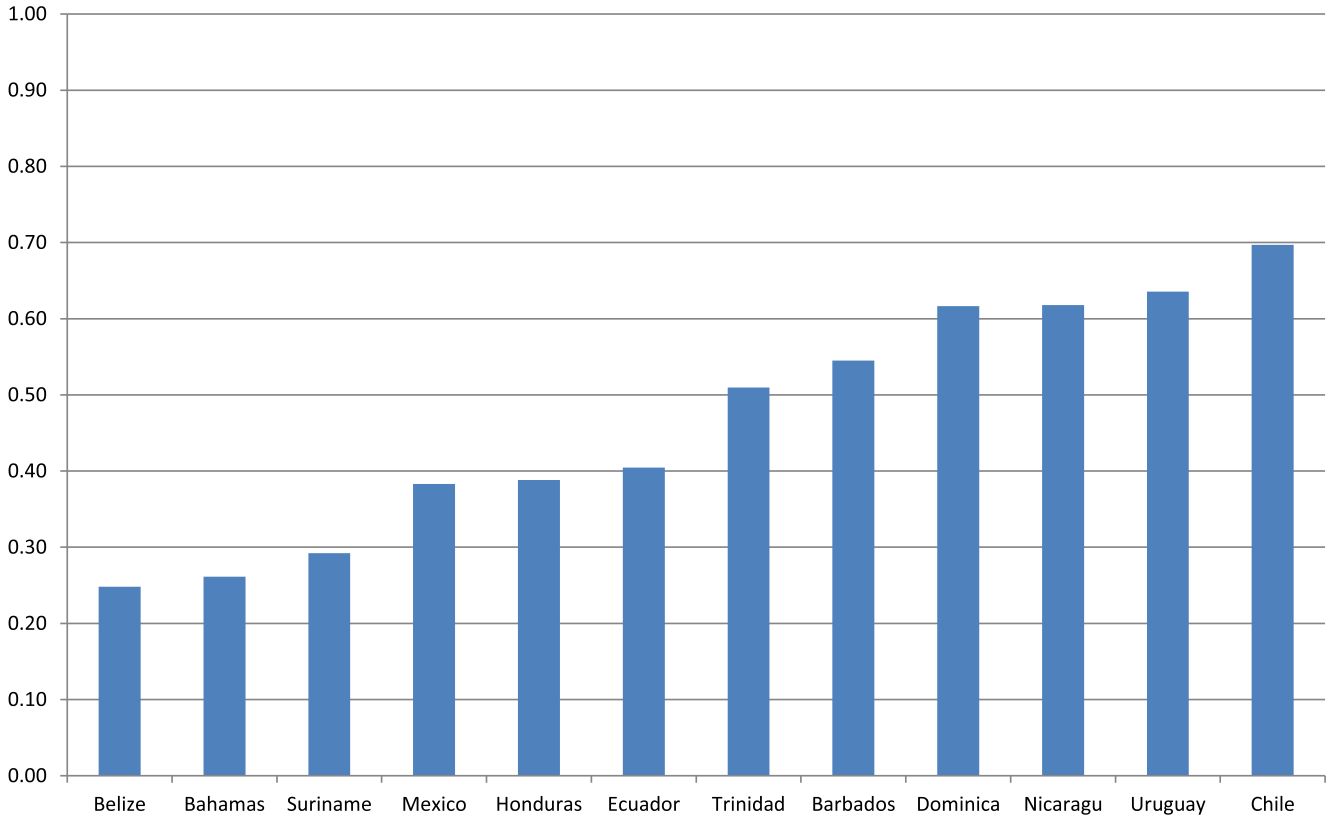

Fig. 3. Valuing safer construction of homes (versus avoiding cost increases), by country.

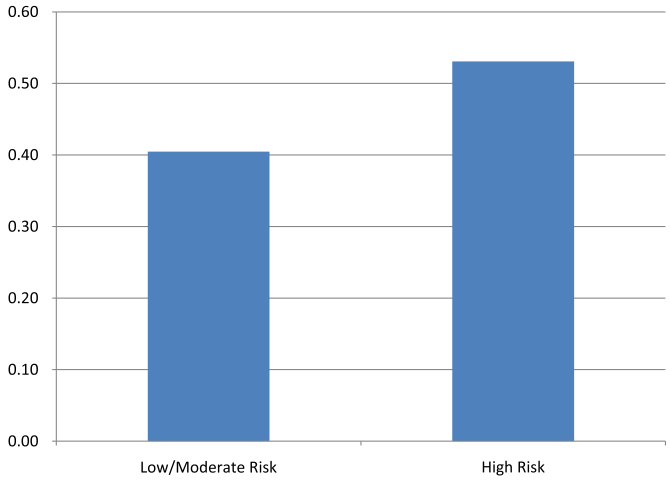

Fig. 4. Valuing safer construction of homes, by low/moderate versus high seismic risk countries.

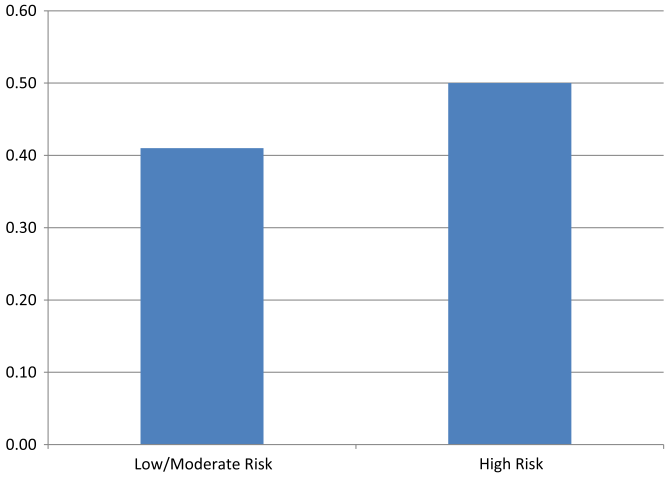

Fig. 5. Valuing safer construction of homes, by low/moderate versus high hurricane risk countries.

Results from Factor Analysis

Having explored the data via bivariate analysis across countries, factor analysis was used to assess whether or not the three variables of interest represent the same underlying concept (a factor or latent variable) or if, instead, they are distinct concepts. (The extent to which variables or *items* are related is expressed as a factor loading with absolute values ranging from 0 to 1. The *dimensionality* of the data is the number of different factors to which a larger number of variables can be reduced.) The analyses presented in the following employed principal components factor analysis. Values are normalized factor loadings rotated using an oblique (promax) rotation. Only factor loadings larger than 0.3 are reported.

Overall, the three variables of interest are largely distinct from one another—but are related to other variables. As Table 1 shows, the way that most Latin American and Caribbean citizens think about the enforcement of permitting/construction regulations is very much of a piece with how they think about street-level enforcement of other rules and laws—for example, how likely it is that someone would be punished for stealing electricity or, more seriously, occupying or invading a vacant lot (Factor 1). How people perceive the likelihood of being asked for a bribe for permitting/construction is, on the other hand, both a component of those overall attitudes about enforcement and, even more strongly, a component of overall attitudes about the frequency and acceptability of corruption (Factor 4). It should also be noted that assessments of the performance and trustworthiness of municipal governments—the level of government usually tasked with implementing these types of regulations—loaded together as an entirely distinct factor (Factor 2).

Interestingly, a preference for safer construction vs. cost savings does *not* load together with either of the other two permitting/construction variables of interest. However, how one weighs the value of safer construction vs. lower costs does load together, and strongly, with one's preferences for environmental protection vs. economic growth. The implication here is that valuing safer construction is one element of a more general orientation toward risk tolerance and, perhaps, differences (shorter vs. longer) in time horizons, i.e., how heavily one discounts the future in assessing expected costs and benefits.

For the sake of checking on the cross-national reliability of these results, a separate factor analysis was conducted for each of the

Table 1. Factor analysis

Items	Factor 1	Factor 2	Factor 3	Factor 4	Uniqueness
And for obtaining electricity (bypassing the meter) without paying, how likely is it that they would be punished by the authorities?	0.75	—	—	—	0.41
And for occupying or invading a vacant lot, how likely is it that they would be punished by the authorities?	0.80	—	—	—	0.35
And for building or renovating a house without a license or permit, how likely is it that they would be punished by the authorities?	0.79	—	—	—	0.36
If people in your neighborhood were to build or renovate a house, how likely do you think it is that they would be asked to pay a bribe to get a license or permit, or to ignore the construction altogether?	0.46	—	—	0.49	0.52
Taking into account your own experience or what you have heard, (how common is) corruption among public officials?	—	—	—	−0.66	0.54
Do you think given the way things are, sometimes paying a bribe is justified?	—	—	—	0.64	0.58
To what extent do you trust the local or municipal government?	—	0.81	—	—	0.31
Would you say that the (quality of) services the municipality is providing to the people are . . . ?	—	−0.86	—	—	0.28
In your opinion, what should be given higher priority: safer construction of homes or avoiding cost increases?	—	—	0.82	—	0.33
In your opinion, what should be given higher priority: protecting the environment or promoting economic growth?	—	—	0.82	—	0.33
Eigenvalues	2.11	1.47	1.35	1.06	—
Cumulative variance explained	—	—	—	—	59.9%

countries examined here (although in several countries in the larger 2014 LAPOP survey, relevant questions were simply not asked). The country-specific results (available upon request) for most countries are close to the results for the pooled data from the 12-country set.

Based on the factor analyses, it can be said that Latin American and Caribbean views on code enforcement, corruption, and safer building/construction practices are distinct from one another but are not attitudes unique to this particular issue. Rather, they seem to align with perceptions of regulatory enforcement in other policy areas, broader views on corruption in society, and more generalized tradeoff preferences between cost and risk.

Results from Multivariate Analysis

Regression-style analysis was then used to assess the impacts of individual-, community-, and country-level variables. We tested three sets of models, one for each of our dependent variables of interest: (1) expected enforcement of permitting/construction regulations; (2) expected corruption in permitting/construction; and (3) valuing safer buildings vs. cost savings. The first two variables (expected enforcement and expected corruption) were then modeled for possible effects on the third (valuing safer construction).

As noted previously, the source data for all variables was the 2014 wave of the AmericasBarometer survey (LAPOP 2014), with the exception of data on seismic risk, which comes from EM-DAT. All independent variables were recoded as ranging incrementally between 0 and 1 (or are dummy variables, which are either 0 or 1). The values of the dependent variables (*Expected Enforcement* and *Expected Corruption* were recoded to range from 0 to 100; the dependent variable *Valuing Safe Construction* is a binary variable (0 or 1).

Models with country dummy variables—Models 2a–b, 3a–b, 4a–b, and 5a–b—are regression models (Models 2a–b, 3a–b) or logit models (Models 4a–b, 5a–b) with linearized standard errors (to address nonconstant variance in residuals, resulting from the survey's sampling design). The "a" and "b" versions of each model use different variables to control for the community setting (community size for the "a" version; urban vs. rural for the "b" version). All other models—Models 2c–f, 3c–f, 4c–f, and 5c–f—are hierarchical linear models (Models 2c–f and 3c–f) or mixed-effects logit models (Models 4c–f and 5c–f). These multilevel models include both fixed and random effects, which accounts for the hierarchical nature of the data (individual respondents are nested within country units) while allowing the researchers to test the impact of other country-level variables (here, disaster risk) on individual-level outcomes (here, attitudes toward disasters). All models were tested for multicollinearity, and none of the individual-level variables were problematic (though in models with country dummy variables, one or more of those country variables were dropped because of multicollinearity). In all models, data were weighted to correct for differences in sample sizes across countries. A coefficient was considered statistically significant if its P-value was less than or equal to 0.05.

The descriptive statistics and factor analyses presented previously suggested that these three attitudes toward building code enforcement and risk reduction are conceptually distinct. Here, in the multivariate models, results for the control variables indicate that these three attitudes are also shaped by somewhat different individual and contextual factors.

The initial task here was to identify individual traits and community settings that shape Latin American and Caribbean perceptions about the likelihood of building codes being enforced (Table 2). Women are more likely to believe that the rules would be enforced; self-identified Indigenous and Black citizens, less likely. Trusting local government—and believing that governments, in general, care about one's needs—increased expectations of code enforcement. So did the sense that one's personal economic prospects were improving. Rural respondents had lower expectations of code enforcement than city dwellers. And national contexts mattered too. For example, all else being equal, living in Ecuador increased a respondent's certainty that building codes would be enforced by a sizeable 24%–25% (Models 2a and 2b) as compared to Barbados, the reference category. More importantly, the variable for moderate or high seismic risk introduced in Model 2c was significantly associated with higher expectations for code enforcement, although the variable for countries with the highest level of seismic risk was not (Model 2d). Neither version of the hurricane risk variable seemed to affect expectations for code enforcement (Models 2e and 2f), though the coefficient for the highest hurricane risk variable (Model 2f) would have met a 0.1 threshold for statistical significance.

Perceptions about the likelihood of corruption in the enforcement of building codes were likewise shaped by a number of different traits (Table 3). Expectations of bribery were highest among LAC respondents who were younger, better-educated, and female. They were higher among those who tended to trust their fellow citizens, and who trust their own ability to understand politics. And not surprisingly, being a victim of corruption at the hands of a government official heightened one's expectations that corruption would plague the building code enforcement process specifically. In terms of context, larger-city dwellers had greater expectations of corruption; rural respondents had lower expectations. Country context mattered here as well. Living in Mexico or the Dominican Republic, for example, increased—by roughly 11% (compared to Barbados, the reference category)—one's sense that building code enforcement officials would ask for a bribe (Models 3a and 3b). Living in a country with higher levels of seismic risk did not make respondents any more likely to expect corruption (Models 3c and 3d), although the coefficient for countries with moderate or high levels of seismic risk (Model 3c) was close to the 0.05 significance level. Citizens of countries with the highest levels of hurricane risk were more likely to expect corruption (Model 3f), although the same did not hold for the larger set of countries that included both moderate and high levels of hurricane risk (Model 3e).

In terms of predicting which citizens would value the safer construction of homes even if it cost more (Table 4), the results suggest that older, wealthier (but not better-educated) people in the LAC region are more likely to support this tradeoff, as are those people who identify as Indigenous. Trusting local government—and believing that governments, in general, care about one's needs—increased the value one placed on safer buildings. Being a victim of corruption, however, decreased that value. Living in a larger population center seems to increase support for safer construction (significant in Models 4c–4f, nearly significant in Model 4a), although the results do not reflect a simple urban–rural divide on this issue. Finally, even though our bivariate analyses (Figs. 4 and 5) may have suggested otherwise, living in a country at higher risk from earthquakes or hurricanes did not, in any version of these more complex multivariate analyses (Models 4c–4f), affect the value respondents placed on safer construction practices.

Building on these results, the analysis then turned to assessing whether expectations of enforcement and expectations of corruption might themselves affect valuing safer construction. Table 5 presents this model specification. These results were similar to those presented in Table 4, with just a few exceptions. Once expectations of building code enforcement and corruption were included, Indigenous identity was no longer a significant predictor of valuing safe construction. Additionally, community size was significant in

Table 2. Expected enforcement

Variable	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e	Model 2f
Age	1.81	1.53	1.70	1.68	1.70	1.76
Female	2.19[a]	2.16[a]	2.18[a]	2.18[a]	2.18[a]	2.18[a]
Mestizo	−0.43	−0.46	−0.31	−0.33	−0.34	−0.35
Indigenous	−5.35[a]	−5.04[a]	−5.17[a]	−5.26[a]	−5.27[a]	−5.26[a]
Black	−4.71[a]	−4.69[a]	−4.67[a]	−4.78[a]	−4.85[a]	−4.84[a]
Mulatto	1.88	1.81	2.15	2.04	1.96	1.98
Other	−1.94	−1.84	−1.71	−1.96	−2.04	−1.97
Income	0.00	−0.41	−0.04	−0.08	−0.07	−0.08
Education	0.33	−0.28	0.28	0.25	0.27	0.36
Interpersonal trust	1.36	1.15	1.40	1.40	1.39	1.39
External political efficacy	7.24[a]	7.18[a]	7.30[a]	7.27[a]	7.26[a]	7.28[a]
Internal political efficacy	1.35	1.35	1.34	1.36	1.33	1.32
Trust in local government	8.51[a]	8.62[a]	8.51[a]	8.51[a]	8.53[a]	8.53[a]
Victim of corruption	−2.39	−2.43	−2.33	−2.34	−2.34	−2.35
Eval. of national economy	−0.31	−0.31	−0.26	−0.28	−0.28	−0.23
Personal economic situation	2.33[a]	2.41[a]	2.31[a]	2.29[a]	2.29[a]	2.31[a]
Community size	1.59	—	1.55	1.58	1.61	1.60
Rural	—	−3.19[a]	—	—	—	—
Moderate or high seismic risk	—	—	9.44[a]	—	—	—
High seismic risk	—	—	—	5.67	—	—
Moderate or high hurricane risk	—	—	—	—	−0.64	—
High hurricane risk	—	—	—	—	—	6.21
Mexico	16.76[a]	17.28[a]	—	—	—	—
Honduras	17.20[a]	17.95[a]	—	—	—	—
Nicaragua	15.10[a]	15.71[a]	—	—	—	—
Ecuador	24.35[a]	25.10[a]	—	—	—	—
Chile	8.96[a]	9.39[a]	—	—	—	—
Uruguay	5.69[a]	5.87[a]	—	—	—	—
DomRep	17.44[a]	18.10[a]	—	—	—	—
TrinTob	Omitted	Omitted	—	—	—	—
Belize	8.86[a]	9.87[a]	—	—	—	—
Suriname	14.04[a]	15.37[a]	—	—	—	—
Bahamas	Omitted	Omitted	—	—	—	—
Constant	26.11[a]	27.86[a]	33.26[a]	36.78[a]	39.44[a]	36.47[a]
n	12,898	12,898	10,580	10,580	10,580	10,580
R^2	0.06	0.06	—	—	—	—

[a]$p < 0.05$.

the models with country dummy variables (unlike Table 4) as well as in the multilevel models (like Table 4).

More importantly, expectations of enforcement and expectations of corruption had the predicted effects on respondents' willingness to spend money on safer construction. Citizens' expectations that building codes would be enforced increased the value they placed on safer construction. Citizens' expectations that building code enforcement would be corrupt likewise reduced their willingness to pay for costlier but safer construction.

Finally, and perhaps most notably, in none of those multilevel models did living in a country with higher levels of risk from earthquakes (Models 5c and 5d) or hurricanes (Models 5e and 5f) significantly predict how much a person would value safer construction practices.

Discussion and Conclusions

Factor analysis and regression-style modeling indicate that these three attitudes toward building codes are both conceptually and causally distinct. They loaded onto separate dimensions in the factor analysis presented in Table 1 and were associated with rather different patterns of demographic and attitudinal variables in Tables 2–4.

Younger citizens were less likely to expect corruption in code enforcement, and they placed a higher value on safer construction. Women were more likely than men to believe that building codes will be enforced, but also more likely to believe that corruption will be involved. Respondents who identified as Indigenous or Black had less faith in existing code enforcement than self-identified White respondents. Additionally, Indigenous people in the LAC region placed a higher value on safer construction, as compared to Whites (the reference category).

Indicators of socioeconomic status (SES) also had disparate effects on attitudes toward safer construction and code enforcement. Higher-income respondents placed a greater value on safer construction practices than did lower-income respondents, but more educated respondents placed a *lower* value on safer construction practices, which was puzzling and clearly requires additional investigation. Education was also a strong predictor for expecting corruption.

Trusting one's fellow citizens actually *increased* one's expectation that building code enforcement would be corrupt. More predictably, external political efficacy—the belief that those who govern are interested in what "people like me" think—increased the expectation that code violations would be punished. Internal political efficacy—one's belief in one's own ability to understand the important political issues of the day—was associated with increased expectations of corruption in code enforcement, but also with increased willingness to support (and pay for) safer construction. As might be expected, trusting local government was associated with increased expectations of code enforcement, and it also

Table 3. Expected corruption

Variable	Model 3a	Model 3b	Model 3c	Model 3d	Model 3e	Model 3f
Age	−3.82[a]	−3.83[a]	−3.96[a]	−3.97[a]	−3.93[a]	−3.88[a]
Female	1.61[a]	1.61[a]	1.61[a]	1.61[a]	1.61[a]	1.62[a]
Mestizo	−0.34	−0.33	−0.12	−0.15	−0.19	−0.07
Indigenous	−1.71	−1.44	−1.36	−1.46	−1.45	−1.31
Black	0.82	1.00	1.38	1.12	1.04	1.42
Mulatto	−0.53	−0.40	−0.06	−0.21	−0.21	−0.01
Other	−2.62	−2.38	−2.08	−2.39	−2.44	−2.03
Income	−0.42	−0.41	−0.41	−0.46	−0.49	−0.46
Education	5.95[a]	5.73[a]	5.93[a]	5.90[a]	5.98[a]	6.13[a]
Interpersonal trust	5.12[a]	5.14[a]	5.13[a]	5.14[a]	5.13[a]	5.13[a]
External political efficacy	0.30	0.24	0.28	0.28	0.31	0.30
Internal political efficacy	5.04[a]	5.09[a]	5.08[a]	5.06[a]	5.04[a]	5.05[a]
Trust in local government	−2.08	−1.95	−2.06	−2.06	−2.03	−2.04
Victim of corruption	6.94[a]	6.92[a]	6.99[a]	6.99[a]	6.99[a]	7.00[a]
Eval. of national economy	0.91	0.92	0.89	0.90	0.97	0.98
Personal economic situation	1.48	1.49	1.44	1.43	1.44	1.44
Community size	4.55[a]	—	4.47[a]	4.53[a]	4.57[a]	4.48[a]
Rural	—	−4.44[a]	—	—	—	—
Moderate or high seismic risk	—	—	5.56	—	—	—
High seismic risk	—	—	—	1.11	—	—
Moderate or high hurricane risk	—	—	—	—	4.68	—
High hurricane risk	—	—	—	—	—	7.21[a]
Mexico	11.04[a]	11.17[a]	—	—	—	—
Honduras	8.29[a]	8.12[a]	—	—	—	—
Nicaragua	4.78[a]	4.59[a]	—	—	—	—
Ecuador	4.83	4.87	—	—	—	—
Chile	Omitted	Omitted	—	—	—	—
Uruguay	−6.79[a]	−7.15[a]	—	—	—	—
DomRep	11.00[a]	11.11[a]	—	—	—	—
TrinTob	4.41	3.03	—	—	—	—
Belize	−1.19	−1.17	—	—	—	—
Suriname	8.89[a]	9.57[a]	—	—	—	—
Bahamas	Omitted	Omitted	—	—	—	—
Constant	34.94[a]	38.56[a]	35.93[a]	38.96[a]	36.53[a]	36.18[a]
n	12,432	12,432	10,181	10,181	10,181	10,181
R^2	0.04	0.05	—	—	—	—

[a]$p < 0.05$.

predicted valuing safer construction. By contrast, the experience of being asked for a bribe by a government employee increased perceptions of likely corruption in code enforcement and reduced the value placed on safer construction.

Respondent perceptions of whether the country's economy as a whole had improved over the previous year were not a significant predictor of any attitudes toward building code enforcement. Perceiving that one's *own* economic fortunes had improved in the past year did predict a higher expectation of code enforcement, although feeling better off had no effect on one's willingness to spend money on safer construction. (As noted previously, reported income level did have such an effect.) Residents of larger cities tended to place a higher value on safer construction practices, but they were also more likely to believe that code enforcement would be corrupt. By contrast, in rural communities there were lower expectations of enforcement but also less anticipation that whatever enforcement did take place would be corrupt.

A country's level of hazard risk—based on its history of experiencing major, damaging earthquakes or hurricanes—had some modest effects on perceptions of code enforcement. Moderate or high seismic risk does significantly predict higher expectations of code enforcement, and high hurricane risk is associated with higher levels of corruption in code enforcement. Most notable, however, are the results for valuing safer construction. Regardless of how the disaster risk profiles of these countries were operationalized, living in a country at higher risk from earthquakes or hurricanes had no apparent effect on the value that residents of those countries placed on safer construction practices.

What this analysis did reveal, however, was a robust relationship between viewing building code enforcement as honest and effective, on the one hand, and support for safer building practices on the other. Indeed, our results support both H1 and H2. Expecting that building codes would indeed be enforced might lead citizens to value safer construction. By contrast, expecting that building code enforcement would be fraught with corruption seems to lead citizens to *de*value safer construction.

As for H3: neither the earthquake risk nor hurricane risk levels of a country affected citizens' preferences for spending more money on safer building construction. Based on some (not all) of the extant literature, as well as a seemingly reasonable "folk hypothesis," we might have expected that living in a country with a high degree of seismic or hurricane risk would increase citizens' willingness to spend money on mitigating the risks posed by these extreme events. The findings here, however, support a null hypothesis rather than H3a or H3b.

Some scholars have posited that, after a disaster, victims would be more willing to spend on safer construction—and to support policies that better regulate the building process—but that such an effect may be short-lived, and is always competing with other factors (demographic, attitudinal) that more consistently shape

Table 4. Valuing safe construction

Variable	Model 4a	Model 4b	Model 4c	Model 4d	Model 4e	Model 4f
Age	0.57[a]	0.58[a]	0.57[a]	0.57[a]	0.57[a]	0.57[a]
Female	−0.03	−0.03	−0.03	−0.03	−0.03	−0.03
Mestizo	0.05	0.05	0.04	0.04	0.04	0.04
Indigenous	0.25[a]	0.25[a]	0.24[a]	0.24[a]	0.24[a]	0.24[a]
Black	0.02	0.03	0.01	0.01	0.01	0.01
Mulatto	0.08	0.09	0.08	0.08	0.08	0.07
Other	0.37[a]	0.38[a]	0.36[a]	0.36[a]	0.36[a]	0.36[a]
Income	0.22[a]	0.24[a]	0.22[a]	0.22[a]	0.22[a]	0.22[a]
Education	−0.51[a]	−0.49[a]	−0.50[a]	−0.51[a]	−0.51[a]	−0.50[a]
Interpersonal trust	−0.02	−0.01	−0.02	−0.02	−0.02	−0.02
External political efficacy	−0.03	−0.03	−0.02	−0.02	−0.03	−0.02
Internal political efficacy	0.19[a]	0.19[a]	0.19[a]	0.19[a]	0.19[a]	0.19[a]
Trust in local government	0.26[a]	0.26[a]	0.26[a]	0.26[a]	0.26[a]	0.26[a]
Victim of corruption	−0.26[a]	−0.26[a]	−0.26[a]	−0.26[a]	−0.26[a]	−0.26[a]
Eval. of national economy	0.09	0.09	0.09	0.09	0.09	0.09
Personal economic situation	−0.05	−0.05	−0.05	−0.05	−0.05	−0.05
Community size	0.14	—	0.14[a]	0.14[a]	0.14[a]	0.14[a]
Rural	—	−0.06	—	—	—	—
Moderate or high seismic risk	—	—	0.53	—	—	—
High seismic risk	—	—	—	0.39	—	—
Moderate or high hurricane risk	—	—	—	—	−0.22	—
High hurricane risk	—	—	—	—	—	0.24
Mexico	0.51[a]	0.52[a]	—	—	—	—
Honduras	0.50[a]	0.49[a]	—	—	—	—
Nicaragua	1.39[a]	1.38[a]	—	—	—	—
Ecuador	0.65[a]	0.65[a]	—	—	—	—
Chile	1.69[a]	1.70[a]	—	—	—	—
Uruguay	1.50[a]	1.50[a]	—	—	—	—
DomRep	1.49[a]	1.50[a]	—	—	—	—
TrinTob	0.88[a]	0.84[a]	—	—	—	—
Belize	−0.35[a]	−0.36[a]	—	—	—	—
Suriname	Omitted	Omitted	—	—	—	—
Bahamas	Omitted	Omitted	—	—	—	—
Constant	−1.32[a]	−1.26[a]	−0.81[a]	−0.64[a]	−0.35	−0.59[a]
n	13,247	13,247	10,839	10,839	10,839	10,839

[a]$p < 0.05$.

citizens' views on risk mitigation. As noted previously, people have multiple problems or issues to worry about on a day-to-day basis, and the long-term risks posed by possibly underdesigned or poorly constructed buildings may not be one of them (Meltsner 1978, inter alia).

The literature on issue salience suggests that the immediacy of a related event may condition how it affects attitudes toward that issue. Might a person's more *recent* experiences with a major hazard event shape the way that she or he values safer construction practices? In analyses not reported here, the earthquake risk variables were recoded to account only for more *recent* seismic events, events during the previous five years or the previous ten years (results available upon request). But respondents in countries with more proximate memories of earthquakes were neither more nor less likely to value safer construction practices. Nor were results substantially different for Chile (the only nation in the 12-country set that experienced a significant seismic event just prior to the date of the survey) than they were for Uruguay (which, when the survey was conducted, had not experienced a major earthquake for nearly 130 years).

To further address this question, it was possible to drill down into the survey results for one area of a high-risk country that happened to experience an earthquake just weeks before the 2014 LAPOP data was collected. Northern Chile was the epicenter of an April 1, 2014, magnitude 8.2 earthquake, which according to EM-DAT killed six people and directly affected more than 50,000. The LAPOP surveys were conducted in Chile between April 16 and May 22, 2014 (between two and six weeks after the earthquake). Yet, our analysis of responses from the three northernmost regions of Chile (Antofagasta; Arica & Parinacota; Tarapacá) yielded a similar nonfinding (results available upon request). Public opinion on safer construction in these regions, with rubble literally still in the streets, did not differ significantly from the national average for Chile.

The implications of these findings may require advocates for better building code enforcement to rethink strategies for achieving those policy goals. A "common-sense" presumption—that even if people do not normally think about disaster risk and assess the benefits of risk mitigation, they will surely do so in the wake of an actual disaster—may be more complicated than it seems at first blush. Much of the focus of these advocacy efforts has been on fostering a sense of immediacy and personal connection to disasters even among populations who have not experienced them firsthand. Yet we need to know more about how even firsthand brushes with disasters shape people's cost-benefit calculations when it comes to making decisions about risk mitigation policies and practices.

It bears repeating that a single LAC region survey with both a limited number of "disaster" questions and a limited number of countries requires cautious interpretation. It is, however, a start, and it does provide a useful baseline for future research. Additional survey waves in the full set of LAC region countries and a

Table 5. Valuing safe construction, regressed on expected enforcement and corruption

Variable	Model 5a	Model 5b	Model 5c	Model 5d	Model 5e	Model 5f
Age	0.48[a]	0.49[a]	0.48[a]	0.48[a]	0.48[a]	0.48[a]
Female	−0.02	−0.02	−0.02	−0.02	−0.02	−0.02
Mestizo	0.00	0.00	−0.01	−0.01	−0.01	−0.01
Indigenous	0.17	0.16	0.16	0.16	0.16	0.16
Black	−0.02	−0.01	−0.03	−0.03	−0.03	−0.03
Mulatto	0.06	0.07	0.06	0.06	0.06	0.06
Other	0.32[a]	0.33[a]	0.30[a]	0.30[a]	0.30[a]	0.30[a]
Income	0.22[a]	0.25[a]	0.23[a]	0.22[a]	0.22[a]	0.22[a]
Education	−0.56[a]	−0.54[a]	−0.56[a]	−0.56[a]	−0.56[a]	−0.56[a]
Interpersonal trust	−0.03	−0.01	−0.03	−0.03	−0.03	−0.03
External political efficacy	−0.06	−0.06	−0.06	−0.06	−0.06	−0.06
Internal political efficacy	0.26[a]	0.26[a]	0.26[a]	0.26[a]	0.26[a]	0.26[a]
Trust in local government	0.25[a]	0.25[a]	0.24[a]	0.24[a]	0.24[a]	0.24[a]
Victim of corruption	−0.21[a]	−0.21[a]	−0.21[a]	−0.21[a]	−0.21[a]	−0.21[a]
Eval. of national economy	0.06	0.06	0.06	0.06	0.06	0.06
Personal economic situation	−0.06	−0.06	−0.06	−0.06	−0.06	−0.06
Expectation of enforcement	0.19[a]	0.19[a]	0.19[a]	0.19[a]	0.19[a]	0.19[a]
Expectation of corruption	−0.17[a]	−0.17[a]	−0.17[a]	−0.17[a]	−0.17[a]	−0.17[a]
Community size	0.17[a]	—	0.17[a]	0.17[a]	0.17[a]	0.17[a]
Rural	—	−0.07	—	—	—	—
Moderate or high seismic risk	—	—	0.51	—	—	—
High seismic risk	—	—	—	0.38	—	—
Moderate or high hurricane risk	—	—	—	—	−0.21	—
High hurricane risk	—	—	—	—	—	0.24
Mexico	0.48[a]	0.50[a]	—	—	—	—
Honduras	0.43[a]	0.42[a]	—	—	—	—
Nicaragua	1.35[a]	1.34[a]	—	—	—	—
Ecuador	0.59[a]	0.59[a]	—	—	—	—
Chile	1.65[a]	1.66[a]	—	—	—	—
Uruguay	1.42[a]	1.43[a]	—	—	—	—
DomRep	1.47[a]	1.47[a]	—	—	—	—
TrinTob	0.86[a]	0.82[a]	—	—	—	—
Belize	−0.37[a]	−0.39[a]	—	—	—	—
Suriname	Omitted	Omitted	—	—	—	—
Bahamas	Omitted	Omitted	—	—	—	—
Constant	−1.23[a]	−1.17[a]	−0.75[a]	−0.59[a]	−0.32	−0.54
n	12,120	12,120	9,943	9,943	9,943	9,943

Note: Key variables of interest are in bold.
[a]$p < 0.05$.

much-expanded question set in both normal (scheduled) times and in the aftermath of major damaging events is needed. Without that follow-up, both scheduled and event-driven, it will be impossible to understand the dynamics of public support for disaster risk reduction broadly defined.

Future analyses should extend the multilevel models to include a broader range of country-level variables: country characteristics like wealth, development, or an objective measure of state capacity (rather than the sorts of subjective perceptions captured in this survey data). More urgently needed is research that will provide additional analytical leverage precisely over the question of whether experiencing a major damaging event *does* change minds about the value of risk reduction, and if so, how are they changed? How extreme of an impact must an event have to change minds? For how long, if at all, will those changed attitudes endure?

Answering these questions will not only help solve a puzzle posed by the scholarly literature, it will also have practical policy and policy advocacy implications. It would be valuable to know, after the tragedy of the *next* major event, whether and for how long a window of opportunity opens that could allow legislators, policymakers, and political leaders in LAC countries to commit sustained state resources to improving risk reduction. This is, without exaggeration, a question of life or death.

References

Akbar, M. S., and D. P. Aldrich. 2016. "Flood damage and victims' perceptions about political leadership." *Risk Hazard. Crisis Public Policy* 6 (4): 329–343. https://doi.org/10.1002/rhc3.12089.

Albrecht, F. 2017. "Government accountability and natural disasters: The impact of natural hazard events on political trust and satisfaction with governments in Europe." *Risk Hazard. Crisis Public Policy* 8 (4): 381–410. https://doi.org/10.1002/rhc3.12122.

Albright, E. A., and D. A. Crow. 2016. "Learning in the aftermath of extreme floods: Community damage and stakeholder perceptions of future risk." *Risk Hazard. Crisis Public Policy* 6 (3): 308–328. https://doi.org/10.1002/rhc3.12085.

Ambraseys, N., and R. Bilham. 2011. "Corruption kills." *Nature* 469 (7329): 153–155. https://doi.org/10.1038/469153a.

Anbarci, N., M. Escaleras, and C. A. Register. 2005. "Earthquake fatalities: The interaction of nature and political economy." *J. Public Econ.* 89 (9–10): 1907–1933. https://doi.org/10.1016/j.jpubeco.2004.08.002.

Arceneaux, K., and R. M. Stein. 2016. "Who is held responsible when disaster strikes? The attribution of responsibility for a natural disaster in an urban election." *J. Urban Affairs* 28 (1): 43–53. https://doi.org/10.1111/j.0735-2166.2006.00258.x.

Baker, E. J. 1977. "Public attitudes toward hazard zone controls." *J. Am. Inst. Planners* 43 (4): 401–408. https://doi.org/10.1080/01944367708977904.

Barnhart, J. D. 1925. "Rainfall and the populist party in Nebraska." *Am. Political Sci. Rev.* 19 (3): 527–540. https://doi.org/10.2307/2939131.

Beatley, T., and D. J. Brower. 2008. "Public perception of hurricane hazards: Examining the differential effects of Hurricane Diana." *Coastal Zone Manage. J.* 14 (3): 241–269. https://doi.org/10.1080/08920758609362004.

Becker, J. S., D. Paton, D. M. Johnston, K. R. Ronan, and J. McClure. 2017. "The role of prior experience in informing and motivating earthquake preparedness." *Int. J. Disaster Risk Reduct.* 22 (Jun): 179–193. https://doi.org/10.1016/j.ijdrr.2017.03.006.

Birkland, T. A. 1997. *After disaster: Agenda setting, public policy, and focusing events*. Washington, DC: Georgetown University Press.

Birkland, T. A. 1998. "Focusing events, mobilization, and agenda setting." *J. Public Policy* 18 (1): 53–74. https://doi.org/10.1017/S0143814X98000038.

Blake, C. H., and S. D. Morris. 2009. *Corruption and democracy in Latin America*. Pittsburgh: University of Pittsburgh Press.

Bodet, M. A., M. Thomas, and C. Tessier. 2016. "Come hell or high water: An investigation of the effects of a natural disaster on a local election." *Electoral Stud.* 43 (Sep): 85–94. https://doi.org/10.1016/j.electstud.2016.06.003.

Brilly, M., and M. Polic. 2005. "Public perceptions of flood risks, flood forecasting and mitigation." *Nat. Hazards Earth Syst. Sci.* 5: 345–355. https://doi.org/10.5194/nhess-5-345-2005.

Carlin, R. E., G. J. Love, and E. J. Zechmeister. 2014a. "Natural disaster and democratic legitimacy: The public opinion consequences of Chile's 2010 earthquake and tsunami." *Political Res. Q.* 67 (1): 3–15. https://doi.org/10.1177/1065912913495592.

Carlin, R. E., G. J. Love, and E. J. Zechmeister. 2014b. "Trust shaken: Earthquake damage, state capacity, and interpersonal trust in comparative perspective." *Comp. Politics* 46 (4): 419–453. https://doi.org/10.5129/001041514812522761.

Chavez, J., O. Khemici, M. Khater, and P. Keshishian. 2012. "Building codes and relative seismic vulnerability in Latin American Countries." Accessed March 17, 2018. http://www.iitk.ac.in/nicee/wcee/article/WCEE2012_4534.pdf.

Cole, S., A. Healy, and E. Werker. 2012. "Do voters demand responsive governments? Evidence from Indian disaster relief." *J. Dev. Econ.* 97 (2): 167–181. https://doi.org/10.1016/j.jdeveco.2011.05.005.

Daniell, J. E. 2015. "Global view of seismic code and building practice factors." In *Encyclopedia of earthquake engineering*. Berlin: Springer.

Donahue, A. K. 2014. "Risky business: Willingness to pay for disaster preparedness." *Public Budgeting Finance* 34 (4): 100–119. https://doi.org/10.1111/pbaf.12051.

Donahue, A. K., C. C. Eckel, and R. K. Wilson. 2014. "Ready or not? How citizens and public officials perceive risk and preparedness." Supplement, *Am. Rev. Public Administration* 44 (S4): 89S–111S. https://doi.org/10.1177/0275074013506517.

Donahue, A. K., and J. Miller. 2006. "Experience, attitudes, and willingness to pay for public safety." *Am. Rev. Public Administration* 36 (4): 395–418. https://doi.org/10.1177/0275074005285666.

Donahue, A. K., M. Robbins, and B. Simonsen. 2008. "Time, taxes, and support for security." *Public Budgeting Finance* 28 (2): 69–86. https://doi.org/10.1111/j.1540-5850.2008.00903.x.

Escaleras, M., N. Anbarci, and C. A. Register. 2007. "Public sector corruption and major earthquakes: A potentially deadly interaction." *Public Choice* 132 (1): 209–230. https://doi.org/10.1007/s11127-007-9148-y.

Gasper, J. T., and A. Reeves. 2011. "Make it rain? Retrospection and the attentive electorate in the context of natural disasters." *Am. J. Political Sci.* 55 (2): 340–355. https://doi.org/10.1111/j.1540-5907.2010.00503.x.

Han, Z., X. Hu, and J. Nigg. 2011. "How does disaster relief works affect the trust in local government?" *Risk Hazard. Crisis Public Policy* 2 (4): 1–20. https://doi.org/10.2202/1944-4079.1092.

Healy, A., and N. Malhorta. 2009. "Myopic voters and natural disaster policy." *Am. Political Sci. Rev.* 103 (3): 387–406. https://doi.org/10.1017/S0003055409990104.

Hewitt, K., ed. 1983. *Interpretation of calamity, from the viewpoint of human ecology*. Boston: Allen & Unwin.

Hewitt, K. 1995. "Excluded perspectives in the social construction of disaster." *Int. J. Mass Emergencies Disasters* 13 (3): 317–339.

Holguín-Veras, J., M. Jaller, L. N. Van Wassenhove, N. Perez, and T. Wachtendorf. 2014. "Material convergence: Important and understudied phenomena." *Nat. Hazard. Rev.* 15 (1): 1–12. https://doi.org/10.1061/(ASCE)NH.1527-6996.0000113.

Hurley, M. A., and R. B. Corotis. 2014. "Perception of risk of natural hazards: A hazard mitigation plan framework." *Int. J. Risk Assess. Manage.* 17 (3): 188–211. https://doi.org/10.1504/IJRAM.2014.062777.

Kahn, M. E. 2005. "The death toll from natural disasters: The role of income, geography, and institutions." *Rev. Econ. Stat.* 87 (2): 271–284. https://doi.org/10.1162/0034653053970339.

Kaufmann, D., A. Kraay, and M. Mastruzzi 2010. *The worldwide governance indicators: Methodology and analytical issues*. World Bank Policy Research Working Paper No. 5430. Washington, DC: The World Bank.

Keefer, P., E. Neumayer, and T. Plümper. 2011. "Earthquake propensity and the politics of mortality prevention." *World Dev.* 39 (9): 1530–1541. https://doi.org/10.1016/j.worlddev.2011.02.010.

Kenny, C. 2009. *Why do people die in earthquakes? The costs, benefits and institutions of disaster risk reduction in developing countries*. World Bank Policy Research Working Paper No. 4823. Washington, DC: The World Bank.

Kingdon, J. W. 1984. *Agendas, alternatives, and public policies*. Boston: Little, Brown.

Kingdon, J. W. 1995. *Agendas, alternatives, and public policies*. 2nd ed. New York: Longman.

LAPOP (Latin American Public Opinion Project). 2014. *The Americas barometer by the Latin American Public Opinion Project (LAPOP)*. Nashville, TN: Vanderbilt Univ.

Lavell, A. 1994. "Opening a policy window: The Costa Rican hospital retrofit and seismic insurance programs 1986–1992." *Int. J. Mass Emergencies Disasters* 12 (1): 95–115.

Lay, J. C. 2009. "Race, retrospective voting, and disasters." *Urban Affairs Rev.* 44 (5): 645–662. https://doi.org/10.1177/1078087408326900.

Lin, S., D. Shaw, and M. Ho. 2008. "Why are floods and landslide victims less willing to take mitigation measures than the public?" *Nat. Hazard.* 44 (2): 305–314. https://doi.org/10.1007/s11069-007-9136-z.

Lindell, M. K., and C. S. Prater. 1999. *Household adoption of seismic hazard adjustments: A comparison of residents in two states*. College Station, TX: Texas A&M University Hazard Reduction & Recovery Center.

Luna, J. P., and H. D. Soifer. 2017. "Capturing sub-national variation in state capacity: A survey-based approach." *Am. Behav. Sci.* 61 (8): 887–907. https://doi.org/10.1177/0002764217720964.

Marincioni, F., F. Appiotti, M. Ferretti, C. Antinori, P. Melonaro, A. Pusceddu, and R. Oreficini-Rosi. 2012. "Perception and communication of seismic risk: The 6 April 2009 L'Aquila earthquake case study." *Earthquake Spectra* 28 (1): 159–183. https://doi.org/10.1193/1.3672928.

May, P. J. 2004. "Making choices about earthquake performance." *Nat. Hazard. Rev.* 5 (2): 64–70. https://doi.org/10.1061/(ASCE)1527-6988(2004)5:2(64).

Meli, R., and S. Alcocer. 2004. "Implementation of structural earthquake-disaster mitigation programs in developing countries." *Nat. Hazard. Rev.* 5 (1): 29–39. https://doi.org/10.1061/(ASCE)1527-6988(2004)5:1(29).

Meltsner, A. J. 1978. "Public support for seismic safety: Where is it in California?" *Mass Emergencies* 3 (2–3): 167–184.

Morris, S. D., and C. H. Blake. 2010. *Corruption & politics in Latin America: National and regional dynamics*. Boulder, CO: Lynne Rienner Publishers.

Neumayer, E., T. Plümper, and F. Barthel. 2014. "The political economy of natural disaster damage." *Global Environ. Change* 24: 8–19. https://doi.org/10.1016/j.gloenvcha.2013.03.011.

Norris, F. H., M. J. Friedman, P. J. Watson, C. M. Byrne, E. Diaz, and K. Kaniasty. 2002. "60,000 disaster victims speak: Part 1. An empirical review of the empirical literature, 1981-2001." *Psychiatry Interpersonal Biol. Processes* 65 (3): 207–239. https://doi.org/10.1521/psyc.65.3.207.20173.

O'Keefe, P., K. Westgate, and B. Wisner. 1976. "Taking the naturalness out of natural disasters." *Nature* 260 (5552): 566–567.

Olson, R. S. 2000. "Toward a politics of disaster: Losses, values, agendas, and blame." *Int. J. Mass Emergencies Disasters* 18 (2): 265–287.

Passerini, E. 2000. "Disasters as agents of social change in recovery and reconstruction." *Nat. Hazard. Rev.* 1 (2): 67–72. https://doi.org/10.1061/(ASCE)1527-6988(2000)1:2(67).

Pennebaker, J. W., and K. D. Harber. 1993. "A social stage model of collective coping: The Loma Prieta earthquake and the Persian Gulf War." *J. Social Issues* 49 (4): 125–145. https://doi.org/10.1111/j.1540-4560.1993.tb01184.x.

Prater, C. S., and M. K. Lindell. 2000. "Politics of hazard mitigation." *Nat. Hazard. Rev.* 1 (2): 73–82. https://doi.org/10.1061/(ASCE)1527-6988(2000)1:2(73).

Quarantelli, E. L. 1987. "What should we study? Questions and suggestions for researchers about the concept of disasters." *Int. J. Mass Emergencies Disasters* 5 (1): 7–32.

Quarantelli, E. L. 2000. "Emergencies, disaster and catastrophes are different phenomena." Preliminary paper no. 304. Univ. of Delaware Disaster Research Center. Accessed March 6, 2018. http://udspace.udel.edu/bitstream/handle/19716/674/PP304.pdf?sequence=1.

Quarantelli, E. L. 2006. "Catastrophes are different from disasters: Some implications for crisis planning and managing drawn from Katrina." Accessed March 6, 2018. http://understandingkatrina.ssrc.org/Quarantelli/printable.html.

Reeves, A. 2011. "Political disaster: Unilateral powers, electoral incentives, and presidential disaster declarations." *J. Politics* 73 (4): 1142–1151. https://doi.org/10.1017/S0022381611000843.

Sainz-Santamaria, J., and S. E. Anderson. 2013. "The electoral politics of disaster preparedness." *Risk Hazard. Crisis Public Policy* 4 (4): 234–249. https://doi.org/10.1002/rhc3.12044.

Smith, N. 2006. "There's no such thing as a natural disaster." Accessed March 7, 2018. http://understandingkatrina.ssrc.org/Smith/.

Transparency International. 2013. "Corruption perceptions index 2013." Accessed June 11, 2017. https://www.transparency.org/cpi2013.

Transparency International. 2017. "People and corruption: Latin America and the Caribbean." Accessed February 23, 2018. https://www.transparency.org/whatwedo/publication/global_corruption_barometer_people_and_corruption_latin_america_and_the_car.

Tulchin, J., and R. Espach. 2000. *Combatting corruption in Latin America*. Washington, DC: Woodrow Wilson Center Press.

UNISDR (United Nations Office for Disaster Risk Reduction). 2017. "Terminology on disaster risk reduction." Accessed March 17, 2018. https://www.unisdr.org/we/inform/terminology.

Västfjäll, D., E. Peters, and P. Slovic. 2014. "The affect heuristic, mortality salience, and risk: Domain-specific effects of a natural disaster on risk-benefit perception." *Scand. J. Psychol.* 55 (6): 527–532. https://doi.org/10.1111/sjop.12166.

Wachinger, G., O. Renn, C. Begg, and C. Kuhlicke. 2013. "Risk perception paradox—Implications for governance and communication of natural hazards." *Risk Anal.* 33 (6): 1049–1065. https://doi.org/10.1111/j.1539-6924.2012.01942.x.

Wachtendorf, T., B. Brown, and J. Holguín-Veras. 2010. "Catastrophe characteristics and their impact on critical supply chains." In *Problematizing material convergence and management following hurricane Katrina*, 33–34. Newark, Delaware: Disaster Research Center.

Warf, B., and S. Stewart. 2016. "Latin American corruption in geographic perspective." *J. Lat. Am. Geogr.* 15 (1): 133–155. https://doi.org/10.1353/lag.2016.0006.

Wisner, B., J. C. Gaillard, and I. Kelman. 2012. "Framing disaster: Theories and stories seeking to understand hazards, vulnerability, and risk." In *The Routledge handbook of hazards and disaster risk reduction*. New York: Routledge.