


ARTICLE

Natural Hazards, Social Policy, and Electoral Performance: Evidence from the 2017 Earthquake in Mexico City

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Abstract

Do large-scale and unexpected events, such as natural disasters, affect elections? This article studies the political dimension of the 19-S earthquake that hit Mexico City in 2017, a few months before the 2018 elections. Using fine-grained geospatial data, the results show that candidates from the city-level incumbent Partido de la Revolución Democrática (PRD) had a small increase in vote share in 2018 compared to the previous election in precincts more exposed to damaged caused by the earthquake (in terms of both distance-based and per capita measures), accounting for the seismic profile and socioeconomic characteristics of the neighborhood. The article shows that the implementation of disaster-recovery policy explains part of this relationship. Moreover, voters were as electorally responsive to a future risk reduction strategy as to a reconstruction credit.

Keywords: social policy; natural hazards; natural disasters; accountability; elections

Resumen

¿Cuáles son las consecuencias electorales de eventos asociados con desastres naturales, tales como terremotos? En este artículo, los autores estudian la dimensión política del terremoto que ocurrió en la Ciudad de México en septiembre de 2017, meses antes de las elecciones de 2018. Por medio de datos geoespaciales sobre la localización y magnitud de los daños del terremoto, los autores muestran que los candidatos del partido en el gobierno obtuvieron una pequeña ventaja electoral en los distritos electorales más expuestos a los daños ocasionados por dicho evento. Asimismo, el artículo muestra que esta relación se atribuye, en parte, a la implementación de diversas políticas de recuperación ante desastres, incluyendo políticas de transferencias directas así como aquellas que fomentan la reducción de daños futuros.

Palabras clave: política social; peligros naturales; desastres naturales; responsabilidad; elecciones

The data and files to replicate the findings of this study are available at: Martinez-Alvarez, Cesar B. and Rodríguez-Valadez, José María, 2023, "Replication Data for: Natural Hazards, Social Policy, and Electoral Performance: Evidence from the 2017 Earthquake in Mexico City", <https://doi.org/10.7910/DVN/ZVZV2Q>, Harvard Dataverse.

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The ability of citizens to evaluate the performance of their political leaders and vote accordingly is a cornerstone of democracy. Social scientists have found that individuals are sometimes sophisticated retrospective voters who reward politicians for good performance in areas like macroeconomic management. Other scholars suggest, however, that large-scale and unexpected events, such as natural hazards, fluctuations in the international markets, and global pandemics, can also influence elections.¹

The extent to which citizens “blindly” punish politicians for events they cannot completely control is still a matter of academic debate. Whereas some scholars show that phenomena associated with natural hazards, for example earthquakes and hurricanes, are associated with lower vote shares for the incumbent political party, other studies present either null or even the opposite effects. This suggests that the electoral consequences of natural disasters depend largely on local political conditions (Olson 2000)

Moreover, research is lacking that explains not only whether these events affect electoral outcomes but also why such effects might occur, including the role of different types of postdisaster social policies. Some authors point out that different government strategies to address natural hazards—in particular prevention versus relief actions—have heterogeneous effects on political behavior. In addition, recent scholarship shows that these events affect preferences for different types of relief policies at the individual level (Visconti 2021). Given the central role of governments in preventing and alleviating the impacts of disasters, additional research on the political dimension of these policies is needed, in particular from the Global South.

To address some of these research gaps, we study the electoral consequences of a major seismic event in Mexico, a multiparty democracy with a long history of exposure to natural hazards. The earthquake of September 19, 2017 (known as the 19-S earthquake) was the worst crisis to hit the country’s capital in more than thirty years. The reconstruction process quickly became one of the most salient political issues in the following 2018 presidential, gubernatorial, and mayoral elections, which occurred only a few months afterward and were some of the most consequential in the history of Mexican democracy.

We posit two specific questions. First, did the impacts of this large-scale event influence the aggregate outcomes of the 2018 local elections? Second, what was the role of different types of social policies implemented to address the emergency? Empirically, we employ fine-grained, geospatial information on damage and distribution of aid relief, as well as data on the seismic and urban characteristics of the city’s electoral precincts to control for some of the drivers of vulnerability to earthquakes.

We find a positive relationship between exposure to the earthquake damage—measured as both the distance between the precinct’s centroid and the closest damaged building and the number of affected housing units per capita—and the vote share for mayoral and legislative candidates from the city-level incumbent party, Partido de la Revolución Democrática (PRD). We also present some evidence that the opposite relationship occurred for politicians from the main challenger (Movimiento de Regeneración Nacional, or MORENA, led by the current president Andrés Manuel López Obrador). Our analysis shows that the distribution of disaster-relief policies—including both measures to reduce further risk and to provide immediate housing relief—played a role in the pro-incumbent effect of the natural disaster. Nonetheless, in the context of a highly competitive election, both the damage caused by the earthquake and the response from the local government had a relatively small overall political impact.

¹ We employ the terms *natural hazards* and *natural disasters* interchangeably; however, they are not identical. Scholars have argued that disasters are social and political phenomena, whereas hazards are natural. Hence, political decisions, policy implementation, and societal dynamics may transform a natural hazard into a disaster (Cohen and Werker 2008; Escaleras, Anbarci, and Register 2007; Raschky 2008).

This article offers two contributions to the research on the politics of natural hazards. First, from a theoretical perspective, we compare the electoral consequences of two distinct types of disaster-recovery policies, one of them focusing on reducing future risk and another centered on providing immediate housing relief. Moreover, we show, in contrast to other studies, that relief policies as well as the damage associated with the earthquake played a relatively minor role in the following local elections. In doing so, we add to the small but growing literature on the politics of disaster-aid policies in Latin America (Visconti 2021; 2022; Cooperman 2022; Carlin, Love and Zechmeister 2014; Gallego 2018; Gawronski and Olson 2013).

Our second contribution relates to the type of data we analyze. Many existing studies on the political dimension of natural hazards employ information aggregated at the state or municipal levels or survey data; instead, we collect and process fine-grained measures of citizen electoral behavior, exposure to different types of damage, and, importantly, distribution of postdisaster-recovery policies at the electoral precinct level—the smallest political unit in Mexico. As a result, we are able to capture the spatial dimension of a major natural disaster in ways that previous research has not exploited.

Literature review

Do unexpected, large-scale events that threaten the security and livelihoods of individuals and communities—such as phenomena associated with natural hazards—affect electoral behavior? If so, what is the role of the government’s response to the crisis in this relationship? Scholars have found solid evidence that voters are responsive to good performance in areas which politicians can more or less control, such as the management of the economy (Fiorina 1978; Duch and Stevenson 2008; Powell and Whitten 1993; Singer and Carlin 2013) or public safety (Carlin, Love and Martinez-Gallardo 2011).

Nonetheless, other authors point out that voters are also sensitive to events that their representatives cannot either anticipate or influence. Some examples of these include fluctuations in the international commodity markets (Campello and Zucco 2016), the occurrence of pandemics (Gutierrez, Meriläinen, and Rubli 2022; Piazza and Schneider 2021), exchange rate crises (Murillo and Visconti 2017), the timing of natural hazards (Healy and Malhotra 2009), and even shark attacks (Achen and Bartels 2004; Fowler and Hall 2018). In this article, we focus on natural hazards as a type of large-scale and unpredictable events.

Political scientists have explored both the effects of exposure to natural events on electoral behavior and the variables that explain politicians’ distribution of postdisaster policies. However, despite the growing attention to this issue, there are still a few gaps in our understanding of the politics of natural hazards. We focus on two of them: whether voters reward or punish their representatives for damages associated with these events and the role of disaster-related policies as a mechanism in this relationship.

Regarding the first gap, the extent to which citizens punish or reward their leaders after a disaster is still a matter of debate. Whereas some studies show evidence of a negative relationship between exposure to a natural hazard and incumbent vote shares (Abney and Hill 1966; Arceneaux and Stein 2006; Gasper and Reeves 2011; Heersink, Peterson, and Jenkins 2017; Healy and Malhotra 2010; Flores and Smith 2013), others present results in the opposite direction or even null findings (Ramos and Sanz 2020; Bodet, Thomas, and Tessier 2016; Bovan, Banai, and Banai 2018). These disparate findings seem to suggest that the political consequences of disasters are highly dependent on the context.

What is the political role of disaster-relief policies?

In terms of the second gap, the existing literature is not yet conclusive about three dimensions of the politics of disaster-relief policies: the role of electoral calculations in the

distribution of aid, the drivers of citizens' attitudes toward specific aid strategies, and the electoral effectiveness of different relief policies. Regarding the first element, some research claims that electoral variables play an important role in governments' allocation of postdisaster spending. For example, Sainz-Santamaria and Anderson (2013) argue that US politicians distribute more disaster preparation funds to electorally competitive counties. Moreover, Gasper and Reeves (2011) show that American presidents are more likely to issue disaster declarations in competitive states. In addition, Chen (2008) presents evidence of an electoral bias in the distribution of Federal Emergency Management funds.

From a comparative perspective, Cooperman (2022) shows that local politicians in Brazil are also strategic in their drought declarations, as they tend to issue them more often when elections are close. Similarly, Gallego (2018) finds that Colombian political elites took advantage of severe floods and landslides to exchange immediate relief for votes. Nonetheless, not all studies point out to such electorally oriented strategies of postdisaster-aid distribution, as Kumar (2016) posits for the case of India.

Regardless of politicians' motivations, there is still some disagreement about voters' preferences and responsiveness to different types of postdisaster policies. For example, Healy and Malhotra (2009) find that voters in the United States prioritize short-term relief policies over long-term strategies to reduce risk to future disasters. Bechtel and Mannino (2022) posit that citizens prefer a need-based approach to distributing aid after a natural disaster. Visconti (2022) argues that these events increase support for left-leaning politicians, who are more likely to implement social policies that support the reconstruction process. Visconti (2021) also shows that natural hazards have an impact on the policy priorities of citizens.

Finally, in terms of the electoral effectiveness of different types of aid, Cooperman (2022) posits that voters in Brazil reward politicians who issue drought declarations close to elections. Similarly, there is evidence that distributive spending is electorally beneficial among core voters in the United States (Chen 2008). Nonetheless, other scholars point to different conclusions. Heersink, Peterson, and Jenkins (2017) argue that President Herbert Hoover suffered important electoral losses in places affected by the 1927 floods despite the allocation of aid by the federal government.

In summary, there are still a few important gaps in our understanding of the electoral consequences of natural hazards. First, we need more evidence on whether voters reward or punish their representatives for these events and under what conditions, particularly in non-US contexts. Second, the existing research has not fully explored the mechanisms behind this relationship, especially the role of postdisaster social policies; moreover, with a few exceptions (Healy and Malhotra 2009; Visconti 2021, 2022), scholars focus on only one type of government actions in the aftermath of a disaster, either relief or prevention policies. Our article aims to contribute to address some of these theoretical gaps.

Natural disasters, social policies, and electoral outcomes

We advance two arguments. First, we posit that the ability to distribute government resources to the affected populations offers an electoral advantage to candidates from the incumbent party in charge of these resources. Hence, exposure to a natural disaster could benefit certain candidates in the elections following the event, conditional on the implementation of social policies in response to the crisis. Second, we expect that different characteristics of postdisaster policy (whether they offer private or public goods or whether they address the short-term effects of a disaster versus the long-term causes of vulnerability) affect their electoral performance.

The first element of our theory centers on the ability of the incumbent party to allocate public funds to the affected populations in the aftermath of a disaster. We argue that having control over the initial response to an emergency benefits candidates from the party in government under two scenarios. First, state bureaucracies may distribute relief and

reconstruction funds on the basis of need, such as levels of damage in a particular neighborhood. Voters observe the performance of their representatives and vote accordingly. Second, incumbents may allocate these resources strategically, on the basis of electoral criteria and clientelistic networks. Party brokers influence the vote choice of the affected citizens.

Regardless of the specific mechanism, the observable implication is the same: exposure to a natural hazard could benefit the candidates from the incumbent party, conditional on the implementation of postdisaster social policies. Indeed, the literature on the politics of natural disasters presents examples of both frameworks. In any case, this distinction between programmatic responses and clientelistic networks lies at the core of the literature on distributive politics (Golden and Min 2013).

The second component of our theory disentangles the role of social policy in this relationship. We argue that different postdisaster policies may have heterogeneous electoral impacts. These are a function of two features of a given government response: whether it provides public versus private goods and how effective it is to provide relief and address the consequences of the crisis. In terms of the first one of these characteristics, a large body of literature in political science, including case studies in Mexico, shows that citizens are responsive to particularistic goods that provide an immediate economic benefit, for example, cash handouts (Díaz-Cayeros, Estévez, and Magaloni 2016; Hicken and Nathan 2020).

In the context of natural disasters, Visconti (2021) shows that exposure to these events makes individuals more likely to prioritize investments in housing (an individual good). Nonetheless, another equally relevant strand of research suggests that public goods represent an electorally effective strategy because they benefit a larger subset of the population (Flores and Smith 2013).

It is important to mention that we do not have a strong position one way or another with respect to the electoral impacts of policies at either side of this range—that is, on whether more universalistic interventions are more or less effective from a political perspective than individualized transfers are.

The second feature of a disaster response that should affect its electoral impact is the extent to which the response effectively addresses the crisis. In the literature, the classical distinction is between policies that provide immediate relief and strategies to reduce vulnerability to future disasters. Although both are relevant, there is an increasing consensus that long-term adaptation measures are cost effective and should be prioritized as general prevention strategies. For example, Aldrich (2012) and Aldrich and Meyer (2015) suggest that postdisaster actions that strengthen social capital and are implemented in close interaction with citizens are particularly beneficial to populations affected by a disaster.

Nonetheless, as mentioned before, some scholars show that voters prefer short-term postdisaster policies (Healy and Malhotra 2009; Gailmard and Patty 2019; Fox and Van Weelden 2015). As with the previous dimension, we do not have a strong position one way or another about the relative electoral impact of these two policy types for the case of Mexico, although we recognize that existing research tends to find that short-term responses are more electorally advantageous.

It is important to note that, although the two dimensions are related, they are conceptually distinct. Hence, governments can implement strategies along a two-dimensional space, defined by the extent to which a policy offers private versus public goods and addresses the short-term versus the long-term impacts of a disaster. In this article, we explore the role of two specific policies that Mexico City's government implemented after the earthquake: actions to mitigate future risk for a small subset of the affected population and cash transfers that offer immediate housing relief to all affected citizens. Although these represent only a subset of all official responses to the crisis, we focus on these two for reasons of data availability. We do not have strong positions about which is more electorally advantageous.

A final consideration in our theory is the relevance of party labels. We argue that candidates—all down the ballot—who are from the party in charge of distributing risk

reduction and housing-relief policies also benefit electorally from this policy implementation advantage. In the case of Mexico City, the office of the governor (*jefatura de gobierno*) controls the vast majority of public spending. We posit that candidates for mayor (*alcaldes*) and deputies from the same political party of the governor are able to receive some benefits from the actions implemented at higher levels of government. Regardless of whether the allocation of these resources followed a need-based or a clientelistic logic, the observable implication is the same: exposure to a natural hazard benefits copartisans of the governor, conditional on the implementation of postdisaster policies.

In summary, our theory claims that large-scale and unexpected events associated with natural hazards, such as earthquakes, can affect electoral outcomes. The implementation of policies in response to the crisis is a key mechanism behind this relationship. From the policy supply side, candidates from the party in charge of distributing resources have an electoral advantage over challengers from other parties in the election following the emergency. From the policy demand dimension, citizens update their evaluations of political parties and candidates on the basis of the responses they implement; however, as mentioned earlier, we have no strong position as to whether any of these characteristics is more electorally advantageous; therefore, the analysis of the relative effectiveness of different postdisaster policies is mostly exploratory.

Finally, we emphasize that, in this article, we focus on the political dimension of the earthquake at the aggregate (electoral precinct) level. As mentioned earlier, some researchers have studied the individual-level consequences of exposure to natural disasters (Carlin, Love, and Zechmeister 2014; Visconti 2021, 2022). The following are the key observable implications of our theory:

H1: candidates from the city-level incumbent (PRD)—the party in charge of the distribution of spending at the local level—had better electoral performance in the 2018 election than in the previous one in neighborhoods with higher levels of exposure to damages caused by the 19-S earthquake, controlling for the seismic and socioeconomic characteristics of the electoral precinct.

H2: candidates from the city-level incumbent (PRD) had better electoral performance in the 2018 election than in the previous one in neighborhoods with more postdisaster relief per capita, controlling for the seismic and socioeconomic characteristics of the electoral precinct.

H3: different postdisaster-relief policies (risk reduction versus rent relief) have heterogeneous effects on electoral outcomes at the aggregate level.

The 19-S earthquake and the 2018 elections in Mexico City: Natural disasters and local politics

Mexico, especially the country's capital, is severely vulnerable to different types of natural hazards. Seismic events, in particular, have affected the metropolis socially and politically throughout its history (Monsiváis 2005). The 1985 earthquake, for example, contributed to the transformation of the disaster prevention policy in Mexico (Estrada Díaz 2014), catalyzed the democratization process of the city, and exposed the incapacity of the autocratic Partido Revolucionario Institucional (PRI) to respond to a major emergency (Leal Martínez 2014; Davis 1990; Massolo 1986).

When the 19-S event hit, the city—as the rest of the country—was in the middle of one of the most consequential electoral periods since democratization. At both the federal and the state levels, unpopular incumbents (President Peña Nieto from the PRI and Mexico City's Governor Mancera from the PRD) faced a serious challenge from MORENA, a political party created in 2014 by then presidential candidate—and former governor of Mexico

City—Andrés Manuel López Obrador (AMLO). In its first election (2015), MORENA made substantial gains in the capital, seizing five boroughs from the PRD.

During most of the 2018 campaign, AMLO's political party was the front runner and clear favorite to win the presidency, nine governorships (including Mexico City), and majorities in both chambers of the federal congress. After the election, MORENA became the predominant party in the city, whereas the PRD, which had been the main political party in the metropolis for two decades, practically disappeared from the political arena. The majority of the former's victories in the 2018 election came from the latter's losses.

Claudia Sheinbaum (MORENA), who was mayor of the Tlalpan borough from 2015 to 2018, won the governorship of Mexico City in the 2018 election by a landslide. At the municipal level, MORENA kept the five boroughs it won in 2015 and seized six more—eleven of sixteen. The alliance between the PRD and the Partido Acción Nacional (PAN) and the PRI retained four and one municipalities, respectively. In summary, the 2018 local election was a contest between a widely unpopular city incumbent (PRD) and a powerful rising challenger (MORENA), which resulted in a massive defeat of the former (see Figures S1 and S2 in the Online Appendix).

What was the role of the 19-S earthquake in the public debate during the electoral campaigns? In the aftermath of the crisis, the affected populations received support from the federal and the local governments. The National Fund for Natural Disasters provided resources for the reconstruction of critical infrastructure.² However, most of its funding went to other states affected by this and a previous earthquake (the Online Appendix provides a detailed description of this response).

At the local level, the office of Mexico City's governor implemented several policies to address the crisis. In this article, we focus on two of them for reasons of data availability. First, Mexico City's Housing Institute (Instituto de Vivienda de la Ciudad de México) gave immediate rent relief—equivalent to US\$200 per month—and housing reconstruction credits (US\$700). Second, the Social Attorney's Office (Procuraduría Social de la Ciudad de México) offered some services to address long-term risk of future seismic events: support for neighborhood organizations, inspection of buildings, and institutional capacity building. These policies required the strong participation of citizens (for a detailed description of these policies, see the Online Appendix). In both cases, the state-level incumbent (the governor, or *jefe de gobierno*) had discretion over the amount and allocation of resources.

Some of these actions, in particular the distribution of the reconstruction budget, were quite controversial. Candidates for governor from MORENA and PRI attacked the candidate from the PRD-PAN alliance for the overall response of Governor Mancera and the local assembly to the crisis. The opponents to the incumbent governor (along with civic organizations) criticized the disbursement of hundreds of millions of pesos in reconstruction efforts. According to the media, deputies from the PRD and the PAN were involved in serious malfeasance as leaders of the Commission for Reconstruction.³ The discretionary ability of Mexico City's governor to spend emergency funds was at the core of the controversy.

At the municipal level, local candidates from the PRD-PAN alliance accused Sheinbaum of negligence in the enforcement of building codes, which led to the collapse of a private school in southern Mexico City.⁴ In summary, the 19-S earthquake happened during one of

² A detailed description of the different sources of funding for reconstruction in Mexico is located at the website Transparencia Presupuestaria (<https://www.transparenciapresupuestaria.gob.mx/es/PTP/fuerzamexico>).

³ "Asamblea aprueba reforma para que recursos de reconstrucción no sean controlados por diputados en CDMX," *Animal Político*, February 22, 2018, <https://www.animalpolitico.com/2018/02/asamblea-recursos-reconstruccioni-diputados-cdmx/>.

⁴ "Verificado.mx: Documentos faltantes e inconsistencias en el expediente Rebsamen (primera parte)," *Animal Político*, May 17, 2018, <https://www.animalpolitico.com/2018/05/documentos-faltantes-inconsistencias-rebsamen-sheinbaum/>.

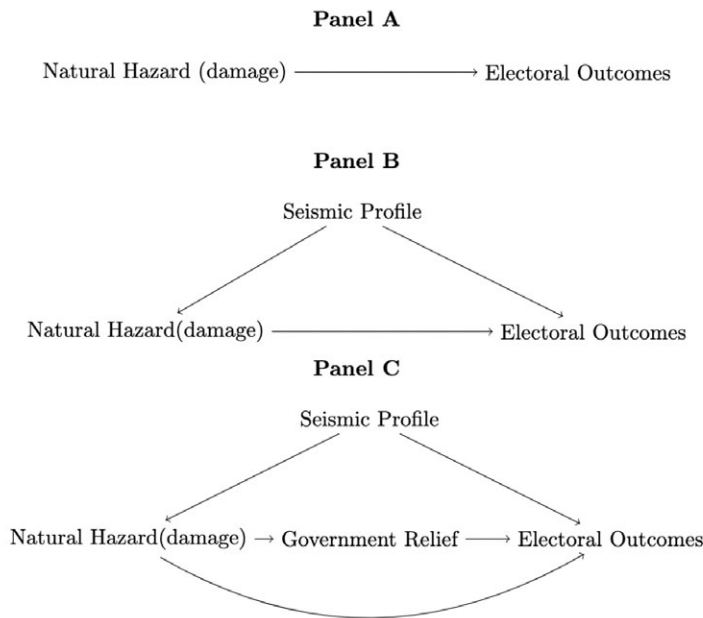


Figure 1. Structure of the argument: direct and indirect effects of treatment (natural disaster) on outcome variable (electoral outcomes). Panel A describes the basic setup. The damage from a natural disaster affects electoral outcomes. Panel B considers the confounding role attributable to the relative risk associated to seismic zones. Panel C adds the mediating role of government relief efforts.

the most relevant political changes in Mexico since democratization. The main theme of the election was the threat that MORENA posed to the party system dominated by the PRI, PAN, and PRD. The earthquake exacerbated the divisions between the establishment and the challenger parties and became one of the central issues in the local and national campaigns.

Research design

To analyze the relationship between the damages associated with the 19-S earthquake and the electoral outcomes of the 2018 elections in Mexico City, we employ a quantitative approach at the electoral precinct level. Estimating the causal effects of natural disasters on political variables is challenging for a variety of reasons, in particular the nonrandom assignment of the treatment (Visconti 2021, 2022; Carlin, Love, and Zechmeister 2014). We do not claim to identify a causal effect; nonetheless, our empirical design accounts for some key geological and socioeconomic drivers of the treatment assignment process, thus allaying some of these concerns. Our approach has two main building blocks. Figure 1 provides an illustration of our argument.

First, we do not assume that the impacts of events associated with natural hazards are randomly distributed. As the existing research shows, political decisions and institutional quality define the extent to which a hazard becomes a disaster (Flores and Smith 2013; Anbarci, Escaleras, and Register 2005; Raschky 2008; Cohen and Werker 2008). In the case of earthquakes and other geological phenomena, although they are practically impossible to predict, it is much more straightforward to identify what regions will be more affected when they hit.

The second dimension of our empirical strategy consists in identifying the set of variables that account for most of the variation in the treatment assignment. The literature on disaster management and adaptation to other natural hazards (e.g., climate change) offers good theoretical guidance. According to the Intergovernmental Panel on Climate Change, the vulnerability of a household, a community, or a polity to natural hazards depends crucially on their exposure and sensitivity to that event. The first term refers to the extent to which an actor or system is located in the area of influence of a hazard, for example along the path of a hurricane or near the epicenter of an earthquake. The second variable denotes how resilient is that actor or system to the effects of said event (Cardona et al. 2012, 72). Hence, households or communities with equal exposure to a hazard but different levels of sensitivity have varying degrees of vulnerability.

We argue that, for the case of Mexico City, besides socioeconomic factors, two other characteristics that have an impact on the vulnerability of neighborhoods to earthquakes are the geological exposure of a precinct to that type of disaster and the average year of building construction for said neighborhood. Whereas the former approximates the geophysical exposure of an actor or system to a seismic event, the latter is an appropriate measure of how sensitive that actor or system is to an earthquake.

The first one of these variables is the geological location of an electoral precinct. Much of contemporary Mexico City was built on the former Lake Texcoco bed, which explains in part the high vulnerability of the metropolis to earthquakes. Softer soils, such as those on the former lake, are associated with a faster expansion of seismic waves and, therefore, more vulnerability to disasters. In contrast, more solid and rocky soils are correlated with a slower expansion of seismic waves. There is a clear correspondence between being located on the former lake and having greater seismic intensity. Figure 2 shows the geographic distribution of this variable across Mexico City. Darker shades of gray indicate more seismic intensity and lighter shades of gray denote less. Areas shaded in white have the lowest levels of intensity.

The second variable is the average year of construction of the electoral precinct. As we mentioned earlier, the 1985 earthquake motivated crucial reforms in the building codes in Mexico City. Over time, these regulations have become more strict, at least on paper. Our assumption is that, on average, older buildings, particularly those built before the 1980s, are more vulnerable to severe damages during an earthquake than are more recently built ones. In contrast, newer housing units and commercial construction should be more resilient.

Although we cannot claim that these two variables alone make the treatment—the damages resulting from the earthquake—assigned as if random, we argue that, when controlling for them in our analysis, they reduce some of the endogeneity concerns associated with the treatment assignment process. See, for example, the clear correlation between geological zones and the distribution of damaged housing units in Figures 2–5. That is, we assume that for any two electoral precincts in the same seismic zone and with the same average building age, the distribution of damage after the earthquake should not be related to the main outcome variable (electoral performance), as they share both the same exposure (geology) and sensitivity (urban structure) to this type of natural hazard.

Data sources

In our empirical analysis, the main dependent variables are the electoral performance of the city incumbent (PRD) and of the main challenger (MORENA), at the state, municipal, and local legislative levels. We measure these variables as the change in the vote share for the candidates of each party for governor, mayor, and local deputies in 2018 compared to

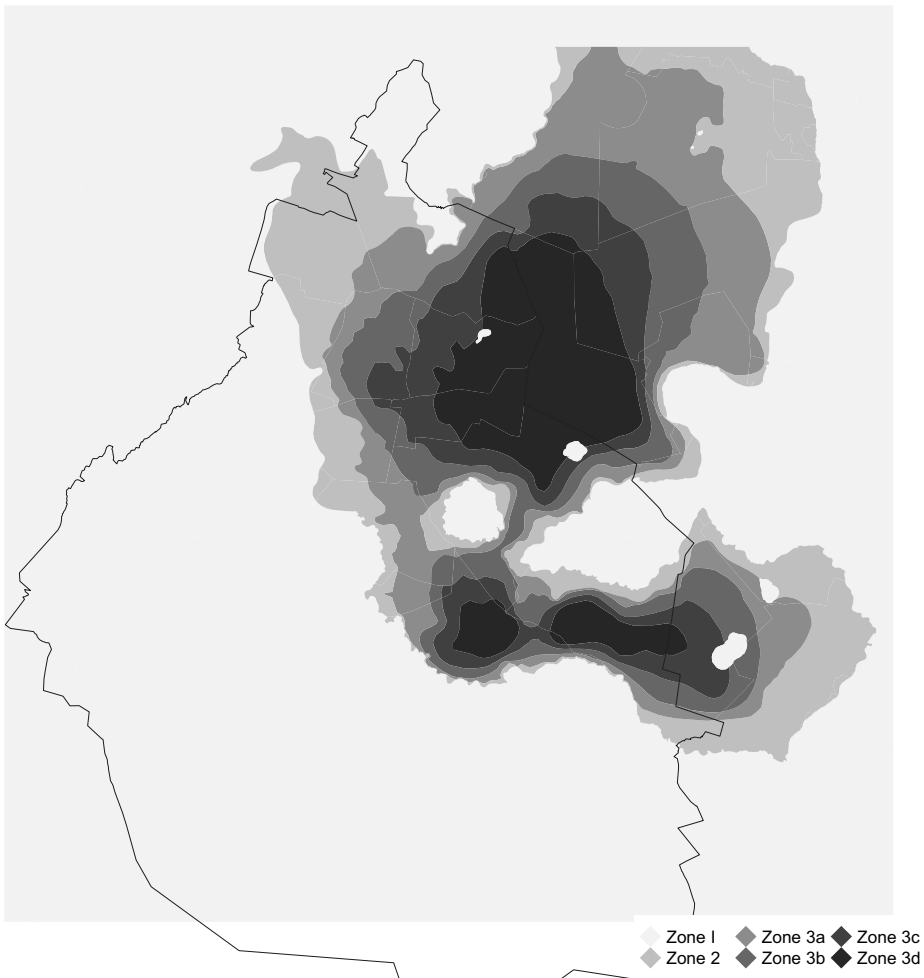


Figure 2. Different seismic zones in Mexico City (darker shades of gray indicate more vulnerability to earthquakes).

the immediate previous race. For the gubernatorial race, we analyze the change from 2012 to 2018 (elections are every six years); for the other elections, we calculate the change from 2015 to 2018 (elections are every three years).

Although the 2018 elections in Mexico City, as in the rest of the country, had multiple political parties competing, we focus on the performance of PRD and MORENA candidates at the electoral precinct level for two reasons. First, we are interested in explaining how the ability to distribute disaster relief affected local elections; since the PRD governor was in charge of the reconstruction process from September 2017 to July 2018 (when the election happened), we analyze the performance of candidates running with this party. Second, as mentioned, the rise of AMLO's political party against unpopular incumbents at the federal and local levels was the defining feature of the 2018 elections. Hence, our main goal is to understand how the 19-S earthquake affected the electoral competition between a weak incumbent and a powerful new challenger. The data come from the Electoral Institute of Mexico City (IECM 2021).

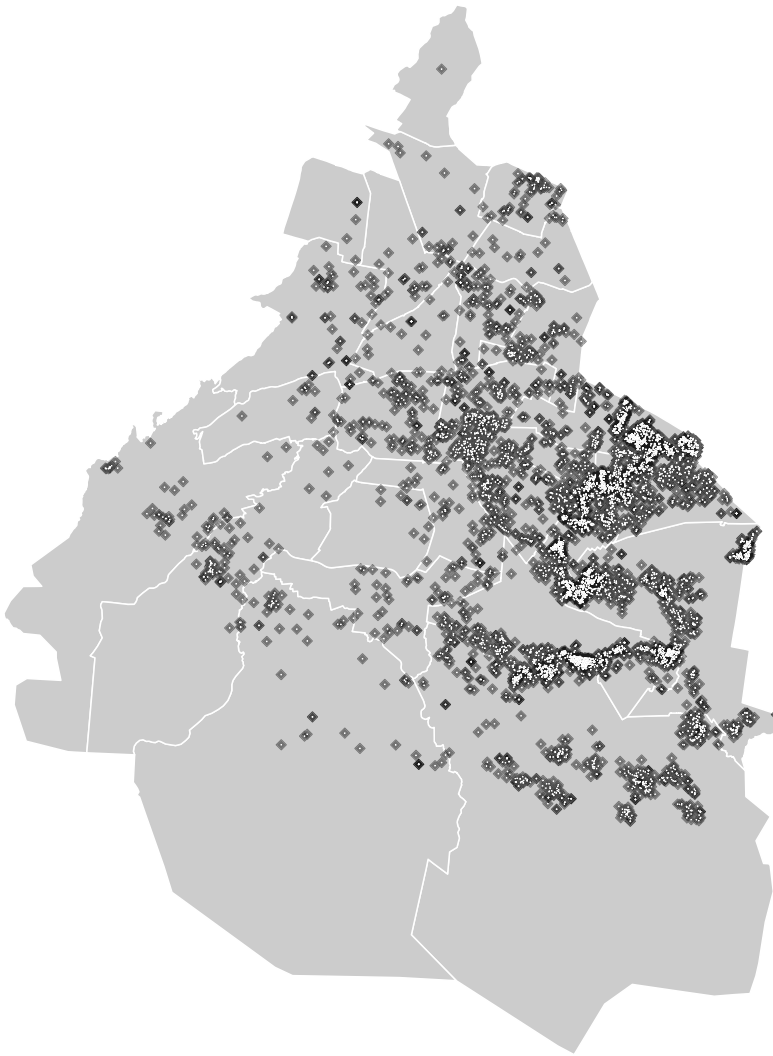


Figure 3. Geographic distribution of all damaged housing units after the September 2017 earthquake.

The key independent variable in the article is exposure to damages caused by the 19-S earthquake at the precinct level in Mexico City, which we measure in two ways. First, we calculate number of damaged housing units, number of severely damaged housing units, and number of damaged multifamily housing units (known in Mexico City as *multifamiliares*) per capita in a given electoral precinct. Second, we compute the distance from the centroid of an electoral precinct to the closest damaged housing unit, the closest severely damaged housing unit, and the closest multifamily housing unit. For the latter measures, we follow an empirical approach similar to that of Enos (2016). These different variables allow us to take full advantage of the geospatial granularity of our data and estimate how different intensities of and geographic exposure to the earthquake damage affected electoral results.

We make three assumptions about the different damage variables. First, regarding the distance measures, we assume that the shorter the distance between a damaged housing

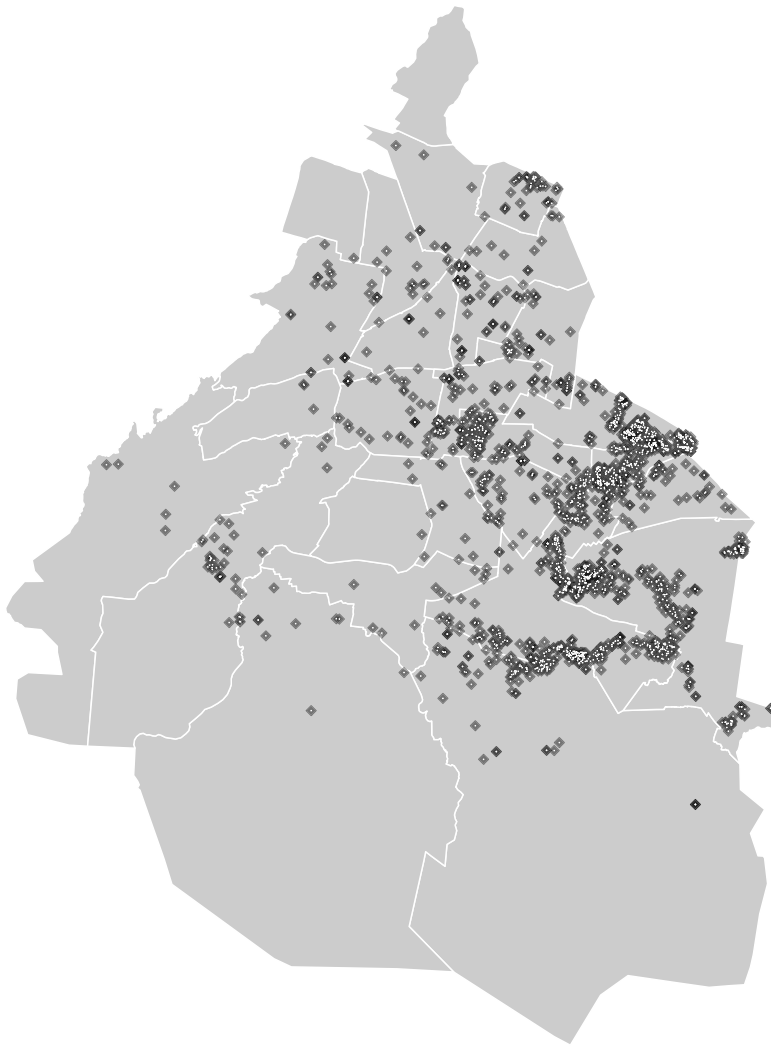


Figure 4. Geographic distribution of severely damaged housing units after the September 2017 earthquake.

unit and the centroid of a neighborhood, the greater is the exposure of said neighborhood to the effects of a natural disaster. Therefore, this measures how much damage was concentrated in a particular precinct and how visible it was for citizens there. Second, in terms of per capita variables, we assume that the larger the normalized number of damaged housing units, the more intense is the impact of the earthquake. Third, for both types of independent variables, we assume that the impacts of a damaged large multifamily unit are larger than the effects of severely damaged housing, which are, in turn, more intense than exposure to any damaged housing unit.

The damage data comes from Gobierno CDMX (2021b), which created a specific repository of data related to the earthquake. The unit of analysis of these data are the geocoded addresses of more than 11,500 damaged housing units, which we aggregated to the precinct level (for the geographic distribution of the 19-S earthquake, see Figures 2, 3, and 4).

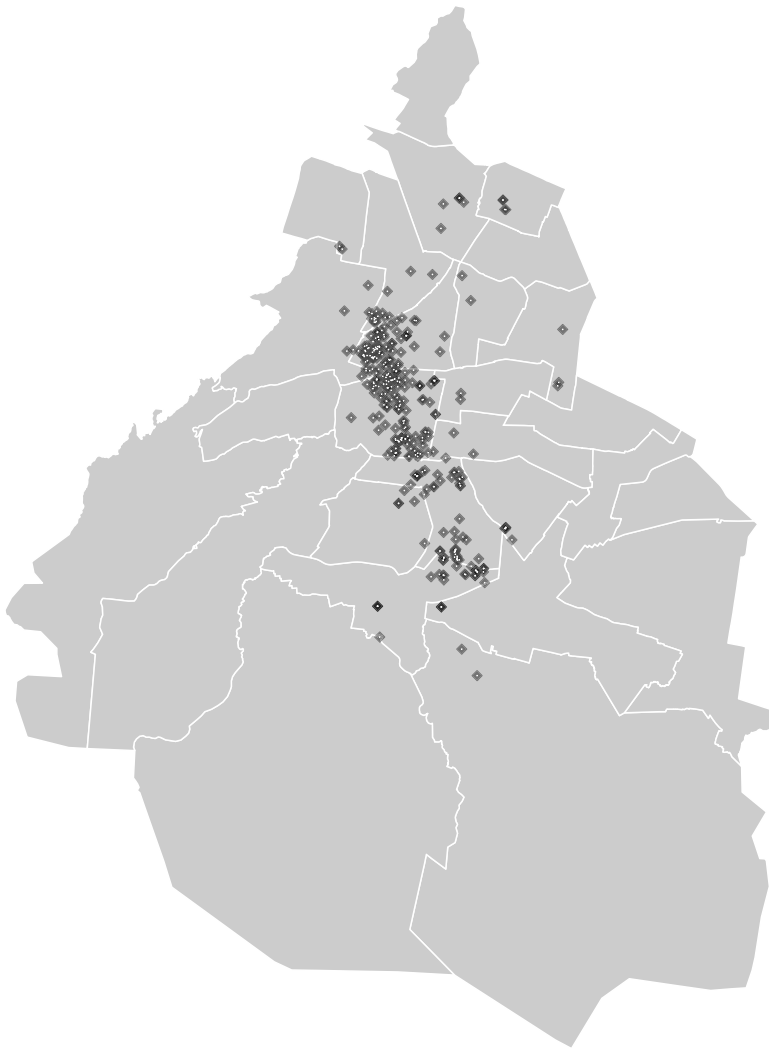


Figure 5. Geographic distribution of damaged multifamily housing units after the September 2017 earthquake.

Our empirical strategy conditions exposure to damage on the geological characteristics of the precinct and its average year of construction, which together form the seismic profile of a given neighborhood. For the first variable, we gathered georeferenced data from the National Center for Disaster Prevention (CENAPRED 2021). For each electoral precinct, we calculated the percentage of its area overlapping each seismic intensity zone (see Figure 2). When the precinct extends over two or more such zones, we calculated the weighted average of both. For the second variable, we employed data at the building level from the Urban Land Registry, or Catastro Público de la Propiedad (Gobierno CDMX 2021a); we summarized this data at the precinct level to obtain an average year of construction, which we use to calculate the average building age.

We test the mechanisms of our theory with two previously untapped public-spending data sets. The first one includes geocoded information of the distribution of a program that provided immediate housing relief in the affected areas. This policy, administered by

Mexico City's Housing Institute (Instituto de Vivienda de la Ciudad de México), consisted of a credit for housing reconstruction (INVI 2019). The second data set has geocoded information of a program administered by the Social Attorney's Office of Mexico City (Procuraduría Social de la Ciudad de México). Although this policy also was meant to provide relief to affected neighborhoods, its components were quite different, as they focused on fostering the organization of neighbors, providing technical assessments of buildings, forming neighbors' assemblies, and training specialists in risk reduction and civil protection, among other issues (PROSOC 2019). In both cases, we divide the number of benefits per one thousand inhabitants to account for different population sizes across electoral precincts. We obtained the data through an official information request.

Finally, our models also include a wide array of control variables. First, one of the most relevant features of the 2018 election was the success of MORENA at the federal, state, and municipal levels. It has been argued that the coattails of the presidential election explain much of the gains of MORENA candidates for other types of office (Johnson and Cantú 2020; Garrido and Freidenberg 2020). Therefore, we control for the levels of support for MORENA's candidate in the presidential elections, as this could be an important confounder in the relationship between damage and local electoral returns. The data come from the National Electoral Institute. Second, socioeconomic variables are closely associated with political behavior and exposure to natural disasters in Mexico. To account for the potential effects of these variables, our models include illiteracy rates, percentage unemployment, and primary health-care coverage; the data comes from the national 2010 census—the most up to date at the time of the 19-S earthquake (INEGI 2010).

Methods

To test H1, we analyze the relationship between exposure to damage caused by the earthquake and the aggregate electoral performance of the city incumbent (PRD) and the main challenger (MORENA) using a linear regression model with municipality fixed effects—to control for unobserved time invariant characteristics and capture the heterogeneity in the political landscape across municipalities. Moreover, as mentioned, we condition the levels of damage on the seismic profile of the precinct.

Equations 1 and 2 present the main specification of this ordinary-least-squares model:

$$\Delta PRD \text{ Vote Share}_{m,i} = \alpha + \beta \text{Damage}_i + \delta \text{GeoZone}_i + \varphi \text{UrbanYear}_i + \gamma \cdot \mathbf{X}'i + \nu_m + \varepsilon_i \text{ and} \quad (1)$$

$$\Delta MOR \text{ Vote Share}_{m,i} = \alpha + \beta \text{Damage}_i + \delta \text{GeoZone}_i + \varphi \text{UrbanYear}_i + \gamma \cdot \mathbf{X}'i + \nu_m + \varepsilon_i, \quad (2)$$

where $\Delta PRD_{m,i}$ is the change in the vote share for the incumbent (in Equation 1), and $\Delta MOR_{m,i}$ is the change in the vote share for the challenger (in Equation 2) in the corresponding election—gubernatorial, mayoral or legislative—in precinct i , located in municipality m . The treatment variable—*Damage*—is our measure of earthquake damage (of which we have a distance-based version and a per capita version). The variables *GeoZone* and *UrbanYear* denote the geological location and the average age of buildings in the precinct. Also, \mathbf{X}' is a vector of control variables that could also be correlated with the change in the vote for party, and ν_m represents the municipality fixed effects. Finally, we adjust ε_i robust standard errors.

To understand how the distribution of disaster aid is related to the electoral performance of the incumbent and the challenger (H_2 and H_3), we employ the two following equations:

$$\Delta PRD \text{ Vote Share}_{m,i} = \alpha + \beta \text{Damage}_i + \lambda \text{Relief}_i + \delta \text{GeoZone}_i + \varphi \text{UrbanYear}_i + \gamma \mathbf{X}'_i + \nu_m + \varepsilon_i, \text{ and} \quad (3)$$

$$\Delta MOR \text{ Vote Share}_{m,i} = \alpha + \beta \text{Damage}_i + \lambda \text{Relief}_i + \delta \text{GeoZone}_i + \varphi \text{UrbanYear}_i + \gamma \mathbf{X}'_i + \nu_m + \varepsilon_i, \quad (4)$$

The main difference between these and previous equations is the addition of the term *Relief*, which denotes the amount of housing relief (in one set of models) and risk reduction spending (in another one) per capita received in precinct *i*. Hence, we analyze the relationship between distribution of different types of disaster relief and electoral outcomes controlling for the levels of damage. Moreover, these models allow us to study the changes to the coefficients of the damage variables once we account for some of the strategies that the local government implemented to address the crisis.

Empirical findings

Exposure to earthquake damage and electoral performance

We present two sets of empirical results. First, we explore the relationship between exposure to the earthquake damage and the electoral performance of candidates from two political parties (the city-level incumbent, PRD, and the rising challenger, MORENA), which addresses Hypothesis 1. Second, we study the statistical association between the distribution of two types of disaster relief and the vote, conditional on the levels of damage, the seismic profile, and the socioeconomic characteristics of the precinct, which addresses Hypotheses 2 and 3. Figures 6–8 show the statistical relationship between the different damage variables and the performance of the PRD and MORENA candidates in the gubernatorial (Figure 6), mayoral (Figure 7), and legislative (Figure 8) elections in the city. For mayors and deputies, we compare the two parties. For the gubernatorial race we include only the PRD, as MORENA did not compete in 2012.

We highlight three findings. First, there is a strong and positive association between exposure (distance) to damage and damage per capita and the electoral performance of the city-level incumbent PRD. Starting with distance-based measures, the top-left panels in Figures 7 and 8 and the top panel in Figure 6 show that as the distance from the precinct to a damaged housing unit increases, the vote for the PRD decreases, suggesting that proximity to the damage was beneficial for the PRD candidates. In terms of the different levels of damage, we find that proximity to any damage housing unit had the largest coefficient, whereas proximity to a large multifamily home was the smallest, though statistically significant.

The situation is somewhat different when we measure damage in terms of magnitude: although the number of damaged large multifamily buildings per thousand inhabitants is positively associated with vote for the PRD (first models in top-right panel of Figures 7 and 8), damage per capita measured as both total number of housing units and high-risk housing units is not. Moreover, the signs and magnitudes of the coefficients are remarkably similar for the gubernatorial, mayoral, and legislative candidates, suggesting that Mexico City inhabitants applied similar assessments to politicians from the same party across different levels of office. The one exception is the model using the number of damaged multifamily units per capita for the PRD gubernatorial candidate. This is the only instance in our analysis in which the damage caused by the earthquake is associated with a lower vote share for the PRD candidate in 2018 than in 2012.

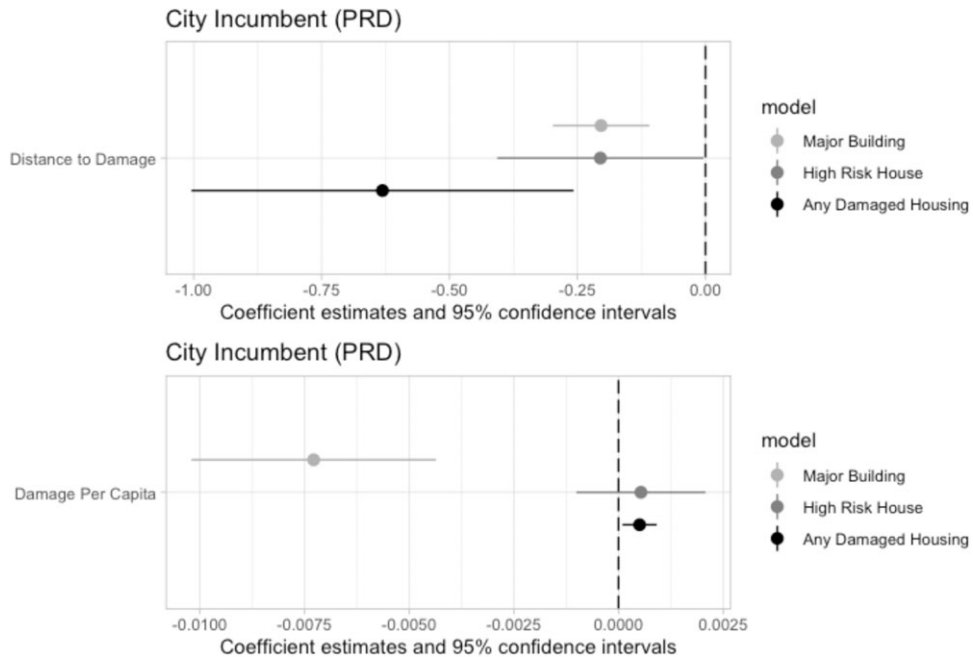


Figure 6. Relationship between damage associated with the earthquake and the electoral performance of the PRD candidate for governor. The outcome variable is the change in the vote from 2012 to 2018. The coefficients in the plot correspond to the distance-based and per capita measures of damage associated with the earthquake. Major building refers to large multifamily housing, high-risk house refers to houses with severe damage, and any damaged housing includes all damaged units. All models include seismic, socioeconomic, and political covariates; municipality fixed effects; and heteroskedasticity-robust standard errors.

Regardless of the statistical significance and sign, the coefficients are relatively small from a substantive point of view. For example, for the mayoral race, a one standard deviation change in the distance to any damaged housing unit is associated with 0.9 percent better performance for the PRD candidate. Although in competitive elections this could make the difference between winning and losing a race, in the context of the decisive victory of MORENA, it was relatively minor. The same occurs when we measure damage in per capita terms. A one standard deviation change in the levels of large-scale damage per capita (measured as number of damaged multifamily housing units) is associated with approximately 0.26 percent higher vote share for the PRD mayoral candidates; the magnitudes are similar for legislative candidates (0.2 percent).

The second finding we highlight is that the impact of the earthquake seemed to have been mostly concentrated among PRD candidates. Although there is some evidence that places with more exposure to it punished the candidates from the rising challenger (MORENA) at the polls, the findings are less consistent across different races and ways to measure damage. Hence, we cannot conclude that the 19-S earthquake damaged the electoral performance of MORENA across Mexico City.

In general, the signs of the damage coefficients for the models explaining the electoral performance of MORENA candidates are the opposite from the PRD. For example, the models using a distance-based measure of damage (bottom-left plots in Figures 7 and 8) show that MORENA underperformed in precincts closer to damaged housing units. In contrast to the findings for the PRD, only the broadest distance measure of damage (to any housing unit) is associated with the MORENA vote for mayors and deputies. Regarding the per capita measures of damage, there is some evidence that places with more per capita exposure

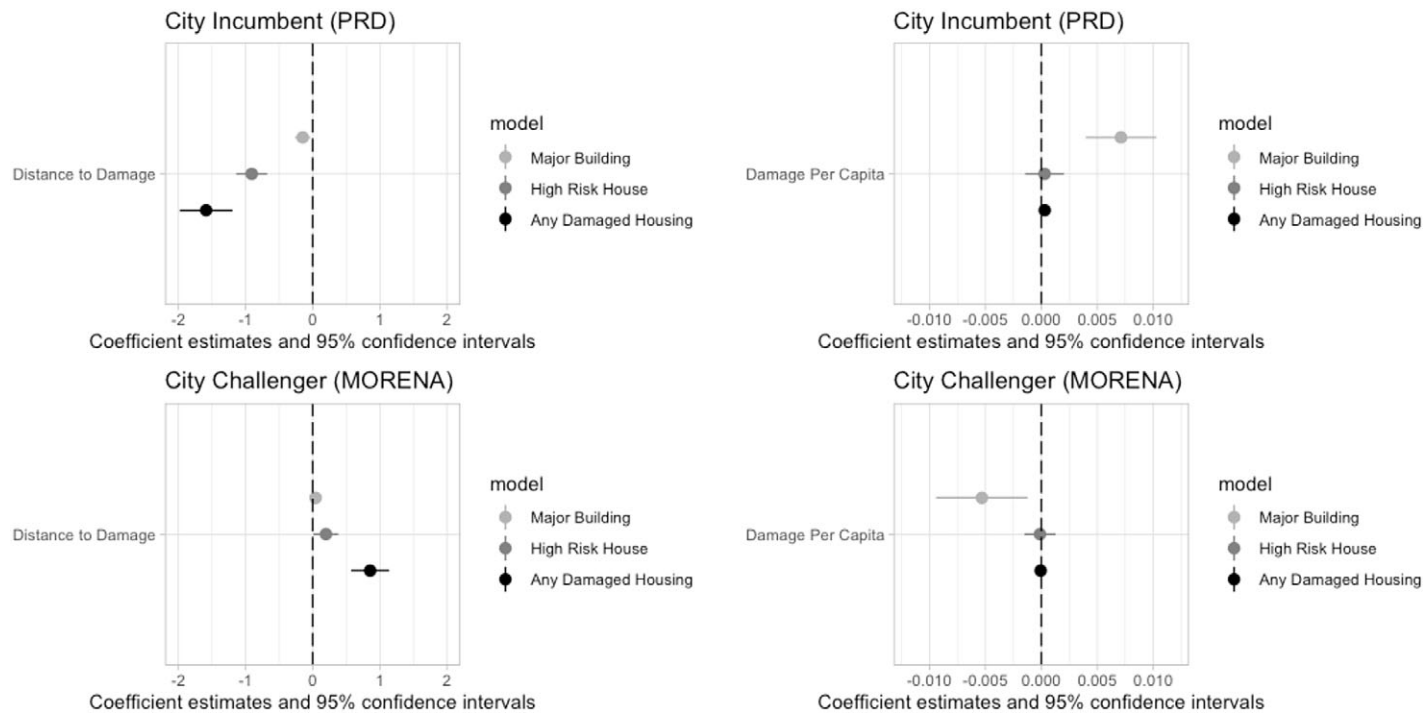


Figure 7. Relationship between damage associated with the earthquake and electoral performance of the PRD and MORENA candidates for mayor. The outcome variable is the change in the vote from 2015 to 2018. The coefficients in the plot correspond to the distance-based and per capita measures of damage associated with the earthquake. Major building refers to large multifamily housing, high-risk house refers to houses with severe damage, and any damaged housing includes all damaged units. All the models include seismic, socioeconomic, and political covariates; municipality fixed effects; and heteroskedasticity-robust standard errors.

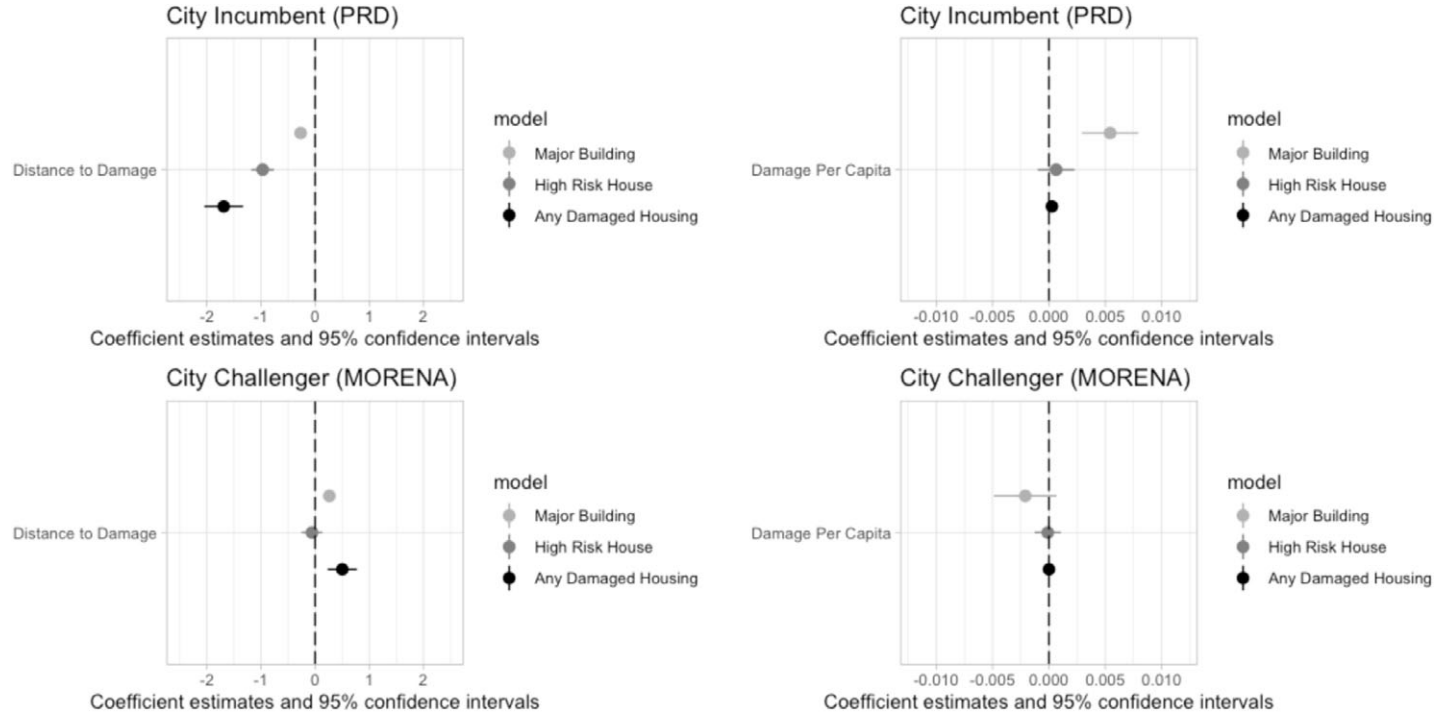


Figure 8. Relationship between damage associated with the earthquake and the electoral performance of the PRD and MORENA candidates for deputy. The outcome variable is the change in the vote from 2015 to 2018. The coefficients in the plot correspond to the distance-based and per capita measures of damage associated with the earthquake. Major building refers to large multifamily housing, high-risk house refers to houses with severe damage, and any damaged housing includes all damaged units. All models include seismic, socioeconomic, and political covariates; municipality fixed effects; and heteroskedasticity-robust standard errors.

to damaged multifamily housing units punished MORENA candidates for mayor (bottom-right plot in Figure 7). This finding is consistent with the conventional wisdom claiming that some MORENA mayors, in particular then soon-to-be governor Claudia Sheinbaum, had somewhat controversial responses to the emergency.

As in the case of the PRD, the coefficients corresponding to the different damage measures are relatively minor given the enormous electoral success of the party. For example, for the mayoral race, a one standard deviation increase in the number of high-profile damaged buildings per capita (multifamily units) is associated with only a 0.20 percent decrease in vote share for MORENA candidates. Similarly, a one standard deviation increase in distance from any damaged housing unit is associated with a 0.48 percent decrease in vote share for the party. In many competitive elections, similar effects would be enough to flip one district from one party to another; however, as mentioned, the political landscape of Mexico City by the time of the 2018 election meant that the party was the clearly favorite to win the gubernatorial, mayoral, and legislative races across the country.

To summarize, the empirical analysis of our article provides some strong support for our first hypothesis. We find that exposure to the damage from the 19-S earthquake had a mostly pro-incumbent effect during the 2018 local elections. Across the different elections (mostly for mayors and deputies) and different ways to measure damage, places more affected by the earthquake showed a stronger support for the PRD candidates in 2018 compared to the previous election—with the notable exception of the candidate for governor.

In contrast, although there is some evidence that voters punished MORENA candidates in more affected places, particularly among mayoral candidates, the findings are somewhat inconsistent across different races and ways to measure damage. Regardless of the specific party, office, or damage variable, the overall effects of the earthquake were surprisingly small, given the salience of the topic in the media and among the electorate (Tables S1–S10 in the Online Appendix present the full results of the analysis for Figures 6–8).

The role of post-disaster social policy

Regarding our second hypothesis (about the role of different disaster-relief policies), we highlight two main findings. First, we show that risk reduction and rent-relief policies had slightly different effects on electoral performance of the PRD and MORENA. Figure 9 presents the results associated with Equations 3 and 4; the main independent variable is distribution of disaster relief per capita, conditional on the levels of damage, the seismic profile and the socioeconomic characteristics of the precinct. Both types of social policy had a pro-incumbent effect: PRD candidates for office at the state, local, and legislative levels had better electoral performances in precincts with more aid per capita.

The distribution of risk reduction and rent-relief policies was associated with statistically significant decreases in the vote share for MORENA candidates for mayor; in contrast, the electoral performance of candidates for deputies was unrelated to the levels of aid per capita after the earthquake. These results (for PRD and MORENA) are consistent with the previous finding that the city-level incumbent outperformed in places with more earthquake damage and, to a lesser extent, that the rising challenger underperformed in the same type of precincts. Hence, our results suggest a close relationship between earthquake damage, social policy, and the vote. There are three additional points worth emphasizing. First, even after controlling for levels of aid, exposure to the earthquake damage is still statistically significant, suggesting that part, but not all, of the pro-incumbent effect we find could be attributed to the distribution of relief.

Second, as with the damage measurements, the substantive effects of the social policy variables are rather small. For example, a one standard deviation increase in the amount of risk reduction aid per capita is associated with 0.26 percent additional votes for the PRD

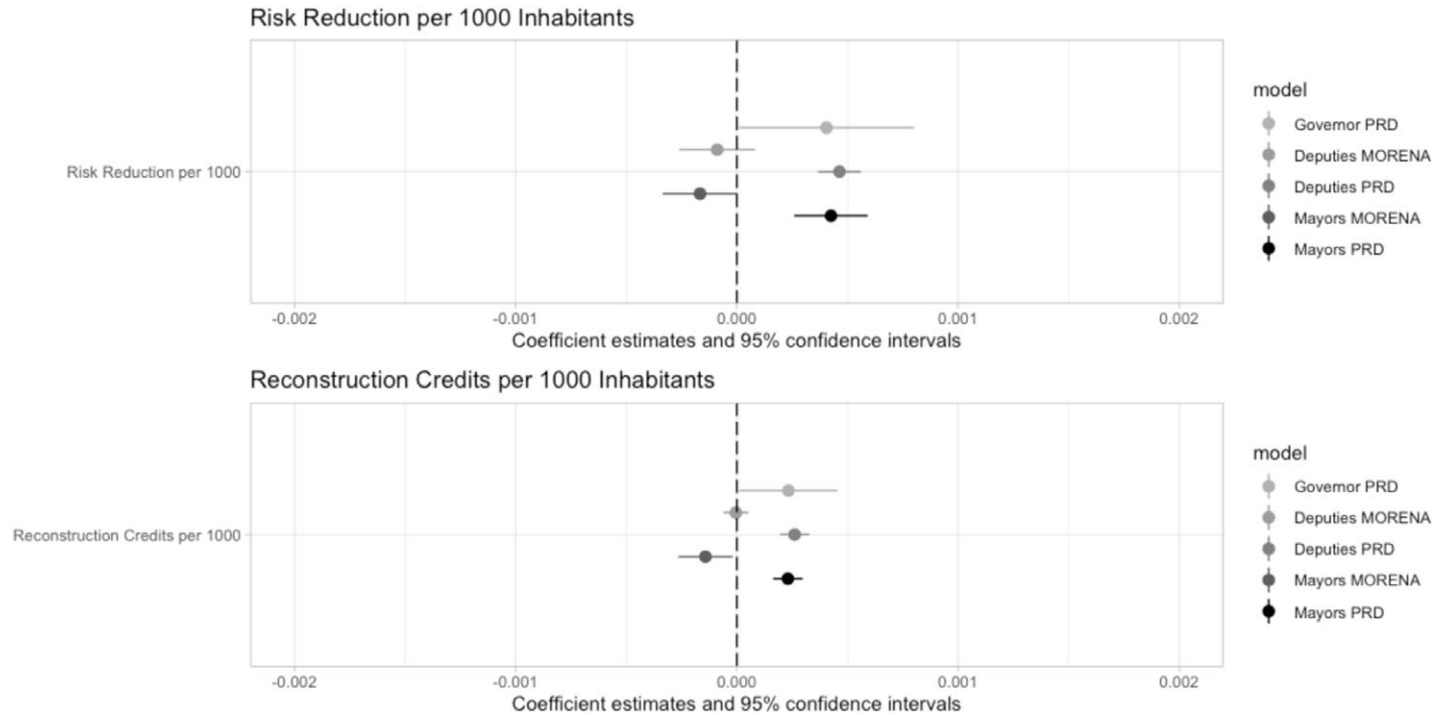


Figure 9. Relationship between damage associated with the earthquake, the electoral performance of the PRD and MORENA candidates, and the distribution of disaster-relief policies. The outcome variable is the change in the vote from 2018 to the previous election. The coefficients in the plot correspond to two different social policies implemented by the local government to address the crisis. Risk reduction refers to the actions implemented by the Social Attorney’s Office to reduce risk to future natural disasters. Reconstruction credit refers to the cash transfer from the local Institute for Housing to rebuild damaged housing units. All models include seismic, socioeconomic, and political covariates; municipality fixed effects; and heteroskedasticity-robust standard errors.

mayoral candidates from 2015 to 2018. The relevance of the rent relief policies is even smaller. Third, in contrast to conventional wisdom, a rent-relief policy did not outperform a risk reduction strategy that did not rely on direct cash transfers. This suggests that, in the context of natural disasters, voters may also value policies that provide nonmonetary benefits (Tables S11 and S12 in the Online Appendix present the full set of results corresponding to Figure 9).

Robustness checks

We implemented a series of robustness checks that increase our confidence in these findings. First, we employ different matching algorithms to reduce some of the imbalances between treated and control units. Other scholars have employed a similar approach to study the politics of natural disasters in Latin America (Carlin, Love, and Zechmeister 2014). We modeled the probability of treatment—defined as having one or more damaged housing unit—as a function of the seismic characteristics of a precinct, socioeconomic indicators, and the availability of public services. This procedure allows us to significantly reduce any remaining imbalance between damaged and nondamaged electoral precincts (see Figures S7–S12 in the Online Appendix). We then estimated a linear regression with electoral performance variables as the outcomes and damage variables as the main independent regressors (using different versions of damage in per capita terms), with nearest neighbor and optimal matching. The conclusions of the previous analysis held: precincts with higher levels of damage had higher vote shares for the incumbent PRD, and the opposite occurs for MORENA candidates.

A main concern of our empirical strategy is the presence of omitted variables that could bias our findings. Although we control for key factors that influence electoral performance of the PRD and MORENA, it is likely that we are missing other important variables. To address this possibility, we perform a sensitivity analysis of our results to potential confounders, as developed by Cinelli and Hazlett (2020).

Their methodology allows for researchers to determine how sensitive an observational result is to the presence of confounders. In particular, it determines how much of the variance in the independent and dependent variables would need to be explained by a confounder to make the coefficient of interest statistically indistinguishable from 0. Another attribute of the methodology is that it enables researchers to compare the strength of hypothetical confounders with variables known to the researcher (Cinelli and Hazlett 2020).

For example, in Table 1 we present the summary of the sensitivity analysis the model using a distance-based measure for PRD deputies; a confounder would need to explain 12.5 percent of the variance in the outcome and independent variable to reduce the statistical significance of the damage coefficient to 0. A matter of qualitative judgment is how big 12.5 percent is in explaining the main dependent and independent variables in the analysis. As Table 1 shows, the confounder would need to be almost as strong as the vote for AMLO to change our conclusions about the damage variable. Tables 2–6 present the sensitivity analysis for the rest of our main results. It is important to notice that, although the per capita measures are more sensitive to the presence of confounders than the distance-based measures, they are still relatively strong given that we are comparing to one of the most important drivers of the 2018 local elections. From both substantive and theoretical points of view, it is highly unlikely that any single confounder (or even a set of omitted variables) is as strong as the vote for AMLO to explain the performance of both the PRD and MORENA.

Finally, the last robustness check addressed the geospatial structure of the data. After confirming that the standard errors are spatially autocorrelated, we run a model that corrects for this feature of our data. The results are consistent with our main analysis; however, the magnitude of the coefficients is smaller (Tables S13–S20 in the Online Appendix present the results associated with these models).

Table 1. Sensitivity analysis for main results (deputies/distance-based damage).

Outcome: Change in vote for PRD candidates for deputies						
Treatment	Est.	S.E.	t-Value	$R^2_{Y \sim D X}$	RV_{q-1}	$RV_{q=1, \alpha=0.05}$
Distance to any damaged housing	-1.69	0.172	-9.837	1.8%	12.5%	10.2%
Degrees of freedom = 5,396	Bound (1x AMLO 2018 Vote): $R^2_{Y \sim D X} = 14.7\%$				$R^2_{D \sim Z X} = 1.1\%$	

Table 2. Sensitivity analysis for main results (deputies/per capita damage).

Outcome: Change in vote for PRD candidates for deputies						
Treatment	Est.	S.E.	t-Value	$R^2_{Y \sim D X}$	RV_{q-1}	$RV_{q=1, \alpha=0.05}$
Multifamily per 1,000	0.005	0.002	2.64	0.1%	3.5%	0.9%
Degrees of freedom = 5,396	Bound (1x AMLO 2018 Vote): $R^2_{Y \sim D X} = 13.2\%$				$R^2_{D \sim Z X} = 0.5\%$	

Table 3. Sensitivity analysis for main results (mayors/distance-based damage).

Outcome: Change in vote for PRD candidates for deputies						
Treatment	Est.	S.E.	t-Value	$R^2_{Y \sim D X}$	RV_{q-1}	$RV_{q=1, \alpha=0.05}$
Distance to any damaged housing	-1.587	0.186	-8.545	1.3%	11%	8.6%
Degrees of freedom = 5,397	Bound (1x AMLO 2018 Vote): $R^2_{Y \sim D X} = 12\%$				$R^2_{D \sim Z X} = 1.1\%$	

Table 4. Sensitivity analysis for main results (mayors/per capita damage).

Outcome: Change in vote for PRD candidates for deputies						
Treatment	Est.	S.E.	t-Value	$R^2_{Y \sim D X}$	RV_{q-1}	$RV_{q=1, \alpha=0.05}$
Multifamily per 1,000	0.007	0.002	3.209	0.2%	4.3%	1.7%
Degrees of freedom = 5,397	Bound (1x AMLO 2018 Vote): $R^2_{Y \sim D X} = 10.8\%$				$R^2_{D \sim Z X} = 0.5\%$	

Table 5. Sensitivity analysis for main results (governor/distance-based damage).

Outcome: Change in vote for PRD candidates for deputies						
Treatment	Est.	S.E.	t-Value	$R^2_{Y \sim D X}$	RV_{q-1}	$RV_{q=1, \alpha=0.05}$
Distance to any damaged housing	-0.631	0.168	-3.751	0.3%	5%	2.4%
Degrees of freedom = 5411	Bound (1x AMLO 2018 Vote): $R^2_{Y \sim D X} = 3.3\%$				$R^2_{D \sim Z X} = 1.1\%$	

Table 6. Sensitivity analysis for main results (governor/per capita damage).

Outcome: Change in vote for PRD candidates for deputies						
Treatment	Est.	S.E.	t-Value	$R^2_{Y \sim D X}$	RV_{q-1}	$RV_{q=1, \alpha=0.05}$
Multifamily per 1,000	-0.007	0.002	-3.641	0.2%	4.8%	2.3%
Degrees of freedom = 5,411	Bound (1x AMLO 2018 Vote): $R^2_{Y \sim D X} = 3.2\%$				$R^2_{D \sim Z X} = 0.5\%$	

Discussion

In this article, we analyze the political implications of the 19-S earthquake in Mexico City (2017), the worst natural disaster in the country's capital in more than thirty years and one of the most politically salient topics in the consequential 2018 election that happened a few months afterward. Using a fine-grained data set of damage and disaster-relief distribution at the electoral precinct level, we found that candidates from the city-level incumbent (PRD) had higher vote shares in precincts that were more exposed to the earthquake, particularly for mayoral and legislative candidates. Across different measures of distance to and intensity of the damage, candidates from the incumbent outperformed their party in 2018 compared to the 2015 election. We also found some evidence that voters punished MORENA candidates in precincts with higher levels of damage caused by the earthquake.

The only exception to this pattern is the finding that voters in precincts with more damaged multifamily housing units per capita punished the PRD candidate for governor in the election, which we attribute to the very low popularity levels of Governor Mancera. We take this as evidence that voters in these neighborhoods (mostly middle class) applied different assessments to candidates for different levels of office.

In line with the existing research on the politics of natural disasters in Latin America, we argue that the ability to distribute relief and implement other reconstruction policies gave candidates from the incumbent political party an advantage over their main competitors in the 2018 election. We find a strong, positive, and statistically significant association between levels of aid per capita and vote for the PRD, controlling for the seismic profile and socioeconomic conditions of the precinct, as well as the overall levels of damage. In contrast, more aid per capita was associated with worse performances for MORENA candidates. In contrast to conventional wisdom, we find that cash transfers did not outperform a strategy based on risk reduction in electoral terms. Even more, the coefficients associated with distribution of risk reduction were larger than for rent relief, suggesting that different disaster-relief policies have heterogeneous political effects.

As mentioned in the theory section, we do not have a strong position with respect to relative electoral influence of these (and other) types of policies. The two government strategies that we analyze have different features that may explain their heterogeneous relationship with the vote. First, although the actions implemented by the Social Attorney's Office did not involve any cash transfers, they did provide a key valuable good—reductions in risk to future disasters. In a setting highly exposed to severe earthquakes, citizens value actions to decrease future suffering from similar events. As mentioned by Flores and Smith (2013), expenditures on public goods are highly advantageous in democratic settings such as Mexico City.

In contrast, it is possible that citizens associated the housing-relief payments with the contentious aspects of the reconstruction process, hence reducing the electoral effectiveness of this policy. Multiple neighborhood organizations and activists denounced a series of irregularities in the use of public funds for the reconstruction, in particular corruption. Therefore, the affected populations could have seen these immediate cash transfers as

explicit attempts from the government at getting their vote. In addition, it is also possible that the slow and inefficient initial response during the early months of the reconstruction process explains the lack of stronger electoral effects of these short-term payments. A small amount of money was not enough given the dimensions of the disaster and the accusations of malfeasance in the use of public funds. More research at the individual level is necessary to disentangle the explanations behind the lack of strong electoral effects of these cash transfers.

Our results support the conclusions of other scholars who show that the policy responses to different types of natural hazards are essential to understand the politics of natural disasters in Latin America (Visconti 2021, 2022; Cooperman 2022; Gallego 2018; Gil 2022). We contribute to this growing literature by analyzing fine-grained geospatial data on two different types of social policies in response to the disaster. In doing so, we complement existing research, which tends to focus on either housing policy or disaster declarations at the municipal level. Moreover, we also show the relevance of exposure to damage and distribution of disaster relief to different types of office, including state, local, executive, and legislative.

Although the sign and statistical significance of the damage and policy variables conform with existing literature, their substantive relevance is somewhat counterintuitive. As mentioned, the 19-S earthquake in Mexico City was the worst natural disaster in the city in more than three decades—the most recent comparable event happened in September 1985. The 19-S earthquake dominated social and mass media (Martín 2020) and incumbent and opposition political campaigns. Other scholars show that similar high-profile disasters associated with natural hazards have profound political consequences. However, in this case, the overall association between damage and electoral performance of the PRD and MORENA is relatively small, despite the high salience of the earthquake and the expectations from existing research. There are two possible interpretations behind this counterintuitive finding.

On the one hand, it is possible that the nature of the 2018 election explains the relatively small effects of the earthquake. As one of the most consequential elections in Mexico's history, multiple issues dominated the campaigns and, hence, even a large-scale natural disaster was not enough to sway large groups of voters. On the other hand, it is possible to interpret these findings in a different way. As we mentioned, the federal and state level incumbents were highly unpopular and the PRD, in particular, suffered massive losses in Mexico City (on average, the PRD lost 7.2 percent from 2015 to 2018 at the mayoral level and 8.5 percent at the legislative level). Therefore, the small increase in their vote share associated with the 19-S earthquake would not be that insignificant if we take into account its overall electoral performance.

The authors have no competing interests to declare.

Supplementary material. The updated link to the supplementary material in the Harvard Dataverse is <https://doi.org/10.1017/lar.2023.3>

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References

- Abney, F. Glenn, and Larry B. Hill. 1966. "Natural Disasters as a Political Variable: The Effect of a Hurricane on an Urban Election." *American Political Science Review* 60 (4): 974–981. <https://doi.org/10.2307/1953770>.
- Achen, Christopher H., and Larry M. Bartels. 2004. "Blind Retrospection: Electoral Responses to Drought, Flu, and Shark Attacks." Instituto Juan March de Estudios e Investigaciones, Madrid.
- Aldrich, Daniel P. 2012. *Building Resilience: Social Capital in Post-Disaster Recovery*. Chicago: University of Chicago Press.
- Aldrich, Daniel P., and Michelle A. Meyer. 2015. "Social Capital and Community Resilience." *American Behavioral Scientist* 59 (2): 254–269. <https://doi.org/10.1177/000276421455029>.
- Anbarci, Nejat, Monica Escaleras, and Charles A. Register. 2005. "Earthquake Fatalities: The Interaction of Nature and Political Economy." *Journal of Public Economics* 89 (9–10): 1907–1933. <https://doi.org/10.1016/j.jpubeco.2004.08.002>.
- Arceaux, Kevin, and Robert M. Stein. 2006. "Who Is Held Responsible When Disaster Strikes? The Attribution of Responsibility for a Natural Disaster in an Urban Election." *Journal of Urban Affairs* 28 (1): 43–53. <https://doi.org/10.1111/j.0735-2166.2006.00258.x>.
- Bechtel, Michael M., and Massimo Mannino. 2022. "Retrospection, Fairness, and Economic Shocks: How Do Voters Judge Policy Responses to Natural Disasters?" *Political Science Research and Methods* 10 (2): 260–278. <https://doi.org/10.1017/psrm.2020.39>.
- Bodet, Marc Andre, Melanee Thomas, and Charles Tessier. 2016. "Come Hell or High Water: An Investigation of the Effects of a Natural Disaster on a Local Election." *Electoral Studies* 43: 85–94. <https://doi.org/10.1016/j.electstud.2016.06.003>.
- Bovan, Kosta, Benjamin Banai, and Irena Pavela Banai. 2018. "Do Natural Disasters Affect Voting Behavior? Evidence from Croatian Floods." *PLOS Currents* 10. <https://doi.org/10.1371/currents.dis.cb57c8ac3b239ba51ccc801d3362c07>.
- Campello, Daniela, and Cesar Zucco Jr. 2016. "Presidential Success and the World Economy." *Journal of Politics* 78 (2): 589–602. <https://doi.org/10.1086/684749>.
- Cardona, Omar Dario, Maarten K. van Aalst, Jörn Birkmann, Maureen Fordham, Glen McGregor, Rosa Pérez, Roger S. Pulwarty, E. Lisa F. Schipper, and Bach Tan Sinh. 2012. "Determinants of Risk: Exposure and Vulnerability." In *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change*, 65–108. Cambridge: Cambridge University Press.
- Carlin, Ryan E., Gregory J. Love, and Elizabeth J. Zechmeister. 2014. "Natural Disaster and Democratic Legitimacy: The Public Opinion Consequences of Chile's 2010 Earthquake and Tsunami." *Political Research Quarterly* 67 (1): 3–15. <https://doi.org/10.1177/106591291349559>.
- Carlin, Ryan E., Gregory J. Love, and Cecilia Martinez-Gallardo. 2011. "Security, Clarity of Responsibility, and Presidential Approval." *Comparative Political Studies* 48 (4): 438–463. <https://doi.org/10.1177/00104140145546>.
- CENAPRED (Centro Nacional de Prevención de Desastres). 2021. *Atlas nacional de riesgo*. <http://www.atlasnacionalderiesgos.gob.mx/>
- Chen, Jowei. 2008. "Buying Votes with Public Funds in the US Presidential Election: Are Swing or Core Voters Easier to Buy Off?" Typescript, Stanford University.
- Cinelli, Carlos, and Chad Hazlett. 2020. "Making Sense of Sensitivity: Extending Omitted Variable Bias." *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* 82 (1): 39–67. <https://doi.org/10.1111/rssb.12348>.
- Cohen, Charles, and Eric D. Werker. 2008. "The Political Economy of 'Natural' Disasters." *Journal of Conflict Resolution* 52 (6): 795–819. <https://doi.org/10.1177/0022002708322157>.
- Cooperman, Alicia. 2022. "(Un)natural Disasters: Electoral Cycles in Disaster Relief." *Comparative Political Studies* 55 (7): 1158–1197. <https://doi.org/10.1177/0010414021104741>.
- Davis, Diane E. 1990. "Social Movements in Mexico's Crisis." *Journal of International Affairs* 43 (2): 343–367.
- Díaz-Cayeros, Alberto, Federico Estévez, and Beatriz Magaloni. 2016. *The Political Logic of Poverty Relief: Electoral Strategies and Social Policy in Mexico*. New York: Cambridge University Press.
- Duch, Raymond M., and Randolph T. Stevenson. 2008. *The Economic Vote: How Political and Economic Institutions Condition Election Results*. New York: Cambridge University Press.
- Enos, Ryan D. 2016. "What the Demolition of Public Housing Teaches Us about the Impact of Racial Threat on Political Behavior." *American Journal of Political Science* 60 (1): 123–142. <https://doi.org/10.1111/ajps.12156>.

- Escaleras, Monica, Nejat Anbarci, and Charles A Register. 2007. "Public Sector Corruption and Major Earthquakes: A Potentially Deadly Interaction." *Public Choice* 132 (1): 209–230.
- Estrada Díaz, Gabriela. 2014. "Puesta en práctica de una política de desastres: Los instrumentos de la gestión de riesgos en México." *Bulletin de l'Institut Francais d'Études Andines* 43 (3): 611–632.
- Fiorina, Morris P. 1978. "Economic Retrospective Voting in American National Elections: A Micro-Analysis." *American Journal of Political Science* 22 (2): 426–443. <https://doi.org/10.2307/2110623>.
- Flores, Alejandro Quiroz, and Alastair Smith. 2013. "Leader Survival and Natural Disasters." *British Journal of Political Science* 43 (4): 821–843. <https://doi.org/10.1017/S0007123412000609>.
- Fowler, Anthony, and Andrew B. Hall. 2018. "Do Shark Attacks Influence Presidential Elections? Reassessing a Prominent Finding on Voter Competence." *Journal of Politics* 80 (4): 1423–1437. <https://doi.org/10.1086/699244>.
- Fox, Justin, and Richard Van Weelden. 2015. "Hoping for the Best, Unprepared for the Worst." *Journal of Public Economics* 130: 59–65. <https://doi.org/10.1016/j.jpubeco.2015.07.007>
- Gailmard, Sean, and John W. Patty. 2019. "Preventing Prevention." *American Journal of Political Science* 63 (2): 342–352. <https://doi.org/10.1111/ajps.12411>.
- Gallego, Jorge. 2018. "Natural Disasters and Clientelism: The Case of Floods and Landslides in Colombia." *Electoral Studies* 55: 73–88. <https://doi.org/10.1016/j.electstud.2018.08.001>.
- Garrido, Sebastián, and Flavia Freidenberg. 2020. "The Power of Vote Electoral Change and National Party System in Mexico 2018." *Política y Gobierno* 27 (2): 1–22.
- Gasper, John T., and Andrew Reeves. 2011. "Make It Rain? Retrospection and the Attentive Electorate in the Context of Natural Disasters." *American Journal of Political Science* 55 (2): 340–355. <https://doi.org/10.1111/j.1540-5907.2010.00503.x>.
- Gawronski, Vincent T., and Richard Stuart Olson. 2013. "Disasters as Crisis Triggers for Critical Junctures? The 1976 Guatemala Case." *Latin American Politics and Society* 55 (2): 133–149. <https://doi.org/10.1111/j.1548-2456.2013.00196.x>.
- Gil, Magdalena. 2022. "Disasters as Critical Junctures: State Building and Industrialization in Chile after the Chillán Earthquake of 1939." *Latin American Research Review* 57 (4): 1–19. <https://doi.org/10.1017/lar.2022.53>.
- Gobierno CDMX, Catastro Público de la Propiedad. 2021a. "Sistema Abierto de Información Geográfica de la Ciudad de México (Año de Construcción o Remodelación)." Online. Access date: September 2020, url: <https://sig.cdmx.gob.mx/>
- Gobierno CDMX, Gobierno de la Ciudad de México. 2021b. "Portal de Reconstrucción: Estadística." Online. Access date: September 2020, url: <https://reconstruccion.cdmx.gob.mx/estadistica>
- Golden, Miriam, and Brian Min. 2013. "Distributive Politics around the World." *Annual Review of Political Science* 16: 73–99. <https://doi.org/10.1146/annurev-polisci-052209-121553>.
- Gutiérrez, Emilio, Jaakko Meriläinen, and Adrian Rubli. 2022. "Electoral Repercussions of a Pandemic: Evidence from the 2009 H1N1 Outbreak." *Journal of Politics* 84 (4): 1899–1912. <https://doi.org/10.1086/719634>.
- Healy, Andrew, and Neil Malhotra. 2009. "Myopic Voters and Natural Disaster Policy." *American Political Science Review* 103 (3): 387–406. <https://doi.org/10.1017/S0003055409990104>.
- Healy, Andrew, and Neil Malhotra. 2010. "Random Events, Economic Losses, and Retrospective Voting: Implications for Democratic Competence." *Quarterly Journal of Political Science* 5 (2): 193–208. <http://doi.org/10.1561/100.00009057>.
- Heersink, Boris, Brenton D. Peterson, and Jeffery A. Jenkins. 2017. "Disasters and Elections: Estimating the Net Effect of Damage and Relief in Historical Perspective." *Political Analysis* 25 (2): 260–268. <https://doi.org/10.1017/pan.2017.7>.
- Hicken, Allen, and Noah L. Nathan. 2020. "Clientelism's Red Herrings: Dead Ends and New Directions in the Study of Nonprogrammatic Politics." *Annual Review of Political Science* 23: 277–294. <https://doi.org/10.1146/annurev-polisci-050718-032657>.
- IECM. 2021. "Estadística de las Elecciones de 2018." Online. Access date: September 2019, url: <https://www.iecm.mx/>
- INEGI (Instituto Nacional de Geografía y Estadística). 2010. "Censo de Población y Vivienda 2010." Online. Access date: August 2019, url: <https://www.inegi.org.mx/programas/ccpv/2010/>
- INVI (Instituto de Vivienda de la Ciudad de México). 2019. "Respuesta a solicitud de información pública."
- Johnson, Paul, and Francisco Cantú. 2020. "The Nationalization of Mexican Parties." *Política y Gobierno* 27 (2): 1–25.
- Kumar, Nakul. 2016. "The Political Economy of Intergovernmental Transfers: Evidence from Indian Disaster Relief." *Journal of South Asian Development* 11 (3): 261–275.
- Leal Martínez, Alejandra. 2014. "De pueblo a sociedad civil: El discurso político después del sismo de 1985." *Revista Mexicana de Sociología* 76 (3): 441–469.
- Martín, Francisco Carrillo. 2020. "Crisis naturales y textos de emergencia: Cómo leer el sismo del 19 de septiembre de 2017 en la Ciudad de México." *Latin American Research Review* 55 (1): 99–109. <https://doi.org/10.25222/larr.658>.

- Massolo, Alejandra. 1986. "¿Que el gobierno entienda, lo primero es la vivienda! La organización de los damnificados." *Revista Mexicana de Sociología* 48 (2): 195–238. <https://doi.org/10.2307/3540362>.
- Monsiváis, Carlos. 2005. "No sin nosotros": *Los días del terremoto, 1985-2005*. Mexico City: Ediciones Era.
- Murillo, M. Victoria, and Giancarlo Visconti. 2017. "Economic Performance and Incumbents' Support in Latin America." *Electoral Studies* 45: 180–190. <https://doi.org/10.1016/j.electstud.2016.10.007>.
- Olson, Richard Stuart. 2000. "Toward a Politics of Disaster: Losses, Values, Agendas, and Blame." *Crisis Management* 18 (2): 154.
- Piazza, Kelly Senters, and Rodrigo Schneider. 2021. "The Electoral Buzz: Rational Prospective Voting and the Politics of the Zika Epidemic in Brazil." *Latin American Research Review* 56 (3): 575–591. <https://doi.org/10.25222/larr.916>.
- Powell, G. Bingham, Jr., and Guy D. Whitten. 1993. "A Cross-National Analysis of Economic Voting: Taking Account of the Political Context." *American Journal of Political Science* 37 (2): 391–414. <https://doi.org/10.2307/2111378>.
- PROSOC (Procuraduría Social de la Ciudad de México). 2019. "Respuesta a solicitud de información pública."
- Ramos, Roberto, and Carlos Sanz. 2020. "Backing the Incumbent in Difficult Times: The Electoral Impact of Wildfires." *Comparative Political Studies* 53 (3–4): 469–499. <https://doi.org/10.1177/00104140198589>.
- Raschky, Paul A. 2008. "Institutions and the Losses from Natural Disasters." *Natural Hazards and Earth System Sciences* 8 (4): 627–634.
- Sainz-Santamaria, Jaime, and Sarah E. Anderson. 2013. "The Electoral Politics of Disaster Preparedness." *Risk, Hazards and Crisis in Public Policy* 4 (4): 234–249. <https://doi.org/10.1002/rhc3.12044>.
- Singer, Matthew M., and Ryan E. Carlin. 2013. "Context Counts: The Election Cycle, Development, and the Nature of Economic Voting." *Journal of Politics* 75 (3): 730–742. <https://doi.org/10.1017/S0022381613000467>.
- Visconti, Giancarlo. 2021. "Do Disasters Affect Policy Priorities? Evidence from the 2010 Chilean Earthquake." *Journal of Elections, Public Opinion and Parties* 32 (3): 695–706. <https://doi.org/10.1080/17457289.2021.1917584>.
- Visconti, Giancarlo. 2022. "After the Flood: Disasters, Ideological Voting and Electoral Choices in Chile." *Political Behavior*. <https://doi.org/10.1007/s11109-022-09814-1>.

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