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Career incentives of local leaders and crisis response: A case study of COVID-19 lockdowns in China

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ABSTRACT
This paper studies the role of local Chinese leaders’ career incentives in decisions regarding large-scale crises such as the COVID-19 pandemic. Most local leaders were reluctant to impose lockdowns at the beginning of the pandemic, because their promotions rely on posting strong numbers for economic growth in their region, while lockdowns can suppress growth. Once the nation’s top leader warned that local leaders who failed to control the disease would be removed from office, many rapidly implemented resolute measures. However, we find that local leaders with larger promotion incentives were still more likely to downplay the virus by avoiding or minimizing lockdowns.

1. Introduction

Local leaders in China play a central role in providing public goods, managing socio-economic affairs, and therefore in dealing with major crises. However, in many large-scale crises, such as the recent COVID-19 pandemic, even though resolute actions by local leaders, such as lockdowns, would create positive externalities for other jurisdictions and would benefit the nation as a whole, local bureaucrats in many countries were accused of being slow to act because of political career concerns. Despite the torrent of studies on the consequences of COVID-19 and the widely implemented lockdown policies (e.g., Fang et al., 2020), research on the political economy of government interventions during the pandemic is still scant.

This paper aims to advance our understanding of this issue by studying the role of career incentives in the response of local Chinese leaders to the COVID-19 pandemic. During the first stage of the outbreak of the coronavirus, Chinese prefectural party secretaries (henceforth referred to as prefectural leaders) responded to the exponentially growing number of cases with only sluggish interventions, since economic performance within their jurisdictions is a key performance indicator (KPI) in upper-level officials’ evaluation of their promotion. Thus, local leaders had intrinsic career incentives to minimize anti-epidemic measures for fear of harming the local economy. We first use cross-sectional regressions to reveal the impacts of local leaders’ promotion incentives on their lockdown decisions. Our measurement of prefectural party secretaries’ promotion incentives is borrowed from Wang et al. (2020), the

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ex-ante probability of promotion predicted by using their inauguration age and political hierarchy level. We find that Chinese prefectural leaders with larger career incentives were more reluctant to implement lockdowns at the beginning of the COVID-19 pandemic.

However, most prefectural leaders swiftly changed their stance after the nation’s top leader, Xi Jinping, sternly warned that failure to control the disease could hamper their career advancement and potentially lead to their removal from office, making pandemic control a de-facto “one-item-veto” task for their promotion. Most prefectural leaders quickly responded to Xi’s warning by implementing resolute lockdown measures. Despite this general pattern, we document an interesting finding that prefectural leaders with larger career incentives were still more willing to put public health at risk by minimizing lockdowns. We construct prefecture-week-level panel data to unearth the interaction of Xi’s warning and local Chinese leaders’ career incentives on their anti-pandemic policy measures. On the extensive margin, we find that the pattern depicted in the cross-sectional regression remains: a one-standard-deviation increase in a prefectural leader’s career incentive reduced the probability of locking down the prefecture after Xi’s speech by over 11 percentage points during our sample period. On the intensive margin, using within-prefecture human mobility (offered by the Baidu migration index) to proxy for lockdown stringency as in Fang et al. (2020), we find that a prefecture’s lockdown measure was significantly laxer if its party secretary had a larger career incentive.

One rationalized explanation of Chinese prefectural leaders’ behavior is that they might have formed the belief from their experience with SARS that the importance of pandemic control to promotion, as emphasized by the central government, was only temporary, and that after the black swan event, economy-related factors would resume a decisive role in their career advancement. To investigate this, we first show that the tradeoff facing local leaders, between pandemic control and developing the local economy, also existed during the SARS (severe acute respiratory syndrome) epidemic in 2003, where leaders with larger promotion incentives also tended not to order lockdowns. In addition, we find that prefectural governments were more likely to order looser COVID-19 lockdowns if their leaders had experienced lockdowns during SARS, which in general were substantially laxer than those imposed during COVID-19 due to the difference in infection rate and spreading speed of the two viruses. In addition, our data show that no prefectural party secretary incumbent during SARS was actually punished for imposing loose lockdown measures. The evidence documented above supports our interpretation that leaders who had experienced SARS lockdowns might have formed the belief that they could downplay this new virus, just as former prefectural leaders had done during SARS.

Our findings highlight the difference in crisis responses implemented in China and other countries. In democracies, local leaders might hesitate to take crisis-response actions if concerned that such actions would be unpopular to voters; in authoritarian states like China, where their evaluation by upper-level officials is based on KPIs, such as their jurisdictions’ economic growth (Maskin et al., 2000; Li and Zhou, 2005; Xiong, 2018; Wang et al., 2020), local leaders can be reluctant to act if they fear that such policy changes would negatively affect their career advancement.

There has been debate over the uneven effectiveness of the provision of public goods and services in centralized vs. decentralized organizations (e.g., Seabright, 1996; Bailey and Rom, 2004; Dahlberg and Edmark, 2008). The phenomenon exposed in our paper, where in order to compete with their peers for promotion, local Chinese leaders tended to trade public health for better economic growth to be promoted, sheds light on this by emphasizing the potential pitfalls of dealing with large-scale crises that have huge cross-regional externalities in a fully decentralized manner.

This paper joins the literature on the theory of self-interested bureaucrats (Tullock, 1965; Niskanen, 1971; Egeberg, 1995; Finan et al., 2017). Like most other people, bureaucrats pursue private interests, which can conflict with their role as public decision-makers to do a public favor. This situation would become even worse in the absence of local accountability and monitoring within hierarchies. We provide a novel empirical case to reveal local leaders’ self-interest motivations in China. The paper most related to ours is Pulejo and Querubín (2021), which uncovers that, in democratic countries, incumbents eligible for re-election implemented less-stringent anti-pandemic measures when elections were imminent. Compared to their study, ours focuses on the behavior of local government officials, who in many countries have more authority over public health than the federal government, including deciding whether to issue lockdown orders. We also relate to the scholarship on how career incentives determine bureaucrats’ performance (Alesina and Tabellini, 2007; Che et al., 2017; Hillman, 2019; Khan et al., 2019; Bertrand et al., 2020).

2. Background

2.1. Local leaders’ incentives in China’s bureaucratic system

A striking feature of China’s unique bureaucratic system is that local leaders are evaluated and promoted by the level of government above them based on their performance during their tenure and several other considerations (Maskin et al., 2000; Li and Zhou, 2005).

The “one-item-veto” task means that once you fail to meet the minimum requirements for this item, you will not be eligible for promotion, even if you perform well at other tasks like facilitating economic growth. Under this mechanism, over-fulfilling the specified “one-item-veto” task will not help with local leaders’ career advancement, but under-fulfillment will have severe career consequences.

In other related literature, Fisman et al. (2021) find that Chinese local governments may respond to citizen concerns in order to minimize dissent when they decide on reopening.

For example, among the Group of Twenty countries, Australia, Brazil, Canada, Germany, Indonesia, and United States allowed regional governments rather than the federal government to order lockdowns, causing significant variation within the same country. Please see https://www.cfr.org/in-brief/comparing-coronavirus-lockdowns-federal-local-divide for details.
where economic growth is a key factor, and they are accountable to the upper-level officials. Another example is the implementation of growth to be promoted. In this sense, local leaders have great power in managing socio-economic affairs in their jurisdictions. For example, prefectural governments have great flexibility when implementing policies such as locking down the cities to combat COVID-19 without direct interventions from the central or the provincial leadership. On the other hand, lower-level officials are effectively incentivized to implement policies suitable for the objectives set by upper-level officials, e.g., reforms and economic development (Xu, 2011).

A famous example of this feature is the “tournament” for economic growth, where local leaders compete for better economic growth to be promoted. In this sense, local leaders’ career advancement appears to be determined by this merit promotion system where economic growth is a key factor, and they are accountable to the upper-level officials. Another example is the implementation of lockdowns during the COVID-19 pandemic. As shown later in this paper, prefectural officials’ attitudes towards the outbreak of the virus drastically changed after the nation’s top leader stipulated them to fight against it. This contrasts with the situations in other countries such as the United States, where state governors can and frequently would reject the president’s orders on pandemic controls because they come to their positions through elections rather than being appointed by upper-level officials like the president. As a result of this political personnel control mechanism, China’s local leaders tend to strategically ignore or downplay some tasks not closely related to their promotion (Xu, 2011).

Besides the key indicators set by the upper-level officials like economic growth, local leaders’ career advancement also relies on other mechanisms such as nepotism and corruption, the importance of which has been stressed by several studies on China’s political selection system. Shih et al. (2012) imply that patronage (i.e., the connections to higher-level leaders) determines the likelihood of promotion. Jia et al. (2015) suggest that connections and performance are complements in China’s political selection system.6 Kahana and Liu (2010) base their analysis on payments for promotion to superiors in the bureaucratic hierarchy. We do not consider whether nepotism is important in China’s political promotion mechanism. Instead, we follow the procedure common in the literature of viewing a jurisdiction’s economic performance, an observed signal of the local leader’s ability, as among the most important promotion assessment criteria. At the same time, we further control through a set of proxies for patronage and corruption in the empirical section to eliminate the potential confounding effects of nepotism.

It is noteworthy that there are two core leaders at the prefecture-level, namely the prefectural party secretary and the mayor, both of which are appointed by their supervisor (the provincial government) through the Chinese Communist Party (CCP) system. In each prefecture, the party secretary heads the prefecture’s party oversight bureaucracy, oversees the jurisdiction’s government, and has the final say on imposing major policies. Enlisted as the vice-secretary of the prefecture’s CCP committee, the mayor heads the prefectural government and thus plays a subordinate role in making important decisions. Therefore, we use the prefecture’s party secretary rather than its mayor as the primary leader in the empirical setting, but we also consider the career incentive of the mayor in case the two leaders jointly decide on local governance.

2.2. The spread of COVID-19 and the political concerns underlying Chinese prefectural leaders’ implementation of lockdown policies

According to China’s official statistics, the first COVID-19 case was diagnosed in Wuhan in Hubei Province on January 11, 2020.8 While the virus spread quickly to other prefectures, Chinese local governments initially responded with only sluggish interventions. Indeed, by February 2, 2020, only 13 prefectures had imposed lockdowns, while around 250 were already hit by the virus.

Lockdown decisions in China were made almost exclusively by local governments. As specified in the Law of the People’s Republic of China on the Prevention and Treatment of Infectious Diseases, “in the event of an outbreak, or the prevalence of an infectious disease, the local government shall immediately get people organized to control it and cut off the route of transmission”.9 There are at least two reasons for the delayed response of prefectural governments in the early stage of the pandemic. First, since COVID-19 was a new disease, there was little medical knowledge that could be just taken off the shelf. Second, and more importantly, the promotion mechanism for prefectural leaders lies at the root of their initial reluctance to respond. Unlike most democracies, where candidates need to account for voters’ interests such as public health to be elected, Chinese local political leaders are evaluated and promoted by upper-level officials based on their performance during their tenure and several other considerations. In any province, prefectural leaders compete for better economic growth to be promoted in the pyramid hierarchical political system. Since lockdown measures would hamper the economy and thus cast a shadow on their career advancement, prefectural leaders had little to no interest in imposing strict lockdown measures.

The stance of prefectural officials changed swiftly after February 3, 2020, when Xi Jinping, the general secretary of the Chinese Communist Party (CCP) and head of China, presided over an urgent meeting on COVID-19. Emphasizing the serious threat that COVID-19 posed to the lives and well-being of the Chinese people, Xi Jinping called for a national response to the pandemic.

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5 Please see https://www.politico.com/news/2020/11/13/republican-governors-reject-biden-mask-orders-436385 for an example.
6 As an anecdotal support to this view, a local officer from Gansu Province confessed that both job performance and connection contribute almost equally to the promotion. Please see http://news.sohu.com/20130516/n376141310.shtml for the discussion.
7 The nepotism literature does not necessarily falsify the findings on meritocracy. Instead, most papers on nepotism acknowledge the role of performance and abilities. For example, Kahana and Liu (2010) models promotion prospects jointly depending on bribes and personal ability.
8 As the origin and the transmission process of COVID-19 is still under scientific investigation and no consensus has been reached, one should not necessarily take this date for granted as the exact date of the COVID-19 outbreak.
9 Please see http://english.mofcom.gov.cn/article/lawsdata/chineselaw/200211/20021100050619.shtml for the law. Consistent with the law, our data show that there was no province in which all prefectures within it implemented lockdowns on the same day.
19 posed to the nation, Xi urged local leaders to combat the virus with resolute measures: “Party committees and governments at all levels should firmly follow the unified command, coordination and arrangement of the CPC Central Committee … all job tasks must serve the goal of winning the blockade war against the pandemic … officials in every department in every region … should be warned and corrected if they don’t follow the central committee’s order well, and, if the mistake is considered to be serious, not only will the person involved get punished, their main leader should take responsibility too.” Xi’s stern warning marked a major watershed in the responses of prefectural governments, after which many prefectures launched campaigns against COVID-19. As in Fig. 1, the number of prefectures imposing lockdown policies jumped dramatically from 13 to 123 in one week and further to 163 in two weeks. Fig. 2 shows the geographic display of prefectures under lockdown and prefectures hit by the virus about ten days after Xi’s speech.

While this pattern indicates that the views of local leaders regarding pandemic control were swiftly and remarkably changed after Xi delivered his message, this does not mean that their focus on economic growth was completely removed. The stringency of the counter-COVID-19 measures varied substantially among prefectures that announced lockdowns. Some prefectures imposed so-called “wartime emergency” lockdowns, including checking passengers in each vehicle, shutting down almost all businesses except grocery stores, and enforcing strictly monitored quarantine at assigned places for everyone coming from outside. At the same time, the counter-COVID-19 measures in other prefectures that announced lockdowns were not this strict. In some prefectures, commercial vehicles still operated freely, and people coming from outside were only required to self-quarantine.

A prefecture’s lockdown stringency was highly influenced by its leader’s career incentive, since the leader oversaw policy implementation and had the final say on specific measures. Xi’s warning confronted each prefectural leader with a bitter dilemma: on the one hand, playing down the pandemic might lead to a COVID-19 explosion, a clear sign of incompetence that could lead to his/her removal; on the other hand, the promotion mechanism still incentivized him/her to place major emphasis on regional economic outcomes. Facing this dilemma, those who had great enough career incentives might still choose GDP growth over public health by imposing mainly non-coercive restrictions.

3. Data and variables

3.1. Sample and data sources

Our study focuses mainly on the COVID-19 pandemic but also connects to the SARS epidemic. We assemble two weekly balanced panels of 324 and 323 Chinese prefectures for the two periods, December 12, 2019, to March 14, 2020, and March 3 to July 28, 2003, respectively. Our samples exclude epidemic center cities, namely, Wuhan in COVID-19 and Guangzhou in SARS, since upper-level governments might directly order their lockdowns. All prefectures of Tibet are also excluded from our analysis because their information is often missing. We describe our main variables and the corresponding data sources below and report the descriptive statistics in Table 1.

Data on prefectures’ lockdown policies. As in He et al. (2020), we designate a prefecture as being locked down when at least two of the following three preventive measures were enforced: 1) closure of non-essential businesses, such as bars, theatres, and libraries; 2) cancellation of large gatherings; 3) limitation or prohibition of private and public transportation.

Information on each prefecture’s lockdown policy during SARS is hand collected from news reports, government documents, as well as yearbooks for prefectures and provinces. Using these sources, we can tell whether a prefecture had ever imposed a lockdown as per our definition, and if so, when the lockdown started and ended. For COVID-19, we borrow heavily from Fang et al. (2020), and we complement their list with information collected from news reports and government documents. Our definition of lockdown is consistent across both parts of our study. The detailed lockdown dates for each prefecture are in Appendix Table B1 for COVID-19 and in Appendix Table B2 for SARS.

Data on the SARS epidemic and the COVID-19 pandemic. For SARS, the data we use are housed at the China Academy of Military Medical Sciences. It contains information on each of 5327 Chinese SARS patients, including location, occupation, and importantly, dates of diagnosis and discharge or death. The data were collected retrospectively by researchers at the Academy through interviewing each hospital that had admitted SARS patients in 2002 and 2003. As a result, we can avoid the risks of under-reporting and manipulation as happened in the official data announced by China’s Ministry of Health, which was the reason for the removal of the then Minister of Health Zhang Wenkang and the then mayor of Beijing Meng Xuenong. For our analysis, we aggregate the data to the prefecture level. Details on the data are described in Feng et al. (2009). The COVID-19 case count data were collected by a Chinese newspaper company called The Paper, and can be obtained from their website at the paper.cn. Unlike our SARS data, our COVID-19 data contain only prefecture-by-date cumulative diagnoses and discharges instead of individual-level information.

Prefectural party secretaries’ biographic information. We hand collect the resumés of all Chinese prefectural party secretaries in office.

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10 According to information released later, on January 22nd, 2020, President Xi Jinping personally directed the provincial government of Hubei to implement strict restrictions on human mobility. Following his command, Wuhan was locked down on January 23rd. Source: http://www.gov.cn/xinwen/2020-02/15/content_5479271.htm. Nevertheless, including the epidemic center cities does not affect our empirical findings. The results are available upon request.

11 Note that four directly administered municipalities, Beijing, Tianjin, Shanghai, and Chongqing, have provincial-level administrative ranking, and their secretaries are members of the Political Bureau of the CPC Central Committee; that is, China’s national leaders. Thus, they are not included in our sample.
from 1994 to 2020 from various sources, including Baidu Baike and numerous government websites. In particular, the data include each local leader’s start and end time in office, age and political hierarchical level at term start, and power status at term end, including promotions, lateral moves, and retirement. As a complement, we also collect the information for mayors to help distinguish the effects of party secretaries from that of mayors.

**Human mobility data.** We employ the within-prefecture mobility index from the travel map Baidu Migration offered by Baidu, the largest search engine in China. The mobility index is calculated from real-time location records for each user of Baidu’s smartphone map app and is consistent across prefectures. We also use the data Baidu Migration created for 2019’s Spring Festival season to eliminate the seasonality driven by the Spring Festival. Specifically, the outcome variable we construct, $\Delta$Human Mobility, denotes the difference in the mobility index between 2020 and 2019 on the same lunar calendar date of each prefecture. The sample we use is from January 1, 2020, to March 1, 2020, after which Baidu Migration data are not available for the comparable lunar calendar dates in 2019.

**Weather data.** The data are obtained from the National Climatic Data Center (NCDC) of the United States. For each prefecture, we

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12 Baidu Baike (https://baike.baidu.com) is the Chinese version of Wikipedia.
use weekly temperature and precipitation. Missing values are interpolated in the software ArcGIS using the information of their neighborhood prefectures.

Additional prefecture-level information. We supplement the data above with information on GDP growth for each prefecture from the China Statistical Yearbooks for Regional Economy, which are created by the Statistics Bureau of China. We obtain the prefecture-level misused public funds detected by auditing institutions from the China Audit Yearbook in various years. This measure has been widely used as a proxy for corruption in the Chinese context (Liu and Ma, 2019; Bo et al., 2020; Jia et al., 2021). The prefecture-level geographic boundaries and centroids used in this paper are collected from China’s National Geographic Information System (CNGIS). The travel hours to Wuhan by road are retrieved from Google Map.

### 3.2. Measuring the career incentives of Chinese prefectural leaders

To introduce our measure of Chinese prefectural leaders’ career incentives, we note that in China’s unique bureaucratic system, each prefectural government has two core leaders—the party secretary and the mayor. As discussed in Section 2.1, we consider a Chinese prefecture’s party secretary rather than its mayor as the primary leader. Nevertheless, we consider the career incentive of the

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13 The travel hours to Guangzhou by road are calculated using the digitized map of China’s road network created in 2000.
mayor and show that it has limited explanatory power in the patterns we have documented. As noted in Wang et al. (2020), under China’s promotion mechanism for government officials, the glass ceiling of a prefectural leader’s career is largely determined by two factors, which are therefore the decisive factors in the leader’s career advancement incentive.

The first determinant is a prefectural leader’s hierarchical ranking, which can fall into one of two categories, including, in descending order, deputy-provincial and prefectural. Since officials’ promotion is determined by their supervisors who are “one-level-up,” prefectural leaders ranked prefectural are evaluated and appointed by provincial governments, while prefectural leaders ranked deputy-provincial or higher are evaluated and appointed by the central government. As a result, leaders who are currently ranked higher should have a lower glass ceiling than others, which might affect their incentives for career advancement.

The second determinant of the career glass ceiling is the prefectural leader’s age. To understand the role of age, one needs to differentiate between inauguration age and calendar age and note that it is inauguration age that determines an official mayor and show that it has limited explanatory power in the patterns we have documented. As noted in Wang et al. (2020), under China’s promotion mechanism for government officials, the glass ceiling of a prefectural leader’s career is largely determined by two factors, which are therefore the decisive factors in the leader’s career advancement incentive.

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The second determinant of the career glass ceiling is the prefectural leader’s age. To understand the role of age, one needs to differentiate between inauguration age and calendar age and note that it is inauguration age that determines an official’s career incentive. Specifically, officials with a younger inauguration age would have larger career advancement incentives, even if they have the same calendar age as their competitors at the same political level.

To gain intuition, consider the scenario where two candidates at the same political level, X and Y, compete for promotion. Suppose both people are the same calendar age, but person X took office at a younger age. He would thus have been working a longer time at the current political level compared to his competitor. In principal, under China’s personnel control system, promotion to the next political level requires the candidate to work at least 3 years at the current level,15 so person X would be closer in time to his “promotion window,” and thus all else equal, his promotion is more justified. Besides, China’s age-based retirement rule requires prefectural leaders to retire from their positions at age 60, so once promoted, person X would be able to earn the gains associated with the higher ranked position for a longer time. As a result of both the work experience requirement and the age-based retirement rule, person X should have a higher expected payoff from working hard towards promotion, and thus he is believed to have larger career incentives.

Therefore, as pointed out in Wang et al. (2020), the glass ceiling of the career trajectory of a prefectural leader is largely fixed, given his/her age and hierarchy level. As a result, we construct our first measure of prefectural leaders’ career incentives by replicating the work in Wang et al. (2020) using our sample, which includes all prefectural party secretaries who were incumbent from 1994 to 2019 and whose promotion outcomes can be observed. In Table 2, we use a probit model to estimate the effects of inauguration age and political hierarchy level on the promotion dummy,16 and then we use the estimated coefficients to predict the ex-ante promotion probability, which is our first measure of career incentive. At the same time, as shown in Panel A of Fig. 3, a plot of promotion outcome against inauguration age reveals an obvious negative correlation. Therefore, we use the inauguration age as an alternative measure of career incentive for transparency. In fact, a plot of lockdowns against the inauguration age helps to motivate our main results: as depicted in Panel B of Fig. 3, Chinese prefectural party secretaries inaugurated at a younger age were more reluctant to implement lockdowns during the COVID-19 pandemic. This suggests the negative impact of local leaders’ career incentives on implementing lockdowns.

To further support our findings, we borrow our third measure of an official’s career incentive, Term Year, from Guo (2009). This is defined as the years he/she has spent in the current position. The underlying logic of this measure is that local leaders would try to accelerate economic growth at certain points during their tenure, typically not the first or the second year, to maximize their chances of promotion. Recall that the average tenure for prefectural party secretaries in office from 1994 to 2019 is 3.63 years in our data. Prefectural leaders were expected to have larger career incentives after staying in the same position for a longer period.

In our subsequent analyses, we mainly use the promotion-incentive measure calculated by applying the method of Wang et al. (2020), and we use prefectural party secretaries’ inauguration age and Term Year to conduct robustness checks.

4. Effects of local leaders’ career incentives on COVID-19 lockdown decisions

4.1. Validating the identification assumption

Our main message is that Chinese prefectural party secretaries with larger career incentives were more likely to downplay the virus by avoiding or minimizing lockdowns. The validity of our empirical strategy rests on the assumption that a prefectural leader’s promotion incentive is not correlated with any factors that affect his/her lockdown decision conditional on some basic controls. To examine whether this assumption holds, we conduct a balance check, shown in Table 3, by regressing promotion incentive on a full set of potentially confounding factors that might alternatively give the patterns observed in our data.

On the one hand, local leaders’ promotion incentives may coincide with some location-specific unobservable factors that may affect their career expectations. For example, there are anecdotes that province-level governments tend to place more favored officials in specific “promising prefectures” whose party secretaries were more likely to be promoted. Our results on how career incentives affect lockdown decisions can be biased if such prefectures happen to be major economic centers of systemic importance to the country and if

14 Throughout this paper, the inauguration age is defined as the age at which a party secretary took their current position.

15 In our data, the average tenure for prefectural party secretaries staying in office from 1994 to 2019 is 3.63 years.

16 The promotion dummy is coded as one if the leader was promoted to a higher-level position at his/her term end. Examples of these positions include minister and deputy minister in the central government, provincial party-secretary, provincial deputy party secretary, provincial governor, and provincial deputy governor, and chairman or deputy chairman of provincial PC or CPPCC. For officials starting from the prefectural level, higher-level positions also include party secretary or mayor at deputy-province-level cities and member of the standing committee of the provincial CPC committee.
officials assigned to such regions have different career incentives. Specifically, in such a region, the cost of lockdown is higher due to its economic importance, and the probability of implementing lockdowns is thus lower. Therefore, we control for the historical promotion likelihood of each prefecture during 1994–2019 in Table 3. We further incorporate the number of prefectures within each province as a proxy for the difficulty of leaders’ promotion since prefectural leaders in the same province usually compete for promotion. The number of prefectures within a province can also reflect the difficulties of coordinating anti-epidemic efforts for the provincial governments. Corruption can also impede effective government actions against COVID-19 and can erode the meritocratic system by weakening the linkages between promotion opportunities and the incentive to maintain economic growth since corrupt officials would look out for themselves rather than seeking social benefit for the population (Kahana and Liu, 2010; Aidt et al., 2020). Inspired by this line of thought, we also incorporate the cumulative misused public funds detected by auditing institutions as a proxy for the corruption endemic in local governments, following existing studies (Liu and Ma, 2019; Bo et al., 2020; Jia et al., 2021). In addition, in the unlikely scenario where prefectural leaders with larger promotion incentives happen to be assigned to regions closer to Wuhan, our estimate can exaggerate the true effects of the career incentive. Therefore, we include the prefecture’s distance to Wuhan (measured by the hours traveled by road in log) as a potential confounding factor.

On the other hand, we consider several crucial personal attributes of prefectural leaders. To conduct the balance check, we control for leaders’ calendar age since older leaders might have different health concerns and thus different preferences for public health. First, we note that the ability of local leaders may correlate with both their lockdown decisions and their career incentives. Since a leader’s ability cannot be measured in the data available, we resort to education as an alternative by controlling for a dummy indicator of college education or above. It has long been recognized by observers of Chinese politics that political stars tend to receive training in China’s party schools, so we also consider whether a leader has a party school degree. In addition, we acknowledge the possibility that a leader’s ability can be reflected not only in his/her education but also in how well he/she has been supporting the local economy (the KPI in the promotion mechanism), and thus we include prefecture-level logarithmic GDP growth for the two years before the pandemic (2017–19) as another proxy for ability.

Second, informal patronage networks play a critical role in affecting the policy choices of local leaders (Jia et al., 2015; Jiang, 2018). One might worry about the validity of our results if the correlation between patronage networks and leaders’ incentives is

| Dependent Variable | (1) |
|--------------------|-----|
| Promotion          |     |
| Inauguration Age   | –0.0505*** |
|                    | (0.008) |
| Deputy-Province-Level | –5.7551*** |
|                    | (1.554) |
| Inauguration Age × Deputy-Province-Level | 0.0990*** |
|                    | (0.031) |
| Observations       | 1821 |
| Dep. Mean          | 0.384 |

Notes: This table replicates Column 3 of Table 2 in Wang et al. (2020) using our sample of all prefectural party secretaries who were incumbent during 1994–2019. Robust standard errors are reported in parentheses, clustered at the prefecture-level. ***p < 0.01, **p < 0.05, *p < 0.1.
suspected. In such cases, our results on how leaders’ career incentives affect their lockdown decisions could be biased since leaders better connected to upper-level officials might have different attitudes towards lockdowns after the nation’s top leader called for a national pandemic control campaign. To address this concern, we use two dummies indicating a leader’s past work experience at the central or provincial government as proxies for patronage networks and include them in the regression displayed in Table 3.

As shown in Table 3, the wide range of potentially confounding factors described above are largely comparable among local leaders with varying promotion incentives. Consequently, the systematic differences in the responses of prefectural governments to the supreme leader’s call to combat the pandemic should be attributed to the difference in local leaders’ promotion incentives rather than to other predetermined attributes. Nevertheless, our results are remarkably robust to including the wide range of controls described above, suggesting that these factors cannot confound our findings.

4.2. Cross-sectional evidence

We start by conducting a set of cross-section regressions of lockdown measures against the promotion incentives of prefectural leaders and other control variables as evidence to support our main specification, and the results are reported in Table 4.

In Columns 1 and 2 of Table 4, we consider a probit model and an ordered probit model, respectively, and both can be represented as Equation (1) below:

\[ Y_i = F(\alpha_i + \beta \text{Incentive}_i + X_i \theta + \epsilon_i) \]

where \( F \) represents the standard normal cumulative distribution function (CDF). In the simple probit model, \( Y_i = \Pr(\text{Lockdown}_i \mid X_i) \), where \( \text{Lockdown}_i \) is a dummy variable equal to one if the prefecture had ever implemented lockdown over our sample period, and \( X_i \) is the list of prefectoral and leader characteristics specified in Section 4.1. We then consider an ordered probit model where \( Y_i = \Pr(\text{Lockdown}_i \leq i \mid X_i) \). The subscript \( i \) is an integer and \( \text{Lockdown}_i \) represents the number of days from Xi’s speech to the date when the prefecture began lockdown, which proxies how responsive prefecture leaders were to the top leader’s call. Note that this measure allows for negative values since a small proportion of prefectures had already implemented lockdowns before Xi’s speech.\(^{17}\)

In Column 3, we consider a Cox proportional hazards model as in Equation (2) to characterize the dynamic decision-making process that highlights lockdown as a distinct one-time decision. This model shares the same spirit as Ru et al. (2021) who use a Cox proportional hazards model to estimate the effect of historical SARS experience on countries’ COVID-19 lockdown decisions. In the model, the hazard function \( h(t) \) represents the likelihood of a prefecture being locked down at day \( t \), conditional on that the prefecture has not been locked down before day \( t \). The hazard function is affected by time-varying factors, including the dynamics of the pandemic.

\(^{17}\) To avoid sample attrition, we arbitrarily assign the days from Xi’s speech to lockdown as 99 for those prefectures in our sample that never locked down.
reflected in a nonparametric baseline hazard function $h_0(t)$, as well as prefecture-specific characteristics:

$$ h(t) = h_0(t) \exp(\alpha + \beta \text{Incentive}_s + X_t \theta + e_s). $$

(2)

Each prefecture enters the hazard regression at the date of Xi’s speech and exits when lockdown takes effect. Prefectures that implemented lockdowns before Xi’s speech are thus excluded from the hazard regression.

As shown in Table 4, we first report unconditional correlations between our main regressor, promotion incentive, and lockdown decisions in Columns 1, 3, and 5, and further include the full set of control variables used in Columns 2, 4, and 6. One might also be concerned that lockdown patterns were driven by the career incentives of mayors rather than those of party secretaries. To address this concern, we further include the mayor’s promotion incentive, which is also calculated using the method of Wang et al. (2020). While the mayor nominally heads the prefectural government and is responsible for implementing policies, the party secretary is more powerful and directs the government’s operation. Consistent with our expectation, all columns show that prefectures whose incumbent party secretaries had larger promotion incentives were less willing to implement lockdowns, and even if they finally did, they tended to do so later than others. For example, the estimate in Column 6 suggests that a one-standard-deviation increase in a prefectural leader’s promotion incentive yields a hazard ratio of 0.735, indicating that the rate of lockdown decreases by 26.5%. In addition, the set of control variables, except road travel distance to Wuhan, exhibit no clear signals of having strong impacts on lockdown decisions, which is consistent with our findings in Table 3.

4.3. Evidence from panel regression

One drawback of the cross-sectional study in Table 4 is that we cannot consider the impact of the dynamics of disease transmission. To overcome this obstacle, we use the differences-in-differences strategy in Equation (3) to identify the effects of local leaders’ career incentives on whether lockdown policies were imposed:

$$ \text{Lockdown}_{it} = \beta \text{Incentive}_s \times \text{Window}_i + \alpha_s + \delta_i + (X_{si} \times \delta_i) \theta + Z_{si} \varphi + e_{si}. $$

(3)

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**Table 4**
Cross-section results for the effects of promotion incentives on lockdown decisions.

| Method                        | (1) Probit          | (2) Ordered Probit | (3) Cox Proportional Hazards |
|-------------------------------|---------------------|--------------------|-----------------------------|
| Dependent Variable            | I(Ever Locked Down During COVID-19) | Days from Xi’s Speech to Lockdown | Lockdown |
| Promotion Incentive           | –0.3407*** (0.075)  | 0.1847*** (0.057)  | –0.3927*** (0.066)          |
| Historical Promotion Likelihood | 0.1782 (0.311)    | –0.3109 (0.265)   | 0.2351 (0.129)              |
| Number of Prefectures Within Province | –0.0092 (0.021) | 0.0331* (0.018) | 0.0119 (0.023)              |
| Log Misused Public Funds, 1999–2015 | 0.0292 (0.039) | 0.0173 (0.035) | 0.0585 (0.078)              |
| Log Road Travel Hours to Wuhan | –0.4352*** (0.119) | 0.7102*** (0.122) | –0.3903** (0.159)          |
| Calendar Age                  | –0.1583 (0.111)   | 0.1050 (0.081)    | –0.0098 (0.099)             |
| College or Above Education    | 0.6884 (0.453)    | –0.7233* (0.435) | 0.9308 (0.671)              |
| Party School Degree           | 0.1412 (0.184)    | –0.0523 (0.160)   | –0.0238 (0.194)             |
| Log GDP Growth, 2017-19       | –0.0258 (0.107)   | 0.0501 (0.086)    | –0.1192 (0.101)             |
| Provincial Experience         | 0.3008 (0.264)    | –0.0892 (0.214)   | 0.0631 (0.266)              |
| Mayor’s Promotion Incentive   | –0.1067 (0.158)   | 0.02019 (0.136)   | –0.2180 (0.169)             |
| Observations                  | 324                | 324                | 300                          |

Notes: This table reports results for the effects of promotion incentive on lockdown decisions using the cross-sectional sample of prefectures during COVID-19. Columns 1–2 use probit models, Columns 3–4 use ordered probit models, and Columns 5–6 use Cox proportional hazards models. Promotion incentive, calendar age, and mayor’s promotion incentive are standardized so that their means equal zero and their standard deviations equal one. Robust standard errors are reported in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

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18 We construct the mayor’s promotion incentive in a similar way to that of the prefectural party secretary. Please refer to Table A1 for more details.

19 1-exp(-0.3075) = 1–0.735 = 0.265.
where subscripts $c$ and $t$ index prefecture and week, respectively. $Lockdown_{ct}$ denotes whether prefecture $c$ is under lockdown in week $t$. $Incentive_c$ denotes the promotion incentive of the incumbent party secretary of prefecture $c$ and is constant over time. For the convenience of interpretation, we standardize this variable so that its mean equals zero and its standard deviation equals one. $Window_c$ denotes the policy window when the attention of prefectural leaders was temporarily shifted from economic growth to disease control as a result of political pressure from the central government. In particular, $Window_c$ equals one if it’s after President Xi’s speech on February 3, 2020. $\beta$ is our parameter of interest, $\alpha_c$ and $\delta_t$ denote prefecture and week fixed effects, and $X_c$ is the same list of prefectural and leader characteristics specified above. Since lockdown decisions might be affected by the severity of COVID-19 in each prefecture, we also control for the number of active cases in each prefecture lagged by a week (denoted by $Z_{ct}$).

Results from Equation (3) are presented in Table 5. Column 1 includes only week fixed effects, prefecture fixed effects, and lagged active cases. The point estimate suggests that a one-standard-deviation increase in a prefectural leader’s promotion incentive decreases the likelihood of imposing a lockdown by 11.3 percentage points in COVID-19 within the policy window. Considering the fact that half of all Chinese prefectures went through lockdowns during the COVID-19 pandemic, the average effect is of both statistical and economic significance. In Column 2, we also include the interactions of week dummies and the list of prefectural characteristics described in Table 3 to rule out alternative hypotheses. Our estimate of interest changes only marginally, and together with Table 3, it reassures that we can safely rule out the possibilities of confounding factors. As in Table 4, in addition to the confounding factors in Table 3, in Table 5 we also include the mayors’ promotion incentives to rule out the possibility that mayors played an important role in the decision-making process of implementing lockdowns.

To consider the dynamic effects, we conduct an event study estimation by replacing $Window$, in Equation (3) with a full set of week dummies. Despite the strong political pressure from the central government, prefectural leaders with larger promotion incentives were more reluctant to impose lockdowns within the policy window, as shown in Fig. 4.

4.4. The intensive margin effects of local leaders’ promotion incentives on lockdown stringency

Tables 4 and 5 can uncover only the extensive margin effects of career incentives on whether to implement a lockdown or not. To study the intensive margin effects of local leaders’ promotion incentives on the stringency of lockdown enforcement, we conduct a panel regression as in Equation (4).

$$Y_{ct} = \alpha_c + \delta_t + \tau Lockdown_{ct} + \gamma Incentive_c \times Lockdown_{ct} + (X_c \times \delta_t) \theta + Z_{ct} \phi + \epsilon_{ct}. \quad (4)$$

where $Y_{ct}$ denotes the proxy for lockdown stringency, for which we use the within-prefecture human mobility index developed by Baidu Map, following Fang et al. (2020). The mobility index is calculated from real-time location records for each user of Baidu’s smartphone map app, and is consistent across prefectures. We take the difference between the human mobility index in 2020 and the index on the same lunar calendar date in 2019 to eliminate the seasonality driven by the Spring Festival. Due to data availability constraints, our data on the human mobility index cover only the period January 1, 2020, to March 1, 2020. One may be concerned that the index measures not only the stringency of policy but also people’s compliance, as discussed in Alcott et al. (2020). However, unless we have reason to believe that prefecture leaders’ promotion incentive is somehow related to residents’ compliance, we can still use the measure to proxy lockdown stringency. $Z_{ct}$ is a vector of weather controls, including weekly average daytime (6 a.m.-6 p.m.) precipitation, temperature, and its square, which are crucial determinants of human activity, as well as the number of active cases lagged by a week in each prefecture. Other symbols are defined as in Equation (3).

In Table 6, we report the results for Equation (4). Column 1 presents the results where no controls were included except prefecture fixed effects, week fixed effects, weather controls and lagged active cases. In Column 2, we rule out the competing hypotheses as we did in Column 2 of Table 5. The estimates of Lockdown$_{ct}$ confirm lockdown’s effectiveness in reducing human mobility, and more importantly, our estimates of the interaction term, Incentive$_c \times Lockdown_{ct}$, are significantly negative, indicating that prefectural leaders with greater career incentives were more inclined to implement loose lockdowns, arguably for consideration of the economy.

We conduct a similar event study estimation for Equation (4), where Lockdown$_{ct}$ was replaced by the dummies of relative weeks to the first week of lockdown. Fig. 5 plots the estimates and shows that a prefecture’s lockdown tended to be less stringent if its leader had a larger career aspiration.

4.5. Robustness checks and placebo tests

We report our robustness checks in Table 7 to deal with the following concerns (Panel A for Table 5 and Panel B for Table 6). First, one might worry that our prefecture-by-week-level data conceal crucial information regarding prefectural leaders’ lockdown decisions. We rerun our regressions using prefecture-by-date-level data, and the findings in Column 1 are highly consistent with our main results in Tables 5 and 6. Second, prefectural leaders might have systematic differences in imposing lockdowns if they were at the deputy-provincial political level or were newly inaugurated. In Columns 2 and 3 of Table 7, we drop the sample of party secretaries

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20 We define a prefecture to be under lockdown during a week if it’s locked down for at least 4 days of that week. Alternative definitions of lockdown, such as denoting it to be one only if it’s locked down for 7 days of the week, do not change our findings.

21 Active cases equals total cases minus deaths and recoveries and represents the number of people currently affected. In our week-level observations, a case is defined as “active” in a week if it is in active status for over 3 days of that week.
with these characteristics, and the findings stay unchanged. Third, one might suspect that our findings are driven by our proxy for the career incentives of prefectural party secretaries. Therefore, we borrow another measure, \textit{Term Year}, from Guo (2009), which is defined as the years one official has spent in the current position. The underlying logic of this measure is that the longer a local leader has held the current position, the more intense is his/her desire to be promoted. For comparison, we standardize this measure as well, and the results reported in Column 4 are consistent with those calculated using the original incentive measure. Finally, we include the results using the standardized inauguration age of a prefectural leader as an alternative measure of promotion incentive and the findings are largely unchanged, as reported in Column 5. Essentially, using inauguration age as the proxy for each prefectural party secretary’s career incentive shares similar sources of variation as the measure in Wang et al. (2020) but is more transparent. The high internal consistency strengthens our confidence in the results.

In addition, we conduct a set of placebo tests by using arbitrary policy windows, which are two-to-four weeks ahead of the actual periods. As reported in Table 8, all estimates of the interaction terms constructed using the false treatment variable are indistinguishable from zero, suggesting that our findings are not driven by other unobservables.\footnote{The point estimate in Column 3 is significant at the 90\% level, but its sign is opposite to our baseline result.}

\textbf{Table 5} Panel regression results for the effects of promotion incentives on lockdown decisions.

| Dependent Variable | (1) | (2) |
|--------------------|-----|-----|
| \text{Lockdown in COVID-19} \times \text{Promotion Incentive} | $-0.1130^{***}$ | $-0.1231^{***}$ |
| \text{Lagged Active Cases} | $0.0006^{***}$ | $0.0003^{***}$ |
| \text{Dep. Mean} | 0.160 | 0.160 |
| \text{Week FE} | YES | YES |
| \text{Prefecture FE} | YES | YES |
| \text{Controls} \times \text{Week FE} | 4860 | 4860 |
| \text{Num. of Clusters} | 324 | 324 |

Notes: Controls include historical promotion likelihood, the number of prefectures within each province, log misused public funds detected by auditing institutions in 1999–2015, log road travel hours to Wuhan, leader’s calendar age, whether a leader has a college degree or above, whether a leader has a party school degree, the prefecture-level logarithmic GDP growth in 2017–19, two dummies indicating whether a leader has work experience at the central or provincial government, and mayor’s promotion incentive. Promotion incentive, calendar age, and mayor’s promotion incentive are standardized so that their means equal zero and their standard deviations equal one. Robust standard errors are reported in parentheses, clustered at the prefecture-level. ***p < 0.01, **p < 0.05, *p < 0.1.

\textbf{Fig. 4}. Event Study of Promotion Incentives on Lockdown Decisions during the COVID-19 Pandemic \textit{Notes}: This figure visualizes the dynamic effects of prefectural party secretaries’ promotion incentives on lockdown decisions during the COVID-19 pandemic using the specification in Column 2 of Table 5. We illustrate the estimated coefficients with the 95\% confidence intervals of the interaction terms between promotion incentive and a full set of week dummies. February 3, 2020 denotes Xi’s speech. The week before Xi’s speech is omitted as the reference group. The vertical axis depicts the indicator for having lockdown implemented.
5. Evidence from SARS and its long-lasting impact on COVID-19 lockdowns

The results above show that Chinese prefectural leaders with greater promotion incentives were more likely to delay and minimize lockdown measures for fear of damaging the economy at the beginning of the COVID-19 pandemic. COVID-19 was not the first acute respiratory disease caused by a coronavirus, but SARS was. Chinese people and policymakers took SARS as an important reference when considering policy measures to cope with the COVID-19 pandemic.23 In this section, we first study whether the tradeoff local leaders faced between combating an epidemic and developing the local economy that we observed with COVID-19 also existed during

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23 Please see [https://www.scmp.com/news/china/article/3047319/wuhan-coronavirus-full-blown-community-epidemic-chinese-health](https://www.scmp.com/news/china/article/3047319/wuhan-coronavirus-full-blown-community-epidemic-chinese-health) for an example of such a discussion during the early stage of COVID-19, when experts explained the severity of COVID-19 by referring to SARS.
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Table 7
Robustness checks for the effects of promotion incentives on lockdown decisions.

| Specification | (1) | (2) | (3) | (4) | (5) |
|---------------|-----|-----|-----|-----|-----|
| Panel A:      |     |     |     |     |     |
| Lockdown in COVID-19 |     |     |     |     |     |
| Window × Promotion Incentive | −0.1156*** (0.034) | −0.1673*** (0.050) | −0.1288*** (0.035) | −0.0761*** (0.028) | 0.1392*** (0.042) |
| Window × Alternative Career Incentives |     |     |     |     |     |
| Lagged Active Cases | 0.0002* (0.000) | 0.0004*** (0.000) | 0.0003*** (0.000) | 0.0004*** (0.000) | 0.0004*** (0.000) |
| Dep. Mean | 0.215 | 0.156 | 0.160 | 0.160 | 0.160 |
| Observations | 19,581 | 4650 | 4785 | 4860 | 4860 |
| Num. of Clusters | 321 | 310 | 319 | 324 | 324 |
| Panel B:     |     |     |     |     |     |
| Lockdown | −0.3390*** (0.071) | −0.3670*** (0.070) | −0.3389*** (0.069) | −0.3513*** (0.069) | −0.3579*** (0.070) |
| Lockdown × Promotion Incentive | 0.1612*** (0.056) | 0.1817** (0.072) | 0.1692*** (0.056) | 0.1542*** (0.056) | −0.1462** (0.058) |
| Lockdown × Alternative Career Incentives |     |     |     |     |     |
| Lagged Active Cases | −0.0010** (0.000) | −0.0012** (0.000) | −0.0011** (0.000) | −0.0012** (0.000) | −0.0012** (0.000) |
| Dep. Mean | −0.864 | −0.816 | −0.822 | −0.820 | −0.820 |
| Observations | 19,581 | 2772 | 2853 | 2889 | 2889 |
| Num. of Clusters | 321 | 308 | 317 | 321 | 321 |
| Prefecture FE | YES | YES | YES | YES | YES |
| Date FE | YES |     |     |     |     |
| Week FE |     | YES | YES | YES | YES |
| Controls × Week FE | YES | YES | YES | YES | YES |

Notes: Column 1 uses prefecture-by-date-level data to estimate our model in Equation (1). We restrict our sample by dropping deputy-provincial party secretaries in Column 2 and prefectures with turnovers of local leaders in Column 3. Column 4 uses prefectural party secretaries’ term year to measure career incentives as in Guo (2009). Column 5 uses the standardized inauguration age to measure career incentives. Controls include historical promotion likelihood, the number of prefectures within each province, log misused public funds detected by auditing institutions in 1999–2015, and log road travel hours to Wuhan, leader’s calendar age, whether a leader has a college degree or above, whether a leader has a party school degree, the prefecture-level logarithmic GDP growth in 2017–2019, two dummies indicating whether a leader has work experience at the central or provincial government, and mayor’s promotion incentive. Promotion incentive, term year, inauguration age, calendar age, and mayor’s promotion incentive are standardized so that their means equal zero and their standard deviations equal one. The dependent variable in Panel B, ΔHuman Mobility, denotes the difference in the mobility index between 2020 and 2019 on the same lunar calendar date in each prefecture. For all regressions in Panel B, we further control for weather conditions, including average daytime rainfall and average daytime temperature and its square. Robust standard errors are reported in parentheses, clustered at the prefecture-level. ***p < 0.01, **p < 0.05, *p < 0.1.

The SARS epidemic in 2003. Then we examine whether the SARS experience had long-lasting effects on the reactions of local Chinese governments towards COVID-19.

The first SARS case was retrospectively discovered during late November 2002 in China’s Guangdong Province. As in the case of COVID-19, prefectural leaders were initially reluctant to impose lockdowns: by April 17, 2003, only eight prefectures had imposed lockdowns among more than 40 hit by SARS, as shown in Fig. 6.

The number of prefectures hit by SARS kept growing exponentially. Just as Xi did in the COVID-19 pandemic, on April 17, 2003, Hu Jintao, then general secretary of CCP and head of China, gave a speech during an urgent meeting on SARS. Hu emphasized the importance of controlling SARS and warned prefectural leaders that they “would be held accountable for the overall situation in their jurisdictions.” The pressure coming from the nation’s top leader substantially impacted prefectural leaders’ behavior. As Fig. 6 illustrates, 29 prefectural governments began to lock down their jurisdictions, and the national total rose to 77 after another week. Compared to the COVID-19 pandemic, prefectures’ response to SARS appeared to be slower, partly because the transmission of COVID-19 is faster than SARS. Fig. 7 shows the geographic displays of prefectures under lockdown and prefectures hit by the virus during the SARS outbreak about one month after Hu’s speech.
Table 8
Placebo tests for the effects of promotion incentives on lockdown decisions.

| Specification                        | (1)                          | (2)                          | (3)                          |
|--------------------------------------|-----------------------------|-----------------------------|-----------------------------|
|                                      | Placebo: 2 Weeks Earlier    | Placebo: 3 Weeks Earlier    | Placebo: 4 Weeks Earlier    |
| Dependent Variable                   | Lockdown in COVID-19        |                             |                             |
| Placebo Window × Promotion Incentive | 0.0034                      | 0.0023                      | 0.0017                      |
|                                      | (0.008)                     | (0.005)                     | (0.004)                     |
| Lagged Active Cases                  | 0.0069***                   | 0.0069**                    | 0.0069**                    |
|                                      | (0.003)                     | (0.003)                     | (0.003)                     |
| Dep. Mean                            | 0.00432                     | 0.00432                     | 0.00432                     |
| Observations                         | 3240                        | 3240                        | 3240                        |
| Num. of Clusters                     | 324                         | 324                         | 324                         |
|                                     | △Human Mobility             |                             |                             |
| Placebo Lockdown                     | −0.0421                     | −0.0090                     | 0.0353                      |
|                                      | (0.037)                     | (0.029)                     | (0.028)                     |
| Placebo Lockdown × Promotion Incentive| −0.0338                     | −0.0059                     | −0.0360*                    |
|                                      | (0.033)                     | (0.024)                     | (0.021)                     |
| Lagged Active Cases                  | −0.0068***                  | −0.0067***                  | −0.0068***                  |
|                                      | (0.002)                     | (0.002)                     | (0.002)                     |
| Dep. Mean                            | −0.502                      | −0.502                      | −0.502                      |
| Observations                         | 2274                        | 2274                        | 2274                        |
| Num. of Clusters                     | 321                         | 321                         | 321                         |
| Week FE                              | YES                         | YES                         | YES                         |
| Prefecture FE                        | YES                         | YES                         | YES                         |
| Controls × Week FE                   | YES                         | YES                         | YES                         |
|                                      |                             |                             |                             |
| Notes: Controls include historical promotion likelihood, the number of prefectures within each province, log misused public funds detected by auditing institutions in 1999–2015, and log road travel hours to Wuhan, leader’s calendar age, whether a leader has a college degree or above, whether a leader has a party school degree, the prefecture-level logarithmic GDP growth in 2017–19, two dummies indicating whether a leader has work experience at the central or provincial government, and mayor’s promotion incentive. Promotion incentive, calendar age, and mayor’s promotion incentive are standardized so that their means equal zero and their standard deviations equal one. The dependent variable in Panel B, △Human Mobility, denotes the difference in the mobility index between 2020 and 2019 on the same lunar calendar date in each prefecture. For regressions using △Human Mobility as outcomes, we further control for weather conditions, including average daytime rainfall and average daytime temperature and its square. To eliminate the real treatment effects, we exclude the sample after Xi’s speech in the first panel, and the sample after lockdowns in the second panel. Robust standard errors are reported in parentheses, clustered at the prefecture-level. **p < 0.01, *p < 0.05, *p < 0.1.

Fig. 6. The Spread of SARS and the Implementation of Lockdowns. Notes: April 17, 2003: Hu’s speech; June 1, 2003: Beijing’s reopening.

Column 1 of Table 9 reports the results of Equation (3) using data on SARS. Of particular note is that Window, equals one if the week is between President Hu’s speech on April 17, 2003, and Beijing’s reopening on June 1, 2003. Consistent with our findings using the COVID-19 data, the estimate in Column 1 confirms that leaders with greater career incentives tended not to announce lockdowns. As before, we exclude the epidemic center Guangzhou from our sample. Correspondingly, we replace the log road travel hours to Wuhan with the log road travel hours to Guangzhou. We are unable to control for the historical promotion likelihood from 1994 to 2019 in Column 1 because, for the shorter period from 1994 to 2002, there are many missing values in historical promotion outcomes.
Fig. 7. Geographic display of prefectures under lockdown and prefectures hit by SARS on May 15, 2003.

Table 9
Evidence from SARS and the long-lasting impact of SARS experience on the implementation of lockdowns in COVID-19.

| Dependent Variable                                           | (1)                  | (2)                  | (3)                  |
|---------------------------------------------------------------|----------------------|----------------------|----------------------|
| Window × Promotion Incentive                                 | -0.0710***           | -0.1188***           | △Human Mobility      |
| (0.023)                                                       | (0.036)              |                      |
| Window × Prefecture’s SARS Lockdown Experience               | 0.0981               |                      |                      |
| (0.061)                                                       |                      |                      |
| Window × Party Secretary’s SARS Lockdown Experience           | 0.0537               |                      |                      |
| (0.053)                                                       |                      |                      |
| Lockdown                                                      |                      |                      | -0.3964***           |
| (0.099)                                                       |                      |                      |
| Lockdown × Promotion Incentive                               | 0.1481***            |                      |                      |
| (0.055)                                                       |                      |                      |
| Lockdown × Prefecture’s SARS Lockdown Experience              | -0.2057**            |                      |                      |
| (0.098)                                                       |                      |                      |
| Lockdown × Party Secretary’s SARS Lockdown Experience         | 0.1718*              |                      |                      |
| (0.097)                                                       |                      |                      |
| Lagged Active Cases                                          | 0.0045***            | 0.0004***            | -0.0011**            |
| (0.001)                                                      | (0.000)              | (0.000)              |
| Dep. Mean                                                     | 0.0629               | 0.160                | -0.820               |
| Week FE                                                      | YES                  | YES                  | YES                  |
| Prefecture FE                                                | YES                  | YES                  | YES                  |
| Controls × Week FE                                           | YES                  | YES                  | YES                  |
| Observations                                                 | 6666                 | 4860                 | 2889                 |
| Num. of Clusters                                             | 319                  | 324                  | 321                  |

Notes: Controls include historical promotion likelihood (in Columns 2–3), the number of prefectures within each province, log misused public funds detected by auditing institutions (1999–2003 in Column 1 and 1999–2015 in Columns 2–3), and log road travel hours to epidemic centers (Guangzhou in Column 1, Wuhan in Columns 2–3), leader’s calendar age, whether a leader has a college degree or above, whether a leader has a party school degree, the prefecture-level logarithmic GDP growth for the two years before events (2000–02 in Column 1 and 2017–19 in Columns 2–3), two dummies indicating whether a leader has work experience at the central or provincial government, and mayor’s promotion incentive. Promotion incentive, calendar age, and mayor’s promotion incentive are standardized so that their means equal zero and their standard deviations equal one. In Column 3, △Human Mobility denotes the difference in the mobility index between 2020 and 2019 on the same lunar calendar date in each prefecture. Robust standard errors are reported in parentheses, clustered at the prefecture-level. ***p < 0.01, **p < 0.05, *p < 0.1.
for COVID-19, we also conducted an event study estimation to illustrate the dynamic effects. As plotted in Fig. 8, the estimates display a similar pattern.

We proceed to explore the connection between the two outbreaks by studying the repercussions of SARS: What would be the consequence in combating COVID-19 if a prefecture had experienced lockdown during SARS, and what would be the consequence if its leader had done so? Chinese prefectural leaders are rotated frequently and regularly across prefectures (Yao and Zhang, 2015; Jia and Xu, 2018), creating substantial variation in the SARS experience of prefectural leaders for us to study.

Specifically, we construct two dummy variables, one for whether a prefecture experienced SARS lockdown, and one for whether a prefecture party secretary experienced it at the prefecture he/she worked in during SARS. We include their interactions with our main regressors and report the results of Equations (3) and (4) in Columns 2 and 3 of Table 9, respectively. Unsurprisingly, the effects of COVID-19 lockdowns on human mobility were stronger in prefectures that experienced SARS lockdowns, even though we do not observe the pattern that such regions were more likely to implement lockdowns than others. This finding is consistent with the association documented in Ru et al. (2021), which shows that governments in countries that did not experience SARS were significantly slower in their response to COVID-19.

Of particular note are the patterns of prefectural leaders’ SARS lockdown experience. Evidence from news reports shows that containment measures were generally more strictly implemented during COVID-19 than during SARS since COVID-19 was transmitted faster than SARS and caused more infections in China. The estimated parameter of the interaction terms with the party secretary’s SARS lockdown experience suggests that prefectural leaders’ lockdown decisions were independent of the prefecture’s or their own experience of SARS lockdown, as shown in Column 2. However, if the leaders had experienced SARS lockdown, they were more likely to downplay the virus by implementing loose lockdown measures, as revealed in Column 3.

To better understand the career consequences of local leaders’ performance in SARS, we use both a linear probability model (LPM) (Table A2 Column 1) and a probit model (Table A2 Column 2) and report the correlation between the promotion outcomes of prefectural leaders incumbent during SARS and a set of variables reflecting their performance in facilitating economic growth and responding to the epidemic. These include the logarithmic average GDP growth over their term, whether they implemented lockdowns, and the cumulative SARS cases per 10,000 people. We further include leaders’ ex-ante promotion likelihood as a control, and to be consistent with our main specification in Table 3, we also control for several covariates, but their inclusion has a limited impact on the messages we want to deliver. In both columns, we find that prefectural leaders would have higher odds of being promoted if they achieved higher GDP growth during their term. Also, a leader’s promotion incentive has more statistical power in explaining his/her promotion outcomes. This pattern suggests that even after controlling for prefectural leaders’ ex-ante promotion likelihood, maintaining a spectacular record for economic growth is still a dominant strategy in the promotion game. At the same time, according to our dataset, not even one prefectural party secretary was dismissed for reluctance in responding to SARS. Combined with this anecdotal evidence, Table A2, which shows that neither SARS infection rates nor whether lockdown was implemented affected the promotion of prefectural party secretaries, gives rise to our preferred interpretation: prefectural party secretaries who had experienced SARS lockdowns would have formed the belief that, to be promoted in the future, facilitating economic growth would still be non-negligible during the pandemic, while in terms of public health responsibilities, they could muddle through COVID-19 just as before.

The heterogeneous impacts of prefectures’ and prefectural leaders’ SARS lockdown experience on COVID-19 lockdown measures enrich our understanding of the long-lasting consequences of anti-epidemic measures. Our empirical finding also cautions that failing to punish government officials’ sluggishness in controlling disease outbreaks may come back to bite a nation.

6. Conclusion

This study draws lessons from China’s campaign against COVID-19 to shed light on whether local leaders’ career incentives contributed to their reluctance in adopting effective measures, such as implementing lockdowns, to combat the virus. We find evidence of reluctance to impose lockdowns at the beginning of the pandemic because of promotion concerns associated with economic growth. While warnings from the nation’s top leader obstructed local leaders’ desires to trade public health for economic growth, we find that local leaders with larger promotion incentives were still more likely to avoid or minimize lockdowns. As revealed by the data, local leaders might have formed the belief from their experience of SARS that the emphasis on pandemic control by the central government was temporary. Our focus on China suggests similarities with democracies. Politicians in authoritarian regimes like China, because of promotion incentives, may place a higher weight on economic growth than disease control, while politicians in democratic countries are incentivized to win elections, and thus may hesitate to take resolute policy actions for fear that voters care more about employment and incomes than disease control. No matter in which regime, politicians can have incentives to act slowly to combat a pandemic.

Declaration of competing interest

The authors have no conflicts of interest and have nothing to declare.

Data availability

Data will be made available on request.
Fig. 8. Event Study of Promotion Incentives on Lockdown Decisions during SARS. Notes: This figure visualizes the dynamic effects of prefectural party secretaries’ promotion incentives on lockdown decisions during SARS using the specification in Column 1 of Table 9. We illustrate the estimated coefficients with the 95% confidence intervals of the interaction terms between promotion incentive and a full set of week dummies. April 17, 2003, denotes Hu’s speech and June 1, 2003, denotes Beijing’s reopening. The week before Hu’s speech is omitted as the reference group.

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Appendix A. Additional Empirical Results

Table A1
Calculating Prefectural Mayors’ Career Incentives Using the Method of Wang et al. (2020).

| Dependent Variable | (1) | (2) |
|--------------------|-----|-----|
| Promotion Inauguration Age | −0.0393*** | 0.7276*** |
| Deputy-Province-Level | 5.0379** | (0.048) |
| Inauguration Age × Deputy-Province-Level | −0.1066** | (2.469) |
| Observations | 2035 | Dep. Mean | 0.499 |
| Notes: This table reports the same specification as Table 2 using our sample of all prefectural mayors who were incumbent during 1994–2019. The promotion dummies for mayors are defined in the same way as for party secretaries except that we define the dummy as one if a prefecture’s mayor becomes a party secretary afterwards. Robust standard errors are reported in parentheses, clustered at the prefecture-level. ***p < 0.01, **p < 0.05, *p < 0.1. |

Table A2
Determinants of Promotion of Prefectural Party Secretaries Incumbent in SARS

| Method | (1) | (2) |
|--------|-----|-----|
| Dependent Variable | Promotion Incentive | 0.1948*** |
| | | (0.025) |
| | Log Average GDP Growth over Term | 0.7276*** |
| | | (0.151) |

(continued on next page)
Table A2 (continued)

| Method     | (1)       | (2)       |
|------------|-----------|-----------|
|            | LPM       | Probit    |
| Dependent Variable | Promotion | Promotion |
| Ever Locked Down in SARS | 2.0256*** | 6.8749*** |
| (0.576)    | (1.993)   |
| Cumulative SARS Cases per 10,000 People | 0.0308 | 0.0886 |
| (0.064)    | (0.192)   |
| Number of Prefectures Within Province | −0.0338 | −0.0990 |
| (0.153)    | (0.754)   |
| Log misused public funds, 1999–2003 | −0.0172** | −0.0498** |
| (0.007)    | (0.022)   |
| Log Road Travel Hours to Guangzhou | 0.0698*** | 0.2532*** |
| (0.016)    | (0.067)   |
| Calendar Age | −0.1283*** | −0.4024*** |
| (0.040)    | (0.129)   |
| College or Above Education | −0.0107 | −0.0115 |
| (0.086)    | (0.284)   |
| Party School Degree | 0.0321 | 0.0876 |
| (0.062)    | (0.181)   |
| Central Experience | 0.3067** | 1.0490** |
| (0.125)    | (0.423)   |
| Provincial Experience | 0.1148** | 0.3729** |
| (0.054)    | (0.164)   |
| Mayor’s Promotion Incentive | −0.0137 | −0.0539 |
| (0.025)    | (0.084)   |
| Dep. Mean | 0.0107 | 0.0115 |
| 0.394      | 0.394     |
| Observations | 322       | 322       |

Notes: This table explores the determinants of the promotion outcomes of prefectural party secretaries who were incumbent during the SARS outbreak. Promotion incentive, calendar age, and mayor’s promotion incentive are standardized so that their means equal zero and their standard deviations equal one. Column 1 applies a linear probability model (LPM) and Column 2 uses a probit model. Robust standard errors are reported in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Appendix B. Data Appendix

Table B1
Prefecture Lockdown Records during COVID-19

| Prefecture | Lockdown Date | Prefecture | Lockdown Date | Prefecture | Lockdown Date | Prefecture | Lockdown Date | Prefecture | Lockdown Date | Prefecture | Lockdown Date |
|------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|---------------|
| Wuhan      | 2020/1/23     | Binzhou    | 2020/2/3      | Fushan     | 2020/2/5      | Huaihua    | 2020/2/5      | Lanzhou    | 2020/2/7      |
| Ezhou      | 2020/1/23     | Tongren    | 2020/2/3      | Dandong    | 2020/2/5      | Zuhai      | 2020/2/5      | Qinhua     | 2020/2/6      |
| Huagang    | 2020/1/23     | Qiannan    | 2020/2/3      | Jinzhou    | 2020/2/5      | Maoming    | 2020/2/5      | Foshan     | 2020/2/8      |
| Huangshi   | 2020/1/24     | Songyuan   | 2020/2/4      | Fuxin      | 2020/2/5      | Zhaqiong   | 2020/2/5      | Chongqing  | 2020/2/8      |
| Shiyan     | 2020/1/24     | Ha’erbin   | 2020/2/4      | Liaoyang   | 2020/2/5      | Nanning    | 2020/2/5      | Ziyang     | 2020/2/8      |
| Yichang    | 2020/1/24     | Shuangyashan| 2020/2/4     | Panjin     | 2020/2/5      | Guilin     | 2020/2/5      | Dalian     | 2020/2/9      |
| Jingmen    | 2020/1/24     | Nanjing    | 2020/2/4      | Tieling    | 2020/2/5      | Wuzhou     | 2020/2/5      | Wuxi       | 2020/2/9      |
| Xiaogan    | 2020/1/24     | Xuzhou     | 2020/2/4      | Chaoyang   | 2020/2/5      | Haikou     | 2020/2/5      | Huainan    | 2020/2/9      |
| Jingzhou   | 2020/1/24     | Nantong    | 2020/2/4      | Daqing     | 2020/2/5      | Sanya      | 2020/2/5      | Huai Bei   | 2020/2/9      |
| Xianning   | 2020/1/24     | Zhenjiang  | 2020/2/4      | Heihe      | 2020/2/5      | Lanzhou    | 2020/2/5      | Huizhou    | 2020/2/9      |
| Suizhou    | 2020/1/24     | Hangzhou   | 2020/2/4      | Daxinganli | 2020/2/5      | Nanchong   | 2020/2/5      | Meizhou    | 2020/2/9      |
| Enshi      | 2020/1/24     | Ningbo     | 2020/2/4      | Changzhou  | 2020/2/5      | Meishan    | 2020/2/5      | Dongguan   | 2020/2/9      |
| Xiangyang | 2020/1/28     | Jiaxing    | 2020/2/4      | Lianyang   | 2020/2/5      | Ganzhi     | 2020/2/5      | Deyang     | 2020/2/9      |
| LvLiang    | 2020/1/29     | Wuhu       | 2020/2/4      | Yancheng   | 2020/2/5      | Kunming    | 2020/2/5      | Mianyang   | 2020/2/9      |
| Samenxia   | 2020/1/31     | Bengbu     | 2020/2/4      | Yangzhou   | 2020/2/5      | Lijiang    | 2020/2/5      | Hanzhong   | 2020/2/9      |
| Yinchuan   | 2020/1/31     | Lian      | 2020/2/4      | Taizhou    | 2020/2/5      | Tingshan   | 2020/2/6      | Beijing    | 2020/2/10     |
| Wuzhong    | 2020/1/31     | Fuzhou     | 2020/2/4      | Suqian     | 2020/2/5      | Suzhou     | 2020/2/6      | Shanghai   | 2020/2/10     |
| Lishui     | 2020/2/1      | Jingdezhen | 2020/2/4      | Huzhou     | 2020/2/5      | Jinhua     | 2020/2/6      | Dongying   | 2020/2/10     |
| Liupanshi  | 2020/2/1      | Yingtan    | 2020/2/4      | Quzhou     | 2020/2/5      | Ma'an shan | 2020/2/6      | Huhehaote  | 2020/2/12     |
| Xinzhou    | 2020/2/1      | Linyi      | 2020/2/4      | Hefei      | 2020/2/5      | Fuzhou     | 2020/2/6      | Baotou     | 2020/2/12     |
| Wenzhou    | 2020/2/2      | Deshous    | 2020/2/4      | Fuyang     | 2020/2/5      | Liao chang | 2020/2/6      | Wuhai      | 2020/2/12     |
| Guiyang    | 2020/2/2      | Zhengzhou  | 2020/2/4      | Quanzhou   | 2020/2/5      | Xinyang    | 2020/2/6      | Chifeng    | 2020/2/12     |
| Zunyi      | 2020/2/2      | Nanyang    | 2020/2/4      | Nanchang   | 2020/2/5      | Fangcheng | 2020/2/6      | Tongliao   | 2020/2/12     |

(continued on next page)
Table B1 (continued)

| Prefecture    | Lockdown Start | Lockdown End |
|---------------|----------------|--------------|
| Anshun        | 2020/2/2       |              |
| Qianxian      | 2020/2/2       |              |
| Bijie         | 2020/2/2       |              |
| Jincheng      | 2020/2/3       |              |
| Anshan        | 2020/2/3       |              |
| Huaiian       | 2020/2/3       |              |
| Zhoushan      | 2020/2/3       |              |
| Taizhou       | 2020/2/3       |              |
| Weifang       | 2020/2/3       |              |
| Jining        | 2020/2/3       |              |

Table B2
Prefecture Lockdown Records During SARS

| Prefecture | Lockdown Start | Lockdown End |
|------------|----------------|--------------|
| Beijing    | 2003/4/24      |              |
| Tianjin    | 2003/4/24      |              |
| Shijiazhuang| 2003/4/24    |              |
| Qinhuangdao| 2003/4/26      |              |
| Xingtai    | 2003/4/26      |              |
| Baoding    | 2003/4/20      |              |
| Zhangjiaxiu| 2003/4/21      |              |
| Cangzhou   | 2003/4/24      |              |
| Langfang   | 2003/4/20      |              |
| Hengshui   | 2003/4/24      |              |
| Taiyuan    | 2003/4/18      |              |
| Datong     | 2003/4/23      |              |
| Yangquan   | 2003/4/20      |              |
| Changzhi   | 2003/4/24      |              |
| Jinzhong   | 2003/4/20      |              |
| Yuncheng   | 2003/4/26      |              |
| LvLiang    | 2003/5/12      |              |
| HuHehaote  | 2003/4/15      |              |
| Baotou     | 2003/4/17      |              |
| WuHai      | 2003/4/24      |              |
| Bayannao‘er| 2003/4/10      |              |
| Wulanchabu | 2003/4/14      |              |

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