The Social Costs of Patronage Ties:

Lessons from a Devastating Earthquake

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Abstract

This paper examines the social costs of patronage ties through the lens of a devastating earthquake in China, 2008. Using an original dataset covering 1,064 buildings in the quake-affected area, I find that, conditional on seismic intensity, the probability of collapse increases by 13.4 percentage points (86 percent) for buildings constructed under the authority of connected county officials. I then examine heterogeneous effects along multiple dimensions, through which I find suggestive evidence that the poorer building quality likely reflect underlying corruption by connected officials. The building level findings are supplemented with an analysis of county-level aggregates in which I find 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 bring to light a massive yet otherwise invisible social cost of patronage networks and corruption in general: they create vulnerabilities that may lead to very high social costs in some states of the world, yet of which the consequences can remain deeply hidden over a long period of time.

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

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1 Introduction

A longstanding debate exists on the social impact of patronage ties in bureaucratic organizations. The overall effect hinges to a large extent on whether such ties provide an additional governance tool that mitigates selection and agency problems or encourages favoritism that undermines accountability and entrenches rent-seeking behaviors. Empirical evaluation of this tradeoff is rare and challenging because of the covert nature of these behaviors (such that conclusions drawn from the analysis of any immediately visible outcomes might represent at best the tip of an iceberg). Especially in the case of social and economic governance, such behaviors may have latent and prolonged social impacts that, while not emerging right away, can lead to very high social costs in some states of the world — a notion of social vulnerability — most notably when hit by exogenous shocks.

In this paper, I examine the physical and economic damages of a notable earthquake in China, thereby offering a unique lens to manifest the social vulnerability consequences — a massive yet otherwise invisible social cost — of patronage networks.

The earthquake occurred in Sichuan, China on May 12, 2008 with a moment magnitude of 7.9 Mw. A total of 87,587 people were killed (including the missing ones) in the earthquake, making it the third deadliest earthquake of the 21st century, and the 18th of all time. [1] Most of the deaths were resulted from the destruction of buildings. [2] There have been considerable anecdotal accounts of substandard construction leading up to the collapse. One salient example is the observably unequal damages among identically located buildings. A photo published in *New York Times* shows a primary school being completely destroyed whereas the two buildings directly next to it standing fairly well (Yardley, 2008). Reconnaissance surveys also reveal that most of the buildings that collapsed featured a lack of reinforcements in their columns and had very little seismic resistance, ductility, or redundancy (Miyamoto and Gilani, 2008; He et al., 2011a,b). Most of these shoddy buildings are heavily state involved; therefore their fragility is often attributed — either explicitly or implicitly — to the ignorance of building codes by the local governments. [3] Yet, there is no systematic evidence that substantiates this hypothesis. [4]

[1] Source: U.S. Geological Survey

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

[3] There have been lots of media coverage of the "tofu dregs" buildings following the earthquake with a special highlight of school buildings. The reports uncovered a pattern of corner-cutting and dubious laxity about quality control in the construction process. It has even been admitted by a government official that "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); Chen (2008) for details.

[4] Despite the widespread anecdotes, it is extremely difficult to pin down the role of local governance in the

It is ex ante ambiguous whether patronage networks improve or worsen social vulnerability in the context of earthquake hazards. The local officials may have stronger incentives to enforce the building codes if information transparency decreases monitoring costs or if loyalty limits agency problems. The connection may also be detrimental if favoritism disincentives local officials or if bureaucratic collusion protects them from being investigated for corruption.

To empirically investigate this ambiguity, I construct an original dataset that exploits building-level variations, 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 covers 1,064 buildings in the quake-affected area, including schools, hospitals, government headquarters, manufacturing plants and other public organizations. [5] For each building, I first observe its damage grade in the 2008 earthquake which is classified according to a 5-point scale (where 1 stands for intact and 5 stands for fully collapse). I then identify the building's year of construction — as well as the county officials in power during that year — from archival sources. I define patronage connection between county officials and their prefecture level supervisors by their hometown ties — a traditional and prevalent means of favor exchange in China. The data also contain information on building characteristics (size, height, usage, etc.), geographical features (seismic intensity and terrain ruggedness), and individual profiles (age, education, etc.) of county officials.

My identification strategy is in spirit similar to a generalization of the difference-in-differences framework. Specifically, I compare buildings constructed under the authority of politically connected versus unconnected county officials. The design exploits two sources of variation: first, fixing the location (hence the seismic intensity), the connection status of county officials varies across years; second, fixing the year of construction (hence the building's cohort and age), there is spatial variation in connectedness. The identification assumption states that, in the absence of connection, the difference between buildings constructed in a connected and an unconnected county should be constant over time.

The estimated results robustly suggest that patronage ties have played a significant role

earthquake. The detailed information on earthquake damages is limited and lacks appropriate counterfactuals for causal inference. Malfeasant behaviors that took place far back in the past are even harder to track and identify, and whatever exposed to the public can be highly selective. After all, the government officially declared that the damages was mainly due to the "unusually severe extent" of the earthquake (see Caixin (2009) for details).

[5]The sample is, admittedly, not guaranteed to be representative of all the buildings in the quake area. Most of the sampled buildings are public projects with substantial state involvement; I do not observe the majority of the residential or commercial buildings however. This limitation, however, should not undermine the essence of my study since public buildings have been identified as more vulnerable and fatal in the earthquake (Miyamoto and Gilani, 2008; Zhang and Jin, 2008) and therefore are of particular interest to the study.

in creating social vulnerability: buildings constructed when the county officials had connections are expected to receive severer damages during the earthquake. In particular, the probability of partially or fully collapse increases by 13.4 percentage points (or 86 percent) for buildings constructed under the authority of connected officials relative to the others. The identification assumption has been evaluated using event-study type analyses on the effect of gaining and losing connection; 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 through which this might bias my estimates, including the selection and manipulation in damage reporting, economic condition in the year of construction, and common shocks to officials from some specific hometown, and find very limited support for any of these possibilities.

I offer some suggestive evidence that the poorer building quality likely reflect the underlying corruption by the connected officials. First, I find that hometown ties matter foremost for moderately hit buildings that should have survived the quake given the seismic intensity — a patter indicative of corner-cutting and code noncompliance. Second, the detrimental effects can be largely attributed to officials who are in direct charge of public projects (i.e., the governors) rather than those who maintain more political authority (i.e., the party secretaries). Third, buildings with heavy state-involvement — schools and hospitals in particular — are especially susceptible to the influence of connected officials, yet government headquarters — in which the officials themselves stay — appear relatively immune. Most strikingly, I find that the involvement of private capital — through the means of investment or donation — serves to mitigate or even offset the negative consequences of having a connected official. While none of these pieces of evidence are conclusive on their own, they collectively present a pattern suggestive of a story in which patronage ties undermine the accountability of the connected officials and thereby facilitate corruption by these officials (or their agencies).

I supplement the building level findings with an analysis of county-level aggregates that allows me to examine more systematic and economically relevant outcomes. Using a dataset covering all 181 counties in Sichuan Province, I document a positive cross-county correlation between cumulative ties and earthquake losses: 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. This pattern is observed across all sectors except for government agencies. These results, though not necessarily causal, help to alleviate concerns about the external validity of the building level analysis.

My work contributes most directly to the study of patronage ties within bureaucratic organizations. The theoretical foundations were laid by Aghion and Tirole (1997) and Prendergast and Topel (1996) which consider the conditions under which favoritism prevail-

s. Some recent empirical work has discovered the prevalence of favoritism associated with connection (Barbosa and Ferreira, 2019; Colonnelli et al., 2018; Jia et al., 2015; Shih, 2012; Xu, 2018), yet these papers focus exclusively on the selection and allocation of positions and there is no clear notion of its social welfare implications. [6] One such attempt is Jia (2017) which finds that connected politicians tend to favor more the use of polluting but growth-enhancing technologies. By focusing on earthquake damages plausibly due to corner-cutting, I emphasize the potential role of bureaucratic collusion rather than the promotion incentives for multi-task agents.

More broadly, this paper contributes in a number of ways to the growing literature on the consequences and alleviation of corruption. 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 whether or not corruption is socially detrimental. In particular, I focus on a setting in which the actions — and in most states of the the world, their consequences — are hidden from the public or even a central monitor; it offers a glimpse of the latent danger of corruption in terms of creating vulnerabilities that lead to very high social costs in some states of the world. Fisman and Wang (2015) and Jia and Nie (2017), along the same lines, characterize the workplace deaths as a result of rent-seeking by firms. Apart from their work, I emphasize the potential collusion among bureaucrats, in which case the corruption is invisible not just in the present but potentially over a long period of time. 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. [7] Additionally, the existing literature generally emphasizes the roles of electoral accountability and government auditing in fighting corruption (see Bobonis et al. (2016) and Avis et al. (2018) for recent examples); my results suggest that private participation may also be useful in alleviating corruption in certain public projects, especially in a setting in which formal election is absent and the government audits themselves might be subject to corruption (see Chu et al. (2020) for details).

This study represents an application of political economy approaches to the increasingly

[6] Although some of these papers also present evidence that the selected officials tend to be incompetent or exert less effort for the principal, it does not necessarily imply detrimental social outcomes. For example, Xu (2018) finds that connected colonial governors generate less revenue for the British Empire, which may be gauged as either good or bad for the colonized people.

[7] 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 US, the collusion between banks and regulators has also been blamed for the oversight failures that amplified the financial crisis (Kaufmann, 2009).

interdisciplinary research in hazards and disasters. [8] The natural scientists have increasingly recognized 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 repeated appeals (see, for example, O'Keefe et al. (1976) for the initial notion and Adger et al. (2005) and Eakin et al. (2017) for recent calls), however, there are rare attempts that subject this speculation to rigorous analyses. Corruption, among others, has been one of the most prevailing hypotheses in this domain accounting for the vulnerability; yet until now there is no formal evidence of this mechanism other than cross-country correlation between corruption perception and disaster deaths (see Kahn (2005), Escaleras et al. (2007) and Ambraseys and Bilham (2011)). By exploiting building level variations during a deadly earthquake, I provide, to my knowledge, the first causal evidence that corruption makes a society vulnerable to natural hazards. While I focus on one single earthquake in China, it is likely representative of the role that corruption may play in other societies given the abundant anecdotal reports across the globe (See, for example, Kinzer (1999) for Turkey, Pejhan (2003) for Iran, Lin (2017) for Mexico and Scaglia (2010) for Italy).

The rest of this paper is organized as follows. In Section 2, I introduce the geographical, institutional and cultural backgrounds of the 2008 Earthquake, along with the anecdotal accounts of the shoddy buildings. Section 3 describes the sources and processing of the data, and discusses the potential limitations. The building level analysis of hometown tie and building damage is presented and discussed in Section 4, followed by the aggregate county level analysis in Section 5. Section 6 concludes.

2 Background

2.1 Earthquake Hazards and Building Construction in China

China is one of the most prone-earthquake countries in the world. 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 in the world and accounting for 10 percent of all global earthquakes. [9] Sichuan Province is, among others, particularly prone to earthquake hazards. A number of large-scale strike-slip faults have been developed around the area due to the collision of the Indian plate

[8] see McNutt (2015) for an editorial call for the formation of a disaster science community from a range of natural and social science disciplines.

[9] Calculated by the author 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 the earthquake generated a tsunami. See National Geophysical Data Center for details.

into the Eurasian plate and the resultant formation of the Qinghai-Tibetan Plateau (Xing and Xu, 2011). There are more than 400 earthquakes recorded in the history of Sichuan (Xie et al., 1983), and 58 significant ones since 1900.

The significant earthquake risk in China highlights the need for strong and effective building codes to ensure safety. The first edition of the national codes was promulgated in 1974 and has been amended subsequently in 1978, 1989, 2001 and 2010 (Li et al., 2012). [10] The codes require that buildings should be "no damage under minor earthquakes, repairable under moderate earthquakes, and no collapse under severe earthquakes". [11] 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) a local seismic intensity of VIII or IX (see Gao and Shi (1992)). [12] 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).

However, the construction industry in China is highly prone to corruption, which likely undermines the effective enforcement of the building codes. [13] [14] Local government officials, being in charge of local compliance and enforcement activities, are particularly susceptible. [15] Interviews and case studies have documented various suspicious practices in almost every phase of a construction project, including poor project selection, fund misappropriation, misrepresented qualification licensing, fake tendering, illegal subcontracting, unauthorized alteration, corner cutting, loose site supervision, price inflation, and unqualified certificates

[10] The 1974 Code did not work well because it did not impose sufficient safety requirement. The requirements have been significantly upgraded in the 1978 Code in response to the 1976 Tangshan Earthquake that killed over 200 thousand people.

[11] 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%); "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).

[12] The relationship between the seismic intensity (which measures the perceived shaking) and the magnitude of an earthquake is not determinate. Empirically, a seismic intensity of VIII or IX corresponds approximately to an earthquake of magnitude 6.5 at its epicenter.

[13] According to legal documents, 54% of the 12,759 bribery cases prosecuted in China between 2014–2017 involved construction projects (see Chen (2017) for details).

[14] The phenomenon is not unique to China though. In a survey in 19 leading emerging market countries, the business executives and business professionals rank public works contracts and construction as the most corrupt industry in their home countries. See Transparency International (2011).

[15] Yu et al. (2019) analyze 83 complete recorded cases of construction related corruption held by the Chinese National Bureau of Corruption Prevention, and find that 50% of the convictions are associated with government agencies in direct charge of planning, licensing, inspecting and project acceptance. It is not even uncommon for highly positioned government leading 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 according to Yu et al. (2019). 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).

of completion (Shan et al., 2019, 2017; Le et al., 2014). Some of these activities would result in a waste or misallocation of resources, while others could detrimentally compromise the integrity and safety of the buildings. Most of these misdeeds, and often their consequences, are very difficult to detect owing to their covert nature and the complexity and diversity of construction techniques; only in some rare occasions do they accidentally come to light. [16]

2.2 The 2008 Earthquake and the Shoddy Building Scandals

The earthquake originated at 2:28:04pm local time on May 12, 2008, with a moment magnitude of $7.9M_W$. The epicenter is Yingxiu Town, Wenchuan County (N30.99, E103.36), 80 kilometers northwest of Chengdu Municipality, the capital city of Sichuan Province. It caused a rupture of approximately 240 kilometers striking northeast along the Yingxiu-Beichuan fracture with a maximum displacement of 9 meters. [17] The shape of the intensity distribution is that of a narrow ellipsoid around the fracture, and its two ends — namely, Yingxiu and Beichuan — experienced the strongest level XI shaking (see Figure 1 for a visual illustration). Hundreds of aftershocks were recorded around this rupture within 72 hours of the main shock and the latest aftershock exceeding $6.0M_W$ occurred on August 5, 2008 (Chen and Booth, 2012).

The 2008 Sichuan Earthquake is one of the most costly earthquakes in human history. It kills 87,587 people, injures another 374,643, and incurs a direct economic loss of 845 billion RMB (80% of Sichuan's 2007 GDP). The death toll is extraordinarily high compared to other earthquakes of similar magnitude. [18] Most of the deaths are resulted from the destruction of buildings, and public buildings — despite their higher resistance requirements — are among the most vulnerable and deadly ones in the earthquake. [19] In a survey of 484 buildings, 57% of the schools are no longer usable or have to be removed immediately, more than twice as much as the share of residential houses (Ye and Lu, 2008). [20]

While the official announcement attributes the collapse of buildings to the severity of

[16] One such example is the toppling over of a nearly finished, newly constructed 13-storey apartment complex in Shanghai in June 2009, caused by the improper construction methods that undermined the foundation (see Canaves (2009)). Another recent example is the collapse of a coronavirus quarantine hotel in Fujian Province in March 2020, suspiciously due to construction and remodeling incompliance (see Yu and Lily (2020)).

[17] The estimation of focal depth ranges between 10km and 20km according to various sources.

[18] Figure 2 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.

[19] In Dujiangyan City, for example, 3,004 out of the 3,091 deaths were caused by building collapse, and a quarter of them are primary and middle school students. See Yuan (2008).

[20] It is also remarkable that 87% of the government headquarters in their sample remain safe aside from some additional repairing requirements.

the earthquake, it is widely believed that the suspected shoddy construction should also be responsible. The scandal emerges with the salient observation that some buildings crumbled to dust — sometimes brittly in less than 10 seconds with no shaking at all — while others directly next to them remained mostly intact (see Yardley (2008) for a notable example). The fragility of these buildings is also thrown into sharp contrast with the performance of a few excellent ones standing at the very heart of the disaster zone (where the seismic intensity is X or XI). [21] Investigative news reports have discovered the use of low-grade cement and inadequate steel reinforcements in some crumbled buildings; the reports also probe into a few dubious practices in their construction process that may be associated — either directly or indirectly — with the local governments' ignorance in ensuing building safety. [22] Despite all these widespread anecdotes and speculations, there is no formal evidence that statistically examine the potential link between the possible corruption and the damages.

2.3 Hometown Ties and Bureaucratic Collusion

Hometown tie has been recognized as one important means of favor exchange in the Chinese society. 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). A few recent studies also document the prevalence of favoritism via hometown tie 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, the social networks based on homes of origin appear to have facilitated bureaucratic and business collusion. It is not uncommon for corrupt officials to cluster around certain native places, and having been aware of this phenomenon, the Chinese government explicitly prohibited its officials from participating in any hometown-based associations. [23]

In the context of this study, the collusion between the prefecture and the county officials may be associated with corruption in the construction industry in a number of ways. One prominent channel is that the collusion might undermine the accountability of local officials who are in direct charge of the construction projects; as a result, the local officials would be

[21] The two most prominent examples are *Bailu Town Central Primary School* and *Liu Han Hope Elementary School*, both located directly above the rupture surface. In the former case, a three-story school building was elevated 3 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.

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

[23] See, for example, Guo (2019) for a prominent example of collective corruption of high-ranking officials originated from 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).

more susceptible to duty-related malfeasance — either the direct misappropriation of public funds or additional favor exchange with the contractors. Alternatively, there are also anecdotal accounts that suggest the possibility of corrupted prefecture officials colluding with their trusted subordinates to commit the offence. Therefore, it is likely that the collusion between bureaucratic officials could eventually affect the quality of safety of the construction projects despite the caveat that the characteristics of the contractors are not directly observed.

3 Data

I combine information from multiple sources to construct two datasets — one at the building level and the other at the county level. The building level dataset contains 1,076 buildings from 37 counties at the heart of the earthquake zone; all of the sampled buildings are built between 1978 and 2007. [24] The county level one covers all 181 counties in Sichuan Province. Both samples contain information on earthquake damages in 2008 and the political connection of county officials. In the building level dataset, the officials' political connection is defined over the year in which the building was constructed; in the county level dataset, I measure the cumulative connection for each county over the past 30 years prior to the earthquake (1978 – 2007).

3.1 Earthquake Damages

Building Level The building level dataset is constructed by combining two collections of local gazetteers. The first is a collection of specialized *Books of Earthquake Relief [Kangzhen Jiuzai Zhi]* from which I obtain a list of buildings of which the damages are described. The second collection is the general *County Gazetteers [Xian Zhi]* from which I obtain the construction history of a second list of buildings. My sample consists of 1,076 buildings that have been jointly mentioned in these two sources so that both of their damages and construction records are observed.

The collection *Books of Earthquake Relief* is a series of specialized gazetteers officially compiled and published by each administration's *Office of Local Gazetteers [Difangzhi Bangongshi]* after the earthquake. The books are generally composed of three parts: the damages, the rescues, and the reconstruction efforts during and post the 2008 quake. The damage parts put together detailed descriptions and statistics of the damages caused by the

[24] I restrict the sample to buildings constructed during this period for two reasons. First, the local governance was substantially distorted during the Cultural Revolution (1966–1976); second, as summarized in Section 2, there were no strict building codes in China until 1978.

earthquake; it is also common for them to mention the damages of individual buildings. [25] By the time of my study, 31 counties and 3 prefectures have subsequently published their *Books of Earthquake Relief* — from which I extract a list of buildings located in 37 counties. [26]

The damages of the sampled buildings are encoded according to a 5-point scale following the official guidelines. [27] The definition and indexing of the damage scales is summarized as follows: [28]

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 damages; safe to use with no or minor repairing.

2. **Moderate damage:** Load-bearing components have some major cracks; non-load bearing components and attachments have visible damages; has to be repaired before using.

3. **Severe damage:** Load-bearing components have many severe cracks and minor collapse; Some non-load bearing components and attachments fall apart; no longer usable.

4. **Partly collapse:** Load-bearing components significantly fall apart; has to be removed immediately.

[25] 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. The representative types include schools, hospitals, government headquarters, some other public organizations (e.g., libraries, news outlets, postal offices, nursing homes, etc.), and a few prominent local factories. Individual buildings for residential or commercial purposes are rarely covered in the records.

[26] The prefecture's *Book of Earthquake Relief* covers materials from all its governing counties, which allows me to observe some additional counties that have yet published their own *Books of Earthquake Relief*.

[27] The national standard *GB/T18208.3-2000* categorizes building earthquake damages into 5 grades: "intact", "slight", "moderate", "severe" and "collapse". 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., *JGJ125-99* that uses 4 grades to appraise dangerous buildings) or even elaborately. The damages of these buildings are manually encoded through a careful reading of the descriptions in accordance with the definitions of the standard grades. The work is conducted by a second party who only sees 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).

[28] The indexes I employ here are slightly variant from the standard recommendation in *GB/T18208.3-2000*. First, I group "intact" and "slight damage" into one single category because there is literally no "intact" buildings that enter the sample. Second, I split the standard "collapse" into two categories to differentiate the fully collapsed buildings (esp. the notoriously shoddy ones such as those summarized in Section 2) whenever informed. These modifications allow me to better exploit 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 4 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).

5. **Fully collapse:** The entire building collapse or fall apart; flatten to the ground in seconds; crumble to dust.

The construction records are obtained from the collection of the general *County Gazetteers* that are again published by each county's *Office of Local Gazetteers* every few decades. Most counties in Sichuan Province have published two rounds of *County Gazetteers* since 1949. The first round is approximately between 1985 and 1989, covering materials starting from 1949 (and in some cases, 1911) and until the publication year; the second round renews the coverage until the 2003–2007 period. [29] The materials 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. [30] This allows me to observe a second list of buildings of which the years of construction are precisely stated. [31] I also collect, whenever available, other building features such as their size, number of storeys, structure and material, funding source, etc.

I manually compare the two lists of buildings by their documented names and locations and successfully identify 1,065 buildings that are jointly mentioned in both lists, including schools, hospitals, government headquarters, public organizations and factories. This is, admittedly, not a representative sample of all buildings in the quake area; and the buildings that enter the sample are likely to be selective. I will offer a detailed discussion of these limitations and their empirical interpretations later in Section 3.5.

County Level The county level damages are obtained from *The Comprehensive Statistics on Damage Evaluation of the 2008 Sichuan Earthquake*. The book 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 (OCR) techniques to extract the statistical tables from a digital version of the book and manually correct the recognition errors.

[29] The fact that these gazetteers are published prior to the 2008 earthquake makes it relatively unlikely for the observed construction projects to be selected by their future damages. It is nevertheless possible for selection on the latent quality though. I will defer the discussion of this possibility to section 3.5

[30] The building types likely to be recorded in these gazetteers are similar to those likely described in the *Books of Earthquake Relief*. This feature makes it feasible to identify a set of buildings that have been jointly mentioned in these two sources.

[31] For the small set of buildings of which the construction spent multiple years, I define its year of construction as the beginning of the project.

3.2 Hometown Ties

I define political connection as the hometown tie (i.e., shared city of origin) between local officials and their prefectural superiors. [32] The list of county and prefecture level officials and their cities of origin are constructed 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 collect 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). [33] I also construct an intensity measure using the aggregated number of ties of the county officials.

In the building level analysis, I define connectedness of the county officials over the year in which the building was constructed. In the county level analysis, I aggregate the connectedness of the county officials over the 1978–2007 period. I also construct the county officials' hometown tie in 2008 to account for the impact of hometown tie during and post the quake.

3.3 Other Variables

I construct some additional variables to account for other factors that could determine a building's damage by the earthquake, including a set of building characteristics, geographical features, individual profiles of the officials, and social economic conditions of the counties.

Building Features The first set of controls I consider are the characteristics of the buildings that may be relevant for their resistance. These characteristics are collected from the general *County Gazetteers* from which the list of building construction history is obtained. The documents also mention, though occasionally, some basic characteristics of the buildings, such as size, number of storeys, structure, materials used and funding source. For buildings for which I observe these characteristics, I include them in my analyses; for those of which

[32] I focus the top two county officials, i.e., the county's party secretary and governor, and the top two prefecture officials, i.e., the prefecture's party secretary and mayor, in defining the political connection.

[33] For transition years in which multiple county secretaries or governors have been in position, I consider the connections of the ones who are in position for the longest time during the 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.

the information is not reported, I create a set of indicators denoting the specific variables' being missing.

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. [34] 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-seconds 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 Map 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 the county's overall intensity and ruggedness.

Individual Characteristics Whether a county official has patronage ties may be correlated with his/her other profiles that are relevant for local governance. Therefore, I also collect the individual profiles of these county officials from their online biographies, including gender, year of birth, education, ethnicity and first year in current position. Since there are two county officials of interest, I construct the following variables for a given county and year: an indicator denoting whether any of them are female, the average age, the average years of education, an indicator of any of them belonging to a minor ethnicity group, and the average number of years having been in current position (i.e., the average tenure). I also construct a set of indicators denoting the missing values.

Economic and Demographic Conditions Finally, I include economic and demographic factors that might constrain the resources available and thus relevant for outcomes in the earthquake. I focus on per capita GDP and population measures. The data is obtained from the *China County Statistical Yearbook*. For the building level analysis, I include the per capita GDP and population for the building's year of construction. [35] For the county level analysis, I include these variables in 2007 to capture the local economic condition before the earthquake occurred.

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

[35] Note that the economic and demographic constraints (that 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, we will not include these conditions in our baseline specification in Section 4.2. Instead, we will evaluate them as an robustness check in Section 4.3.

3.4 Description and Visualization

Building Level I present the summary statistics of my building level dataset in Table 1. There are 1,065 matched buildings in the sample. The damages are encoded according to a 5-point scale, with the average being 2.84. Buildings constructed under the authority of a connected county official represents 16% of the sample. The mean building in the sample is located 162km from Yingxiu and 121km from Beichuan, the two focal points of the intensity distribution, and has four floors in height. The county officials when the building was constructed are 44 years old, have some college education, and have been in position for three years on average. 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 encode the missing values as 0 and then include a set of dummy indicators that denote the missing ones for each of the variables.

Figure 3 shows the spatial distribution of the sampled buildings by damage scales, along with the seismic intensity zones. A few observations emerge from the map. First, my sample spreads across multiple intensity zones, and are most representative of buildings in intensity VIII and IX [36] Second, the levels of damage are generally decreasing with distances from the fracture, yet it is uncommon for buildings at the heart to stand and those farther away to collapse. Third, there are variations in damages for buildings within the same county or even at the same location, suggesting that factors other than seismic intensity may also affect the building damage.

Figure 4 plots the probability distribution of building damages by the connectedness of county officials. While buildings that receive "severe" damages (indexed as 3) are most representative in both cases, the distribution of the connected buildings is more skewed to the right. In terms of magnitude, the probability of partial or full collapse (indexed as 4 or 5) of connected buildings is 2.5 times that of unconnected buildings; in particular, a half of the fully collapsed buildings are constructed under connected county officials (recall that only 16% of the buildings are connected).

County Level The summary statistics of my county level dataset is presented in Table 2. The average death toll and direct economic loss are 479 and 3.6 billion RMB respectively. 60% of the counties have ever had a connected official, and the average number of years being connected is 2.67.

[36] The building codes require that buildings should not collapse under intensities of VIII or IX

3.5 Caveats

One fundamental challenge in my study is that there are no comprehensive and systematic statistics on building damages that are publicly available; if any, it's even harder to identify their years of construction and the economic and institutional circumstances back then. [37] I overcome this difficulty by combining two collections of archival records — one for damages and the other for construction histories — and identify the jointly mentioned buildings. However, neither of the sources is in a standardized statistical format, which comes with important caveats on the selectivity and representativeness of my sample.

Selectivity One leading concern about my sampling process is that the selection of buildings is hardly at random. For example, a county might only record buildings whose damages are salient (either extraordinarily good or bad), leading to the problem of selection on outcomes. In addition, since the gazetteers are compiled and published by each individual county, the selection function can also vary across counties, making it incomparable among buildings sampled in different counties.

These concerns, however, can be significantly mitigated 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 back in the year when the buildings were constructed. This is generally a reasonable assumption since the past officials are no longer in the position and therefore should have very limited impact on the compilation of the gazetteers after 2008.

It is nevertheless possible that some of the past officials might have the ability to manipulate the selection of buildings to report. Yet it is most likely that their manipulation efforts will lead to a negative selection and therefore a downward bias of my estimates. I can not, however, fully rule out the possibility that the damage reporting could at all be positively selected on past connectedness. [38] Therefore, I will also provide a formal test of the potential selectivity in damaging reporting using the full set of buildings that I obtain from the *County Gazetteers*.

[37] For example, one seemingly possible approach to obtain comprehensive building damages is to identify collapsed buildings from satellite photos. However, most of the high resolution satellites that cover the quake area are launched after 2008, making it hard to identify damages and even impossible to recover their construction histories.

[38] One such story could be that the political competition targets the connected officials and intentionally bring to light the buildings constructed under their authority. I believe this is relatively unlikely, though, given the archival nature of the documents that I rely on.

Representativeness Another concern is that my sample may not representative of the universe of buildings in the quake area. In particular, it only takes into account buildings that are recognizable in a town and sector, and for this reason most of the sampled buildings are public projects. However, I believe that the representativeness is less of a concern for the current study since public buildings have been identified as the most vulnerable and deadly ones in the earthquake and therefore are of particular interest to my study. To address the external validity of this selective sample, I complement the building level analysis with an analysis of county level aggregates to provide some suggestive evidence that the findings in this sample may exhibit more general implications.

4 Building Analysis

This section presents my main analyses using the building level dataset. I start by describing my empirical design, discussing the identification assumptions and formalizing the model specification. It is followed by the baseline estimation of the impact of county officials' hometown connections on the buildings' damage. I then address some of the most prominent concerns that might bias the estimates, including the selection and manipulation in damage reporting, economic condition in the year of construction, and common shocks to officials from some specific hometown. I close the section by discussing some heterogeneous effects that are suggestive of the potential corruption taking place.

4.1 Research Design and Model Specification

The research design is in spirit similar to a staggered differences-in-differences framework, in which I compare buildings constructed under the authority of politically connected (via hometown tie) county officials relative to their unconnected counterparts. I exploit two sources of variation which is illustrated in Figure 5: first, for buildings located in the same county, the exposure to connected officials varies in their years of construction; second, for those constructed in the same cohort, the connection status of the bureaucrats in office varies across counties. The design is formalized by estimating the following equation:

$$Damage_{ict} = \beta HometownTie_{ct} + \delta_c + \sigma_t + \chi_{ict} + \varepsilon_{ict} \tag{1}$$

where i indexes buildings, c indexes counties, and t indexes building cohorts (i.e., years of construction). The outcome of interest, denoted $Damage_{ijt}$, is the 5-point damage scale of a building i, located 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; χ_{ict} denotes other building or county level controls that also vary in time. 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, and a positive β would suggest buildings constructed under connected officials being more vulnerable in the 2008 earthquake.

The estimation strategy inherits all of 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 secular patterns of earthquake damage that affect all buildings in the same cohort: e.g., 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 storeys and structure; second, within-county variations in the geographical characteristics of the building's location, including the distances to the epicenters and local ruggedness; 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: Hometown Tie and Building Damage

Baseline I start by estimating the effect of bureaucrats' hometown connections on buildings' earthquake damage using both the linear and ordered-probit versions of Equation (1). The results are reported in Table 3. In column (1), I show the linear estimates of Equation (1) including only $HometownTie$, along with county and year fixed effects. The coefficient on $HometownTie$ is 0.31, significant at the 5 percent level. The magnitude is just above 10% of the mean damage index, or 38% of its standard deviation. In column (2), I include building type $\times$ 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 (3) and (4) consider some additional building-specific characteristics that might influence the earthquake damage. In column (3), I control for building features, including size, number of storeys, number of rooms, and structure; since these variables are only available for a small subset of buildings in the sample, I also include a set of dummies indicating the missing ones. The coefficient and level of significance on $HometownTie$ remain constant. Column (4) takes into account the geography of the building's location, including local peak ground acceleration (PGA) — the seismic ground motion parameter — and terrain ruggedness; the results remain mostly the same. Finally, in column (5), 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.

In column (6), I estimate, with the full 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. To aid the interpretation of this coefficient, I compute the predictive margins of $HometownTie$ — i.e., the predicted probability of falling in any of the 5 categories by connectedness — and plot the results in Figure 6, 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 terms of earthquake damage. In particular, the officials' $HometownTie$ increases the probability of partial or full collapse (indexed by 4 and 5) by 13.4 percentage points (or 86 percent) from 15.6% to 29%.

Overall, the results in Table 3 indicate that the political connections of local officials via hometown ties exert a robust effect in making the buildings vulnerable in the earthquake. I also verify that my findings are robust to alternative measures of treatment intensities such as the number of ties or the duration being connected; they are also robust to using a different damage classification method.

Event Studies The identification 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:

$$Damage_{ict} = \sum_{j=-3}^{3} \beta_j GainTie_{cjt} + \delta_c + \sigma_t + \chi_{ict} + \varepsilon_{ict} \tag{2}$$

$$Damage_{ict} = \sum_{j=-3}^{3} \beta_j LoseTie_{cjt} + \delta_c + \sigma_t + \chi_{ict} + \varepsilon_{ict} \tag{3}$$

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 consistent 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 7. Panel (a) examines the effect of gaining political connections using Equation (2), and plots the estimated 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 of being vulnerable — 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 plot, 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 get more strengthened — despite some apparent noises — if constructed after the county loses 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.

Placebo To further probe into the extent to which the buildings' conditional damage might be identical in the absence of hometown ties, I perform an additional placebo test using the local officials' political connections with higher-ranking officials from a different but neighboring prefecture — so that the privileges of having connections with a direct supervisor are not granted. It captures, for example, the extent to which a particular city tends to

produce leading government officials. 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. It suggests that having a hometown tie per se does not imply poorer building quality unless the connection is associated with a direct supervisor — a pattern that reinforces my identification assumption.

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

4.3 Addressing additional Concerns

The results I have obtained reveal a clear association between the county officials' hometown tie and the buildings' earthquake damage. To make credible causal claims, however, I have to rule out the alternative mechanisms through which my estimates might be biased. I consider in this part some of the most prominent channels: the selection bias, the underlying social economic conditions, and potential common hometown shocks.

Selection One major concern of this study, as discussed in Section 3.5, is that the buildings observed in the sample are not guaranteed to be random. If, for example, the selection is somehow manipulated by the connected ex-officials, my findings are likely subject to this selection bias — though it appears more likely a downward one 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 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 *Books of Earthquake Relief*) 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 with respect to the role of hometown connections.

The results are reported in Table 5 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) reports 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.

Social Economic Environment Another potential source of bias is the social economic condition of the county upon 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 the buildings compliant with the quality requirements. I did not include any proxies for the social economic conditions as control variables in the baseline because these outcomes might themselves be the consequence of having a connected official, and hence likely bad controls for the study. However, if such shocks are predictive of the presence of a connected official, it is possible that omitting the social economic circumstances may bias my results.

To make sure that my results are not subject to this possibility, I replicate the baseline analyses controlling for additional social economic conditions — in particular, per capital GDP and population — and present the results in Table 6. First, I find that, higher per capita GDP, as expected, significantly alleviates building damages; the increase in population, on the other hand, contribute to the vulnerability of the buildings. More importantly, the effect of $HometownTie$ on a building's damage is, across various specification, robust to the inclusion of social economic controls. The coefficients across all columns appear approximately 25% smaller than those in the baseline after partialing out the social economic constraints, yet they remain significant at the 5% level or above. These results suggest that the detrimental effects are not merely through the channel of resource constraints. They also reinstate the argument that the consequences of patronage ties extend far beyond the immediately visible economic outcomes.

Hometown Shocks I consider a third possibility 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 results may be biased by this home-of-origin effects if these places also tend to produce less (or more) prefectural leaders. To rule out this possibility, I estimate the baseline model with the set of hometown fixed effects so that the comparison is within officials of the same homes of origin. The results are reported in Table 7. 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.

4.4 Heterogeneous Effects Suggestive of Corruption

The results I have presented provide plausibly causal evidence that the poor resistance of the buildings may be attributable to the authority of politically connected officials. However, there is less indication whether this association reflects potential abuses of power by the connected officials. While the specific behaviors of the officials are generally unobservable, I examine heterogeneous effects along four dimensions — seismic intensity, official's position, building type, and funding source — through which I find some evidence suggestive of corruption taking place.

By Seismic Intensity I start by examining the role of patronage ties across different seismic intensities (in comparison to the resistance requirements specified in the building codes). [39] Specifically, I compare the perceived ground motion to the resistance requirements — the range of motion parameters within which buildings are required "not to collapse" according to the building codes — and partition my sample into three intensity groups: buildings for which the perceived motion is weaker than, equivalent to, and stronger than the resistance requirements. [40] I then interact the $HometownTie$ indicator with the set of dummies each denoting one of the intensity groups and jointly estimate the group-specific effects of hometown ties on building collapse (either partly or fully). [41] The estimates, using specifications parallel to the baseline, are reported in Table 8. They suggest that hometown ties matter only and foremost for buildings that experienced a moderate ground motion under which a building compliant with the code should not collapse. The pattern is revealed more clearly in Figure 8, in which I plot the predictive margins of the probability of building collapse using the estimates from column (6) of Table 8. First, focusing on the unconnected buildings, 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, however, I find a

[39] As noted in Section 2, the resistance requirements vary across regions and have been substantially modified over time. The information is extracted from the generations of *Seismic Ground Motion Parameters Zonation Map* attached to national codes. I employ this relative seismic intensity as it allows me to more effectively detect the underlying corner-cutting and code non-compliance. My results are robust to grouping the buildings based solely on observed seismic intensity without referring to the required resistance though.

[40] It follows that the collapse of a building that suffered from a ground motion stronger than the resistance requirements (given its location and year of construction) is perhaps venial , whereas the collapse of a building that experienced a ground motion no stronger than the resistance requirements is almost surely a signal of code non-compliance.

[41] I use the building collapse indicator as the dependent variable in 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 what I have used in the baseline.

substantial increase in the probability of collapse when the perceived seismic intensity is just within the range of required resistance, and these buildings are just equally, if not more, 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, yet there is no statistical difference between the two groups for stronger motions. Overall, the observed patterns suggest that corner-cutting and code non-compliance are likely bringing about the vulnerability of these connected buildings.

By Official's Position exploring the differential effects between the connected party secretaries and the 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, 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 the social programs (Shirk, 1993). Consequently, the governors are placed in a position that is more susceptible to direct embezzlement or favor exchanges. Motivated by this institutional structure, I distinguish between the hometown tie of the party secretary and that of the governor, and separately estimate their impacts on building damage. The results, summarized in Table 9, reveal that the overly-damaged buildings are mostly constructed in the administration of connected governors; the connected party secretaries, on the contrary, exhibit a much smaller effect — though still positive — insignificant at any conventional levels. While it remains ambiguous whether this result alone reflects the connected governors' incompetence to enforce the building codes or their willful rent-seeking activities, the finding is suggestive that it is the direct association with the construction projects that matters for which reason corruption is at least more feasible.

By Building Type I then exploit the heterogeneous effects of $HometownTie$ on different types of buildings. The intention is to investigate whether the connected officials disproportionately undermine the quality of certain types of buildings. Specifically, I interact the $HometownTie$ indicator with the set of dummies each denoting a specific type of buildings in my sample: hospitals, schools, public organizations, factories and government headquarters. The estimated coefficients along with their 95% confidence intervals are presented visually in Figure 9. According to the graph, schools and hospitals appear to be particularly vulnerable to the authority of politically connected officials, whereas the other types of buildings are relatively less susceptible. The effect of $HometownTie$ is even negative — despite their

large standard error — for factories and government headquarters. A post-estimation test confirms statistically significant differences between hospitals and the other types of buildings. Overall, the pattern suggests that buildings with heavier state-involvement tend to be more likely adversely affected by the connected officials — with the exception of government headquarters in which the officials themselves reside.

By Funding Source Most strikingly, I find that the destructive effects of connected officials can be mitigated by a large by the involvement of private capital in the construction process. This pattern is identified by interacting $HometownTie$ and an indicator that equals 1 if the project has been at least partly financed by some private funds. This category typically includes investments and donations by firms, charities and sometimes individuals. The results are reported in Table 10 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 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 comprehensive specifications. Moreover, the magnitude of the coefficients on the interaction is as large as, if not larger than, those on $HometownTie$, suggesting that the involvement of private capital serves to mitigate or even offset the adverse effect of having a connected official. Finally, I find that the main effect of $PrivateFund$ — which captures the role of private capital for buildings constructed outside a connected regime — does not appear to improve building quality. These results suggest that the association between the connected officials and the poor building quality is more likely due to the potentially willful misconduct of the officials rather than their inability or negligence in regulating the profit-seeking firms.

To sum up, by exploring heterogeneous effects along a variety of dimensions, I find evidence that: i) the collapse of connected buildings likely reflects corner cutting and code noncompliance, ii) hometown ties matter only for officials in direct charge of public projects, iii) public projects with heavy state-involvement are especially susceptible, and iv) private investment or donation serves to mitigate the detrimental consequences. While none of these pieces of evidence are sufficiently conclusive on their own, they collectively support a story that there might be some sort of corruption taking place in these government-led projects administrated by a connected county official, making the buildings vulnerable to earthquake hazards.

5 Aggregate Analyses

The building level analyses provide plausibly causal evidence that the connected county officials may be associated with more violations and abuses in the construction industry, leading to severer damages in the 2008 earthquake and causing some of the buildings that would otherwise be resistant to collapse. The internal validity of the causal inference has been established by a differences-in-differences style design that compares buildings constructed in 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 of this claim remains unclear due to the possible selectiveness of the sample. It is also unclear about the economic implication of the building damages. Therefore, 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.

5.1 Model Specification

My county level sample contains all 181 counties in Sichuan Province. For each county, I observe the aggregate statistics of fatality and direct economic loss decomposed by sectors. I aggregate a county's exposure to connected officials over the past 30 years (i.e., 1978 – 2007) to construct two measures: i) an indicator denoting whether the county ever had a connected official, and ii) the cumulative number of years of having a connected official. The estimating equation takes the following form:

$$Y_i = \beta Tie_i + \chi_i + \epsilon_i \tag{4}$$

where i indexes counties. Y_i denotes any of the aggregate outcomes that I look into: 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. χ_i denotes the set of county level controls: the distances to the epicenters, average ruggedness, the logarithms of GDP and population in 2007, and the connection status of the county officials in 2008. They take into consideration the geographic determinants of earthquake intensities, the social economic condition upon the earthquake, and the potential manipulation of the statistics of damages. It doesn't, however, account for the potential factors that could possibly make those vulnerable counties more favorable to the connected

officials — for example, worse rule of law — through which it could bias my results. Therefore, I refrain myself from making any causal claims other than cross-sectional correlations between the exposure to connected officials and the mortality and economic loss in the earthquake.

5.2 Results

The main results of my aggregate analyses are presented in Table 11. The first three columns consider the logarithm of fatalities (the total number of people who died or missed in the earthquake). In column (1), I compare the earthquake fatality between the ever-connected counties versus the never-connected ones conditional on the geographic, social economic and during-earthquake connectedness controls. The coefficient on *EverConnected* is 0.457, significant at the 5% level (standard errors are calculated allowing for heteroscedasticity. Same below.). It suggests that the total number of deaths or missing ones 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. It suggests that one additional year of having an connected official is associated with an approximate 12.5% increase in earthquake fatality. This coefficient is reduced by about one-thirds 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 *EverConnected* suggests, on average, 33% higher direct loss in money value in counties that ever has a connected official, significant at the 95% 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 3% – 5% increase in total economic loss, significant at least at the 5% level.

I then explore the effects of cumulative hometown ties on direct economic losses in various sectors. The outcomes that I observe include damages, in money value, of infrastructures, education facilities, health facilities, government agencies, and the physical losses in the agriculture, the manufacture, and the service sectors. All estimations take into consideration the geographic and social-economic controls and the set of prefecture fixed effects. The results are summarized in Table 12. I first observe a consistent positive effect of cumulative

hometown ties on direct losses in all of these sectors. The magnitude ranges between 0.5% to 5% depending on the specific sectors. Most of the coefficients are significant at least at the 10% level; the only exception is that of government agencies, which is, nevertheless, consistent with the pattern that I observe in my building level results.

Overall, the county level results suggest a clear correlation between the authority of the politically connected officials and the human and economic loss in the earthquake. While the association is not necessarily causal, it is indicative that the patterns I observe at the building level is likely representative of the general role that political connections may play in worsening the earthquake damages.

6 Concluding Remarks

In this paper, I examine the link between political connections and earthquake damages in the context of the 2008 Sichuan Earthquake. I construct two original datasets, one at the building level and the other at the county level. Using the building level dataset, I establish a plausibly causal relationship between the county officials' political connections in the year in which a building was constructed and the damage of the building in the 2008 earthquake. The estimates across a variety of specifications robustly suggest that buildings constructed in the authority of a connected official are 86% more likely to collapse relative to their non-connected counterparts. I offer some suggestive evidence that the detrimental effects is likely attributable to the potential corruption of the connected officials. To evaluate the external validity of these findings, I analyze 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 social economic conditions, is positively correlated with the aggregate statistics of earthquake damage such as fatality and direct economic loss. This result, while not necessarily causal, suggest that the patterns that I have observed in my building level dataset — a possibly selective sample — is likely representative of the role that political connections may play in worsening the earthquake damages.

The findings in this paper offer several unique, fresh insights into the understanding of bureaucratic connections 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 whether or not corruption is socially detrimental — the conclusion of which might be less obvious by simply looking at inefficiencies from resource misallocation or effort distorsion. 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 long enough that the perpetrators are long gone. It is suggestive of the potential role that corruption may play in making a society vulnerable, and much of its consequences can remain deeply hidden over a long period of time.

While I focus specifically on a natural disaster in China as a particularly striking example, the notion of social vulnerability and its association with corruption is likely applicable to other economic realms and to other countries. One such example might be the shadow banking in the financial system, which has been attributed as one important amplifier of the financial crisis. The scandals of shoddy buildings associated with corruption are also widely observed in a variety of countries, including Turkey, Iran, Mexico and Italy.

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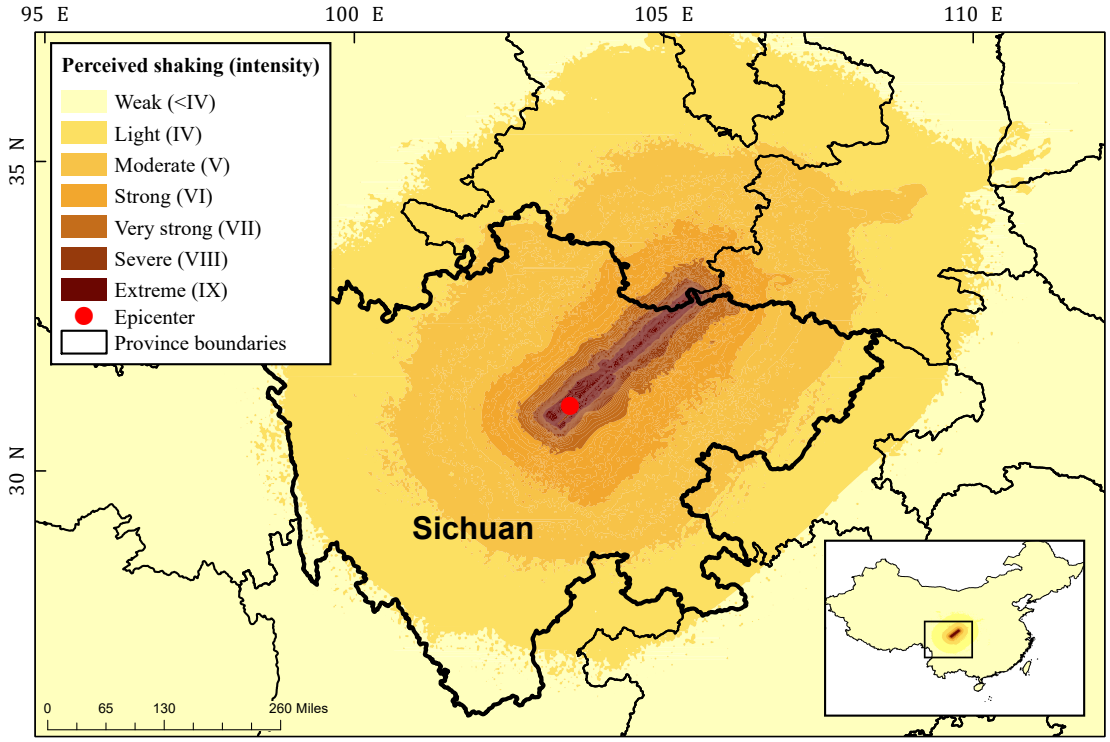
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Figure 1: Intensity Distribution of the 2008 Sichuan Earthquake



Source: USGS

Figure 2: The 20 most notable earthquakes since 2000 in terms of magnitude

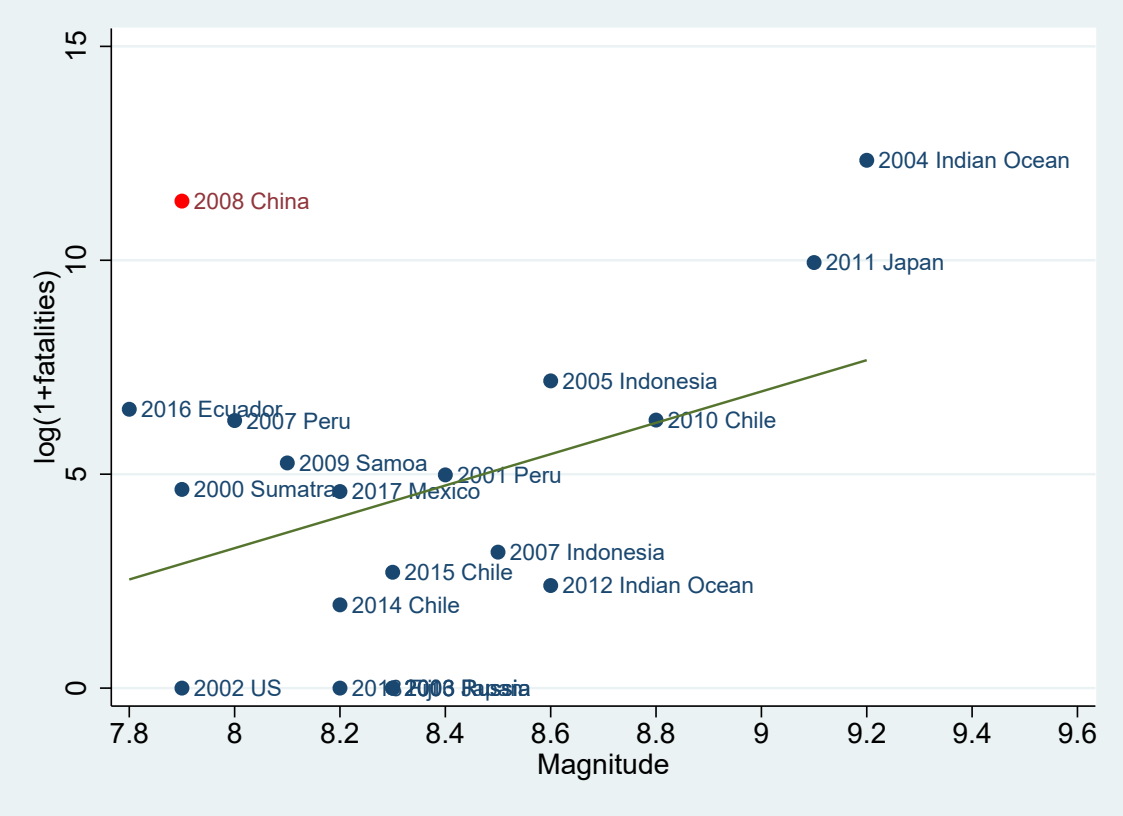


Figure 3: Spatial distributions of building damages in the sample

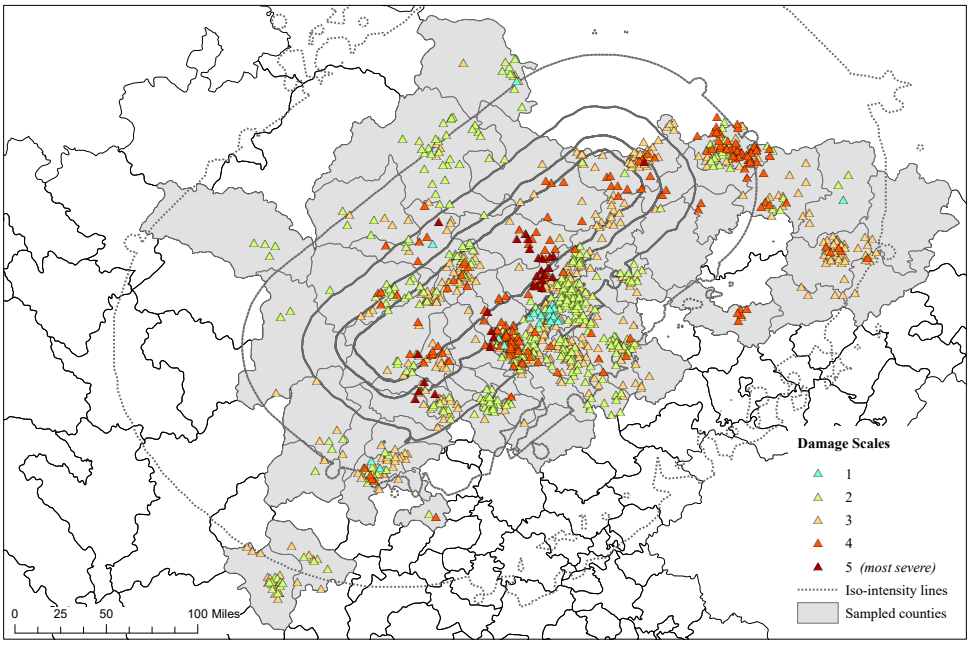
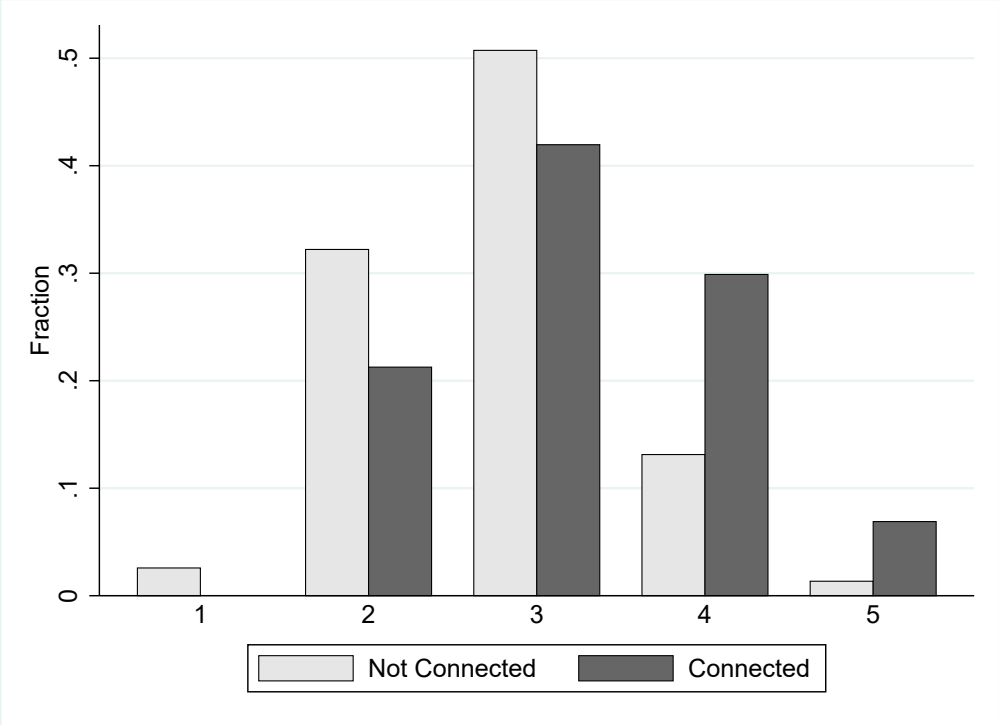


Figure 4: Distribution of damage scales by connectedness



Notes: The figure depicts the distribution of damage scales with and without hometown tie. Each bar represent the fraction of buildings that have experienced each of the damage scales with and without political connection during their years of construction.

Figure 5: Graphic illustration of the identification design for the building level analysis

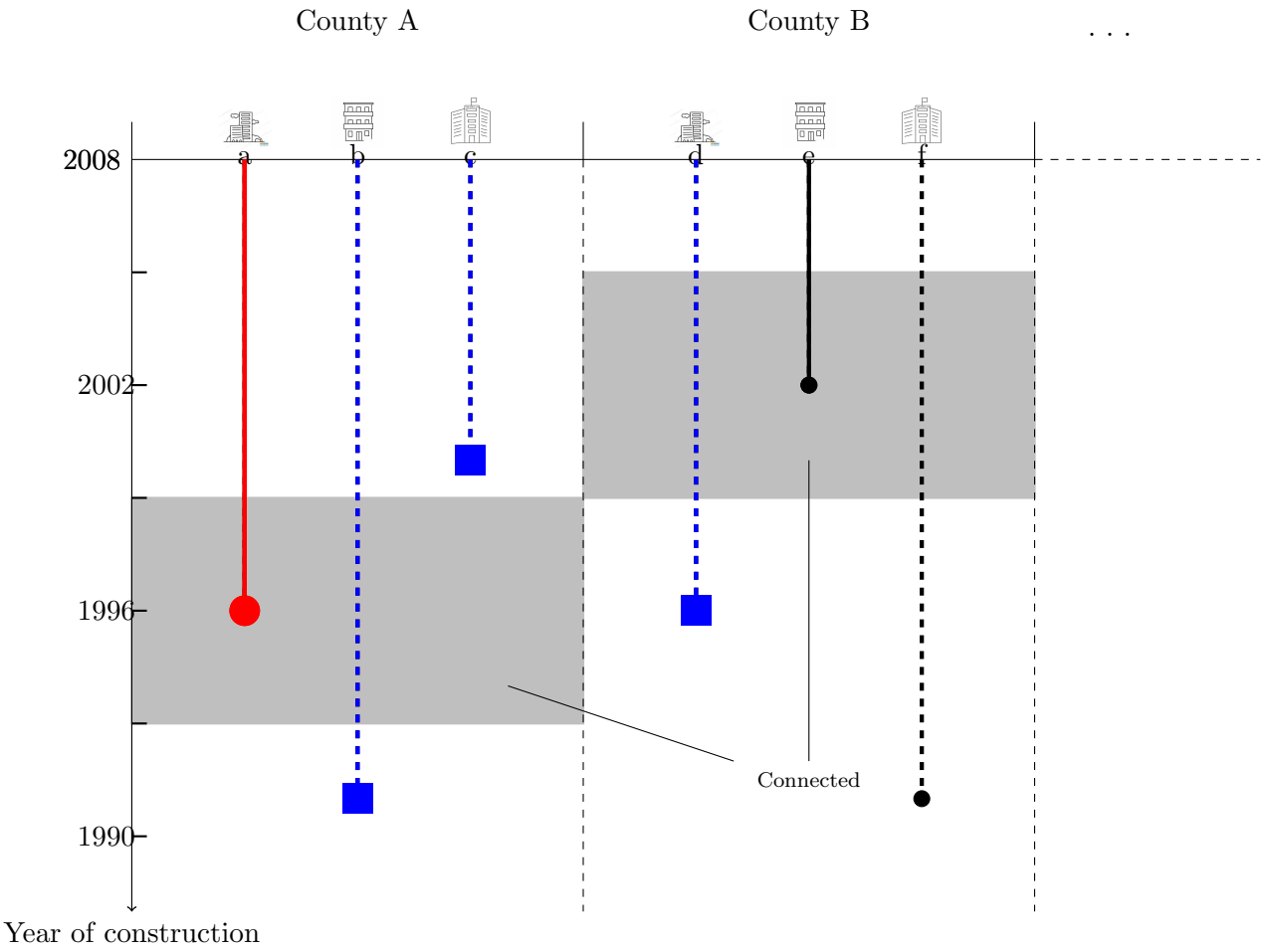
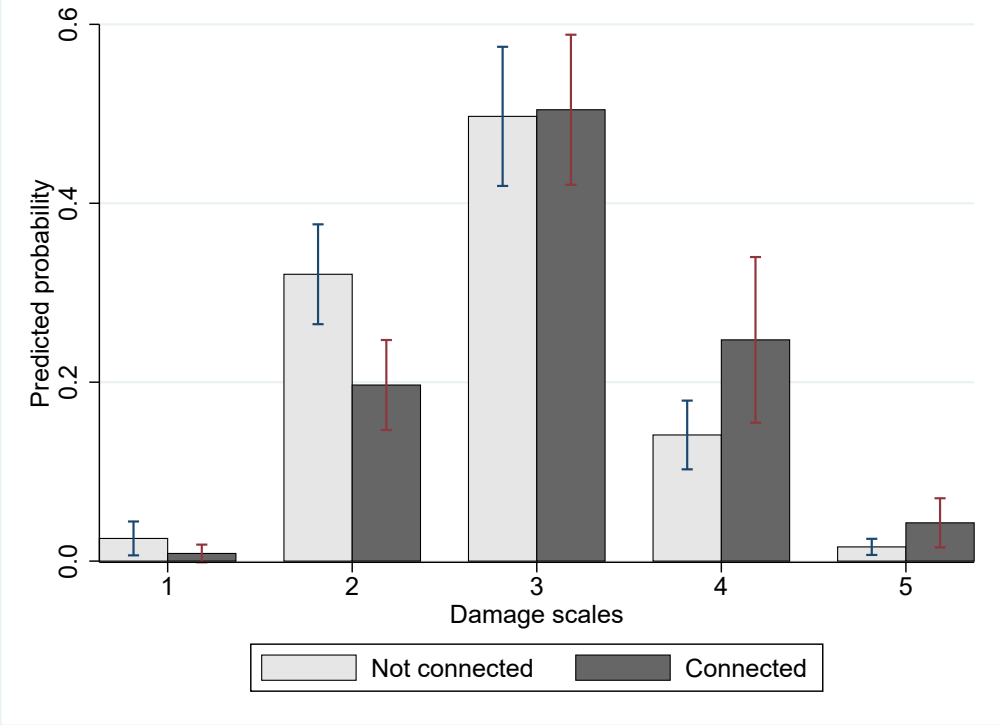
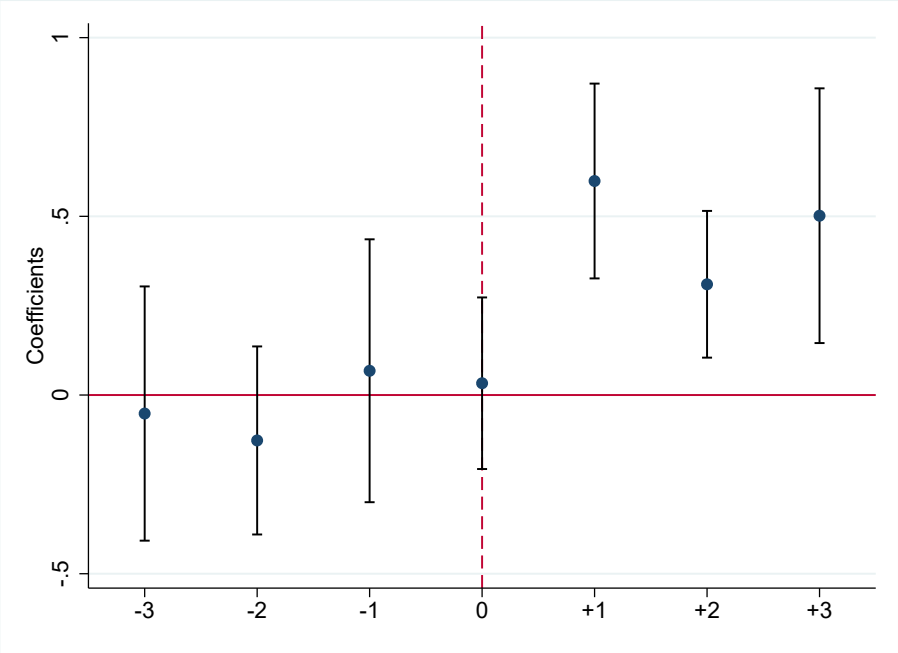


Figure 6: Predictive margins of political connection for each damage category

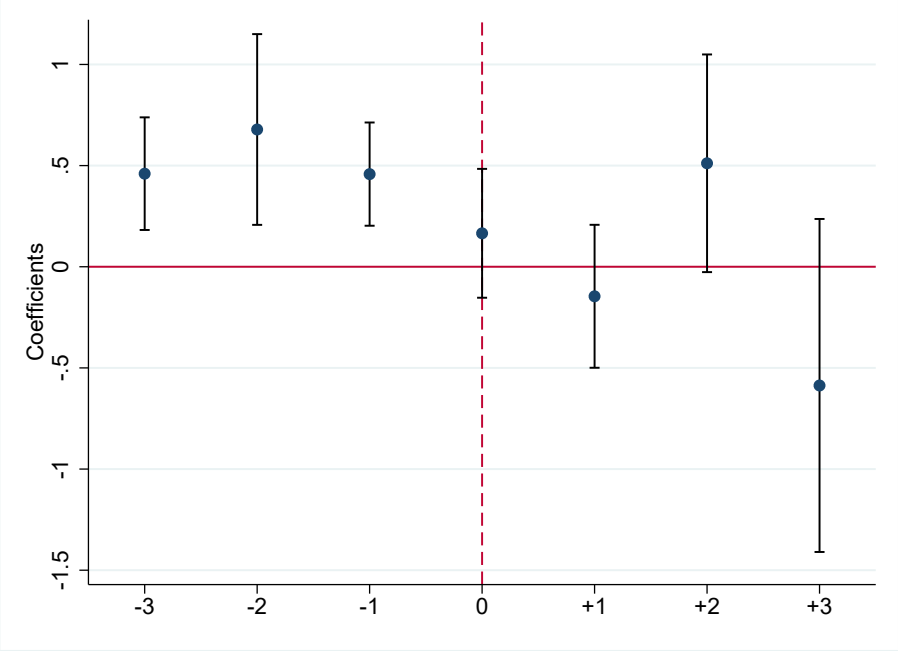


Notes: The figure depicts the predictive margins of political connection derived from the ordinal-probit estimation in Column (5), Table 3. Each bar represents the predicted probability for each of the damage scales that a building would have experienced with and without political connection during its year of construction. 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.

Figure 7: The effects of gaining and losing connection on building damages



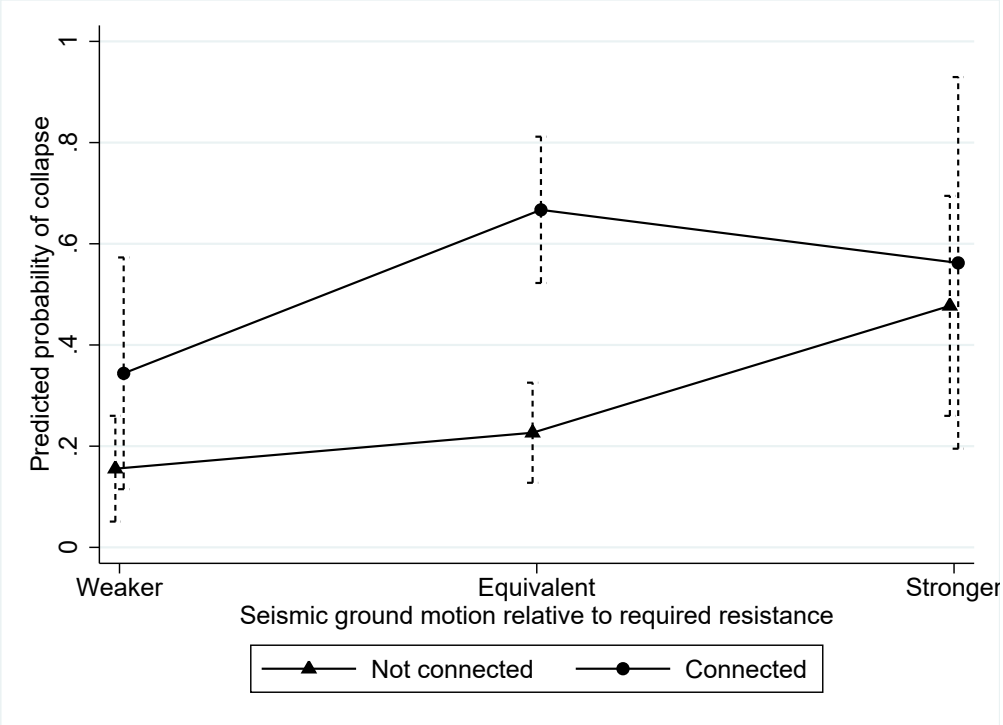
(a) Gaining connection



(b) Losing connection

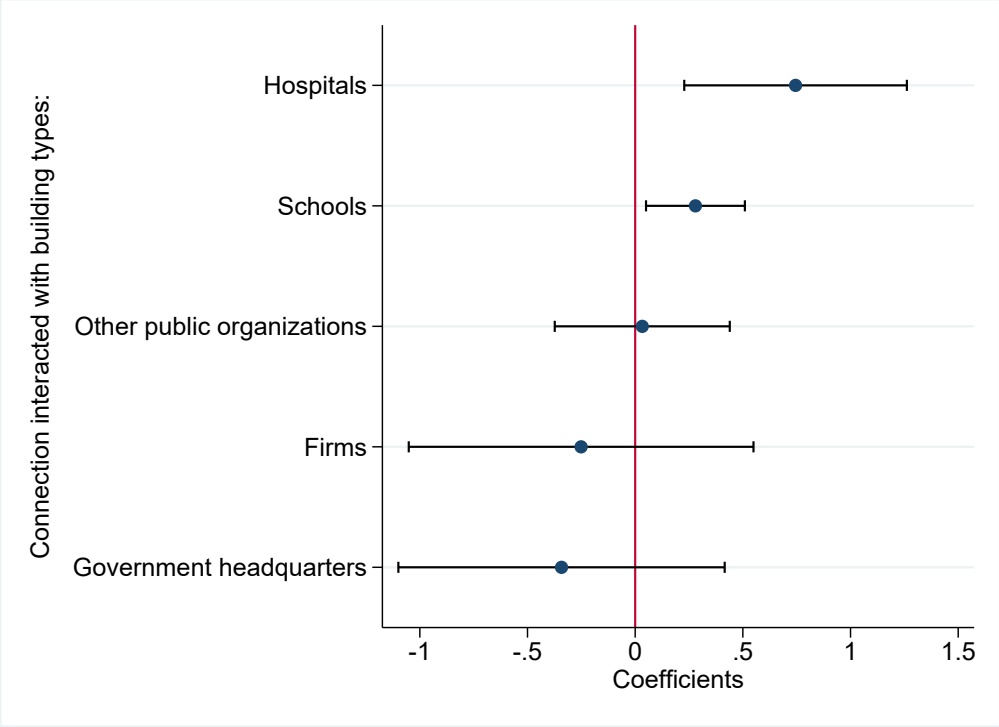
Notes: The figures depict the effects of gaining and losing political connection on building damages. The markers and capped spikes represent the OLS estimators and 95% confidence intervals. Figure 7(a) normalizes the years of construction to the year when the county gains political connection (year 0), with buildings constructed more than 3 years earlier as the comparison. Figure 7(b) normalizes the years of construction to the year when the county loses political connection (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 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.

Figure 8: Resistance requirements, seismic intensities and earthquake damage



Notes: The figure depicts the predictive margins of patronage ties, by seismic groups, derived from the probit estimation in Column (6), Table 8. 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 resistantce requirements respectively. 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.

Figure 9: Political connection and building damages by building types



Notes: 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 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 accelaration (g)	1065	0.29	0.23	1.04	0.04
Ruggedness	1065	265.96	302.27	1682.99	0.00
BuildingFeatures					
Storeys #	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

Table 2: 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
Ever connected	181	0.59	0.49	1.00	0.00
Years connected	181	2.67	3.32	13.00	0.00
Distance to epicenters (km)	181	528.00	254.79	1181.69	141.58
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
2008 Connectedness	181	0.28	0.45	1.00	0.00

Table 3: Political connection and building damages

	Dependent Variable: Damage Scale (1–5)					
	OLS					Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie	0.3086**	0.3103***	0.3051***	0.3069***	0.3049***	0.6454***
	(0.1140)	(0.0977)	(0.1008)	(0.1032)	(0.0993)	(0.1654)
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	0.385	0.388	0.390	0.391	
Pseudo R^2						0.287

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. *HometownTie* is an indicator variable denoting that either the county's party secretary or the governor (who had been in position for the longest time during the year) shared his/her city of birth with either the prefecture's party secretary or mayor back 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. 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-superviosr)	-0.0408	0.0669	0.0565	0.0540	0.0489	0.0811
	(0.1297)	(0.1119)	(0.1097)	(0.1107)	(0.1091)	(0.2035)
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	0.381	
Pseudo R^2						0.280

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. $Connected(non-supervisor)$ is an indicator variable denoting that either the county's party secretary or the county head shared his city of birth with either the party secretary or mayor from another adjacent prefecture back 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Political connection and the availability of building damages

	Dependent Variable: $\mathbb{1}\{DamagesObserved\}$					
	OLS					Probit
	(1)	(2)	(3)	(4)	(5)	(6)
HometownTie	-0.0395	-0.0253	-0.0230	-0.0237	-0.0123	-0.0796
	(0.0294)	(0.0259)	(0.0255)	(0.0262)	(0.0232)	(0.0983)
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)	0.185	0.185	0.185	0.185	0.185	0.211
# Counties	39	39	39	39	39	36
# Observations	5501	5500	5500	5479	5479	4799
Adjusted R^2	0.172	0.276	0.281	0.283	0.288	
Pseudo R^2						0.298

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. *HometownTie* is an indicator variable denoting that either the county's party secretary or the governor (who had been in position for the longest time during the year) shared his/her city of birth with either the prefecture's party secretary or mayor back 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Political connection 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**	0.2331**	0.2219**	0.4720**
	(0.1041)	(0.1002)	(0.1004)	(0.1063)	(0.1064)	(0.1893)
Per capita GDP (1,000 RMB)	-0.0140**	-0.0230**	-0.0229**	-0.0248**	-0.0234*	-0.0499**
	(0.0063)	(0.0104)	(0.0105)	(0.0109)	(0.0119)	(0.0228)
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	0.394	0.395	
Pseudo R^2						0.292

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. *HometownTie* is an indicator variable denoting that either the county's party secretary or the governor (who had been in position for the longest time during the year) shared his/her city of birth with either the prefecture's party secretary or mayor back 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7: Political connection 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*	0.1809*	0.1708*	0.3876*
	(0.0801)	(0.0977)	(0.0963)	(0.0961)	(0.0914)	(0.1993)
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
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	0.409	0.409	
Pseudo R^2						0.306

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. *HometownTie* is an indicator variable denoting that either the county's party secretary or the governor (who had been in position for the longest time during the year) shared his/her city of birth with either the prefecture's party secretary or mayor back 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. Standard errors are clustered by county. *HomeCity* is a set of indicators denoting that either the county's party secretary or the governor was originated from each of the cities.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8: Political connection and building damages

	Dependent Variable: Damage Scale (1–5)					
	OLS					Ordered Probit
	(1)	(2)	(3)	(4)	(5)	(6)
Xbelow	0.0809	0.0845	0.0696	0.0716	0.0690	0.9447*
	(0.0896)	(0.0987)	(0.0976)	(0.0982)	(0.0980)	(0.5434)
Xwithin	0.2514***	0.2394***	0.2465***	0.2459***	0.2662***	1.8213***
	(0.0896)	(0.0799)	(0.0770)	(0.0766)	(0.0694)	(0.3380)
Xabove	0.0723	0.0803	0.0591	0.0572	0.0965	0.3292
	(0.1042)	(0.1322)	(0.1217)	(0.1304)	(0.1489)	(0.7765)
within_requirement	0.0455	0.0413	0.0283	0.0353	0.0448	0.4147
	(0.0568)	(0.0684)	(0.0628)	(0.0594)	(0.0608)	(0.2780)
above_requirement	0.1394**	0.1253	0.1180	0.1370	0.1439	1.4660***
	(0.0666)	(0.0808)	(0.0800)	(0.0866)	(0.0939)	(0.5358)
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	0.346	0.348	
Pseudo R^2						0.380

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. *HometownTie* is an indicator variable denoting that either the county's party secretary or the governor (who had been in position for the longest time during the year) shared his/her city of birth with either the prefecture's party secretary or mayor back 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 9: Political connection 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	0.1253	0.0639	0.1676
	(0.1267)	(0.1399)	(0.1481)	(0.1452)	(0.1220)	(0.2293)
HometownTie(governor)	0.2735**	0.2794**	0.2820**	0.3050**	0.3456**	0.7079***
	(0.1066)	(0.1172)	(0.1280)	(0.1138)	(0.1276)	(0.2270)
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	0.387	0.390	
Pseudo R^2						0.290

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. $HometownTie$ is an indicator variable denoting that either the county's party secretary or the governor (who had been in position for the longest time during the year) shared his/her city of birth with either the prefecture's party secretary or mayor back when the building was constructed. $HometownTie(secretary)$ is an indicator denoting that the county's party secretary who was in position for the longest time during the year shared his/her hometown tie with at least one of the prefecture's party secretary or the mayor when the building was constructed. $HometownTie(secretary)$ is an indicator denoting that the county's governor who was in position for the longest time during the year shared his/her hometown tie with at least one of the prefecture's party secretary or the mayor 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. Standard errors are clustered by county.
Significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 10: Political connection 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***	0.3593***	0.3577***	0.7561***
	(0.1112)	(0.0877)	(0.0908)	(0.0966)	(0.0899)	(0.1523)
PrivateFund	0.0150	-0.0239	-0.0349	-0.0430	-0.0482	-0.1083
	(0.1298)	(0.1300)	(0.1302)	(0.1242)	(0.1297)	(0.2543)
HometownTie × PrivateFund	-0.2398	-0.4135**	-0.3922**	-0.3874**	-0.4018*	-0.7987*
	(0.1734)	(0.1860)	(0.1827)	(0.1869)	(0.2072)	(0.4237)
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	0.393	0.395	
Pseudo R^2						0.291

Notes: The dependent variable in all specifications is the level of damages on the 1(no damages)–5(completely collapsed) scale. *HometownTie* is an indicator variable denoting that either the county's party secretary or the governor (who had been in position for the longest time during the year) shared his/her city of birth with either the prefecture's party secretary or mayor back when the building was constructed. *PrivateFund* is an indicator denoting that at the building was known to be partly or fully funded by private investment or donation 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 building's squared sum distances to the two centroids of the earthquake and the ruggedness index. Building Controls include the building's size, number of storeys, number of rooms, material and structure, and a set of indicators denoting missing values. BuildingType includes a set of indicators denoting schools, hospitals, public administrations, firms, residential buildings and others. Standard errors are clustered by county.

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

Table 11: Cumulative connection and aggregate loss

	Dependent Variables:					
	$ln(1 + dead_or_missing\#)$			$ln(1 + total_econ_loss)$		
	(1)	(2)	(3)	(4)	(5)	(6)
Ever connected	0.4570**			0.3340**		
	(0.2112)			(0.1311)		
Years connected		0.1254***	0.0840*		0.0571***	0.0330**
		(0.0375)	(0.0449)		(0.0202)	(0.0166)
Controls	Y	Y	Y	Y	Y	Y
Prefecture FE			Y			Y
Mean(Dep.var)	1.531	1.531	1.531	2.010	2.010	2.010
# Observations	181	181	181	181	181	181
Adjusted R^2	0.658	0.678	0.768	0.794	0.796	0.920

Table 12: Cumulative connection and aggregate economic loss by sector

	Dependent Variables: $ln(1 + econ_loss)$ in ...						
	Infrastructure	Education	Health	Government	Agriculture	Manufacture	Service
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Years connected	0.0359**	0.0083**	0.0054*	0.0084	0.0369***	0.0543***	0.0459**
	(0.0152)	(0.0038)	(0.0032)	(0.0092)	(0.0127)	(0.0179)	(0.0192)
Controls	Y	Y	Y	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y	Y	Y	Y
Mean(Dep.var)	0.783	0.138	0.069	0.155	0.334	0.480	0.393
# Observations	181	181	181	181	181	181	181
Adjusted R^2	0.818	0.645	0.572	0.626	0.757	0.759	0.651