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Theory of the Political Regulation Wave

> The same water – a different wave.
> What matters is that it is a wave.
> What matters is that the wave will return.
> What matters is that it will always return different.
> What matters most of all: however different the returning wave,
> it will always return as a wave of the sea.
>
> Marina Tsvetaeva, Russian poet

2.1 BEIJING'S OLYMPIC BLUE

The year 2008 was a watershed for China to raise its international image, cherished all the more by Beijing after a heartbreaking, narrow-margin loss to Sydney to host the Summer Olympics eight years earlier. Determined to make the Games the most memorable of all time, Beijing spent a then record-high USD 40 billion, of which USD 17 billion was poured into sometimes extreme actions to clean up the environment. One year before the Olympics, Beijing tested short-term pollution control measures based on a previously successful experience at the Sino-African Summit in 2006. During that testing, nitrogen oxides (NO_x) emissions decreased by 40 percent, and ground-level aerosol concentrations over the city also decreased significantly (Wang et al. 2007; Cermak and Knutti 2009). In just a few days, the skyline transformed from being shrouded in brownish-yellow haze to a crystal-clear blue sky (see Frontispiece).

In a mighty wave of pollution regulation, stringent emissions measures were put in place in the months leading up to and during the Olympics. Vehicles that did not meet the European exhaust emissions standards were banned from the city. Half of privately owned cars were kept off the streets through an odd and even number system. Power plants operated at only 30 percent capacity; construction projects were suspended; several high-polluting factories were shut down (UNEP 2009). These measures were not just confined to Beijing but also extended to highly

urbanized industrial centers in localities as far away as Shanxi and Henan. Satellite-based measurements suggest that, from July to September of 2008, Beijing experienced a 43 percent reduction in tropospheric column nitrogen dioxide (NO_2), compared to the previous three years (Witte et al. 2009).[16] Also, Beijing and the provinces to the south experienced boundary layer SO_2 and carbon monoxide (CO) reductions of 13 percent and 12 percent, respectively.

The Beijing Olympics story is a vivid example of how the government can impose campaign-style regulation to change air quality decisively. Local incentives to prioritize specific goals over others underpin this variation. While the existing literature on air quality has deepened our understanding of why excessive pollution exists – even in a country with one of the world's most comprehensive systems of environmental laws and regulations – these works incorrectly assume that air quality in a given locality would stay consistent over time. Furthermore, *systematic* variation in air quality over time, independent of the effect of ad hoc regulation campaigns, remains underexplored.

In this chapter, I begin by laying out the existing knowledge on the political sources of local policy waves and postulating local political incentives as a potent source of such waves. I then propose the theory of the political regulation wave, which comes with three scope conditions. I explain why the quasi-natural experiments in China's air pollution control efforts in the past two decades make for excellent empirical cases to test the theory. Finally, I spell out three testable implications for Chapters 4 and 5.

2.2 POLITICAL SOURCES OF LOCAL POLICY WAVES

According to Max Weber's seminal work on bureaucracy, regular activities in bureaucratic agencies are carried out as official duties and the authority to pursue these duties "is distributed in a stable way and is strictly delimited by rules concerning the coercive means, physical, sacerdotal, or otherwise" (Weber 1946, 196). In a similar vein, Robert Merton elaborates that "the bureaucratic structure exerts a constant pressure upon the official to be 'methodical, prudent, disciplined'" (Merton 1963, 365). Merton further notes that "if the bureaucracy is to operate successfully, it must attain a high degree of reliability of behavior, an unusual degree of conformity with prescribed patterns of action" (Merton 1963, 365).

Regular, Weberian-style regulation, which assumes an insulated bureaucracy, is expected to deliver consistent policy outcomes. That may not hold when the regulatory bureaucracy comes under the influence of politicians or political leaders via ad hoc campaign-style implementation of policies to achieve quick outcomes.

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[16] The data source used in this book for NO_2 is Krotkov (2013).

Campaigns are usually short lived, disruptive of regular activities, resource intensive, attention demanding, and fierce in sanctioning noncompliance, making them quite effective at achieving results in a short time. These characteristics of campaigns have given rise to the conventional wisdom that campaigns are the main political driver of local policy waves at the implementation stage (Weiss and Tschirhart 1994; van Rooij 2016). Such operations are government-led and sponsored efforts to address highly urgent issues within a specified time. Government campaigns are targeted at producing policy outcomes in a broad range of issue areas, from family planning to crime prevention. Campaigns are seen across regime types, although campaigns in autocracies generally involve a more significant segment of the population and impose more coercion than those in democracies (Weiss and Tschirhart 1994; van Rooij 2016).

Mobilization campaigns have been integral to propagating central policies in contemporary China (Bernstein 1967; Bennett 1976; Cell 1976; Oksenberg 1969; Teiwes 1979). Their popularity as a mode of governance in China, from imperial times to the present day, is magnified by the presence of a top-down political structure and the absence of a rule of law culture (Zhou 2012). The Great Leap Forward (1958–59) is rife with examples of Maoist-style ideological campaigns to engender policy waves in localities. In 1958, Mao waged the Four Pests campaign to eradicate pests responsible for transmitting deadly diseases (mosquitos, rodents, and flies) and for consuming grain seeds (sparrows). The massive killing of sparrows was rooted in Mao's conviction that "people will conquer Nature" and his desire for China's self-sufficiency in grain production (Shapiro 2001). Local grain-first campaigns culminated in devastating ecological destruction, widespread resource waste and famine, and tremendous human suffering (Bernstein 1984; Shapiro 2001).

The study of Chinese politics bids no "farewell to revolution" since the Maoist-style campaigns are still alive and well to engender policy waves in localities (Perry 2007). Campaigns have remained a core instrument to promote the one-child policy (White 2006), curb the practice of informal levies (Bernstein and Lü 2003), combat public health crises like SARS (Pang et al. 2003), fight corruption (Manion 2016), crack down on crimes (Tanner 2000), foster patriotic education (Zhao 1998), attack "counter-revolutionary" forces like Falun Gong (Noakes and Ford 2015), disseminate legal knowledge (Exner 1995), and enforce existing environmental laws and policies to protect natural resources and the environment (van Rooij 2006; Guo and Foster 2008; Liu et al. 2015).

Can regular enforcement also engender local policy waves? The central or federal policy interacts with the microlevel institutional setting. When the bureaucracy is not insulated from politics, local political incentives become a defining contextual factor within the implementing environment. In decentralized political systems, local leaders or politicians can have significant discretion in decision-making, integrating their desires and priorities into the implementation process as they see fit. Hence, I postulate that their desires and priorities can shape bureaucratic

enforcement strategically throughout their tenure, engendering local policy waves in predictable ways.

2.3 THEORETICAL FRAMEWORK

The theoretical foundation for my study consists of three core elements, which form the scope conditions of the political regulation wave theory. First, local politicians or leaders possess power over decision-making, resource allocation, and bureaucratic activities. Second, incentives for reelection or promotion manifest during a local leader's or politician's tenure and shape the exercise of power over the regulatory bureaucracy over time. Third, when the policy issue is high conflict and low ambiguity, its implementation is political in nature. I expand on these three scope conditions below.

2.3.1 *Local Discretion and Control over the Bureaucracy*

In a decentralized political system, local politicians or leaders usually possess considerable power over decision-making and control over resources. Local politicians' or leaders' ability to wield local fiscal and state capacity may empower them to influence bureaucracies' everyday functioning, either directly or indirectly.

In some contexts, local politicians or leaders can exert direct control over bureaucratic activities. This has been documented empirically in various contexts. In India, some politicians have refused to call in police on Muslim protestors and have transferred bureaucrats who tried to act (Wilkinson 2006). In Chile, Santiago's mayor declined to involve the police against street vendors in order to curry favor with poor voters (Holland 2017). In China, top prefectural leaders sometimes call up environmental protection bureaus to order laxer regulation of large industrial firms that hire predominantly male workers to preempt protests when the leaders could be up for promotion consideration (see Chapter 5).

In other contexts, the politicians' or leaders' influence over the bureaucracy is more subtle, exercised instead by allocating scarce resources to their favored types of bureaucratic activities, leaving the unfunded or underfunded bureaucratic activities unfulfilled or underfulfilled. This phenomenon is seen almost everywhere. In the United States, the Trump administration was quite aggressive in slashing funding to the Environmental Protection Agency (EPA), putting public health at risk while advancing the administration's arguably antienvironment agenda (Thrush and Davenport 2017).

Hence, local politicians' or leaders' power over decision-making and resource allocation allows them to act on their career incentives during the policy implementation process. This is accomplished via political control over bureaucratic regulatory activities.

2.3.2 *Incentive-Based Policy Prioritization throughout Tenure*

Given limited time, resources, and energy, people have to be selective and realistic about what goals they pursue, how much effort to expend on them, and when to target those efforts. This could not be truer for officeholders, who also face limited time in office. The seminal work of Olson (1993) introduces the distinction between a "stationary bandit" and a "roving bandit," where the former, with a longer time horizon, provides conditions that promote economic productivity while the latter, feeling insecure in their rule, expropriates assets and forgoes long-term gains. Olson's framework of policy prioritization under a time horizon constraint has been extended to study of a variety of policy contexts. For incumbents who face fierce competition, the incentive to seize all available opportunities to demonstrate competency in what their superiors or voters care the most about, and to do so most intensively at the right time, is naturally strong. The "right time" is determined by the preferences of the voters in democracies and political superiors in autocracies.

A politician's time in office influences a wide range of policy outcomes. As reviewed in Chapter 1, in democratic regimes, political incentives to seek reelection have given rise to growth in employment, income, expenditure on infrastructure projects, and fiscal balance around election times to attract support from voters who usually judge incumbent competency during that relatively short time span (Tufte 1978; Achen and Bartels 2016; Gonzalez 2002; Drazen and Eslava 2010; Alt and Lassen 2006).

In authoritarian regimes, political incentives to seek promotion have similarly spawned strategic behavior in local government spending and environmental regulation (Guo 2009; Shen 2018). Across contexts, local politicians or political leaders are incentivized to prioritize different policies throughout their tenure to maximize their chances of career advancement. Political superiors prefer such prioritization as part of a strategy to distinguish subordinates based on their capability of improvement and their control of localities. I will explain this point in the context of China in more detail in Chapter 3.

The prioritization of different policies throughout tenure in both democracies and autocracies entails that for any single policy, deemed critical or not, it is implemented to varying degrees at different times to cater to the preferences of voters or political superiors. That temporal change in implementation creates policy waves.

2.3.3 *High-Conflict, Low-Ambiguity Policy*

Finally, the political regulation wave theory applies to policies that involve high levels of conflict and low levels of ambiguity. According to the synthesis of the policy implementation literature presented in Matland (1995), the nature of particular policy implementation can be categorized along two dimensions: the level of conflict and the level of ambiguity.

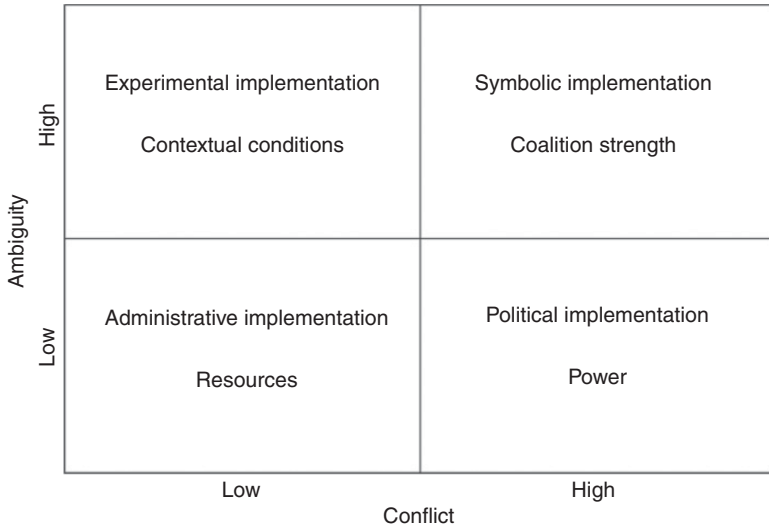|	Low Conflict	High Conflict
High Ambiguity	Experimental implementation Contextual conditions	Symbolic implementation Coalition strength
Low Ambiguity	Administrative implementation Resources	Political implementation Power

FIGURE 2.1 The nature of policy implementation

Policy ambiguity is manifested in the ambiguity of goals and the ambiguity of means (Matland 1995, 157). An example of an unambiguous goal is to reduce the annual concentration of pollutant X by Y percentage based on the level in year Z. An example of an ambiguous goal is "to promote sustainable development" – this is vague, broad, and it can be interpreted in more than one way.

According to Matland (1995), the ambiguity-conflict dimensions, presented dichotomously, categorize the nature of policy implementation into four types: administrative, political, experimental, or symbolic (Figure 2.1). Different types of policy implementation rely on different factors to succeed, such as resources. For example, when a policy is unambiguous but involves conflicts, it is political in nature, and the success (or lack thereof) of its implementation hinges on power.

In sum, local politicians or leaders who possess discretionary power over decision-making and resource allocation are incentivized to systematically influence bureaucratic regulatory activities differently throughout their tenure to maximize their career gains, engendering policy waves. When the policy issue is high conflict and low ambiguity, its strategic behavior can give rise to political regulation waves.

2.4 EMPIRICAL CONTEXT

Industrialization and urbanization in China have occurred at an unprecedented rate in the past few decades, pulling millions out of poverty and into a burgeoning middle class. Such a grand transformation demanded gigantic consumption of fossil fuels, especially coal. A direct consequence has been massive emissions of air

pollutants like SO_2, a toxic gas that contributes to acid rain and endangers human health, and $PM_{2.5}$, a mixture of various particles whose size is smaller than one-thirtieth of a normal human hair. $PM_{2.5}$ is the most dangerous type of air pollution due to its ability to penetrate deep into the lungs and cause respiratory and cardiovascular ailments.

Economic development and social stability were the two pillars used to evaluate cadre performance until at least the 2000s (Zhou 2007; Wang and Minzner 2015). While a plethora of environmental laws and regulations had already existed in China for a few decades, environmental protection did not effectively gain traction until the 11th FYP (2006–10), which granted binding-target status for emissions reductions of SO_2 and COD – a measure for water pollution – in cadre evaluation. The 10th FYP (2001–5) stipulated the same reduction targets for SO_2 and COD, but they were nonbinding. Under the 12th FYP (2011–15), $PM_{2.5}$ became monitored in four regional clusters. Under the first phase of the Clean Air Action Plan (2013–17), meeting $PM_{2.5}$ pollution reduction targets became binding in select cities. Changing rules reshaped the incentive structure of local implementers and, by extension, the systematic pattern in policy implementation.

The local regulatory discretion of local political leaders, the incentives provided by the *nomenklatura* and short tenures, and the contrasting nature of SO_2 and $PM_{2.5}$ emissions reduction policies (the former being high conflict and low ambiguity, and the latter high conflict and medium ambiguity) make China during 2000–17 a compelling case to test the political regulation wave theory. In the following subsections, I expand on these three points below, followed by testable implications. Chapter 3 will provide a more detailed description of China's evolving local governance.

2.4.1 *Local Political Discretion and Control over the Bureaucracy*

Contrary to popular belief, China has one of the world's most decentralized political systems, as measured by the subnational share of expenditures or revenues. In 2002, local governments accounted for nearly 70 percent of all government spending (Landry 2008). Local governments in China have considerable discretionary power over budgetary and resource allocation, as well as decision-making.

Furthermore, local political power is extended into the bureaucratic sphere. In stark contrast to a Weberian bureaucracy that is entirely insulated from political influence, Chinese bureaucracies are under the indirect control of local political actors. That means who gets to become the bureau leader, how much they can spend, and what they do are all influenced by local leaders. I will explain the microworkings in more detail in Chapter 3.

The literature on the decentralization of the Chinese political and bureaucratic apparatuses is replete with examples of local regulatory discretion over policy implementation. In the case of state procurement of grain from peasants,

Oi (1989) illustrates how the production team leader, as a state agent, was at liberty to interpret state grain procurement laws for the peasants and control the upward flow of information to the central state. Manion (1993) highlights that, in implementing state retirement policies for senior cadres, establishing an administrative norm of retirement, and rejuvenating China's vast bureaucracy, the middlemen who were tasked with local implementation took advantage of the discretion they enjoyed to set the conditions of retirement by bargaining with old cadres.

2.4.2 Nomenklatura *and Preferred Implementation Pattern for Key Policies*

Imported from the former Soviet Union, the *nomenklatura* personnel management system is the main instrument the Chinese Communist Party employs to appoint, promote, transfer, demote, or remove officials. In *nomenklatura*, each level manages the personnel at the immediately lower level. Policies that are prioritized by the center, especially those given binding targets, are crucial for cadre promotion.

Local leaders in China typically want to get promoted because there are usually considerable increments in material benefits associated with a promotion in administrative rank. Given the short duration of local tenures, which most commonly last for three years, aspiring local leaders can be particularly incentivized to induce an implementation pattern throughout their tenure based on what their superiors value. I will elaborate more on the characteristics of the *nomenklatura* and local tenures and the emphasis on a gradual improvement in key policy areas in Chapter 3.

2.4.3 *High-Conflict, Low- and Medium-Ambiguity Air Pollution Control Policies*

Reducing both SO_2 and $PM_{2.5}$ emissions involves a high level of conflict because economic interests are pitted against reduction measures. Furthermore, reduction policy targets for both pollutants in the past nearly two decades have been unambiguously specified. However, the means to achieving those targets are more ambiguous for $PM_{2.5}$ than SO_2 control.

SO_2 and $PM_{2.5}$: High Conflict

The policy to reduce SO_2 emissions involved a high level of conflict when social stability and economic growth still ruled in cadre evaluation; SO_2 emissions mainly come from the industrial sector. In the past, it was in the interest of the local leadership to protect industries from regulation because the industries contributed to the local revenue base. The local EPBs, which are the chief bureaucracies in charge of implementing environmental policies, were often complicit because pollution levies from polluting industries contributed indirectly to their budgets. Without explicit incentives embodied in the binding targets in cadre evaluation,

local leaders were not poised to mandate regulatory rules that may limit industrial production, such as the installation and operation of flue gas desulfurization (FGD) devices. These FGD systems are more commonly known as "scrubbers" and are deployed to remove SO_2 from the flue gas. While scrubbers have been documented to be effective at removing SO_2, their operation and maintenance are costly. Until 2007, the pollution levy rate was much lower than the cost to operate the scrubbers, rendering it less expensive to pollute and pay the levy than actually implement emissions control (Gao et al. 2009). Hence, reducing SO_2 involved a high level of conflict.

Reducing $PM_{2.5}$ emissions also created a high level of conflict. $PM_{2.5}$ is mainly generated by the types of economic activities that are most rewarded by cadre evaluation, namely, industrial production, infrastructure projects, and transportation. Reducing $PM_{2.5}$ would entail limiting economic activities or installing pollutant treatment devices against the interests of economic actors. Furthermore, unlike SO_2, whose sources are concentrated in the industrial sector, the multitude of sources that contribute to $PM_{2.5}$ means that effective control often involves drastically shutting down the operation of multiple sectors.

SO_2: Unambiguous Goals, Unambiguous Means

Government efforts to restrict SO_2 emissions started with the 9th FYP (1996–2000), which stipulated emissions targets for critical sectors and regions that were mostly ambitious and not rigorously enforced. Both the 10th and the 11th FYPs specified an overall 10 percent decrease in SO_2 emissions, using the 2000 and 2005 figures as the baselines, respectively. However, under the 11th FYP, SO_2 emissions reduction became a binding target in the evaluation system for local officials in most prefectures.

The central government's determination to reduce SO_2 emissions is reflected in the opening speech of the then premier Wen Jiabao at the National People's Congress (NPC) session in 2007. He underscored the mandatory nature of the targets in the 11th FYP and the need for local officials to work resolutely toward reaching them. He also declared that the NPC would receive annual reports from the State Council on progress made toward achieving the reduction goals.

In addition to the centrally imposed incentives to reduce emissions, a series of enhanced monitoring measures were also put in place under the 11th FYP. Between 2001 and 2005, local efforts to verify industry self-reported emissions statistics were limited. The 11th FYP instituted auditing and data verification programs operated by the Ministry of Environmental Protection (MEP), mandated the installation of continuous emissions monitoring systems (CEMS) at coal-fired power plants, and deployed data from satellite observations and air quality models to verify reported SO_2 trends. The reported and satellite-derived patterns have been documented to be mostly consistent (Schreifels, Fu, and Wilson 2012). Table 2.1 summarizes the comparison between the two FYPs. The policy goals are unambiguous.

TABLE 2.1 *Comparison of sulfur dioxide control under the 10th and the 11th FYPs*

	10th FYP	11th FYP
Time period	2001–5	2006–10
Overall SO_2 reduction goal	10 percent	10 percent
SO_2 reduction is a binding target	No	Yes
Emissions verification	Self-reported data that were largely unverified or unverifiable	• Auditing and data verification programs operated by the MEP • Installation of CEMS at coal-fired power plants • Verification based on data from satellite observations and air quality models
Implementation outcome	2005 emissions 28 percent above 2000 level	2010 emissions 14 percent below 2005 level

$PM_{2.5}$: Unambiguous Goals, Somewhat Ambiguous Means

The goal to control $PM_{2.5}$ pollution is similarly unambiguous. The 12th FYP (2011–15) made it mandatory to monitor $PM_{2.5}$ in regional clusters. Under the first phase of the Clean Air Action Plan (2013–17), reducing $PM_{2.5}$ pollution in these regions by specified percentages by 2017 became mandatory and would become binding targets in the cadre evaluation system. Regional clusters that received binding targets to reduce $PM_{2.5}$ were Jing-Jin-Ji and surrounding areas (i.e., Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Shandong), the Yangtze River delta (i.e., Shanghai, Jiangsu, Zhejiang), the Pearl River delta (i.e., some prefectures in Guangdong that include Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Zhaoqing, Huizhou, Dongguan, and Zhongshan), and Chongqing. Hence, the policy goals to reduce $PM_{2.5}$ pollution are unambiguous.

However, the means to achieving those goals can be somewhat ambiguous. Unlike pollutants such as SO_2, which has a primarily industrial origin and requires the installation and operation of scrubbers to treat it effectively, $PM_{2.5}$ has diverse emissions sources spanning many sectors, from industry to transportation. Efforts to comprehensively identify its origins in China are still ongoing as of the time of this writing. Successfully reducing $PM_{2.5}$ so far has involved drastic measures, such as shutting down business operations across various sectors.

SO_2 and $PM_{2.5}$ control thus present an interesting comparison, although $PM_{2.5}$ control is not within the scope of the theory of the political regulation wave. As Richard Matland's (1995) synthesis would predict, when a policy has a high level of conflict (e.g., economy vs. environment) and some level of ambiguity, political power alone is no longer the main determinant of successful implementation. That consideration leads to varying testable implications for the two types of pollutants.

2.5 TESTABLE IMPLICATIONS

How do local career incentives translate into implementation patterns? The theory of the political regulation wave yields a general empirical implication. When policy X is crucial for promotion or reelection, local leaders or politicians are incentivized to promote the implementation of X across their tenures in a pattern preferred by their superiors or voters, *ceteris paribus*. The shape of that pattern (e.g., gradual scale-up, flat, peak in a given year) depends on what is desired. For instance, preference for a gradual improvement would entail a gradual scale-up in implementation. For another example, appreciation for regularized, Weberian-like enforcement would mean equal implementation over time. A shift in the incentive structure of local politicians or political leaders is likely to transform the pattern in implementation.

In the context of air pollution control in China, I propose three hypotheses for pollutants like SO_2 whose characteristics satisfy all the scope conditions of the theory, though I would expect H1, the political pollution wave, and H3, the dominant mechanism, but not H2, the political environmental protection wave, to also hold for a pollutant like $PM_{2.5}$. The first hypothesis concerns the scenario in which the economy and stability are paramount and the implementation of those goals is expected to improve gradually over time (more on this in Chapter 3). In this setting, strategizing local leaders loosen environmental regulation gradually during their time in office. The gradual tapering off of environmental regulation then results in more and more pollution, *ceteris paribus*, giving rise to a political pollution wave.

H1 **Political pollution wave**: *When the economy and social stability are highly prioritized and expected to improve gradually, and the reduction of pollutant X is not binding for career advancement, regulation of pollutant X will become laxer across the leader's tenure, ceteris paribus.*

The second hypothesis applies when environmental protection becomes more critical vis-à-vis other goals. When the environment takes center stage, and effective reduction of pollutant Y is credibly tied to career advancement for local leaders, the political regulation wave will take the form of a political environmental protection wave, which could exhibit a regularized trend or even the reverse of a political pollution wave, depending on the expectation of upper levels (more on this in Chapter 3). In this case, strategizing local leaders may order consistent or gradually more stringent regulation of pollutant Y throughout their tenure, contributing to a leveling or decline in pollutant Y, *ceteris paribus*. In other words, the local leaders seek to align their observable actions with their superiors' expectations. This is expected to apply to the control of SO_2, but not $PM_{2.5}$.

H2 **Political environmental protection wave**: *When binding targets are set to reduce pollutant Y, the level of regulation for pollutant Y remains consistent or increases across the leader's tenure, ceteris paribus, depending on the preferences of political superiors.*

Finally, a question remains: which is the dominant causal mechanism in explaining the pollution patterns over time – the promotion of economic development or regulatory forbearance, or both? Economic growth is the result of *ex-ante* planning. It is challenging to time growth for strategically important periods, which is especially true given the variability of tenure length in China and the number of actors involved in making growth happen. I will elaborate on this point more in Chapter 3. By contrast, environmental regulation can be switched on and off quickly, making it the more likely candidate to explain temporal changes in pollution, especially as local leaders further along in their tenure take strategic actions to boost their chances of promotion. Answering this question will also help shed light on an alternative explanation – learning by doing. This perspective suggests that the gradual scale-up in pollution is the result of economic growth, which may reflect the leaders' learning and improved ability to grow the economy.

H3 **Dominant mechanism**: *Regulation, rather than economic development, is the dominant mechanism that explains patterns in the concentration of pollutant Z during a given tenure, ceteris paribus.*

If regulatory forbearance were the primary mechanism driving pollution patterns, that would mean additional pollution taking place without further growth. However, some may be confused as to how that could be possible. I explain it using the hypothetical scenarios presented in Figure 2.2 below. Generally, the amount of pollution is influenced by two main pathways: economic growth and environmental regulation (Ringquist 1993). While holding economic outputs constant, the amount of pollution generated is influenced by regulatory stringency. In the first situation (Figure 2.2a), environmental regulation is stringent due to, for instance, more visits from EPB inspection teams. Industries have to install and operate pollution treatment facilities or devices and burn cleaner fuels to avoid hefty fines and other punishments. One unit of pollution is generated per unit of growth. In the second situation (Figure 2.2b), environmental regulation is lax. Polluters enjoy some freedom not to operate pollution treatment facilities or devices and to burn dirty fuels. Two units of pollution are produced per unit of growth. Hence, with laxer regulation, it is possible to incur more pollution while growth remains constant.

FIGURE 2.2 Additional pollution without additional growth

2.6 CONCLUSION

In this chapter, I have surveyed the relevant literature on local policy implementation and proposed a new political source of local policy waves. I have presented a new incentive-based theory, the theory of the political regulation wave, to explain the systematic variation in regulatory stringency over time. It is intended to be a general theory with three scope conditions. First, in a decentralized political system, local leaders or politicians possess discretionary power when it comes to decision-making and resource allocation, and they have control over the bureaucracy. Second, local politicians or political leaders are incentivized to prioritize different policy goals throughout their tenure, as per the preference of their constituencies or political superiors, to maximize their chances of reelection or promotion. Third, when the implementation of the policy is high conflict and low ambiguity in nature, its success depends on power dynamics. China's air pollution control policies for SO_2 satisfy the scope conditions and provide a suitable quasi-natural experiment to test the theory. $PM_{2.5}$ control policy, by contrast, entails some level of ambiguity. While it does not neatly satisfy the third scope condition, it provides an interesting comparison with SO_2 reduction.

I derive three testable implications for the empirically focused Chapters 4 and 5, where the first and third implications are predicted to apply to both SO_2 and $PM_{2.5}$ while the second only to SO_2. The first testable implication concerns the political pollution wave. I hypothesize that when the economy and social stability are highly prioritized and expected to improve gradually, and the reduction of pollutant X is not binding for career advancement, regulation of pollutant X will become laxer across the leader's tenure, *ceteris paribus*. The second testable implication is about the political environmental protection wave. I hypothesize that when binding targets are set to reduce pollutant Y, the level of regulation for pollutant Y remains consistent or increases across the leader's tenure, *ceteris paribus*. The exact trend in the concentration of pollutant Y depends on what political superiors want. Finally, I hypothesize that manipulating the stringency of the regulation of pollutant Z is the dominant mechanism underpinning variation in the concentration of pollutant Z throughout a given tenure.[17]

In the next chapter, I will explain how governance, especially local governance, happens in China, with particular attention paid to the environmental realm. I will also deliberate on the changing importance of environmental protection in China's political landscape and important policy initiatives over time. Referencing public and internal policy documents, I will explain the preferred implementation patterns for key policy goals from upper levels.

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[17]   Different letters – X, Y, Z – are used to refer to any potential pollutants.