Performance Management and Its Impacts: Evidence from China's Response to the COVID-19

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Abstract: Taking the implementation of a new performance management (PM) system in China during the COVID-19 as a quasi-natural experiment, this article contributes to the literature by providing theoretical analysis and empirical evidence on how local governments respond to the PM system. Using a unique dataset including 303 cities in China, the analysis finds that officials with low promotion probability perform better in epidemic control, while officials with high promotion probability perform better in economic recovery. Further tests show that the effects are more prominent after the overall epidemic is brought under control and among those elderly officials.

Keywords: performance management, local government, anticipated target, obligatory target, COVID-19

Introduction

Since the first cases were detected in Wuhan in December 2019, the COVID-19 outbreak has sickened more than 232 million people, affecting more than 200 countries around the world. [1] In terms of the economy, the COVID-19 pandemic has caused great damage to the global supply chain, plunging the global economy into its worst recession since World War Two. [2] In the post-epidemic era, how to control the COVID-19 spread and how to reopen the economy have become the two primary concerns of governments around the world. [3] China is one of the first countries in the world to achieve effective epidemic control and rapid economic recovery, making it an outlier among large economies (Figure 1). What contributes to China's effective response to the COVID-19 epidemic? Scholars have given explanations from different perspectives. One is medical interpretation, demonstrating that China has taken vigorous and multifaceted measures in the fields of public health response, clinical management, and research development (Chen, 2020; Hu et al., 2020; Lu et al., 2021; Phelan et al., 2020; Zhang et al., 2020). Another is sociological interpretation, arguing that Collectivism rooted in traditional Chinese culture makes it more likely for Chinese people to cooperate with the government's strict measures, such as non-medical mask-wearing and shelter-in-place (Biddlestone et al., 2020; Huang et al., 2020; Lu et al., 2021). The third interpretation focuses on governance and posits that the efficiency and penetration of Chinese governments played an important role in epidemic control (Cai et al., 2021; Cheng et al., 2020; Dai et al., 2020; Liu et al., 2021; Wei et al., 2021). However, the existing studies regard China as a whole and ignore the within-country variance (George et al., 2020).

The COVID-19 epidemic provides a quasi-natural experiment for studying how the performance management (PM) system works and its impacts on government officials. Soon after the COVID-19 outbreak, the Chinese central government implemented a new PM system for local governments during the epidemic. [4] The new PM system focuses on two key performance indicators (KPIs), namely, epidemic control performance (obligatory target) and economic recovery performance (anticipated target). As pointed out by President Xi Jinping at a leadership meeting on February 12, 2020, coordinating the epidemic prevention and control, and the economic and social development is a "major battle" as well as a "big test", Party committees, governments, and leading officials at all levels should shoulder their responsibilities and pass the test. [5] Although the PM system is unified throughout China, it is each local government that sets the local epidemic control measures (Zhang et al., 2021) and economic targets (Caulfield, 2006; Zhang, 2021). [6] This leads to an interesting phenomenon, that is, there are significant differences in the performance of epidemic control and economic recovery in different cities across China, and there is no obvious geographical distribution pattern for such differences (Figure 2; Figure 3). These differences provide a unique perspective for studying how local officials respond to the PM system. This article contributes to the literature by proving empirical evidence on how the PM system works and its impacts on government officials.

The remainder of the article proceeds as follows. The second section reviews the research on the impacts of the PM system and introduces the implementation of a new PM system in China during the COVID-19 epidemic. The third section proposes a simple model to illustrate how a rational official responds to a typical PM system with both obligatory and anticipated targets. The fourth section introduces the methodology, including the sample, measures of the variables, data sources, and empirical models. The fifth section presents the empirical findings, followed by a discussion and conclusion.

Theory

Performance Management Impacts

As one of the key components of the New Public Management (NPM) movement, the PM system has become a common practice in governments around the world (Cepiku et al., 2012; Moynihan and Pandey, 2005). The essence of PM is to improve the efficiency and effectiveness of public services through the process of defining, monitoring, and using objective indicators of the performance of organizations and programs (Osborne et al., 1995; Poister et al., 2014). While studies on PM are largely predicated on the assumption that it will lead to performance improvement, empirical research testing this relationship has been relatively sparse to date (Decramer et al, 2021; Poister et al., 2013; Ma, 2017). Gerrish (2016) reviews 49 empirical studies which examine the impacts of PM on performance in public organizations and finds few consistent results. Hall (2017) identifies and elucidates a series of challenges local governments face in implementing PM approaches.

Despite their importance and scarcity, empirical tests on the impacts of PM are often challenged for the following three reasons. First, multi-target mixing. Governments are faced with multiple, potentially conflicting targets (Andersen et al., 2016; Li, 2021; Zhang, 2021), such as environmental sustainability (Krause et al. 2019; Ran, 2017; Zhang and Wu, 2020), economic growth (Li and Zhou, 2005; Ma 2016), and social stability (Gao, 2015; Wei et al., 2021). The interactive relationships between different types of targets are mixed, making it too complicated to identify the impacts of specific PM factors. Second, measurement validity. The PM system may induce behaviors that increase measured performance while adversely affecting actual performance (Courty and Marschke 2004; Heinrich and Marschke 2010; Jacobsen and Andersen, 2014). Studies have shown that the implementation of PM may lead to data manipulation of local governments (Chen et al., 2012; Kalgin, 2016; Wallace, 2016). Third, selection bias. The implementation of the PM system is not randomly selected. Those originally poorly performed organizations are more likely to experience PM monitoring, and at the same time, greater performance improvements (Julnes and Holzer 2001).

The COVID-19 epidemic provides a unique quasi-natural experiment for studying the impacts of PM. After the COVID-19 outbreak, the Chinese central government implemented a new PM system for local governments during the epidemic. The new system contains only two

KPIs, namely epidemic control and economic recovery. As local policymakers, local governments' response to the PM system can be directly reflected in the performance of local epidemic control and economic recovery. Since the COVID-19 epidemic is an exogenous shock, there is no selection bias problem, and the performance data is difficult to manipulate.

Performance Management During the COVID-19

Research on PM in Chinese public sector shows that top-down target responsibility system (TRS) is the core mechanism to motivate and control local governments (Jing et al., 2015; Ma, 2017; Yu and Ma 2015). There is extensive literature discussing the TRS faced by local governments. The targets can be classified into two types, namely obligatory and anticipated targets (Zhang, 2021). Typical anticipated targets include GDP growth (Li and Zhou, 2005; Ma, 2016), fiscal revenue (Qian and Weingast, 1997; Jin et al., 2005), and infrastructure construction (Li, 2011; Tan and Zhao, 2019). Typical obligatory targets include environmental protection (Krause et al. 2019; Ran, 2017; Zhang and Wu, 2020), poverty elimination (Guo et al., 2019; Zhou et al., 2018), and social stability maintenance (Gao, 2015; Wei et al., 2021).

After the COVID-19 outbreak, the Chinese central government implemented a new PM system for local governments. [4] The originally complex TRS was simplified into two simple KPIs, namely, the performance of epidemic control and economic recovery. As pointed out by President Xi Jinping at a leadership meeting on February 12, 2020, coordinating the epidemic prevention and control, and the economic and social development is a "major battle" as well as a "big test", Party committees, governments, and leading officials at all levels should shoulder their responsibilities and pass the test. [5] Both being important KPIs for local governments, epidemic control and economic recovery are two different types of targets.

Epidemic control is a typical obligatory target, featured by sanctions for not performing well. Soon after the COVID-19 outbreak, Chinese governments at all levels have addressed the epidemic as a top priority and taken swift action. [7] The central government has insisted on the dynamic zero-case policy, where local governments have a duty to "defend the land" and prevent any outbreaks from spreading beyond their area of control. [8] At the same time, the central government also established a strict performance outcome monitoring system, where local governments are obliged to release information on COVID-19 in a timely, open, and transparent manner. [7] As a result, cities around China have set up COVID-19 control working groups, headed by the Party Secretary of the city. Officials who perform poorly in epidemic control will be immediately held accountable or even removed from their posts. [9] Take Ma Guoqiang, former city leader [10] of Wuhan, as an example. He was considered a political star in China, and once in charge of the world’s largest steel group (Baowu Steel Group). After the outbreak of the epidemic in Wuhan, he was quickly removed from office, ending his political career. Ma is not a special case. By April 30, 2020, a total of 757 officials in China have been held accountable for not performing well in epidemic control, and the number is still rising. [11] To avoid accountability, conservative local officials will overemphasize epidemic control even at the expense of other development goals.

Economic recovery is a typical anticipated target, featured by rewards for performing well. Since the COVID-19 outbreak, President Xi Jinping has repeatedly emphasized the importance of coordinating epidemic control with economic development. [12] In China, GDP growth has always been one of the most important KPIs for local governments. Studies have shown that the higher the GDP growth rate, the greater the probability of local government officials being promoted (Chen et al., 2005; Li and Zhou, 2005). 2020 is the deadline for China to reach the target of building a moderately prosperous society in all respects and fighting poverty, where economic development is the central task. President Xi Jinping has repeatedly asked governments at all levels to work hard on economic development to ensure that the 2020 goals are achieved on schedule. [13] As a result, officials eager for promotion will do their best to stimulate the local economic development even during the epidemic. In Zhejiang, one of the richest and most developed provinces in China, the ambitious local officials have been busy promoting local enterprises to resume work and production since February 2020, where the epidemic was not fully under control. [14]

The implementation of a new PM system during the COVID-19 epidemic provides a golden perspective for studying the impacts of PM. In China, local governments are granted great autonomy to set the local epidemic control measures (Zhang et al., 2021) and economic targets (Caulfield, 2006; Zhang, 2021). Therefore, even facing the unified PM system, different local officials will still take different responses, resulting in different performance outcomes. Since the COVID-19 epidemic is an exogenous shock, there is no endogenous problem, and the performance data is difficult to manipulate. By studying how local officials respond to the new PM system during the COVID-19 epidemic, this article contributes to the literature on how the PM system works and its impacts on government officials.

Model

This article proposes a simple model to illustrate how government officials respond to a typical PM system. Assume an official's utility consists of three parts: the benefit of promotion (reward for achieving the anticipated target), the loss of being held accountable (sanction for failing the obligatory target), and the cost of efforts. The individual official maximizes his expected utility by choosing two kinds of efforts: effort on the anticipated target, and effort on the obligatory target.

The benefit of promotion is U_1. The probability of being promoted is $p_1(ke_1)$, where $k \in (0,1)$ denotes the personal characteristics that affect the probability of promotion, such as tenure and age; $e_1 \in (0,1)$ denotes effort on the anticipated target. Since the marginal return of effort is diminishing, $p_1(\cdot)$ is strictly concave, with $p_1'(\cdot) > 0$, $p_1''(\cdot) < 0$ and $\lim_{x \to 0} p_1'(x) = +\infty$. The loss of being held accountable is U_2. The probability of being held accountable is $p_2(1 - e_2)$, where $e_2 \in (0,1)$ denotes effort on the obligatory target. Since the marginal cost of "laziness" is increasing, $p_2(\cdot)$ is strictly convex, with $p_2'(\cdot) > 0$, $p_2''(\cdot) > 0$ and $\lim_{x \to 0} p_2'(x) = 0$. The cost of efforts is $c(e_1 + e_2)$. The cost function is strictly convex, with $c'(\cdot) > 0$ and $c''(\cdot) > 0$.

The problem of the individual official is given by

$$\max_{e_1, e_2} \mathrm{p}_1(ke_1) \cdot U_1 - p_2(1 - e_2) \cdot U_2 - c(e_1 + e_2)$$

which yields the following FOC:

$$\begin{cases} k \cdot U_1 \cdot p_1'(ke_1^*) = c'(e_1^* + e_2^*) \\ U_2 \cdot p_2'(1 - e_2^*) = c'(e_1^* + e_2^*) \end{cases}$$

After taking the derivative of k, we have

$$\begin{cases} U_1 \cdot p_1'(ke_1^*) + U_1 \cdot ke_1^* \cdot p_1''(ke_1^*) + U_1 \cdot k^2 \cdot p_1''(ke_1^*) \cdot \dfrac{\partial e_1^*}{\partial k} = c''(e_1^* + e_2^*) \cdot (\dfrac{\partial e_1^*}{\partial k} + \dfrac{\partial e_2^*}{\partial k}) \\ -U_2 \cdot p_2''(1 - e_2^*) \cdot \dfrac{\partial e_2^*}{\partial k} = c''(e_1^* + e_2^*) \cdot (\dfrac{\partial e_1^*}{\partial k} + \dfrac{\partial e_2^*}{\partial k}) \end{cases}$$

Proof by contradiction, we have

$\frac{\partial e_1^*}{\partial k} > 0$ and $\frac{\partial e_2^*}{\partial k} < 0$

Similarly, we have

$\frac{\partial e_1^*}{\partial U_1} > 0$, $\frac{\partial e_2^*}{\partial U_1} < 0$, $\frac{\partial e_2^*}{\partial U_2} < 0$ and $\frac{\partial e_2^*}{\partial U_2} > 0$

Our model indicates that, given a typical PM system with both obligatory and anticipated targets, the optimal level of efforts an official chooses to achieve the anticipated target (e_1^*) will increase with his likelihood of being promoted (k), increase with the benefit of promotion (U_1), and decrease with the loss of being held accountable (U_2). On the contrary, the optimal level of efforts an official chooses to achieve the obligatory target (e_2^*) will decrease with his likelihood of being promoted (k), decrease with the benefit of promotion (U_1), and increase with the loss of being held accountable (U_2). This is in line with China's economic development path over the past decades. At the beginning of China's reform and opening up, there were few cases where officials were held accountable (U_2 is relatively small). As a result, officials at all levels devoted almost all their energy to promoting economic development (e_1^* is large, while e_2^* is scarce), which partly explains China's economic growth miracle. After 2012, with the development of accountability mechanisms and anti-corruption campaigns (U_2

increases), officials have been paying more attention to ensuring political correctness and avoiding mistakes (e_2^* increases) rather than pursuing economic development (e_1^* decreases). This partly explains the slowdown of China's GDP growth over the past decade.

Our model also shows that officials with different promotion possibilities (k) react differently to the PM system. Officials with a higher probability of being promoted will make more efforts on the anticipated target, at the same time, fewer efforts on the obligatory target. Our findings are consistent with the latest research on Chinese public human resource management (Xie and Yang, 2021). In section 4, we will provide empirical evidence using a unique city-level dataset.

Data and Methodology

Variables, Measures, and Data Sources

This article uses a unique dataset including 303 cities in China to empirically test how local officials respond to the PM system during the COVID-19 epidemic. The data covers the COVID-19 cases, GDP growth rate, GDP per capita, population and location of each city, as well as the tenure, age, education, and other characteristics of each city leader. We will introduce three key variables.

Epidemic Control Index. A major contribution of this article is the construction of ECI (Epidemic Control Index) to measure the performance of epidemic control in different cities. The raw data comes from the CSMAR database. The data is from January 14, 2020, to December 31, 2020. Following the method of Leng and Lemahieu (2021), fourteen-day rolling averages of new daily figures were calculated for the following six indicators: confirmed cases, confirmed deaths, confirmed cases per million people, confirmed deaths per million people, growth rate of confirmed cases, and growth rate of confirmed deaths. Collectively, these indicators point to how well or poorly cities have managed the epidemic. An equally-weighted average of the rankings across those indicators was then calculated for individual cities in each period and normalized to produce the ECI from 0 (worst performing) to 100 (best performing). Figure 2 presents a heat map of the annual average ECI for each city. We can find that ECI can effectively represent the performance of epidemic control in different cities. According to this indicator, cities near Wuhan respond poorly compared with others. However, for cities outside the epidemic center, ECI has no obvious geographical distribution pattern, that is, some cities may perform well while their neighbors perform poorly. As noted in the previous sections, we argue this is partly due to differences in local officials' responses to the PM system.

[Insert Figure 2 Here]

GDP Growth Rate. This article uses the year-on-year GDP growth rate to measure the performance of economic recovery in different cities. GDP growth has a momentum effect, which may lead to endogenous problems. Therefore, this article uses difference-in-difference (DID) regression specifications to identify the causal effects (Lechner, 2011; Goodman-Bacon and Marcus, 2020). Figure 3 presents a heat map of the annual GDP growth rate for each city. In the empirical section, we also use the excess GDP growth compared to the provincial average for the robustness test.

[Insert Figure 3 Here]

Promotion Group of City Leaders. In studies of the political business cycle, tenure is considered to be the key factor affecting the incentives and behaviour of officials (Besley and

Case, 1995; Hibbs, 1977; Nordhaus, 1975; Rogoff and Sibert, 1988). In China, where there is no fixed term, tenure affects the official's behaviour by influencing his likelihood of promotion (Guo, 2009; Geng et al., 2016; Wang and Xu, 2008; Zhang and Gao, 2007). There are 334 city-level governments and 34 provincial-level governments in China, which means that only a few city leaders can be promoted to provincial leaders. Three-year tenure is considered the promotion window for most city leaders. We analyzed the resumes of all current provincial leaders (including both party secretary and governor of the province) and found that most provincial leaders have spent less than 3 years in their previous posts as city leaders (Figure 4). Therefore, we divide city leaders in our dataset into two groups according to whether their tenure exceeds three years, namely promotion group (officials with tenure less than three years) and ceiling group (officials with tenure exceeds three years). Officials in the promotion group account for 63% of the total sample.

[Insert Figure 4 Here]

The measures of the variables and descriptive statistics are presented in Table 1. The data sources are as follows. The COVID-19 case statistics are from the CSMAR database. Economic and social data comes from the CEIC database. Data of city leaders is generated from their resume data using web scraping and text analysis methods. Their resumes are collected from People.cn, a major government agency, and information from Baidu.com.

[Insert Table 1 Here]

Identification Strategy

This article uses COVID-19 as a quasi-natural experiment to study how local government officials respond to the PM system. More specifically, we divide the city leaders into two groups, namely promotion group (with high promotion probability) and ceiling group (with low promotion probability). Then we empirically test the differences between the two groups of officials' responses to the obligatory and anticipated targets respectively.

Obligatory Target. After the COVID-19 outbreak, epidemic control has become the most important obligatory target for local governments in China. To test how local officials respond to the obligatory target, this article uses the following regression specification, for city i in time t,

$$ECI_{it} = \alpha + \beta_1 PromotionGroup_{it} + \beta_n Controls_{it} + FixedEffects + \varepsilon_{it} \quad (1)$$

where the dependent variable ECI denotes the performance of the city's epidemic control. The key independent variable is PromotionGroup, dummy variable equals to 1 if the city leader is in the promotion group, 0 otherwise. Control variables are characteristics of cities and officials that may affect the performance of epidemic control. The city-level control variables include population, GDP per capita, and location [15]. These variables represent the economic openness, population density, and the distance from the epidemic center, which may affect the difficulty of local epidemic control. The official-level control variables include age, gender, race, educational background. By controlling these personal attributes, we rule out the influence of officials' personal abilities. The day fixed effects control for the time-trend shocks common to all cities. The province fixed effects control for the location, medical conditions, population movement, and other factors that may affect epidemic control. We also use data from sample cities and sample periods for robustness testing to rule out the potential endogenous problems.

Anticipated Target. To test how local officials respond to the anticipated target, this article uses promotion group officials as the treated group and ceiling group officials as the control group and uses difference-in-difference (DID) specifications to test the impacts of different officials on the local economic recovery. For city i in time t,

$$GDPgrowth_{it} = \alpha + \beta_1 PromotionGroup_{it} + \beta_2 Post_{it} + \beta_3 (PromotionGroup_{it} * Post_{it}) + \beta_n Controls_{it} + FixedEffects + \varepsilon_{it} \quad (2)$$

where the dependent variable is measured in two ways for robustness: (i) real GDP growth rate and (ii) excess GDP growth compared to the provincial average. PromotionGroup is a dummy variable equal to 1 if the city leader is in the promotion group, 0 otherwise. Post is a dummy variable equal to 1 in times after the COVID-19 outbreak, 0 otherwise. The coefficient of PromotionGroup*Post is our DID estimator in the performance of economic recovery between treated and control groups. The control variables are the same as equation (1). Again, we control for time and province-fixed effects.

Results

Local Officials and Performance of Epidemic Control

Baseline Regression. Table 2 and Table 3 present the estimation results for equation (1) based on the daily data in 2020. Columns (1)-(2) of Table 2 are the results of the baseline regression. We find that the coefficients of the PromotionGroup are significantly negative, which shows that, on average, officials with a lower promotion probability perform better in epidemic control. We also find that the coefficients of GDP per capita and population are significantly negative, while the coefficients of distance are significantly positive. This indicates that the more active the economy, the denser the population, and the closer the city is to the epidemic center, the more difficult it is to effectively control the epidemic.

Robustness Check. To rule out the potential endogenous problems, we use data from sample cities and sample periods for robustness tests. Firstly, we divide China's epidemic control into two stages: tough stage (before March 25, 2020) and stable stage (after March 25, 2020). [16] Columns (3)-(4) in Table 2 present the results for these two stages respectively, showing that the coefficient of the PromotionGroup in Columns (4) is more economically significant than that in columns (3). This indicates that local officials in the ceiling group perform better in epidemic control than those in the promotion group, and such gap becomes more prominent after the overall epidemic is brought under control.

Secondly, we divide local officials into two groups according to their current age: those under the age of 58 are young officials, otherwise old officials. [17] Columns (1)-(2) in Table 3 present the estimation results for these two groups respectively. The results show that officials with a lower promotion probability perform better in epidemic control, and such effect is more prominent among elderly officials.

Thirdly, we delete the data of cities that experienced turnover of city leaders in 2020 to rule out adverse selection problems. Column (3) in Table 3 presents the estimation results of the sub-sample. Finally, we delete the data of cities in Hubei province to avoid the influence of outliers. Column (4) in Table 3 presents the estimation results. Overall, our empirical results indicate that local officials with a lower promotion probability are more sensitive to the obligatory target and perform better in epidemic control. Such effects are more prominent after the overall epidemic is brought under control and among elderly officials.

[Insert Table 2 Here]

[Insert Table 3 Here]

Local Officials and Performance of Economic Recovery

Baseline Regression. Table 4 and Table 5 presents the estimation results for equation (2) based on the quarterly data from 2018 Q3 to 2020 Q4. Table 4 presents the results from the baseline fixed effect (FE) model (columns (1)-(2)) and the difference in difference (DID) model (columns (3)-(4)). For each model, we use two complementary measures of economic recovery performance: real GDP growth for baseline regression and excess GDP growth for robustness test. Both the key independent variable (denoted in the tables as PromotionGroup) and DID estimator (denoted in the tables as PromotionGroup*Post) are found to be significantly positive across these measures. Our results show that, on average, officials with a higher promotion probability perform better in economic recovery. We also find that the coefficients of GDP per capita are significantly positive, indicating that the more developed the city, the faster the economic recovery.

Robustness Check. To rule out the potential endogenous problems, we use data from sample cities for robustness tests. Firstly, we divide China's epidemic control into two stages: tough stage (before March 25, 2020) and stable stage (after March 25, 2020). Columns (1)-(2)

in Table 5 present the results for these two stages respectively. The coefficient of the DID estimator in column (1) is insignificant, while that in column (2) is significantly positive. This indicates that local officials in the promotion group perform better in economic recovery than those in the ceiling group, and such gap is only prominent after the overall epidemic is brought under control.

Secondly, we divide local officials into two groups: young group (below 58 years old) and old group (over 58 years old) according to their current age. Columns (3)-(4) in Table 5 present the estimation results for these two groups respectively. The results show that officials with a higher promotion probability perform better in economic recovery, and such effect is only prominent among elderly officials.

Thirdly, we delete the data of cities that experienced turnover of city leaders in 2020 to rule out adverse selection problems. Column (5) in Table 5 presents the estimation results of the sub-sample. Finally, we delete the data of cities in Hubei province to avoid the influence of outliers. Column (6) in Table 5 presents the estimation results. Overall, our empirical results indicate that local officials with a higher promotion probability are more sensitive to the anticipated target and perform better in economic recovery. Such effects are only prominent after the overall epidemic is brought under control and among elderly officials.

[Insert Table 4 Here]

[Insert Table 5 Here]

Discussion

How do government officials respond to the PM system? Empirical tests on this issue have been sparse and inconsistent (Gerrish, 2016; Poister et al., 2013; Ma, 2017). The existing results are often challenged for multi-target mixing (Andersen et al., 2016; Li, 2021; Zhang, 2021), measurement validity (Courty and Marschke 2004; Heinrich and Marschke 2010; Kalgin, 2016; Jacobsen and Andersen, 2014), and selection bias problems (Julnes and Holzer 2001). This article argues that the COVID-19 epidemic provides a unique quasi-natural experiment for studying how the PM system works and its impacts on government officials.

In China, the TRS is the core mechanism to motivate and control local governments (Jing et al., 2015; Ma, 2017; Yu and Ma 2015), where local officials face numerous targets such as GDP growth (Li and Zhou, 2005; Ma, 2016), fiscal revenue (Qian and Weingast, 1997; Jin et al., 2005), infrastructure construction (Li, 2011; Tan and Zhao, 2019), environmental protection (Krause et al. 2019; Ran, 2017; Zhang and Wu, 2020), poverty elimination (Guo et al., 2019; Zhou et al., 2018), and social stability maintenance (Gao, 2015; Wei et al., 2021). The interaction between different targets is mixed, making it too complicated to identify the impacts of specific PM factors. After the COVID-19 outbreak, the Chinese central government implemented a new PM system for local governments. The new PM system focuses on two primary KPIs, namely, epidemic control performance (obligatory target) and economic recovery performance (anticipated target). As local policymakers, local governments' response to the PM system can be directly reflected in the performance of local epidemic control and economic recovery. This provides a golden perspective for studying the impacts of PM. Since the COVID-19 epidemic is an exogenous shock, there is no selection bias problem, and the performance data is difficult to manipulate.

This article first proposes a simple model to illustrate how a rational official chooses his optimal level of efforts in the face of a typical PM system with both obligatory and anticipated targets. Then it uses a unique dataset including 303 cities in China to empirically test how local officials with different promotion possibilities respond to the PM system during the COVID-19 epidemic. The empirical results show that there is indeed a trade-off between obligatory and anticipated targets. Local officials with a lower promotion probability are more sensitive to the obligatory target and perform better in epidemic control. Local officials with a higher promotion probability are more sensitive to the anticipated target and perform better in economic recovery. Interestingly, further tests find that the differences in performance among officials with different promotion probabilities are more prominent after the overall epidemic is brought under control and among those elderly officials. In other words, the behaviour of elderly officials with low promotion probabilities is most likely to be distorted by the PM system. Even after the overall epidemic is brought under control, they will still overemphasize epidemic control at the expense of the economic development goals.

It is also necessary to discuss the generality of the findings from the following three perspectives. First, this article focuses on COVID-19, but more than COVID-19. As an exogenous shock, the COVID-19 epidemic provides a golden quasi-natural experiment to study the impacts of PM. However, the conclusions are not restricted to the epidemic response. In fact, local governments often face multiple targets such as economic development and environmental protection (Li, 2021; Zhang, 2021). Whenever they are faced with a trade-off between obligatory and anticipated targets, the findings can be of help.

Second, this article focuses on city leaders, but more than city leaders. 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. Therefore, his personal motives can easily be translated into the actions of other local officials (Feng et al., 2018; Li and Zhou, 2005). This article focuses on how city leaders respond to the PM system, which actually represents the responses of all local officials. There are also reasons to believe that the conclusions will still hold in province-level and county-level tests, as long as the data is available.

Third, this article focuses on China, but more than China. Though the system of government in China is significantly different from Western democratic systems, multi-tasking is a common feature of local governments in all countries (Andersen et al., 2016; Radin, 2006). The unique institutional arrangement in China provides an ideal context in which to explore how local governments respond to the obligatory and anticipated targets. The findings may provide useful policy implications for local governments' PM system design in other countries.

Conclusion

This article uses implementation of a new PM system in China during the COVID-19 epidemic as a quasi-natural experiment to explore how the PM system works and its impacts on government officials. Using a unique dataset including 303 cities in China, the empirical findings reveal that there are trade-offs between epidemic control (obligatory target) and economic recovery (anticipated target). Officials with low promotion probability tend to be more sensitive to the obligatory target and perform better in epidemic control, while officials with high promotion probability are more sensitive to the anticipated target and perform better in economic recovery. Further tests show that the differences in performance among officials with different promotion probabilities are more prominent after the overall epidemic is brought under control and among those elderly officials.

The contributions of this article are twofold. First, it theoretically develops and empirically tests the impacts of the PM system on local government officials, which helps us better understand the mechanisms of PM in public sectors. There is extensive literature discussing the impacts of the PM system, however, the results are often inconsistent and challenged. Using the implementation of a new PM system in China during the COVID-19 epidemic as a quasi-natural experiment, this article contributes to the literature by providing theoretical analysis and empirical evidence on how local government officials respond to the PM system.

Second, this article analyzes China’s response to the COVID-19 epidemic from the perspective of local government officials. China is one of the first countries in the world to achieve effective epidemic control and rapid economic recovery. There is extensive literature discussing China's experience in effectively responding to the COVID-19. However, the existing studies regard China as a whole and ignore the within-country variance. This article develops ECI (Epidemic Control Index) to measure the performance of COVID-19 control for 303 cities in China and uses web scraping and text analysis methods to construct the resume data of local leaders. The empirical results indicate that local officials’ promotion probability can significantly affect the performance of local epidemic control and economic recovery.

The findings reported in this article generate some meaningful policy implications for the design of PM systems and improvement of crisis management. First, the PM system plays an important role in China's effective response to the COVID-19. Thus, in crisis management like the COVID-19 epidemic, the central government should regard the PM system as an effective governance tool, and dynamically adjust KPIs for local government. Adopting this approach can effectively motivate and control local governments to achieve specific governance goals.

Second, officials with different promotion probabilities respond differently to the PM system. Thus, the optimal PM system design for officials with different characteristics can be different. A unified PM system of all officials may not be appropriate and may cause distortions in the performance of some individuals.

Third, local officials can significantly affect the performance of local governance. Especially for local leaders, whose incentives can be easily transferred to other local officials. Therefore, it is crucial to put the right people in the right positions, at the same time, set the right PM systems to prompt them to do the right things.

Endnotes

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[15] In mainland China, Hubei Province is the region most affected by COVID-19, accounting for more than 70% of the total number of confirmed cases. Therefore, this article controls for location, which is measured by the distance from the local city hall to Wuhan's Huanan seafood market (the site of the earliest COVID-19 outbreak).

[16] On March 25, 2020, Hubei Province ended its 76-day lockdown, which is a turning point in China's epidemic control. Before March 25, the authorities around China took strict measures to prevent the spread of the epidemic. After March 25, the COVID-19 was basically under control, and local officials have been working to resume economic activity and relax restrictions.

[17] 58 years old is considered a threshold for most local officials in China. Normally, a Party Secretary of the city will retire at the age of 60. Therefore, the literature suggests that the incentives and behaviour of city leaders over the age of 58 will be different (Xi et al, 2018; Huang et al, 2020). According to our definition, young officials account for 52% of the total sample.

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Figures and Tables

Figure 1 Number of COVID-19 Cases in China in 2020

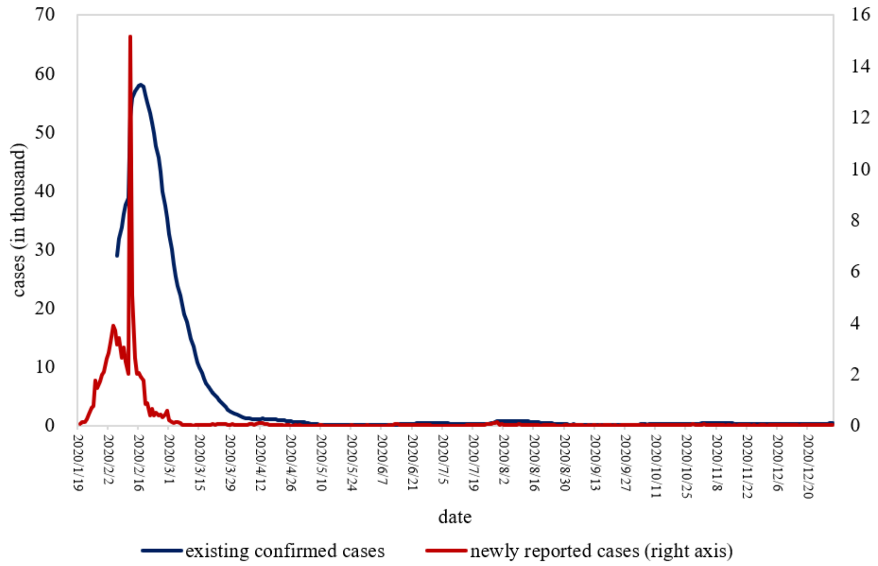

Figure 2 The Annual Average ECI of Each City in 2020 (0-100)

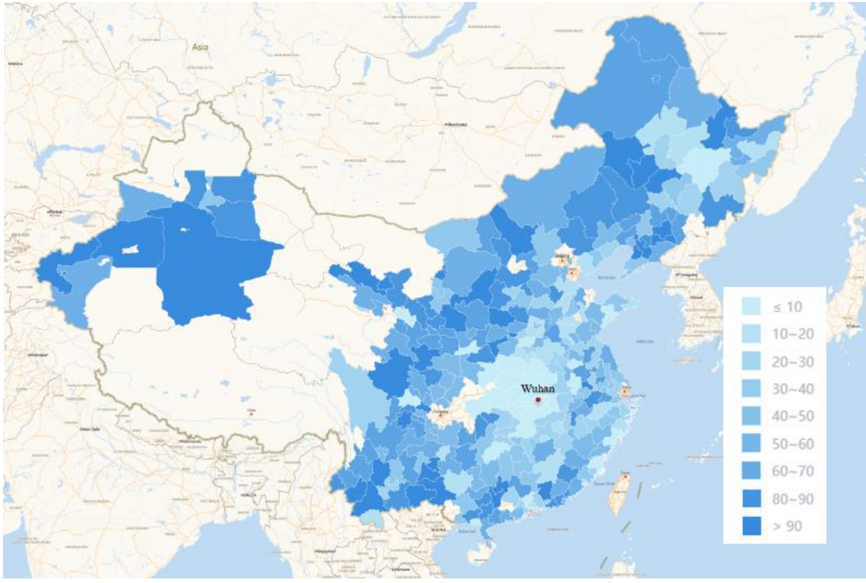

Figure 3 The GDP Growth Rate of Each City in 2020 (%)

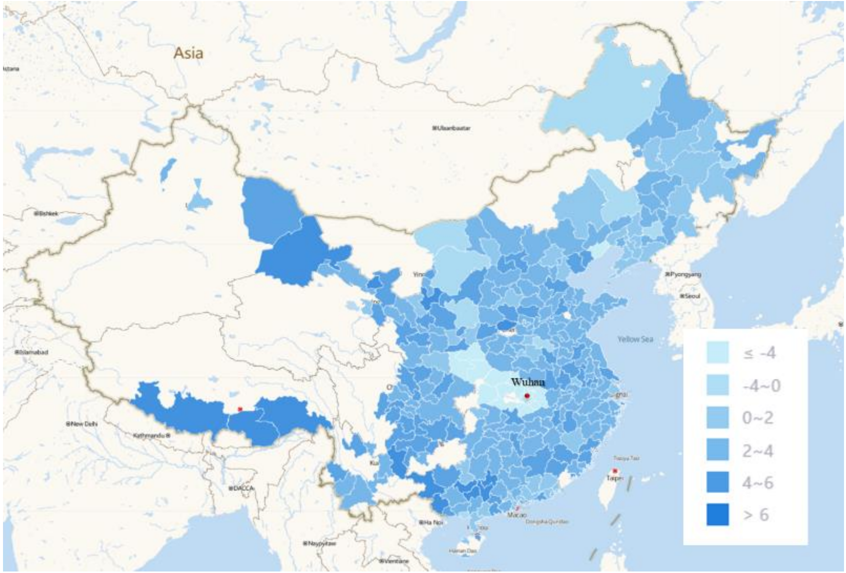

Figure 4 Histogram of Current Provincial Leaders' Tenure in Their Previous Posts As City Leaders

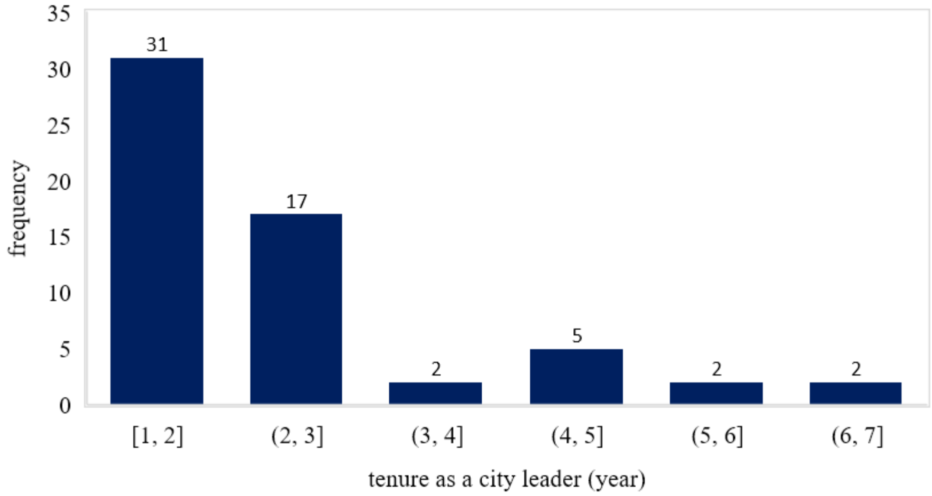

Table 1 Variables, Measures, and Descriptive Statistics

Variable	Measure	Num	Mean	SD	Min.	Max.
ECI	Epidemic Control Index, measuring the relative performance of local epidemic control	100000	50.16	28.87	0.33	100
GDP growth	Year-on-year GDP growth rate (%)	2538	4.0	4.73	-24.80	13.0
Excess GDP growth	GDP growth rate minus the provincial average (%)	2517	0.025	2.24	-27.31	15.90
PromotionGroup	Equal to 1 if the tenure exceeds three years, 0 otherwise	3230	0.63			
log(GDPpercapita)	Real GDP per capita (take log)	3230	1.60	0.51	0.25	2.98
log(Population)	Number of permanent residents (take log)	3100	5.86	0.66	3.38	7.33
log(Distance)	Distance from the local city hall to Wuhan's Huanan seafood market (take log)	3230	6.81	0.74	1.87	8.41
Tenure	City leader's time in his current post	3230	2.72	1.81	0	9.76
Age	City leader's age when appointed to his current post	3230	53.05	2.62	45	59
Race	Equal to 1 if the city leader is a minority, 0 otherwise	3230	0.061	0.24	0	1
Female	Equal to 1 if the city leader is a female, 0 otherwise	3230	0.038	0.19	0	1
Scholar	Equal to 1 if the city leader is a scholar, 0 otherwise	3230	0.23	0.42	0	1
Major	Equal to 1 if the city leader majors in STEM, 0 otherwise	3230	0.20	0.40	0	1
Local	Equal to 1 if the city leader is local, 0 otherwise	3230	0.59	0.49	0	1
Degree	1 for bachelor's degree, 2 for master's degree, 3 for doctoral degree	3230	2.12	0.59	1	3
Post	Equal to 1 if in times after the COVID-19 outbreak, 0 otherwise.	3230	0.40	0.49	0	1

Table 2 Effects Local Officials on Performance of Epidemic Control

	Full Sample	Full Sample	Before March 25th	After March 25th
Dependent variable	ECI	ECI	ECI	ECI
	(1)	(2)	(3)	(4)
PromotionGroup	-2.295***	-2.847***	-1.661***	-3.099***
	(0.158)	(0.162)	(0.393)	(0.178)
log(GDPpercapita)	-17.842***	-17.612***	-14.533***	-18.251***
	(0.169)	(0.169)	(0.401)	(0.185)
log(Population)	-13.210***	-13.536***	-11.295***	-14.000***
	(0.124)	(0.130)	(0.324)	(0.141)
log(Distance)	1.987***	1.598***	2.636***	1.397***
	(0.257)	(0.256)	(0.631)	(0.280)
Constant	162.398***	148.163***	130.397***	140.597***
	(3.570)	(3.773)	(6.660)	(2.920)
Control variables	No	Yes	Yes	Yes
Day fixed effect	Yes	Yes	Yes	Yes
Province fixed effect	Yes	Yes	Yes	Yes
Observations	96,212	96,212	16,792	79,420
R-squared	0.518	0.525	0.495	0.534

Note: This table reports the estimation results for equation (1) based on the daily data in 2020. The dependent variable ECI denotes the performance of the city's epidemic control. The key independent variable is PromotionGroup, dummy variable equals to 1 if the city leader is in the promotion group, 0 otherwise. Control variables are characteristics of cities and officials that may affect the performance of epidemic control. Day and province fixed effects are included. The clustered standard errors are reported in parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Table 3 Robustness Test

	Young Group	Old Group	Without Turnover	Without Hubei
Dependent variable	ECI	ECI	ECI	ECI
	(1)	(2)	(3)	(4)
PromotionGroup	-0.527**	-16.258***	-3.834***	-2.568***
	(0.235)	(0.307)	(0.170)	(0.166)
log(GDPpercapita)	-20.590***	-11.561***	-15.230***	-18.902***
	(0.229)	(0.279)	(0.183)	(0.175)
log(Population)	-13.143***	-14.123***	-13.731***	-13.185***
	(0.178)	(0.208)	(0.149)	(0.134)
log(Distance)	8.474***	1.290***	11.609***	13.203***
	(0.291)	(0.298)	(0.246)	(0.340)
Constant	92.248***	-24.155***	67.971***	70.582***
	(4.986)	(6.755)	(3.998)	(4.289)
Control variables	Yes	Yes	Yes	Yes
Day fixed effect	Yes	Yes	Yes	Yes
Province fixed effect	Yes	Yes	Yes	Yes
Observations	50,371	45,841	81,147	91,749
R-squared	0.641	0.509	0.525	0.469

Note: the same as Table 2.

Table 4 Effects of Local Officials on Performance of Economic Recovery

Dependent variable	FE Model GDP growth (1)	FE Model Excess GDP growth (2)	DID Model GDP growth (3)	DID Model Excess GDP growth (4)
PromotionGroup	0.332**	0.215**	0.121	0.012
	(0.135)	(0.097)	(0.136)	(0.101)
PromotionGroup*Post			0.596**	0.575***
			(0.298)	(0.212)
Post	-4.094***	0.084	-4.479***	-0.288
	(0.207)	(0.174)	(0.295)	(0.228)
log(GDPpercapita)	0.358**	0.242**	0.359**	0.243**
	(0.168)	(0.119)	(0.168)	(0.119)
log(Population)	-0.091	0.029	-0.092	0.029
	(0.132)	(0.099)	(0.132)	(0.099)
log(Distance)	-0.419	0.037	-0.421	0.036
	(0.614)	(0.114)	(0.616)	(0.116)
Constant	112.493***	-1.653	112.660***	-1.494
	(4.661)	(1.564)	(4.675)	(1.570)
Control variables	Yes	Yes	Yes	Yes
Day fixed effect	Yes	Yes	Yes	Yes
Province fixed effect	Yes	Yes	Yes	Yes
Observations	2,464	2,451	2,464	2,451
R-squared	0.716	0.065	0.717	0.069

Note: This table reports the estimation results for equation (2) based on the quarterly data from 2018 Q3 to 2020 Q4. The dependent variable (excess) GDP growth denotes the performance of the city's economic recovery. The key independent variable is PromotionGroup, dummy variable equals to 1 if the city leader is in the promotion group, 0 otherwise. Post is a dummy variable equal to 1 in times after the COVID-19 outbreak, 0 otherwise. Control variables include characteristics of cities and officials that may affect the economic recovery. Day and province fixed effects are included. The clustered standard errors are reported in parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Table 5 Robustness Test

Dependent variable	Before March 25th GDP growth (1)	After March 25th GDP growth (2)	Young Group GDP growth (3)	Old Group GDP growth (4)	Without Turnover GDP growth (5)	Without Hubei GDP growth (6)
PromotionGroup*Post	0.619	0.584**	0.079	1.147***	0.886***	0.845***
	(0.854)	(0.272)	(0.472)	(0.391)	(0.306)	(0.224)
Post	-13.374***	-4.507***	-4.169***	-4.526***	-4.721***	-4.487***
	(0.677)	(0.277)	(0.467)	(0.387)	(0.301)	(0.245)
PromotionGroup	0.137	0.054	0.970***	-0.151	-0.091	-0.090
	(0.132)	(0.117)	(0.289)	(0.207)	(0.150)	(0.108)
log(GDPpercapita)	0.372*	0.391***	0.348	0.335*	0.466***	0.303**
	(0.205)	(0.141)	(0.282)	(0.203)	(0.178)	(0.130)
log(Population)	-0.076	0.049	0.042	-0.134	-0.056	-0.008
	(0.142)	(0.123)	(0.215)	(0.162)	(0.152)	(0.102)
log(Distance)	-0.666	-0.321	-0.771	-0.238	-0.165	-0.050
	(0.853)	(0.407)	(0.985)	(0.768)	(0.585)	(0.257)
Constant	115.275***	110.453***	115.249***	117.266***	108.761***	108.225***
	(6.160)	(3.307)	(7.719)	(7.476)	(5.003)	(2.235)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Day fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,753	2,206	1,178	1,286	2,057	2,385
R-squared	0.714	0.658	0.713	0.740	0.729	0.775

Note: the same as Table 4.