Patronage and Performance under Uncertainty: Evidence from China's Local COVID-19 Responses

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Abstract

Why do local Chinese governments prefer draconian pandemic control responses even against the central mandates to balance social-economic development? Using an original city-month panel dataset on purges of officials and COVID-19 cases from January 2020 through March 2022, we find that while local leaders were rarely purged for their poor performance in pandemic control, significantly more officials were purged for non-pandemic reasons in cities that experienced a COVID-19 outbreak several months ago. Meanwhile, using city mobility data from January 2020 to April 2020, cities whose leaders have patronage ties with the provincial party secretary saw less severe lockdown policies imposed in outbreaks. Our findings suggest that local leaders in China adopt strict lockdown policies to avoid the uncertainty of being exposed to post-outbreak investigations; however, their conservatism and pandemic responses can be moderated by patronage networks by assuring them protection from the patron. These findings highlight the benign effects of patronage networks for bureaucratic management in authoritarian governance.

Keywords: patron-client relations, purge, pandemic control, authoritarianism, China

1 Introduction

The COVID-19 pandemic has significantly challenged governments around the world, with China's response receiving particular attention due to its draconian measures. Despite widespread belief that China's Zero-Covid strategy is a top-down mandate, recent research reveals that the decision to adopt stringent pandemic control policies is primarily driven by local governments. In the face of central government directives advocating for a balance between socio-economic development and pandemic control, many local authorities have persisted in implementing strict measures at the expense of economic growth, social welfare, and even citizens' well-being. The widespread fear among local officials for being held accountable for mishandling COVID-19 outbreaks drives this phenomenon. We highlight two particular features of punishments that exacerbate the political uncertainty surrounding COVID-19 responses: inconsistency and externality. We show that standards used to punish mishandling outbreaks were not uniform and outbreaks generate externalities by attracting top-down investigations that punish non-COVID-related wrongdoings. Therefore, local officials overreacted to COVID-19 outbreaks for political survival. In turn, we propose that informal institutions like patronage networks that can moderate the uncertainty allowed local officials to make decisions based on public health considertaions.

Building on the literature of both how patron-client relations solve the credible commitment problem under weak institutions (Jiang, 2018) and how patrons protect clients from purges (Lorentzen and Lu, 2018; Qingjie and Yujeong, 2017; Xi, Yao and Zhang, 2021), this paper tests a hypothesis that patron-client relations improve government performance under political uncertainty.

To examine this relationship, we constructed an original panel dataset of Chinese prefectural cities, spanning from January 15, 2020, to April 28, 2020. The dataset combines information on intra-city mobility, patronage ties, and daily covariates such as air quality index, temperatures, precipitation, and city-level covariates like biographic data of city leaders, local GDP per capita, and service sector employment. Using a generalized difference-

in-differences (DID) design, we estimate the causal impact of patronage ties on changes in intra-city mobility in response to outbreaks, controlling for time-invariant unobserved heterogeneity and common temporal trends and allowing for different trends for different levels of GDP per capita and service sector share.

This study contributes to the existing literature in three significant ways. First, we examine how local officials navigate China's fragmented bureaucratic structure, thereby enriching the "fragmented authoritarianism" literature. Our empirical analysis reveals that establishing personalized patronage ties can be an effective solution to China's fragmented and nontransparent bureaucracy and uncertain political environment.

Second, we address the problem of bureaucratic slack resulting from anti-corruption campaigns and purges documented in recent studies (Chen, Keng and Zhang, 2023; Wang, 2022; Wang and Yan, 2020). Our research is among the first to offer solutions to this issue by demonstrating that patronage networks can incentivize risk-taking behaviors and mitigate the effects of bureaucratic slack in response to political uncertainties such as anti-corruption campaigns and sudden policy changes arising from natural disasters, public health crises, and security emergencies.

Finally, this paper advances our understanding of the impact of informal institutions in socio-economic systems with weak formal institutions. By examining how patron-client relations interact with political uncertainty to influence government performance outcomes in authoritarian regimes, our analysis uncovers the role of informal networks in hedging against political uncertainty and enhancing government performance and social welfare outcomes. Through this investigation, we hope to shed light on the complex interplay between informal networks, political uncertainty, and policy responses to major crises such as the COVID-19 pandemic.

This chapter is organized as follows: Section 1 offers an overview of decision-making under political uncertainty and patron-client relations. Section 2 provides a background of China's political uncertainty in the COVID-19 pandemic and outlines our hypotheses. Section 3

describes the data, measurement, and empirical strategy employed in our analysis. Section 4 presents the results of our investigation into the relationship between patronage ties and changes in intra-city mobility during the pandemic. Section 5 concludes by discussing the implications of our findings and offering suggestions for future research.

2 Political Uncertainty

Political uncertainty refers to situations where there is a high level of unpredictability or instability in the political environment, such as changes in government or policy, electoral cycles, institutional instability, or social unrest. It is a crucial factor that can significantly affect decision-making and actions of relevant stakeholders, consequently influencing political and economic outcomes.

A substantial body of literature explores the impacts of political uncertainty on various economic activities, such as investment, loans, stock market volatility, IPO activities, firm innovation, and economic growth. The effects of political uncertainty on political outcomes are also well-studied in political science. In democracies, political uncertainty usually stems from electoral competition (De Figueiredo 2002; Angelopoulos and Economides 2008) and the lack of information about coalition partners' policy preferences (Huber, 2001). In authoritarian regimes, however, sources of political uncertainty are more complex and multifaceted, encompassing issues such as leadership turnover, coups, institutional and policy instability, polarized political competition, limited access to credible information, and social unrest. The absence of strong institutions to effectively manage critical problems of power-sharing and mass control (Svolik, 2012) exacerbates the unpredictability of political outcomes and policy processes. Any failure of political institutions to reduce uncertainty can further result in additional changes in the behavior of the actors, leading to an even more complex and uncertain political environment that adversely affects government performance.

2.1 Decision-Making Under Political Uncertainty

In societies with well-functioning institutions, the influence of political uncertainty can be mitigated and decision-making patterns are made relatively stable by enhancing the predictability of stakeholders' strategic behaviors according to preset rules. For instance, research in both political science and economics finds evidence across countries that rent-seeking activities, such as lobbying efforts, interest group activity, and participation in strikes and demonstrations, intensify and government spending increases as political actors become short-sighted before elections (Alesina, Roubini, and Cohen 1997; Persson and Tabellini 1999; Drazen 2000; Mueller 2003). Also, political uncertainty induced by electoral competition creates an opportunity and incentive for opposed groups to sabotage each other's policies. To ensure policy stability even after a change in office, elected officials use insulating structures that constrain bureaucratic discretion, making bureaus less susceptible to future pressure from opposing groups (Moe 1989; Moe 1990). In addition to the expected opportunistic behavior associated with electoral cycles, institutions are also designed to hedge against the political uncertainty resulting from a lack of credible information about coalition partners' policy preferences. One institutional feature that is particularly salient to intra-government bargaining is the confidence motion. By invoking a vote of confidence procedure, the prime minister can tie the survival of the government to the passage of a bill.

These institutions provide a framework for managing political uncertainties through established procedures, norms, and regulations that guide the behavior of political actors, including elected officials, bureaucrats, interest groups, and citizens. By adhering to these rules, stakeholders can navigate political uncertainties in a more predictable and consistent manner, reducing the negative impacts of uncertainty on decision-making processes and outcomes. However, in contexts where institutions are weak or absent, such as in authoritarian regimes, the lack of established procedures and norms can lead to ad hoc and unpredictable responses to political uncertainties. In such situations, authoritarian regimes often resort to purges or smaller-scale crackdowns as a means to address power struggles and policy conflicts

(Li and Manion, 2023). This can further exacerbate uncertainty and instability, as these responses are often arbitrary and lack transparency and due process. Such capricious and unforeseeable crackdowns or purges heighten uncertainty about career stability and personal safety, leading to increased fear. Consequently, lower-level bureaucrats may choose to play it safe by avoiding any actions that might fall outside officially sanctioned domains in order to protect themselves from potential repercussions. This produces bureaucratic slack. We argue that informal institutions, such as patronage networks, can help alleviate bureaucrats' risk-averse tendency under political uncertainty, as patrons can provide extra-institutional protection for their clients' mistakes or risky behaviors.

2.2 The Role of Patron-Client Relations Under Uncertainty

Existing research on patronage networks generally portrays them negatively in terms of their impact on government performance, as they are claimed to foster corruption, distort political incentives and voting behavior, and undermine formal accountability mechanisms in government (Rose-Ackerman, 1999; Geddes, 2023; Stokes, 2005). These networks are also often blamed for the poor economic performance of many developing countries (Goldsmith, 1999; Ilkhamov, 2007; Van Zon, 2001). More recently, they have been recognized for their potential to address the principal-agent problem by aligning interests between the two parties. For example, Jiang (2018) finds that city leaders in China with informal ties to incumbent provincial leaders deliver significantly faster economic growth than those without. Jiang and Zeng (2020) argue that connected political leaders, blessed with more resources and support from informal networks, are less likely to be captured by local stakeholders, therefore more responsive to public demands.

However, there remains a gap in understanding the positive impact of patronage networks during periods of political uncertainty, as most research has focused on normal circumstances. Examining the impact of patronage networks on bureaucrats' decision-making in politically uncertain contexts enhances our understanding of how officials navigate dynamic, complex,

and uncertain environments, and how these decision-making patterns influence government performance. We argue that patronage networks can have a significant impact on enhancing government performance in situations characterized by political uncertainties, particularly in polities that lack strong institutions.

In situations of political uncertainty, lower-level officials without backing from higher-level patrons face a dilemma about how to secure their position. To increase their chances of survival, these agents may adopt a risk-averse and conservative approach, which could inhibit innovation and entrepreneurship, ultimately leading to a decline in organizational performance and public trust (Chen, Keng and Zhang, 2023; Wang, 2022; Wang and Yan, 2020). The ability of patrons to provide credible information about the political environment and offer extra-institutional protection is crucial in providing assurance to their clients during political uncertainty. This assurance can foster clients' risk-taking and innovative activities, ultimately leading to improved government performance.

3 Patronage Networks and Political Uncertainty in China

The main theoretical argument posited in this chapter is that patron-client relations can positively affect government performance, particularly in the presence of political uncertainty. We contextualize this argument by examining local officials' policy responses in the aftermath of the COVID-19 pandemic, where political uncertainty is a prominent feature. In this section, we first offer a brief overview of how top communist party chief Xi Jinping's corruption crackdown has reshaped the political landscape for factions and its impact on the decision-making and behavior of local officials in China. This contextual knowledge facilitates a better comprehension of how officials navigate the uncertainties of pandemic control policies in the aftermath of the COVID-19 pandemic, and the underlying rationale behind their responses. Subsequently, we examine how patronage networks interact with political uncertainty to influence local officials' responses to the central pandemic control policies.

3.1 Xi Jinping's Broad Purges

Xi Jinping assumed leadership of the Chinese Communist Party (CCP) in November 2012. He launched a series of political campaigns to strengthen government accountability and fight corruption beginning in 2013. These anti-corruption campaigns, such as the Eight Rules (八项规定), the Sunshine Wage (阳光工资), and other initiatives, aimed at holding officials accountable (官员问责), targeted officials at both high and low ranks. During Xi's first five-year term, over half a million cadres were imprisoned, and many others faced disciplinary actions such as demotion. These measures indeed increased the CCP's political legitimacy and boosted Xi Jinping's personal popularity, but they also had unintended consequences (Wang, 2022; Wang and Yan, 2020). One of these consequences was the widespread occurrence of "bureaucratic slack" or shirking (懒政/怠政) among local governments in China.

Before Xi's reign, Chinese officials were recognized for their high level of commitment to economic performance, which was seen as crucial for career advancement. These performance-oriented efforts played a significant role in China's rapid economic growth (Li and Zhou, 2005; Landry, Lü and Duan, 2018). After the reform and opening up policy (1980s), local officials in China were motivated to achieve performance goals without much concern for personal accountability for their methods or mistakes made during the process. However, many have observed that Chinese officials lost their previous passion for performance following Xi's anti-corruption crackdown: many became passive in their approach to work and avoided tough decisions. With the recent imposition of stricter standards, more severe punishments, and an expanded scope of accountability, many officials in China face demotions, dismissals, and even imprisonment. As a result, they have become increasingly concerned about their career security and personal safety. Moreover, the principle of "holding officials accountable" lacks clear definition, leading to uncertainty and anxiety among Chinese officials. The concept of "life-long accountability" is also loosely defined, creating an environment of constant uncertainty for the entire Chinese bureaucratic system. Consequently, many local officials, especially those responsible for making governance decisions, have tended to avoid difficult

decisions and defer direct actions. Their reasoning is that, as the popular saying goes, "The more you do, the more mistakes you will make". To minimize job risks, these cadres have often chosen to wait for clear and specific instructions before taking actions (Chen, Keng and Zhang, 2023; Wang and Yan, 2020)

Patron-client relations are a prominent feature of Chinese politics. Scholars argue that officials with informal ties with higher-level leaders are more likely to deliver faster economic growth (Jiang, 2018), resist local vested interests and respond to public demands (Jiang and Zeng, 2020), and to get promoted (Jia, Kudamatsu and Seim, 2015; Shih, Adolph and Liu, 2012). How patron-client relations affect officials' incentives and behavior in response to the political uncertainty created by Xi's corruption crackdown? Li and Manion (2023) find that patronage networks may have a weakening effect on the appointment of city party secretaries, as local party leaders may seek to display loyalty to Beijing by avoiding appointments that favor their own clients. Additionally, Wang and Yan (2020) provide interview-based evidence suggesting that patronage networks are no longer perceived as important for driving local economic growth. Although there is evidence pointing to a decline in the impact of patronage networks, scholars have also noted that patron-client relations can still offer some protection to clients during periods of anti-corruption purges (Qingjie and Yujeong, 2017; Xi, Yao and Zhang, 2021; Lorentzen and Lu, 2018).

3.2 Political Uncertainty During the Covid-19 Pandemic

Local governments in China were given an unprecedented task of eliminating COVID-19, which was declared as the most significant political mission by the party center in a document dated January 30, 2020.[1] However, instead of imposing a national lockdown, the party center opted for a decentralized approach, allowing each city to design and implement its own pandemic control strategy while holding local officials responsible for the results. The enforcement of lockdown measures varied across localities, with some praised for their swift

[1] "关于做好新型冠状病毒感染肺炎疫情防控和脱贫攻坚有关工作的通知," State Council Poverty Alleviation Office, January 30, 2020.

and strict measures,[2] while others were acclaimed for their precise and moderate pandemic control that did not disrupt daily lives.[3] Local officials had significant administrative autonomy in their lockdown decisions as economic targets set in the beginning of 2020 were de facto abandoned.

China's Emergency Response Law institutionalizes localized responses by requiring county governments and higher to immediately contain emergencies and report to higher-level governments if necessary, bypassing intermediate leadership. This grants local governments on-the-spot discretion during crises, and only ex-post upward reporting is required. Monitoring policy outcomes alone enables the party to induce a nationwide pandemic control response without instructing a national lockdown.

Political punishments for mishandling COVID-19 outbreaks exhibited heterogeneity when compared to other public scandals. For instance, the provincial party secretary of Hubei Province and Wuhan city were suspended from their posts on February 13, 2020. However, both later assumed non-leadership roles at higher-level legislative bodies.[4] Moreover, neither Hubei's governor nor Wuhan's mayor were punished. In contrast, following the ineffective vaccine scandal in 2018, two vice governors of Jilin Province and the mayor of Jilin's capital, Changchun, were dismissed entirely without reinstatement. Considering the impact of the Wuhan outbreak on the country, the punishment seemed underwhelming at the very least. Table 1 compiles all sanctions against county-level and prefectural-level government heads

[2]For instance, Henan province has been considered a role model in and repeatedly praised for implementing effective pandemic control measures in rural areas to prevent the spread of COVID-19 cases. See `http://leaders.people.com.cn/n1/2020/0127/c58278-31562958.html`

[3]Before the major outbreak and ensuing lockdown in 2022, Shanghai had consistently pursued a cautious pandemic control policy known as the "catching mice in a porcelain shop" approach. This approach aims to control the epidemic with minimal social costs, ensuring both rapid tracking of infection cases and the normal functioning of the city's production and daily life. As a result, when many other areas in China implemented one-size-fits-all lockdown policies, Shanghai's "precise pandemic control" strategy received widespread acclaim and unanimous praise from the public and the media. See `https://www.bbc.com/zhongwen/simp/chinese-news-60980620`

[4]The former party secretary of Wuhan, Guoqiang Ma, was appointed as the Vice Chairman of the Hubei Provincial People's Congress Standing Committee (湖北省人大常委会副主任) in August 2021, about one and a half years after being suspended from his previous role. This honorary position is commonly viewed as the "final destination" for local leaders who are approaching retirement.

Table 1: County-and-above Administrative Sanctions Reported in Central Medias

Date	Sanction	Province	Jurisdiction	Position	Covid-Related
2020-02-02	Oral warning	Hebei	Zhangjiakou	County-level	Yes
2020-02-15	Removal	Heilongjiang	Qiqihar	County-level	Yes
2020-02-16	Removal	Hubei	Qichun	County-level	Yes
2020-02-20	Removal	Heilongjiang	Xiangfang	County-level	Yes
2020-02-20	Removal	Heilongjiang	Wuchang	County-level	Yes
2020-02-24	Removal	Yunnan	Dali	Both	Yes
2020-05-16	Removal	Jilin	Shulan	County-level	Yes
2020-06-15	Removal	Beijing	Fengtai	County-level	Yes
2020-09-06	Suspension	Guizhou	Dafang	County-level	No
2021-01-07	Warning	Hebei	Gaocheng	County-level	Yes
2021-01-15	Removal	Shandong	Qixia	County-level	No
2021-01-21	Removal	Henan	Jiyuan	County-level	No
2021-02-01	Removal	Hebei	Gaocheng	County-level	Yes
2021-04-08	Dismissal	Yunnan	Ruili	County-level	Yes
2021-05-09	Oral warning	Yunnan	Baoshan	County-level	No
2021-10-26	Warning	Guangdong	Zhuhai	Vice Mayor	No
2021-11-03	Suspension	Hebei	Shenze	County-level	Yes
2021-12-06	Removal	Inner Mongolia	Hulunbuir	County-level	Yes
2021-12-17	Removal	Shanxi	Xiaoyi	County-level	No
2022-01-02	Removal	Shaanxi	Yanta	County-level	Yes
2022-01-21	Demotion	Henan	Zhengzhou	Party Chief	No
2022-03-12	Removal	Jilin	Jilin	Mayor	Yes
2022-03-19	Removal	Jilin	Jilin	County-level	Yes

Notes: Position: "Both" denotes both party chief and mayor are sanctioned. "County-level" means the official sanctioned is party chief or government heads of administrations lower than prefectures, such as county-level cities and districts. This list is produced from Weibo posts of CCTV, People's Daily, and Xinhua that contain the Chinese words "accountable" (问责), "removal" (免职), "dismissal"（撤职）, or "suspension"(停职) of city/district/county party chiefs and government heads ("市/区/县委书记"及"市/区/县长").

and party chiefs reported in public announcements by People's Daily and Xinhua's Weibo posts from January 2020 to May 2022. County-level leaders were frequently dismissed for local outbreaks, while only two prefectures had their leaders removed from office due to COVID-related reasons. These include the party secretary and mayor of Dali, Yunnan, who were removed for illegally confiscating and requisitioning masks in February 2020, and the mayor of Jilin City, who mishandled a local outbreak in March 2022. In sum, direct punishments on city leaders for local outbreaks appear inconsistent, if not exceptional.

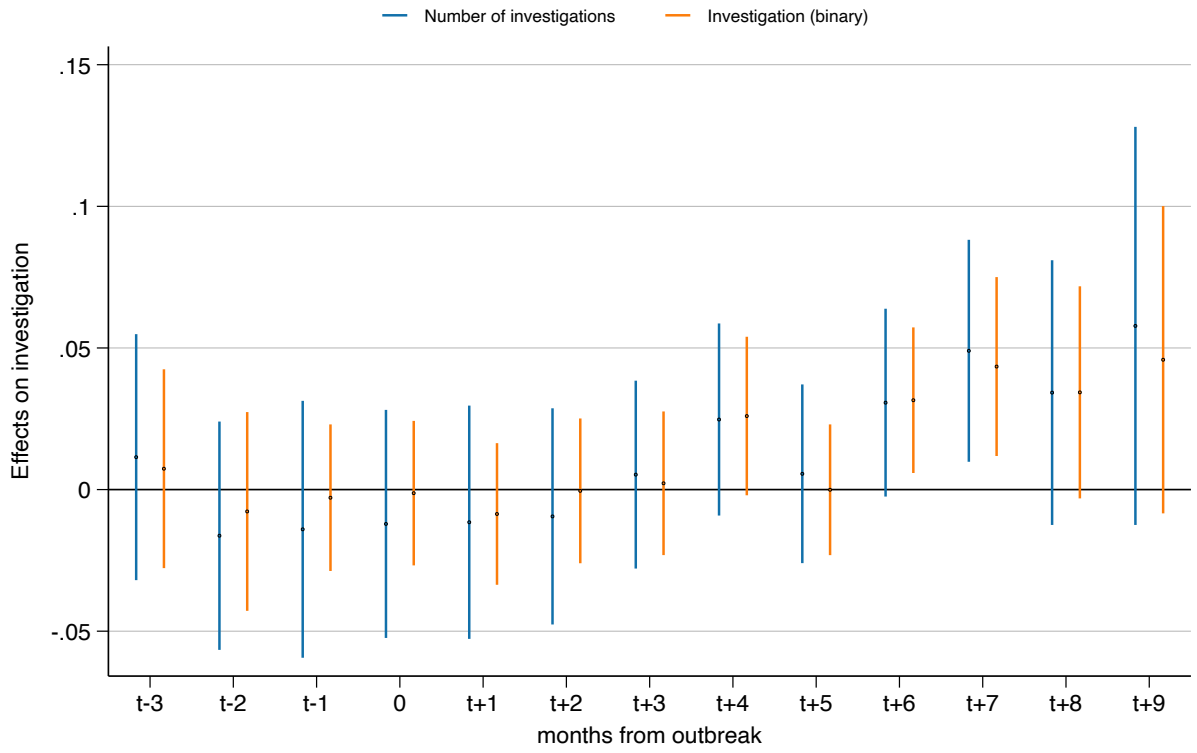
Furthermore, COVID-19 outbreaks not only led to heterogeneous punishments but also attracted incidental attention. Figure 1, generated from a city-month panel covering the period from January 2020 to March 2022, includes Central Commission of Discipline Inspection (CCDI) information on investigations on city-level officials and COVID-19 cases. The model used here is an OLS model that regresses investigations on thirteen-month dummies relative to local outbreaks, with city and month fixed effects. The orange bars represent the past outbreak's effects on a binary measure of whether there is a disciplinary investigation in the city-month, while the blue bars illustrate the effects using a continuous measure of disciplinary investigations. We note that investigations by the CCDI are considered more severe than suspensions and dismissals, as the former almost certainly lead to criminal charges. As shown in Table 2, none of the sanctions against city leaders during the pandemic were COVID-related. This means the city leaders fear local outbreaks mostly out of fear of negative externalities they may bring.

Our findings indicate that a COVID-19 outbreak six months prior (defined as reporting more than 50 cases in the city-month) increases the probability of a top-down investigation by five percentage points. However, recent or future COVID-19 outbreaks do not have any significant effect. Note that these investigations are rarely COVID-related and usually expose wrongdoings in previous years.

Combining the two findings, we suggest a two-fold political uncertainty that COVID-19 pandemic brought upon local officials: uneven punishments directly related to local out-

breaks; coupled with unwanted investigations that follow outbreaks and can lead to even more severe punishments. Officials are not only motivated by the direct consequences of missing the policy target, but also the potential top-down attention that may follow. Since the investigations are comprehensive and can implicate the official for any past wrongdoings discovered, we expect every official who is unsure of withstanding a thorough examination by the party strives to avoid such scrutiny.

Figure 1: Investigations Follow Local Outbreaks



Notes: This figure illustrates the effects of past outbreaks on disciplinary investigations. Each circle represents a point estimate for the effect of outbreaks on subsequent investigations, and the vertical bars are the corresponding 95% confidence intervals. The estimates are presented using two different measures: a binary measure of investigations depicted in orange, and a continuous measure of investigations represented in blue.

Table 2: Disciplinary Sanctions of City Leaders by CCDI from Jan 2020-May 2022

Date	Sanction	Name	Province	Jurisdiction	Position	Covid-related
2020-06-28	Expel	Gao Shihong	Inner Mongolia	Wuhai	Mayor	No
2020-09-02	Investigation	Gao Hongzhi	Hebei	Handan	Party Chief	No
2020-12-21	Investigation	Deng Peiran	Hebei	Shijiazhuang	Mayor	No
2021-01-15	Expel	Hao Maorong	Inner Mongolia	Tongliao	Mayor	No
2021-05-09	Investigation	Zhang Enliang	Heilongjiang	Hegang	Party Chief	No
2021-09-16	Investigation	Wang Junbiao	Shanxi	Changzhi	Mayor	No
2021-11-18	Investigation	Yang Yiwen	Hunan	Changde	Party Chief	No
2021-12-23	Investigation	He Jian	Ningxia	Zhongwei	Party Chief	No
2022-03-02	Expel	Wang Junbiao	Shanxi	Changzhi	Mayor	No
2022-04-12	Investigation	Wangdui	Tibet	Linzhi	Mayor	No
2022-04-17	Investigation	Liu Hushan	Tibet	Rikaze	Mayor	No
2022-05-09	Investigation	Wan Kai	Jiangxi	Ganzhou	Mayor	No
2022-05-16	Investigation	Li Chenghui	Xinjiang	Hami	Party Chief	No

3.3 Theory and Hypothesis

Lower-level agents are faced with two choices: a risky option that could yield high rewards if successful but *may* result in punishment if unsuccessful and a safe option that offers low rewards with certainty. According to our theory, a patronage network can offer assurance to agents that risk-taking [5] is less likely to result in repercussions even if the outcome turns out to be unfavorable. Upper-level patrons can either prevent follow-up investigations or divert them away from their connected client, leaving others to take the blame (Qingjie and Yujeong, 2017; Xi, Yao and Zhang, 2021; Lorentzen and Lu, 2018). If the outcome is favorable, the connected client can not only provide benefits to the patrons with overarching interests but can also expect to receive credit from the patron (Jiang, 2018). Therefore, being connected decreases the uncertainty of the risky choice. In contrast, the safe choice does not receive a similar boost from connections because of its certainty. Hence, we anticipate that connected lower-level agents are more likely to choose the uncertain option.

Our theory is based on the premise of political uncertainty. Due to the diversity of punishments for mishandling local outbreaks and the non-COVID-related investigations that often follow, local officials are confronted with a wide range of potential political outcomes resulting from the COVID-19 pandemic. However, individual local officials have knowledge of the strength of their patron-client relationships, which we believe can provide them with a more precise understanding of the distribution of political outcomes. While connections can significantly reduce political uncertainty by avoiding the harshest political penalties, they cannot change the risk of an outbreak determined by the natural contagiousness of the disease. When political uncertainty is low, such as when the punishment for a local outbreak is narrowly distributed around a minor warning, being connected has only a marginal impact on the appeal of the risky option.

[5] In the case of COVID-19 response, while the local official may know the risk of an outbreak, we presume that he would not know the risk of being punished after the outbreak, according to the uneven punishments described above. Therefore, there is a political uncertainty about the value of the outcome, which is better assured by connection.

In a Zero-COVID environment, the risky option involves avoiding extreme lockdown measures while maintaining some level of mobility, while the safe option requires locking down the city to minimize the risk of an outbreak.

Hypothesis 1: *In the face of political uncertainty, officials who are connected are more likely to implement less severe lockdown measures when facing the same level of outbreak risk.*

4 Empirical Design

4.1 Data

We constructed an original panel dataset of Chinese prefectural cities that covers the early days of the COVID-19 pandemic from January 15, 2020, to April 28, 2020. This dataset combines information on intra-city mobility and patronage ties between city leaders and the provincial party secretary. It also includes daily covariates such as air quality index, temperatures, precipitation, and city-level covariates such as biographic data for city leaders, local GDP per capita, and service sector employment. We use this dataset to investigate whether patronage ties influence decision-making in lockdown policies.

The main dependent variable in this analysis is the implementation of new lockdown measures, which is indicated by changes in intra-city mobility. Imposing stricter lockdown measures within a city results in a reduction in mobility. The decision to concentrate on changes in mobility instead of mobility level is because the latter reflects the culmination of all previous lockdown measures as well as the city's pre-pandemic mobility, whereas changes in mobility reflect daily decisions made by local governments in response to new infection cases. Given that this study is focused on local government decision-making, changes in mobility the more appropriate measure.[6]

[6]To normalize the mobility change, we use pre-pandemic mobility as baseline to generate relative mobility for each city-day. We then use the equal-weighted moving average of the previous seven days' relative mobility to smooth the measure.

The variable of interest is the patronage ties of the prefectural party secretary with the provincial party secretary directly above him. We follow Jiang (2018) and measure patronage ties as whether the prefectural secretary was promoted to a prefectural leadership position from within the province when the provincial secretary currently above him serves as the provincial secretary of the province.

The logarithmic level of infections in the city on the preceding day is the primary variable used to assess the scale of a local COVID-19 outbreak. To evaluate progress towards the goal of achieving zero-COVID, we establish a binary variable that shows whether the city has reported no local infections for three consecutive days following an outbreak. The third day of zero infections is regarded as the day the city attains the zero-COVID objective. To measure the resurgence of outbreak risk, we create a binary variable that indicates whether the city records its initial COVID-19 case after having documented zero cases in the prior three days.

Baidu provides intra-city mobility data, utilizing Baidu Location-Based Service (LBS), which includes Baidu Maps, a Chinese equivalent of Google Maps, and apps that collect and transmit users' location data to Baidu. LBS receives 120 billion service requests daily from 1.1 billion monthly active devices. The degree of intra-city mobility is determined by the proportion of city residents who "make a trip."[7] Liu et al. (2022) have compared Baidu's mobility data with similar measures offered by alternative internet platforms, such as Weibo, which is China's Twitter-like platform. The findings demonstrate a high degree of correlation, indicating that both measures are capturing the population's underlying mobility. While Baidu's mobility data are widely utilized by financial institutions and media outlets to evaluate China's reopening and recovery, it should be noted that the data only cover users with a GPS device and may not represent the entire population. However, as

[7]To identify a trip, an origin-destination inference algorithm is used, which is based on a Density-based spatial clustering technique. Baidu uses this algorithm to analyze users' location points to generate clusters of tightly packed points, subject to a set of predefined parameters such as a minimum number of points to make up a cluster and a distance threshold. If the user remains in a cluster for a specific period, the cluster is deemed a "stationary cluster," and an origin and destination are assigned to the temporal order.

of June 2020, the penetration rate of mobile internet in China was 65 percent for the entire population and 76 percent for urban residents, who are the primary drivers of intra-city mobility.

Extending the existing biographic data of China's prefectural leaders (Jiang, 2018; Li and Manion, 2023; Xi, Yao and Zhang, 2021) to 2020 through reviewing Baidu Baike, a web-based Chinese language encyclopedia, we construct an up-to-date and comprehensive biographic dataset of prefectural leaders. Daily case data from COVID-19, precipitation, and temperature are from Harvard Dataverse's China Data Lab. To generate Figure 1, we obtained the purge data of prefectural-level officials from Central Commission of Discipline Inspection website from January 2020 through March 2022. To review all pandemic-related announcements of official media, we scraped all 109,984 Weibo posts by People's Daily(人民日报), Xinhua(新华社), and CCTV News(央视新闻) from January 1, 2020 to May 25, 2022. Summary statistics of the dependent variable, independent variables, and covariates are presented in Table 3.

Table 3: Summary Statistics

Variable	N	Mean	SD	Min	Max
Change in Relative Mobility(MA)	33495	-0.05	2.29	-15.44	10.43
Connection	33075	0.53	0.50	0.00	1.00
Presence of Outbreak	33495	0.30	0.46	0.00	1.00
Change in Precipitation	33180	-0.00	0.32	-5.51	5.91
Change in Temperature	33180	0.32	4.99	-29.00	24.80
Moving Average of COVID-19 Cases	31581	0.44	1.85	0.00	47.86
log(COVID-19 Cases)	33436	0.14	0.46	0.00	5.31
Zero COVID-19 Cases in 3 days	33495	0.03	0.17	0.00	1.00
log(GDP per capita)	27930	-5.78	4.41	-10.10	2.22
% Employed in Service Sector	27405	51.11	9.80	26.54	79.71

4.2 Empirical Strategy

To analyze the effect of patronage ties on local government decision-making regarding lock-down measures during the COVID-19 pandemic, we employ a generalized difference-in-

differences (DID) design with continuous treatment (Callaway, Goodman-Bacon and Sant'Anna, 2021). This approach allows us to estimate the causal impact of patronage ties on changes in intra-city mobility in response to outbreaks, controlling for time-invariant unobserved heterogeneity and common temporal trends.

The main specification Model (1) for our empirical analysis can be expressed as follows:

$$\begin{aligned}\Delta M_{it} = \beta_0 &+ \beta_1(\text{PatronageTies}_{it}) + \beta_2(\text{LogInfections}_{i,t-1}) \\ &+ \beta_3(\text{PatronageTies}_{it} \times \text{LogInfections}_{i,t-1}) \\ &+ X'_{it}\gamma + \alpha_i + \tau_t + \epsilon_{it}\end{aligned}$$

Where:

ΔM_{it} represents the change in intra-city mobility in city i at time t. $\text{PatronageTies}_{it}$ is a binary variable indicating the presence of patronage ties between the prefectural secretary and the provincial secretary in city i at time t. $\text{LogInfections}_{i,t-1}$ is the logarithmic level of infections in city i on the preceding day. $\text{PatronageTies}_{it} \times \text{LogInfections}_{i,t-1}$ is an interaction term between patronage ties and the logarithmic level of infections on the preceding day, which allows us to estimate the differential effect of patronage ties on mobility changes as the scale of the outbreak varies. X_{it} represents a vector of time-varying control variables, including air quality index, temperature, and precipitation. α_i captures city-fixed effects, which account for time-invariant unobserved heterogeneity across cities. τ_t represents time-fixed effects, controlling for common temporal trends that may affect all cities similarly. ϵ_{it} is the error term.

The coefficient of interest, β_3, measures the effect of having patronage ties on the change in intra-city mobility in response to COVID-19 outbreaks, conditional on the logarithmic level of infections. A negative estimate of β_3 suggests that cities with patronage ties implement stricter lockdown measures, leading to a larger reduction in intra-city mobility when facing

an outbreak, particularly as the scale of the outbreak increases.

We also exploit the natural experimental event of achieving zero COVID and detecting the first COVID case to use event studies methods on patronage's effect on mobility change.

Zero COVID event study's Model (2) is formulated as follows:

$$\begin{aligned}\Delta M_{it} = &\sum_{\tau=-5,0_1,0_2,0_3}^{7,>7} \theta_\tau(\tau\text{DaysAfterZeroCovid}_{it}) + \zeta_1(\text{PatronageTies}_{it}) \\ &+ \sum_{\tau=-5,0_1,0_2,0_3}^{7,>7} \beta_\tau(\tau\text{DaysAfterZeroCovid}_{it} \times \text{PatronageTies}_{it}) \\ &+\alpha(\text{LogInfections}_{i,t-1}) + \boldsymbol{\gamma}(\text{LogInfections}_{i,t-1} \times \text{EconomicStructure}_i) \\ &+X_{it}\boldsymbol{\beta} + \eta_i + \lambda_t + \epsilon_{it}\end{aligned}$$

where $\text{EconomicStructure}_i$ denotes a vector of time-invariant economic indicators like GDP per capita and service sector share. $\tau\text{DaysAfterZeroCovid}_{it}$ denotes whether date t is τ days after achieving zero-COVID after an outbreak[8]. $\tau = 0_1$, 0_2, and 0_3 for the three zero-COVID days. To control for mechanical factors for which different economic structures may lead to different COVID-19 responses, we include interaction terms of economic indicators and daily infections to allow for cities with different economic structures responding to outbreaks differently.

First COVID event study's Model (3) is formulated as follows:

$$\begin{aligned}\Delta M_{it} = &\sum_{\tau=<-5,-5}^{7} \theta_\tau(\tau\text{DaysAfterFirstCovid}_{it}) + \zeta_1(\text{PatronageTies}_{it}) \\ &+ \sum_{\tau=<-5,-5}^{7} \beta_\tau(\tau\text{DaysAfterFirstCovid}_{it} \times \text{PatronageTies}_{it}) \\ &+\alpha(\text{LogInfections}_{i,t-1}) + \boldsymbol{\gamma}(\text{LogInfections}_{i,t-1} \times \text{EconomicStructure}_i) \\ &+X_{it}\boldsymbol{\beta} + \eta_i + \lambda_t + \epsilon_{it}\end{aligned}$$

[8]Zero-COVID days are identified by finding three days with zero case after a day with non-zero case.

where τDaysAfterFirstCovid$_{it}$ denotes whether date t is τ days after detecting first COVID case after at least three days of zero case.

To ensure the robustness of our results, we perform several sensitivity checks, such as alternative specifications of the DID model, more restrictive sample, and checks for parallel trends. Moreover, we test for potential heterogeneity in the treatment effect across cities with different characteristics and explore potential mechanisms driving the relationship between patronage ties and local government decision-making during the pandemic.

5 Results

Table 4 presents the results from examining the relationship between patronage ties and changes in intra-city mobility during the COVID-19 pandemic. Each column corresponds to a different model specification, with the dependent variable being the change in mobility. In all models, the coefficient of the interaction term of patronage network and previous day's infection cases, *Connection*L1.log(case)*, is positive and statistically significant at the 5% level. This result suggests that cities with patronage ties between the prefectural and provincial secretaries experience a smaller decrease in mobility as the number of COVID-19 cases increases. The coefficient for previous day's Log(Infections) is negative and statistically significant in all models, indicating that as the number of infections rises, the overall mobility in cities tends to decrease.

The "Connection" variable, representing the presence of patronage ties, has a negative and statistically significant coefficient in Model 1, but the significance disappears in Models 2, 3, and 4. In Model 5, the coefficient is positive but not statistically significant. This result implies that the presence of patronage ties alone may not have a clear impact on mobility changes, but the interaction with the number of COVID-19 cases does.

Models include date fixed effects (FE) to control for common temporal trends. City fixed effects (in Models 2-5) control for time-invariant unobserved heterogeneity across cities.

Table 4: Connection and Lockdown

	Mobility Change				
	(1)	(2)	(3)	(4)	(5)
Connection*L1.log(case)	**0.344**	**0.418**	**0.421**	**0.522**	**0.480**
	(0.061)	(0.068)	(0.068)	(0.097)	(0.095)
L1.log(case)	**-0.404**	**-0.477**	**-0.476**	**-0.584**	**-1.135**
	(0.040)	(0.043)	(0.043)	(0.072)	(0.287)
Connection	**-0.059**	-0.727	-0.736	0.138	0.187
	(0.014)	(0.491)	(0.493)	(0.101)	(0.122)
Date FE	✓	✓	✓	✓	✓
City FE		✓	✓	✓	✓
Weather			✓	✓	✓
Exclude Hubei				✓	✓
Economy*log(case)					✓
Observations	34032	34032	33720	32389	26891
R-squared	0.709	0.711	0.714	0.723	0.758

Notes: The dependent variable is the change in intra-city mobility. *L1.log(case)* denotes the logarithmic level of infections of the previous day. *Connection* means that the prefectural party secretary is connected to the provincial party secretary. *Economy*log(case)* refers to an interaction term between economic factors and the number of COVID-19 cases. Standard errors clustered at the city level are reported in parentheses. FE = fixed effects. Bolded coefficients indicate statistical significance at the level of $p < 0.05$.

Weather controls are included in Models 3-5. Models 4 and 5 exclude Hubei province, the outbreak's initial epicenter. Model 5 also includes an interaction term between economic factors and the number of COVID-19 cases. Standard errors are clustered at the city level to account for potential within-city correlation of the error term.

Table 5 only includes cities that underwent prefectural or provincial party secretary turnovers during the analysis period to exploit the sudden changes in patronage ties as a result of turnovers. For example, Yangquan city changed its prefectural secretary on March 19, 2020 and the departing secretary was unconnected with the provincial secretary while the incoming secretary was connected. In all models, the coefficient of the interaction term of patronage network and previous day's infection cases, *Connection*L1.log(case)*, is positive and statistically significant at the 5% level. This result suggests that cities that experienced changes in patronage ties between the prefectural and provincial secretaries also changed their COVID responses and in the same direction as the cities in Table 4.

Table 5: Connection and Lockdown: Turnover Only

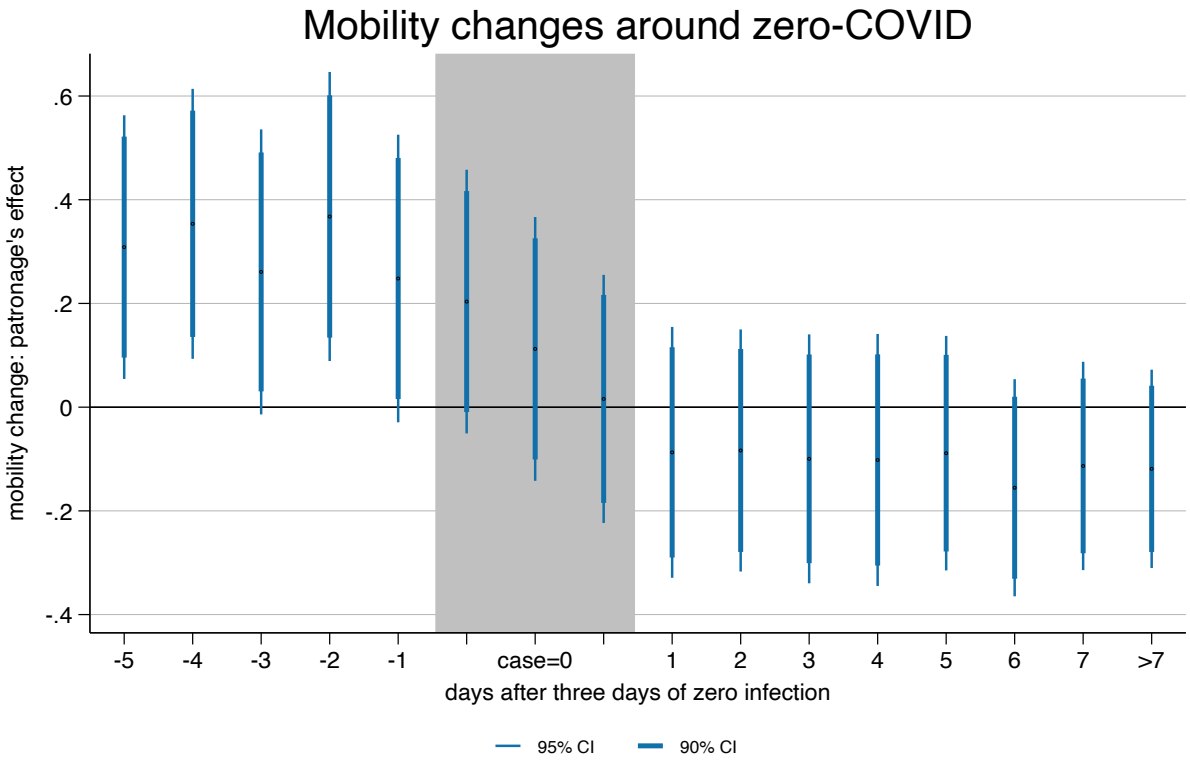
	Mobility Change			
	(1)	(2)	(3)	(4)
Connection*L1.log(case)	**0.301**	**0.309**	**0.310**	**0.270**
	(0.055)	(0.059)	(0.059)	(0.067)
L1.log(case)	**-0.432**	**-0.474**	**-0.475**	-0.452
	(0.068)	(0.081)	(0.081)	(0.468)
Connection	**-0.262**	-0.007	-0.009	0.135
	(0.064)	(0.256)	(0.257)	(0.255)
Date FE	✓	✓	✓	✓
City FE		✓	✓	✓
Weather			✓	✓
Economy*log(case)				✓
Observations	2370	2370	2370	2061
R-squared	0.767	0.769	0.770	0.802

Notes: The dependent variable is the change in intra-city mobility. *L1.log(case)* denotes the logarithmic level of infections of the previous day. *Connection* means that the prefectural party secretary is connected to the provincial party secretary. *Economy*log(case)* refers to an interaction term between economic factors and the number of COVID-19 cases. Standard errors clustered at the city level are reported in parentheses. FE = fixed effects. Bolded coefficients indicate statistical significance at the level of $p < 0.05$.

Figure 2 presents a comparison between two groups of cities, examining the impact of patronage ties on changes in mobility before and after the city achieved zero-COVID. The comparison group consists of days that were more than five days before the zero-COVID days. To isolate the patronage effect, we control for local infections on the previous day as well as interactions of GDP per capita and service sector share with log(infections). The positive values of coefficients before zero COVID indicate that connected cities exhibited a more lenient approach in suppressing outbreaks compared to other cities. The coefficients after achieving zero COVID are not significantly different from zero, suggesting that the patronage premium was contingent on pandemic risk rather than city-specific characteristics.

Figure 3 presents a comparison between two groups of cities, examining the impact of patronage ties on changes in mobility before and after the city reported its first COVID case. The comparison group consists of days that occurred more than seven days after the detection of the first COVID case. Prior to reporting the first COVID case, the effect of

Figure 2: Zero COVID and Patronage in Pooled Samples

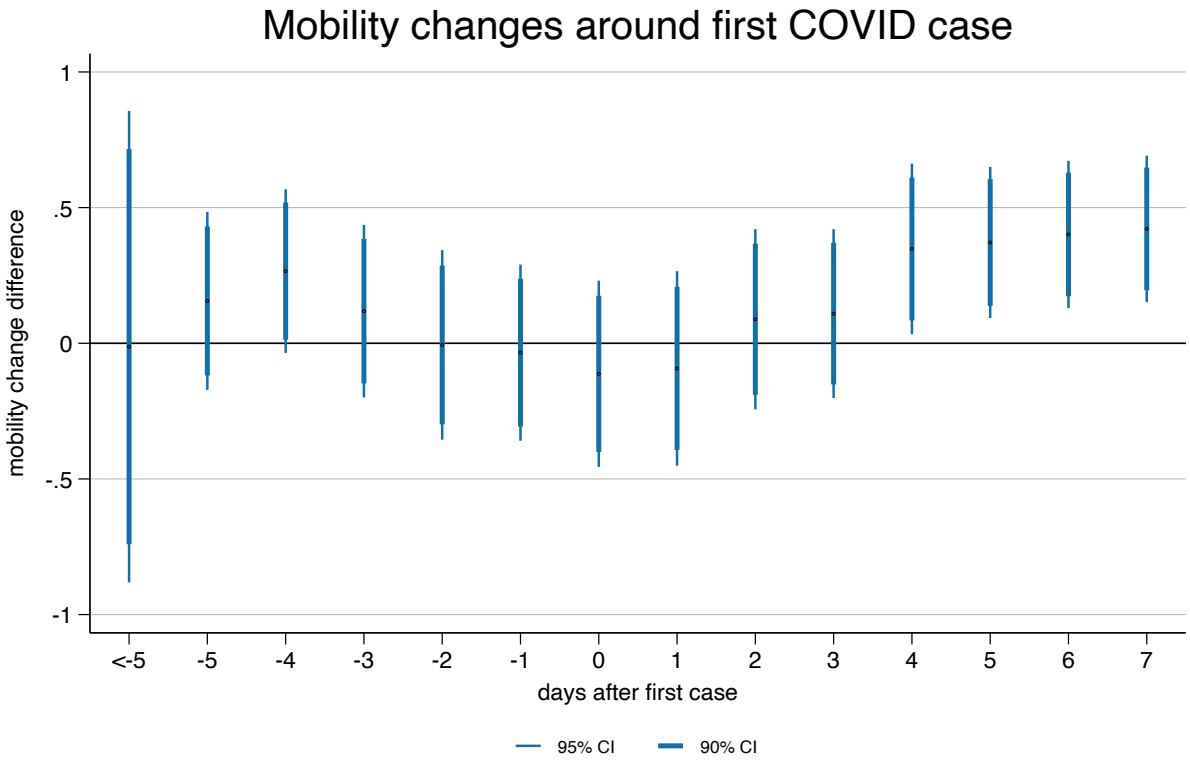


Notes: This figure plots the impact of patronage networks on mobility changes before and after achieving the Zero-COVID status. Each circle represents a point estimate for difference in mobility change between connected and unconnected cities, and the vertical bars are the corresponding 90% and 95% confidence intervals.

patronage is consistently not different from zero. However, starting on the fourth day after the first case, connected cities and unconnected cities begin to diverge, with the former imposing more restrictive control measures than the latter. This finding is consistent with the event study conducted around the "zero-COVID" day, where connected cities exhibit a more lenient approach compared to unconnected cities during an outbreak.

Table 6 replicates Table 4 with an alternative measure of COVID-19 risks: "Outbreak," a indicator variable that takes value 1 when there are COVID-19 cases in the city on that day. In all models except Table 6(4), the coefficient of the interaction term of patronage network and COVID-19 outbreaks (*Connection*Outbreak*) is positive and statistically significant at

Figure 3: First COVID and Patronage



Notes: This figure plots the impact of patronage networks on mobility changes before and after a city reports its first COVID-19 case. Each circle represents a point estimate for the difference in mobility change between connected and unconnected cities, and the vertical bars represent the corresponding 90% and 95% confidence intervals.

the 5% level. This result suggests that cities with patronage ties between the prefectural and provincial secretaries experience a milder decrease in mobility in a COVID-19 outbreak.

6 Conclusion

In conclusion, this paper provides evidence that patronage ties between city leaders and the provincial party secretary play a significant role in shaping local government decision-making on lockdown measures during the COVID-19 pandemic in China. Using a comprehensive panel dataset of Chinese prefectural cities and a generalized difference-in-differences design,

Table 6: Connection and Outbreak

	Mobility Change				
	(1)	(2)	(3)	(4)	(5)
Connection*Outbreak	**0.202**	**0.204**	**0.215**	0.106	**0.161**
	(0.064)	(0.067)	(0.068)	(0.063)	(0.065)
Outbreak	**-0.768**	**-0.856**	**-0.862**	**-0.706**	**-0.577**
	(0.072)	(0.083)	(0.083)	(0.077)	(0.216)
Connection	**-0.053**	-0.235	-0.236	0.071	0.083
	(0.023)	(0.223)	(0.221)	(0.065)	(0.072)
Date FE	✓	✓	✓	✓	✓
City FE		✓	✓	✓	✓
Weather			✓	✓	✓
Exclude Hubei				✓	✓
Economy*Outbreak					✓
Observations	34440	34440	34125	32760	27195
R-squared	0.709	0.710	0.713	0.723	0.758

Notes: The dependent variable is the change in intra-city mobility. *Connection* means that the prefectural party secretary is connected to the provincial party secretary. *Outbreak* is a binary variable that takes 0 if there are no COVID-19 cases and 1 otherwise. *Economy*Outbreak* refers to an interaction term between economic factors and the status of COVID outbreak. Standard errors clustered at the city level are reported in parentheses. FE = fixed effects. Bolded coefficients indicate statistical significance at the level of $p < 0.05$.

our findings suggest that cities with patronage ties experience a smaller decrease in mobility as the number of COVID-19 cases increases, indicating a more lenient approach to implementing lockdown measures. This relationship holds across various model specifications and robustness checks, highlighting the consistency of our results.

Furthermore, our analysis reveals that connected leaders are more willing to tolerate uncertainty and avoid suppressing the economy too much, even when they have not yet achieved zero COVID. In contrast, unconnected leaders tend to double down on lockdown measures until zero COVID is assured. These findings contribute to our understanding of how political connections influence policy implementation during a public health crisis and highlight the benign effect of informal institutions like patronage networks in moderating political uncertainty in an increasingly centralized authoritarian regime.

As a caveat, it is worth noting that our study is limited to the early days of the COVID-19 pandemic in China and may not fully capture the evolution of local government responses as the pandemic progressed. Future research could extend this analysis to other stages of the pandemic or explore the impact of patronage ties in different contexts or other public health crises.

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