The Dilemma of Political Control: Top-Down Inspection, Risk-Avoidance Strategy, and Bureaucrats' Preference for Using Discretion in Policymaking

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Abstract

Effective governance requires a balance between political control and bureaucratic discretion. Sometimes, bureaucrats may voluntarily curtail their use of discretion in response to political control from above, even when they have the formal authority to make decisions. In this article, we argue that in an under-institutionalized accountability system, top-down inspections as a political control instrument can cause widespread decrease in bureaucrats' preference to use discretion in policymaking by provoking their risk-avoidance strategies. We substantiate this claim by examining the effect of central disciplinary inspections on provincial industrial policymaking in China. Using an original dataset of 612 central-level and 1907 provincial-level industrial policies stipulated between 2001 and 2019, we find that Chinese provincial governments significantly decrease their preference for using discretion in industrial policymaking during inspection active periods. This is shown by reduced willingness of provincial governments to enact local-initiated industrial policies relative to center-following ones. Moreover, we find that central disciplinary inspections have a stronger impact on uninspected provinces who observe their peers being inspected than on provinces being inspected themselves. Additional analysis suggests that central disciplinary inspections, by dampening bureaucrats' preference for using discretion in policymaking, lead to increasing policy homogeneity across provinces in China.

1. Introduction

A challenge of policy control of bureaucracy is how to direct bureaucratic agencies to behave in accordance with the assigned goals while simultaneously granting them enough discretion to apply their expertise in policymaking (Terry M. Moe 2012). Previous literature mainly discusses how political leaders (i.e. legislative, judicial, and executive actors with formal political authority) should delegate the right amount of discretion to bureaucrats to balance the needs of political control and bureaucratic autonomy (Epstein and O'Halloran 1999; Gailmard and Patty 2012; Huber and Shipan 2002).

Even if political leaders grant bureaucrats sufficient discretion to make decisions, whether bureaucrats would prefer to use that discretion in policymaking is a separate consideration. At one extreme, bureaucrats abstain from using any of their discretion by always adopting "center-following policies" that are similar to the baseline policies already proposed by political leaders. At the other extreme, bureaucrats make full use of their discretion by always adopting "local-initiated policies" that are quite different from those proposed by political leaders.

The issue of bureaucrats' preference for using discretion in policymaking has been largely neglected in the literature. Previous studies often assume that, as long as bureaucrats take actions within statutory constraints, there are no additional costs for them to use discretion by adopting local-initiated policies relative to center-following ones. In the real world, however, bureaucrats may need to think twice before exercising their discretion for the following reasons. First, adoption of local-initiated policies that are quite different from pre-existing baseline policies may easily attract the attention of political leaders and increase the likelihood of ex post oversight. Second, frequent adoption of local-initiated policies can be seen as a sign of disobedience if disloyalty is a big concern for political leaders. Third, adopting local-initiated policies makes it more difficult for bureaucrats to shift blame if the policies turn out to be failures.

In this article, we attempt to fill the gap in the literature by discussing how bureaucrats adjust their preference for using discretion in policymaking in response to political control from above. More specifically, we examine how bureaucrats react to top-down inspections from political leaders. Top-down inspection as a political control instrument is common across political systems and national contexts. It often involves a political leader authorizing a specific institution to conduct on-site inspections of bureaucratic agencies and report findings back to her. Bureaucrats

found to be shirking, fraudulent, or corrupt during the inspection are likely to face further investigation or even sanctions.

We argue that in an under-institutionalized accountability system, top-down inspections as a political control instrument can cause widespread decrease in bureaucrats' preference to use discretion in policymaking by provoking their risk-avoidance strategies. An under-institutionalized accountability system has two characteristics that are widely observed in non-democratic and developing countries. First, formal institutions to regulate bureaucrats are ambiguous, incomplete, or inadequately developed, making them difficult to enforce in reality. Second, enforcement processes to hold bureaucrats accountable lack consistency and transparency, and short-term goals of enforcement agencies take precedence over formal institutions (L. Chen 2022; Zhang 2021). Insufficient or inadequately developed formal rules to regulate bureaucrats, combined with highly uncertain accountability enforcement processes, result in bureaucrats behaving according to "circumstances" rather than "rules." However, selective adherence to rules according to circumstances can make bureaucrats extremely vulnerable to top-down inspections from political leaders. As a result, bureaucrats are likely to adopt various risk-avoidance strategies when faced with the risk of inspection, including staying low-key by reducing adoption of local-initiated policies, and showing obedience by increasing adoption of center-following policies. Both two risk-avoidance strategies decrease bureaucrats' preference for using discretion in policymaking. We further propose that top-down inspections not only impact bureaucrats who are being inspected, but also impact uninspected bureaucrats. By observing their peers being inspected, uninspected bureaucrats can be influenced by the chilling atmosphere and feel that the next inspection is just around the corner. As a result, they would also reduce their preference for using discretion in policymaking.

We place the above arguments in the context of provincial industrial policymaking in China. While Chinese provincial governments have no inherent power, they are granted by Chinese central authority a great deal of discretion in local governance (Xu 2011). In terms of industrial policymaking, for example, provincial governments have much freedom to stipulate industrial policies that differ much from those proposed by central agencies (Tan 2020). Provincial governments can also decide which specific industry categories (e.g., shipbuilding, automobiles, computers, etc.) to target in an industrial policy. However, whether provincial governments use their discretion is another matter. Here we distinguish two types of provincial industrial policies:

"center-following" and "local-initiated." The former refers to provincial industrial policies that target the industry categories already proposed by central industrial policies. The latter, by contrast, refers to those that target the industry categories not yet proposed by any central industrial policy. Then a provincial government's preference to use discretion can be measured by the quantity difference between local-initiated policies and central-following ones adopted by the provincial government in each period of time.

Since the second quarter of 2013, the Central Commission for Discipline Inspection (CCDI) in China has repeatedly conducted disciplinary inspections on both central agencies and subnational governments to combat corruption and ensure enforcement of central rules. The disciplinary inspections since 2013 are widely believed as "unprecedented" regarding the total number and the rank of public officials investigated and charged with misconduct or corruption during the inspections. From 2013 to 2019, CCDI conducted nine rounds of disciplinary inspections on provincial governments. During each round of inspections, CCDI dispatches inspection teams to a portion of the 31 provinces in mainland China, and each inspection team stay "on-site" for around two months. The inspection teams collect information and report findings back to the central authority.

We study the effects of central disciplinary inspections on provincial governments' preference for using discretion in industrial policymaking by analyzing the Chinese Industrial Policy Attention Dataset (CIPAD). The CIPAD is an original dataset containing detailed information for 612 central-level and 1907 provincial-level industrial policies stipulated between 2001 and 2019 in China. A novel design of the CIPAD is leveraging computational text analysis methods to transform the full text of each industrial policy into a distribution-of-attention vector. Each distribution-of-attention vector describes the allocation of an industrial policy's attention to 155 finely segmented manufacturing industry categories. By transforming each policy full text into a distribution-of-attention vector, we can fast compare similarity between different industrial policies in terms of the manufacturing industry categories they target. This also enables us to easily distinguish center-following and local-initiated policies adopted by provincial governments.

Empirical analysis shows that provincial governments significantly reduce their preference to use discretion in industrial policymaking during periods when the CCDI sends inspection teams to provincial governments. This is evidenced by the decreased number of local-initiated industrial

policies compared to center-following ones adopted by provincial governments during inspection active periods. Interestingly, we find that the negative effect of central disciplinary inspections on provincial governments' preference for using discretion is more substantial for uninspected provinces who are observing their peers being inspected than for provinces being inspected themselves. This result may be due to the fact that provinces who are undergoing inspection have less operating space to strategically adjust their policymaking behaviors. Moreover, we find evidence that central disciplinary inspections are associated with increasing industrial policy homogeneity across provinces. This is shown by an increase in the similarity of distribution-of-attention vectors between different provinces during inspection active periods than during inspection inactive periods.

By examining how bureaucrats voluntarily decrease their preference to use discretion in response to political control from above, this study contributes to a large literature on political control of bureaucracy (Carpenter 1996; Epstein and O'Halloran 1999; Gailmard and Patty 2012; Huber and Shipan 2002; Terry M. Moe 2012; Volden 2002). Previous studies often assume that, as long as bureaucrats act within the limit of discretion, there are no extra costs for them to actively use their discretion in policymaking by moving away from the baseline policies proposed by political leaders (Gailmard and Patty 2012; Terry M. Moe 2012). Our study shows, however, that bureaucrats may strategically reduce use of discretion as a risk-avoidance strategy when political control creates a chilling environment (Gueorguiev 2018). Therefore, political leaders should pay more attention to the potential effect of political control on bureaucrats' preference to use discretion, even when political control instruments themselves do not constrain bureaucrats' decision-making freedom.

This study also speaks to a burgeoning literature on policy experimentation and policy learning. (S. Wang and Yang 2023) mainly focus on policy experiments sponsored by central government. By examining China's policy experimentation since 1980, they find that China's policy experimentation is characterized by positive sample selection and local politicians' strategic efforts. (Xu 2011) takes the privatization of state-owned enterprises as an example and suggests that locally initiated experiments also play a vital role in advancing China's economic reforms. Mukand and Rodrik (2005) discuss how politicians' tendency to avoid blame of corruption impacts their choices in policy experimentation, and how the above process helps explain a worldwide convergence of economic liberalization policies in the late 20th century. Although our study does

not directly analyze the phenomenon of policy experimentation and policy learning, we believe the distinction between center-following and local-initiated policies in our study can shed light on the above discussions. Center-following policies, since they imitate the baseline policies proposed by central government, are likely to have lots of similar policies adopted by other regions who also follow the same central policies. As a result, center-following policies offer limited new information to policy learning process. By contrast, local-initiated policies can come from more diverse sources and are less likely to have been tried by other regions, thus providing new information for other regions to learn from.

Moreover, our study adds to the literature on developmental states by discussing how state-led developmental strategies can be shaped by complex interactions between central and subnational governments. Previous studies, when discussing about the role of government in "developmental states," often view central and subnational governments of a state as one single actor(Evans 1989; Haggard 2018; Routley 2012). In real-world situation, however, subnational governments may have both de jure and de facto power to stipulate local developmental policies which may or may not follow the baseline policies proposed by central government. This is particularly true for countries with large geographical areas. In the context of China, for example, scholars have noticed the divergence between central and local governments in terms of economic intervention and industrial policymaking. Tan (2020) finds that Chinese central government and subnational governments adopt very different strategies in response to the entry of WTO, with the former adopting more regulatory strategies and the latter adopting more developmental or directive strategies. Chen (2018) studies local governments' behaviors in economic policymaking responding to national paradigm change from FDI attraction to indigenous industry upgrading. The author finds that the success or failure of new central policies is greatly impacted by local bureaucrats' self-interest. Our study joins the above discussion by examining how local governments strategically adjust their choices between center-following and local-initiated industrial policies in response to political control from central government.

2. Political Control and Bureaucratic Discretion

Political control of bureaucracy is an important issue in governance. Although political leaders have formal authority over bureaucratic agencies, it is hard to assume that bureaucratic agencies would automatically behave in consistence with the goals set by their political leaders (Hammond

and Knott 1996; Terry M. Moe 1987; Weingast 1984). As a result, political leaders often need to employ certain mechanisms, processes, and strategies of political control to influence and direct the behavior of bureaucratic agencies within a governmental system.

Political control of bureaucracy can take various forms (Wood and Waterman 1991). One common mechanism of political control is using statutory constraints (such as administrative procedures) to directly limit bureaucrats' behaviors (Bawn 1997; Hill and Brazier 1991; McCubbins, Noll, and Weingast 1987, 1989; Xiao and Zhu 2022). Another frequently used mechanism of political control is oversight, which involves monitoring bureaucratic behaviors with rewards or punishments (McCubbins and Schwartz 1984). Measurable performance indicators have also become an important tool of control since the New Public Management (NPM) movement in 1980s (Verbeeten and Speklé 2015). In addition, scholars have found that budget (Bolton and Thrower 2019; Carpenter 1996) and personnel appointments (Jiang and Zeng 2020; Landry, Lü, and Duan 2018; Wood and Waterman 1991; Xu 2011) can serve as powerful devices of political control as well.

A challenge of political control of bureaucracy is how to induce bureaucrats to act in consistence with their political leaders while simultaneously granting them enough discretion to make decisions (Epstein and O'Halloran 1994, 1999; Gailmard and Patty 2012; Huber and Shipan 2002). Sufficient bureaucratic discretion is a prerequisite for effective governance (Moe 1990, 2012). Bureaucrats need enough discretion to apply their expertise in policy process. Previous studies have discussed how "red tapes" restricts talented bureaucrats' ability (Bozeman 1993; Duflo et al. 2018; Gore 1993; Mascarenhas 1993) to pursue societal welfare outcomes (Grandy and Hiatt 2020). Bureaucratic discretion also enhances bureaucrats' responsiveness to diverse needs of society and allows them to fast respond to emerging challenges (Xu 2011). Moreover, bureaucratic discretion also incentivizes bureaucrats to work harder. This is because discretion mentally helps bureaucrats to get proactive motivations at work (Parker and Ohly 2008) and enable bureaucrats to obtain rents from their expertise (Dessein 2002; Gailmard and Patty 2012).

The issue of balancing political control and bureaucratic discretion has been closely examined in the literature on delegation. Scholars mainly focus on discussing the optimal level of discretion that should be granted to bureaucratic agencies. Epstein and O'Halloran (Epstein and O'Halloran 1994, 1999) develop a straightforward approach to model Congress delegation. The authors find

that both policy uncertainty and alignment of preferences between legislature and bureaucracy influence the level of delegation. Volden (2002) extended Epstein-O'Halloran model by considering the role of both Congress and the president. He shows that, in a separation of powers system, bureaucratic agencies tend to get more discretion than in a system of single power. Huber and Shipan (2002) develop a comparative theory of delegation by thoroughly discussing how different institutional contexts matter. They show that legislative capacity, existence of veto player, and cost of other non-statutory control mechanisms all impact level of delegation. Besides, Gailmard (2002) examines legislature's delegation choice when bureaucrats can subvert legislative limit on discretion at some cost. Interestingly, the author finds that bureaucrats would like the subversion of legislative limit difficult since only then would Congress delegate discretion at first hand.

3. Bureaucrats' Preference to Use Discretion in Policymaking: Center-Following versus Local-Initiated Policy

Previous discussions largely focus on the scenario when political leaders directly use political control instruments to limit bureaucrats' discretion, such as adoption of statutory constraints by Congress. Nevertheless, few studies investigate how political control mechanisms could cause bureaucrats to voluntarily curtail the exercise of discretion even when bureaucrats are granted the freedom to make decisions. This distinction arises from the fact that bureaucrats may formally possess discretion, yet their actual preference to exercise it constitutes a separate consideration.

In this study, we examine bureaucrats' preference to use discretion in policymaking by distinguishing two types of policies. The first type is called "center-following policies," which refer to policies adopted by a bureaucratic agency when similar policies have already been proposed by political leaders. The other type is "local-initiated policies," which refer to policies adopted by a bureaucratic agency when there doesn't exist any similar policy that has been proposed by political leaders. Bureaucrats' preference to use discretion in policymaking is then embodied by their choice between center-following and local-initiated policies. In one extreme, bureaucrats abstain from using any of their discretion by always adopting center-following policies. In the other extreme, bureaucrats make full use of their discretion by always adopting local-initiated policies.

The issue of bureaucrats' preference to use discretion in policymaking has largely been neglected in the previous literature. A formal model of delegation often assumes that political leaders set a baseline policy, **p,** and a level of discretion, **d** (Moe 2012). Then a bureaucratic agency choose a policy of its own, $\boldsymbol{p_A}$, that meets the requirement of $|\boldsymbol{p_A} - \boldsymbol{p}| < \boldsymbol{d}$. An implicit assumption of the model is that, as long as bureaucrats take actions within the scope of discretion granted to them, there is no extra cost (benefit) for them to adopt a policy that is quite different from (similar to) the baseline policy pre-determined by political leaders.

In real-world situations, however, bureaucrats might need to think twice before they adopt local-initiated policies that are quite different from baseline policies proposed by their political leaders even if bureaucrats do have the formal authority to do so. There are several reasons behind this argument. First, adopting a local-initiated policy can increase the likelihood of receiving ex post investigations. This is because local-initiated policies, since being quite different from pre-existing baseline policies, are likely to arouse political leaders' suspicion and make them wonder why bureaucrats adopt them. Second, adopting a local-initiated policy could be regarded as a signal of disobedience when subordinates' disloyalty is a big concern for political leaders. Therefore, bureaucrats might prefer to adopt more center-following policies rather than local-initiated ones to show their loyalty (Lü and Landry 2014). Third, adopting a local-initiated policy makes it difficult for bureaucrats to shift blame if the policy turns out to be failure (Hood 2011; Weaver 1986). This is because failure of a center-following policy could at least be partly attributed to the baseline policy set by political leaders. By contrast, failure of a local-initiated policy is likely to be fully attributed to bureaucrats' own decisions.

The above discussion shows that bureaucrats' use of discretion should not be taken for granted. There are multiple types of costs that potentially come along with bureaucrats' decision to exercise their discretion. Therefore, both scholars and practitioners should have better understanding about how bureaucrats' preference to use discretion varies across contexts.

4. Top-Down Inspection as A Political Control Instrument in An Under-Institutionalized Accountability System

As a political control instrument, top-down inspections aim to ensure the actions undertaken by bureaucratic agencies align with the goals of political leaders. In essence, top-down inspection

exerts control over bureaucracy by mitigating information asymmetry between political principals and subordinate agencies. It is common that political leaders authorize a specific institution to conduct inspections and report findings to it. Top-down inspections often encompass on-site visits, during which inspectors physically demonstrate their presence in the inspected agency. Such on-site visits facilitate inspectors to better collect information and conduct investigations. Individuals or entities who are found to be fraudulent, shirking, or involve in corruptive activities are likely to receive further investigations, interventions, or even sanctions.

The utilization of top-down inspection as a political control method is observed across diverse political systems and national contexts. In the United States, for example, the federal government passed The Inspector General Act in 1978. The purpose of the Act is to create independent inspectors general within federal agencies to prevent and detect fraud, abuse, waste and inefficiency. The inspectors general report directly to agency head and to Congress (Gates and Knowles 1984). In China, the central committee of Chinese Communist Party has routinized strict disciplinary inspections since 2013 (Fang 2022). Inspection teams conduct on-site visits to central ministries and local governments, with an aim to combat corruption and ensure the enforcement of party discipline.

In this study, we argue that top-down inspections, when conducted in an under-institutionalized accountability system, can cause widespread decrease in bureaucrats' preference to use discretion in policymaking. Figure 1 demonstrates the causal mechanism of our argument.

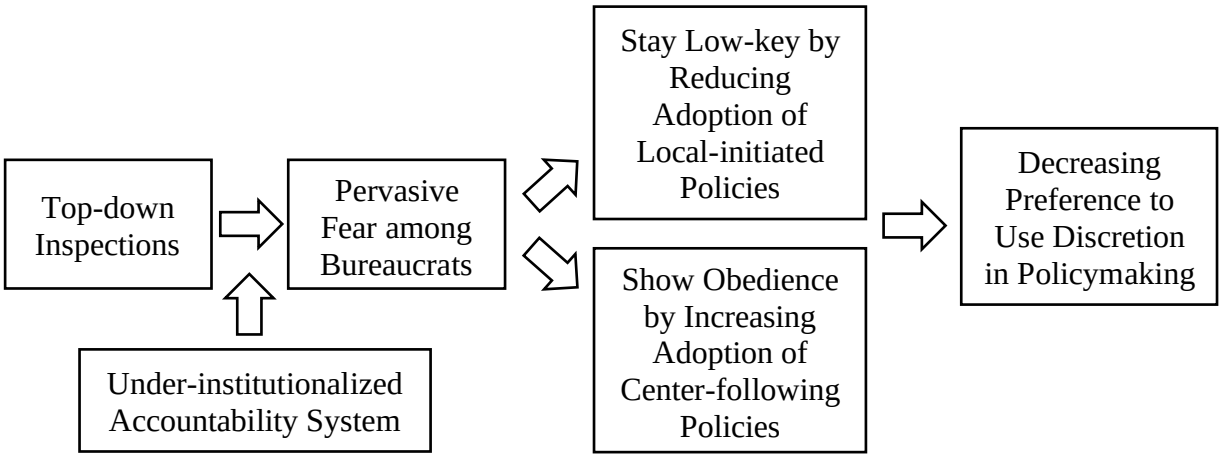

Figure 1: Causal Mechanism of Bureaucrats' Decreased Preference to Use Discretion

An under-institutionalized accountability system is characterized by two phenomena: First, formal institutions to regulate bureaucrats are ambiguous, incomplete, or inadequately developed, making them difficult to enforce in reality. Second, enforcement processes to hold bureaucrats accountable lack consistency and transparency, and short-term goals of enforcement agencies take precedence over formal institutions (L. Chen 2022; Zhang 2021).

Due to insufficient or inadequately developed formal institutions to regulate bureaucrats, as well as inconsistent accountability enforcement processes, bureaucrats are likely to behave according to "circumstances" rather than "rules." However, selective compliance with formal rules according to circumstances make bureaucrats highly vulnerable to top-down inspections from above. Even those "clean" bureaucrats who are not involved in corruptive practices could be worried about their situation, since they might occasionally sidestep some burdensome formal procedures to get work done, and they are uncertain about the consequences once their informal practices are identified during inspections.

As a result, top-down inspections are likely to provoke large-scale risk-avoidance strategies among bureaucrats. One strategy to avoid risk is to stay low-key by reducing the adoption of local-initiated policies. Adopting local-initiated policies can be risky by attracting inspectors' attention and increasing likelihood of ex post investigations. This is because local-initiated policies, since they are quite different from baseline policies suggested by political leaders, could easily arouse inspectors' suspicion and make them wonder why bureaucrats adopt them. By contrast, adopting center-following policies is relatively safe since bureaucrats are simply following what have already been suggested by their superiors. Another strategy to avoid risk is to show obedience by increasing the adoption of center-following policies. Remember that a main goal of top-down inspections as a political control method is to ensure bureaucratic agencies take actions that are aligned with the goals of political leaders. Therefore, a natural and straight-forward way for bureaucrats to protect themselves is to demonstrate their obedience by imitating what has been proposed by political leaders, which leads to increasing adoption of central-following policies. Both the above two risk-avoidance strategies decrease bureaucrats' preference for local-initiated policies relative to center-following ones.

Hypothesis 1: In an under-institutionalized accountability system, bureaucrats would decrease their preference for local-initiated policies compared to center-following ones when their working place is being inspected.

Another question is whether top-down inspections only impact bureaucrats who are undergoing inspections, or such inspections would have a spillover effect on uninspected bureaucrats. In this study, we argue that top-down inspections are likely to have a chilling effect on uninspected bureaucrats as long as bureaucrats cannot know in advance when they will be inspected. By watching their peers to be inspected, uninspected bureaucrats would feel that the next inspection is around the corner. As a result, uninspected bureaucrats would also decrease preference for local-initiated policies as a risk-avoidance strategy.

Hypothesis 2: In an under-institutionalized accountability system, uninspected bureaucrats who are observing their peers to be inspected would also decrease their preference for local-initiated policies compared to center-following ones.

5. Institutional Background

5.1 Disciplinary inspections in China since 2013

Since President Xi Jinping took office in China in the end of 2012, top-down inspections have increasingly become an important governing tool inside the Chinese government. The most frequently mentioned type of central inspections in both media and academia in China since late 2012 is probably the disciplianry inspections conducted by the Central Commission for Discipline Inspection (CCDI) since 2013. The starting point was May 17, 2013, when Wang Qishan, the previous head of the CCDI, announced that CCDI would begin to conduct regular disciplinary inspections on both central agencies and subnational governments, with the primary objective of these inspections being combatting corruption and ensuring enforcement of party rules.

The CCDI-led disciplinary inspections since the second quarter of 2013 (i.e. 2013Q2) are unprecedented for the following reasons. First, the disciplinary inspections since 2013 have far greater influence than those in the past regarding the total number of public officials investigated and charged with misconduct and corruption. Between 2013 and 2022, at least 226 sub-provincial (ministerial) or higher level public officials were finally transferred to Supreme Procuratorate for corruption investigation. By contrast, this number was only 65 between 2003 and 2012. Second,

the disciplinary inspections since 2013 are sensational considering that they even cracked down some top leaders in Chinese central authority. In July 2014, CCDI started the investigation to Zhou Yongkang, who was a previous national-level leader. Zhou Yongkang was reported to be the first Politburo Standing Committee member who was ever charged with corruption since 1949, the founding year of the People's Republic of China.

The disciplinary inspections since 2013 are not a one-time campaign. From 2013 to 2019, CCDI launched nine rounds of inspections that conducted on-site visits to subnational governments. In each round of inspection, CCDI dispatches inspection teams to a portion of the 31 provinces in mainland China, with each inspection team stays in a province for around two months. Figure 2 demonstrates the provinces being inspected during each round of inspection. Table A1 in the appendix shows the detailed lists of provinces being inspected.

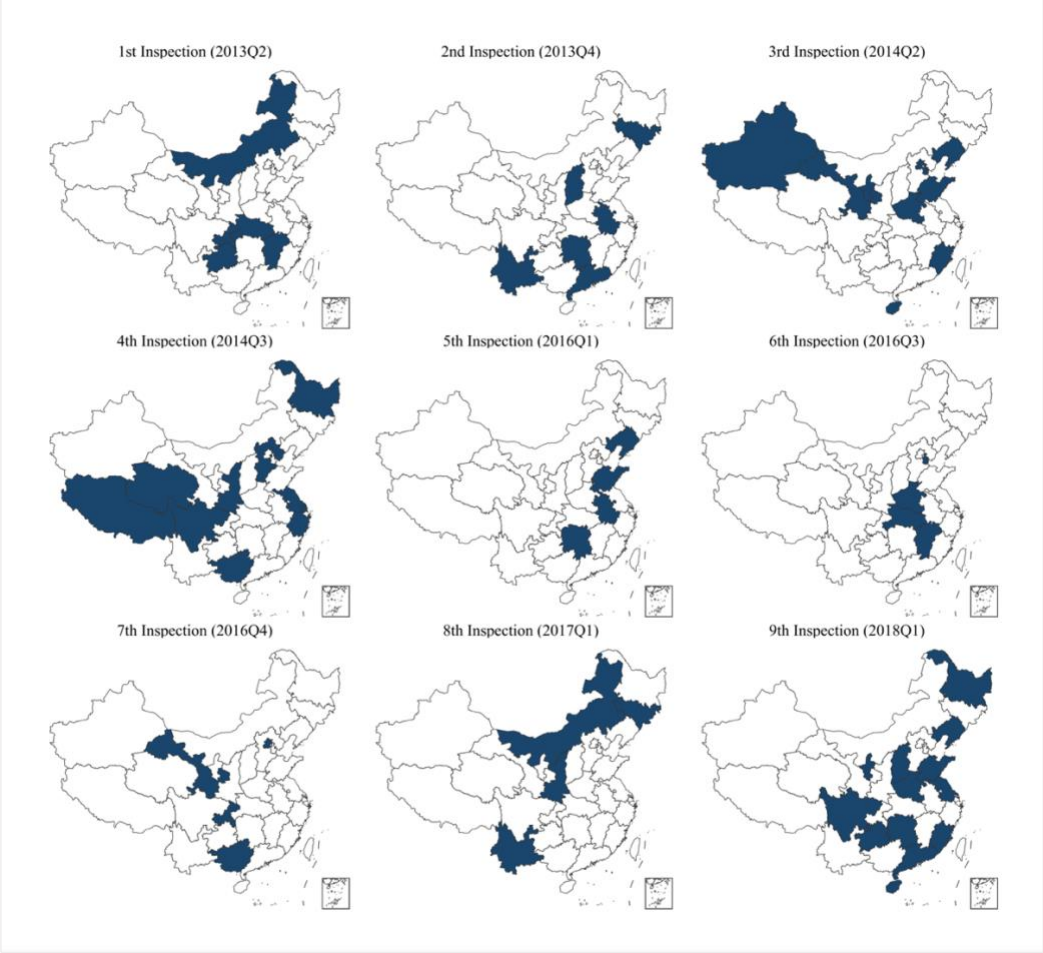

Figure 2: Provinces Being Inspected in Nine Rounds of Central Disciplinary Inspections That Target Subnational Governments from 2013 to 2019

For a long time, China grappled with pervasive misconduct and corruption in its governmental agencies (Ang 2020; Wedeman 2005). Although evidence shows that the disciplinary inspections since 2013 have strongly curbed the spread of corruption (T. Chen and Kung 2019), people are worried that the enforcement processes to hold bureaucrats accountable are subject to human manipulations and political interventions (Zhu and Zhang 2017). This, in turn, introduces significant uncertainty into accountability enforcement processes.

Both media and academia noticed that the intense disciplinary inspections since 2013 caused widespread fear inside government (T. Chen and Kung 2019; E. H. Wang 2022). However, it is still unclear to what extent such fear changed Chinese bureaucrats' preference to use discretion in policymaking. This study attempts to address the question in the context of provincial industrial policymaking in China.

5.2 Central and Provincial Industrial Policymaking in China

A significant characteristic of Chinese industrial policies is that they often target specific industry categories (e.g. automobile, shipbuilding, computer chips…) rather than impacting the whole economy (Aghion et al. 2015; L. Chen and Naughton 2016; Hausmann, Hwang, and Rodrik 2007; Liu 2019; Prud'homme 2016). Such industrial policies that focus on a number of selected industry categories are often called "targeted industrial policies" in literature.

Both Chinese central and provincial governments adopt targeted industrial policies every year. Most central-level targeted industrial policies are issued by the following five central agencies: the State Council, the National Development & Reform Commission (NDRC), the Ministry of Science & Technology (MST), the Ministry of Industry & Information Technology (MIIT), and the Ministry of Finance (MF). On the provincial level, Most influential targeted industrial policies are issued either directly by provincial governments themselves or by their general offices. This study does not discuss other targeted industrial policies issued by departments under provincial governments, as they are considered to be less influential.

In terms of selecting specific industry categories to target, provincial industrial policies might or might not choose industry categories that have already been proposed in central industrial policies. On the one hand, choosing industry categories proposed in central industrial policies has a better chance for provincial governments to obtain support and resources from central government. On the other hand, industry categories proposed by central government are not

necessarily suitable for local context. Provincial governments might also worry about fierce inter-governmental competition and industrial overcapacity if most provinces choose to follow the same central industrial policies. Therefore, it would be interesting to examine whether provincial governments prefer to adopt "center-following" industrial policies that target industry categories already proposed in central industrial policies or to adopt "local-initiated" ones targeting industry categories not mentioned in previous central policies.

The adoption of targeted industrial policies in China merits special attention for the following reasons: First, recent years have witnessed a resurgence of targeted industrial policies worldwide, and China is one of the key players in this trend. A vivid example is "Made in China 2025," which selectively supports the development of aerospace, biotech, electric vehicles, robots, and other advanced manufacturing categories. Similarly, the United States and Europe have also adopted their own targeted industrial policies in the past a few years, such as the CHIPS and Science Act enacted by the U.S. Congress and the European Chips Act proposed by the European Commission to encourage semiconductor production. Second, there is much controversy regarding the effectiveness of targeted industrial policies on a region's economic development. Supporters argue that targeted industrial policies could help address certain types of market failures, such as externalities, monopoly, etc., while critics argue that targeted industrial policies tend to "pick winners" and are likely to fail due to "government failures" (Harrison and Rodríguez-Clare 2010; Juhász, Lane, and Rodrik 2023; Krugman 1995; J. Lin and Chang 2009; J. Y. Lin 2011; Liu 2019; Tassinari et al. 2019). We believe a better understanding about the policy process behind adoption of targeted industrial policies could shed light on the previous discussion.

6. Data and Methods

6.1 Chinese industrial policy attention dataset (CIPAD)

The data on central and provincial targeted industrial policymaking in China are drawn from the Chinese Industrial Policy Attention Dataset (CIPAD), an original dataset containing detailed information for 612 central-level and 1907 provincial-level targeted industrial policies in manufacturing sector from 2001 to 2019.

A novel design of CIPAD is that, by using computational text analysis techniques, the full text of each targeted industrial policy is transformed into a distribution-of-attention vector. A

distribution-of-attention vector can be written as $(x_1, x_2, \ldots, x_{155})$, with $x_i \in [0,1]$ and $\sum_1^{155} x_i = 1$. Each vector describes the attention allocation of an industrial policy to 155 finely segmented industry categories in manufacturing sector, and x_i equals the proportion of attention paid to the ith industry category. The 155 industry categories are based on the three-digit codes in Chinese Industrial Classification for National Economic Activities (GB/T 4754-2002). For instance, three-digit code "372" denotes auto manufacturing, and "266" denotes special chemical products. To the best of our knowledge, this dataset stands out as one of the first to identify industry categories as granular as three-digit levels in full texts of industrial policies.

CIPAD transforms a policy full text into a distribution-of-attention vector by three steps. The first step is to identify in policy full text all the manufacturing key phrases which describe either industry categories or products within industry categories. The second step is to categorize each manufacturing key phrase into one or more than one of the 155 industry categories. Then the third step is to calculate the proportion of attention that a policy pays to each industry category by counting the ratio of the manufacturing key phrases classified into that industry category. Appendix B provides an example of transforming a policy into a distribution-of-attention vector. Appendix C introduces the computational text analysis methods we use to construct the dataset.

CIPAD allows researchers to fast identify industry categories that receive the most attention from a targeted industrial policy. Take the policy "Made in China 2025" issued by Chinese State Council in 2015 as an example. Based on CIPAD, we can fast extract the top-15 industry categories. According to Figure 3, the industry category that received the most attention is "special equipment manufacturing" which receives eight percent of attention from the policy. The industry categories that rank the second and the third are "aerospace manufacturing" and "communication equipment manufacturing," which obtain five and four percent of the policy's attention respectively. Industry categories outside the top-15 chart account for 45% of attention, showing that "Made in China 2025" is a highly comprehensive industrial policy that targets diverse industry categories.

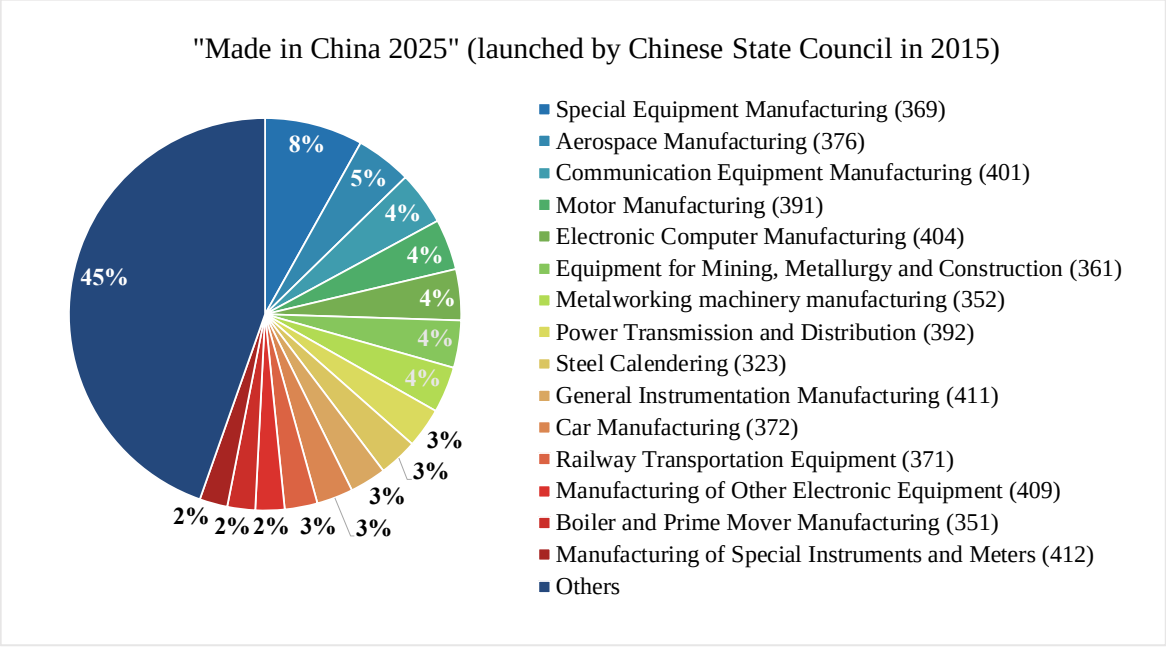

Figure 3: Attention Allocation of "Made in China 2025"

CIPAD also enable researchers to fast compare similarity between industrial policies in terms of the industry categories they mentioned. By transforming policy full texts into distribution-of-attention vectors, researchers can measure policy similarity by calculating cosine similarity between policies' corresponding vectors. Cosine similarity ranges from 0 to 1, where 0 indicates no similarity at all, and 1 indicates complete similarity. In table 1, we demonstrate the top-3 provincial industrial policies that are the most and the least similar to "Made in China 2025" after the adoption of the latter. According to panel A of table 1, the provincial industrial policy that is most similar to "Made in China 2025" is an action plan stipulated by Hunan Provincial Government to implement the central policy. By contrast, provincial industrial policies that are least similar to "Made in China 2025" are those focusing on industry categories like liquor, tobacco, and silk, which are barely mentioned in "Made in China 2025."

Table 1: Provincial Industrial Policies Most and Least Similar to "Made in China 2025"

Panel A: Provincial industrial policies that are most similar to "Made in China 2025"			
Title	Time	Issue Agency	Cosine Simi.
"Made in China 2025" Five-Year Action Plan	2015.11	Hunan Provincial Government	0.891
Opinions on Further Promoting "Made in China 2025"	2015.11	Henan Provincial Government	0.881
Implementation Plan for Transformation and Upgrading of Equipment Manufacturing Industry	2018.12	Shandong Provincial Government General Office	0.881
Panel B: Provincial industrial policies that are least similar to "Made in China 2025"			
Title	Time	Issue Agency	Cosine Simi.
Implementation Opinions on Promoting Supply-side Structural Reform in the Liquor Industry	2016.9	Guizhou Provincial Government General Office	0.001
Measures to Support The High-quality Development of the Tobacco Industry	2019.10	Yunnan Provincial Government	0.006
Guiding Opinions on Promoting the Inheritance and Development of the Silk Industry	2015.11	Zhejiang Provincial Government General Office	0.020

Note: The table presents the top-3 provincial industrial policies that are most similar and least similar to "Made in China 2025." Cosine similarity between distribution-of-attention vectors corresponding to each pair policies are shown in the last column of the table.

6.2 Preference to use discretion: "center-following" versus "local-initiated" policies

Based on CIPAD, we can now fast distinguish "center-following" and "local-initiated" industrial policies adopted by provincial governments in China. Here we define a provincial industrial policy as "center-following" if the distribution-of-attention vector of the policy is similar to (i.e. cosine similarity>0.8) that of at least one central industrial policy issued within the past three years. We define a provincial industrial policy as "local-initiated" if it is not similar to any central industrial policy issued within the past three years.

Figure 4 compares the time trends of the number of center-following policies and local-initiated ones adopted by the Chinese provincial governments between 2004 and 2019. Time points are year-by-quarter. The solid red line denotes center-following policies, while the dashed blue

line denotes local-initiated policies. The vertical solid line shows the initiation of central disciplinary inspections in May 2013. Figure 4 shows that, the number of center-following policies and that of local-initiated policies adopted over time used to share similar time trends before 2013Q2, which is the starting point of central disciplinary inspections. However, 2013Q2 witnessed a big divergence between the time trends of two types of policies. Since then, the number of center-following policies have remained greater than that of local-initiated ones in most time. The gap widened further during the period of 2016-2017 and then narrowed after 2017.

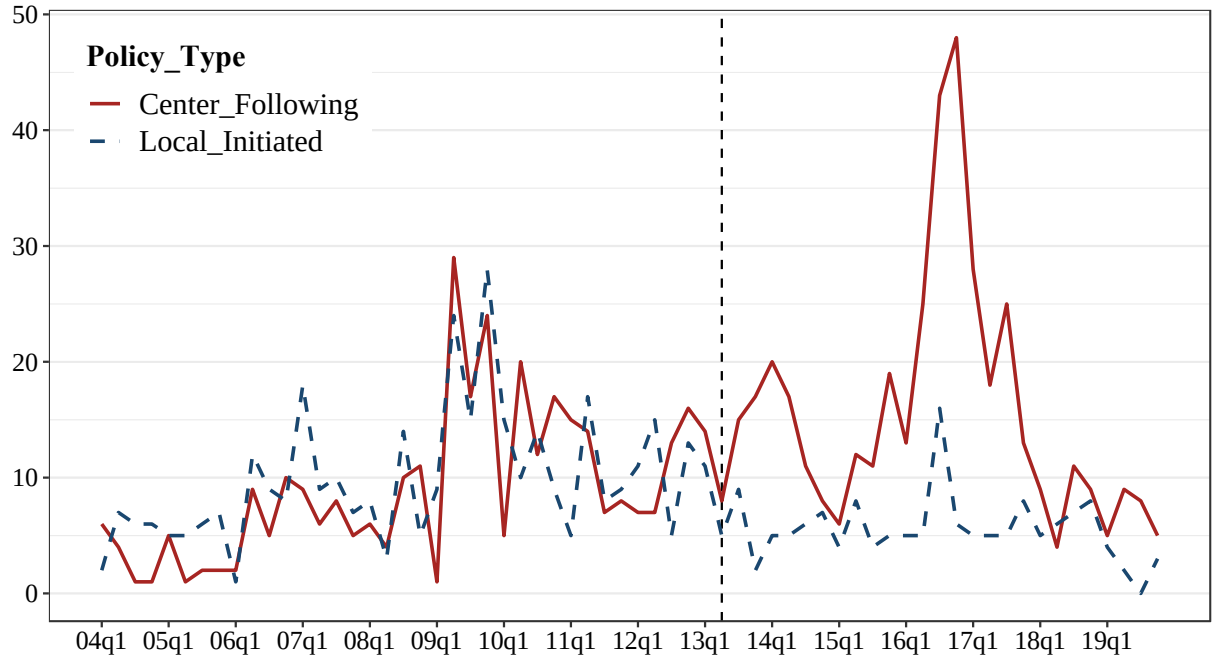

Figure 4: Time Trends of the Number of Center-Following and Local-Initiated Industrial Policies by Provincial Governments from 2004 to 2019

To measure provincial governments' preference to use discretion in policymaking, we calculate the difference between the number of local-initiated policies and that of central-following ones adopted by each provincial government in each quarter of year based on function (1). Here *i* denotes each provincial government; *t* denotes each year-by-quarter time point.

$$Preference\ to\ Use\ Discretion_{it} = NumLocalInitiated_{it} - NumCentralFollowing_{it} \quad (1)$$

In robustness check, we use another way to measure preference to use discretion, that is, to calculate the proportion of local-initiated policies to the total number of policies adopted by a provincial government in each quarter of year. This is shown by function (2):

$$Preference\ to\ Use\ Discretion_{it} = \frac{NumLocalInitiated_{it}}{NumLocalInitiated_{it} + NumCentralFollowing_{it} + 1} \quad (2)$$

It is notably that we add one to the denominator to address the problem that the denominator may equal zero when a provincial government adopts no industrial policy. As we will discuss later, the results remain largely the same when we applied the alternative way to calculate provincial governments' preference to use discretion.

6.3 Baseline model: pre-post comparison design

The biggest challenge in this study is how to choose comparison group so that the spillover effect of disciplinary inspections on uninspected provinces is appropriately modeled. One strategy to deal with this issue is by conducting pre-post comparison. For each province (either inspected or uninspected), we compare post-event periods with a pre-event reference period that is right before the time when central disciplinary inspections were initiated in 2013Q2.

The key assumption of pre-post comparison as an identification strategy is that, after properly controlling for observed variables, a provincial government's preference to use discretion in industrial policymaking (i.e. $NumLocalInitiated_{it} - NumCentralFollowing_{it}$) would have remained the same as that of the pre-event reference period in the absence of an inspection.

We now explain why this assumption is plausible in the context of our study. First, empirical evidence shows that Chinese provincial governments' preference to use discretion in industrial policymaking was quite stable before the initiation of disciplinary inspections in 2013Q2. In figure 5, we choose two quarters (i.e. 2012Q4 and 2013Q1) right before the initiation of disciplinary inspections (i.e. 2013Q2) as the pre-event reference period. Then we compare provincial governments' preference to use discretion in each year-by-quarter between 2004 and 2019 with that of the reference period (2012Q4 and 2013Q1) by estimating the following equation:

$$Preference\ to\ Use\ Discretion_{it} = \sum_{j \in \{04Q1,\ldots,12Q3,13Q2,\ldots,19Q4)} \gamma_j \cdot D_{j,t} + \alpha_i + \beta \cdot X_{it} + \epsilon_{it} \quad (3)$$

In equation (3), $D_{j,t} = 1$ if time point t=j; α_i controls for provincial fixed effect; X_{it} are control variables including provincial GDP (ln), industrial added value, and age and tenure of provincial governor and party chief. Variable descriptions and summary statistics are shown in Table A2. Robust standard errors clustered at the province level. The y axis of figure 5 shows the estimated values of γ_j. The x axis shows year-by-quarter time point j. As is shown by the figure, for a long historical period between 2004Q1 and 2012Q3, provincial governments' preference to use discretion remained statistically indifferent (95% confidence interval) from that of the pre-event reference period (i.e. 2012Q4 and 2013Q1) in most time points except one. The only time point that is statistically significant is above zero. This means by choosing the pre-event reference period as the comparison group, we are more likely to underestimate rather than overestimate the negative effect of central disciplinary inspections. It is only after the initiation of central inspections in 2013Q2 that the time points appear to be significantly lower than zero. These results give us confidence to choose the pre-event reference period as the comparison group.

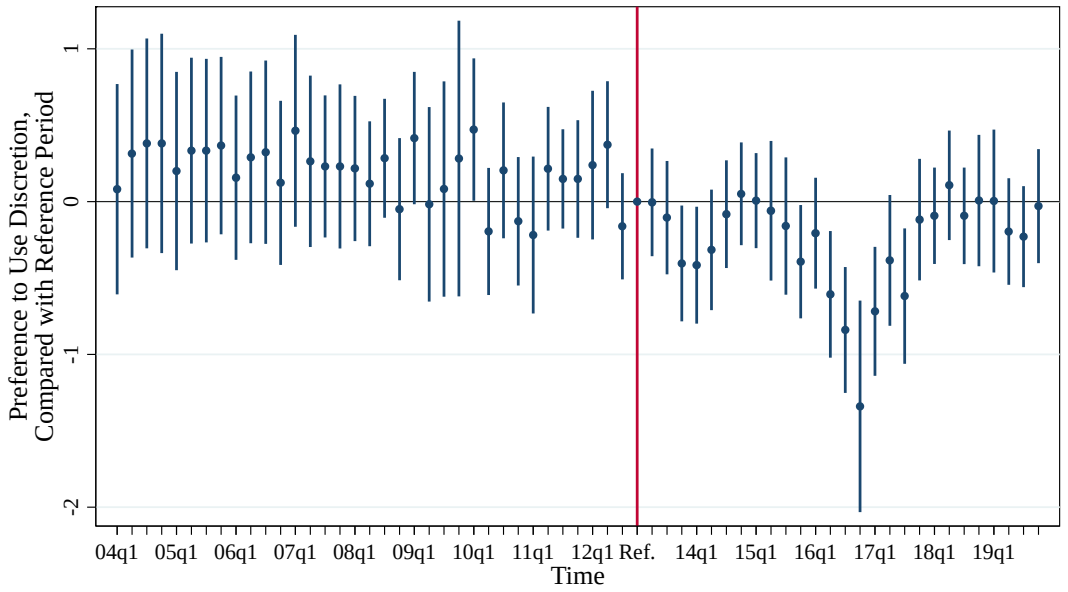

Figure 5: Compare Each Year-by-Quarter with the Pre-Event Reference Period

Second, the design of our dependent variable makes it less influenced by time-variant confounders, thus making the pre-post comparison design plausible. In our study, preference to use discretion equals the quantity difference between local-initiated and central-following policies. That means the impact of any time-variant factor that influences local-initiated and center-following policies the same way would be cancelled out.

Due to the above reasons, we apply the pre-post comparison design as the identification strategy in our study. We choose two quarters (i.e. 2012Q4 and 2013Q1) right before the initiation of central disciplinary inspections as the pre-event reference period. Then, we compare different post-event time points with the pre-event reference period. Figure 6 presents the diagram of the pre-post comparison design in our study. As is shown by the figure, we divide post-event period (i.e. >=2013Q2) into *inspection active period* and *inspection inactive period*. The former indicates the time points when at least one province is being inspected, and the later the opposite. Then we compare the two subperiods to the pre-event reference period based on function (4). The variable $Historical\ Period_t$ indicates the historical period (2004Q1-2012Q3) before the pre-event reference period. By comparing historical period with pre-event reference period, we are able to test whether provincial governments' preference to use discretion used to remain quite constant before the initiation of central disciplinary inspections.

$$Preference\ to\ Use\ Discretion_{it} = Inspection\ Active\ Period_t + Inspection\ Inactive\ Period_t + Historical\ Period_t + \alpha_i + \beta \cdot X_{it} + \epsilon_{it} \quad (4)$$

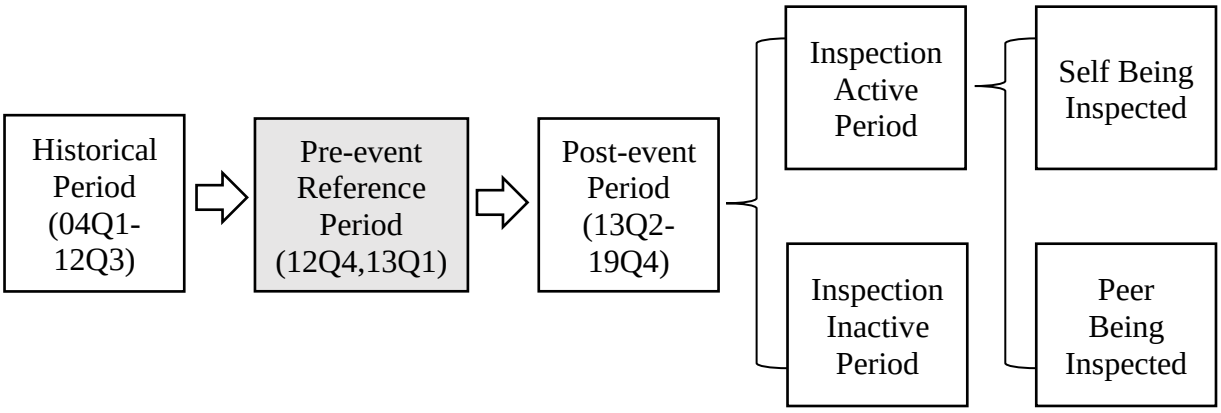

Figure 6: Diagram of the Pre-Post Comparison Design

To distinguish between the scenarios when a province itself is undergoing inspection and when inspection is happening outside a province, we further divide *inspection active period* into *self being inspected* and *peer being inspected*. *Self Being Inspected* refers to the time points when a province itself is undergoing inspection. By contrast, *Peer Being Inspected* refers to the time points when the inspection is happening in other provinces rather than in a province itself. We

estimate the new model by replacing the variable $Inspection\ Active\ Period_t$ in function (4) with the two variables $Self\ Being\ Inspected_{it}$ and $Peer\ Being\ Inspected_{it}$.

7. Main Results

7.1 Baseline

To examine how provincial governments' preference to use discretion in industrial policymaking changes due to central disciplinary inspections, we first draw a scatter plot to do some descriptive anaylsis. In figure 7, the x axis and the y axis measure a provincial government's preference for using discretion during "inspection inactive period" and "inspection active period" respectively. Each dot represents a province. Figure 7 shows that most dots are located below the 45 degree reference line. This means for most provinces, their preference to use discretion during inspection active period is lower than that during inspection inactive period. This result suggests a strong correlation between central disciplinary inspections and provincial governments' willingness to use discretion in policymaking.

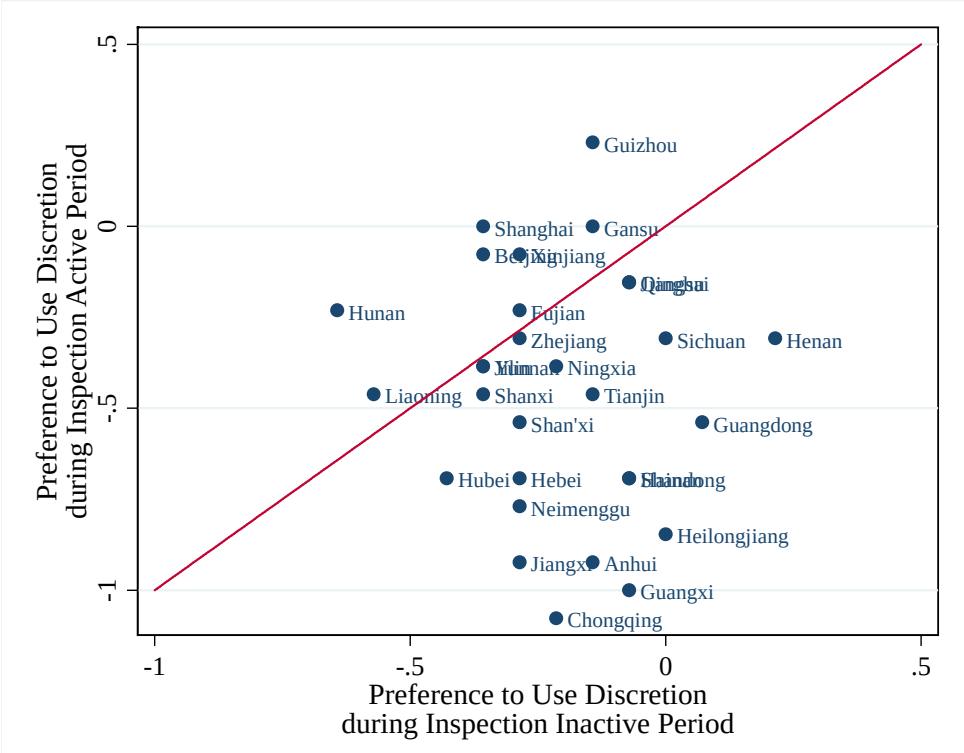

Figure 7: Compare Preference to Use Discretion during Inspection Active and Inactive Periods

Table 2 presents the results of the pre-post comparison model (2012Q4 and 2013Q1). Model 1 shows that, during inspection active period, provincial governments' preference to use discretion is 0.352 (or 39.8% of a standard deviation) lower than that in the pre-event reference period. The magnitude of the decline is substantial and is statistically significant at the 0.01 level. By contrast, decrease in preference to use discretion during inspection inactive period is 0.111, which is much less in magnitude and is statistically insignificant.

Table 2: Baseline Results of the Pre-Post Comparison Model

	Preference to Use Discretion		
VARIABLES	(1)	(2)	(3)
Inspection Inactive Period	-0.111	-0.111	-0.109
	(0.115)	(0.115)	(0.115)
Inspection Active Period	-0.352**		
	(0.117)		
Self under Inspection		-0.243	-0.243
		(0.183)	(0.183)
Peer under Inspection		-0.382**	
		(0.109)	
Inspection within 500km			-0.321*
			(0.122)
Inspection within 1000 km			-0.533***
			(0.134)
Inspection over 1000km			-0.193
			(0.194)
Historical Period	0.105	0.104	0.103
	(0.130)	(0.130)	(0.130)
Province Fixed Effects	√	√	√
Province Economic controls	√	√	√
Province leader controls	√	√	√
Observations	1,920	1,920	1,920
R-squared	0.059	0.060	0.061

Note: This table presents the effects of central disciplinary inspections on provincial governments' preference to use discretion in industrial policymaking. Province economic controls include provincial GDP (ln) and industrial added value. Province leader controls include the age and tenure of the party chief and the governor of each province. Robust standard errors clustered at province level are reported in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Model 2 further divides inspection active period into two variables: *Self Under Inspection* and *Peer Under Inspection*. The first variable indicate the scenario when a province itself is being inspected, and the second variable indicates that a province is not being inspected but its peers are.

To our surprise, although the coefficients of both variables are negative, the coefficient of *Peer Under Inspection* is larger in magnitude and is the only one that is statistically significant. This result suggests that the impact of central disciplinary inspections is stronger for uninspected provinces who are observing their peers being inspected than for provinces themselves being inspected. A possible explanation of this result is that provinces being inspected are under close supervision by inspection teams, so they don't have much operating space to change their policymaking behaviors. By contrast, provinces that are not being inspected have more opportunities to adjust their behaviors when they observe other provinces undergoing inspections.

Model 3 takes a step further by considering whether the effect of central disciplinary inspections on uninspected provinces is associated with the distance between the latter and the nearest province being inspected. Model 3 replace the variable *Pees Under Inspection* with three new variables: *Inspection within 500km*, *Inspection within 1000km*, and *Inspection over 1000km*. Interestingly, we find that an uninspected province would be impacted by central disciplinary inspections only if the inspections take place within 1000km of it. This result suggests that the spillover effect of central disciplinary inspections may not be able to reach the uninspected provinces that are located too far away from where the inspections happen.

7.2 Alternative identification strategy: two-way fixed effects model with spatial spillovers

In the last section, we find that the spillover effect of central disciplinary inspections on uninspected provinces may be limited by distance. This inspires us to adopt a two-way fixed effects model with spatial spillovers as an alternative identification strategy to examine the robustness of the results.

As we mentioned before, disciplinary inspections could have a spillover effect on uninspected provinces. That means we could not directly use uninspected provinces as the comparison group. To address the issue, here we adopt a less strict assumption: for each round of inspection, uninspected provinces that are located far away enough from all the provinces being inspected would not be impacted by the inspection. The criterion for two provinces to be considered "far enough apart" is that the distance between their capitals is greater than 1000 km. As a reference, 1000 km is similar to the distance between Beijing and Shanghai, or between New York City and Chicago.

Based on the above assumption, we are able to conduct a two-way fixed effects model by using uninspected far-away-enough provinces as the comparison group. It is worth noting that provinces being inspected are different for each round of inspection, so the comparison group is also changing for each round of inspection. We identify the direct effect and spillover effect (Butts 2023) of disciplinary inspections based on the function below:

$$Preference\ to\ Use\ Discretion_{it} = \tau D_{it} + \gamma(1 - D_{it})S_{it} + \beta \cdot X_{it} + \mu_i + \lambda_t + \epsilon_{it} \quad (5)$$

D_{it} is a dummy variable indicating whether a province is being inspected. S_{it} is a dummy variable indicating whether a province is located near (i.e. distance<=1000km) a province that is being inspected. X_{it} are control variables including provincial GDP (ln), industrial added value, and age and tenure of provincial governor and party chief. μ_i is province fixed effect, and λ_t is year-by-quarter fixed effect. Robust standard errors clustered at the province level. τ is the direct effect of anti-corruption inspection on a province being inspected, and γ is the spillover effect of anti-corruption inspection on an uninspected province located nearby.

Recent literature shows that TWFE estimation with staggered adoption and heterogenous treatment effect may fail to produce readily interpretable results (de Chaisemartin and D'Haultfœuille 2020; Imai and Kim 2021). To address the concern, here we apply two-stage TWFE suggested by (Butts and Gardner 2021; Gardner 2022). Two-stage TWFE, as its name suggests, contains two stages. The first stage is to estimate group and period fixed effects by only using the subsample of untreated observations. In the second stage, the estimated fixed effects are subtracted from observed outcomes, after which treatment effects are estimated by using the whole sample. Butts and Gardner (2021) designed a Stata package for the above two-stage procedure.

Figure 8 reports the results of TWFE model with spatial spillovers. Panel A of figure 8 shows the effects of disciplinary inspections on provinces being inspected and on uninspected provinces with peers being inspected nearby. Panel A of figure 8 reconfirms our finding that central disciplinary inspections decrease provincial governments' preference to use discretion in policymaking, and the negative effect of inspections is stronger for uninspected provinces than for provinces being inspected. The only difference between the results of the TWFE model and those of the pre-post comparison model is that the effect of inspections on provinces being inspected is significantly negative in the TWFE model.

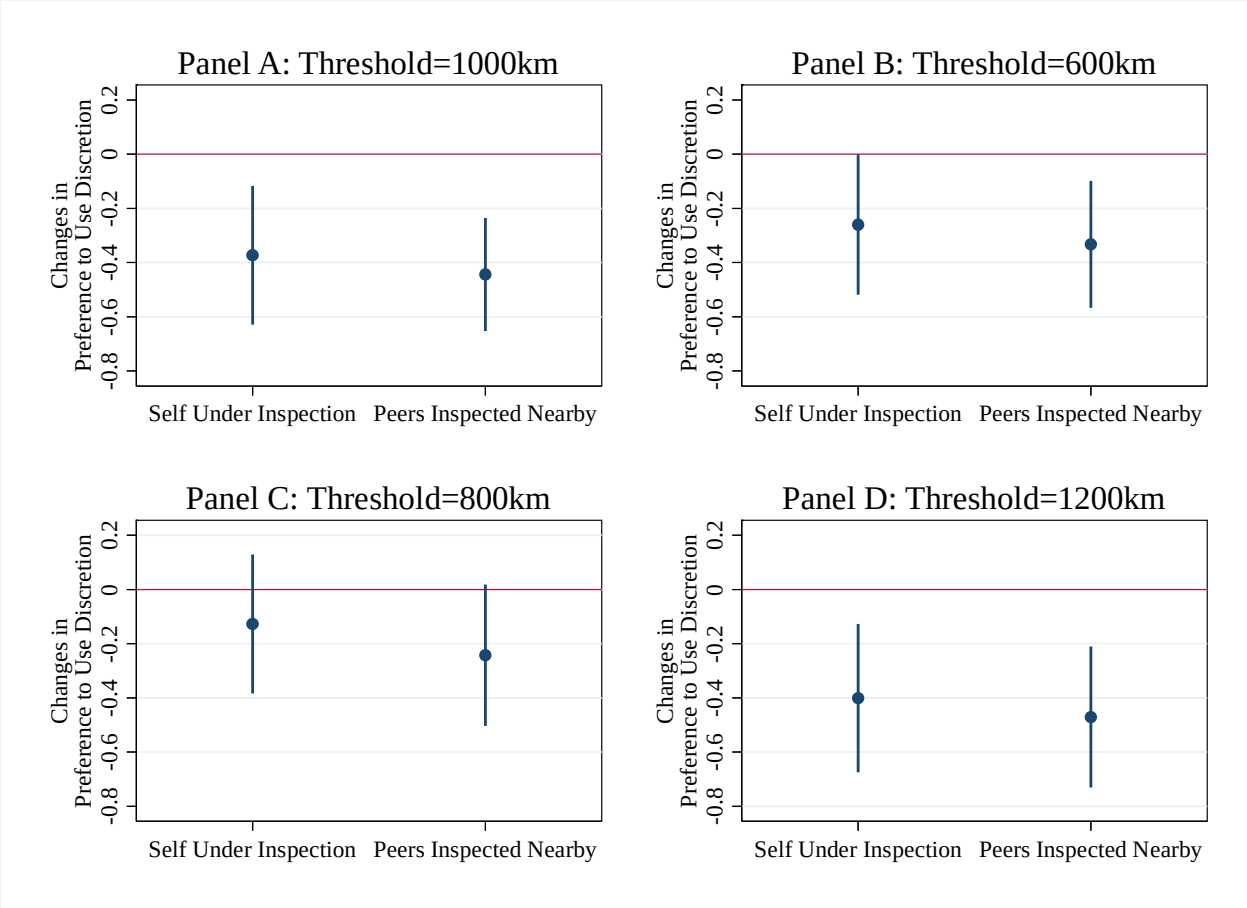

Figure 8: Results of the TWFE Model with Spatial Spillovers

7.3 Further Robustness Check

A concern of TWFE model with spatial spillovers is whether a distance threshold of 1000km is appropriate, and whether the results would be different if we change the threshold. To check the robustness of the results in TWFE model, in panel B, C, D of figure 8, we changed the distance threshold to 600km, 800km, and 1200km respectively. We find the results are generally stable. The coefficients in panel C become insignificant, but the direction and the magnitude of the coefficients are consistent with the previous results.

We also examine whether the results would change if we use an alternative way to measure provincial governments' preference to use discretion. This time we measure preference for using discretion based on function (2) by calculating the proportion of local-initiated policies to total number of policies. In Figure A1, we present the time trend of provincial governments' preference to use discretion over time. As is shown by the figure, after the initiation of disciplinary inspections, provincial governments' preference to use discretion remain at a relatively low level, with most

values lower than 0.1. Figure A1 also shows much fluctuation of the value by using the new measure. In this case, pre-post comparison is no longer an appropriate method. We apply the TWFE model with spatial spillovers instead. Figure A2 shows the regression results by using four different distance thresholds. We find the results are largely the same by using the alternative way of measuring provincial governments' preference to use discretion in policymaking.

Moreover, we test the robustness of our results by adjusting the time period of our sample data. In the previous analyses, we choose our sample period to be between 2004 and 2019. However, there might be concern that the sample period is too long and might be impacted by some significant events like the global financial crisis in 2007 and 2008. Here we change the sample period from 2004-2019 to 2011-2019. Then we reran the pre-post comparison model. The regression results are reported in Table A3 in the appendix. The results are quite the same as before.

7.4 Central disciplinary inspections and increasing policy homogeneity across provinces

A key difference between center-following and local-initiated policies is that the sources of the latter tend to be more diverse than those of the former. Center-following policies are largely attributed to a top-down diffusion process in which bureaucratic agencies imitate what has been proposed by their superior authority, while local-initiated policies may come from various channels, such as governments' own indigenous inventions, horizontal diffusion from other governments, or bottom-up diffusion from grassroots agencies.

As a result, by decreasing bureaucrats' preference to adopt local-initiated policies compared to center-following ones, top-down inspections can lead to increasing policy homogeneity among bureaucratic agencies. In the context of provincial industrial policymaking in China, this means that provincial industrial policies adopted during the inspection active period tend to be more similar to each other across provinces than during the inspection inactive period.

To illustrate this point, for each provincial industrial policy, we calculate the number of provinces that have adopted similar policies in the past three years. We then calculate the composition of these values among local-initiated policies and center-following policies, respectively. The results are shown in table 3. For local-initiated policies, 67.89% of them are pure indigenous innovations in the sense that no other provincial government (and also no other central agency, since it is local-initiated) has adopted a similar policy before. By contrast, for center-following policies, this number is only 21.91%. On the other hand, only 0.19% of local-initiated

policies have been adopted by more than 10 provinces prior to their own adoption, but this number is as high as 15.03% for center-following policies. Therefore, by reducing provincial governments' preference for local-initiated policies compared to central-following ones, central disciplinary inspections are likely to lead to increasing policy homogeneity across provinces.

Table 3: Composition of the Number of Provinces Adopting Similar Policies Prior to the Adoption of A Policy Itself

Num. of Provinces Adopting Similar Policies	**Center-Following Policy**	**Local-Initiated Policy**
0	21.91%	67.89%
1	13.94%	16.05%
2	9.03%	7.35%
3	10.09%	3.68%
4	7.17%	3.09%
5	7.30%	0.77%
6	5.84%	0.39%
7	2.92%	0.19%
8	4.38%	0.19%
9	2.39%	0.19%
More than 10	15.03%	0.19%
Grand Total	**100.00%**	**100.00%**

Note: This table calculates, for central-following and local-initiated policies respectively, the composition of number of provinces that have already adopted similar policies prior to the adoption of a policy itself.

In figure 9, we take a step further by calculating the overall policy homogeneity between provinces during inspection active period and inspection inactive period respectively. Policy homogeneity between provinces is measured by similarity of the average distribution-of-attention vectors corresponding to provinces during each period of time. Figure 9 shows that, during inspection active period, the density distribution of policy homogeneity across provinces shifts towards the right compared to that during inspection inactive period. This result suggests strong correlation between central disciplinary inspections and industrial policy homogeneity across provinces in China.

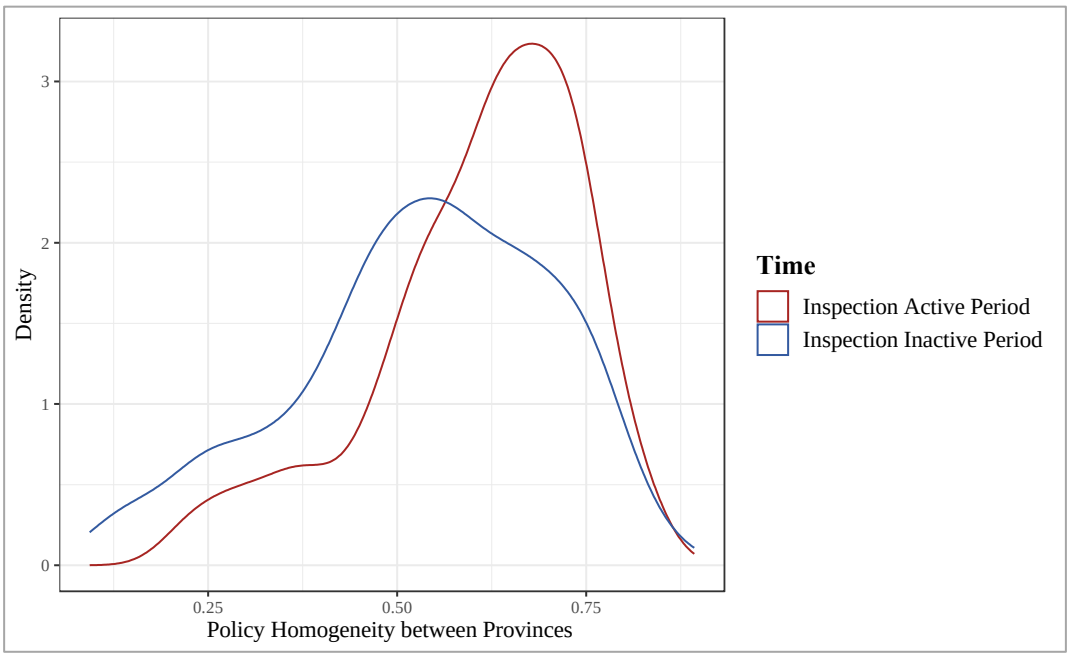

Figure 9: Density Distribution of Policy Homogeneity between Provinces

8. Conclusion

In this study, we examine how bureaucrats actively adjust their preference for using discretion in policymaking in response to political control from above. More specifically, we examine how top-down inspections as a political control instrument would impact bureaucrats' willingness to adopt local-initiated policies compared to center-following ones. We argue that, in an under-institutionalized accountability system, top-down inspections can cause widespread decrease in bureaucrats' preference for local-initiated policies compared to center-following ones not only for bureaucrats being inspected but also for uninspected bureaucrats who are influenced by the chilling environment.

We place our arguments in the context of provincial industrial policymaking in China. By analyzing an original dataset of 612 central-level and 1907 provincial-level industrial policies stipulated between 2001 and 2019, we find strong evidence that provincial governments substantially decrease their use of discretion in industrial policymaking during the time when Chinese central authority conduct disciplinary inspections on provincial governments. Moreover, we find that the effect of central disciplinary inspections is even stronger for uninspected provinces who are observing their peers being inspected than for the provinces being inspected themselves.

Extensive analysis shows that central disciplinary inspections are associated with increasing policy homogeneity across provinces due to decreasing preference for provincial governments to use discretion in policymaking.

Our study questions an implicit assumption that has received little scrutiny in the literature on political control of bureaucracy. This assumption is that there are no additional costs for bureaucrats to actively exercise their discretion as long as they take actions within statutory constraints. Our study shows, however, that bureaucrats can be quite cautious about using their discretion when faced with the risk of top-down inspections in an under-institutionalized accountability system. Future research may explore more scenarios in which bureaucrats voluntarily curtail their preference to use discretion in policymaking.

Our study also discusses the challenge of political control of bureaucracy in developing and non-democratic countries. Due to lack of ability to enact high-quality laws and regulations and the absence of an independent judiciary, developing and non-democratic countries often struggle with an under-institutionalized accountability system. Such a system is characterized by incomplete or inadequately developed institutions to regulate bureaucrats, as well as inconsistent and non-transparent enforcement processes to hold bureaucrats accountable. This results in a bureaucracy that is guided more by "circumstances" than by "rules." However, bureaucrats' selective adherence to rules can make them highly vulnerable to any top-down inspection or investigation. As a result, bureaucrats would actively adopt various risk-avoidance strategies to protect themselves, and these risk-avoidance strategies can complicate the process of political control and lead to unintended consequences. Future research on the challenge of governing bureaucrats in an under-institutionalized accountability system could be of great academic importance and policy relevance.

References

Aghion, Philippe et al. 2015. “Industrial Policy and Competition.” *American Economic Journal: Macroeconomics* 7(4): 1–32.

Ang, Yuen Yuen. 2020. *China’s Gilded Age: The Paradox of Economic Boom and Vast Corruption*. Cambridge: Cambridge University Press.

Bawn, Kathleen. 1997. “Choosing Strategies to Control the Bureaucracy: Statutory Constraints, Oversight, and the Committee System.” *The Journal of Law, Economics, and Organization* 13(1): 101–26.

Bolton, Alexander, and Sharece Thrower. 2019. “The Constraining Power of the Purse: Executive Discretion and Legislative Appropriations.” *The Journal of Politics* 81(4): 1266–81.

Bozeman, Barry. 1993. “A Theory Of Government ‘Red Tape.’” *Journal of Public Administration Research and Theory*.

Butts, Kyle. 2023. “Difference-in-Differences Estimation with Spatial Spillovers.” http://arxiv.org/abs/2105.03737 (January 9, 2024).

Butts, Kyle, and John Gardner. 2021. “{did2s}: Two-Stage Difference-in-Differences.” *arXiv.org*. https://arxiv.org/abs/2109.05913v2 (January 10, 2024).

Carpenter, Daniel P. 1996. “Adaptive Signal Processing, Hierarchy, and Budgetary Control in Federal Regulation.” *American Political Science Review* 90(2): 283–302.

de Chaisemartin, Clément, and Xavier D’Haultfœuille. 2020. “Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects.” *American Economic Review* 110(9): 2964–96.

Chen, Ling. 2018. *Manipulating Globalization: The Influence of Bureaucrats on Business in China*. Stanford, CA: Stanford University Press.

———. 2022. “Getting China’s Political Economy Right: State, Business, and Authoritarian Capitalism.” *Perspectives on Politics* 20(4): 1397–1402.

Chen, Ling, and Barry Naughton. 2016. “An Institutionalized Policy-Making Mechanism: China’s Return to Techno-Industrial Policy.” *Research Policy* 45(10): 2138–52.

Chen, Ting, and James Kai-sing Kung. 2019. “Busting the ‘Princelings’: The Campaign Against Corruption in China’s Primary Land Market*.” *The Quarterly Journal of Economics* 134(1): 185–226.

Dessein, Wouter. 2002. “Authority and Communication in Organizations.” *Review of Economic Studies* 69(4): 811–38.

Duflo, Esther, Michael Greenstone, Rohini Pande, and Nicholas Ryan. 2018. “The Value of Regulatory Discretion: Estimates From Environmental Inspections in India.” *Econometrica* 86(6): 2123–60.

Epstein, David, and Sharyn O’Halloran. 1994. “Administrative Procedures, Information, and Agency Discretion.” *American Journal of Political Science* 38(3): 697.

———. 1999. *Delegating Powers: A Transaction Cost Politics Approach to Policy Making under Separate Powers*. Cambridge: Cambridge University Press.

Evans, Peter B. 1989. “Predatory, Developmental, and Other Apparatuses: A Comparative Political Economy Perspective on the Third World State.” *Sociological Forum* 4(4): 561–87.

Fang, Hanming, Jing Wu, Rongjie Zhang, and Li-An Zhou. “Understanding the Resurgence of the SOEs in China: Evidence from the Real Estate Sector.”

Gailmard, Sean. 2002. “Expertise, Subversion, and Bureaucratic Discretion.” *The Journal of Law, Economics, and Organization* 18(2): 536–55.

Gailmard, Sean, and John W. Patty. 2012. “Formal Models of Bureaucracy.” *Annual Review of Political Science* 15(1): 353–77.

Gardner, J. 2022. “Two-Stage Differences in Differences.” https://www.semanticscholar.org/paper/Two-stage-differences-in-differences-Gardner/8c98f4e69eb0f287ea4ab0b9d8adfa240feb7ed6 (January 15, 2024).

Gates, Margaret J., and Marjorie Fine Knowles. 1984. “The Inspector General Act in the Federal Government: A New Approach to Accountability.” *Alabama Law Review* 36(2): 473–514.

Gore, Albert. 1993. *From Red Tape to Results: Creating a Government That Works Better and Costs Less, Report of the National Performance Review*. Collingdale, PA: Diane Publishing.

Grandy, Jake B., and Shon R. Hiatt. 2020. “State Agency Discretion and Entrepreneurship in Regulated Markets.” *Administrative Science Quarterly* 65(4): 1092–1131.

Gueorguiev, Dimitar D. 2018. “Dictator’s Shadow.” *China Perspectives* 2018(1–2): 17–26.

Haggard, Stephan. 2018. *Developmental States*. Cambridge University Press.

Hammond, T. H., and J. H. Knott. 1996. “Who Controls the Bureaucracy?: Presidential Power, Congressional Dominance, Legal Constraints, and Bureaucratic Autonomy in a Model of Multi-Institutional Policy-Making.” *Journal of Law, Economics, and Organization* 12(1): 119–66.

Harrison, Ann, and Andrés Rodríguez-Clare. 2010. “Trade, Foreign Investment, and Industrial Policy for Developing Countries.” In *Handbook of Development Economics*, Elsevier, 4039–4214.

Hausmann, Ricardo, Jason Hwang, and Dani Rodrik. 2007. “What You Export Matters.” *Journal of Economic Growth* 12(1): 1–25.

Hill, Jeffrey S., and James E. Brazier. 1991. “Constraining Administrative Decisions: A Critical Examination of the Structure and Process Hypothesis.” *The Journal of Law, Economics, and Organization* 7(2): 373–400.

Hood, Christopher. 2011. *The Blame Game: Spin, Bureaucracy, and Self-Preservation in Government*. Princeton University Press.

Huber, John D., and Charles R. Shipan. 2002. *Deliberate Discretion?: The Institutional Foundations of Bureaucratic Autonomy*. Cambridge University Press.

Imai, Kosuke, and In Song Kim. 2021. “On the Use of Two-Way Fixed Effects Regression Models for Causal Inference with Panel Data.” *Political Analysis* 29(3): 405–15.

Jiang, Junyan, and Yu Zeng. 2020. “Countering Capture: Elite Networks and Government Responsiveness in China’s Land Market Reform.” *The Journal of Politics* 82(1): 13–28.

Juhász, Réka, Nathaniel Lane, and Dani Rodrik. 2023. *The New Economics of Industrial Policy*. SocArXiv. preprint. https://osf.io/gsyq4 (August 7, 2023).

Krugman, Paul R., ed. 1995. *Strategic Trade Policy and the New International Economics*. 7. pr. Cambridge, Mass.: MIT Press.

Landry, Pierre F., Xiaobo Lü, and Haiyan Duan. 2018. “Does Performance Matter? Evaluating Political Selection Along the Chinese Administrative Ladder.” *Comparative Political Studies* 51(8): 1074–1105.

Lin, Justin, and Ha-Joon Chang. 2009. “Should Industrial Policy in Developing Countries Conform to Comparative Advantage or Defy It? A Debate Between Justin Lin and Ha-Joon Chang.” *Development Policy Review* 27(5): 483–502.

Lin, Justin Yifu. 2011. “New Structural Economics: A Framework for Rethinking Development1.” *The World Bank Research Observer* 26(2): 193–221.

Liu, Ernest. 2019. “Industrial Policies in Production Networks*.” *The Quarterly Journal of Economics* 134(4): 1883–1948.

Lü, Xiaobo, and Pierre F. Landry. 2014. “Show Me the Money: Interjurisdiction Political Competition and Fiscal Extraction in China.” *American Political Science Review* 108(3): 706–22.

Mascarenhas, R. C. 1993. “Building an Enterprise Culture in the Public Sector: Reform of the Public Sector in Australia, Britain, and New Zealand.” *Public Administration Review* 53(4): 319.

McCubbins, Mathew D., and Thomas Schwartz. 1984. “Congressional Oversight Overlooked: Police Patrols versus Fire Alarms.” *American Journal of Political Science* 28(1): 165–79.

McCubbins, Matthew D., Roger G. Noll, and Barry R. Weingast. 1987. “Administrative Procedures as Instruments of Political Control.” *The Journal of Law, Economics, and Organization* 3(2): 243–77.

———. 1989. “Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies.” *Virginia Law Review* 75(2): 431–82.

Moe, T. M. 1990. “Political Institutions: The Neglected Side of the Story.” *Journal of Law, Economics, and Organization* 6(special): 213–53.

Moe, Terry M. 1987. “An Assessment of the Positive Theory of ‘Congressional Dominance.’” *Legislative Studies Quarterly* 12(4): 475.

———. 2012. “Delegation, Control, and the Study of Public Bureaucracy.” *The Forum* 10(2).

Parker, Sharon K., and Sandra Ohly. 2008. “Designing Motivating Jobs: An Expanded Framework for Linking Work Characteristics and Motivation.” In *Work Motivation*, Routledge, 260–311.

Prud’homme, Dan. 2016. “Dynamics of China’s Provincial-Level Specialization in Strategic Emerging Industries.” *Research Policy* 45(8): 1586–1603.

Routley, Laura. 2012. “Developmental States: A Review of the Literature.”

Tan, Yeling. 2020. “Disaggregating ‘China, Inc.’: The Hierarchical Politics of WTO Entry.” *Comparative Political Studies* 53(13): 2118–52.

Tassinari, Mattia, Elisa Barbieri, Giovanni Morleo, and Marco Rodolfo Di Tommaso. 2019. “Targeted Industrial Policy and Government Failures: Insights from the South Korean Experience.” *International Journal of Emerging Markets* 16(2): 221–40.

Verbeeten, Frank H. M., and Roland F. Speklé. 2015. “Management Control, Results-Oriented Culture and Public Sector Performance: Empirical Evidence on New Public Management.” *Organization Studies* 36(7): 953–78.

Volden, Craig. 2002. “Erratum: A Formal Model of the Politics of Delegation in a Separation of Powers System.” *American Journal of Political Science* 46(2): 476.

Wang, Erik H. 2022. “Frightened Mandarins: The Adverse Effects of Fighting Corruption on Local Bureaucracy.” *Comparative Political Studies* 55(11): 1807–43.

Wang, Shaoda, and David Y Yang. 2023. “Policy Experimentation in China: The Political Economy of Policy Learning.”

Weaver, R. Kent. 1986. “The Politics of Blame Avoidance.” *Journal of Public Policy* 6(4): 371–98.

Wedeman, Andrew. 2005. “Anticorruption Campaigns and the Intensification of Corruption in China.” *Journal of Contemporary China* 14(42): 93–116.

Weingast, Barry R. 1984. “The Congressional-Bureaucratic System: A Principal Agent Perspective (with Applications to the SEC).” *Public Choice* 44(1): 147–91.

Wood, B. Dan, and Richard W. Waterman. 1991. “The Dynamics of Political Control of the Bureaucracy.” *American Political Science Review* 85(3): 801–28.

Xiao, Shiyang, and Xufeng Zhu. 2022. “Bureaucratic Control and Strategic Compliance: How Do Subnational Governments Implement Central Guidelines in China?” *Journal of Public Administration Research and Theory* 32(2): 342–59.

Xu, Chenggang. 2011. “The Fundamental Institutions of China’s Reforms and Development.” *Journal of Economic Literature* 49(4): 1076–1151.

Zhang, Changdong. 2021. *Governing and Ruling: The Political Logic of Taxation in China*. Ann Arbor, MI: University of Michigan Press.

Zhu, Jiangnan, and Dong Zhang. 2017. “Weapons of the Powerful: Authoritarian Elite Competition and Politicized Anticorruption in China.” *Comparative Political Studies* 50(9): 1186–1220.

Appendix A: Tables and Figures

Table A1: Detailed Lists of Provinces Being Inspected during the Nine Rounds of Disciplinary inspections from 2013 to 2019

ID	Time Period	Provinces Being Inspected
1	2013Q2-2013Q3	Hubei, Neimenggu, Chongqing, Guizhou, Jiangxi
2	2013Q4	Jilin, Shanxi, Anhui, Hunan, Guangdong, Yunnan
3	2014Q2	Beijing, Tianjin, Liaoning, Fujian, Shandong, Henan, Hainan, Gansu, Ningxia, Xinjiang
4	2014Q3	Guangxi, Shanghai, Qinghai, Zhejiang, Hebei, Shan'xi, Heilongjiang, Sichuan, Jiangsu
5	2016Q1-2016Q2	Liaoning, Anhui, Shandong, Hunan
6	2016Q3	Tianjin, Jiangxi, Henan, Hubei
7	2016Q4	Beijing, Chongqing, Guangxi, Gansu
8	2017Q1-2017Q2	Neimenggu, Jilin, Yunnan, Shan'xi
9	2018Q1-2018Q2	Fujian, Henan, Sichuan, Guizhou, Liaoning, Heilongjiang, Jiangsu, Shandong, Hunan, Ningxia, Guangdong, Hainan, Heibei, Shanxi

Table A2: Variable Descriptions and Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Inspection Active Period	1920	.203	.402	0	1
Inspection Inactive Period	1920	.219	.414	0	1
Self under Inspection	1920	.044	.206	0	1
Peer under Inspection	1920	.159	.366	0	1
Inspection within 500km	1920	.081	.272	0	1
Inspection within 1000 km	1920	.057	.232	0	1
Inspection over 1000km	1920	.021	.143	0	1
Historical Period	1920	.547	.498	0	1
Party Chief Older Than 60	1920	.579	.494	0	1
Governor Older Than 60	1920	.283	.451	0	1
Tenure of Party Chief	1920	3.202	2.427	1	18
Tenure of Governor	1920	2.958	1.82	1	10
GDP (log form)	1920	9.308	1.034	6.095	11.59
Industry Value Added	1920	6516.435	6813.714	98.4	39141.8

Table A3: Results of the Pre-Post Comparison Model, 2011-2019

	Preference to Use Discretion		
VARIABLES	(1)	(2)	(3)
Inspection Inactive Period	-0.191	-0.188	-0.182
	(0.130)	(0.132)	(0.132)
Inspection Active Period	-0.407**		
	(0.114)		
Self under Inspection		-0.291	-0.290
		(0.179)	(0.180)
Peer under Inspection		-0.437***	
		(0.107)	
Inspection within 500km			-0.371**
			(0.118)
Inspection within 1000 km			-0.578***
			(0.138)
Inspection over 1000km			-0.274
			(0.193)
Historical Period	0.153	0.152	0.152
	(0.135)	(0.135)	(0.136)
Province Fixed Effects	√	√	√
Province Economic controls	√	√	√
Province leader controls	√	√	√
Observations	1,080	1,080	1,080
R-squared	0.059	0.061	0.065

Note: This table presents the effects of central disciplinary inspections on provincial governments' preference to use discretion in industrial policymaking by using the data sample between 2011 and 2019. Province economic controls include provincial GDP (ln) and industrial added value. Province leader controls include the age and tenure of the party chief and the governor of each province. Robust standard errors clustered at province level are reported in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

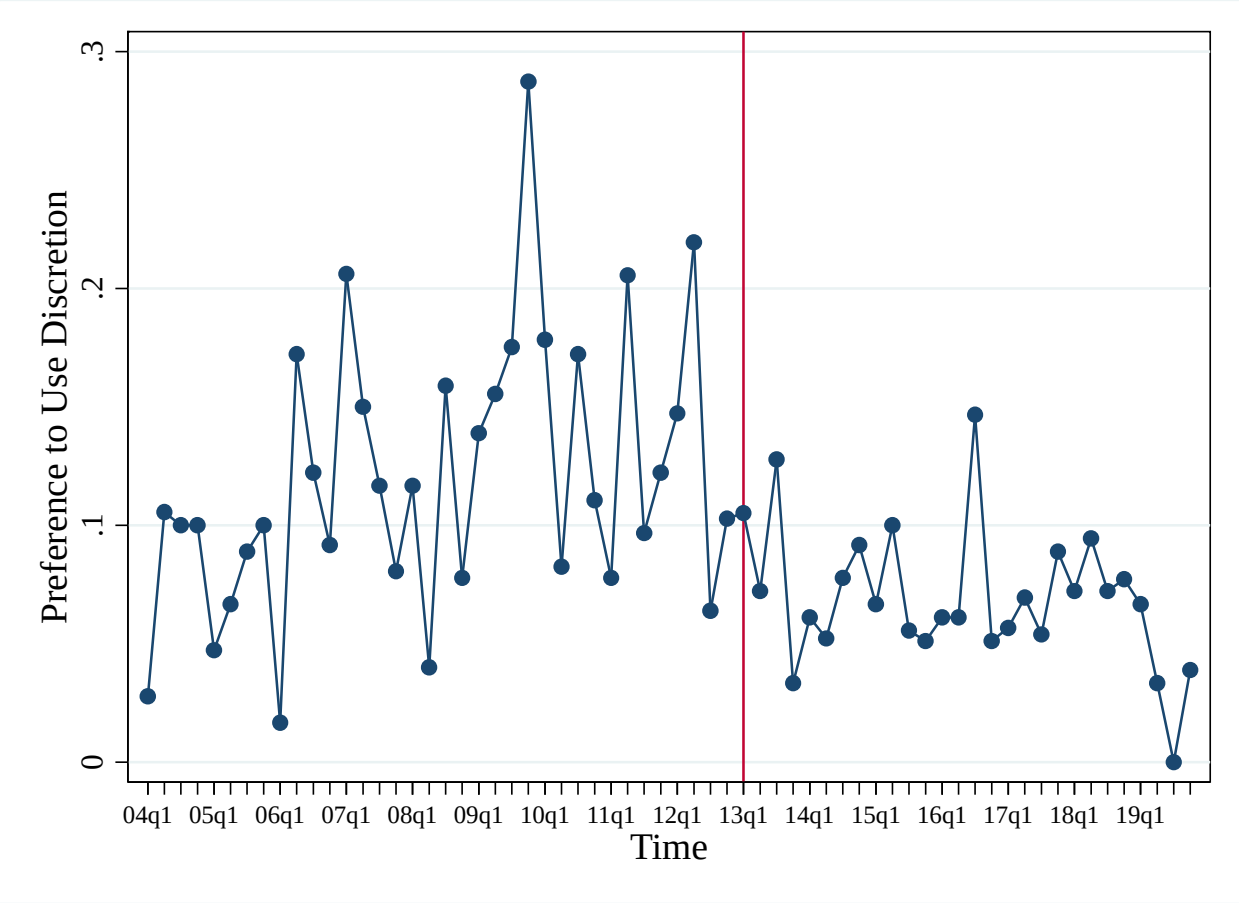

Figure A1: Time Trend in Provincial Governments' Preference for Using Discretion in Policymaking, Using the Alternative Measure

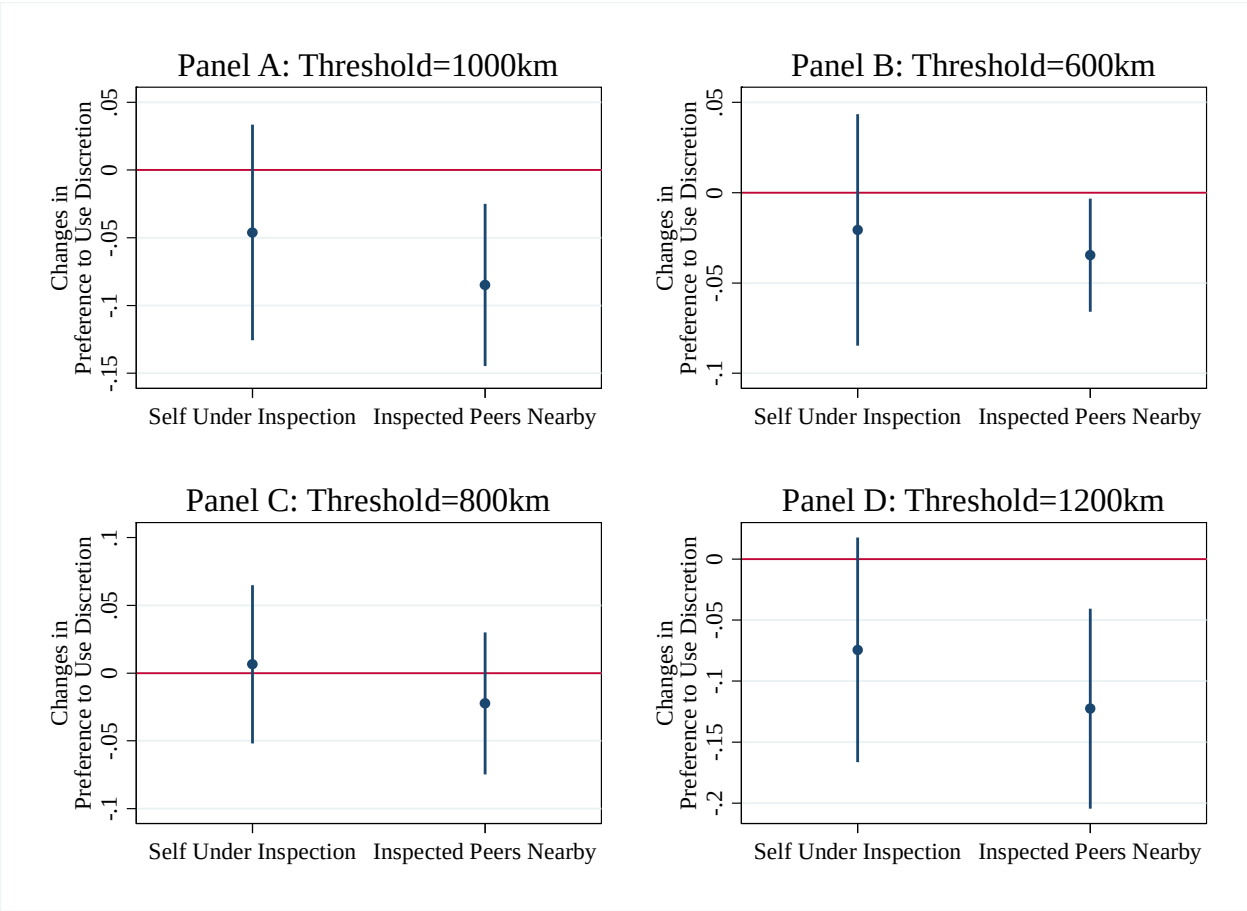

Figure A2: Results of the TWFE Model with Spatial Spillovers, Using the Alternative Measure

Appendix B: Transforming Policies into Distribution-of-Attention Vectors

In this section, we show an example of how to transform an industrial policy into a distribution-of-attention vector which records the amount of attention the policy pays to each of the 155 industry categories.

Our example industrial policy is "Three-Year Plan for Chongqing's Equipment Manufacturing Industry" adopted by Chongqing government in 2012.

STEP ONE: identify all the manufacturing phrases which denote specific manufacturing industry categories in the policy text. The following sentence is an excerpt from the example industrial policy. All the identified manufacturing phrases are highlighted in red.

"重点发展千亿级**摩托车**产业集群和**风电成套装备**、**轨道交通装备**、**环保安全装备**、**船舶零部件**、**航空航天装备**、**能源装备**、**内燃机**、**大型铸锻件**及**关键基础件**等 10 个百亿级产业集群，**重大装备总装**及配套本地化率达到 80%以上。"

STEP TWO: categorize each manufacturing phrase into one (or more than one) of the 155 industry categories. The 155 industry categories are based on the 3-digit codes in Chinese Industrial Classification for National Economic Activities (GB/T 4754-2002).

Table B1: Categorize manufacturing phrases into industry categories

Manufacturing Phrases	Industry Category (with 3-digit code)
摩托车 Motorcycle	373:摩托车制造 Motorcycle Manufacturing
风电成套装备 Wind-Power Equipment	351:锅炉及原动机制造 391: 电机制造 Boiler & Prime Mover Manufacturing; Motor Manufacturing
轨道交通装备 Rail Transportation Equipment	371:铁路运输设备制造，399:其他电器机械制造 Railroad Transportation Equipment; Other Electrical Machinery
环保安全装备 Environmental Protection & Safety Equipment	369: 环保、社会公共安全及其他专用设备制造 Environmental Protection, Public Safety and Other Special Equipment Manufacturing
船舶及零部件 Ship & Ship Parts	367: 农林牧渔专用机械制造，375: 船舶及浮动装置制造 Special Machinery Manufacturing for Agriculture, Forestry, Animal Husbandry and Fishery; Ship and Floating Device Manufacturing
……	

STEP THREE: calculate the amount of attention that a policy pays to each industry category by counting the ratio of the manufacturing phrases classified into that industry category.

Table B2: Calculate Distribution of Attention

Three-Year Plan for Chongqing's Equipment Manufacturing Industry				
Total num. of manufacturing phrases identified in the policy full text: 518				
3-Digit Code	Industry Category	Example Manufacturing Phrases Identified in the Policy Full Text	Frequency	Ratio
369	环保、社会公共安全及其他专用设备制造 Environmental Protection, Public Safety and Other Special Equip.	环保安全装备、大型烟气脱硫装备 Environmental Protection & Safety Equipment, Large-Scale Flue Gas Desulfurization Equipment	41	0.079
375	船舶及浮动装置制造 Ship and Floating Device Manufacturing	船舶及零部件、小型游船、工程船、海洋工程装备 Ship & Ship Parts, small tourist boats, engineering ships, marine engineering equipment	31	0.060
392	输配电及控制设备 Power Transmission and Distribution and Control Equipment	超高压变压器、特高压输变电装备、智能电网装备 UHV transformers, UHV power transmission equipment, smart grid equipment	35	0.068
…				

STEP FOUR: create a 155-dimension vector, and the value of each dimension equals the amount of attention that the industrial policy pays to the corresponding industry category. The 155-dimension vector of the example industrial policy should be like this, and the sequence of the values depend on the sequence of the 3-digit codes of the corresponding industry categories:

$$(x_1, \dots, 0.079, \dots, 0.060, \dots, 0.068, \dots, x_{155})$$

Appendix C: Computational Text Methods to Transform Industrial Policy Full Texts into Distribution-of-Attention Vectors

In this section, we show the main computational text analysis methods we apply to transform policy full texts into vectors.

Table C1: Main Computational Text Analysis Methods

Steps	Main Computational Text Analysis Methods
Step One: Identify Manufacturing Phrases	Named Entity Recognition Technique, Conditional Random Fields (CRF), Supervised Learning
Step Two: Categorize Manufacturing Phrases into Industry Categories	Inverted Index, Levenshtein distance, Word Embedding, Cosine Similarity
Step Three: Calculate Amount of Attention	Word/Phrase Frequency Analysis
Step Four: Create Distribution-of-Attention Vector	N.A.

STEP ONE: Identify Manufacturing Phrases

In step one, we need to first identify all the manufacturing phrases in industrial policies. There is a typical task in natural language processing called "Named Entity Recognition" (NER) which is exactly what we need to do in this step. Named Entity Recognition (NER) aims to recognize mentions of real-world objects belonging to predefined semantic types—such as person, location, organization, product—from unstructured text (Li, et al., 2020). In this research, the goal of NER is to identify from the policy full texts the manufacturing phrases which denote industry categories and products in manufacturing sector.

We applied a widely used supervised machine learning model—conditional random field (CRF) —to accomplish the NER task. CRF is an algorithm specifically designed for dealing with sequential data. In the task of identifying manufacturing phrases in policy texts, it is important to take into account the context of (i.e. information appears before and after) the potential phrases. CRF is best suited to such prediction tasks where contextual information or state of the neighbors affect the current prediction.

Since CRF is a supervised machine learning technique, Users need first create a hand-labeled dataset to train the CRF model so it can later be used to predict unlabeled data. Therefore, we randomly selected 34513 sentences for human coding. These sentences constitute 8.5% of all the sentences appeared in the central-level and provincial-level ITUPs. We invited 5 research assistants to manually identify and label all the keywords/phrases which denote manufacturing industry categories and products in these sentences. After that, we divided the pre-labeled sentences into two parts: 80% of them in the training set and 20% of them in the test set. We later trained the CRF model by using the labeled sentences in the training set, and then we tested the performance of the CRF model by comparing machine-labeled sentences with the human-labeled sentences in the test set.

To evaluate the performance of CRF model, there are two important metrics:

Recall Rate: number of manufacturing phrases correctly identified by the CRF model divided by the total number of manufacturing phrases identified by human beings.

Precision Rate: number of manufacturing phrases correctly identified by the CRF model divided by the total number of manufacturing phrases identified by the CRF model.

We calculated the recall rate and precision rate of the model. The precision rate is 0.855, and the recall rate is 0.803. This means that the CRF model has a satisfactory performance in identifying manufacturing phrases in unstructured policy texts.

Table C2: Performance of CRF Model

Metrics	Value
Precision Rate:	0.855
Recall Rate:	0.803

STEP TWO: Categorize Manufacturing Phrases into Industry Categories

After identifying all the manufacturing phrases in policy text, now it's time to classify these phrases into one or more than one of the 155 industry categories based on the 3-digit codes in Chinese Industrial Classification for National Economic Activities (GB/T 4754-2002).

A challenge here is that it is difficult and time-consuming for human beings to match manufacturing phrases with different industry categories. For example, ordinary people usually do not know that "molybdenum" belongs to the industry category "rare metals" (three-digit code: 333) and that "calcium carbide" to "basic chemical raw material manufacturing" (three-digit

code: 261). As a result, it would be highly costly to create hand-labeled training set from scratch for supervised machine learning.

To address this challenge, here we chose not to use supervised learning technique. Instead, we leveraged several "natural training sets" that provide information about the connection between manufacturing phrases and industry categories. In Table C3, we present these "natural training sets" in detail. We used these natural training sets to create a manufacturing-phrase dictionary which contains both manufacturing phrases and their corresponding industry categories.

Table C3: Natural Training Sets

Name	Issue Year	Issue Agency
Chinese Industrial Classification for National Economic Activities (GB/T 4754-2002)	2002	General Administration of Quality Supervision, Inspection and Quarantine; Chinese Standardization Administration;
Chinese Industrial Classification for National Economic Activities (GB/T 4754-2017)	2017	General Administration of Quality Supervision, Inspection and Quarantine; Chinese Standardization Administration;
Chinese High-tech Industry Classification	2017	National Bureau of Statistics
Chinese Classification for Strategic Emerging Industries	2018	National Bureau of Statistics
Product Catalog for Strategic Emerging Industries in China	2018	National Bureau of Statistics
Health Industry Classification	2019	National Bureau of Statistics
Energy Saving and Environmental Protection Industry	2021	National Bureau of Statistics
Chinese Industrial Enterprise Dataset	2011	Information provided by firms, data collected by National Bureau of Statistics

After created a manufacturing-phrase dictionary, we matched the manufacturing phrases appeared in industrial policies with the manufacturing phrases in the dictionary. The matching process involves two techniques. The first is Levenshtein distance, and the second is word embedding. For each manufacturing phrase appeared in an industrial policy, we matched it with the most similar phrase in the dictionary as long as their similarity has exceeds a threshold. In Table C4, we showed the percentage of manufacturing phrases that were finally matched in central/provincial industrial policies by year.

Table C4: Matching Rate

Year	Central Industrial Policies	Provincial Industrial Policies
2004	0.894	0.926
2005	0.832	0.904
2006	0.901	0.901
2007	0.920	0.926
2008	0.898	0.914
2009	0.923	0.924
2010	0.864	0.915
2011	0.890	0.920
2012	0.883	0.927
2013	0.907	0.895
2014	0.907	0.924
2015	0.858	0.914
2016	0.865	0.918
2017	0.858	0.908
2018	0.834	0.906
2019	0.839	0.907

STEP THREE: Calculate Amount of Attention

After we have categorized each manufacturing phrases into one or more than one industry categories, it is relatively easy to calculate the amount of attention that an industrial policy pays to each of the 155 industry categories. We first calculated the total number of manufacturing phrases, written as *N*, matched in the policy. Then for each industry category i, we calculated the number of matched manufacturing phrases that belong to the industry category, written as m_i. Then the amount of attention that the policy pays to industry category i equals $\frac{m_i}{N}$.