The Social Costs of Patronage Ties: Lessons from the 2008 Sichuan Earthquake

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Abstract

This paper examines the societal consequences of patronage ties, the informal personal connections between individuals unequal in their power. I provide empirical evidence that these connections create social vulnerabilities that magnify the impact of negative shocks. Specifically, I study the aftermath of the devastating 2008 Sichuan earthquake, which offers an opportunity to bring to light vulnerabilities that remain invisible in most states of the world. Using an original dataset that covers 1,065 buildings in the quake-affected area, I find that buildings constructed when the county officials had connections to their superiors at the prefecture level (in terms of having the same hometown) are 13 percentage points (83 percent) more likely to collapse relative to the no-connection benchmark. I find suggestive evidence that the effects likely reflect a lack of building code enforcement due to shirking or rent-seeking by connected officials. Aggregated damage statistics at the county level suggest that one additional year of having a connected official is associated with an 8 percent increase in mortality and a 3 percent increase in direct economic loss from the earthquake. These findings add to the long-standing debate on whether patronage (and corruption more broadly) is socially detrimental by highlighting the fact that the costs of corruption may be latent and hard to observe in the absence of negative shocks.

Keywords: Bureaucracy; Patronage; Corruption; Social Tie; Vulnerability; Natural Disaster; China

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1 Introduction

Patronage ties, broadly defined as the informal personal connections between individuals of unequal political status (Hicken, 2011), are pervasive in governments and organizations globally.[1] Opinions on this phenomenon are sharply divided. For some, these informal connections can provide an additional governance tool that facilitates the use of "soft information" and mitigates agency problems (Dewan and Squintani, 2016; Jiang, 2018; Toral, 2019; Voth and Xu, 2020). Others view patronage ties as detrimental because they may encourage favoritism, which undermines accountability and entrenches rent-seeking behaviors (e.g., Stokes, 2005). This ongoing debate pertains to the societal consequences of patronage ties. Yet, empirical work has struggled to identify these implications because, by definition, we do not directly observe the favor-trading or soft information transfers that are enabled by these ties. Furthermore, linking patronage ties to social outcomes is complicated by the fact that the societal consequences of these behaviors may be latent and hard to observe in the absence of a negative shock.

This paper aims to empirically identify the latent social cost resulting from patronage ties. I overcome the empirical challenges by examining damage from natural disasters, which offers an opportunity to bring to light vulnerabilities that remain invisible in most states of the world. The study is situated in the context of the 2008 Sichuan earthquake, one of the most devastating catastrophes in modern history. By associating building damage with patronage networks of past county officials when the buildings were constructed, I provide evidence that patronage created societal vulnerabilities that led to greater damage from the earthquake. In doing so, I highlight the broader notion that institutional failures, while costly, may appear decent under normal circumstances. Yet, their latent effects may build up over time, only to be revealed after a much later exogenous shock.[2]

The earthquake occurred in Sichuan Province, China on May 12, 2008, killing a total of 87,587 people, making it the third deadliest earthquake of the 21st century, and the 18th of all time.[3] Most of the deaths resulted from the collapse of buildings. [4] In the earthquake's aftermath, there appeared many anecdotal accounts of substandard construction, which possibly amplified the death rate. One salient example is the observably unequal levels of damage among identically located buildings. A photo published in *New York Times* shows a primary school being completely destroyed whereas two buildings standing directly next to the school survived fairly well (Yardley, 2008). Post-earthquake reconnaissance surveys also reveal that most of the buildings that collapsed featured a lack of reinforcing materials in their columns and had very little seismic resistance, ductility, or redundancy (Miyamoto and Gilani, 2008; He et al., 2011a,b). The state was involved in the

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[1] The concept of patronage is ambiguous and often contested in the literature. While I use the term in a broad sense to refer to the globally pervasive phenomenon, it is worth pointing out that other scholars may define it in narrower ways in accordance with the specific contexts of their studies. See Appendix A.2 for a detailed discussion of terminology.

[2] This idea echoes a famous quote from Warren Buffett: *"It's only when the tide goes out that you learn who's been swimming naked."*

[3] Source: U.S. Geological Survey.

[4] For example, according to official records, 3004 out of the 3091 deaths in Dujiangyan City were caused by building collapse.

construction of most of these substandard buildings; therefore, their seismic inadequacy is often attributed — either explicitly or implicitly — to the disregard of the relevant building codes by local governments. [5] Yet, there is no systematic evidence to substantiate this link.

The unequal damage to buildings in the earthquake offers a unique opportunity to bring to light the latent vulnerabilities resulting from patronage ties. The effects are ambiguous ex-ante. These ties may reduce social vulnerability — thus minimizing the damage — if connections help to align the incentives and consolidate monitoring effectiveness. Conversely, they may exacerbate the damage if the lack of accountability due to favor exchange undermines resistance and safety measures.

To investigate this question empirically, I construct an original dataset at the building level, with which I am able to associate vulnerability (revealed by damage levels) with past patronage networks based on a building's year of construction. The sample consists of 1,065 buildings in the quake-affected area, constructed between 1978 and 2007. The types of buildings include schools, hospitals, government headquarters, state-owned factories, and other public organizations. For each building, I first observe its damage level in the 2008 earthquake from official seismic surveys on a 5-point scale (where 1 stands for intact and 5 stands for fully collapsed). I then identify, from archival sources, the incumbent county officials during the year in which the building was constructed. [6] I measure patronage ties at the county level by whether the county officials had the same hometown with their prefectural leaders — or "hometown ties," a traditional and prevalent means of favor exchange in China (see, for example, Fisman et al. (2017)).

My identification strategy is in a similar spirit to a generalized difference-in-differences framework. Specifically, I look at buildings constructed under the authority of county officials with prefectural connections and compare these buildings to others built by people without such connections. The design exploits two sources of variation. First, buildings located within the same county (and therefore, experiencing similar seismic intensity) differ in their years of construction by which connections are defined. Second, for buildings constructed during the same year (so that they are in the same cohort), there is spatial variation in patronage ties. The identification assumption states that in the absence of connection, the difference between buildings constructed in connected and unconnected county administrations should be constant over time.

The estimated results indicate that patronage ties have played a significant role in creating social vulnerability: buildings constructed when the county officials had connections are expected to incur more severe damage during the earthquake. In particular, the probability of partial or full collapse increases by 13 percentage points (or 83 percent) for buildings constructed under the authority of connected officials relative to the unconnected benchmark. I evaluate my identifying

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[5] There has been much media coverage of *doufu zha gongcheng* (shoddily constructed buildings, literally "tofu dregs engineering") following the earthquake, with a special emphasis on school buildings. The reports uncovered a pattern of corner-cutting and dubious laxity about quality control in the construction process. This was even admitted by a government official, "its structure is not completely sound or its materials are not very strong ... we've built school buildings relatively fast, so some construction problems might exist." See Yuan (2008),Wong (2008), and Chen (2008) for details.

[6] I consider the two leading officials in each county: the party secretary and the governor.

assumption using event-study type analyses on the effect of gaining and losing connections. In so doing, I find no differential effects for buildings constructed before the county gained its connection, and the difference diminishes after the connection terminates. I consider some of the most prominent mechanisms that might bias my estimates — selection or manipulation in damage reporting, preference for building features, economic condition in the year of construction, and any unobservable factors associated with a specific hometown — and find very limited support for any of these possibilities.

I present evidence that the association between patronage ties and building damage likely indicates malevolent behaviors (such as shirking or corruption) on the part of connected officials, rather than unintended consequences. First, hometown ties matter primarily for buildings located in moderately affected regions where seismic intensity is equivalent to the resistance requirements. These buildings should have survived the quake, but suffered greater damage than would have been expected, which is often a pattern indicative of corner-cutting and code noncompliance. Second, the effects are driven primarily by schools and hospitals, whereas government headquarters in which officials themselves stay appear immune from the effects; this result suggests that connected officials were able to internalize the cost and benefit of building safety into their decision making. Third, the detrimental consequences are observed mostly for officials who are in direct charge of a county's public projects (i.e., the governors) rather than those who maintain more political authority to set agendas (i.e., the party secretaries). Finally, I find that the involvement of private capital — through investment or donation — helps to mitigate or even offset the negative consequences associated with having connected officials. Although none of these pieces of evidence is conclusive on its own, they collectively present a pattern suggestive of there being malevolent behaviors associated with projects administratered by connected officials.

I explore two reasons for which connected officials may have behaved differently from unconnected ones: negative political selection and moral hazard incentives. I disentangle these two channels by exploiting variations in connectedness status both at the time of official appointment and at the time of building construction. The results show that both "connected appointment" and "connected construction" lead to worsened building damage, indicating that both the selection and the incentive explanations may be at play. This further implies that senior officials in the patron-client relation may have provided positions to connected junior officials who have lesser administrative ability or are less ethical and protected them from being accountable for illicit activities.

To establish the broader implications of my study, I supplement the building-level findings with an analysis of county-level aggregates that allows me to examine a set of economically relevant outcomes. Using a dataset covering all 181 counties in Sichuan Province, I first document a positive cross-county correlation between earthquake losses and the period of the connectedness of county officials: one additional year of having a politically connected official is associated with an 8 percent increase in mortality and a 3 percent increase in direct economic loss from the earthquake.[7] This pattern is observed across all sectors except for government agencies. These findings, though not

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[7] In this article, mortality includes missing persons as well as those whose death is verified.

necessarily causal, show that the conclusions drawn from my building-level analysis may be relevant for aggregate outcomes. I then explore other socioeconomic and political consequences associated with patronage ties in a balanced county-year panel between 1978 and 2007, and find that connected officials receive additional resources from the upper governments (but no evidence of better socioeconomic performance) and are more likely to be involved in corruption activities. While it is beyond the scope of this study to make any decisive welfare calculation, these findings indicate that the latent costs of patronage ties that I have uncovered may only represent the tip of a much larger iceberg.

My work contributes most directly to the study of patronage ties across a spectrum of regime types. The theoretical foundations were laid by Prendergast and Topel (1996), who consider the conditions under which favoritism prevails. Recent empirical work has demonstrated the prevalence of favoritism associated with patronage networks in various institutional and cultural contexts, particularly in the allocation of public offices and other resources (see, e.g., Barbosa and Ferreira, 2019; Colonnelli et al., 2020; Jia et al., 2015; Shih, 2012; Xu, 2018; Voth and Xu, 2020; Fisman et al., forthcoming; Jiang and Zhang, 2020; Bandiera et al., 2021). While some of these papers also discuss the costs and benefits arising from such selection, they focus mostly on the tradeoff within the principal-agent framework, without a clear notion of its societal consequences, which may not necessarily align with the principals' payoffs.[8] One such attempt is Jia (2017), which finds that connected politicians seem to favor technologies that pollute but enhance economic growth. By focusing on earthquake damage plausibly due to corner-cutting, I emphasize the potential role of bureaucratic collusion rather than promotion incentives for multi-task agents.

More broadly, this paper contributes to the vast literature on corruption. My findings offer several new perspectives on the measurement, consequence, and alleviation of corruption. First, because of its illicit nature, the literature mostly rely on surveys or experiments to identify evidence of corruption (Olken, 2006; Bertrand et al., 2007; Weaver, 2021); these approaches are either subjective or expensive (Bertrand and Mullainathan, 2001). I suggest a novel detection device — which exploits variations in disaster damage — that is objective, economical, and applicable to a broad range of settings. Second, in contrast to the extensive literature that characterizes the efficiency loss from misallocation and distortion (see Akcigit et al. (2018) and Cingano and Pinotti (2013) for recent examples and Olken and Pande (2012) for a review of earlier work), my work highlights a more direct and salient social cost on a substantial scale. It throws into sharp relief the debate on whether corruption is socially detrimental (Huntington and Fukuyama, 1996; Rock and Bonnett, 2004; Mon and Weill, 2010; Wiig and Kolstad, 2010). In particular, I focus on a setting in which the actions — and in most situations, their consequences — are hidden from the public or even a monitoring agency; my findings offer a glimpse of the high social costs of rent-seeking behavior in terms of creating societal vulnerabilities.[9] The results also highlight the fact that the costs of

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[8] For example, in a very well-identified study on how patronage affects the promotion and incentives of governors within the Colonial Office of the British Empire, Xu (2018) provides convincing evidence that connected colonial governors generated less revenue for the British Empire; yet it is less clear whether lower revenue generation is good or bad for colonized people.

[9] In a similar vein, Fisman and Wang (2015) and Jia and Nie (2017) study the link between rent-seeking by

corruption may be latent and hard to observe in the absence of a negative shock, and normal accounting of the costs may only capture a small fraction of the total.[10] Additionally, the existing literature generally emphasizes the roles of electoral accountability and government auditing in fighting corruption (Olken, 2007; Bobonis et al., 2016; Avis et al., 2018). However, audit-based solutions may be problematic if auditors themselves collude with the agent (Duflo et al., 2013; Chu et al., 2020; Vannutelli, 2021). In this case, my results suggest that private participation may also help to alleviate corruption in certain public projects.

This study represents an application of political economy approaches to the increasingly interdisciplinary research in hazards and disasters. [11] More and more natural scientists have begun to recognize that disasters are not merely acts of God, but arise from the interplay between naturally-occurring hazards and a vulnerability induced by socio-economic and institutional conditions. Despite the many calls to take institutional factors more seriously (see, e.g., O'Keefe et al. (1976) for the initial notion and Adger et al. (2005) and Eakin et al. (2017) for recent restatements), the core hypothesis that institutional failures result in greater damage from natural disasters has gone largely untested.[12] Corruption has often been proposed as a potential force that magnifies the impact of natural disasters; until now, however, there is no formal evidence for this mechanism other than cross-country correlations between corruption perception and disaster deaths (see Kahn (2005), Escaleras et al. (2007) and Ambraseys and Bilham (2011)). By exploiting building-level variation during a deadly earthquake, I provide micro-level causal evidence that corruption makes a society vulnerable to natural hazards.[13] While I focus on one single earthquake in China, this scenario is likely representative of the role that corruption may play in other societies given the abundant anecdotal reports from across the globe (See, e.g., Kinzer (1999) for Turkey, Pejhan (2003) for Iran, Lin (2017) for Mexico, Scaglia (2010) for Italy, and Putzier et al. (2021) for the U.S.).

The remainder of this paper is organized as follows. Section 2 introduces the geographical, institutional, and cultural background of the 2008 Sichuan earthquake, along with the roles of patronage ties in China's local politics. Section 3 describes the sources and processing of the data and discusses their potential limitations. The empirical design and results that associate patronage ties to building damage are presented in Section 4. Section 5 discusses the interpretation of the main findings. Section 6 talks about the external validity and broader welfare implications of the

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firms and workplace fatalities. Whereas these prior studies look at firm-government connections, I emphasize the detrimental effects of collusion *within* the bureaucracy and, thus, speak also to a distinct literature on corruption in bureaucratic hierarchies (see, e.g., Charron et al. (2017) and Rose-Ackerman and Palifka (2016) for notable examples from political science).

[10] While I focus on the physical loss from a natural disaster as a particularly striking example, the notion of vulnerability and its association with corruption is likely applicable to other realms in the economy (e.g., financial system and public health).

[11] See Mcnutt (2015) for an editorial call for forming a disaster science community from a range of natural and social science disciplines.

[12] The idea behind this hypothesis is analogous to the pioneering work by Sen (1981) on the institutional causes of famines. For recent studies on this topic, see Lin and Yang (2000); Kung and Lin (2003); Kung and Chen (2011); Meng et al. (2015).

[13] By emphasizing the notion of ex ante vulnerability, my findings complement those of Henderson and Lee (2015) and Tarquinio (2021) who focus more on the distortions in post-disaster relief efforts.

study. Section 7 concludes.

2 Background

2.1 The 2008 Sichuan Earthquake

China is highly prone to earthquakes; it is located between the Pacific Rim seismic belt and the Eurasian seismic belt — the world's two largest earthquake focus areas. There have been 361 significant earthquakes in China since 1900, more than any other country, accounting for 10 percent of all earthquakes globally.[14] Sichuan Province is particularly prone to earthquakes. Several large-scale strike-slip faults have developed throughout the area due to the collision of the Indian Plate with the Eurasian Plate and the resultant formation of the Qinghai-Tibetan Plateau (Xing and Xu, 2011). More than 400 earthquakes have been recorded in the history of Sichuan (Xie et al., 1983), including 58 significant ones since 1900.[15]

The 2008 Sichuan earthquake occurred on May 12, with a moment magnitude of $7.9M_W$. The epicenter was Yingxiu Town, Wenchuan County, 80 kilometers northwest of Chengdu, the capital city of Sichuan Province. The earthquake killed 87,587 people, injured another 374,643, and incurred a direct economic loss of 845 billion RMB (80% of Sichuan's 2007 GDP), which makes it one of the most costly earthquakes in human history. [16] Most of the deaths resulted from the destruction of buildings; of these, public buildings were among the most vulnerable and deadly ones in the earthquake. [17]

While the official announcement attributed the collapse of buildings to the severity of the earthquake, it is widely believed that suspected shoddy construction was also responsible. A scandal emerged with the salient observation that some buildings crumbled to dust — the structures were so inflexible that they collapsed in less than 10 seconds with no shaking at all — while others directly adjoining them remained mostly intact.[18] The fragility of certain buildings sharply contrasted with the performance of a few sturdy buildings standing at the very heart of the disaster zone. [19] Investigative news reports have discovered the use of low-grade cement and inadequate steel

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[14] This number is calculated using data from the Global Significant Earthquake Database. The database keeps records of all destructive earthquakes that meet at least one of the following criteria: moderate damage (approximately $1 million or more), 10 or more deaths, Magnitude 7.5 or greater, Modified Mercalli Intensity X or greater, or tsunami generation. See National Geophysical Data Center for details.

[15] Being aware of the significant earthquake hazard, the Chinese government has promulgated national building codes to ensure safety. The building codes made clear the required level of seismic resistance (the range of seismic intensity under which a building should not collapse), which varies across locations depending on the estimated earthquake hazard. See Section A.1 for details.

[16] The death toll of this earthquake was extraordinarily high compared with other earthquakes of similar magnitude. Figure C1 plots the fatalities of the twenty most notable earthquakes (in terms of magnitude) since 2000 against their magnitudes. The death toll in the 2008 Sichuan earthquake is much larger than the other earthquakes of similar magnitude, and only comparable to the two strongest earthquakes of magnitudes 9 and above.

[17] In a survey of 484 buildings, 57% of the schools were no longer usable or had to be removed immediately, more than twice as much as the share of residential houses (Ye and Lu, 2008). It is also remarkable that 87% of the government headquarters in their sample remained safe aside from some additional repair requirements.

[18] See Yardley (2008) for a notable example.

[19] The two most prominent examples are *Bailu Town Central Primary School* and *Liu Han Hope Elementary*

reinforcements in some destroyed buildings; the reports also probe a few dubious construction practices that may be associated — either directly or indirectly — with the local government neglect of building safety. [20] Despite widespread anecdotes and speculation, there is no formal evidence that can be used to examine quantitatively the potential link between possible corruption and its associated damage.

2.2 Patronage in China's Local Politics

Patronage networks are widely observed across the spectrum of regime types. The defining feature of this relationship is a favor exchange through informal personal connections between two or more actors (or groups of actors) of unequal political status (Hicken, 2011).[21] Such networks have been long embedded in Chinese society since as early as the second century A.D. (Ebrey, 1983), and are pervasive in shaping the political and social lives of the Chinese people.[22] In China's political system, particularly at the county and prefectural level, the senior officials (patrons) provide a range of benefits — including resources, information, opportunity, and protection in times of trouble — in return for loyalty, obedience, and political support from junior officials (clients).[23]

The favor exchange between senior and junior officials via patronage ties may undermine local governance quality and entrench corruption in two distinct ways. First, senior officials at the prefectural level may set a lower bar for their clients when appointing officials at the county level.[24] As a result, officials selected because of their patronage ties may be less qualified in terms of either ability (less competent) or ethics (more prone to corruption). Second, prefectural officials may provide protection to their clients, which prevents them from being held accountable for corrupt acitivity or dereliction of duty. Such lenience would cause county officials to be less scrupulous in maintaining economic and political integrity. In either case, officials with patronage ties may be more susceptible to duty-related malfeasance — in terms of either direct misappropriation of public funds or bribe-taking from contractors. The association between patronage networks and bureaucratic corruption has also been made evident in China's anti-corruption campaign since 2012, which has uncovered massive corruption by officials connected via patronage ties to Zhou Yongkang, the former party secretary in Sichuan Province and the largest "tiger" (*da laohu*, i.e., senior corrupted official) among those who were sentenced for graft in the campaign.[25]

School, both located directly above the rupture surface. In the former case, a three-story school building was elevated three meters above the ground, but the main building stood firmly, and 1,046 students successfully evacuated the building. See Branigan (2008) and China Daily (2011) for details.

[20] For some notable examples, see Deng (2008), Yuan (2008), Ding and Zhu (2008), Chen et al. (2008), and Hu (2008b).

[21] While the phenomenon is ubiquitous worldwide, it may take distince forms and functions in various political and cultural contexts, and terminology may vary as well. See Section A.2 for further discussions.

[22] In particular, patron-client connections constitute the basis of what Nathan (1973) famously refers to as "factions" in CCP elite politics.

[23] The political support often involves making decisions on the awarding of contracts, supporting or opposing particular policy initiatives, and voting for candidates being considered for promotion. See Hillman (2014) for further details.

[24] During the period studied, a prospective county official was first nominated by prefectural officials; the nomination had to be approved by provincial officials before taking effect (Yang and Peng, 2009).

[25] For example, among the 22 officials that had been investigated for corruption in Chengdu City until 2015, 13

A large amount of corruption occurs in the construction industry, and local government officials are often involved directly.[26] Yu et al. (2019) analyzed 83 complete recorded cases of construction-related corruption held by the Chinese National Bureau of Corruption Prevention, and found that 50% of the convictions were associated with government agencies in direct charge of planning, licensing, inspecting, and project acceptance.[27] One prominent example from the Sichuan area is Liu Junlin, the former party secretary of Dujiangyan (county level). Liu has been identified as a client of Li Chuncheng, the former party secretary of Chengdu (prefecture level), who himself is a client of Zhou Yongkang (Xinhua Net, 2014; Forsythe, 2015). According to Liu's court verdict, he was accused of 31 criminal convictions for graft (totaling an amount of 12 million RMB). Among these convictions, 19 were related to bribe-taking in construction projects, and the other 12 are associated with the distribution of public sector jobs. Dujiangyan turns out to be one of the most severely damaged counties during the 2008 earthquake, where many poorly-constructed buildings were identified as a result of their dramatic leveling in the earthquake. Although I do not find any investigation report that attributes a specific building collapse explicitly to Liu's administration (or any specific government official in my sample), this example presents the intriguing possibility that patronage and construction-related corruption may be inextricably linked together, leading to corners being cut and building code being violated.

For this study, I measure patronage ties between county and prefectural officials using their hometown connections (*laoxiang guanxi*), which have been recognized as the most common and distinctive basis for the establishment of a patron-client relationship between local officials (Douw et al., 1999; Chen and Chen, 2004). Since as early as the sixteenth century, having a shared hometown has served as a fertile ground for building up social networks, creating emotional bonds, and trading reciprocal favors with people from various occupational and social backgrounds (Moll-murata, 2008). In the past decades, social networks organized around the hometown also played a crucial role in sustaining China's historically unprecedented rural-urban migration and the growth of private entreprise (Zhao, 2003; Hu, 2008a; Dai et al., 2020). Yet, recent studies also document the prevalence of favoritism via hometown ties in the business, political, and academic worlds (Shih, 2012; Jia et al., 2015; Fisman et al., 2017; Shen et al., 2019; Chu et al., 2020; Fisman et al., forthcoming). In particular, social networks based on hometowns appear to have facilitated bureaucratic and business collusion. It is not uncommon for corrupt officials to cluster around native locations; having been aware of this phenomenon, the Chinese government explicitly prohibited its officials from participating in any hometown-based associations in 2015. [28]

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are explicitly involved in the patronage network associated with Zhou Yongkang (often referred to as the "Sichuan Gang") (Wang, 2015).

[26] According to (Chen, 2017), 54% of the 12,759 bribery cases prosecuted in China between 2014–2017 involved construction projects.

[27] It is not even uncommon for highly positioned officials who are distant from specific projects to be directly involved: they account for an additional 25% of the corruption cases, but extract the highest total monetary amounts. A more comprehensive report reveals that 1,671 officials at the county level or above received disciplinary sanctions for construction-related misconduct between 2009 and 2011 (10% of all bureaucrats sanctioned), including 78 prefectural level ones (Zhou, 2011).

[28] See, for example, Guo (2019) for a prominent example of collective corruption of high-ranking officials originating

3 Data

I have combined information from multiple sources to construct a building-level dataset. The dataset contains 1,065 buildings from 37 counties in the heart of the earthquake zone; all of the sampled buildings were built between 1978 and 2007. [29] I measure patronage networks by the hometown connections (i.e., having the same hometown) between county officials and their prefectural-level superiors. I associate a building's damage to past patronage networks based on the year during which the building was constructed.

3.1 Building Damage

I construct the building-level dataset by combining two collections of local gazetteers. The first is the local *Earthquake Relief Reports* (*Kangzhen Jiuzai Zhi*), from which I obtain a list of buildings and the extent of damage they were subject to.[30] The second collection is the general *County Gazetteers* (*Xian Zhi*) from which I obtain the construction history of a second list of buildings. I manually compare the two lists of buildings by their documented names and locations, and have successfully identified 1,065 buildings that were jointly mentioned in both lists so that both their damage and construction records are observed. There are five types of buildings in my linked sample: schools, hospitals, government headquarters, public organizations (e.g., libraries), and state-owned factories.

The damage levels of the sampled buildings are encoded according to a 5-point scale following the official guidelines. The key features that determine a building's damage level are the extent to which the load-bearing components were affected, and whether the building could be used with or without repairing, or had to be removed immediately. The detailed definitions and indexes of the damage levels are summarized as follows:

1. **Intact or slight damage:** Load-bearing components are intact or have minor (less than 5%) cracks; non-load-bearing components and attachments have various levels of damage; safe to use with no or minor repairs.

2. **Moderate damage:** Load-bearing components have some major cracks; non-load-bearing components and attachments have visible damage that must be repaired before use.

3. **Severe damage:** Load-bearing components have many severe cracks and minor areas of collapse; some non-load-bearing components and attachments have fallen and are no longer serviceable.

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in Shanxi Province, and China Comment (2017) for a more localized case. For the government's ban on officials' participation in hometown associations, see Huang (2015).

[29] I restrict the sample to buildings constructed during this period for two reasons. First, local governance was substantially disrupted during the Cultural Revolution (1966–1976); second, as summarized in Section A.1, there were no strict building codes in China until 1978.

[30] See Section B.1 for further details about the nature of these archival sources and the procedure to collect them.

4. **Partial collapse:** Load-bearing components have deteriorated significantly and must be removed immediately.

5. **Full collapse:** The entire building has collapsed or fallen apart; nothing remains of the basic structure.

3.2 Hometown Ties

I define patronage ties between local officials and their prefectural superiors by whether they have the same city of origin (i.e., *hometown ties*).[31] I focus on the top two county officials, i.e., the county party secretary and governor, and the top two prefectural officials, i.e., the prefectural party secretary and mayor, in defining patronage ties. I construct a list of county- and prefecture-level officials and their cities of origin from various sources, including county gazetteers, *Information on the Organizational History of the CCP in Sichuan Province* (*Zhongguo Gongchandang Sichuan Sheng Zuzhishi Ziliao*), *Sichuan Year Book* (*Sichuan Nianjian*), Chen et al. (2019) and the online biographies of these officials. I also collected their gender, year of birth, education and ethnicity whenever available.

For each county in a given year, I define the county as having a connected official if one or both of its top officials (i.e., the county secretary and the governor) share the same city of origin with at least one of their superiors (i.e., the prefecture secretary and the mayor). [32] I then associate the connectedness status of county officials to buildings in my linked sample based on the year in which the building was constructed.

3.3 Covariates

I construct additional variables to account for other factors that might determine the damage to a building from the earthquake. These covariates include: i) building characteristics (size, height, etc.), geographical features (seismic motion intensity and terrain ruggedness), individual profiles of the officials (gender, ethnicity, age, education, and term), and county-wide socio-economic conditions (per capita GDP and population). The definitions and construction of these variables are explained in more detail in Section B.3.

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[31] The political connection literature has provided two other measures of connection in China's context: one is "college ties" (*xiaoyou guanxi*) and the other is "workplace ties" (*tongshi guanxi*). Both types of connections are relevant for the formation of patron-client networks. However, information on county officials' education and working experience was barely available before 2000, making it infeasible to examine the effects of these alternative ties in my context.

[32] For transition years in which multiple county secretaries or governors have been in position, I considered the connections of the ones who were in their positions for the longest time within that year. My results are robust to accounting for county officials who have been temporarily in position, and to the cumulative months that the county's officials have been connected.

3.4 Description and Visualization

I present the summary statistics of my building level dataset in Table 1. There are 1,065 matched buildings in the sample. The damage is encoded according to the 5-point scale, with the average being 2.84. Buildings constructed under the authority of a connected county official represent 16% of the sample. The mean building in the sample is four stories high and is located 162km from Yingxiu and 121km from Beichuan, the two focal points of the intensity distribution. At the time of construction, the average county official was 44 years old, had some college education, and had been in office for three years. One issue highlighted in the table is the prominence of missing values for many control variables, especially those of building features. To utilize this information as much as possible in the analysis, I first encoded the missing values as 0 and then included a set of dummy indicators that denoted each of the missing variables.

Figure 2 shows the spatial distribution of the sampled buildings by damage level and seismic intensity zone. A few observations emerge from the map. First, my sample spreads across multiple intensity zones, and is most representative of buildings in intensity VI and VII regions. [33] Second, the levels of damage generally decrease as distances from the fracture increase, yet it is not uncommon for buildings around the fracture to stand while those farther away collapse. Third, there are variations in damage for buildings within the same county or even at the same location, suggesting that factors other than seismic intensity may also affect the nature and extent of building damage.

Figure 3 plots the probability distribution of building damage by the connectedness of county officials. While buildings that receive "severe" damage (indexed as 3) are most representative in both cases, the distribution of the county-official connectedness buildings is skewed to the right. In terms of magnitude, the probability of partial or full collapse (indexed as 4 or 5) of connected buildings (i.e. those constructed under the auspices of connected county officials) is 2.5 times that of unconnected buildings; in particular, whereas, at the time of construction only about 16% of buildings are connected, about 50% of the fully collapsed buildings exhibit this connectedness.

3.5 Discussion

One fundamental challenge to my study is that there are no publicly available comprehensive and systematic statistics on building damage; it is even harder to identify their years of construction and the economic and institutional circumstances in the past. [34] I overcome this difficulty by combining two collections of archival records — one of damage and the other of construction history — and identifying the jointly mentioned buildings. However, I find neither type of information in a standardized statistical format, which introduces important caveats on the selectivity and representativeness of my sample.

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[33] The building codes generally require that buildings should not collapse under earthquake intensities of VI or VII.

[34] For example, one seemingly possible approach to obtain comprehensive building damage information is to identify collapsed buildings from satellite photos. However, before-and-after comparison is difficult, because most of the available high-resolution satellite images of the area of interest were taken after 2008.

One leading concern about my sampling process is that the selection of buildings is hardly random.[35] In particular, since the gazetteers are compiled and published by each individual county, the selection function may vary across counties, making samples from different counties incomparable as to buildings sampled. This concern can be significantly mitigated, however, by the inclusion of county fixed effects with which I only compare buildings in the same county if the selection is consistent within the county. In the possible situation that the selection function might be inconsistent even within a county, the identification relies on an additional assumption that the selection does not depend on the connectedness of county officials for the year in which the buildings were constructed.[36] In Section 4.3, I will present a tentative test of this assumption and discuss the possible scenarios in which this assumption might be violated.

The second concern is that my sample may not be representative of the universe of buildings in the quake area. In particular, it only takes into account buildings that are recognizable in a county, and, for this reason, most of the sampled buildings are public projects. To address the external validity of this selective sample, Section 6.1 will present an analysis of county-level aggregates, which suggests the extent to which the conclusions drawn from my building-level sample may exhibit more general implications.

4 Empirical Strategy and Results

This section presents the main analyses using the building-level dataset. I start by describing my empirical design, discussing the identification assumptions, and formalizing the model specifications. I follow this by the baseline estimation of the impact of county officials' hometown connections on damage to the buildings. I then address some of the most prominent concerns that might bias the estimates, including the selection in damage reporting, the economic conditions in the year of construction, and common shocks to officials from some specific hometown.

4.1 Research Design and Model Specification

The research design is, in spirit, similar to a generalized differences-in-differences framework, in which I compare buildings constructed under the authority of connected (via hometown ties) county officials relative to their unconnected counterparts. Since both county and prefectural officials in China are appointed by the higher-level government and the personnel at both levels is rotated regularly across places, the presence of hometown connections is likely exogenous to other predetermined factors that affect future building damage. I exploit two sources of variation, which are illustrated in Figure 4: the first for buildings located in the same county, for which the exposure to connected officials varies in the year in which they were constructed, and the second, for those

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[35] For example, a county might only record buildings whose damage was salient, so that only extraordinarily good or extraordinarily bad buildings get observed.

[36] This assumption is generally reasonable since past officials were no longer in the same positions in 2008 (some of them had even retired) and, therefore, should have a very limited impact on the compilation of the gazetteers after the earthquake.

constructed in the same cohort, for which the connection status of the incumbent bureaucrats varies across counties. The design is formalized by estimating the following equation:

$$Damage_{ict} = \beta HometownTie_{ct} + \delta_c + \sigma_t + \mathbf{X'_{ict}}\mathbf{\Gamma} + \varepsilon_{ict} \tag{1}$$

where i indexes buildings, c indexes counties, and t indexes building cohorts (i.e., years of construction). The outcome of interest, denoted $Damage_{ict}$, is the damage level, on the 5-point scale, of a building i, in county c, built in year t. $HometownTie_{ct}$ is an indicator variable denoting that the county officials in county c, year t share a home of origin with their prefecture-level superiors. The equation also controls for county and year fixed effects, δ_c and σ_t, respectively; $\mathbf{X'_{ict}}$ denotes a vector of other building or county level covariates that also vary in time; and ε_{ict} denotes the error term. I compute standard errors that allow for clustering by counties on the rationale that the buildings have been sampled by individual counties. The coefficient of interest is β, which, if positive, would suggest buildings constructed under the authority of connected officials being more vulnerable than their unconnected counterparts in the 2008 earthquake.

The estimation strategy inherits all the advantages and potential pitfalls of the classical differences-in-differences estimators. In the model, the county fixed effects control for time-invariant factors that differ between counties, including, for example, location and average earthquake intensity; it also captures the potentially county-specific sampling functions of buildings. The year fixed effects take into account any regular patterns of earthquake damage that affect all buildings in the same cohort: for example, building age or the construction technology. I also consider the following set of additional controls that may nevertheless vary within a county: first, the basic features of the building, such as type of use, size, number of stories and structure; second, within-county variations in the geographical characteristics of the building's location, including seismic motion (measured by peak ground acceleration) and terrain ruggedness at the building's site; third, the profiles of the county officials, such as gender, age, education, ethnicity, and term.

The identification requires that buildings constructed in a connected and unconnected regime should be otherwise identical in damage in the absence of the connections, conditional on the factors that have been controlled for. While this assumption cannot be directly validated, I will present various diagnostic tests and consider some of the most prominent mechanisms through which this assumption could be violated.

4.2 Main Results

Baseline I start by estimating the effect of bureaucrats' hometown connections on the earthquake damage to buildings using both the linear and ordered-probit versions of Equation (1). The results are reported in Table 2. Column (1) shows the linear estimate of Equation (1) including only *HometownTie* without any covariates. The estimated raw coefficient is 0.44, significant at the 1 percent level. The magnitude is about 15 percent of the mean damage index, or 54 percent of its standard deviation.

For column (2), I include the sets of county and year fixed effects to the equation. This specification reduces the estimated coefficient by 30 percent to 0.31, significant at the 5 percent level. The reduction in magnitude suggests that time-invariant county characteristics (e.g., location) and cohort effects (e.g., age) might explain a large portion of the effects. Yet the association between hometown connections and building damage remain significant, both statistically and economically, for within-county and within-cohort comparisons.

For column (3), I include building type × year fixed effects, which capture, for example, the evolution of technology and safety requirements that may vary across different types of buildings. In doing so, I rule out the comparison between different types of buildings and only exploit the variations among simultaneously constructed buildings identical in type. The coefficient on $HometownTie$ is almost unchanged, though the level of significance improves from 5% to 1%.

Columns (4) and (5) consider additional building-specific characteristics that might influence the earthquake damage. For column (4), I control for building features, including size, number of stories, number of rooms, and structure; since these variables are only available for a very small subset of buildings in the sample, I also include a set of dummies indicating those that are missing. The coefficient and level of significance on $HometownTie$ remain constant. Column (5) considers the geography of the building's location, including local peak ground acceleration (PGA) — the seismic ground motion parameter — and terrain ruggedness, both measured at the building's locality; the results remain mostly the same. Finally, for column (6), I further include the personal profiles of the county officials: their gender, ethnicity, age, education, and term, taking an average of the party secretary and the governor. Again, my estimates remain the same.

For column (7), I estimate, with the complete set of controls, the ordered-probit model of Equation (1) to accommodate the ordinal nature of the dependent variable. The estimated coefficient of $HometownTie$ on the latent outcome variable is 0.65, significant at the 1 percent level. The overall marginal effect, calculated as the linear combination of the marginal effects for each outcome value, is 0.307, which is comparable to the estimated coefficients in linear models. Thus, our estimates are robust to the potential nonlinearity of ordinal damage measures.

To aid in the exposition of the estimated effect, I compute the predictive margins of $HometownTie$ — i.e., the predicted probability of falling within each of the five categories — by connectedness, and plot the results in Figure 5, along with the 95% confidence intervals. The figure shows a pattern that echoes my previous results: buildings constructed under the authority of connected county officials stochastically dominate their unconnected counterparts in earthquake damage. In particular, the officials' $HometownTie$ increases the probability of partial or full collapse (indexed by 4 and 5) by 13 percentage points (or 83 percent) from 15.7% to 28.7%.

Overall, the results in Table 2 indicate that patronage ties of local officials have a robust effect in making the buildings vulnerable in the earthquake. I also verify that my findings are robust to alternative treatment intensities such as the number of ties or the duration being connected; they are also robust to using a different damage classification method[37].

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[37] These results are available upon request.

Event Studies The identification in my baseline specification relies on the assumption that buildings constructed under the authority of connected and unconnected officials should be otherwise identical in terms of earthquake damage in the absence of such connections. While a direct test of this counterfactual assumption is not feasible, I employ some diagnostic approaches that allow me to examine the extent to which the assumption holds. One strategy is to look at the effects of entering and exiting a connected regime in an event-study framework. Specifically, I investigate the year-by-year differences in earthquake damage for buildings constructed right before and right after the county officials gain and lose their hometown ties using the following flexible specifications:

$$Damage_{ict} = \sum_{j=-3}^{3} \beta_j GainTie_{cjt} + \delta_c + \sigma_t + \mathbf{X'_{ict}\Gamma} + \varepsilon_{ict} \tag{2}$$

$$Damage_{ict} = \sum_{j=-3}^{3} \beta_j LoseTie_{cjt} + \delta_c + \sigma_t + \mathbf{X'_{ict}\Gamma} + \varepsilon_{ict} \tag{3}$$

where $GainTie_{cjt}$ ($LoseTie_{cjt}$) is a set of dummies indicating the normalized year j relative to the moment that county c enters (exits) a connected regime. Buildings constructed beyond 3 years from a connected regime are included in the comparison group. If the identification assumption holds, we should expect a consistently positive effect for buildings constructed within a connected regime and no differences before the county gains or after it loses its connection.

I estimate these flexible equations with the full set of controls and present the results in Figure 6. Panel (a) examines the effect of gaining political connections using Equation (2) and plots the estimated coefficients along with their 95% confidence intervals. The horizontal axis is normalized to the year in which the county enters a connected regime. The comparison is relative to buildings constructed more than 3 years before the establishment of the political connections. The figure shows that buildings constructed ahead of a connected regime exhibit no tendency toward vulnerability — a pattern consistent with a generalized common trends assumption. I also observe a notable increase in earthquake damage if a building is constructed after the connection has been established.

Turning to the effect of losing a connection, I plotted, in Panel (b), the coefficients and confidence intervals estimated from Equation (3) in which the relative year is centered around the county's exiting a connected regime. Buildings constructed more than 3 years after the connection ends are included in the comparison group. A symmetric pattern emerges from the estimates that buildings tend to have greater strength — despite some apparent noise — if constructed after the county lost its connection. Taken together, the event studies show no anticipatory or carryover effects of hometown ties, which provides supportive evidence that the counterfactual assumption is likely to hold.

In sum, the results I have presented in this section provide robust evidence that buildings constructed under the authority of politically connected officials tended to be more severely damaged in the 2008 earthquake. I also provide supporting evidence that may be informative about the counterfactual in the context of the absence of connections, which facilitates causal interpretations of the results.

4.3 Threats to Identification

The results I have obtained reveal a clear association between the county officials' hometown ties and the buildings' earthquake damage. To make credible causal claims, however, I have to rule out the alternative mechanisms that might bias my estimates. I consider in this part some of the most prominent channels: selection bias, manipulation of damage records, building preferences, socio-economic conditions, and hometown-specific effects.

Selection One major concern of this study, as discussed in Section 3.5, is that the buildings observed in the sample may not be randomly selected. If the selection criteria is consistent within a county, this concern can be addressed directly by the inclusion of county fixed effects, which effectively eliminates between-county differences. If the selection is inconsistent within a county, the identification relies on an additional assumption that the selection does not depend on the connectedness of county officials for the year in which the buildings were constructed. While this is a generally plausible assumption, there are situations in which it may be violated. If, for example, the connected ex-officials had persistent influence over the compilation of county gazetteers after the earthquake occurred, they may use that influence to interfere the selection process — although it appears more likely a downward bias in most of the plausible occasions.

To get a sense of the extent to which the selection of buildings might depend on the connection, I examine whether the hometown tie is predictive of a building's damage being observed in my sample. Specifically, I take the list of buildings for which I can observe the construction history from the *County Gazetteers*, and regress a building's being selected into the linked sample (i.e., the building's damage being observed in the *Earthquake Relief Reports*) on the hometown tie of the county officials during the building's construction. While this list of buildings may well be unrepresentative of the population, it is at least suggestive of the nature of the selection process concerning the role of hometown connections.

Table 3 reports the results for all specifications parallel to those in the baseline. The outcome is a dummy variable denoting whether the building's damage is observed. Columns (1) – (5) report the OLS estimates with different sets of controls, and column (6) estimates a probit model to exploit the potential nonlinear effects. The estimated coefficients are, if anything, negative and statistically insignificant across all specifications. They suggest that, despite the lack of randomization in the sampling process, it is unlikely that there exists positive selection based on the hometown ties of ex-officials that could otherwise contaminate my main results.

Manipulation While there is no evidence of selected reporting, one might worry about the damage reports being manipulated according to the connectedness of past county officials. The manipulation may go either way. On one hand, connected ex-officials may have persistent influence in the county to systematically underreport the damage of buildings constructed under their authority. In this case, the effect of hometown connection on building damage would be underestimated in my study. On the other hand, however, the damage reports may also systematically exaggerate the damage of buildings constructed by connected county officials, causing an upward bias of my estimates. This might happen, though with small probability, if incumbents use these reports as tools for political struggle, as connected officials are more likely to be involved in political struggle.[38]

To probe the extent to which my findings might be driven by connected officials' engagement in political competition, I perform a placebo test looking at the hometown connections between county officials and senior officials in a different but neighboring prefecture. These officials were not connected to their direct superiors at the time of building construction, but had a similar propensity of facing political struggle (post earthquake) because of their having a patron. If political competition systematically overstate the building damage by connected officials, we would expect a similar effect for those connected with senior officials who were not their direct supervisors. If hometown connections matter exclusively for those connected with their direct supervisors, it would point towards the substantial benefits/protection from being connected rather than other factors associated with having patrons — including being more susceptible to political struggles.

The results, obtained for all specifications parallel to those in the baseline, are presented in Table 4. I observe, across all columns, close-to-zero effects of this non-supervisor hometown connection. This test suggests that having a hometown tie per se does not imply poorer building quality unless the connection is associated with a direct supervisor. Thus, it is unlikely that our findings are driven by political competitions that target past officials with connections to senior officials at the prefectural level. The pattern also serves to reinforce my identification assumption that in the absence of connection, buildings constructed under the authority of connected and unconnected officials are not systematically different from each other.

Preference for buildings A third source of bias is that connected and unconnected officials may construct buildings (or more precisely, manage construction projects) differently. For example, they may have different preferences for where to construct a building and what specifications to use for it. Such choice of site and specifications, even in the absence of malicious intent or misconduct, may be correlated with the seismic intensity a building experienced or its resistance. In my baseline estimation, I have controlled for the building characteristics, including their locations and specifications, for all linked buildings in our sample. To further investigate the extent to which connected and unconnected officials might have constructed buildings differently, I examine whether

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[38] In fact, many of the officials investigated in Sichuan during the ongoing anti-corruption campaign begun in 2012 are associated with Zhou Yongkang in some way. However, to manipulate the building damage report does not appear to be an effective way of harming reputations. In particular, the reports provide no information about building construction nor officials administrating it; if such reports were used as a tool in political struggle or as a means to tarnish the reputation of past officials, we should expect them to associate the buildings with past officials explicitly. Moreover, none of the officials investigated for corruption have been accused of being responsible for any building collapse during the earthquake, according to their court verdict, suggesting that the association between past officials and building collapse in 2008 was not readily observable or recognized by the stakeholders without the use of statistical tools.

hometown connections affected the choice of building sites and specifications using the larger sample that contains all building constructions that I have collected from *County Gazetteers* (regardless of whether their damage was reported or not).[39]

I present the results in Table C2. The first two columns examine whether buildings constructed by connected officials tend to locate in seismically more dangerous regions. The outcome variables of interest are peak ground acceleration (PGA) and terrain ruggedness, both measured at the site of the buildings. The following four columns examine the effects of hometown connections on the structure/specifications of buildings. I look at four pieces of information that are occasionally documented in the gazetteers: height, size, number of rooms, and number of phases. For all specifications, I control for county fixed effects, year fixed effects, building type × year fixed effects, and the set of individual-level controls of those county officials. I do not find hometown connections to be associated with any of these decisions regarding where and how to construct the buildings.

Social Economic Environment Another confounding factor is the socio-economic condition of the county at the time of the building's construction. For example, the public budget might be more constrained in years with negative economic shocks, leading to insufficient resources to keep buildings compliant with the quality requirements. I did not include any proxies for the socio-economic conditions as control variables in the baseline because these outcomes might themselves be the consequence of having a connected official, and hence likely be bad controls for the study. However, if such shocks are predictive of the presence of a connected official, it is possible that omitting the socio-economic circumstances may bias these results.

To make sure that my results are not subject to this possibility, I replicate the baseline analyses controlling for additional socio-economic conditions — in particular, per capita GDP and population; I present the results in Table C3. First, I find that, higher per capita GDP, as expected, significantly mitigates building damage; the increase in population, on the other hand, contributes to the vulnerability of the buildings. More importantly, the effect of $HometownTie$ on a building's damage is, across various specifications, robust to the inclusion of socio-economic controls. The coefficients across all columns appear approximately 25% smaller than those in the baseline after partialing out the socio-economic constraints, yet they remain significant at the 5% level or above. These results suggest that, while some of the effects of having a connected county official on building damage may come from the lack of financial resources during the construction, this mechanism alone cannot explain most of my findings. They also reinstate the argument that the consequences of patronage ties extend far beyond the immediately visible economic outcomes.

Hometown Shocks I consider an additional threat to identification, namely, that the $HometownTie$ of county officials may capture shocks to some specific homes of origin. For example, officials from some specific cities may be particularly good (or bad) at regulating the construction industry — due to, for example, the city's earthquake history or its industrial endowment. My

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[39] The results are robust to restricting the sample to the one used in my baseline analysis, for which both the construction and the damage are observed.

results may be biased by this home-of-origin effect if these places also tend to produce fewer (or more) prefectural leaders. To rule out this possibility, I estimated the baseline model with the set of hometown fixed effects so that the comparison is of officials with the same homes of origin. The results are reported in Table C4. Unsurprisingly, the estimated coefficients shrink after the exclusion of between-hometown variations, yet they remain significant at least at the 10% levels. Therefore, I believe that my results mainly reflect the essence of being connected via hometown ties rather than capturing some shared city effects specific to some hometown.

Taken together, the results that I have presented in this section show a robust causal effect of patronage ties at the time of building construction on the damage of buildings during the 2008 Sichuan earthquake. The effect is significant both statistically and economically. There is no evidence that the finding suffers from sample selection, manipulation, or other bias associated with the most prominent omitted variables at the building, county, and individual levels.

5 Interpretation

The results I have presented provide clear causal evidence that the poor resistance of buildings may be attributable to the authority of officials involved in patronage networks. This section delves deeper into why this causal effect occurred. Specifically, I attempt to investigate two questions: i) does this effect reflect malevolent behavior of connected officials or non-intentional consequences arising from their presence of connected officials in a particular location, and ii) are connected officials different from others in their types (political selection) or their incentives (moral hazard). Both questions are hard to answer as we do not observe directly either the behaviors or the incentives of those officials associated with building construction. Yet, developing at least a conceptual understanding of these questions is crucial to an accurate interpretation of my findings.

5.1 Malevolent behaviors or unintended consequences?

One central question for the interpretation is whether the poorer earthquake resistance reflects malicious behavior of connected officials (corruption, rent-seeking, etc.) or merely non-intentional consequences. The anecdotal evidence associated with shoddy buildings suggests that the abuse of power might be a plausible (if not definitive) explanation. However, since I do not have information about the contractors (or their interactions with local officials) in my data, there might be alternative stories in which the consequence is unconscious. Below, I will lay out three prominent explanations and evaluate the extent to which they can explain my findings. Additionally, I will offer an additional piece of evidence pointing towards the abuse-of-power interpretation.

Benevolence of Unconnected Officials The baseline estimation, in its essence, represents the relative difference between connected and unconnected buildings in their seismic resistance. However, it does not inform us about which one of them should be considered benchmarks for proper interpretation. One possible scenario could be that the connected buildings were by no means defective, and they appeared shoddy only because the unconnected buildings to which they were compared had exceptionally high resistance. Given the strong magnitude of the earthquake, it could be that only buildings of exceptional resistance survived the earthquake.[40] The excellent resistance of those surviving buildings may not even be efficient if the (ex ante) seismic hazard was low (given that an earthquake is essentially a tail event).

To better understand the nature of the difference, I leverage additional information on the requirement for seismic resistance specified in the building codes, which serves as a reasonable benchmark for what is legally or ethically "acceptable".[41] As noted in Section 2, the building codes specify the range of ground motion under which a building should *not* collapse.[42] I compare this required resistance to the actual (perceived) ground motion a building experienced during the earthquake at its locality and partition my sample into three groups: buildings for which the perceived motion is weaker than, equivalent to, or stronger than the resistance requirements (hereafter, "mildly", "moderately", and "severely" hit buildings). A building compliant with the building codes should not collapse when hit by seismic waves that are weaker than or equivalent to the level of resistance it is required to have, and its collapse is perhaps venial if the seismic waves are stronger than the required level of resistance. On the other hand, the collapse of a mildly or moderately hit building is almost surely a signal of code noncompliance.

I estimate the effects of having a connected official for each of the three groups by multiplying the $HometownTie$ indicator with the set of dummies denoting whether a building was mildly, moderately, or severely hit by the earthquake (in relative terms to the level of resistance it was required to have).[43] The dependent variable is an indicator of building collapse (either partial or full collapse).[44] The estimates, using specifications parallel to the baseline, are reported in Table C5. I find that hometown ties matter only for buildings that experienced a moderate ground motion under which a building that is compliant with the code should not collapse. I do not find evidence that unconnected buildings had a higher chance of survival when the perceived ground motion was stronger than the resistance requirement. Thus, my findings mainly reflect connected buildings' failure to pass the bar rather than unconnected buildings' ability to exceed it.

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[40] As mentioned earlier, the government officially attributed the collapse of buildings and the high mortality to the "unusually severe extent" of the earthquake (Caixin, 2009).

[41] Note that being legally or ethically acceptable is neither sufficient nor necessary for being economically efficient, as the building codes might not be efficiently specified (e.g., too strict requirements when the hazards are low). However, while the efficient level of resistance remains an open question, it is unlikely that the required resistance was higher than that bar given the high earthquake hazards in the area (see Section 2). In fact, the government revised the building codes to increase the required level of resistance significantly after the 2008 earthquake (National Codes of P.R.C., 2015), which indicates that the previous requirement might have been too low.

[42] This resistance requirement is location specific, and was modified in 1990 and 2001, as was documented in National Codes of P.R.C. (2001) and China Earthquake Administration (1990, 1977). I extract the location- and period-specific requirement for each building from `http://www.gb18306.net/`.

[43] My findings are robust to using absolute measures of earthquake intensity without referring to the required resistance.

[44] I use the building collapse indicator as the dependent variable for this exercise to facilitate the interpretation in terms of code violation. The estimates are consistent with the ones using the same 5-point damage scale as I have used in the baseline.

The pattern is revealed more clearly in Figure 7, in which I plot the predictive margins of the probability of building collapse using the estimates from column (6) of Table C5. First, focusing on the unconnected buildings (marked by triangles), I find that the probability of collapse barely changes when the perceived ground motion is weaker or equivalent to the required resistance, and increases substantially when the ground motion exceeds the required resistance levels — a pattern that makes perfect sense for code-compliant buildings. Turning to the connected buildings (marked by circles), I find, in sharp contrast, a substantial increase in the probability of collapse when the perceived seismic intensity is just within the range of required resistance. Furthermore, these buildings are at least as likely to collapse as they are when hit by stronger, beyond-resistance seismic waves. In addition, while connected buildings appear more likely to collapse than their unconnected counterparts overall, a pattern consistent with the baseline, the gap is particularly stark for a ground motion equivalent to the required resistance, which is consistent with the estimates in Table C5. There is, however, no statistical difference between the two groups for stronger motions.

Taken together, the observed patterns suggest that corner-cutting and code noncompliance are causing the vulnerability of connected buildings. Therefore, the difference in building damage likely reflects the malevolent behaviors of connected officials rather than the benevolence of unconnected officials.

Knowledge about Building Construction The second explanation that reconciles the innocence of connected officials is that connected and unconnected officials may have different information or skill sets relating to (managing) construction projects. For example, connected officials may be ignorant of the seismic resistance measures to which they should pay attention, or they may lack the ability/experience to enforce them effectively.[45] Another possibility is that connected and unconnected officials may have different perceptions of earthquake hazards and/or the optimal level of resistance. In either case, the outcome should not hinge on the officials' private stakes associated with building safety.

I evaluate this explanation by exploring the heterogeneity in treatment effects across building types, for which the officials' private stakes may vary. For example, the safety of government headquarters would be most directly associated with the officials' own welfare as they themselves work (and in many cases, live) there. Conversely, buildings mainly accessed by the public (e.g., schools, hospitals, libraries) may be less relevant and receive a smaller weight in the officials' private utility function. If my findings mainly reflect the gap in knowledge or information, we should expect the effects to be homogeneous across all types of buildings. If, on the contrary, the effects are pertinent to the officials' personal stakes in the buildings, the evidence would undermine the plausibility of a lack of knowledge/information story and suggest that selfish motives might be at play.

Figure 8 presents the results visually; I obtain these by multiplying the $HometownTie$ indicator

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[45] Such difference in knowledge may arise from the potentially distinct career paths between connected and unconnected officials. For example, one possible scenario could be that connected officials have comparative advantage in political tactics whereas unconnected officials have more expertise knowledge in specific fields (though I do not have enough information to test this hypothesis in my data).

with the set of dummies, each denoting a specific type of buildings in my sample: hospitals, schools, public organizations, SOE factories, and government headquarters. The figure plots the estimated coefficients for each building type, along with their 95% confidence intervals. According to the graph, schools and hospitals appear to be particularly vulnerable to the authority of politically connected officials, whereas other types of buildings are relatively less susceptible. More importantly, the effect of $HometownTie$ is even negative — despite its large standard error — for state-owned factories and government headquarters. I conduct a post-estimation test that confirms statistically significant differences between hospitals and other types of buildings. Overall, the pattern suggests that connected officials seem able to internalize the cost and benefit of building safety into their decision making, and therefore the difference in earthquake damage does not merely reflect a potential knowledge/information gap between connected and unconnected officials.

Priority among Policy Objectives A third explanation is that connected and unconnected officials may have different policy agendas and give different priorities to building code enforcement. For example, connected officials may prioritize quantity over quality, or focus more on other issues the county needs to address (e.g., growth and pollution). As a result, the difference in building damage might reflect the different policy objectives that connected and unconnected officials choose to prioritize rather than willful misconduct.

To investigate this possibility, I explore the differential effects of hometown connections for party secretaries and for governors. While both are the top officials in a county, they differ substantially in their ranges of responsibilities. The party secretary, who retains the formal political authority in the county (and more powerful politically), sets the general policy line and oversees the work of the government; the governor, being the head of the government agency, is responsible for making and implementing specific policies and administering social programs (Shirk, 1993). Consequently, party secretaries are more responsible for any consequences associated with agenda setting, whereas governors are placed in a position that is more susceptible to direct embezzlement or favor exchange.

Motivated by this institutional structure, I attempt to distinguish between the hometown ties of the party secretary and that of the governor and separately estimate their impacts on building damage. The results, summarized in Table 5, reveal that the overly-damaged buildings were mostly constructed in the administrations of connected governors; the connected party secretaries, on the contrary, exhibit much smaller effects, which, although still positive, are nonsignificant at conventional levels. Therefore the evidence suggests that a differential in policy priorities is *not* a significant factor; if it were, we would expect most effects to come from connected party secretaries. It also provides additional support for the malevolent interpretation by showing that the effects mainly come from officials who are in direct charge of project administration (i.e., governors) who have more opportunities for rent-seeking.

Abuse of Power The evidence I presented above consistently points towards the potential abuse of power by connected county officials: (a) the collapse of connected buildings likely reflects corner-cutting and code-noncompliance during the construction, (b) officials seem to be able to internalize the costs of low-resistance buildings in which they themselves work and live, and (c) hometown ties matter only for officials in direct charge of public projects. Since these projects are largely administered by local government officials, their abuse of power would lead to a pattern of corner-cutting and undue laxity with respect to quality/safety control in the construction process. As a result, the buildings they administered were not code-compliant, had insufficient seismic resistance, and collapsed more easily during the earthquake.

This interpretation suggests that connected officials failed to assume their duty in administering the project and enforcing the building code. One implication is that the difference between connected and unconnected buildings should be reduced if there are other parties involved in the construction that might be able to fulfill these duties. I test this hypothesis by looking at buildings which were privately financed, through fundraising, donations, and individual or corporate investment. These financial backers often have direct interest in ensuring the quality and safety of the buildings.[46] I multiply $HometownTie$ and an indicator that equals 1 if private funds have at least partially financed the project (the information is occasionally revealed in the county gazetteers) to estimate the heterogeneous treatment effects by funding source.

The results are reported in Table 6, with all specifications parallel to those in the baseline. A few patterns emerge from the table. First, the coefficients on $HometownTie$ across all specifications are larger than those in the baseline, and all are significant at the 1% level once the funding source has been accounted for. This set of coefficients estimates the average effect of $HometownTie$ on earthquake damage for buildings not associated with any form of private resources. Second, the coefficients on the interaction term, $HometownTie \times PrivateFund$, are negative and significant at least at the 10% level in the most saturated specifications. Moreover, the magnitude of the coefficients on the interaction term is, if not larger, as large as those on $HometownTie$, suggesting that the involvement of private capital serves to mitigate or even offset the adverse effect of having a connected official. Thus, the evidence shows that other stakeholders may effectively fulfill the roles that an otherwise responsible administrator should have played.

One alternative interpretation of this mitigation effect is that having private funding might imply having more funding to spend, which would naturally increase the quality and resistance of buildings. If this explanation holds, we would expect an improvement in seismic resistance for unconnected buildings as well. However, the coefficient on $PrivateFund$, which captures the role of private funds for buildings constructed outside a connected regime, is close to zero and statistically nonsignificant. Thus, the involvement of private funds does not appear to improve building safety in general; rather, it only serves to prevent the detrimental effects that connected county officials would have otherwise caused.

To sum up, by exploring heterogeneous effects along a variety of dimensions, I find it hard to reconcile the evidence with any explanation in which the consequence of having a connected official

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[46] For example, they may name the buildings after their names or brands, so that the building quality matters for their reputation. To do so, they often participate in managing and overseeing the project to prevent corner cutting activities. See Branigan (2008) for a notable example.

was unintended. The multiple pieces of evidence collectively suggest that there may be unobserved malevolent behavior occurring in government-managed projects administered by connected county officials. Such behavior may make buildings inordinately vulnerable to earthquake hazards.

5.2 Selection or Incentive?

The previous section presents evidence that connected officials might be more involved in malevolent behaviors (be it shirking or corruption), which leads to a lack of seismic resistance in buildings constructed during their administration. Yet, it remains unclear why these officials behave differently. There are two possible channels, each associated with a different type of benefit that the patron may offer to the client. The first channel is political selection (in which case the patron offers jobs): connected individuals may have lesser administrative ability or be less ethical than unconnected ones if having connections gives them an additional advantage over, orther, perhaps more qualified candidates. Such negative selection has been extensively documented in the patronage literature (e.g., Xu, 2018). The second channel is moral hazard (in which case the patron offers shelter or protection): connected officials may have fewer incentives to exert effort or maintain integrity once they know that they will not be held accountable under the authority of their patrons.

To investigate whether one or both of these channels play a role in explaining my findings, I exploit additional information on whether the county officials had patronage ties with their prefectural superiors when they were first appointed to the position. This information provides a possible indicator of those who have benefited from the selection channel. Comparing buildings constructed in the administration of "connected appointments" (officials connected when appointed) versus "unconnected appointments" (officials unconnected when appointed) would suggest the effect that comes from political selection. Correspondingly, comparing the effects of "connected construction" (connected at the time of building construction) versus "unconnected construction" (unconnected at the time of building construction) holding the selection channel constant would suggest the role of incentive changes induced by patronage ties.

Following this idea, I divide the buildings in my sample into four groups by the connectedness status of the governing officials at the time of appointment and at the time of building construction:

1. Connected at the time of appointment and at the time of construction
2. Connected at the time of appointment and not at the time of construction
3. Not connected at the time of appointment and connected at the time of construction
4. Not connected at the time of appointment nor at the time of construction

I estimate the differences in building damage across the four categories, for which group 4 (buildings with "unconnected appointment and unconnected construction") is taken as the reference group for comparison. The estimation controls for all the covariates that have been included in the baseline estimation.

I plot the estimated coefficients in Figure 9, along with their 95% confidence intervals. First, focusing on the comparison within the "unconnected appointment" group (the first two columns), I find a large and significant increase in building damage if the previously unconnected county officials became connected (as a result of personnel changes at the prefecture level) at the time of building construction. Since these officials did not have connections when they were appointed to office (hence no selection), this coefficient estimates the effect that comes solely from changes in their incentives. I do not observe a corresponding effect among buildings constructed by "connected appointment" officials: the two estimated coefficients are similar and cannot be statistically distinguished from each other. Thus, officials do not seem to become more prudent after their patrons leave office.

To probe the effect from political selection, I compare the difference in building damage associated with the governing officials' connectedness status at the time of appointment while holding constant connections at the time of building construction. The difference between column (1) and (3) estimates the effect of a connected appointment in the absence of a connected construction (hence no incentive). The coefficient is positive, significant at the 10% level, showing that negative political selection may also be at play. For buildings constructed in a connected year (connected construction), the coefficient on connected appointment is smaller than the one on unconnected appointment (though the difference is not significant at conventional levels), which may be indicative of the relative importance of the two channels.

Taken together, the estimates in Figure 9 suggests that both the selection and the incentive channels may be at play. This finding further indicates the range of benefits that a senior official may offer to a junior official through the patron-client relation. Consistent with the theoretical account in the literature, the patrons seem to be offering positions to connected individuals who have lesser administrative ability or are less ethical and protecting them from being accountable for illicit activities.

6 Discussion

The building-level analyses provide plausibly causal evidence that the connected county officials may have been associated with violations and abuses in the construction industry that reduced the resistance of buildings to collapse. The internal validity of the causal inference has been established by a differences-in-differences style design that compares buildings constructed under the authority of connected county officials to their unconnected counterparts conditional on various geographic, building, and individual profiles, and a few additional checks that rule out the most prominent alternative explanations. However, the external validity and the welfare consequence of this causal relation remain unclear. In this section, I attempt to offer a tentative discussion of these issues without the intention of drawing any definitive conclusion from these discussions. Understanding the potential and limitations of my study with respect to external validity and welfare consequences is crucial to better assessing the broader implications of my findings.

6.1 External Validity: Cross County Evidence

As discussed in Section 3.5, one limitation of my study is that the sample is non-random and may not be representative of all buildings in the quake-affected area. Also unclear are the economic implications of the excess building damage. To address these issues, I supplement my building-level findings with an analysis of county-level aggregates that allows me to examine more systematic and economically relevant outcomes. While this analysis only admits cross-sectional correlations with no causal implications, it is at least suggestive of the extent to which the causal relation I draw from my building-level analysis can be generalized.

Model Specification My county-level sample contains all 181 counties in Sichuan Province. For each county, I observed the aggregate statistics of fatality and direct economic loss decomposed by sectors. I aggregated a county's exposure to connected officials between 1978 and 2007 to construct two measures: an indicator denoting whether the county once had a connected official and the cumulative number of years of having connected officials. The estimating equation takes the following form:

$$Y_i = \beta Tie_i + \mathbf{X_i'\Gamma} + \epsilon_i \tag{4}$$

where i indexes counties. Y_i denotes any of the aggregate outcomes that I study: the earthquake fatality and direct economic loss. Tie_i denotes any of the cumulative measures of exposure to connected officials: ever-connected and the cumulative number of years being connected. $\mathbf{X_i'}$ denotes a vector of county-level covariates: average seismic motion, average ruggedness, the logarithms of GDP in 2007, the population in 2007, and the connection status of the county officials in 2008. These controls take into consideration the geographic determinants of earthquake intensities, the socio-economic conditions at the time of the earthquake, and the potential manipulation of the statistics of damage. The model does not, however, account for the potential factors that could possibly make vulnerable counties more favorable to the connected officials — for example, worse rule of law — which could bias my results. Therefore, I refrain myself from making any causal claims beyond noting cross-sectional correlations between the exposure to connected officials and the mortality and economic loss in the 2008 earthquake.

Average Effect I start by estimating the average effect of hometown connections on aggregate damage statistics according to Equation 4. The results are presented in Table 7. The first three columns consider the logarithm of fatalities (the total number of people who died or became missing in the earthquake). In column (1), I compare the earthquake fatalities between the ever-connected counties versus the never-connected ones, conditional on the geographic, socio-economic, and during-earthquake connectedness controls. The coefficient on *OnceConnected* is 0.457, significant at the 5% level. It suggests that the total number of dead or missing is approximately 46% higher, on average, in counties with exposure to connected officials relative to that in never-connected counties. Columns (2) and (3) consider the marginal effects of having one additional year of exposure by looking at the cumulative number of years that a county has had a connected official. The coefficient on $YearsConnected$ in column (2) is 0.125, significant at the 1% level. This suggests that one additional year of having a connected official is associated with an approximate 12.5% increase in earthquake fatality. This coefficient is reduced by about one-third if I restrict the comparison to counties within the same prefecture, as shown in column (3), in which the set of prefecture fixed effects is included; yet the effect remains significant at least at the 10% level.

The next three columns examine the effects of cumulative hometown ties on the logarithm of direct economic loss. Column (4) compares the ever-connected versus the never-connected counties. The estimated coefficient on $OnceConnected$ suggests, on average, a 33% higher direct loss in economic value in counties that ever had a connected official, a significant effect at the 5% level. Columns (5) and (6) estimate, with and without the prefecture fixed effects, the marginal effects of the cumulative number of years being connected. The results show that one additional year of having a connected official is associated with a 3–5% increase in total economic loss, significant at least at the 5% level.

Incremental Effect Next, I attempt to identify how hometown connections exacerbated the damage of the earthquake at different intensity levels. Specifically, I include the interaction terms between each of the two connection measures ($OnceConnected$ and $YearsConnected$) and the local ground motion parameter (PGA), which estimates the incremental mortality and economic loss associated with hometown connections as a function of seismic intensity. The results are reported in Table 8, the structure of which parallels that of Table 7. Focusing on the main effects, I first find that the coefficient on $ln(PGA)$, which estimates the linear effect of seismic intensity on damage in the absence of connections, is positive and statistically significant across all specifications. Meanwhile, the connection measures, which estimate the influence of patronage ties in places untouched by the earthquake (zero ground motion), do not matter for mortality and economic loss from the earthquake. Both results may serve as verifications of the validity of the aggregate damage statistics.

What are even more interesting are the coefficients on the interaction terms ($OnceConnected \times \ln(PGA)$ and $YearsConnected \times \ln(PGA)$), which estimate how patronage ties affect the association between earthquake intensity and its damage. The estimates for mortality are all positive and statistically significant (columns 1–3), showing that an increase in seismic intensity would lead to more additional deaths in once (or more frequently) connected counties than in never (or less frequently) connected ones. The marginal increase is significant both statistically and economically: an increase in earthquake intensity in counties once governed by a connected official would lead to a $0.58/1.52 = 38\%$ larger mortality increase (in logs) relative to an increase in earthquake intensity in unconnected counties (column 1), and having been governed by connected officials for an additional year would lead to a $0.09/0.87 = 10\%$ larger mortality increase (in logs). Thus, having been governed by connected officials for 10 years (out of the 30-year period) is equivalent to a doubling of the ground motion parameter ($\ln(PGA)$), which is in turn equivalent to increasing the seismic intensity scale from, for example, VI (the intensity of a magnitude $4.9M_w$ earthquake at the epicenter) to VIII (the intensity of a magnitude $6.1M_w$ earthquake at the epicenter), or to being

100km closer to the epicenter of this earthquake. I do not find the association between earthquake intensity and economic loss to depend on hometown connections.[47]

Sector-specific effects Additionally, I explore the effects of cumulative hometown ties on direct economic loss in different sectors. The outcomes that I observe include losses in economic value to infrastructure, education facilities, health facilities, government agencies, and physical losses in agriculture, manufacturing, and service sector operations. All estimations take into consideration the geographic and socio-economic controls and the set of prefecture fixed effects. The results are summarized in Table C6. I first observe a consistent positive effect of cumulative hometown ties on direct losses in all sectors. The magnitudes range between 0.5% to 5.0%, depending on the specific sector. Most of the coefficients are significant at least at the 10% level, with the only exception being that of government agencies, which is, nevertheless, still consistent with the pattern that I observe in my building-level results.

Broader Implications While I focus on a single earthquake in China, the idea that institutional failure leads to greater damage upon negative shocks may be applicable to much broader settings. There are news reports from across the globe that describe the common phenomenon of suspicious building collapse as a result of substandard construction, which is often an indicator of corruption. The phenomenon is ubiquitous across a wide spectrum of countries regardless of the form of government. For example, rampant corner-cutting was discovered after the collapse of Florida's Champlain Towers South on June 24, 2021, a catastrophe that killed a total of 98 people (Putzier et al., 2021). It is reported that the developers of the condo building were accused of paying off the officials to get through the permit system as the site was being built in 1981 (Swaine et al., 2021; Fitz-Gibbon, 2021). Other examples include similar reports from Turkey (Kinzer, 1999), Iran (Pejhan, 2003), Mexico (Lin, 2017) and Italy (Scaglia, 2010).

The institutional determinants of disaster deaths have also been documented in cross-country studies. Kahn (2005) shows that the annual deaths from natural disasters for 73 nations from 1980 to 2002 is negatively correlated with regulatory quality, voice and accountability, rule of law, and control of corruption. Ambraseys and Bilham (2011) show that the death toll from earthquakes is positively correlated with the corruption perception index of a country. Both exercises exploit country-level variations, suggesting that the association between institutional failure and disaster deaths may be a systematic phenomenon beyond occasional anecdotal accounts.

More broadly, the notion of institutional failure and social vulnerability may apply to other realms of the economy beyond natural disasters. One such example is shadow banking in the financial system. In China, at least four top-level regulators and nine senior banking executives have been under investigation for providing illicit financial services (Wu and Cheng, 2018). In the U.S., collusion between banks and regulators has also been blamed for the oversight failures that amplified the financial crisis (Kaufmann, 2009). Another example is public health: several

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[47] This is unsurprising because mortality rate is more sensitive to the interplay of earthquake intensity and building resistance than is economic loss.

studies have provided tentative evidence that links corruption to adverse health outcomes (e.g., Delavallade, 2006; Azfar and Gurgur, 2008; Glatman-Freedman et al., 2010). During the ongoing COVID-19 pandemic, corruption and institutional failure have also been identified as important factors in inadequate government response and vaccination rollout delays (Noon, 2021).

Overall, the county-level results confirm the presence of a correlation between the authority of politically connected officials and the human and economic loss attributable to the earthquake. While the association is not necessarily causal, it suggests that the patterns I observe at the building level are likely representative of the general role that patronage ties may play in worsening the outcomes of the earthquake. This idea may be applicable to broader settings outside China and beyond natural disasters.

6.2 Welfare Implications

The analyses I have presented demonstrate the detrimental social consequences of patronage ties. However, my study only focuses on the cost side of these ties, and there may be other net benefits that come from these ties that I do not capture. In particular, since an earthquake is by and large a tail event, the expected welfare gain from patronage networks may even outweigh the social costs that I have uncovered if the earthquake did not occur. That is, ex ante, these ties may have improved overall social welfare by trading off the expected gains in normal times against a small probability of entering a bad state with significant loss. While it is beyond the scope of my data and analysis to make any decisive welfare calculation, I attempt to offer a tentative discussion of two most notable sources of potential benefits in the absence of an earthquake. First, focusing specifically on building construction, I evaluate the extent to which there may be a quantity-quality tradeoff of buildings. I then examine how these connections may be associated with broader political and socioeconomic outcomes.

Quality-Quantity Tradeoff One prominent framework that accommodates the possibility of a welfare gain is the quality-quantity tradeoff of buildings. Specifically, connected officials may have more resources and discretionary power to generate higher volume of construction activity at the cost of quality. The increase in the number of public buildings, especially schools and hospitals, may greatly improve human capital (in terms of both education and health) and provide significant benefits for growth and social welfare (Duflo, 2001). The costs from lowering the quality of these buildings may not have an immediate consequence or may even have no consequence at all in the absence of a destructive earthquake.

To evaluate the extent to which my findings may be embedded in a framework featuring the quality-quantity tradeoff of buildings, I construct a balanced county-year panel consisting of 65 counties in the quake-affected area between 1978 and 2007. I examine whether a county tends to construct more buildings in a year in which its top officials are connected via patronage ties, and present the results in Table C7. The dependent variables are the number of buildings constructed in a county and year according to the records in county gazetteers.[48] The first three columns estimate the effect of hometown connections on the construction of any types of buildings in the sample, with and without county fixed effects, year fixed effects, and individual-level controls. Columns (4)–(8) examine the construction for each of the building types separately. Across all columns, I do not find evidence that connected officials sacrifice building quality in order to be able to construct additional buildings.

Socioeconomic Outcomes The previous analysis suggests that the lower building quality associated with connected officials does not seem to have been compensated by more buildings being constructed, which may indicate a partial welfare loss from substandard building construction. However, the finding does not necessarily imply an overall welfare loss, as patron-client connections may serve to improve welfare in many other domains, and an overall welfare gain does not seem implausible. I leave an accurate evaluation of welfare to future studies; here I confine myself to a brief exploration of how patronage ties in my sample may be associated with various political and socioeconomic outcomes beyond building construction. If these connections are associated with a broader set of benefits, it may still be worth acknowledging that patronage ties have some socioeconomic value.

I start by examining whether patronage ties have played a role in promoting local development by estimating their effects on GDP and population growth. The results are reported in the first two columns of Table C8, controlling for county fixed effects, year fixed effects, and individual profiles of county officials (age, gender, education, and term). The estimates are positive, but are statistically nonsignificant, showing no evidence of better economic development associated with these ties. I then examine how patron-client connections affect the public finance of a county by looking at the growth rate in transfer payments that the county receives from prefectural and provincial government sources (column 3 of Table C8). I find a significant increase in transfer payments to counties where officials have hometown connections, which is consistent with the impact of patronage on resource allocation that Jiang and Zhang (2020) documents. The next column (column 4) shows how connected officials distribute these additional funds, and find a significant increase in administrative expenditure, which is often an indicator of higher-level corruption (Cai et al., 2011). I confirm this association by showing that connected officials in my sample are also more likely to be investigated for corruption eventually during the recent anti-corruption campaign (column 5).

The finding that connected officials are also more likely to be investigated for corruption poses the intriguing question of whether they have been held accountable for the substandard construction and building collapse. To investigate this question, I examine the interplay between having connections and building collapse on the probability of being investigated for corruption. Specifically, I regress whether an official has been investigated for corruption on four dummies indicating

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[48] One caveat of this measure is that it essentially captures the construction of buildings documented in county gazetteers, which may well be different from the actual number of buildings constructed. While I do not have other sources to evaluate the selection issue here, I point out that to alter the interpretation of this exercise would require a scenario in which connected officials systematically under-report the buildings they have constructed.

whether he or she has been connected at least once and whether any building constructed in his or her administration has collapsed. I plot the estimated coefficients in Figure C2, in which connected officials without building collapse are considered as the reference group. The first two bars show that connected officials are slightly less likely to be investigated if none of the buildings that were constructed in their administration have collapsed. In contrast, the last two bars suggest that among officials associated with at least one building collapse, connected ones are much more likely to be investigated for corruption afterwards. Meanwhile, building collapse does not seem to affect the probability of being investigated for corruption for unconnected officials (comparing the first and the third bar). Taken together, these patterns can be reconciled with the explanation that connected officials are in general more corrupt than unconnected officials, yet their illicit behavior has been largely sheltered by their patrons until brought to light suddenly by the earthquake.

To summarize, this section attempts to explore the potential welfare implications of patronage ties by examining a broader set of political and socioeconomic outcomes beyond earthquake damage. I do not find evidence that could associate these connections with beneficial consequences such as increased levels of construction or enhanced economic development. Rather, connected officials seem to have received additional resources from the higher levels of government, and are more likely to be involved in corrupt activity — which is often sheltered by their patrons under normal circumstances. However, I reiterate that the evidence I have presented does not permit a thorough evaluation of the overall costs and benefits associated with patronage ties. In particular, my finding does not imply a higher social welfare in the absence of such patron-client networks in China's local politics (as these connections may also facilitate information, build trust, and improve state capacity, and many of these benefits may not be immediately observable either). Notwithstanding the possibility of hidden benefits, my study highlights a massive social cost associated with patronage ties. Given the difficulty of observing such costs, it is, in fact, quite possible that the damage caused by the Sichuan earthquake, though devastating, is just the tip of the iceberg.

7 Concluding Remarks

In this paper, I have examined the link between patronage ties and building damage in the context of the 2008 Sichuan Earthquake. I have constructed two original datasets, one at the building level and the other at the county level. Using the building-level dataset, I have established a plausibly causal relationship between county officials' political connections in the year in which a building was constructed and the extent of damage to that building in the 2008 earthquake. The estimates across a variety of specifications robustly suggest that buildings constructed under the authority of a connected official are 83% more likely to collapse relative to their non-connected counterparts. I have offered some suggestive evidence that the detrimental effects are likely attributable to the lack of building code enforcement due to dereliction of duty or corruption by connected officials. To evaluate the external validity of these findings, I have analyzed a second county-level dataset that allows me to examine more systematic and economically relevant outcomes. The findings show that the cumulative number of years that a county has had a connected official, conditional on geographic and socio-economic conditions, is positively correlated with the aggregate statistics of earthquake damage, such as fatalities and direct economic loss. This result, while not necessarily causal, suggests that the patterns I have observed in my building-level dataset — a possibly selective sample — are likely representative of the role that political connections may play in worsening the effects of earthquakes.

The findings in this paper offer several unique, fresh insights into the understanding of patronage and corruption in general. In particular, the paper brings to light a particularly detrimental social cost of corruption that would be otherwise impossible to observe in most states of the world. It throws into sharp relief the debate over whether corruption is socially detrimental — the answer to which is less obvious if we only look at inefficiencies from resource misallocation or effort distortion. I also emphasize that, by focusing on bureaucratic collusion rather than rent-seeking by firms, I identify a type of corruption that is not only invisible in the present, but potentially unobservable until long after the perpetrators have left the scene of the crime. My findings thus highlight the fact that patronage and corruption my create societal vulnerabilities, but their costs may be latent and hard to observe in the absence of a negative shock — whether natural disaster or financial calamity.

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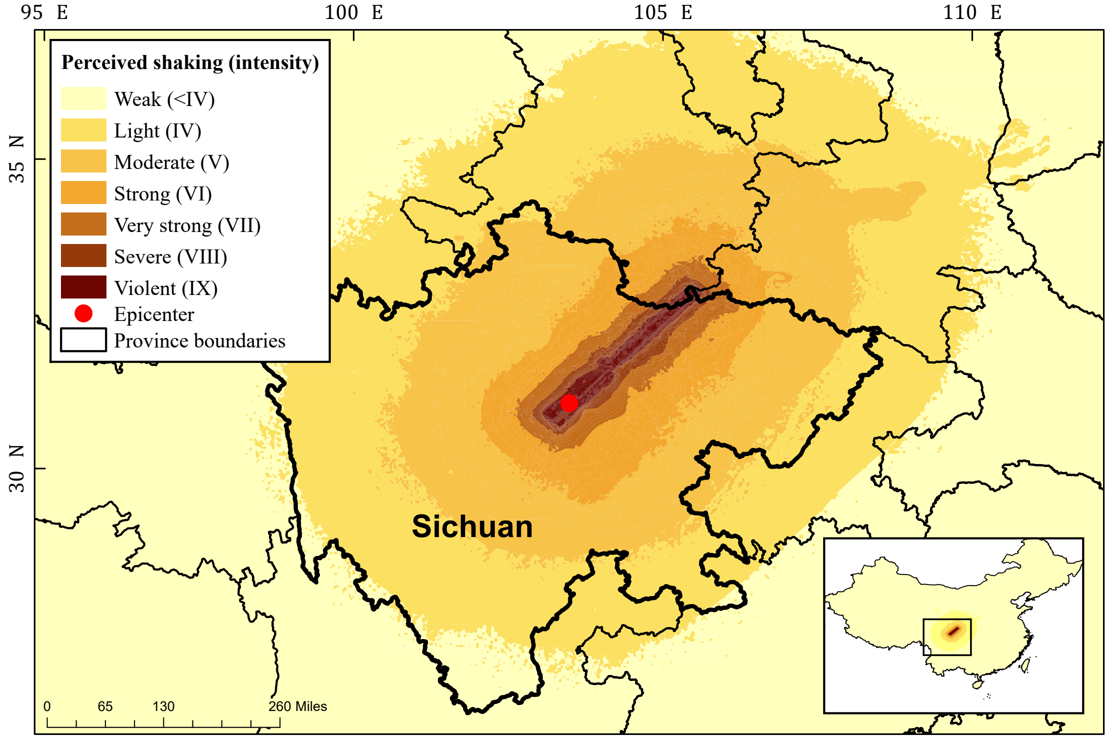
Figure 1: Intensity distribution of the 2008 Sichuan Earthquake



Source: USGS

Figure 2: Spatial distributions of building damages in the sample

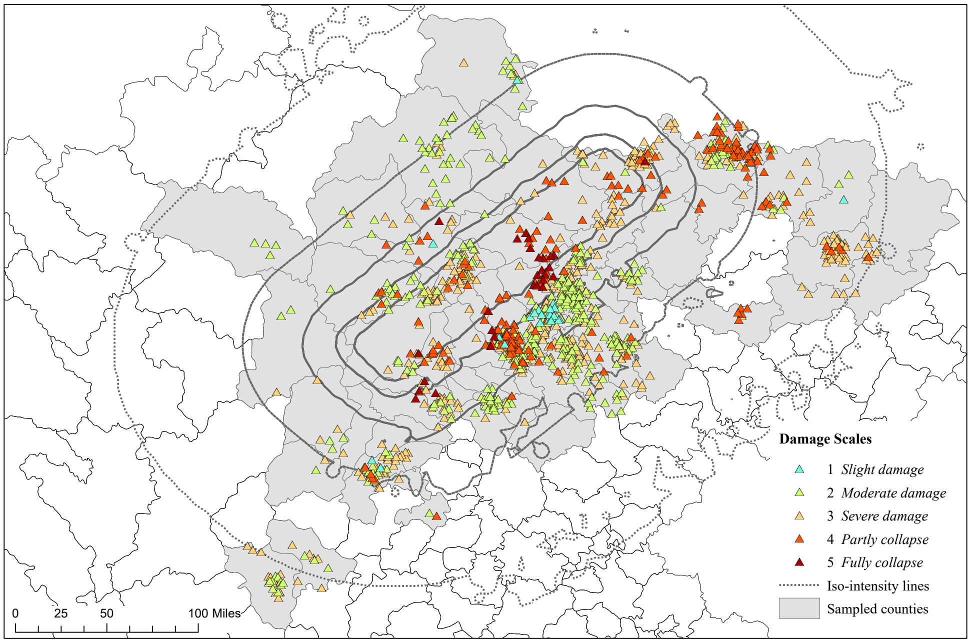
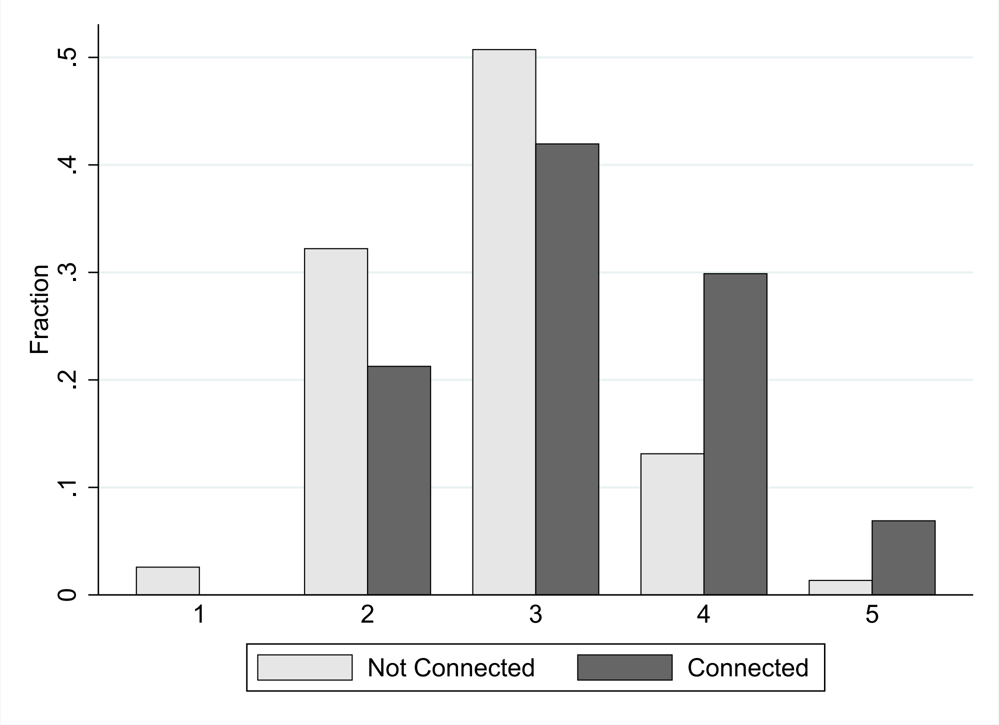


Figure 3: Distribution of damage scales by connectedness



Note. The figure depicts the distribution of damage scales with and without hometown ties. Each bar represents the fraction of buildings that experienced each of the damage scales with and without hometown ties during their years of construction.

Figure 4: Graphic illustration of the identification design for the building-level analysis

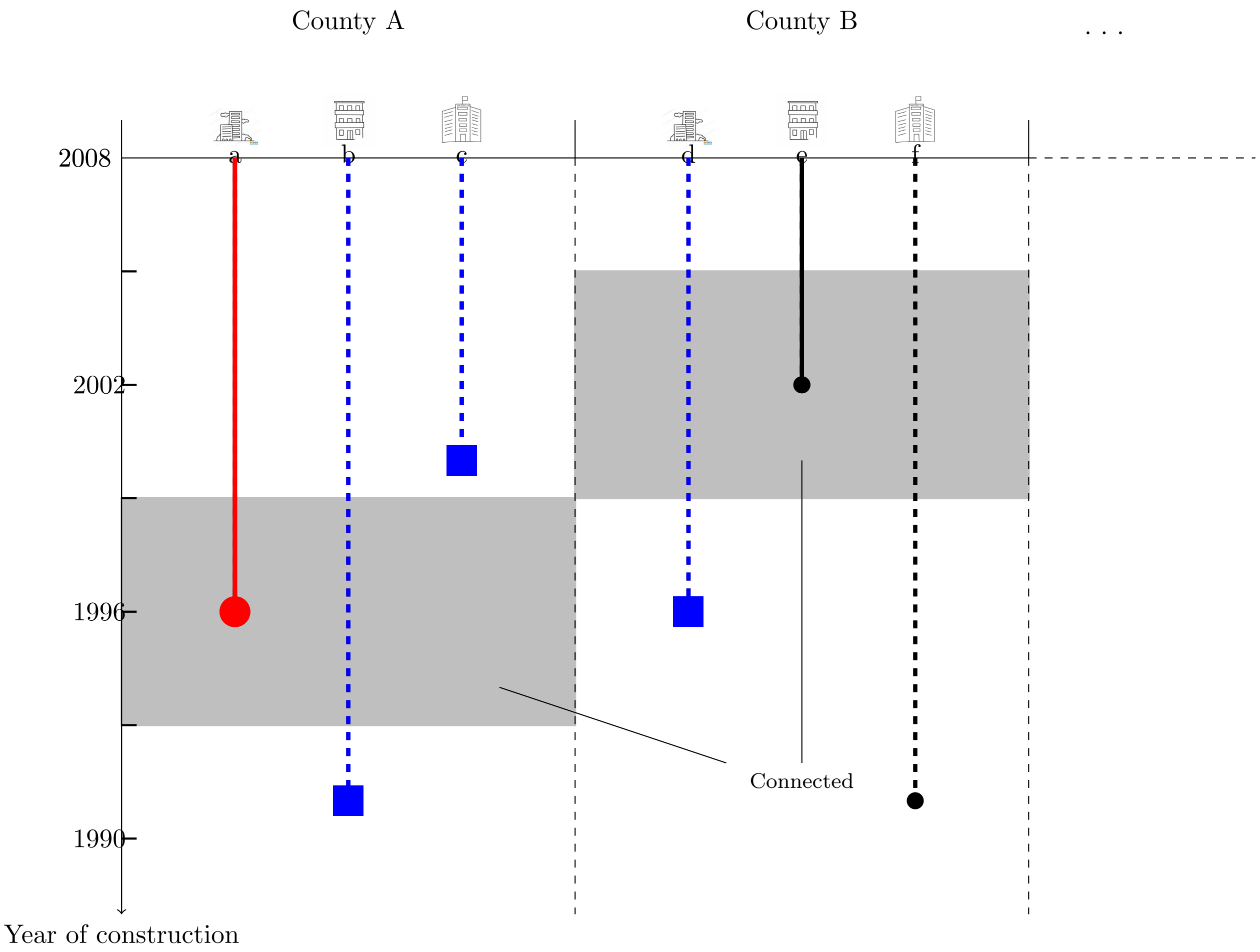
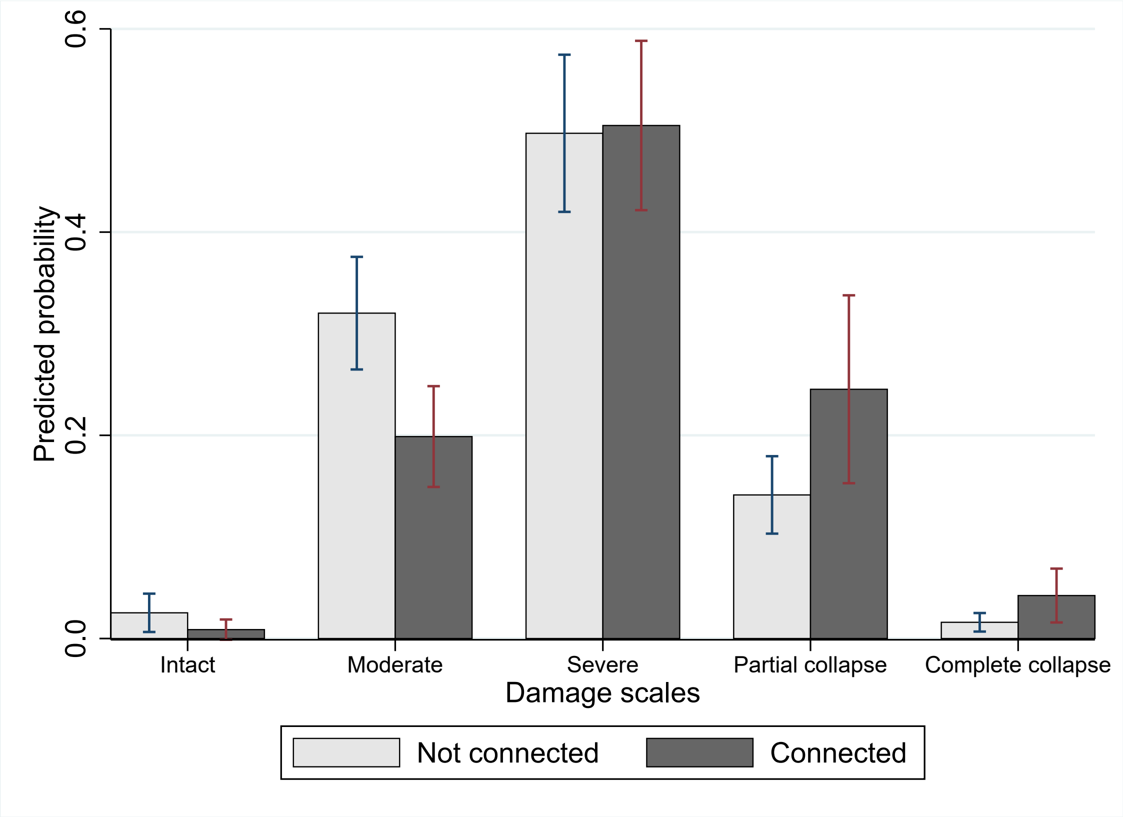
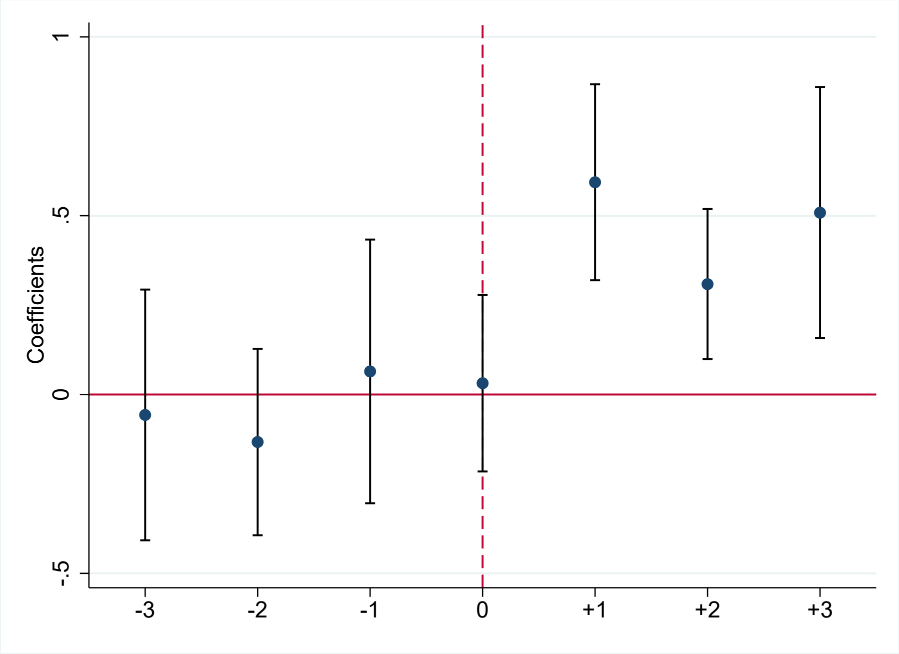


Figure 5: Predictive margins of hometown ties for each damage category

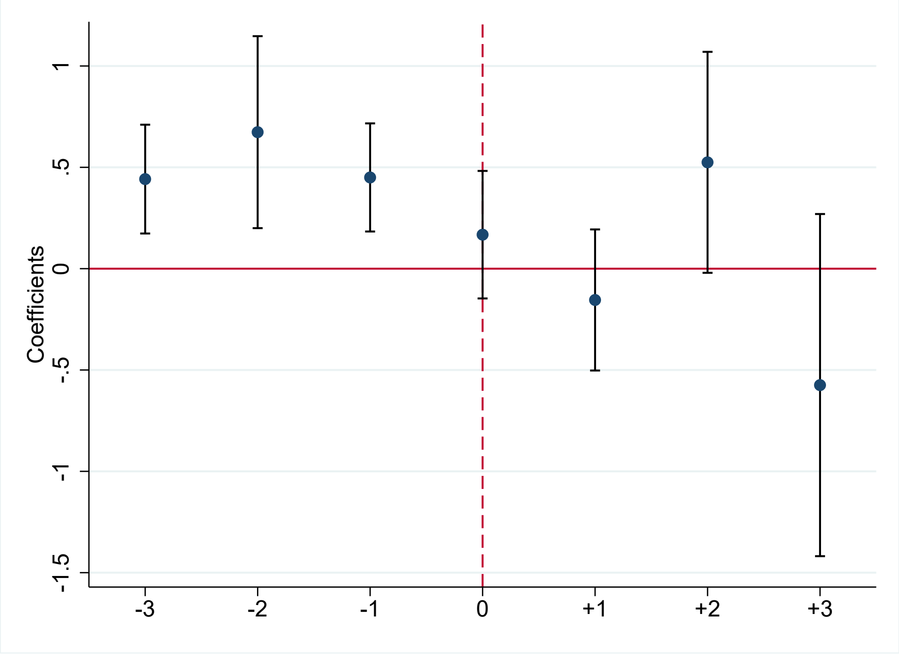


Note. The figure depicts the predictive margins of hometown ties derived from the ordinal-probit estimation in Column (6), Table 2. Each bar represents the predicted probability for each of the damage scales a building would have experienced with and without a connected official when constructed. The regression considers account county fixed effects, year fixed effects, building type by year fixed effects, building features, and geographic controls. Standard errors are clustered by county.

Figure 6: The effects of gaining and losing connections on building damages



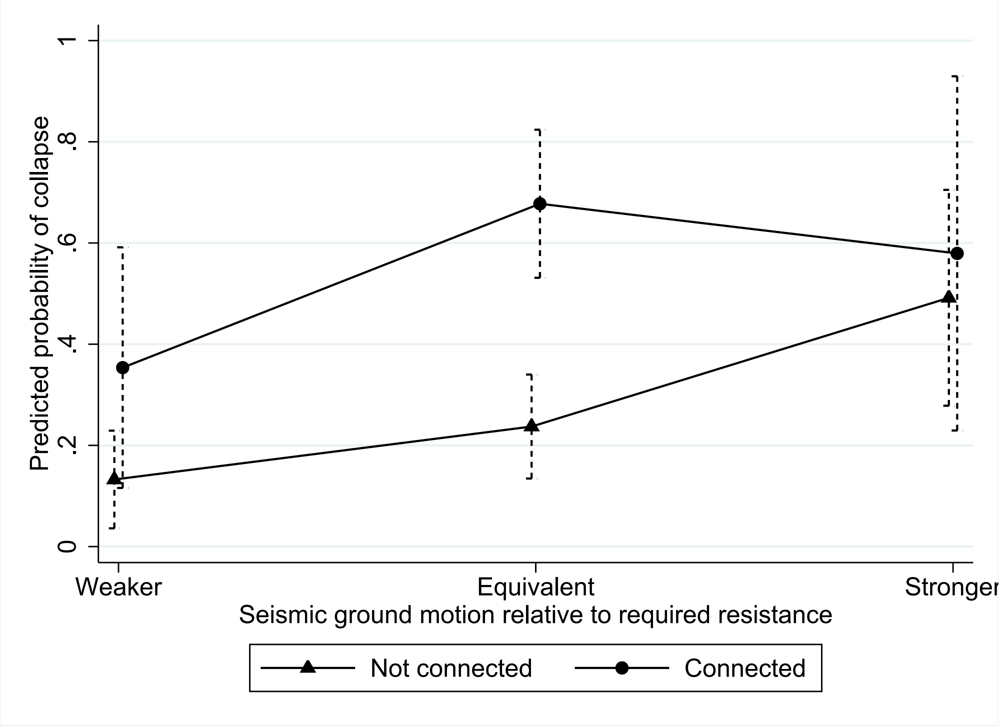
(a) Gaining connection



(b) Losing connection

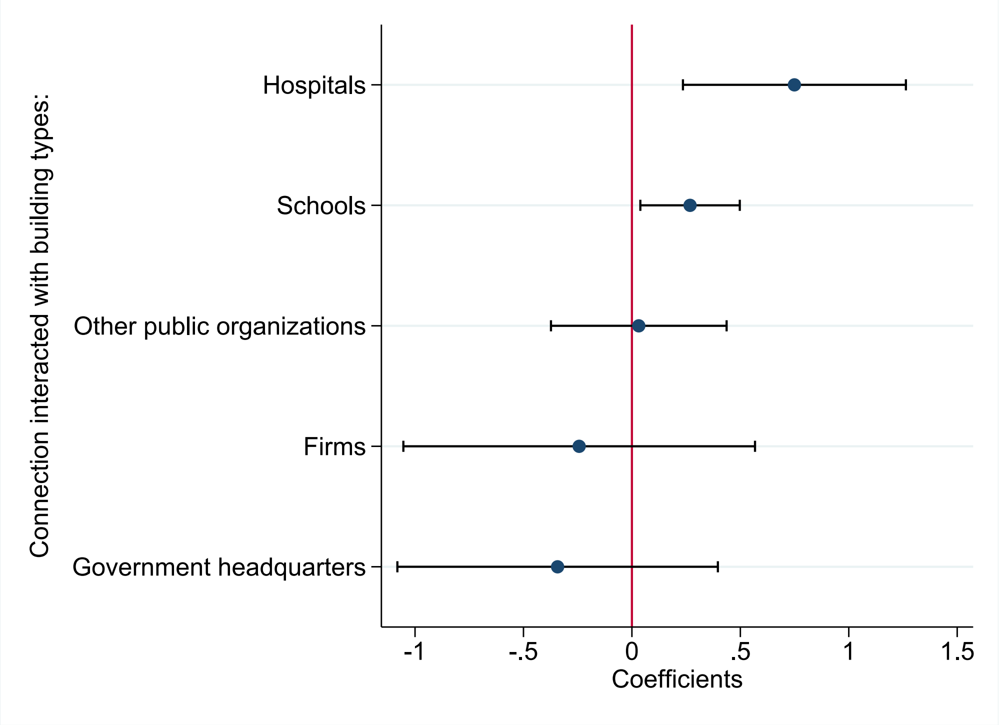
Note. The figures depict the effects of gaining and losing a connected official on building damages. The markers and capped spikes represent the OLS estimators and 95% confidence intervals. Figure 6(a) normalizes the years of construction to the year when the county gains a connected official (year 0), with buildings constructed more than 3 years earlier as the comparison. Figure 6(b) normalizes the years of construction to the year when the county loses a connected official (year 0), with buildings constructed more than 3 years later as the comparison. The dependent variables are the level of damages on the 1–5 scale. The regression considers county fixed effects, year fixed effects, building type by year fixed effects, building features, and geographic controls. Standard errors are clustered by county.

Figure 7: Resistance requirements, seismic intensities and earthquake damage



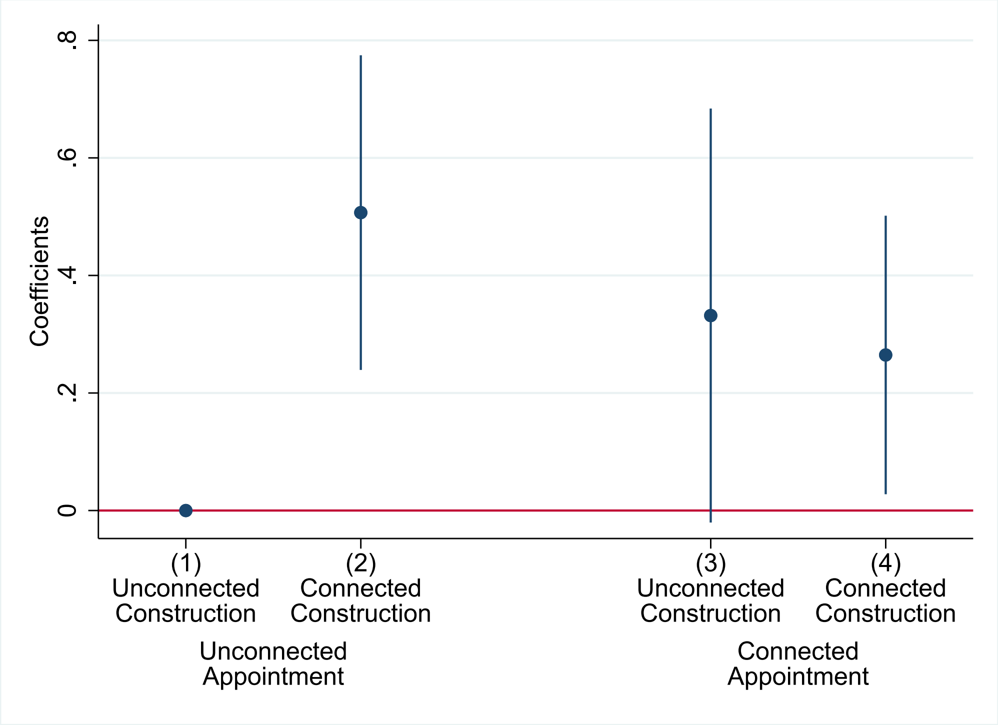
Note. The figure depicts the predictive margins of patronage ties, by seismic groups, derived from the probit estimation in column (6), Table C5. The scatters and connected lines represent the predicted probability of collapse for buildings suffering from a ground motion weaker than, equivalent to, and stronger than the seismic resistance requirements, respectively. The regression considers county fixed effects, year fixed effects, building type by year fixed effects, building features, and geographic controls. Standard errors are clustered by county.

Figure 8: Hometown ties and building damages by building types



Note. The figure depicts the effect of political connection on building damages across different types of buildings. The markers with capped spikes represent the OLS estimators and 95% confidence intervals of the interaction terms between political connection and each of the building types. The dependent variable is the level of damages on the 1–5 scale. The regression considers county fixed effects, year fixed effects, building type by year fixed effects, building features, and geographic controls. Standard errors are clustered by county.

Figure 9: Patronage ties and building damages: selection vs. incentive



Notes: The figure depicts the estimated coefficients of building damage on the connectedness of the governing officials at the time of building construction and at the time of their appointment. The selection effect is estimated by the effect of connected appointment holding the connectedness status upon building construction constant. The incentive effect is estimated by the effect of connected construction holding the connectedness status upon official appointment constant. Buildings constructed by county officials who were unconnected in both time points are in the reference group. The regression takes into account county fixed effects, year fixed effects, building type by year fixed effects, building features and geographic controls. Standard errors are clustered by county.

Table 1: Descriptive statistics of main variables in the building-level analysis

	Obs.	Mean	S.D	Max.	Min.
Outcome					
Damage Scale	1065	2.86	0.79	5.00	1.00
Treatment					
HometownTie	1065	0.16	0.37	1.00	0.00
Geographics					
Peak ground acceleration (% of g)	1065	28.72	23.05	104.00	4.00
Ruggedness	1065	265.96	302.27	1682.99	0.00
BuildingFeatures					
Stories #	55	4.65	2.44	13.00	2.00
Size (1,000 m^2)	611	4.88	14.83	220.00	0.00
Politicians					
AnyFemale	546	0.06	0.23	1.00	0.00
avg(Age)	639	44.05	4.58	56.00	32.00
avg(YrEdu)	792	15.13	2.47	18.00	9.00
avg(Term)	1065	2.97	1.57	8.00	1.00

Note. The unit of observation is a building in the quake-affected area.

Table 2: Patronage ties and building damages

	Dependent Variable: Damage Scale (1–5)						
	OLS						Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
HometownTie	0.440***	0.309**	0.310***	0.305***	0.300***	0.299***	0.634***
	(0.154)	(0.114)	(0.098)	(0.101)	(0.102)	(0.097)	(0.161)
Individual Controls						Y	Y
Geographic Controls					Y	Y	Y
Building Controls				Y	Y	Y	Y
BuildingType × Year FE			Y	Y	Y	Y	Y
County FE		Y	Y	Y	Y	Y	Y
Year FE		Y	Y	Y	Y	Y	Y
Marginal effect							0.307
Wild cluster p-value	0.015	0.008	0.018	0.028	0.023	0.036	
Mean(Dep.var)	2.856	2.857	2.861	2.861	2.861	2.861	2.861
# Counties	37	35	35	35	35	35	35
# Observations	1065	1062	1050	1050	1050	1050	1050
Adjusted R^2	0.042	0.332	0.385	0.388	0.389	0.390	
Pseudo R^2							0.286

Note. The dependent variable in all specifications is the level of damages on the 1(intact or slight damage)–5(full collapse) scale. $HometownTie$ is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education, and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. The marginal effect in column (7) is calculated as a linear combination of the marginal effects for each outcome value. Standard errors are clustered by county.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Patronage ties and selection of buildings

	Dependent Variable: $\mathbb{1}\{DamagesObserved\}$					
	OLS					Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie	-0.0375	-0.0210	-0.0185	-0.0184	-0.0090	-0.0763
	(0.0278)	(0.0245)	(0.0242)	(0.0250)	(0.0218)	(0.0988)
Individual Controls					Y	Y
Geographic Controls				Y	Y	Y
Building Controls			Y	Y	Y	Y
BuildingType × Year FE		Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	0.175	0.175	0.175	0.176	0.176	0.211
# Counties	63	63	63	62	62	36
# Observations	6128	6127	6127	6096	6096	4799
Adjusted R^2	0.222	0.314	0.319	0.321	0.325	
Pseudo R^2						0.298

Note. The sample includes all buildings for which the years of contruction are observed. The dependent variable is an indicator variable denoting that the building's damage scale is observed. $HometownTie$ is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education, and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Column (6) drops observations of which the outcome variable can be perfectly predicted by the set of fixed effects. Standard errors are clustered by county.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Non-supervisor connection and building damages

	Dependent Variable: Damage Scale (1–5)					
	OLS					Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie (w/ non-supervisor)	-0.0408	0.0669	0.0565	0.0625	0.0597	0.1012
	(0.1297)	(0.1119)	(0.1097)	(0.1082)	(0.1062)	(0.1980)
Individual Controls					Y	Y
Geographic Controls				Y	Y	Y
Building Controls			Y	Y	Y	Y
BuildingType × Year FE		Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	2.857	2.861	2.861	2.861	2.861	2.861
# Counties	35	35	35	35	35	35
# Observations	1062	1050	1050	1050	1050	1050
Adjusted R^2	0.320	0.375	0.377	0.379	0.380	
Pseudo R^2						0.280

Notes: The dependent variable in all specifications is the level of damages on the 1(intact or slight damage)–5(full collapse) scale. $HometownTie(non - supervisor)$ is an indicator variable denoting that the county has an official connected with a prefectural-level official in an adjacent prefecture when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Standard errors are clustered by county.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Patronage ties and building damages by position

	Dependent Variable: Damage Scale (1–5)					
	OLS					Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie(secretary)	0.1672	0.1674	0.1483	0.1310	0.0734	0.1847
	(0.1267)	(0.1399)	(0.1481)	(0.1456)	(0.1225)	(0.2285)
HometownTie(governor)	0.2735**	0.2794**	0.2820**	0.2914**	0.3308**	0.6809***
	(0.1066)	(0.1172)	(0.1280)	(0.1169)	(0.1302)	(0.2306)
Individual Controls					Y	Y
Geographic Controls				Y	Y	Y
Building Controls			Y	Y	Y	Y
BuildingType × Year FE		Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	2.839	2.843	2.843	2.843	2.843	2.843
# Counties	35	35	35	35	35	35
# Observations	981	969	969	969	969	969
Adjusted R^2	0.332	0.382	0.386	0.386	0.388	
Pseudo R^2						0.290

Notes: The dependent variable in all specifications is the level of damages on the 1(intact or slight damage)–5(full collapse) scale. $HometownTie(secretary)$ is an indicator denoting that the county has a connected party secretary via hometown ties when the building was constructed. $HometownTie(governor)$ is an indicator denoting that the county has a connected governor via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Patronage ties and building damages by funding source

	Dependent Variable: Damage Scale (1–5)					
	OLS					Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie	0.3386***	0.3653***	0.3571***	0.3530***	0.3522***	0.7449***
	(0.1112)	(0.0877)	(0.0908)	(0.0935)	(0.0867)	(0.1457)
PrivateFund	0.0150	-0.0239	-0.0349	-0.0359	-0.0411	-0.0944
	(0.1298)	(0.1300)	(0.1302)	(0.1261)	(0.1319)	(0.2576)
HometownTie × PrivateFund	-0.2398	-0.4135**	-0.3922**	-0.3948**	-0.4073*	-0.8069*
	(0.1734)	(0.1860)	(0.1827)	(0.1916)	(0.2112)	(0.4305)
Individual Controls					Y	Y
Geographic Controls				Y	Y	Y
Building Controls			Y	Y	Y	Y
BuildingType × Year FE		Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	2.857	2.861	2.861	2.861	2.861	2.861
# Counties	35	35	35	35	35	35
# Observations	1062	1050	1050	1050	1050	1050
Adjusted R^2	0.332	0.389	0.392	0.392	0.394	
Pseudo R^2						0.290

Notes: The dependent variable in all specifications is the level of damages on the 1(intact or slight damage)–5(full collapse) scale. $HometownTie$ is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. $PrivateFund$ is an indicator denoting that private capital has participated in the building's construction. Individual Controls include an indicator for female, an indicator for minority, average age, average education and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Standard errors are clustered by county.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7: Cumulative connections and aggregate loss

	Dependent Variables (arcsinh):					
	Dead or missing			Direct economic loss		
	(1)	(2)	(3)	(4)	(5)	(6)
OnceConnected	0.2846			0.3049**		
	(0.2484)			(0.1477)		
YearsConnected		0.1068***	0.0793*		0.0379*	0.0328*
		(0.0351)	(0.0415)		(0.0224)	(0.0193)
Controls	Y	Y	Y	Y	Y	Y
Prefecture FE			Y			Y
Mean(Dep.var)	1.803	1.803	1.803	2.418	2.418	2.418
# Observations	181	181	181	181	181	181
Adjusted R^2	0.675	0.689	0.795	0.793	0.791	0.924

Notes: The dependent variable in the first three columns is the inverse hyperbolic transformation of the number of deaths (including missings); the dependent variable in the last three columns is the inverse hyperbolic transformation of total economic loss. *OnceConnected* is an indicator variable denoting whether the county ever had a connected official since 1978. $YearsConnected$ denotes the cumulative number of years that the county had a connected official since 1978. The control variable include the county's average seismic ground motion parameter (PGA), average terrain ruggedness, GDP in 2007, population in 2007, connection status in 2008, and a set of indicators denoting whether each of these variables is missing. Robust standard errors in parentheses.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8: Cumulative connections, seismic intensity, and aggregate loss

	Dependent Variables (arcsinh):					
	Dead or missing			Direct economic loss		
	(1)	(2)	(3)	(4)	(5)	(6)
OnceConnected	-0.5243			0.2678		
	(0.3257)			(0.2326)		
Once connected × ln(PGA)	0.6115***			0.0280		
	(0.2168)			(0.1202)		
YearsConnected		-0.0552	-0.0757		0.0224	0.0476
		(0.0509)	(0.0599)		(0.0393)	(0.0330)
Years connected × ln(PGA)		0.0957***	0.0887**		0.0092	-0.0085
		(0.0240)	(0.0341)		(0.0161)	(0.0169)
ln(PGA)	1.7214***	1.6685***	0.9168***	1.7853***	1.7569***	0.8104***
	(0.2023)	(0.1858)	(0.2518)	(0.1108)	(0.1000)	(0.1180)
Controls	Y	Y	Y	Y	Y	Y
Prefecture FE			Y			Y
Mean(Dep.var)	1.803	1.803	1.803	2.418	2.418	2.418
# Observations	181	181	181	181	181	181
Adjusted R^2	0.695	0.717	0.808	0.792	0.790	0.923

Notes: The dependent variable in the first three columns is the inverse hyperbolic sine transformation of the number of deaths (including missings); the dependent variable in the last three columns is the inverse hyperbolic sine transformation of total economic loss. $OnceConnected$ is an indicator variable denoting whether the county ever had a connected official since 1978. $YearsConnected$ denotes the cumulative number of years that the county had a connected official since 1978. $ln(PGA)$ denotes the average peak ground acceleration in the county, measured as % of g. Other control variables include average terrain ruggedness, GDP in 2007, population in 2007, connection status in 2008, and a set of indicators denoting whether each of these variables is missing. Robust standard errors in parentheses.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Online Appendix for
The Social Costs of Patronage Ties:
Lessons from the 2008 Sichuan Earthquake

Yiming Cao

A Additional Background

A.1 China's Building Codes

Given the significant earthquake hazard in China, the Chinese government promulgated its first national building codes in 1974, which were amended subsequently in 1978, 1989, 2001, and most recently in 2010 (Li et al., 2012). The 1974 Code did not work well because it did not impose sufficient safety requirements. The requirements were significantly upgraded in the 1978 Code in response to the 1976 Tangshan earthquake that killed over 200 thousand people.

The guiding goal of the building codes is to ensure that buildings should "[have] no damage under minor earthquakes, [be] repairable under moderate earthquakes, and [suffer] no collapse under severe earthquakes". According to the official explanation, "minor" standards for earthquakes with a 63 percent probability of exceedance in 50 years (or a yearly probability of 2%);[49] "moderate" standards for earthquakes with a 10 percent probability of exceedance in 50 years (0.2% yearly); "severe" standards for earthquakes with a 2–3 percent probability of exceedance in 50 years (0.1% yearly) (National Codes of P.R.C., 1989).

The specifications vary across the country, depending on the estimated earthquake hazards. Most of the regions in Sichuan Province are in the high-intensity zones in which buildings compliant with the codes should sustain (no collapse) at a local seismic intensity scale of VIII or IX according to the China Seismic Intensity Scale (Gao and Shi, 1992). [50] This is equivalent to sustaining an earthquake of magnitude 6.5 at its epicenter. Public buildings such as schools and hospitals are required to survive even stronger earthquakes than this baseline requirement (National Codes of P.R.C., 2004).

A.2 The Terminology of Patronage

The term *patronage* is notoriously ambiguous in political science. Because of its high adaptability to different political, economic, and cultural environments, scholars studying specific contexts often use distinct terms — e.g., patronage, patron-client relationship, clientelism — to describe this

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[49] The probability of exceedance is formally defined as the probability that a certain value will be exceeded in a predefined future time period. Thus, "minor" earhquakes refer to those expected to occur whith a probability of less than 63% in a 50-year period.

[50] Intensities according to the Chinese Seismic Intensity Scale (CSIS) may not be equivalent to the Modified Mercalli Intensity (MMI) measures used by the USGS. A CSIS intensity of VIII or IX is approximately equivalent to a MMI intensity of VII or VIII in terms of the underlying seismic ground motion parameters (National Codes of P.R.C., 2008).

broad phenomenon. Some of them use these terms interchangeably (e.g., Kitschelt and Wilkinson, eds (2007)), while others consider each of them as describing a specific form of the relationship (e.g., Stokes (2011)).

There is no consensus on the formal definition of this concept. For example, Lande (1977) defines the patron-client relationship generically as a "vertical dyadic alliance ... between two persons of unequal status, power or resources, each of whom finds it useful to have as an ally someone superior or inferior to himself. Scott (1972) defines the relationship as an "instrumental friendship in which an individual of higher socioeconomic status (patron) uses his own influence and resources to provide protection or benefits, or both, for a person of lower status (client) who, for his part, reciprocates by offering general support and assistance, including personal services, to the patron". Lemarchand (1977) describes the phenomenon as "patronage, economic security, and protection can be exchanged for personal loyalty and obedience".

Hicken (2011) summarizes four key elements among a variety of terms and definitions that political scientists have proposed to describe this near-universal phenomenon in distinct political and cultural contexts: *dyadic* (personal relationship between two actors), *contingency* (reciprocal benefits), *hierarchy* (unequal political power), and *iteration* (rather than a one-off quids-pro-quo). I follow this approach to refer to patronage as "a favor exchange through informal personal connections between two or more actors (or groups of actors) of unequal political status" and consider it to be interchangeable with related terms such as *clientelism* and *patron-client relationship.*

I emphasize that the patronage in China's context takes a different form from that in many democratic regimes in terms of what it is that patrons and clients exchange (Paik and Baum, 2014; Oi, 1985). In democratic regimes, the relationship often inhabits in party politics, in which a politician-patron distributes public resources (most typically, public employment) in exchange for electoral support from the clients (either their own votes or efforts to secure for the patron the votes of others). In the absence of a competitive election, the benefits patrons offer in China may range from material goods, public offices, and resources to protection in times of trouble. In return, the clients may provide general political support and assistance, including personal services, loyalty, and obedience (Scott, 1972). Hillman (2014) documents how patronage shapes China's local politics in further detail:

> "I became aware that political decision making, particularly at the county and prefectural level, was governed by an unwritten set of rules rooted in loyalty, obligation, self-protection, and mutual self-interest ... officials above a certain rank were typically associated with at least one local power broker working at a senior level in the local state hierarchy. These power brokers provided a range of benefits in return for loyalty. They provided junior officials with access to information and opportunities, and protection in times of trouble. In return, junior officials could be relied upon to do the senior official's bidding. This involved, inter alia, making decisions on the awarding of contracts, supporting or opposing particular policy initiatives, and voting for candidates being considered for promotion." (Hillman, 2014)

B Additional Data Description

B.1 Building Level Data Construction

As explained in the main body of the paper, the building level dataset is constructed by combining two lists of buildings from the archives. In this section, I provide additional information on the nature of the data source and the procedure of sample construction.

Data on Building Damage The data on building damage is obtained from the local *Earthquake Relief Reports* (*Kangzhen Jiuzai Zhi*), which are issued by each county through the local Gazetteer Office (*Difangzhi Bangongshi*). These reports are similarly formatted, though not entirely consistent in terms of the data they present. Counties in Sichuan Province issued these on an occasional basis, and I have used those that are publicly available. As of 2019, 31 counties and 3 prefectures had published their *Earthquake Relief Reports* — from which I extracted a list of buildings located in 37 counties. A prefectural *Earthquake Relief Report* covers materials from all of the counties it governs, which allows me to observe some additional counties that have yet to publish their own *Earthquake Relief Report*.

The books are generally composed of three parts: the damage, the rescue efforts, and the reconstruction projects during and following the 2008 quake. The damage sections contain detailed descriptions and statistics of the damage caused by the earthquake; it is also common for the report to mention the damage to individual buildings. In most cases, the materials are compiled and presented by sectors and by towns. As a result, buildings recognizable within a town-sector's scope are most likely to be recorded. Representative types include schools, hospitals, government headquarters, some other public organizations (e.g., libraries, news outlets, postal offices, nursing homes), and a few prominent local factories (mostly state-owned). Residential or commercial buildings are rarely covered in the records.

The national standard categorizes building earthquake damage into five grades: "intact", "slight", "moderate", "severe" and "collapsed" (National Codes of P.R.C., 2002). Most of the buildings I observe are directly referred to according to these grades. There are, however, buildings that have been described according to other parallel standards (e.g., National Codes of P.R.C. (2008), which uses 4 grades to rank building safety) or in words. The damage of these buildings has been manually encoded through a careful reading of the descriptions in accordance with the definitions of the standard grades. The work was conducted by a second person who only saw the list of descriptions without knowing the details of the buildings being described (e.g., which county the building is located in, or whether it has been linked to those in the other source).

It is worth mentioning that the indexes I employ for the analysis vary slightly from the standard recommendations in National Codes of P.R.C. (2002). First, I group "intact" and "slight damage" into one single category because there are literally no "intact" buildings that entered the sample. Second, I split the standard "collapsed" into two categories to differentiate fully collapsed buildings (esp. the notoriously shoddy ones such as those described in Section 2) whenever the data is specific enough to permit making a distinction. These modifications allow me to exploit better the types of variations in this specific context in which the seismic intensities are extraordinarily strong and the average buildings are "severely" affected (see Figure 3 for the sample distribution). My results are robust to using an alternative index system that strictly follows the recommendation in the national standard (i.e., grouping all collapsed buildings into one single category).

Data on Building Construction Records The data on building construction records is obtained from the general *County Gazetteers* (*Xian Zhi*), which are published by each county's Gazetteer Office on an occasional basis, every few decades. Most counties in Sichuan Province have published two rounds of *County Gazetteers* since 1949. The first round was published generally between 1985 and 1989, covering materials starting from 1949 (and in some cases, from 1911) until the publication year; the second round renewed the coverage until the 2003–2007 period. Since these gazetteers were published before the 2008 earthquake, it is relatively unlikely for the observed construction projects to be selected by their future level of damage.

The *County Gazetteers* are book-length volumes of local history documenting the county's major events. They are often regarded as a locality's "encyclopedia." The materials in these books are generally compiled and presented by town and by sector, and the prominent construction projects completed within the town-sector scope are often highlighted in the gazetteers. The building types likely to be recorded in these gazetteers are similar to those likely described in the *Earthquake Relief Reports*. This feature makes it feasible to identify a set of buildings that have been jointly mentioned in the two sources.

One potential issue with this data source is that, while some buildings report the date of their groundbreaking, others may report the date of their completion, and there is only a very small set of buildings for which both dates are reported. This inaccuracy could lead to serious measurement errors (which would bias the estimates toward zero) if the construction spans multiple years. Fortunately, China is famous for its speed in implementing public construction projects so that most of the building construction should be completed within one year or two (which is verified with the small set of buildings for which I observe both dates). In my analysis, I define a building's year of construction as the beginning of the construction project, which captures the period during which most planning, licensing, and inspecting activities take place. For buildings that only report the date of completion, I take the previous year as their year of construction.

In addition to the year of construction, I also collect, whenever available, other building features such as their size, number of stories, structure and material, and funding source.

B.2 County Level Data Construction

To address the concern about the external validity of my building-level analysis, I construct a second dataset at the county level, which covers all 181 counties in Sichuan Province. This dataset contains aggregate damage statistics that are comprehensive, systematic, and economically relevant. In Section 6.1, I use this dataset to evaluate the extent to which conclusions drawn from my building-level dataset are relevant for aggregate outcomes.

Earthquake Damage I obtained the county-level damage information from Zhang (2008). This statistical compendium provides systematic damage statistics for all 181 counties in Sichuan Province. It reports county-aggregates of physical and economic losses as well as sector breakdowns. I use optical character recognition techniques (OCR) to extract the statistical tables from a digital version of the book and manually corrected the recognition errors.

Hometown Ties The measures of hometown ties for the county-level sample are obtained from the same sources of those for the building-level sample. I aggregate the connectedness of the county officials over 1978–2007 to construct two measures. The first one is an indicator denoting whether any of the county officials had connections during this period, and the second one counts the number of years in which a county official had been connected. In addition, I construct an indicator denoting whether the county officials had hometown ties in 2008 to account for the impact of patronage ties during the quake and post-quake.

Description The summary statistics of my county-level dataset are presented in Table C1. The average death toll and direct economic loss are seen to be 479 lives and 3.6 billion RMB respectively. Sixty percent of the counties have had a connected official, and the average number of years of connectedness is 2.67.

B.3 Covariates

I construct some additional variables to account for other factors that might determine the damage to a building from the earthquake, including a set of building characteristics, geographical features, individual profiles of the officials, and county-wide socio-economic conditions; these variables are explained in more detail in the following paragraphs.

Building Features The first set of controls to consider are the characteristics of the buildings that may be relevant for their resistance. I collect these characteristics from the general *County Gazetteers* which also provide information about building construction history. The documents also mention, though inconsistently, some basic characteristics of the buildings, such as size, number of stories, structure, materials used, and funding source. For such buildings I observe these characteristics and include them in my analyses; for cases of unreported information, I create a set of indicators denoting the specific missing variables.

Geographical Features Another factor that plays a central role in determining earthquake damage is geography — in particular, local seismic intensity and terrain ruggedness. For seismic intensity, I use peak ground acceleration (PGA) — a standard parameter in seismology that measures local ground motion. [51] The PGA contour map of this earthquake comes from *ShakeMap* (U.S. Geological Survey, 2017). The index for terrain ruggedness is constructed for each 30 × 30 arc-second grid cell using the elevation data from GTOPO30 (U.S. Geological Survey, 1996), following the procedure described in Nunn and Puga (2012). For the building sample, I geocode each building's location using Google Maps Geocoding API services to determine its local ground motion parameter and terrain ruggedness. For the county sample, I take the average of all lands within a county to calculate its overall intensity and ruggedness.

Individual Characteristics Whether county officials have patronage ties may be determined by information in their profiles that is relevant for local governance. Therefore, I also collect the individual profiles of these county officials from their online biographies, which indicate gender, year of birth, education, ethnicity, and the first year in their current positions. Since there are two county officials of interest, I construct the following variables for a given county and year: an indicator denoting gender, the average age, the average years of education, an indicator of belonging to an ethnic minority, and the average number of years of tenure in their current positions. I also constructed a set of indicators denoting missing values.

Economic and Demographic Conditions Finally, I include economic and demographic factors that might constrain the financial resources available and thus affect building resistance. I focus on per capita GDP and population measures. I obtain this data from the *China County Statistical Yearbook*. For the building-level analysis, I include the per capita GDP and population of the county in the year in which the building was constructed. [52] For the county-level analysis, I include these variables in 2007 to capture the local economic condition prior to the earthquake's occurrence.

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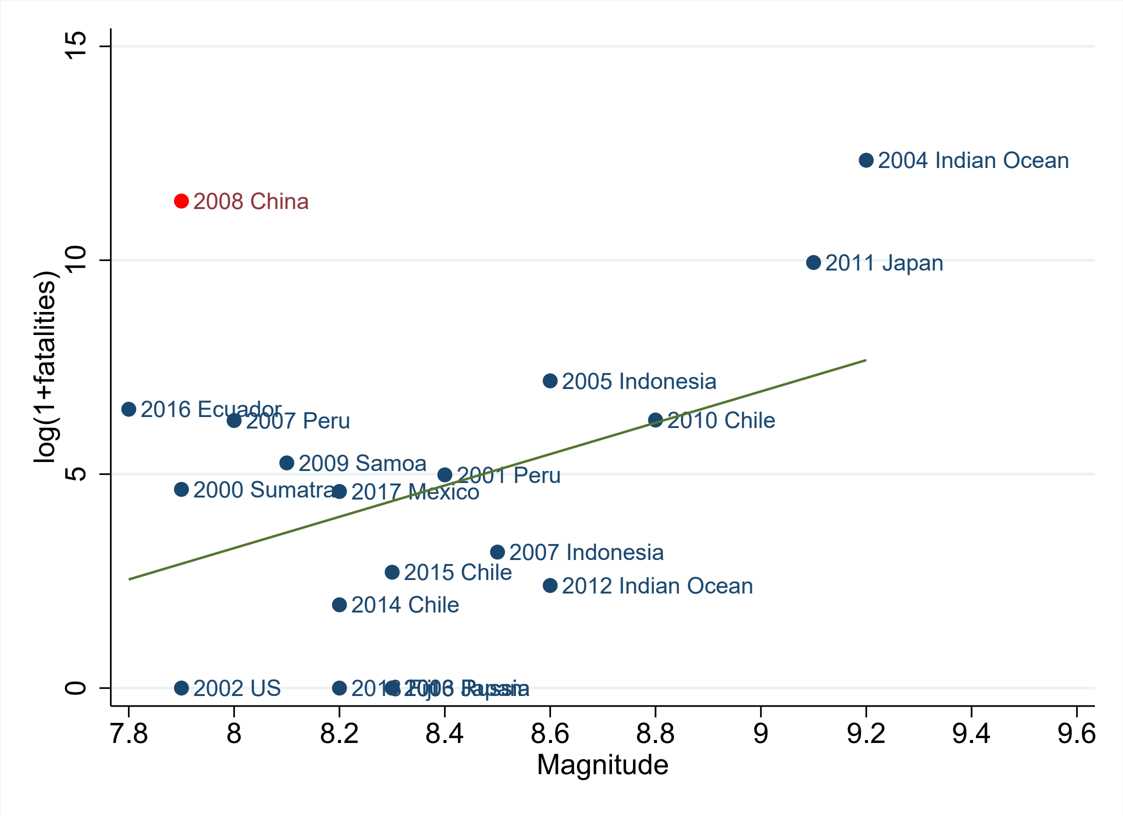
[51] My empirical results are robust to using distance to epicenters as an alternative proxy for seismic intensity.

[52] Note that the economic and demographic constraints (which may affect building resistance) themselves might be an outcome of existing patronage ties — a matter often referred to as "bad controls" (Pearl, 2009). In light of this possibility, I do not include these conditions in my baseline specification in Section 4.2. Instead, I evaluate them as a robustness check in Section 4.3.

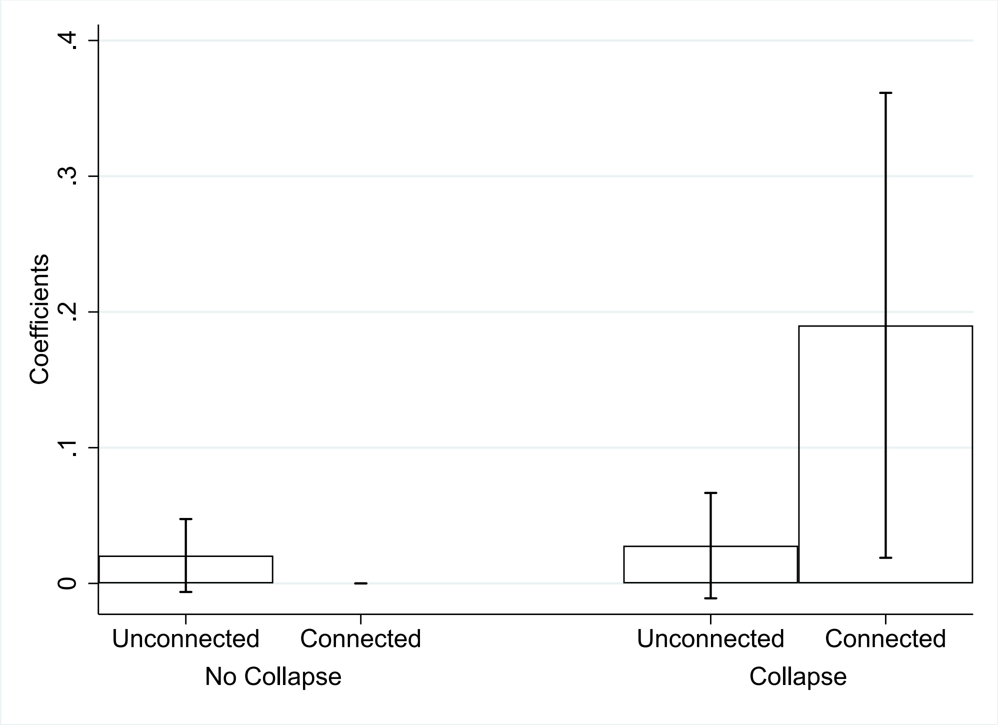
C Supplementary Figures and Tables

Figure C1: The 20 most notable earthquakes since 2000 in terms of magnitude



Source: USGS

Figure C2: Patronage ties, building damages, and corruption investigation



Notes: The figure depicts the estimated coefficients of corruption investigation on patronage ties and building damage. The sample consists 261 county officials from the building sample, and is constructed by aggregating the damage of buildings (any or no collapse) constructed under the official's authority and the connectedness of the official (once or never connected). The dependent variable is an indicator that equals one if the county official was investigated for corruption. The regression controls for the average ground motion (PGA) of all buildings constructed under the official's authority. Standard errors are robust to heteroskedasticity.

Table C1: Descriptive statistics of main variables in the county-level analysis

	Obs.	Mean	S.D	Max.	Min.
Dead_or_missing	181	479.46	2603.65	23787.00	0.00
Total_econ_loss (100M RMB)	181	36.16	86.50	596.76	0.00
EverConnected	181	0.59	0.49	1.00	0.00
YearsConnected	181	2.67	3.32	13.00	0.00
Peak ground acceleration (% of g)	136	11.01	15.07	70.83	1.00
Ruggedness	166	305.60	250.71	901.00	8.51
GDP (100M RMB)	137	43.91	43.31	282.19	1.83
Population (10K)	138	47.26	40.36	157.00	3.00
2008Connectedness	181	0.28	0.45	1.00	0.00

Note. The unit of observation is a county in Sichuan Province.

Table C2: Patronage ties and building construction decisions

	Dependent Variables:					
	Location		Structure			
	ln(PGA)	Ruggedness	ln(Height)	ln(size)	ln(# Rooms)	ln(# Phases)
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie	-0.0231	-5.1935	-0.3423	-0.1495	-0.0820	0.1272
	(0.0156)	(12.8770)	(0.3384)	(0.1299)	(0.0916)	(0.0935)
Individual Controls	Y	Y	Y	Y	Y	Y
BuildingType × Year FE	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	3.072	238.675	1.629	7.635	0.312	0.348
# Counties	62	62	17	51	26	27
# Observations	6096	6096	156	2445	268	352
Adjusted R^2	0.926	0.789	0.663	0.287	0.371	0.283

Note. The sample includes all buildings for which the years of contruction are observed. *HometownTie* is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education, and average term of the party secretary and the governor. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Standard errors are clustered by county.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table C3: Patronage ties and building damages with social economic controls

	Dependent Variable: Damage Scale (1–5)					
	OLS					Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie	0.2628**	0.2427**	0.2286**	0.2258**	0.2148**	0.4575**
	(0.1041)	(0.1002)	(0.1004)	(0.1032)	(0.1022)	(0.1817)
Per capita GDP (1,000 RMB)	-0.0140**	-0.0230**	-0.0229**	-0.0238**	-0.0220*	-0.0469**
	(0.0063)	(0.0104)	(0.0105)	(0.0109)	(0.0118)	(0.0227)
Population (1,000)	0.0001	0.0002**	0.0002**	0.0002**	0.0002**	0.0005**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Individual Controls					Y	Y
Geographic Controls				Y	Y	Y
Building Controls			Y	Y	Y	Y
BuildingType × Year FE		Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	2.857	2.861	2.861	2.861	2.861	2.861
# Counties	35	35	35	35	35	35
# Observations	1062	1050	1050	1050	1050	1050
Adjusted R^2	0.334	0.389	0.392	0.393	0.394	
Pseudo R^2						0.291

Notes: The dependent variable in all specifications is the level of damages on the 1(intact or slight damage)–5(full collapse) scale. *HometownTie* is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Standard errors are clustered by county.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table C4: Patronage ties and building damages with hometown fixed effects

	Dependent Variable: Damage Scale (1–5)					
	OLS					Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie	0.2456***	0.1901*	0.1836*	0.1688*	0.1551*	0.3559**
	(0.0801)	(0.0977)	(0.0963)	(0.0946)	(0.0895)	(0.1601)
Individual Controls					Y	Y
Geographic Controls				Y	Y	Y
Building Controls			Y	Y	Y	Y
BuildingType × Year FE		Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
HomeCity FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	2.857	2.861	2.861	2.861	2.861	2.861
# Counties	35	35	35	35	35	35
# Observations	1062	1050	1050	1050	1050	1050
Adjusted R^2	0.349	0.402	0.406	0.407	0.406	
Pseudo R^2						0.315

Notes: The dependent variable in all specifications is the level of damages on the 1(intact or slight damage)–5(full collapse) scale. $HometownTie$ is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Standard errors are clustered by county. $HomeCityFE$ is a set of fixed effects for each specific city of origin.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table C5: Patronage ties and building damages by seismic intensity groups

	Dependent Variable: $\mathbb{1}\{Collapse\}$					
	OLS					Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie × Weaker	0.0809	0.0845	0.0696	0.0794	0.0770	1.1859**
	(0.0896)	(0.0987)	(0.0976)	(0.0983)	(0.0997)	(0.5929)
HometownTie × Equivalent	0.2514***	0.2394***	0.2465***	0.2451***	0.2647***	1.8411***
	(0.0896)	(0.0799)	(0.0770)	(0.0763)	(0.0689)	(0.3542)
HometownTie × Stronger	0.0723	0.0803	0.0591	0.0567	0.0944	0.3462
	(0.1042)	(0.1322)	(0.1217)	(0.1278)	(0.1456)	(0.7651)
Equivalent	0.0455	0.0413	0.0283	0.0442	0.0550	0.6584**
	(0.0568)	(0.0684)	(0.0628)	(0.0560)	(0.0575)	(0.3038)
Stronger	0.1394**	0.1253	0.1180	0.1498*	0.1596*	1.7305***
	(0.0666)	(0.0808)	(0.0800)	(0.0842)	(0.0902)	(0.5686)
Individual Controls					Y	Y
Geographic Controls				Y	Y	Y
Building Controls			Y	Y	Y	Y
BuildingType × Year FE		Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	0.181	0.182	0.182	0.182	0.182	0.326
# Counties	35	35	35	35	35	20
# Observations	1062	1050	1050	1050	1050	565
Adjusted R^2	0.300	0.343	0.347	0.347	0.349	
Pseudo R^2						0.386

Notes: The dependent variable in all specifications is the level of damages on the 1(intact or slight damage)–5(full collapse) scale. *HometownTie* is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. *Weaker*, *Equivalent*, and *Strong* are three indicators denoting whether the observed seismic ground motion parameter (PGA) at the building's location is weather than, equivalent to or stronger than the required resistance (intensities under which the building should not collapse) in the building codes. Individual Controls include an indicator for female, an indicator for minority, average age, average education and average term of the party secretary and the governor. Geographic Controls include the seismic ground motion parameter and terrain ruggedness of the building's location. Building Controls include the building's size, number of storeys, number of rooms, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, government headquarters, manufacture plants, and other public organizations. Column (6) drops observations of which the outcome variable can be perfectly predicted by the set of fixed effects. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table C6: Cumulative connections and aggregate economic loss by sector

	Dependent Variables: Economic loss in ... (arcsinh)						
	Infrastructure	Education	Health	Government	Agriculture	Manufacture	Service
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
YearsConnected	0.0354**	0.0089*	0.0076*	0.0099	0.0411***	0.0686***	0.0477**
	(0.0167)	(0.0046)	(0.0041)	(0.0127)	(0.0135)	(0.0233)	(0.0228)
Controls	Y	Y	Y	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	0.954	0.166	0.081	0.192	0.413	0.581	0.486
# Observations	181	181	181	181	181	181	181
Adjusted R^2	0.846	0.641	0.528	0.620	0.798	0.758	0.702

Notes: The dependent variables are the inverse hyperbolic sine transformation of economic loss in each sector. $YearsConnected$ denotes the cumulative number of years that the county had a connected official since 1978. The control variable include the county's average seismic ground motion parameter (PGA), average terrain ruggedness, GDP in 2007, population in 2007, connection status in 2008, and a set of indicators denoting whether each of these variables is missing. Robust standard errors in parentheses. Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table C7: Patronage ties and building construction records

	Dependent Variable: Number of buildings (ln)							
	All types			Hospital	School	Public Org.	Factory	Gov.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HometownTie	-0.0879	0.0304	0.0328	0.0286	-0.0398	0.0423	0.0192	-0.0193
	(0.1422)	(0.0967)	(0.0884)	(0.0393)	(0.0839)	(0.0703)	(0.0739)	(0.0359)
Individual Controls			Y	Y	Y	Y	Y	Y
County FE		Y	Y	Y	Y	Y	Y	Y
Year FE		Y	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	1.085	1.085	1.437	1.437	1.437	1.437	1.437	1.437
# Counties	65	65	63	63	63	63	63	63
# Observations	1400	1400	1057	1057	1057	1057	1057	1057
Adjusted R^2	0.000	0.538	0.492	0.204	0.260	0.263	0.588	0.260

Note. The sample is a balanced county-panel of all damaged counties between 1978–2007 (including those with zero construction records). The dependent variables are the number of buildings constructed, calculated as the natural logarithm of one plus the value. *HometownTie* is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education, and average term of the party secretary and the governor. Standard errors are clustered by county.

Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table C8: Patronage ties and other political and economic outcomes

	Dependent Variables:				
	Growth rate in:				Corruption
	GDP	Population	Transfer	Admin. Expense	Investigation
	(1)	(2)	(3)	(4)	(5)
HometownTie	1.8459	0.0036	0.1606***	0.2065**	0.1017**
	(2.9728)	(0.0145)	(0.0412)	(0.0814)	(0.0485)
Individual Controls	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Mean(Dep.var)	15.510	0.021	0.275	0.501	0.142
# Counties	64	64	64	64	65
# Observations	731	733	733	685	1387
Adjusted R^2	0.072	0.016	0.460	0.516	0.360

Note. The sample is a balanced county-panel of all damaged counties between 1978–2007 (including those with zero construction records). The dependent variables are the economic and political outcomes in the county. $HometownTie$ is an indicator variable denoting that the county has a connected official (either the party secretary of the governor) via hometown ties when the building was constructed. Individual Controls include an indicator for female, an indicator for minority, average age, average education, and average term of the party secretary and the governor. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.