Epidemic Control or Economic Development: How Chinese Local Governments Respond to Competing Targets

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Abstract: This article examines how Chinese local governments respond to competing policy targets during crises, using the COVID-19 epidemic as a quasi-natural experiment. We construct a novel panel dataset covering 278 prefecture-level cities in China to investigate whether city leaders' promotion incentives—measured by tenure and age—affect their performance in epidemic control and economic development. Employing difference-in-differences and fixed effects regressions, we find no significant variation in epidemic control outcomes across officials with different tenures or ages. However, during the COVID-19 epidemic, cities governed by short-tenure leaders experienced a 0.84 percentage point higher GDP growth rate compared to those led by long-tenure officials. Furthermore, the impact of officials' promotion incentives on GDP growth was particularly pronounced among older officials, in northern regions, and after the epidemic was brought under control. These results suggest that competing policy targets may generate unintended performance distortions for local officials, particularly among leaders with lower promotion incentives.

Keywords: local government, competing targets, promotion incentive, epidemic control, GDP growth

JEL Classification: H12, H70, H83, R11

I. Introduction

The COVID-19 epidemic has drastically reshaped the global economic landscape, posing unprecedented challenges for governments worldwide in balancing epidemic control with economic recovery efforts (Adefeso & Muraina, 2024). In China, local governments faced the additional pressure of meeting competing targets set by the central government. While previous studies have explored variations in epidemic control measures across different cities in China, attributing these differences to factors such as city size, healthcare resources, and population mobility (Chen et al., 2021; Li et al, 2022; Liu, 2020; Qiu et al., 2020; Sun et al., 2020; Zha et al., 2022), the role of local officials' promotion incentives remains underexplored.

This article contributes to the literature by emphasizing how local government officials' promotion incentives—proxied by tenure and age—serve as crucial determinants in prioritizing competing targets from the central government. The COVID-19 epidemic provides a unique quasi-natural experiment to investigate this dynamic. On February 23, 2020, shortly after the COVID-19 outbreak, President Xi Jinping emphasized the urgent need to coordinate epidemic control and economic development. [1] This marked the launch of a new performance management (PM) framework for local governments, emphasizing two potentially conflicting targets: epidemic control and economic development. Although the central government set the unified targets, the implementation of these targets was left to local governments, where varying responses could be observed (Zha et al., 2022; Zhang, 2021). This divergence presents an opportunity to examine how promotion incentives might influence the decision-making of local officials, particularly in contexts where their career advancement may depend on their performance in these competing areas.

Using a novel panel dataset covering 278 prefecture-level cities in China, our study advances the literature by integrating the analysis of officials' promotion incentives with their

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[1] Xi Jinping. 2020. Speech at a Meeting to Advance the Work on Coordinating the Prevention and Control of the COVID-19 and Economic and Social Development. Chinese Central Government Website, February 23. http://www.gov.cn/xinwen/2020-02/24/content_5482502.htm [accessed October 10, 2021].

responses to two competing policy targets during a major public health crisis. This approach is novel in applying characteristics such as age and tenure to understand multi-tasking dilemmas in local governance, particularly within China's distinctive institutional setting. The findings offer valuable implications for designing more effective performance management frameworks and crisis response strategies.

The remainder of the article proceeds as follows. In the next section, we provide a brief review of the literature. Subsequently, we establish our theoretical hypotheses. We then introduce the methodology, including sample selection, variable measurement, data sources, and empirical models. The fourth section presents the empirical findings, followed by a discussion and conclusion.

II. Theory and hypotheses

Performance management

Outcomes-based performance management (PM) system has been adopted by governments worldwide (Van Dooren et al., 2015). PM aims to enhance the efficiency and effectiveness of public services by defining, monitoring, and using objective indicators to evaluate the performance of organizations and programs (Heinrich, 2002). Numerous studies have empirically tested the effectiveness and impact of PM in public organizations (Gerrish, 2016; Jeremy et al., 2022; Yang and Hsieh, 2007). However, the validity of empirical tests is often challenged for the following three reasons. **First, multi-target mixing.** Governments are often faced with multiple and potentially competing targets (Andersen et al., 2016; Li, 2021; Zhang, 2021), such as environmental protection (Ran, 2017; Shah et al., 2022; Zhang and Wu, 2020), economic growth (Li and Zhou, 2005; Ma 2016), and social stability (Gao, 2015). The complex and interactive relationships among these targets make it difficult to isolate the effects of specific PM factors. **Second, measurement validity.** The implementation of PM systems may lead to data manipulation by local governments (Chen et al., 2012; Kalgin, 2016; Wallace, 2016). Research shows that PM may encourage behavior that improve reported performance metrics while undermining actual outcomes (Courty and Marschke 2004; Heinrich and Marschke 2010; Jacobsen and Andersen, 2014; Verbeeten, 2008). **Third, selection bias.** The adoption of PM systems is not randomly selected. Organizations with initially poor performance are more likely to be subject to PM monitoring, and as a result, may demonstrate greater improvements over time (Julnes and Holzer 2001).

The COVID-19 epidemic provides a unique opportunity to examine the impacts of PM while mitigating the typical challenges described above. **First,** although local governments in China often face multiple and complex targets (Li, 2021; Wang et al., 2020; Zhang, 2021), this situation changed after the COVID-19 outbreak. In response to the epidemic, the Chinese central government introduced a new PM system for local governments. The previously broad targets were streamlined into two primary targets — epidemic control and economic development, thereby avoiding the multi-target mixing problem. **Second**, as an unexpected and exogenous shock, the COVID-19 epidemic affected all cities across China (Gomes, 2020). This uniform exposure provides a unique quasi-natural experiment to study how the PM system works. The responses of local governments to the revised PM system can be directly reflected in the performance of local epidemic control and economic development, thereby avoiding the selection bias problem. **Third**, while local governments in China have been known to manipulate data on GDP growth and air pollution (Ghanem and Zhang, 2014; Wallace, 2016), the costs of falsifying epidemic-related data are significantly higher. Due to the severe penalties associated with misreporting COVID-19 data, local officials have strong incentives to report epidemic figures truthfully. Research suggests that there is no evidence that China manipulated its reported data on COVID-19 cases (Isea, 2020), thus avoiding the measurement validity problem.

Target-based responsibility system in China

Research on PM in the Chinese public sector indicates that the target-based responsibility system (TRS) is the core mechanism to motivate and control local governments (Jing et al., 2015; Yu and Ma, 2015). The targets faced by local governments in China can be classified into three categories: soft targets, hard targets, and priority targets (Edin, 2003; Liang and Langbein, 2015). **First, soft targets** (*ruan zhibiao*) are often associated with general policies that are broadly defined and characterized as policy directives or mission statements. Common examples of soft targets include cultural and social development. **Second, hard targets** (*ying zhibiao*) refer to measurable and quantifiable performance indicators, and are usually related to economic development. Typical hard targets include GDP growth (Li and Zhou, 2005; Ma, 2016; Zhu et al., 2024), fiscal revenue (Qian and Weingast, 1997; Jin et al., 2005), and infrastructure construction (Li, 2011; Wang et al., 2020). **Third, priority targets with veto power** (*yipiao foujue*) are exclusively used for top priorities on the central government policy agenda. If these targets are not successfully attained, officials will fall short in their performance evaluation, regardless of how successfully they accomplished other tasks. Over the past two decades, only four such veto-power targets have been centrally mandated:

birth control (Liang and Langbein, 2015), social stability (Gao, 2015), environmental protection (Ran, 2017; Shah et al., 2022; Zhang and Wu, 2020), and COVID-19 epidemic control (Ding and Zhang, 2022).

Given the competing attention and resources required to pursue each target, local governments must make trade-off in priority allocation and sequential arrangement among multiple targets (Ma, 2015). Based on the performance feedback of different types of targets, local governments officials are more likely to focus on priority targets and hard targets (Edin, 2003; Liang and Langbein, 2015). On the one hand, local officials prioritize the achievement of priority targets with veto power, which constitutes the basis for personnel evaluations and promotion decisions (Edin, 2003). On the other hand, they also strive to accomplish hard targets, which is important both for bonuses and for political rewards (Li and Zhou, 2005; Zhu et al., 2024).

After the COVID-19 outbreak, the Chinese central government simplified the complex TRS into two primary targets: epidemic control and economic development. Epidemic control became a typical priority target with veto power (Ding and Zhang, 2022). In response to the outbreak, the Chinese central government upheld a strict *dynamic zero-case policy*. Officials who perform poorly in epidemic control were promptly held accountable or even removed from their posts. [2] By April 30, 2020, a total of 757 local officials had been held accountable for

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[2] Xinhua News. 2020. Facing the COVID-19, Officials Must Be Held Accountable for Malfeasance. Chinese Central Government Website, February 11. http://www.gov.cn/guowuyuan/2020-02/11/content_5477512.htm [accessed October 10, 2021].

ineffective epidemic control. [3] In contrast, economic development remained one of the most important hard targets for local governments. Research has shown that higher GDP growth rates significantly increase the likelihood of promotion for local officials (Chen et al., 2005; Li and Zhou, 2005). Even after the COVID-19 outbreak, the emphasis on GDP growth remained unchanged. President Xi Jinping repeatedly urged governments at all levels to focus on economic development to ensure that the goal of *building a moderately prosperous society in all respects by 2020* can be achieved on schedule. [4]

Summary and hypotheses

The implementation of a new PM system during the COVID-19 epidemic provides a unique opportunity to examine how local officials respond to competing targets. Given that epidemic control became a priority target with veto power, local officials were compelled to ensure the success of the *dynamic zero-case policy* in order to maintain political correctness. However, the economic and social costs of lockdown measures can be extremely high (Allen, 2022; Ke and Hsiao, 2022; Xu and Wei, 2021). Consequently, officials with strong promotion incentives may seek to stimulate local economic growth even during the epidemic, by adopting more prudent epidemic control strategies to avoid excessive harm to social and economic development. In contrast, officials with weaker promotion incentives may do their utmost to eliminate any possibility of a local COVID-19 outbreak, focusing on political security even at

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[3] The Paper Website. 2020. Within 103 days, 757 officials across China were held accountable for ineffective epidemic control. The Paper Website, June 22. https://www.thepaper.cn/newsDetail_forward_7931579 [accessed October 10, 2021].

[4] Xinhua News. 2020. Xi Stresses Achieving Moderately Prosperous Society in All Respects. Xinhua Website, May 13. http://www.xinhuanet.com/english/2020-05/13/c_139051548.htm [accessed October 10, 2021].

the expense of other development goals. In summary, when faced with unified but competing targets, local officials with different promotion incentives may adopt distinct strategies, ultimately affecting both epidemic control outcomes and GDP growth. This study focuses on two key factors that shape local officials' promotion incentives: tenure and age.

In political business cycle studies, tenure is considered a key factor affecting the behavior and incentives of officials (Besley and Case, 1995; Hibbs, 1977; Nordhaus, 1975; Rogoff and Sibert, 1988). In China, where there is no fixed term, tenure significantly affects an official's likelihood of promotion (Guo, 2009; Geng et al., 2016; Wang and Xu, 2008; Zhang and Gao, 2007). Research indicates that from 2000 through 2011, the average term of office for city leaders was approximately 3.7 years, suggesting that turnover among local officials occurs frequently (Luo and Qin, 2021; Wang et al., 2020). This frequent turnover profoundly influences the behavior of local officials. As the saying goes, "officials work in the first year, observe in the second year, and wait (for turnover) in the third year." Based on this, we predict that long-tenure officials, who are waiting for turnover, will place greater emphasis on epidemic control to avoid making mistakes. In contrast, short-tenure officials are more likely to prioritize long-term plans for the city, focusing more on economic development. Therefore, we formulate the following hypotheses:

H1: Long-tenure officials perform better in epidemic control.

H2: Short-tenure officials perform better in economic development.

Besides tenure, age is another critical factor influencing the promotion incentives of Chinese local officials. Since the establishment of a mandatory retirement age in the early 1980s, age has become a key determinant in career advancement. In China, 57 years old is generally considered a threshold for most local officials. The literature indicates that city leaders over the age of 57 have minimal chances of promotion (Xi et al, 2018; Huang et al, 2020). Based on this, we hypothesize that older officials will be more conservative in policy making, and place greater emphasis on epidemic control. In contrast, younger officials are likely to focus more on accomplishing local economic development targets to gain an advantage in future promotions. We thus formulate the following hypotheses:

H3: Older officials perform better in epidemic control.

H4: Younger officials perform better in economic development.

III. Research methodology

Data source

To test the above hypotheses, We construct a novel panel dataset covering 278 prefecture-level cities in China. The dataset includes variables on performance outcomes—namely, the Epidemic Control Index and GDP growth rate—as well as the biographical information of city leaders[5] (including tenure, age, gender, race, and education background), and key city-level characteristics (such as GDP per capita, population, population mobility, geographic location, government expenditure, import, and export). Except for the Epidemic Control Index, which consists of monthly data from January to December 2020, all other variables are collected on a quarterly basis from Q1 2019 to Q4 2020.

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[5] The top city officials are the party secretary and the city mayor. The party secretary is more powerful than the city mayor due to the ruling position of the Chinese Communist Party. We therefore refer to the city's party secretary as the city leader in this paper.

The data sources are as follows. The COVID-19 case statistics are obtained from the *CSMAR COVID-19 and Economic Research Database*, which provides daily confirmed case data for each Chinese city from January 10 to December 31, 2020. Economic and social indicators are collected from the *CEIC database*, which compiles city-level economic statistics published by local statistical bureaus. Biographical information on city leaders is manually collected and covers 515 officials who were in office between 2019 to 2020.

Dependent Variables

Epidemic Control Index. Following the method of Leng and Lemahieu (2021), this article constructs the monthly Epidemic Control Index (ECI) to measure the performance of epidemic control across different prefecture-level cities, with values ranging from 0 (worst performing) to 100 (best performing). Figure 2 presents a heatmap of the 2020 annual average ECI for each city, showing that there is no obvious geographical distribution pattern of the ECI. As discussed in the previous sections, we argue that this variation may be partly explained by the distinct strategies adopted by local officials.

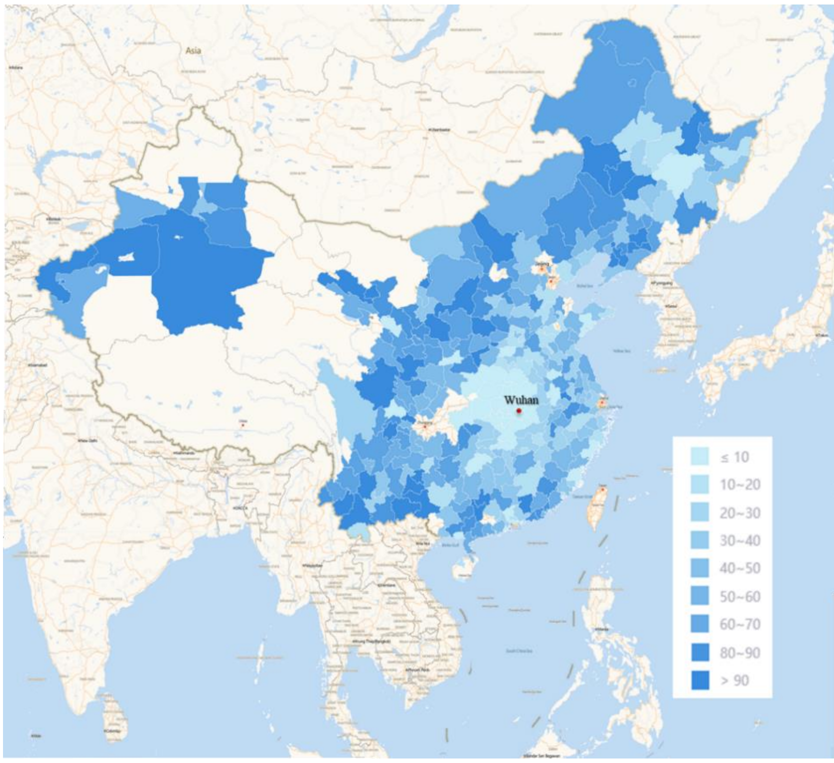

Figure 1 The Annual Average ECI of Each City in 2020 (0-100)

GDP Growth Rate. This article uses the quarterly year-on-year real GDP growth rate to measure the performance of economic development in different cities. Figure 3 presents a heatmap of the 2020 annual GDP growth rate for each city, showing considerable variation in economic development performance across cities. We argue that this variation may be influenced by the promotion incentives of local officials.

Figure 2 The GDP Growth Rate of Each City in 2020 (%)

Independent Variables

Tenure Group. Tenure is a key factor influencing the promotion incentives of Chinese local officials. Three-year tenure is often considered a threshold for most city leaders. Over the past two decades, turnover among city leaders has been frequently, with most city leaders serving less than three years in their posts (Luo and Qin, 2021; Wang et al., 2020). Therefore, we categorize city leaders in our dataset into two groups based on whether their tenure exceeded three years at the time of the COVID-19 outbreak. The *TenureGroup* variable equals to 1 if the city leader's tenure was less than three years, and 0 otherwise.

Age Group. Age is another important determinant influencing the promotion incentives of Chinese local officials. In general, 57 years old is considered a threshold for most city leaders, with officials over the age of 57 having minimal chances of promotion (Xi et al, 2018; Huang et al, 2020). Consequently, we categorize city leaders in our dataset into two groups based on whether their age exceeded 57 years old at the time of the COVID-19 outbreak. The *AgeGroup* variable equals to 0 if the city leader was over 57, and 1 otherwise.

Control Variables

This study also includes a set of control variables. The official-level control variables are as follows: (1) *Gender,* a dummy variable equals to 1 if the city leader is a female and 0 otherwise. (2) *Race,* a dummy variable equals to 1 if the city leader is a minority and 0 otherwise. (3) *Scholar,* a dummy variable equals to 1 if the city leader is a scholar or engineer and 0 otherwise. (4) *Major,* a dummy variable equals to 1 if the city leader majors in STEM and 0 otherwise. (5) *Degree,* a factor variable denotes the highest educational degree attained by the city leader. By controlling for these personal attributes, we aim to rule out the influence of officials' personal abilities, which may affect the performance of epidemic control and economic development.

The city-level control variables include: (1) *log(GDPpercapita),* the logarithm of the city's real GDP per capita, controlling for the level of economic development. (2) *log(Population),* the logarithm of the city's permanent resident population, controlling for population density. (3) *Immigration,* the percentage of the inflow population in a province relative to the total floating population, controlling for population mobility, which can affect the spread of the epidemic. (4) *log(Distance),* the logarithm of the distance from the epicenter (Wuhan's Huanan seafood market), addressing the spatial correlation issue that may affect local epidemic control performance. (5) *GovExp,* the ratio of government spending to GDP, as it is directly related to the PM system. (6) *Import* and *Export,* representing the ratio of import and export values to GDP, controlling for the economic openness that may affect the epidemic control and economic development.

The variable definitions and descriptive statistics are presented in Table 1.

Table 1 Variables, Measures, and Descriptive Statistics

Variable	Measure	Num	Mean	SD	Min.	Max.
ECI	Epidemic Control Index, measuring the relative performance of local epidemic control	3614	50.314	28.348	0.33	100
GDP growth	Year-on-year real GDP growth rate (%)	1996	2.8	5.903	-40.90	13.00
TenureGroup	Equal to 1 if the city leader's tenure was less than three years at the time of the COVID-19 outbreak, 0 otherwise	1996	0.663	0.473	0	1
AgeGroup	Equal to 0 if the city leader was over 57 years old at the time of the COVID-19 outbreak, 1 otherwise	1996	0.488	0.500	0	1
Tenure	City leader's time in his current post	1996	2.416	1.648	0	9.68
Age	City leader's age when appointed to his current post	1996	54.08	2.644	44	59
Race	Equal to 1 if the city leader is a minority, 0 otherwise	1996	0.0610	0.239	0	1
Gender	Equal to 1 if the city leader is a female, 0 otherwise	1996	0.0360	0.185	0	1
Scholar	Equal to 1 if the city leader is a scholar, 0 otherwise	1996	0.239	0.427	0	1
Major	Equal to 1 if the city leader majors in STEM, 0 otherwise	1996	0.207	0.405	0	1
Degree	1 for bachelor's degree, 2 for master's degree, 3 for doctoral degree	1996	2.168	0.598	1	3
Post	Equal to 1 if in times after the COVID-19 outbreak, 0 otherwise.	1996	0.512	0.500	0	1
log(GDPpercapita)	Real GDP per capita (take log)	1996	1.653	0.516	0.27	2.98
log(Population)	Number of permanent residents (take log)	1882	5.906	0.658	3.20	7.33
Immigration	The province's inflow population / total floating population	1825	4.439	3.255	0.36	19.69
log(Distance)	Distance from the local city hall to Wuhan's Huanan seafood market (take log)	1996	6.793	0.660	1.87	8.19
GovExp	Government expenditure / GDP	1992	0.229	0.120	0.066	1.02
Import	Import value / GDP	1968	0.066	0.112	0	0.80
Export	Export value / GDP	1980	0.097	0.155	0	1.71

Note: The dataset includes 278 prefecture-level cities in China. Except for ECI, which is monthly data from January 2020 to December 2020, all other variables are quarterly data from Q1 2019 to Q4 2020.

Model construction

Based on our previous theoretical analysis and hypotheses, this article treats the COVID-19 outbreak as a quasi-natural experiment to examine how local government officials respond to competing targets. We begin by examining whether the promotion incentives of city leaders—proxied by their tenure and age—significantly affect the performance of local epidemic control. Our fixed-effects model is specified as follows:

$$ECI_{it} = \alpha + \beta_1 TenureGroup_{it} + \beta_2 AgeGroup_{it} + \beta_n X_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (1)$$

Where ECI_{it} is the dependent variable, drnoting the Epidemic Control Index constructed, measuring the performance of epidemic control in city i at time t. $TenureGroup_{it}$ and $AgeGroup_{it}$ are the explanatory variable, denoting the tenure group and age group of the city leader respectively. X_{it} is a series of control variables, as defined in Table 1. λ_i denotes city fixed effects, controlling for unobserved heterogeneity such as geographical location and public health capacity that may affect epidemic control. μ_t denotes time fixed effects, capturing common time shocks such as national policy shifts or seasonal effects. ε_{it} is the random error term. In this specification, the main concern is whether the coefficients β_1 and β_2 are statistically significant. β_1 represents the difference in epidemic control performance between short-tenure and long-tenure city leaders, thereby testing Hypothesis 1 (H1). Similarly, β_2 represents age-related differences in epidemic control performance, testing Hypothesis 3 (H3).

In addition, we examine whether the tenure of city leaders significantly affects the performance of local economic development. Since GDP growth tends to exhibit momentum effects, which may lead to endogenous problems. To address this concern, we treat the COVID-

19 outbreak as an exogenous shock, and classify city leaders into a treatment group (short-tenure officials) and a control group (long-tenure officials). We then employ a difference-in-difference (DID) regression approach to identify the causal effect of promotion incentives on economic growth during the epidemic (Lechner, 2011; Goodman-Bacon and Marcus, 2020). The DID model is specified as follows:

$$GDPgrowth_{it} = \alpha + \beta_1(TenureGroup_{it} \times Post_{it}) + \beta_2 TenureGroup_{it} + \beta_3 Post_{it} + \beta_n X_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (2)$$

Where the dependent variable $GDPgrowth_{it}$ denotes the real GDP growth rate of city i at time t. $TenureGroup_{it}$ is a dummy variable that differentiates the treatment group and control group in the DID test. $Post_{it}$ is a dummy variable equal to 1 for the post-COVID-19 period (after December 2019), and 0 otherwise. X_{it} is a series of control variables defined in equation (1). λ_i and μ_t denote province-fixed effects and time-fixed effects, respectively. ε_{it} is the random error term. The coefficient β_1 is the DID estimator, which captures the differential change in GDP growth between cities led by short-tenure and long-tenure officials after the outbreak. A statistically significant β_1 would support Hypothesis 2 (H2), indicating that city leaders with shorter tenures—likely more promotion-motivated—tended to prioritize economic development more actively during the COVID-19 crisis.

Finally, we examine whether the age of city leaders significantly affects the performance of local economic development. Once again, we employ a DID regression approach. The model is specified as follows:

$$GDPgrowth_{it} = \alpha + \beta_1(AgeGroup_{it} \times Post_{it}) + \beta_2 AgeGroup_{it} + \beta_3 Post_{it} + \beta_n X_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (3)$$

$AgeGroup_{it}$ is a dummy variable that differentiates the treatment group (younger officials) and control group (older officials) in the DID test. $Post_{it}$ is a dummy variable equal to 1 for the post-COVID-19 period (after December 2019), and 0 otherwise. The dependent variable $GDPgrowth_{it}$, the control variables X_{it}, the time-fixed effects μ_{t}, province-fixed effects λ_{i}, and error term $\varepsilon_{\mathrm{it}}$ are defined as in Equation (2). The coefficient β_1 is the DID estimator, which captures the differential change in GDP growth between cities led by younger officials and older officials after the outbreak. A statistically significant β_1 would support Hypothesis 4 (H4), suggesting that younger leaders—presumably more promotion-oriented—were more inclined to prioritize economic recovery efforts during the COVID-19 crisis.

IV. Empirical results and analysis

Baseline regression results

Firstly, we test whether the promotion incentives of city leaders—proxied by their tenure and age—significantly affect the performance of local epidemic control. Table 2 presents the estimation results of Equation (1), using monthly data from January to December 2020. Standard errors are clustered at the city level and reported in parentheses. Column (1) and (2) show the baseline regression results. Contrary to Hypotheses 1 and 3 (H1 and H3), the coefficients of *TenureGroup* and *AgeGroup* are statistically insignificant, suggesting that neither the tenure nor the age of city leaders significantly affected epidemic control outcomes. Our explanation lies in the institutional context of cadre evaluation. After the COVID-19 outbreak, epidemic control became the priority target with veto power (Ding and Zhang, 2022). In such a setting, all local officials—regardless of age or tenure—faced intense political pressure to meet epidemic control targets. This likely led to uniform behavior across officials, thereby attenuating the influence of individual career incentives on performance outcomes (Edin, 2003). The results for control variables in Table 2 align with findings from the existing literature, indicating that population density, geographic location, economic strength, and openness are important determinants of epidemic control performance (Li et al., 2022). The results in column (3) show that, on average, a 1% increase in GDP per capita is associated with a 0.20-point decrease in the ECI ($\beta = -20.307$, $p < 0.01$). A 1% increase in population is associated with a 0.16-point decrease in the ECI ($\beta=-15.854$, $p<0.01$). A 1% increase in distance from the epicenter leads to a 0.17-point increase in the ECI ($\beta=17.107$, $p<0.01$). A 1% increase in the import-to-GDP ratio results in a 0.24-point decrease in the ECI ($\beta=-24.362$, $p<0.1$).

Table 2 Effects of Local Officials' Tenure and Age on Epidemic Control

	Baseline regression		Robustness test		Heterogeneity analysis			
	Full Sample	Full Sample	Without Hubei	Without Turnover	Before March 25th	After March 25th	Northern China	Southern China
Dependent variable	ECI (1)	ECI (2)	ECI (3)	ECI (4)	ECI (5)	ECI (6)	ECI (7)	ECI (8)
TenureGroup	-3.773	-3.067	-3.789	-4.461	-2.726	-4.175	-4.969	-3.828
	(3.067)	(2.800)	(2.838)	(3.166)	(2.681)	(3.044)	(4.605)	(3.660)
AgeGroup	2.464	-1.450	-0.390	-1.644	-1.146	-0.017	-2.899	1.193
	(2.557)	(2.437)	(2.442)	(2.765)	(2.324)	(2.650)	(4.153)	(3.229)
log(GDPpercapita)		-17.507***	-20.307***	-16.710***	-15.063***	-22.195***	-14.071*	-24.193***
		(4.780)	(4.725)	(5.173)	(4.255)	(5.088)	(7.607)	(6.708)
log(Population)		-15.447***	-15.854***	-16.783***	-12.132***	-17.178***	-13.723***	-16.849***
		(2.173)	(2.264)	(2.486)	(2.198)	(2.397)	(4.213)	(2.938)
Immigration		0.013	-0.013	-0.345	0.269	-0.104	-1.412	0.355
		(0.308)	(0.325)	(0.333)	(0.563)	(0.556)	(1.314)	(0.350)
log(Distance)		2.767	17.107***	20.991***	17.111***	17.243***	22.969**	8.854
		(6.029)	(6.005)	(6.086)	(5.522)	(6.370)	(9.197)	(7.413)
GovExp		-19.531	-26.690	-25.798	-10.784	-32.066	13.523	-53.845
		(27.259)	(26.967)	(30.777)	(23.544)	(28.889)	(35.091)	(44.304)
Import		-21.226	-24.362*	-34.968**	-17.322	-26.830*	-14.574	-22.333
		(14.313)	(14.524)	(15.293)	(14.817)	(15.108)	(41.890)	(18.461)
Export		-9.172	-6.322	-3.499	-2.855	-7.769	-39.155	0.341
		(12.134)	(11.993)	(11.346)	(10.984)	(12.903)	(45.543)	(11.808)
Constant	70.063***	165.651***	65.901	45.288	27.318	75.529	22.875	139.049**
	(6.279)	(48.270)	(51.805)	(52.139)	(47.968)	(54.828)	(82.901)	(67.679)
Control variables	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,614	2,752	2,631	2,213	712	1,919	1,106	1,525
R-squared	0.373	0.544	0.505	0.513	0.450	0.534	0.537	0.511

Note: This table reports the estimation results for Equation (1) based on the monthly data from January to December 2020. The standard errors are clustered at city level and reported in parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Secondly, we test whether the tenure of city leaders significantly affects the performance of local economic development. Table 3 presents the estimation results of Equation (2), using quarterly data from Q1 2019 to Q4 2020. Standard errors are clustered at the city level and reported in parentheses. Column (1) and (2) show the baseline regression results. We find that the coefficient of the DID estimator (*TenureGroup×Post*) is positive and statistically significant ($\beta=0.842$, $p<0.05$), while the coefficient of the main independent variable (*TenureGroup*) is not significant. This indicates that prior to the COVID-19 outbreak, there was no significant difference in GDP growth rate between cities led by officials with shorter and longer tenures. However, after the outbreak, cities led by short-tenure officials experienced, on average, a 0.84 percentage point higher GDP growth rate compared to those led by long-tenure officials. This results suggest that when faced with competing targets, city leaders with different promotion incentives behaved differently (Wang et al., 2020; Zhu et al., 2024). Specifically, short-tenure officials were more likely to prioritize long-term plans for the city, placing greater emphasis on economic development. In contrast, for long-tenure officials, who were waiting for turnover, their primary goal is to make no mistakes. As a result, they tended to overemphasize the priority target with veto power (epidemic control), even at the expense of the hard target (GDP growth). Overall, the results show that short-tenure city leaders perform better on the economic development target, providing support for Hypothesis 2 (H2).

Table 3 Effects of Local Officials' Tenure on Economic Development

	Baseline regression		Robustness test		Heterogeneity analysis			
	Full Sample	Full Sample	Without Hubei	Without Turnover	Before March 25th	After March 25th	Northern China	Southern China
Dependent variable	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TenureGroup×Post	0.817*	0.842**	0.990**	0.859**	0.891	0.942**	1.839**	0.520
	(0.475)	(0.424)	(0.387)	(0.420)	(0.541)	(0.372)	(0.771)	(0.397)
TenureGroup	-0.020	0.028	-0.073	-0.080	0.007	-0.054	-0.619	0.356
	(0.265)	(0.283)	(0.226)	(0.245)	(0.213)	(0.215)	(0.375)	(0.265)
Post	-4.832***	-4.792***	-4.929***	-4.961***	-12.815***	-4.813***	-5.626***	-4.507***
	(0.365)	(0.376)	(0.331)	(0.340)	(0.458)	(0.327)	(0.714)	(0.334)
log(GDPpercapita)		0.075	-0.018	-0.056	0.063	0.032	0.421	0.040
		(0.362)	(0.366)	(0.384)	(0.367)	(0.335)	(0.781)	(0.398)
log(Population)		-0.308	-0.178	-0.105	-0.084	-0.119	-0.615	0.245
		(0.266)	(0.271)	(0.313)	(0.273)	(0.248)	(0.492)	(0.302)
log(Distance)		-0.615*	0.036	0.270	-0.206	-0.231	-0.692	0.199
		(0.371)	(0.506)	(0.523)	(0.472)	(0.462)	(0.943)	(0.556)
GovExp		-0.659	-0.283	-1.532	0.576	-0.471	-1.604	3.865*
		(2.158)	(2.151)	(2.262)	(1.946)	(1.948)	(3.955)	(2.242)
Constant	109.324***	115.578***	110.145***	108.139***	111.428***	111.996***	113.919***	104.902***
	(0.437)	(3.751)	(4.565)	(4.916)	(4.385)	(4.188)	(8.267)	(4.665)
Control variables	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,996	1,878	1,824	1,546	1,150	1,576	750	1,074
R-squared	0.743	0.746	0.785	0.783	0.832	0.712	0.757	0.818

Note: This table reports the estimation results for Equation (2) based on the quarterly data from Q1 2019 to Q4 2020. The standard errors are clustered at city level and reported in parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Thirdly, we test whether the age of city leaders significantly affects the performance of local economic development. Table 4 presents the estimation results of Equation (3), using quarterly data from Q1 2019 to Q4 2020. Standard errors are clustered at the city level and reported in parentheses. Column (1) and (2) show the baseline regression results. We find that both the coefficient of the DID estimator (*AgeGroup×Post*) and the main independent variable (*AgeGroup*) are statistically insignificant. This indicates that there was no significant difference in GDP growth rate between cities led by younger officials and older officials, either before or after the COVID-19 outbreak. Thus, Hypothesis 4 (H4) is not supported by the empirical results. A possible explanation is that age may not directly influence local economic performance but could exert an effect through its interaction with tenure (Zhu et al., 2024). We will conduct further analysis in the heterogeneity analysis section.

Table 4 Effects of Local Officials' Age on Economic Development

	Baseline regression		Robustness test		Heterogeneity analysis			
	Full Sample	Full Sample	Without Hubei	Without Turnover	Before March 25th	After March 25th	Northern China	Southern China
Dependent variable	GDP growth (1)	GDP growth (2)	GDP growth (3)	GDP growth (4)	GDP growth (5)	GDP growth (6)	GDP growth (7)	GDP growth (8)
AgeGroup×Post	0.031	0.006	-0.051	-0.328	0.204	-0.168	0.313	-0.322
	(0.462)	(0.475)	(0.357)	(0.398)	(0.499)	(0.342)	(0.680)	(0.362)
AgeGroup	-0.306	-0.249	-0.233	-0.160	-0.257	-0.252	0.076	-0.351
	(0.270)	(0.288)	(0.232)	(0.264)	(0.215)	(0.219)	(0.398)	(0.279)
Post	-4.305***	-4.238***	-4.249***	-4.251***	-12.324***	-4.097***	-4.445***	-4.002***
	(0.309)	(0.307)	(0.263)	(0.283)	(0.378)	(0.255)	(0.493)	(0.265)
log(GDPpercapita)		0.048	-0.045	-0.090	0.058	0.000	0.241	0.028
		(0.361)	(0.365)	(0.381)	(0.365)	(0.335)	(0.778)	(0.394)
log(Population)		-0.307	-0.177	-0.111	-0.087	-0.116	-0.601	0.247
		(0.266)	(0.270)	(0.313)	(0.273)	(0.248)	(0.491)	(0.301)
log(Distance)		-0.619*	0.043	0.258	-0.200	-0.228	-0.615	0.192
		(0.370)	(0.506)	(0.522)	(0.472)	(0.462)	(0.951)	(0.560)
GovExp		-0.876	-0.516	-1.793	0.533	-0.744	-2.312	3.680*
		(2.145)	(2.136)	(2.250)	(1.930)	(1.940)	(3.940)	(2.218)
Constant	109.082***	115.435***	109.869***	108.007***	111.313***	111.782***	113.417***	104.750***
	(0.450)	(3.757)	(4.556)	(4.901)	(4.380)	(4.174)	(8.315)	(4.711)
Control variables	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,996	1,878	1,824	1,546	1,150	1,576	750	1,074
R-squared	0.741	0.745	0.783	0.782	0.831	0.709	0.751	0.817

Note: This table reports the estimation results for Equation (3) based on the quarterly data from Q1 2019 to Q4 2020. The standard errors are clustered at city level and reported in parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Robustness tests

Firstly, to mitigate the potential influence of outliers, we exclude cities in Hubei province—the region most severely affected by COVID-19, accounting for over 70% of confirmed cases in mainland China—and re-estimate Equations (1), (2), and (3). The regression results are reported in Column (3) of Tables 2–4, which are consistent with the baseline results. This indicates that the benchmark regression results are robust.

Secondly, to address potential adverse selection bias, we remove cities that experienced turnover of city leaders in 2020, and re-estimate Equations (1), (2), and (3). The regression results are reported in Column (4) of Tables 2–4, which are substantially similar to the baseline findings.

Heterogeneity analysis

Firstly, we investigate the heterogeneous effects of tenure across different age groups. In the previous baseline regression, the age variable of the city leaders failed the significance test (in Table 2 and 4). It is worth noting, however, existing literature suggests that age can meaningfully shape the behavior and promotion incentives of local officials (Xi et al, 2018; Huang et al, 2020). Specifically, city leaders over the age of 57 are generally considered to have minimal chances of further promotion. To explore this dimension, we follow Zhu et al. (2024) and divide all city leaders into two groups based on whether they were older than 57 years old at the time of the COVID-19 outbreak. We then re-estimate Equation (1) and Equation (2) separately for each group. The regression results are reported in Table 5. We find that for officials aged 57 or below, neither the coefficients of the main independent variable (*TenureGroup*, in Columns 1 and 2) nor the coefficients of the DID estimator

(*TenureGroup*×*Post*, in Columns 3 and 4) are statistically significant. However, for officials over the age of 57, both the *TenureGroup* and *TenureGroup*×*Post* coefficients are significant at the 1% and 5% levels, respectively. These findings suggest that tenure has a stronger influence on performance among older officials. Specifically, short-tenure leaders over age 57 tend to achieve higher GDP growth but underperform in epidemic control, consistent with differentiated incentive structures near retirement. In contrast, among younger officials, tenure appears to have no significant explanatory power in shaping performance outcomes—possibly due to their uniformly strong promotion motivations regardless of tenure length.

Table 5 Heterogeneous Effects of Tenure Across Different Age Groups

	Age≤57	Age>57		Age≤57	Age>57
Dependent variable	ECI (1)	ECI (2)	Dependent variable	GDP growth (3)	GDP growth (4)
TenureGroup	1.328	-12.193***	TenureGroup×Post	0.640	1.279**
	(4.103)	(3.939)		(0.621)	(0.525)
log(GDPpercapita)	-21.407***	-17.238**	TenureGroup	0.584	-0.420
	(5.459)	(8.684)		(0.469)	(0.288)
log(Population)	-13.264***	-19.929***	Post	-4.939***	-4.919***
	(2.983)	(3.649)		(0.545)	(0.431)
Immigration	0.128	-0.516	log(GDPpercapita)	-0.088	0.562
	(0.374)	(0.718)		(0.446)	(0.711)
log(Distance)	14.618*	22.076**	log(Population)	-0.032	-0.391
	(8.014)	(9.592)		(0.362)	(0.325)
GovExp	-13.467	-37.120	log(Distance)	-0.013	0.273
	(28.713)	(55.625)		(0.728)	(0.609)
Import	-26.020	-41.037*	GovExp	-1.271	5.917*
	(23.470)	(23.405)		(3.113)	(3.527)
Constant	58.671	61.586	Constant	109.101***	108.001***
	(68.774)	(86.866)		(5.794)	(5.667)
Control variables	Yes	Yes	Control variables	Yes	Yes
Day fixed effect	Yes	Yes	Day fixed effect	Yes	Yes
Province fixed effect	Yes	Yes	Province fixed effect	Yes	Yes
Observations	1,384	1,247	Observations	891	933
R-squared	0.588	0.521	R-squared	0.792	0.800

Note: The standard errors are clustered at city level and reported in parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Secondly, we investigate the heterogeneous effects across different time periods. On March 25, 2020, Hubei Province ended its 76-day lockdown, marking a critical turning point in China's COVID-19 response. Prior to this date, the number of confirmed cases in China was rising rapidly, and local governments across China adopted strict measures to prevent the spread of the virus. After March 25, 2020, the epidemic was largely brought under control, and local officials began to shift their attention toward resuming economic activity and relaxing restrictions (Ke and Hsiao, 2022). To reflect this policy shift, we divide the epidemic response period into two stages: the tough stage (before March 25, 2020) and the stable stage (after March 25, 2020). We then re-estimate Equations (1), (2), and (3) separately for each stage. In Table 2, Columns (5) and (6) show the regression results for Equation (1), and both are consistent with the baseline findings—promotion incentives do not significantly affect epidemic control performance in either stage. In Table 3, Columns (5) and (6) report the estimates for Equation (2). The coefficient of the DID estimator (*TenureGroup×Post*) is statistically insignificant during the tough stage (Column 5), but becomes significantly positive during the stable stage (Column 6) (β=0.942, $p<0.05$). This suggests that the differential behavior of short-tenure and long-tenure officials in promoting economic growth only emerges after the epidemic was brought under control. In Table 4, Columns (5) and (6) present the estimates for Equation (3). The results remain consistent with the baseline regression, indicating no significant difference in economic performance between cities led by younger and older officials during either stage. Overall, the heterogeneity analysis reveals that the impact of officials' tenure on economic development performance becomes significant only after the turning point in epidemic control. This is because once the epidemic was largely contained, officials gained greater policy autonomy, making differences in their policy preferences and behaviors more visible.

Thirdly, we investigate the heterogeneous effects across different regions. Due to the imbalanced economic development between northern and southern China, the influence of local officials' promotion incentives may vary by region (Zhu et al., 2024). To address this issue, we divide the full sample into two regional groups—northern and southern cities—and re-estimate Equations (1), (2), and (3) separately for each group. In Table 2, Columns (7) and (8) show the regression results for Equation (1), and both are consistent with the baseline findings. In Table 3, Columns (7) and (8) report the estimates for Equation (2). The coefficient of the DID estimator ($TenureGroup \times Post$) is statistically insignificant in southern China (Column 8), but becomes significantly positive in northern China (Column 7) ($\beta=1.839$, $p<0.05$). This suggests that the differential behavior between short-tenure and long-tenure officials in promoting economic growth is only evident in northern regions. In Table 4, Columns (7) and (8) present the estimates for Equation (3). The results remain in line with the baseline regression. Our analysis reveals that officials' promotion incentives in the northern region have a more significant impact on local GDP growth compared to those in the southern region. A possible explanation is that southern officials generally place a stronger emphasis on economic development regardless of tenure, whereas in the north, tenure-related incentives play a more decisive role in driving growth.

V. Conclusion

Local governments are often faced with multiple and potentially competing targets from the central government (Andersen et al., 2016; Li, 2021; Zhang, 2021). This article contributes to the literature by arguing that local government officials' promotion incentives are crucial determinants in how they prioritize competing targets. Using the COVID-19 outbreak as a quasi-natural experiment, we construct a novel panel dataset covering 278 prefecture-level cities in China to investigate whether city leaders' promotion incentives—measured by tenure and age—affect their performance in epidemic control and economic development. Employing difference-in-differences and fixed effects regressions, we find no significant variation in epidemic control outcomes across officials with different tenures or ages. However, during the COVID-19 epidemic, cities governed by short-tenure leaders experienced a 0.84 percentage point higher GDP growth rate compared to those led by long-tenure officials. Furthermore, the impact of officials' promotion incentives on GDP growth was particularly pronounced among older officials, in northern regions, and after the epidemic was brought under control. These findings suggest that officials with lower promotion incentives are more likely to exhibit distorted behavior when facing competing policy targets. Even after the nationwide epidemic was brought under control on March 25, 2020, such officials continued to prioritize epidemic control at the expense of local economic growth.

This article may generate two meaningful policy implications. **Firstly, setting a clear priority target can serve as an effective governance tool in crisis management.** Our findings show that when confronted with a priority target such as epidemic control, all officials—regardless of age or tenure—strive to achieve it without distinction. This implies that in crisis management, raising an issue as a priority target with veto power is an effective way for the central government to mobilize local officials. However, once the crisis subsides, the central government should promptly adjust its priority targets to minimize potential behavioral distortions among local officials. **Secondly, the central government should be cautious when introducing competing targets.** Our results indicate that officials with different promotion incentives respond differently to the multiple competing targets. In particular, those with lower promotion incentives may overemphasize the priority target (e.g., epidemic control) to demonstrate political correctness, while neglecting the hard target (e.g., GDP growth). Therefore, when implementing competing targets, the central government should carefully consider their potential to distort the performance and incentives of certain local officials.

It is also necessary to discuss the generality of the findings from the following three perspectives. **Firstly, while this study focuses on COVID-19, its implications extend beyond the epidemic.** As an exogenous shock, the COVID-19 outbreak provides a quasi-natural experiment for examining how local governments respond to multiple, and sometimes competing, policy targets. However, the conclusions are not limited to epidemic response. In practice, local governments frequently encounter situations that require balancing priority targets and hard targets (Li, 2021; Zhang, 2021). In such contexts, our findings remain relevant. **Secondly, while the analysis centers on city leaders, the insights are not confined to them alone.** The city leader is the first-highest-ranking official in the city, who is in charge of all local political, social, and economic affairs, including personnel appointments. Consequently, his personal incentives are likely to be transmitted to other local officials (Li and Zhou, 2005).

Examining city leaders' responses to competing targets thus effectively captures the broader behavior of local officials. Moreover, there is reason to believe that the conclusions would also hold at the county levels, provided relevant data are available. **Thirdly, while the study uses China as its context, the relevance extends beyond the Chinese case.** Although China's political system is significantly different from Western democratic systems, multi-tasking is a common feature of local governments worldwide (Andersen et al., 2016). The unique institutional arrangement in China provides an ideal context in which to explore how local governments respond to the multiple targets, but the findings may also offer valuable policy implications for other countries.

It is also worth noting several limitations of this study that warrant attention in future research. Specifically, we use tenure and age as proxies for promotion incentives; however, other factors—such as political networks, historical performance, and personal ability—may also influence such incentives. In addition, due to sample constraints and data availability, there is room to refine variable selection and data processing methods. Future research could expand the sample scope and incorporate cross-country data to further validate and extend the findings of this study.

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No potential conflict of interest was reported by the author(s).

Data availability statement

The data used in this article are available upon request from the corresponding author.

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