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By

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Abstract

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In weak institutional environments, how can political leaders push through policies that challenge powerful local interests? When states use heavy-handed measures to enforce these policies, is it a sign of strength, or of weakness? This dissertation addresses these questions through examining the puzzle of China's "blunt force" approach to regulating polluters.

In China, and in much of the developing world, attempts to regulate pollution are frequently undermined by corrupt bureaucrats and powerful local businesses. While most states try to solve these problems through bottom-up 'fire alarm' mechanisms—where protests help expose egregious violations—China has resorted to a top-down, 'blunt force' solution, where pollution is reduced by forcibly shutting down entire industries. Quantitative analysis demonstrates that blunt force regulation has successfully reduced pollution across China's cities, but case studies show that it comes at immense cost to local employment, revenue and growth rates. Why would a state capable of delivering decades of high growth, censoring the internet, and controlling birth rates, have to resort to such an unsophisticated, costly method of pollution control?

I argue that blunt force regulation is a product of both the strengths and weaknesses of the Chinese state. China's ability to command bureaucrats to instantly close down polluters, and then silence opposition from workers and entrepreneurs, would earn it the label of 'strong' state in the eyes of its developing country peers. Yet China has been driven to these strong measures, not by choice, but because it cannot incentivize bureaucrats to apply a constant pressure on polluters, and because it fears the public accountability mechanisms that non-authoritarian states draw on to police their bureaucrats. Instead, the leadership must rely on extreme, one-off interventions that require only temporary bureaucratic compliance to reduce pollution. That China can push through such costly measures is a sign of its strength. That they are driven to such measures is a sign of their weakness.

My dissertation develops this argument in three stages. First, through quantitative analysis of original data, I demonstrate that blunt force regulation has become one of the most widespread and important means for systematically reducing pollution in China's cities. This makes it a phenomenon worthy of explanation. Second, using insights from

interviews with national, provincial and local officials, I show how the state's struggle to regulate polluters through weak courts and a porous bureaucracy prompted a turn to more "direct" blunt force methods. Finally, using descriptive statistics and two structured case studies, I show how the state was able to contain the political risks of blunt force measures by disproportionately targeting small, weak firms and informal, transient labor. The success of this strategy is a testament to the depth of China's control over society. However, the inefficiency of this strategy—where the biggest polluters were left largely unscathed—highlights the compromises the regime must make to sustain its rule. In sum, this three-part argument demonstrates how blunt force regulation was a sub-optimal solution arising from China's combination of state strengths and weaknesses.

Examples of blunt force regulation can also be found in Russia, Latin America, and Southeast Asia: states engage in short term solutions to regulatory problems that seem rash, heavy-handed, and counter to leaders' political interests. This dissertation offers a theory for why these measures might be rational in light of the specific institutional challenges of authoritarian states, or of weakly institutionalized states. In so doing, it offers fresh understanding on what it means to be a strong or weak state.

Contents

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Chapter 1

Introduction: Clean Air at What Cost?[1]

1. Introduction and Puzzle

In February 2015, the mayor of Linyi—a city in China's Shandong province—was 'summoned' by the Ministry of Environmental Protection in Beijing to discuss his city's pollution crisis. Days before, environmental inspectors from Beijing had uncovered major pollution violations in 13 of Linyi's 15 biggest companies[2]. Five days after the summoning, city leaders ordered 57 of Linyi's largest factories to stop production. At the stroke of midnight, authorities cut off electricity to an entire industrial park, even though some factories were still in the midst of production. In one glass factory, the sudden electricity outage caused 2000 tons of molten glass and tin to flood into a furnace, causing irreparable damage[3]. Because electricity was cut off to entire industrial areas, even companies that had been verified compliant by regulators were forced to stop production indefinitely.

In the ensuing weeks, authorities ordered a further 412 factories to reduce production output and dismantled several smaller, older factories whose chances of cleaning up their operations had been deemed "hopeless". These 'stop production' orders lasted for several months, until a looming debt crisis forced authorities to lift the ban on normal operations. One high-ranking official in Linyi later estimated that these measures had cost the city 60,000 jobs, and led to defaults on 100 billion RMB worth of business loans (approximately 15 billion USD)[4]. And yet air quality did improve: between January and May 2015, the level of harmful airborne micro-particles (PM2.5) in the city dropped by 25%[5].

In this dissertation, I argue that the measures undertaken in Linyi are characteristic of an emerging 'blunt force' approach to regulating pollution in China. This blunt force approach has two unique features: First, instead of identifying and punishing individual violators, the state applies punitive measures to entire categories of firms that have been deemed 'too polluting'. This means that compliant firms might also be sanctioned in the process. Second, instead of using material incentives or punitive threats

[1] This material is based upon work supported by the National Science Foundation under Grant No. 1560166. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

[2] China Central Television (CCTV), March 1 2015. Focus Report: From "supervising enterprises" to "supervising the government" (《焦点访谈》从"督企"到"督政"). See http://news.cntv.cn/2015/03/01/VIDE1425211015378282.shtml, accessed January 10, 2017.

[3] South China Morning Post, July 2 2015: 60,000 jobs: the cost of one Chinese city's cleaner air. See http://www.scmp.com/news/china/policies-politics/article/1831846/60000-jobs-cost-one-chinese-citys-cleaner-air, accessed July 3 2015.

[4] The Paper. July 2 2015: Linyi's pollution control quickly turns a corner (临沂治污急转弯). See http://www.thepaper.cn/newsDetail_forward_1347676 , accessed July 3 2015.

[5] South China Morning Post, July 2 2015

to deter polluting behavior, the state will intervene directly in firm operations to stop them from producing (and therefore polluting) altogether. These two unusual characteristics of blunt force regulation allow the state to achieve noticeable improvements in pollution levels; data I have gathered suggests that over a period of five years, 11 highly polluting Chinese industries were forced to halt or reduce production in 269 out of 287 cities, with a total of 1.2 billion tons of industrial capacity forcibly reduced in the process. Moreover, quantitative tests demonstrate that reductions in air pollution levels are more closely associated with blunt force regulation than with any other form of regulation. Together, this data confirms that not only are blunt force measures widespread, but they have also become one of the most important means for reducing pollution in China.

Blunt force regulation may have contributed to China's recent success in reducing pollution, but it is an enormously costly solution: First, it can result in compliant, profitable firms being punished despite their efforts to reduce pollution. Not only is this counterproductive, because it devalues compliance and discourages firms from investing in pollution abatement, it is also inefficient, because it deprives firms of the chance to adapt to new regulatory standards while continuing to contribute to growth. Second, blunt force regulation destroys revenue intake and raises the risk of unrest from workers who have lost their jobs, and from entrepreneurs who have lost their businesses. This combination of reduced revenue and rising unrest would be unpalatable to political leaders in any context. However, China's leaders are especially sensitive to open unrest because, as an authoritarian regime, they cannot rely on regular elections to defuse public discontent. Moreover, as a regime that runs the country through a vast, unaccountable bureaucracy, China's leaders are especially reliant on steady streams of local revenue to keep their bureaucrats loyal and committed to state interests. Why, then, have China's leaders chosen such a costly solution to cleaning up the air, and a solution that runs so counter to their political interests?

In this dissertation, I argue that China's politically costly, blunt force approach to pollution control seems more understandable in light of the unique regulatory hurdles and political tradeoffs that developing countries face. While growth friendly environmental models may seem more appropriate for growth-focused developing countries, they presume a high-level of institutional development that is simply unavailable in these countries. Most developing countries struggle with limited administrative capacity, dysfunctional bureaucracies and inadequate institutional authority. Often, these problems are exacerbated by extreme social and environmental crises that require immediate solutions. In the face of these problems, direct, forceful solutions become the most effective and politically expedient approach to pollution regulation. Put simply, in weak institutional environments, it is more feasible for states to reduce pollution by closing down factories, than by investing in the legal, administrative and political infrastructure required to enforce pollution regulation effectively.

Of course, the decision to abruptly restructure local industry or arbitrarily intervene in a firm's operations comes at a high political and social cost. The willingness of a state to opt for such heavy-handed interventions may therefore depend on the urgency of their regulatory crisis and their capacity to mitigate the consequences. In this dissertation, I show how China's success in blunt force pollution reduction was achieved through authoritarian tools of control: the regime pursued a deliberate strategy of

targeting and repressing smaller, weaker firms and workers, while buying off the most powerful companies. Their commitment to this ruthless authoritarian strategy may explain why China's blunt force pollution control policies have, to my knowledge, gone further, lasted longer, and perhaps succeeded better, than any example that has emerged elsewhere. In short, it was the combination of the Chinese state's weakness (in controlling everyday bureaucratic activity) and strength (in enforcing heavy-handed authoritarian interventions) that drove them to this unusual blunt force strategy.

Does China's success suggest that a blunt force approach may be a more 'rational' model for developing countries? In the following sections, I examine the problems of applying conventional models of regulation to weak institutional environments. I then introduce blunt force regulation as an alternative, examining the political tradeoffs involved in this unprecedented approach. Finally, I outline a theory for why, when seen through the eyes of politicians and bureaucrats, a blunt force solution could seem like the most effective and viable (albeit unjust) alternative for regulating in weak institutional environment.

2. Regulating through the law: A 'rational' model of regulation?

The conventional, legal model of regulation aims to reduce pollution by raising the costs of non-compliance for polluting firms (Viscusi, Vernon, and Harrington 2000). In the initial stages, firms, accustomed to the previous norm of unrestrained pollution, may choose to ignore regulatory threats. However, through sustained surveillance and strict punishment of severe violations, regulators gradually raise the risk of detection. Eventually, faced with the prospect of penalties, revoked licenses or lawsuits, firms find it so expensive to continue violating the law that they begin to independently invest in new pollution reduction technologies.

However, effective environmental regulation through this model is not easy, even in the best of circumstances. In the early stages, there is often a direct trade-off between improving the environment and sustaining economic growth. This means that regulating agencies must take on powerful companies and their even more powerful political backers to achieve their mandate of reducing pollution. Often these (newly formed) agencies operate with limited staff, limited resources, and limited authority, making effective enforcement even more improbable. In the US, for example, almost one decade after the Clean Air Act was passed, one quarter of all major sources of industrial pollution were still found to be openly violating pollution standards (Cole and Grossman 1999, 927). Even today, studies find that large, politically-connected polluters in the US are more prone to violations, and to escaping punishment for these violations (Konisky and Teodoro, 2016).

And yet, despite the enormous enforcement challenges and up front investments that must be made in the regulatory process, in the long term, there are clear economic advantages to punishing polluters through the law: First, it ensures that polluting companies, not taxpayers, shoulder the majority of the cost for cleaning up the environment. Of course, regulation itself can be costly to enforce, especially if it results in lawsuits. However, if regulators first focus on punishing the biggest and most visible violators, they can eventually build up a stronger deterrent effect, even with limited fiscal and administrative resources (Ayres and Braithwaite 1992, 83; Braithwaite 2006, 887-889). In sum, by rewarding firms for greater compliance, this approach increases

regulatory efficiency: Firms are incentivized to invest in pollution abatement infrastructure at minimal cost to the state.

Second, this approach also ensures that pollution can be reduced with minimal long-term impact on jobs and the local economy. To be sure, the costs of compliance can become so onerous that it puts polluting companies out of business—especially small companies that operate at the margins. However, this process can also spur innovation amongst polluting industries and create a virtuous cycle of public-private cooperation: Firms develop new, cleaner technologies so as to stay in the business or increase their market share (Allen Blackman 2000, 1079-1080), and governments reward firms with subsidies and special certifications for taking a lead in setting new standards (Carrigan and Coglianese 2011, 115-117; Yasuda n.d. p.8). Over time, this combination of positive incentives and enhanced regulatory strength contribute to a new norm of 'clean' production*;* Instead of zero sum game where the clean air is achieved through painful economic slowdowns, firms eventually learn to stay profitable while minimizing damage to the environment. We see this in the example of California, whose economy grew stronger as even as environmental regulation became stricter[6].

The problem is, for developing countries, this 'growth-friendly' model of regulation presented above is one of the most ideal forms of regulation, but it is also one of the most elusive (Chaudhry 1993, 252-253; Pearson 2005, 299). Developing countries have long been presented with more 'rational' ways to organize their markets, regulate competition and mitigate market externalities. But these models are only rational so long as they are accompanied by the strong institutions and relatively stable politics of developed countries (van de Walle 1989, 603-303). America is often held up as an example to developing countries, because it was able to build up effective environmental regulation, even though regulators initially struggled with limited resources and technical capacity. However, America also succeeded because it has strong courts to uphold the threat of punishment against firms, an independent judiciary to punish politicians who interfere in the regulatory process, and largely disciplined, impartial regulators who refuse to be 'captured' by either meddling politicians or misbehaving firms (Yeung 2010, Carrigan and Coglianese 2011). States in developing countries often lack all these elements. In fact, they struggle with two distinct political problems that can make conventional regulation a highly inefficient means to an often urgent ends.

First, there is the problem of underdeveloped administrative and technical capacity, which leads to weak enforcement capacity. The ideal type of western-style "hands off" regulation, exemplified in the US, is supposed to minimize inefficiency by limiting the role of the state. In reality, it requires a lot of effort to sustain. Regulatory states are expected enforce contracts, protect property rights and reduce transaction costs, all the while protecting citizens and consumers from the negative externalities of the market. In order to do all this at an 'arms length', the state must have sufficient administrative capacity to extract this information, then sufficient technical expertise to use this information to arbitrate between market actors, and finally, sufficient authority over to firms enforce their decision (Pearson 2015, 36-37, Levi-Faur 2008). Given that most developing states are still in the process of building up their bureaucracies, these

[6] See David Vogel, "How the Golden State Became Green, The Politics of Environmental Protection in California"

conventional regulatory procedures can take twice as long to achieve a fraction of the impact—hardly an argument for improved efficiency (Dubash and Morgan 2012).

Consider the difficulties of enforcing the law with weak judicial institutions and under-developed bureaucratic capacity: In developing countries, political authorities often commit to western style regulatory systems in order to attract investors (Helmke and Rosenbluth 2009, 358; Badran 2013). They use stringent regulation to signal that despite the volatile political environments, investors will be protected from political opportunism (where politicians alter laws to serve their own interests) and arbitrary sanctions. The problem is, when states lack resources, staff and technical capacity, this kind of stringent regulation doesn't just protect firms from political opportunism, it also protect firms from the law itself; if regulators are not schooled in the technicalities of the law, or if they cannot collect sufficient information to apply sanctions*,* then by the standards of conventional regulation, even the most committed violators of the law can permanently escape sanctions. Moreover, in developing countries, where business elites can so readily draw on their economic power to subvert formal regulations (Chaudhry 1993, 257*;* Deng and Kennedy 2010), complex legal requirements only add another obstacle to bureaucratic enforcement difficulties.

Second, developing countries often face the problem of weak state capacity: without the political institutions to systematically monitor and constrain bureaucrats, or the resources to reward them, central leaders struggle to win loyalty or command compliance from local bureaucrats (Geddes 1994, Migdal 2001, Slater 2008). In developed countries, the state can lean on independent courts and institutionalized accountability mechanisms to pressure local bureaucrats into enforcing the law. However, in developing countries, courts are compromised and accountability mechanisms are weak, so enforcement is largely dependent on the will of local bureaucrats. More often than not, these local bureaucrats are so focused on protecting their cronies, or extracting rents, that they have little interest in enforcing pollution control policies, especially if these policies challenge growth (van Rooij 2006, Lo and Tang 2006). Thus, even if these countries were able, like the US, to build up stronger technical capacity, it is unlikely that they will use this capacity towards more effective enforcement. All the technical know-how in the world cannot induce bureaucrats to act against their will.

The distinct difficulties of regulating in weak institutional environments have given rise to a new model of regulation that is characteristic to the developing world. As with conventional, law-based regulatory models, this model uses material incentives and punitive threats to encourage compliant behavior in firms. However, regulators also rely disproportionately on public participation to strengthen enforcement. Specifically, regulators leverage the resources of NGOs, citizen activists and the media to alert local authorities to incidences of non-compliance, and increase the overall threat of detection for firms. Regulators also draw on citizen lawsuits, petitions and protests to strengthen their enforcement authority. In this way, despite weak courts and powerless regulatory agencies, sustained public pressure can still force polluting firms to clean up their act (O'Rourke 2004, Abers and Keck 2009, 305-308). In fact, it is precisely because traditional regulators are so weak that citizens, NGOs and non-state actors have begun to play such an important role in enforcing regulation in the global south (Braithwaite 2006, 891; van Rooij, Stern and Furst 2016, Hochstetler 2013, Dubash and Morgan 2012, Amengual 2014).

To date, scholars have focused primarily on the participation of non-state actors as the main solution for regulating in weak institutional environments. In this dissertation, I present an as yet unexplored approach for how states might regulate in weak institutional environments. Drawing on the case of China's unusual response to its pollution problems, I show that states with dysfunctional bureaucracies and weak enforcement capacity can still achieve noticeable improvements in pollution levels. Moreover, these improvements can be achieved *without* widening the space for public participation, or leveraging the power of local and foreign NGOs. I call this approach "blunt force regulation".

3. Blunt Force Regulation: An Alternative Model for Weak Institutional Environments

Two features distinguish blunt force regulation from conventional regulatory models: First, the state targets categories of polluters for sanctions without making any effort to discriminate between compliers and non-compliers at the firm level. In China, for example, polluters are sanctioned on an industry-wide or category-wide basis. Local authorities identify categories of firms that are problematic for pollution, and then punish *all* factories in these categories, irrespective of their individual compliance levels. In effect, the state uses 'information shortcuts' to determine who should be sanctioned. Second, the state deliberately violates companies' property and production rights to achieve the desired regulatory outcomes. In the Chinese case, for instance, the state decided it was more feasible to reduce pollution by controlling firm production, or by seizing and destroying factory equipment, than by intensifying pollution sanctions to deter polluting behavior. Below, I clarify how these two characteristics distinguish blunt force regulation from related regulatory styles. Figure 1 illustrates these distinctions

The most distinctive characteristic of blunt force regulation is the state's use of information shortcuts to determine which companies and which industries should be targeted with sanctions. Local governments determine ex ante which types of firms or which industries are most problematic for enforcing regulation, and then impose punishments on *all* firms in that category, irrespective of individual compliance records. The selection of these categories is a discretionary process. Often, local officials don't just take into account polluting emissions, but also the contribution of different industries to public goods—such as local employment, or providing services like heating (interview X2140515a)—or their importance to provincial economic plans (interview X4090116a). However, once these categories of firms of been selected, the enforcement of punitive sanctions against these categories becomes blunt. For instance, in one county in China's Hebei province, once higher-level authorities had decided the cement industry was "outdated" and the cause of "excessive pollution", county authorities were forced to demolish all 166 local cement factories (including large, state-owned enterprises) in the area [7]. This universal, industry-wide approach to sanctions reduces the state's administrative burden, because local authorities no longer need to monitor and gather information on individual non-compliers, or follow-up on individual punishments.

[7] China Comment (半月谈网), June 6 2014: Hebei supresses production capacity: smashing the people's rice bowl for the 'black hats'(河北压制产能：为了乌纱帽砸别人饭碗?). See http://www.cssn.cn/jjx/jjx_bg/201406/t20140606_1200233.shtml, Accessed April 18 2017; 中国企业报 2014

However it also means that compliant and profitable firms can become the target of sanctions, simply for belonging to a certain category of firms.

This procedure—where firms are targeted according to arbitrary categories and without prior warning or prior inspections—is what distinguishes blunt force regulation from traditional command and control regulation. Command and control types of regulation, the right-hand side of the first branch of figure 1, represent a more heavy-handed breed of regulatory strategies. The state, determined to overhaul polluting industries, will require companies to achieve specific pollution reduction outcomes by a certain deadline, or risk fines and closure. Command and control can be especially unforgiving to smaller companies or heavy industry, because the state will not tailor standards to accommodate the limited budget of small companies. Nor will they extend deadlines to give companies in high-polluting industries more time to catch up to their less polluting counterparts (Carrigan and Coglianese 2011, Cole and Grossman 1999). Command and control can therefore seem like a deliberate purge of small firms and heavy industry—as we see in the cases in China. Thus, on the surface, China's targeting of polluting industries look a lot like what might happen under command and control regulation.

The difference is, command and control regulation still requires regulators to monitor and gather information on the compliance of individual firms. Strict performance standards may disproportionately affect small firms or heavily polluting industries, but these firms can only be sanctioned following clear evidence of non-compliance (Carrigan and Coglianese 2011, 115). In contrast, with blunt force regulation, information is only gathered at the industry level, if it is even gathered at all. This practice of minimizing monitoring costs through the use of information shortcuts is what distinguishes blunt force regulation from traditional command and control regulation, as represented in the second branch of figure 1.

To be sure, the use of regulatory shortcuts is a common feature of regulating in weak institutional environments. In developing countries, authorities simply do not have the resources or capacity to regulate all firms according to the letter of the law (Dubash and Morgan 2012, 264). Instead, regulators find ways to minimize information-gathering and enforcement costs while maintaining a credible regulatory threat. One common tactic to optimize resources is to concentrate enforcement activity on the least compliant firms; known as 'responsive regulation', regulators with limited resources are encouraged to target serial non-compliers for inspections and punishments, while developing a more tolerant attitude to companies that have made previous efforts to comply (Braithwaite 2006, 887-889). The goal is develop a good working relationship with polluters that make an effort to comply, thereby reducing the adversarial relationship between regulators and polluters.

However, under blunt force regulation, regulators are not applying information shortcuts to improve overall regulatory threat. In fact, regulators seem to be applying these shortcuts to force as many companies to reduce pollution as quickly as possible. This can result in fully compliant and profitable companies being punished or forced to shut down. For instance, in the case of Linyi described above, when authorities issued 'stop production' orders against polluting firms, they did not limit these sanctions to the 13 companies where Beijing's inspectors had discovered violations; they sanctioned all 57 companies on the city's list of "National Supervised Polluting Enterprises" (国家重点

监控企业), including at least two that had been deemed compliant by Beijing's inspectors. Moreover, instead of first inspecting and then individually notifying firms to stop production, authorities abruptly cut off electricity to entire industrial districts. This meant that all factories in those areas—compliant or not—had no choice but to stop production until the period of sanctions passed. Reports later revealed that Linyi's regulators were only told to carry out inspections *after* companies had been forced to stop production; one company who passed these environmental inspections was still prevented from restarting operations until several months later[8].

This systematic violation of due process is what distinguishes blunt force regulation from responsive regulation—represented in branch three of figure 1. The actions of regulators in Linyi, far from enhancing regulatory threat, are more likely to increase distrust of regulators, and encourage disregard for pollution standards, leading to highly inefficient regulation. Moreover, the elimination of compliant and profitable companies would be inconceivable under responsive regulation, because these are very companies that tend to develop strong working relations with regulators and pioneer improved compliance and, even in weak regulatory environments (Ayres and Braithwaite 1992).

The final (fourth) branch of figure 1 addresses the second distinctive characteristic of blunt force regulation: the state's use of direct, intrusive tactics to ensure reduced emissions. In China, for example, local authorities forced firms to stop polluting by cutting off electricity, by seizing and destroying factory equipment, or by setting explosives to entire factory premises. Often, these measures are undertaken without prior warning and without legal justification, so firms are never given a chance to adapt to new environmental standards. For instance, in one campaign to close down coal furnaces in the city of Handan, shortly after announcing the campaign, local authorities (together with law enforcement officers) personally destroyed the furnaces of targeted factories. When dismayed factory owners objected, the enforcement officers declared, "the demolition of furnaces is part of the nationwide responsibility to protecting the environment! No one individual can obstruct this process!"[9]

In effect, this model uses 'enforcement shortcuts'; regulators abandon efforts to incentivize firms to change their behavior, and opt instead for sanctions that make it physically impossible for companies to continue their non-compliant activity. This outright disregard for the property and production rights of firms would be inconceivable under conventional regulation, because it violates the 'arms length' relationship that regulators are expected to maintain with regulated entities. It is also highly inefficient for growth, because pollution is reduced through interruptions in productive activity.

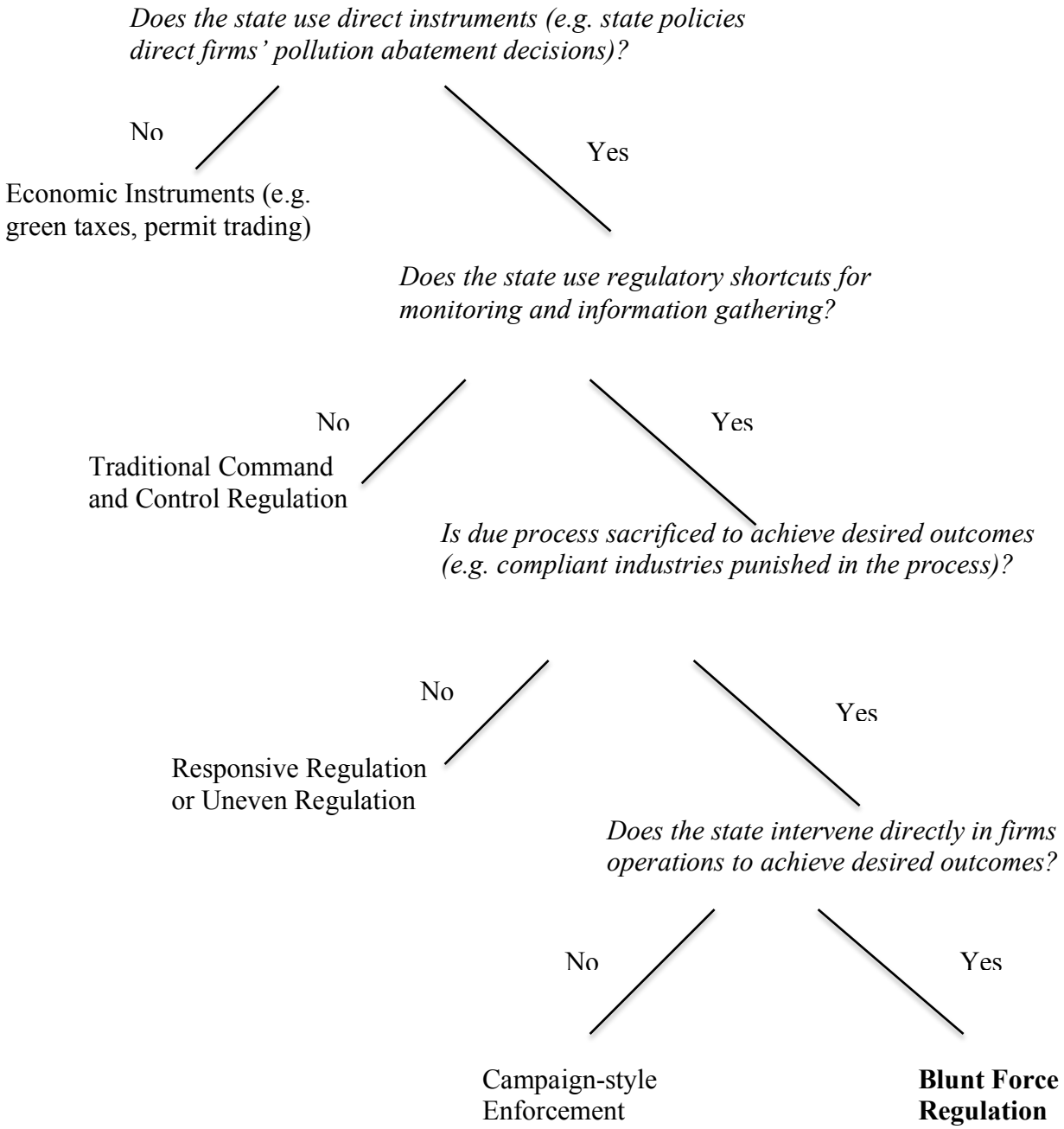
This use of enforcement shortcuts also distinguishes blunt force regulation from previous 'regulatory enforcement campaigns' that we have seen in China (Biddulph et al. 2012). Similar to blunt force regulation, under these campaigns, the central government will compel local officials to implement a wave of coordinated, sometimes extra-judicial, enforcement measures to tackle widespread non-compliance in regulated entities (van Rooij 2009, 14-16; Liu et al. 2015, 87). However, regulatory enforcement campaigns

[8] The Paper. July 2 2015: Linyi's pollution control quickly turns a corner (临沂治污急转弯). See http://www.thepaper.cn/newsDetail_forward_1347676 , accessed July 3 2015.

[9] See China Environment News (中国环境报), August 6th 2014 (above).

only aim to intensify regulatory pressure on firms by ratcheting up the use of conventional punitive measures. Firms may be subjected to fines or sanctions without sufficient evidence, but the state still respects the independence of firms, and only tries to alter firm polluting behavior by increasing the disincentives for continued pollution. In contrast, blunt force regulation sweeps aside conventional tools, disregards firm independence, and allows the state to determine exactly when, how, or how much, a firm can pollute. The directness of the state's actions suggests that, unlike regulatory enforcement campaigns, the primary goal of blunt force regulation is not to fix underlying problems in regulatory institutions, but to achieve a specific regulatory outcome—such as reduced pollution.

Figure 1: Conceptual Scheme Of Blunt Force Versus Other Regulatory Styles



One can observe similar examples of 'blunt force' regulation emerging in other issues areas in China. For example, in the field of livestock regulation, the government recently decided to ban livestock production in designated zones to try and control mounting agricultural contamination issues[10]. Industry insiders claim that the government forcibly closed livestock farms within these zones, contributing to a sudden spike in the price of pork[11]. In the sphere of financial regulation, China also chose—somewhat notoriously—to shut down Shanghai's stock market in the summer of 2015 to prevent share prices from plummeting further; rather than improve its oversight mechanisms, the state decided that it was easier to prevent trading altogether[12].

One can also observe a similar blunt force logic being applied to complex regulatory problems in other parts of the world*:* In Northern Mexico in 1990, municipal leaders decided to forcibly relocate an entire brickmaking industry following a public outcry against polluting brick kilns. Rather than attempt to police this informal industry, the state found it easier to introduce an expensive relocation plan (Blackman 2000). In post-Soviet Russia in the 1990s**,** the state, when confronted with frequent blackouts in eastern region, decide to merge coal producers and power plants into one state-owned energy company. The blackouts had been caused by strikes from repair workers and coal miners, who the cash-strapped state-owned energy companies could no longer afford to pay. Rather than liberalize the electricity sector and introduce fairer prices to ease payment problems, the state chose to improve efficiency by forcing these two opponents to negotiate prices, resolve nonpayment issues, and reduce transport costs as one business entity (Wengle 2015, 123-130). As with blunt force pollution regulation in China, the state found it easier to solve regulatory problems by resorting to mechanisms of direct state control, even if their solution would only entrench a highly inefficient, overly subsidized electricity sector in the long-term.

China's blunt force regulation of polluters represents (to my knowledge) one of the most widespread and long-lasting examples of this regulatory approach. Official data indicates that in 269 out of 287 cities, entire industries were ordered to reduce industrial capacity by a total of 1.2 billion tons in the space of five years. News reports and qualitative data further indicate that widespread forced closures of hundreds of thousands of smaller factories took place alongside these official forced reduction orders. The measures used in China were also unusually extreme. While some local authorities engaged in temporary tactics, such as 'stop production' orders, others resorted to the complete and irreversible destruction of local industry: In chapter four of this dissertation, I present a case where local authorities set explosives to dozens of large, well-connected, profitable factories—effectively eliminating the county's pillar industry. In another city

[10] Xinhua, November 16 2017. China to restrict livestock zones to protect water bodies. (我国饮用水水源保护区等五类地区将划定禁养区). See http://news.xinhuanet.com/2016-11/16/c_1119920496.htm?mc_cid=345fe964d3&mc_eid=0f4073f97b, accessed November 22, 2016.

[11] Interviews X1160715 and X8110715

[12] *The Guardian,* July 9 2015, "China bans major shareholders from selling their stakes for next six months," (accessed Jan 17 2017); *New York Times,* July 27 2015, "Chinese shares tumble again," (accessed Jan 17 2017)

hundreds of factories were arbitrarily and irreversibly closed down in the space of few months, causing factory owners to liken this to a "sudden death" elimination[13].

The extent and extreme nature of China blunt force tactics suggests that, far from a one-off undertaking, this was a concerted regulatory strategy to get pollution under control. This makes it strong case for understanding the calculations, trade offs, and political costs that developing states face when they engage non-traditional regulatory approaches. However, the extreme scenarios outlined above also raise a lot of questions on why China leaders would have opted for such a sub-optimal, costly strategy for dealing with its environmental problems.

4. The Puzzle of Blunt Force Regulation

The rise of blunt force regulation is China is puzzling: Why would any state choose to regulate pollution at such enormous cost to the economy, especially when there are so many growth-friendly regulatory models available? It seems especially strange that China, a country so often accused of pursuing 'growth at all costs', would choose a form of pollution reduction that not only puts the brakes on growth, but also decimates jobs and local revenue. In fact, one would be hard pressed to find *any* developing country that would actively sacrifice growth and jobs for emissions reduction—a position that has contributed to the protracted climate change negotiations in recent years.

It may be that, in terms of the environment at least, China has become an unusually forward-thinking developing country. In recent years, China has taken a lead on the world stage in tackling climate change and, in the face of escalating public health issues and domestic political pressures, has shown a growing commitment to addressing its domestic environmental problems. Recent studies by scientists estimate that air pollution in China is contributing to declines in life expectancy in China (Rohde and Miller 2015, Ebenstein et al. 2015). The widespread contamination of groundwater has also made polluted drinking water a serious and persistent concern (Han et al. 2016). This scarcity of clean air and clean water in China will inevitably increase the public health burden, overwhelming an already overstretched health system. It has also galvanized protests from the informed and comparatively engaged urban middle class, especially in the wake of frequent regulatory crises that expose the government's incompetence at handling pollution problems. While the Chinese regime has proven adept silencing and demobilizing peasant and labor protests, its leaders are less equipped (and less inclined) to silence protest from the well-connected, wealthy urban elites on whom they depend for regime support.

In the face of these mounting domestic pressures, it could be that China's leaders have chosen to engage in these costly, blunt force pollution reduction measures because the political payoffs of 'clean growth' now exceed those of 'growth at all costs'. Moreover, unlike their democratic counterparts, the Chinese regime is relatively insulated from short-term electoral pressures, and relatively successful at quelling temporary opposition from popular groups. As such, they are better equipped to undertake drastic pollution reduction measures—such as blunt force regulation—that require concentrated short-term sacrifices to deliver widespread long-term benefits.

[13] See Xinhua net (新华网), May 7th 2008: Can Closures Bring About Economic Transformation? (关停能否带来转型？佛山整治传统陶瓷业引发震撼) http://news.xinhuanet.com/energy/2008-05/07/content_8121660.htm, accessed May 5th 2017

However, China's struggle to control its vast, unwieldy bureaucracy has shown that it cannot easily forsake growth for the environment: High-powered growth targets are one of the few policies that keep bureaucrats motivated and loyal in China, because only growth can simultaneously satisfies the nation's interest (economic development) and a bureaucrat's personal interests (promotion or rent extraction) (Fewsmith and Gao 2014, Naughton 2016). Thus, while public health risks and widespread pollution protests may have increased the leadership's resolve to address environmental issues, at risk of alienating bureaucracy, central officials cannot afford to abandon growth-focused policies. Why, then, have China's leaders settled on a pollution reduction strategy so counter to its bureaucrats' interests, a strategy that destroys revenue intake and weakens long-term growth prospects? Instead, why did China not persist in controlling pollution through strengthening pollution penalties and fees—a solution that would minimize the impact on growth, provide some deterrence to polluters, while also maintaining opportunities for local rent extraction?

One conceivable theory is that blunt force regulation is, in fact, part of a wider program to restructure and upgrade China's economy by phasing out dying industries. Many of the industries targeted for blunt force measures are from older, ailing industrial sectors such as steel and cement. One could argue that aware of these trends, the government has pursued a policy of forced closures and forced reductions in industrial capacity to speed up the phasing out of these dying sectors. That this policy also results in reduced pollution is simply an added advantage. In fact, as we see in chapter one, much of rhetoric surrounding blunt force regulation is focused on "industrial upgrading" or "industrial restructuring" rather than "pollution reduction". In effect, blunt force regulation is being used to speed up industrial decline so as to to improve overall economic efficiency. In fact, a very similar (and successful) process of state-led industrial restructuring took place in Japan in the 1970s and 1980s: In anticipation of decline in certain industries, the Japanese government activitely incentivized firms to reduce capacity and transition into emerging, more productive sectors (Peck et al. 1987, Tilton 1996). From this perspective, blunt force regulation could be viewed as a wholly rational industrial policy; while costly in the short term, it guarantees both greater economic efficiency and improved environmental outcomes in the long term.

However, even if China's blunt force approach to pollution reduction is part of wider plan to restructure and upgrade the economy, the state's resort to such abrupt and severe measures still seems somewhat irrational, given the significant social and political costs. Consider, for example, the impact of forced factory closures on employment. In the case of Linyi that I described above, the state's 'stop production' orders cost 60,000 workers their jobs. It also led to defaults on 100 billion RMB worth of business loans, provoking anger amongst entrepreneurs. While Beijing has made many pledges to support worker retraining, as I show in the case studies in chapter three, workers and SME entrepreneurs are seldom offered compensation and often left to their own devices. Compare this with the case of Japan, where the government took extensive measures to mitigate the social and political costs of phasing out dying industries. Firms were directly involved in negotiating how much capacity to reduce and in the resettlement of workers. The Japanese government also injected significant funds into unemployment payouts, labor retraining, and financial support for small and medium enterprises (Peck et al. 1987, pp. 84-92). In sum, the extensive measures that Japan took to ease the most destabilizing

effects of the transition also made this state-led transition seem more 'rational'.

However, China's limited investments in labor retraining and SME financing suggest that it is unlikely to cushion this industrial transition to the extent that Japan did (Wong and Karplus 2017). This raises the risk of pushback from entrepreneurs, and widespread unemployment unrest from workers. Mass unrest would be undesirable for any country, but is especially problematic in an authoritarian regime like China. Without regular elections to create the appearance of political responsiveness, or institutionalized feedback mechanisms to ease discontent, authoritarian regimes are much less likely to withstand sustained, concerted challenges to their authority (Huntington 1991, Nathan 2003, Haber 2006, Gandhi and Przeworksi 2006). This is why China invests so much effort into repressing or segregating contentious actors, making it impossible for them to organize and breach the collective action barrier (Cai 2010, O'Brien and Li 2006, Walker 2008, Lee 2007, Deng and O'Brien 2013). Why, then, would the regime allow thousands of workers with shared identities, locations and grievances to be laid off without compensation, and over such a short period of time, effectively creating the conditions for coordinated labor unrest? In fact, why would any authoritarian regime ever choose to risk, nay, tempt, this kind of collective action, just to improve air quality? I propose that China's decision to pursue blunt force regulation can be tied to the specific difficulties of regulating in weak institutional environments.

5. The argument

In weak institutional environments, the preconditions for effective, western-style regulation are so elusive and so expensive, that politicians sometimes find it more expedient to resort to forceful, direct state action. In the face of weak courts, corrupt bureaucrats, and limited administrative capacity, political leaders quickly realize that they lack the basic infrastructure to regulate market activity in the 'efficient' manner of developed countries. In developed countries, states seek regulatory solutions that maximize economic efficiency. They want to protect consumers and prevent monopolies all the while ensuring the highest levels of growth. In contrast, developing states struggle so much to enforce regulation that they seek solutions that maximize enforcement efficiency. Specifically, they seek an approach that can minimize the state's need to extract information and police regulated entities, while still preventing the worst regulatory crises. Second, they seek an approach that can achieve desired regulatory outcomes without depending too much on the strength of the courts or the compliance of wayward bureaucrats.

Consider China's non-traditional solution to its pollution problems. Clearly, blunt force regulation does not prioritize long-term efficiency gains. By treating profitable, compliant and legitimate companies as collateral damage, the state not only hurts the possibility of economic recovery, but also eliminates the very companies that could drive China towards a new norm of clean, green economic growth. Yet viewed from the perspective of the state and environmental regulators, we see that blunt force regulation has three key enforcement advantages.

First, the use of regulatory shortcuts vastly reduces the demands on environmental regulators. This includes the use of information shortcuts, where local authorities are given the green light to carry out sanctions against entire polluting industries, which excuses regulators from collecting and analyzing data to identify individual violations. This also includes the use of enforcement shortcuts; where Beijing endorses direct

enforcement tools, such as cutting off electricity to entire industrial areas or, in more extreme cases, set explosives to factory premises. By physically preventing factories from operating—either temporarily or permanently—the state reduces emissions without requiring local authorities to inspect, punish or cajole individual polluters. In short, these measures allow the state to sidestep the main administrative hurdles of enforcing regulation in weak institutional environments.

Second, blunt force measures can deliver reduced emissions despite the state's inability to control the everyday actions of polluters. Typically, China's embattled, under-resourced courts struggle to enforce sanctions against powerful polluters or prevent meddling from powerful local politicians. However, under blunt force campaigns, enforcement is driven by top-down, administrative orders; higher-level officials use all their political power to demand compliance from local bureaucrats and local companies. The only role of the courts is to uphold criminal sanctions against firms, if these are even pursued. In fact, blunt force measures are often undertaken in outright violation of the law. As one provincial leader openly acknowledged (while presiding over one of China's largest blunt force anti-pollution campaigns) "In order to meet our targets for forcibly reducing production [in polluting industries], a portion of legitimate, compliant enterprises will have to be eliminated in the process"[14]. In sum, under blunt force regulation, the state is able to turn the courts' bias to their advantage, ensuring that enforcement measures are implemented without interference from firms.

Third, the bluntness of China's pollution control measures helps to minimize non-compliance from local authorities. By forcing local authorities to close down or destroy polluters in the space of a few months, and by forcing them to use tactics that produce immediately observable outcomes, the central government makes it harder for bureaucrats to defy their commands: If entire industrial areas have been forced to stop production or entire districts of factories have been scheduled for demolishment, it is much easier to spot the one factory still operating or the one factory still standing. In short, this intense, uncompromising approach to pollution reduction limits the degree to which local bureaucrats can disobey Beijing's demands for improved air quality.

The problem is, states that prioritize enforcement efficiency still have to take into account the political costs of such an approach. Blunt force regulation is politically costly, precisely because it entails such a naked exercise of state power over market actors. Any state that chooses to run roughshod over a company's legal rights cannot help but expect pushback, especially from powerful, independent companies, and the economic elites that run them. Moreover, the state's outright disregard for property rights might dissuade foreign companies from investing, or discourage local companies from expanding their ventures (Levy and Spiller 1996, de Soto 2000, Malesky and London 2014) For instance, in an early case of blunt force regulation in Guangdong province in 2008, a Chinese expert openly called out the regime for its lack of transparency in the process. He argued that "the government should never resort to direct administrative

[14] Zhang Guisheng, department chief in Hebei's Provincial Environmental Protection Bureau, as quoted in China Comment (半月谈网), June 6 2014: Hebei supresses production capacity: smashing the people's rice bowl for the 'black hats'(河北压制产能：为了乌纱帽砸别人饭碗?). See http://www.cssn.cn/jjx/jjx_bg/201406/t20140606_1200233.shtml, Accessed April 18 2017; 中国企业报 2014

methods to close down companies without clear principles or guidelines... otherwise it becomes hard for companies to trust the government."[15] Six years later, a provincial official in Hebei echoed this sentiment, noting that "if we rely only on administrative orders to drive forward forced reductions [in polluting industries], or we if act with too much haste, demolishing factories simply because we have said we will do so, then we run a high risk of causing unrest[16]". In this case, the official was also referring to the risk of social unrest, specifically labor unrest following mass layoffs from closed companies.

Evidently, this type of strong arm solution to regulatory problems can provoke pushback from disgruntled entrepreneurs, laid-off workers, and local bureaucrats who's interests have been sacrificed in the name of national progress. These risks are far higher in states with powerful political opposition groups or established, independent economic elites. In such cases, politicians might only be able to use blunt force measures as a temporary, stopgap solution, presenting these measures as a necessary, but short-term sacrifice. In Argentina, for example, when the state used blunt force measures to freeze utility prices in the aftermath of the 2001 currency crisis, they did so at the risk of losing investors (especially international investors) in their utilities companies (Post and Murillo 2013). Even China's blunt force environmental regulation can take on a short-term character: In the case of Linyi, leaders only ordered companies to temporarily stop production, perhaps because local companies were too powerful for them do otherwise.

However, when a state's solution to its regulatory problems is more drastic, such as intervening in markets, restructuring entire industries, or nationalizing assets, then it may require stronger powers to challenge concerted political and economic opposition. In China's case, as I show in chapter four, the state leaned on their authoritarian control of the courts, their leverage over local businesses, and their demobilization of workers to suppress any concerted opposition. Factory owners that resisted the state's destruction of their property were threatened with criminal sanctions for 'illegal, non-compliant behavior'. More powerful factory owners with strong political backers were offered compensation to neutralize their opposition. While some still resisted, the state's control over land, credit and operation permits made it virtually impossible for these large companies to resist in the long term. The regime also disproportionately targeted companies with informal, migrant workers, taking advantage these workers' limited formal rights and transient behavior to minimize the risk of labor unrest. China's case therefore highlights the affinity between authoritarian politics and successful blunt force solutions to regulatory problems.

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[15]Expert on national policy quoted in Xinhua net (新华网), May 7th 2008: Can Closures Bring About Economic Transformation? (关停能否带来转型？佛山整治传统陶瓷业引发震撼) http://news.xinhuanet.com/energy/2008-05/07/content_8121660.htm, accessed May 5th 2017

[16] Zhang Guisheng, the Hebei provincial EPB measuring team head, quoted in China Comment (半月谈网), June 6 2014: Hebei supresses production capacity: smashing the people's rice bowl for the 'black hats'(河北压制产能：为了乌纱帽砸别人饭碗？). See http://www.cssn.cn/jjx/jjx_bg/201406/t20140606_1200233.shtml, Accessed April 18 2017

6. Blunt Force Regulation in China

In the above section, I present an argument for why, when regulating in weak institutional environments, political leaders might find it more expedient to deploy to costly, blunt force measures. Yet to an extent, there is an element of helplessness in this decision, a degree to which leaders are backed into this sub-optimal solution. This tendency is amplified in the Chinese case. In this dissertation, I argue that the severity and breadth of China's blunt force approach was partly unintended, and driven by three defining characteristics of the Chinese state.

First, China, like so many developing countries, struggles with the problem of weak state capacity. Scholars studying less developed regions of the world may be surprised by this classification of China as a "weak state". After all, this is a state that managed to overhaul its economy and lift millions of people out of poverty in the space of decades. Yet the paradox of state capacity in China is that the institutions that underpin its astonishing economic success also hampers the state's ability to resolve emerging social and environmental problems. Specifically, China is viewed as a strong state because it has managed to build up a semi-rationalized bureaucracy where cadres expect to be and are rewarded for collecting revenue and implementing growth-driven policies (Edin 2003, Landry 2008, Naughton 2016). While bureaucratic corruption is prevalent in China, these stable career incentives, combined with occasional anti-corruption campaigns, ensure that on balance, corruption never reaches a level where it dissuades investment or prevents growth. The overall commitment of China's local bureaucrats and politicians to implementing national growth policies is what makes it the envy of so many other developing countries.

However, studies of bureaucratic incentives in China suggest that the bureaucrats are committed to growth, not only because promotions and bonuses are tied growth rates, but because greater wealth for the state means greater opportunities for personal rent extraction[17]. In contrast, other classes of policies that require high government spending and promise little personal reward tend to fall by the wayside (Naughton 2017). This is especially true of policies (such as environmental protection) that directly threaten growth, and therefore opportunities for bureaucrats to extract rents and earn promotion (Economy 2014, 193). It also true of policies (such as social welfare programs) that take a long time to deliver results, and have little direct benefit to a bureaucrats' career (Fewsmith and Gao 2014, 173-174, Solinger and Jiang 2016) Thus, like many other developing countries, China struggles to motivate its bureaucrats to enforce policies that can address enduring social or environmental problems.

Second, China, as a determinedly authoritarian state, is reluctant to strengthen the two institutions—namely, strong legal institutions and strong public accountability mechanisms—that could hold bureaucrats to account in the enforcement of these policies. In democratic states, even in weak democratic states, central authorities can leverage public protests and regular elections to put pressure on bureaucrats, ensuring a minimum respect for environmental standards or a minimum investment in social welfare. Yet in China, central leaders must rely primarily on internal administrative orders and hierarchical authority to compel bureaucrats to implement their orders. Given the sheer size of China's bureaucracy and its immense geographical reach, it becomes

[17] This builds on broader theories of state capacity and bureaucratic incentives. See Olson 1993, Geddes 1994.

exponentially more difficult for the regime to draw on ordinary hierarchical mechanisms (such as promotion incentives) to ensure that laws and policies are enforced on an everyday basis. In this sense, China may have even weaker control over bureaucrats than its democratic counterparts.

Over the years, China's struggle to make bureaucrats implement social policies has led to a practice of developing policies with 'countable' targets and 'verifiable' outcomes to make it easier for higher levels to assess bureaucratic performance (Edin 2003). With blunt force environmental regulation, for example, central leaders have resorted to concentrated pollution reduction campaigns predicated on more observable outcomes such as factory closures or reduced industrial output. The concentrated nature of these campaigns makes it easier for central leaders to maintain a watchful eye on bureaucrats, and limit bureaucratic room to maneuver. However, if central authorities can only guarantee bureaucratic compliance during these one-off campaigns, then they must ensure that these interventions deliver permanent reductions in pollution levels. This 'one shot' logic could be what drives central authorities to demand such large-scale, irreversible pollution control measures such as the 'scorched earth' factory demolitions I came across during my fieldwork.

In this respect, we see how both the strength and the weakness of the Chinese state have given rise to a blunt force solution to environmental problems: That the Chinese state can command its bureaucracy to implement such scorched earth tactics, and that it can achieve impressive results for the environment over such a short period of time, is a testament to its strength. However, the concentrated nature of these campaigns inevitably imposes a far higher cost on the economy than if polluters were to be controlled through conventional regulation, or even temporary, stopgap measures. That the Chinese state could not control pollution through conventional regulation, and instead, had to resort to an extreme solution in order to wrest back command over its administrative apparatus, can be traced back to its weak everyday control over local bureaucrats.

Third, one reason why China may be willing to countenance such concentrated economic costs is because the regime has an unusually high degree of control over market actors and labor. In China, private companies, especially small and medium enterprises, are more or less at the mercy of the state. The regime's high-level infiltration of the courts makes it difficult for businesses without connections to defend their rights, even when these rights are openly violated by arbitrary sanctions or unfounded administrative action (Tsai 2007, Ang and Jia 2014, Wang 2016). For example, during blunt force pollution control campaigns, China was able to forcibly close down and relocate small firms without offering any compensation. Even when a group of firms successfully sued government agencies for violations of due process, compensation was still not forthcoming[18]. Compare this ruthless approach we see in China to the case in

[18] This case occurred in Anhui province in 2015. Provincial courts ruled in favor of entrepreneurs who had sued the state for dismantling their factories without the justification. However, the state still failed to pay owners the court-ordered compensation. See Qianjiang Evening News, April 24 2015: Anhui firecrackers companies win sue provincial government and win case (安徽花炮企业状告省政府胜诉). See http://qjwb.zjol.com.cn/html/2015-04/24/content_3027030.htm?div=-1 (accessed Nov 30 2015). For more details on this case, see Chapter two.

Northern Mexico, mentioned above, where city governments tried to forcibly relocate polluting brick kilns to appease protesting city residents. Only one city out of four—the one city where brick makers had little political power—was able to successfully relocate kilns, and even then the government had to provide credit to help brick makers build new kilns (Blackman 2000, pp.2075, 2079)

The Chinese regime has also shown an uncanny ability to demobilize workers through divide and rule tactics: state-owned workers are granted different rights from informal, migrant workers, which makes it harder for workers to identify their shared grievances and act collectively in the face of mass layoffs (Lee 2007, pp.72, 84, 106). In Chapter four, I show how the Chinese state exploited these differences in workers' rights to defuse the threat of mass unrest, even when blunt force pollution control led to the layoff of thousands of workers in the space of a few months.

Again, we see how blunt force regulation is a product of both the strength and weakness of the Chinese state. The state's significant leverage over market actors and high level of authoritarian control over workers—the two strongest potential opponents of blunt force regulation—made it easier for China's leaders to pursue what might otherwise be viewed as a risky solution to its widespread pollution problems. However, if the Chinese state had continued to invest in building up strong, independent legal institutions to enforce pollution fines, or allowed citizen activists and an independent media to maintain constant pressure on violators, they could have avoided this extreme, costly approach to extracting compliance from polluters.

This paradoxical outcomes of state strength and weakness in China is not limited to pollution control, but can also be seen in China's policing of protestors: the state expends an enormous amount of resources in demobilizing ordinary protestors, sometimes resorting to "man-to-man coverage" (O'Brien and Deng 2017, 192). That the regime is able to apply these methods on such a large scale is a sign of strength. That they are so wary of contention from unremarkable individual citizens is a sign of their weakness.

While the above argument is derived from the distinct characteristics of the Chinese state, it also offers a fresh understanding on what it means to be a 'strong' or 'weak' state. Certainly, China's ability to deliver growth, command bureaucrats to close down polluters, and silence opposition from workers and entrepreneurs, would earn it the label of 'strong' state in the eyes of its developing country peers. Yet China has been driven to these strong measures, not by choice, but because it cannot incentivize bureaucrats to apply a constant pressure on polluters, and because it fears the public accountability that other states draw on to police their bureaucrats. Moreover, while blunt force measures have effectively reduced pollution, they have also undermined regulatory institutions, making it harder for China to control polluters in the future. These outcomes may make states more wary of China's distinct brand of state 'strength'.

7. Research Design and Chapter Outline

This dissertation draws on a mixed methods research design, using a combination of quantitative analysis and case study research to piece together a picture of how and why politicians resort to blunt force regulatory solutions. I begin by demonstrating that blunt force environmental regulation is a phenomenon worthy of explanation. Using statistical analysis, I show that not only are these measures being used systematically across China,

but they are also having clear effect on pollution levels across China's prefectural-level cities.

While the large n analysis helps establish clear patterns in China's regulatory behavior, it tells us little about why the regime decided that shutting down factories and laying off thousands of workers would be a feasible and reasonable solution to pollution problems. To piece together the logic behind the state's decision-making, I draw on insights from approximately ninety interviews with state officials, factory owners, industry experts, and citizen activists. These interviews took place in northern, central and southern China, and at a range of administrative levels including capital cities, urban city districts and rural counties. In addition, I use process tracing on two case studies to analyze the cost-benefit calculations that allowed local officials to accept blunt force measures as the main solution their pollution problems. The two cases were chosen for variation in the targets of blunt force measures—in one case the primary targets were small and medium enterprises, while in the other case, the state focused on industrial behemoths, including state-owned enterprises. The contrast in how local officials carried out blunt force measures in these two cases highlights the extent to which the social, political and economic costs of blunt force regulation are disproportionately concentrated on weaker firms and social groups. Interview and case study findings are supplemented with details from local, provincial and national news reports, which provide further insights into the state's timing and tactics when applying blunt force measures.

This dissertation is structured around explaining the two puzzles that motivate this study: First, compared to growth-friendly models of pollution regulation, blunt force regulation is costly, intrusive and undermines already weak regulatory institutions. Why, then, would the Chinese government pursue this inefficient strategy to reduce pollution? Second, even if Beijing is committed to this strategy, why would local officials be willing to accept these costs to employment and government revenue, especially when, in so many other policy areas, they have become highly proficient and defying Beijing's orders?

In the first chapter of my dissertation, I lay foundations for these puzzles. Specifically, I use interview evidence and quantitative analysis to demonstrate that blunt force regulation has emerged as a concerted, nationwide strategy to tackle urgent pollution problems in China. Analysis is based on three original datasets: The first dataset uses NASA satellite data to measure changes in environmental outcomes at the municipal level, focusing on changes in Sulfur Dioxide emissions (the main industrial emission) from 2010-2015[19]. The second dataset records blunt force measures used on polluting industries between 2010-2015 including industry-wide forced closures, firm relocations or 'stop production' orders. The third dataset measures the intensity of conventional regulatory actions, such as how often regulators deployed environmental regulation to fine or sue polluting firms between 2010-2015. Data was collected for all 283 Chinese prefecture-level cities.

Descriptive statistics of this data demonstrate the ubiquity of blunt force measures: forceful state action against polluters has been documented in 269 out of 287

[19] For this dataset, I use daily ground-level SO2 measurements for a 0.25x0.25 degree grid covering each city to calculate the monthly averages of SO2 industrial emissions for each city. SO2 measurements were obtained with remote sensing data from the NASA OMSO2e dataset at Goddard Earth Sciences Data and Information Center.

cities, in wealthy, developed coastal regions and in poorer, industrial provinces. Using regression analysis, I then compare the impact of blunt force measures with that of conventional regulatory measures on changes in air pollution, controlling for key variables such as change in GDP and geographic variables. This analysis reveals that blunt force measures are associated with clear improvements in pollution levels across China, and improve pollution levels to a greater degree than any other regulatory interventions.

In the second chapter of my dissertation, I address the question of why China chose to pursue this distinct regulatory strategy. Using interviews with national, provincial and local officials, I present evidence for the two forms of weak state capacity that gave rise to blunt force regulation: First, that local officials simply don't have the capacity to monitor and punish firms on an individual basis. Second, that even if the local state had the capacity to collect information and monitor firms, central authorities still could not compel local authorities to use this information to punish polluters. The former weakness made it more appealing for local officials to regulate through information shortcuts and industry-wide sanctions. The latter weakness compelled central officials to replace everyday, conventional regulation with extreme, one-off blunt force interventions. I then use interviews with local authorities and individual factory owners to demonstrate the degree of China's control over local firms, and how this made blunt force solution possible. This chapter clarifies the sub-optimal nature of blunt force regulation, and highlights the difficult decisions that drive states towards non-traditional regulatory solutions. Through China's case, I show how the severity of blunt force regulation may have been somewhat unintended—a side effect of institutional limitations of authoritarian governance.

The third chapter of my dissertation explains local officials' motivations for undertaking blunt force regulation. Using process tracing on my two cases, I analyze the cost-benefit calculations that allowed local officials to accept blunt force measures as the main solution their pollution problems. My research shows that, contrary to received wisdom, local officials all across China are willing to take drastic action against polluting firms, even to the point of losing 90% of local revenue[20]. My case studies, drawn from two vastly different regions of China, suggest that local officials concede to Beijing's pressure to carry out blunt force regulation, because it offers them a means to reduce pollution while protecting their interests. Because the selection of blunt force victims is discretionary, local officials can concentrate the cost of pollution reduction on those who are least able to pushback—namely on smaller, private firms or on industries that rely on temporary, transient labor. I provide further evidence for this theory with original data showing that of the approximately 6000 firms targeted by blunt force regulation in the last five years, a disproportionate number were small, privately-owned firms with informal workers. In sum, blunt force regulation, while inefficient, has provided local officials with a feasible shortcut to meeting Beijing's demands while minimizing social opposition and protecting key local interests.

This dissertation addresses an enduring question in political science: in weak institutional environments, how can political leaders push through policies that challenge

[20] For instance, in one northern Chinese county I visited, blunt force regulation against the local cement industry led to the loss of 90% of the township's tax revenue, and over 50% of local employment.

powerful local interests (Bates 1981, Tilly 1985, Evans, Rueschemeyer and Skocpol 1985, Migdal, Kohli and Shue 1994, Scott 1998, Migdal 2001, Slater 2008)? China's case suggests that one option available to developing countries is to pursue blunt, top-down measures that rely on increasing state discretion and state control over the economy. This solution is neither ideal nor just. It relies on the naked authority of the state, and can be painful for those groups and individuals that are least able to resist the heavy-handed of state authority. However, as I demonstrate in this dissertation, more than any other form of regulation, blunt force regulation can account for clear improvements in China's air pollution levels over the past few years.

In the face of urgent governance crises, and amidst the developing world's protracted struggle to effectively regulate the causes of these crises, are such decisive solutions worthwhile*?* On a broader level, my dissertation seeks to address this question by shedding light on the micro-dynamics of non-traditional regulatory approaches: what are the compromises, negotiations and day-to-day decisions of the actors implicated in a blunt force solution to pollution problems? These underexplored dynamics can help us understand whether China is developing a viable solution to regulating in weak institutional environments.

Chapter 2

Blunt Force Regulation: China's Answer to Pollution Problems

In recent years, China has become notorious for resorting to 'quick fix' solutions to deal with its pollution problems. In late 2010, on the eve of the 11th Five Year plan, officials in the Chinese county of Anping suddenly switched off power to its 'high energy consumers', which included traffic lights and hospitals[21]. Meanwhile, throughout Henan, Zhejiang and Shandong provinces, the air turned sour with smell of backyard diesel engines after local officials imposed power blackouts in the midst of winter[22]. Reports later revealed that city officials were scrambling to cut emissions after Premier Wen Jiabao threatened to fire all officials who had failed to meet the Five Year Plan's emissions reduction targets (Wang 2013, 420-422). More recently, in the autumn of 2014, Beijing forced thousands of factories to stop producing so they could deliver sparkling "APEC blue" skies for an APEC summit[23]. In the following years, this "APEC blue" strategy was repeated again and again, in preparation for military parades, and other major party conferences[24].

China's ability to produce sudden, dramatic improvements in air quality may seem impressive, but also somewhat extreme. They suggest that so flawed is regime's regulatory system that authorities must resort to ad hoc, stop gap measures to deal with its urgent environmental problems. Yet when we consider the scale and frequency of these stop gap measures, with stories emerging from China's smog-ridden counties to world class cities, these measures begin to seem less reactive, less arbitrary, and more part of a deliberate government strategy to tackle pollution.

In this chapter, I present qualitative and quantitative evidence showing that China's supposed 'stop gap' solutions to pollution control are, in fact, part of nationwide strategy to address pollution through industrial restructuring. This strategy, promulgated by Beijing and known officially as the "Policy to Eliminate Outdated Industrial Capacity" (淘汰落后产能) involves sophisticated technical planning, and enlists the efforts of several government agencies. Although billed as a form of industrial restructuring, this policy also aims to reduce pollution by eliminating the industries and firms that contribute most to industrial emissions. Moreover, while pollution reduction is an explicit

[21] Reuters, Sept. 6, 2010: China County Institutes Blackouts to Save Energy. See http://af.reuters.com/article/energyOilNews/idAFTOE68502L2010090, accessed Dec 1 2013.
[22] Xinhua, Nov 7, 2010: Xinhua Energy Reduction Policies Causes [(sic)] Unexpected Diesel Shortage in China. http://news.xinhuanet.com/english2010/china/2010-11/07/c_13594922.htm
[23] See The Guardian, Nov 4, 2014: Beijing Attempts to Cut Air Pollution for APEC Summit. See https://www.theguardian.com/world/2014/nov/04/beijing-smokescreen-hide-pollution-apec, accessed Jun 19 2017.
[24] See CNN, Sept 4 2015: Blue Sky Vanishes Immediately after Beijing's Massive Parade. See http://www.cnn.com/2015/09/04/asia/china-beijing-blue-sky-disappears-after-military-parade/index.html, accessed Sept 5 2015.

goal, this is largely implemented by the economic ministries—highlighting just how much environmental regulators have been sidelined in China's attempts to control pollution.

In this chapter, I also present evidence showing the impact of this strategy on pollution levels. Using satellite data on pollution and an original dataset on municipal enforcement tools, I demonstrate that, throughout China, this 'blunt force' approach to pollution reduction has become the most important and most effective tool for reducing emissions in the last five years.

Studies of China's environmental performance often highlight its weak enforcement of pollution regulation (Lo et al. 2012, Kostka and Nahm 2017), but seldom acknowledge local officials' attempts to reduce pollution through more direct means, such as with these blunt force measures. Nor do they address the consequences of China's attempts to reduce pollution so rapidly, through such intrusive measures, and on such a large scale. In short, these studies are missing one half of the picture—and a half picture that is transforming industry and labor markets in China's industrial centers. This chapter aims to address this gap in our knowledge by describing the phenomenon of blunt force regulation and quantifying its impact.

1. Pollution Control through Industrial Restructuring

When I first began interviewing local officials and environmental regulators in China, I found it strange that our conversation so often shifted to talk of economic planning. Until then, I assumed that stricter emissions target and stronger sanctions were to be the lynchpin of China's pollution control strategy; Beijing would pressure firms to reduce emissions by increasing pollution penalties, and incentivize local officials to enforce standards by introducing high-powered pollution reduction targets[25].

I was therefore surprised when, on questioning regulators about whether stricter pollution sanctions have helped them to meet environmental targets, they would talk instead about the impact of industrial restructuring measures (产业调整) or forced reductions campaigns (减产). For instance, when I asked a provincial official how environmental enforcement has changed in recent years, he responded:

> Before, we were evaluated on specific measures, such as how well we performed on limiting steel and coal production levels.... But now, a big part of the evaluation is based on how much air quality has improved, which means each city has more flexibility in planning how to meet environmental targets. For instance, if a city doesn't produce much steel, then they won't have to focus on meeting specific steel reduction targets. (Interview X2110815a)

It is striking that, in reference to implementing environmental targets, this official spoke primarily about limiting steel and coal production, rather than of more typical regulatory actions, such as punishing pollution violations. This official was from one of China northern industrial provinces so, to an extent, his preoccupation with industrial

[25] Since 2006 bureaucratic promotions and bonuses have been tied to hard pollution reduction targets. Hard targets are critical to a bureaucrat's bonuses and chances of promotion, and have proven instrumental in achieving industrial development or enforcing birth control (Landry 2008,106; Edin 2003).

restructuring was to be expected. Yet when speaking about environmental targets with provincial officials from one China's more developed, coastal provinces, I found that they also focused on industrial restructuring, going so far as to state that:

> Right now, the most important measures [for reducing pollution] are the policies on industrial restructuring and eliminating industrial overcapacity. So far, we have tried to do this by moving polluting industries to remote areas where pollution will be less concentrated... or by closing down smaller firms and strengthening the bigger ones. (Interview X4090116a)

This became a repeat occurrence in my interviews with local officials, including those in the lower-levels of the bureaucracy, such as cadres from municipal and county environmental agencies. Instead of outlining strategies to identify and punish non-compliant polluters, they talked about industry-wide campaigns to forcibly relocate or close down polluting companies. These included efforts to "eliminate the dirty ceramics industry" (Interview X6210116) or "relocate the waste recycling industry to cleaner industrial parks" (Interview X3a240615a). One municipal EPA official exclaimed:

> "Of course those campaigns for forced reductions of industrial capacity are linked to efforts to reduce emissions! As you can see, the 'outdated industries' targeted in forced reductions are often the most polluting industries" (Interview X6210116)

This is not to say that the Chinese government's orders to reduce industrial capacity are exclusively about pollution control. The state also has strong incentives to restructure China's overall economy, especially in the industries with a high proportion of ailing, inefficient state-owned enterprises. However when we see Chinese authorities reorganizing entire industries through forced closures or 'reduce production' orders, they are not simply attempting to 'upgrade economic efficiency', or address 'overcapacity' problems. They are also trying to limit the economic activity that directly contributes to high pollution levels. As the party secretary of Shijiazhuang city publicly stated:

> "To prevent air pollution.... in addition to resolutely eliminating those small, backwards industries that contribute little to employment and revenue, we must also eliminate those big industries and companies that conform to our industrial policy, but are contributing too much to pollution."[26]

Moreover, while these authorities still keep up the minimum of 'reactive' pollution control measures, such as environmental inspections and pollution penalties, the most concerted efforts to reduce pollution are now being done through these 'proactive' industrial restructuring measures. Thus, pollution control by industrial restructuring has given rise to a very distinct regulatory style—a style I call 'blunt force regulation'.

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[26] Sun Ruibin, Party secretary of Shijiazhuang, as quoted in Economic Daily (经济日报), December 17 2014: Farewell to the "Cement Corridor" (告别"水泥走廊). See http://www.ce.cn/xwzx/gnsz/gdxw/201412/17/t20141217_4138023.shtml, aaccessed April 16 2017

2. How Blunt Force Regulation Works

As with many policy directives in China, blunt force regulation begins with the issuing of national targets, set by Beijing, for achieving specific, quantitative goals. For instance, in 2013, China's State Council determined that by 2015, local governments (specifically, municipal and county governments) would be required to forcibly reduce industrial capacity in iron, steel, and cement industries by an additional 15 million tons, 15 million tons and 100 million tons respectively[27]. Beijing initially divides these targets up by province, taking into account the urgency of industrial restructuring and pollution control in each province. The Center does not give provinces specific instructions on how to carry out these capacity reductions. However, the policy's guiding statement encourages provinces to reduce production output by eliminating capacity in older, less-advanced industrial sectors, by preventing the construction of new projects, and by targeting production in 'illegal' sectors (that is, production in firms without proper land, business or environmental permits). Here, we see that local officials are being encouraged to target entire categories of firms instead of assessing firms on the basis of their compliance with the law.

Once capacity reduction targets are distributed to the provincial level, provincial leaders begin negotiating with local governments (including municipal and county leaders) on which specific firms will be targeted for forced reductions. Through this negotiation process, the province draws up a specific list of firms to be targeted for reductions[28]. This is where political discretion enters into the process. While this policy is directed at reducing pollution and excess capacity in heavy industry, many other variables are taken into account when drawing up the actual list of firms to be targeted. For instance, a provincial-level official from the National Development and Reform Commission mentioned that when drawing up these lists, officials would take into account each firm's contribution to revenue, employment, and whether it provided essential services, such as heating (Interview X2140515a). Note that the compliance level of individual firms is not mentioned in these criteria. The central government's political interests are also taken into account, as the final list of firms' names must be sent to Central ministries for review and approval (Interview X2140515a). This gives central officials the chance to protect firms with higher-level connections[29].

While the process of selecting firms for targeting does seem highly discretionary, overall, it is still a 'blunt' approach to regulation because these firms are being selected

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[27] See State Council, 2013. "Guiding opinion on overcapacity" (国务院关于化解产能严重过剩矛盾的指导意见), October 6, 2013. See http://www.gov.cn/zwgk/2013-10/15/content_2507143.htm

[28] The annual number of firms targeted for blunt force measures in each city can range from anywhere between 132 firms to just one firm.

[29] For instance, Liu Yongting, Vice-leader of Hebei Provincial Bureau of Industry and Information Technology stated that he would have to wait for approval from central ministries on the list of selected firms before they could begin carrying out measures to reduce steel capacity by Hebei province's assigned target of 60 million tons. See China Comment (半月谈网), June 6 2014: Hebei supresses production capacity: smashing the people's rice bowl for the 'black hats'(河北压制产能：为了乌纱帽砸别人饭碗?). See http://www.cssn.cn/jjx/jjx_bg/201406/t20140606_1200233.shtml, Accessed April 18 2017; 中国企业报 2014

for falling into certain categories: First, firms will only be targeted if they belong to a list of 18 specific industries that have been pre-selected for restructuring by the central government. Second, as I demonstrate in chapter four, firms are usually selected for falling into groups that provide minimal political pushback; the majority of firms selected were not the most polluting firms in their jurisdiction, but they did have fewer workers, and were largely privately owned.

Moreover, the list of firms drawn up local officials does not represent the universe of firms targeted for blunt force measures. The policy's guiding statement also encourages the reduction of capacity in 'illegal' firms, that is, firms without proper permits. This instruction is clearly directed at small and medium enterprises, who seldom have the necessary permits, and become easy targets for government cleanup campaigns. This means that widespread closures of small and medium enterprises usually occurs in tandem with forced capacity reduction orders in firms on the approved list of targets. For example, documents from the Ministry of Industry and Information Technology (MIIT) show that for one city in Hebei, 75 cement firms were ordered to reduce capacity by a total of 16 million tons between 2010-2014. My case study research reveals that during the same period, a further 8 million tons of capacity was reduced in smaller firms in this city, but these reductions did not appear on the official list[30]. These measures directed at 'illegal capacity' are where we see the most blunt version of blunt force regulation, where entire districts of small firms, or entire industries run by small and medium enterprises are wiped out in a short period of time.

Despite the explicit pollution control goals of this policy, the implementation of blunt force regulation is largely overseen by the economic ministries and their local government bureaus. For instance, the selection of firms to be targeted is largely worked out by the Economic Development Bureau (发展局), the Bureau of Industry and Information (经信委) the Bureau of Industry and Commerce (工商局). These economic officials will consider air pollution reduction targets when selecting firms, and may even solicit input from the environmental protection agencies, but they still take the lead in deciding how capacity reduction measures will be implemented (Interview X2140515a). Local Environmental Protection Bureaus (EPBs) may receive this list of targeted firms, but environmental regulators I interviewed confirmed that they do not have a direct role in implementing this policy. One regulator noted that "the economic bureaus are much better equipped to carry out these forceful measures with firms, because they are frequently in contact with these companies and have a more direct relationship with them" (Interview X6210116). This process highlights just how much blunt force regulation sidelines the role of environmental regulators, even in measures directed at pollution reduction.

Local officials begin to apply blunt force measures once a list of firms has been approved. Again, we see a degree of discretion involved: Beijing does not dictate the schedule of exactly when or exactly how capacity must be reduced, it simply dictates that a certain tonnage must be reduced in each province within the year. However, as I illustrate with my cases in chapter four, municipal and county officials usually begin to implement blunt force measures under direct pressure from provincial leaders, who are

[30] Yang, L. 2015. *Analysis of the impact of firm closures on the livelihood the local informal workforce* (企业关停对当地临时就业人员的生计影响研究)

usually acting under increased pressure from Beijing. We see this in the case of Linyi, from the introduction, where local authorities suddenly initiated blunt force measures against large firms after being called to account by Beijing. However, even though local officials have some control over the timing of blunt force measures, in general, firms are given very little notice before forceful actions are taken. For instance, in the city of Shijiazhuang, cement firms that had been selected for complete demolition in 2013 were only given a few months notice before their factories were destroyed[31].

Local officials also exercise some discretion over how targeted factories or industries will be forced to reduce production. In Hebei province, local officials have shown a preference for using blanket 'stop production' orders against entire industries. Factory owners in Hebei complain that these stop production orders tend to occur in the winter months, when pollution is particularly heavy (Interview X2230815). For instance, in late 2016, the municipal government of Shijiazhuang (in Hebei province) forcibly halted production in steel, cement and thermal power plants for the final 45 days of the year[32]. This is an example of blunt force regulation in its most blunt. However, local officials might also achieve blunt force targets through less direct methods. For instance, in Qingyuan city in 2015, factories that had been targeted for closures were given a deadline for evacuation, and forceful actions (such as seizing factory equipment) were only taken against factories that had failed to meet the deadline[33].

The pre-determined nature of this process, and the fact that it originates with specific policy targets from Beijing, demonstrates that when local authorities close down factories, cut off electricity, or relocate companies, they are not deploying 'quick fix' measures to meet emissions targets or address urgent pollution problems. In fact, they are applying the regulatory tools developed specifically for this policy of reducing pollution through industrial restructuring. But how widespread is this phenomenon of blunt force regulation? So far I have used only qualitative evidence to show how blunt force regulation works in China. In the next section I will use quantitative evidence to demonstrate that in addition to being widespread, blunt force regulation has become the most important regulatory tool for reducing pollution in China.

3. The Impact of Blunt Force Regulation

Statistics on blunt force regulation are hard to find. Reporting on measures of this sort is seldom institutionalized, because it is carried out through discretionary powers. The most aggressive blunt force interventions also tend to be directed at small or unregistered firms, so it is difficult to find a paper trail of how many firms have been targeted. In

[31] CCTV "Economy Time" (中央电视台《经济半小时》) April 13, 2016: Report from the frontlines of reform: the aftermath of demolishing cement factories (来自改革一线的报道：水泥厂爆破之后). See http://tv.cctv.com/2016/04/13/VIDEVLZLeyoYiLIDWFpQgDKz160413.shtml. Accessed April 23 2017.

[32] Bloomberg "North China City Halts Pharma, Steel Plants to Curb Pollution", November 20 2016. See https://www.bloomberg.com/news/articles/2016-11-21/north-china-city-halts-pharma-steel-plants-to-curb-pollution. Accessed Nov 21, 2016.

[33]The Southern Daily (南方日报), July 26 2016: The transformation of a 40 year old e-waste industry in Qingyuan, Guangzhou. (广东清远 40 年电子拆解业转型 垃圾焚烧污染重). See http://www.chinanews.com/sh/2016/07-26/7951598.shtml. Accessed July 28 2016.

general, evidence of blunt force regulation tends to be anecdotal, appearing occasionally in the media as public interest stories. I myself only began to sense that this was a widespread phenomenon when I came across versions of blunt force measures in every city that I visited, from sites in wealthy coastal provinces, to less-developed industrial provinces.

Since 2010, however, documented evidence of one form of blunt force regulation has existed through bureaucratic reporting on forced reductions of industrial capacity. In 2010, the Ministry of Industry and Information Technology (MIIT) issued a notice ordering local governments to reduce production output in 18 polluting industries. Billed as measure to "eliminate outdated industrial capacity"[34], as I show from the interview evidence above, this program was also introduced as an alternative means to control pollution.

Beginning in 2010, municipal governments have published annual lists of firms that will be forced to reduce production, with specific production cuts allotted to each firm. Firms may be ordered to reduce production by as little as 1000 tons a year or as much as 6.1 million tons a year, but the combined impact on a region's industrial output can be significant. In Hebei province, these orders amounted to a 13% forced reduction in steel capacity in 2011, followed by a 35% forced reduction in cement capacity in 2012.

Table 1 shows descriptive statistics of these forced reductions from 2010-2015, while figure 2 shows a map demonstrating the spread and scale of blunt force measures. Reductions were most severe in Hebei province (one of China's most polluted province) but in table 1 also show that between 2010-2015, industrial capacity was reduced in 269 out of 283 prefecture-level cities. The 14 cities with zero production cuts also tend to be either very wealthy and developed (such as Shenzhen, or Sanya—a resort town) or small towns in remote areas, such as Karamay in Xinjiang.

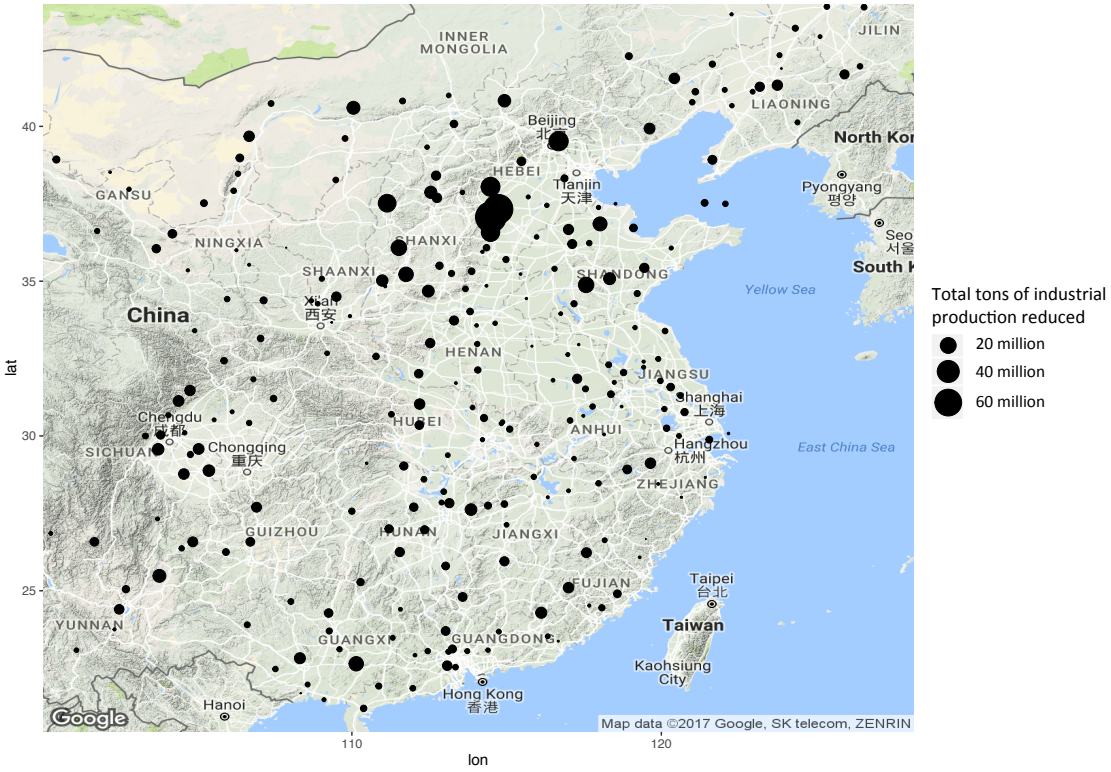
Table 1: Descriptive Statistics of Blunt Force Reductions
(Unit=10,0000 tons)

Year	Mean	Median	Min	Max	Total Tons (10,000 tons)	No. of Cities with Cuts
2010	61.34	19.25	0.36	1393.00	16782.79	189
2011	90.17	28.80	0.10	3565.00	24907.33	217
2012	125.0	46.8	0.20	1837.00	34685.74	215
2013	48.36	10.00	0.50	1446.00	13325.61	168
2014	70.36	2.70	0.20	2740.00	20012.62	156
2015	68.69	40.00	0.50	443.00	6594.44	96
				Total	116,308.53	269

[34] See 2010 notice from Ministry of Industry and Information Technology 《中华人民共和国工业和信息化部公告 —工产业[2010]第111号》

From figure 2, we can how widespread these blunt force measures are, with reductions taking place all over China. Reductions tend to be more intense in polluted areas (such as Hebei, Shandong and Shanxi provinces), which reinforces the point that these forced reductions are ultimately about reducing emissions.

Figure 2: Map Showing Distribution of Forced Industrial Reduction 2010-2015



This quantitative evidence confirms the interview evidence showing that 'blunt force' regulation has become an important means for local officials to reduce pollution in China. While authorities still keep up with conventional regulation through occasional inspections and penalties, the most concerted efforts to reduce pollution are now being done through blunt force measures.

Based on this evidence, I propose that in cities where local authorities use blunt force measure against polluting firms, we are more likely to see significant, lasting improvements in environmental outcomes. In contrast, conventional regulatory measures are expected to have negligible impact on pollution levels. To assess this hypothesis, I examine the impact that different forms of regulation have had on pollution reduction since 2013. My empirical strategy is outlined below.

4. Empirical Approach

In the following section, I examine the effect of blunt force regulation on changes in air pollution in China. To ensure that this effect is not driven by parallel regulatory

interventions, I control for the effect of more conventional regulatory measures. These include 1) conventional pollution penalties and 2) the use of information disclosures to publicly shame polluting firms into reducing emissions—a newer form of regulation that the Chinese government has experimented with. I use ordinary least squares regression to measure and compare the impact of different regulatory measures on changes in industrial pollution levels.

4.1. Dependent variable

To measure reductions in industrial pollution in China, I look at the change in Sulfur-dioxide (SO_2) levels in China's 283 prefecture-level cities between 2010-2015. Specifically, I measure how much SO_2 levels have increased or decreased over recent years. I measure absolute changes in air pollution levels because the dependent variable (intensity of blunt force measures) is also measured in absolute terms. In other words, I am looking at the absolute impact that forced factory closures and orders to reduce industrial capacity have had on air pollution levels. The independent variable is calculated as:

Mean annual SO_2 levels in 2013-2015– Mean annual SO_2 levels (DU) 2010-2012 in[35]

I have chosen to focus on sulfur-dioxide (SO_2) as a measure of air pollution for two reasons: First, SO_2 is produced primarily by industry whereas other airborne pollutants (such as PM2.5 and NOx) are also produced by car and ship exhaust. Thus SO_2 is the best measure of industrial air pollution—the main focus of this paper. Second, SO_2 emissions are stable in the atmosphere; that is, SO_2 is not prone to secondary chemical reactions in the air, so the amount of SO_2 in the atmosphere is a direct product of industrial emissions. PM2.5, however, is often produced by secondary reactions in the air. This means that the levels of SO_2 in the atmosphere have a more direct relationship to the pollution emitted by industrial firms than either PM2.5 or NOx[36].

To overcome the limitations of self-reported Chinese government pollution data (see Ghanem et al. 2014), I use satellite measures of ground-level SO_2 levels—obtained from NASA's OMSO2e dataset —to calculate SO_2 levels. Estimates of ground-level SO_2 from satellite data can now be pinned down to an area of approximately 27 by 27 km^2 at the equator, approximately the area of a Chinese city and its surrounding counties[37].

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[35] SO_2 emissions are measured in Dobson Units (DU). 1 DU is equal to $2.69 \cdot 10^{26}$ molec·km^{-2}. Scientifically, this means that "if you were to compress all of the sulfur dioxide in a column of the atmosphere into a flat layer at standard temperature and pressure (0^o C and 1013.25 hPa), one Dobson Unit would be 0.01 millimeters thick and would contain 0.0285 grams of SO_2 per square meter." (See NASA, https://so2.gsfc.nasa.gov/so2intro.html). To put this in context: Zibo city (Shandong province), one of the most polluted cities in China, recorded a mean SO_2 level of 48.140 DU in 2010-2012 for the summer months of May to September. Lincang (Yunnan province) one of the least polluted cities in China, recorded a mean SO_2 level of 1.598 DU from for same period.

[36] This decision is based on advice from atmospheric science experts at Tsinghua University and information on atmospheric pollution in *Clearer Skies Over China* (Nielson and Ho, 2013)

[37] Given that city officials usually have direct authority of large factories in surrounding counties, it is useful to include SO_2 levels in surrounding counties.

The use of satellite data and SO_2 atmospheric levels to measure SO_2 industrial emissions raise some concerns. First, as with all satellite data, estimates of SO_2 levels are sensitive to extreme weather patterns, severe cloud cover, snow coverage, and larger solar zenith angles. The OMSO2e dataset corrects for some of these issues. However, to minimize measurement error, I also use the Fioletov et al. (2011) method of calculating changes in SO2 from the OMSO2e dataset[38], which includes averaging emissions over three years of data. This is why I measure the pollution reduction between two 3-year periods: 2010-2012 and 2013-2015. This method has been shown to be accurate at pinning down changes in point source SO_2 emissions (Fioletov et al. 2011, 3). The levels of SO_2 measured by satellite data may also include industrial emissions blown in from neighboring cities. I therefore control for changes in SO_2 levels in all neighboring cities less than 100 kilometers away[39]. The measure for neighbors' emissions is weighted inversely by distance, because a city's overall SO_2 levels are more likely to increase the closer a neighboring city is.

4.2. Explanatory and control variables

The main explanatory variable is the intensity of blunt force regulation. Here, I use original data documenting the intensity of 'reduce capacity' orders in each of China's prefecture-level cities for 2012-2014[40]. Specifically, I measure the total production output (in tons) that polluting companies were *ordered* to forcibly reduce in 2012-2014, aggregated at the city-level. This measure only includes capacity reduced in companies that contribute to air pollution[41]. I choose the period 2012-2014 because capacity reduction orders typically take a year to enforce, so this is the period where blunt force interventions are most likely to have an impact on 2013-3015 SO_2 levels. Forceful 'reduce capacity' orders represent only one form of blunt force regulation, so this measure is a conservative estimate of the true intensity of blunt force regulation. However, my case study research—which I present in more detail in chapter four—reveals that these orders are usually enforced in conjunction with other blunt force measures (such as forced closures of small firms). The measure I use here can therefore be considered a proxy for the overall intensity of blunt force regulation.

To limit omitted variable bias from parallel efforts to reduce pollution through conventional regulation, I control for two other forms of environment regulation. First, I control for the intensity of command and control regulation. To measure this, I use the total number of administrative punishments cases (本级行政处罚案件) processed against polluting firms in 2012-2014. Again, this variable is lagged, because it takes time for companies to change their behavior in response to enforcement efforts. This data is available only at the provincial level. However, because provinces are responsible for leading municipal and county governments in allocating and enacting enforcement

[38] For more details see Fioletov et al. (2011)

[39] Satellite analysis reveals that pollution blown in is only a concern for cities within 100 kilometers of each other; ground-level SO_2 measures of major emissions sources (such as 3000 MW coal-fired power plants) are no longer significant once more than around 75km away from these sources (Fioletov et al. 2011 p.2).

[40] Raw data obtained from the Ministry of Industry and Information

[41] The specific list includes firms in steel, copper, lead and zinc smelting, coking, cement and glass. Power plants are not included in this list.

targets, variation in enforcement actions tend to cluster at the provincial-level (interview X5210116, interview X211016). I therefore impute this provincial data on administrative punishments at the city level. Second, I control for the implementation of information disclosures. To measure this, I use each city's score in the Pollution Information Transparency Index (PITI) index in 2013-2015. This well-respected index, developed by an independent NGO, evaluates the implementation of pollution transparency in 113 cities. Values range from 0 (poor transparency) to 100 (excellent transparency). This variable is not lagged, because PITI scores assess government performance on pollution transparency that year.

In my empirical tests, I also include a set of controls for factors that may be associated with changes in SO_2 emissions. This includes the change in total capacity (in Megawatts) of coal-fired power plants in each city between 2012-2015, which takes into account changes to the coal-fired energy sector during this period[42]. Power plants were not included on the list of firms ordered to reduce capacity. However, they are by far the biggest contributors of SO_2 industrial emissions in any locality, and can emit up to 2.5 times more SO_2 than the steel, cement, chemical and petroleum industries combined[43]. Thus, it is important to control for any regulatory measures used to close or reduce capacity in power plants during this period (see Liu, Lo et al. 2015 for more details). I also control for change in GDP between the two periods. In recent years, China's GDP growth rates have started to decline, so this measure controls for any reductions in industrial output (and related reductions in SO_2 industrial emissions) that can be attributed to general market slowdowns. GDP data is drawn from China's statistical yearbooks, while the data on power plants was collated from different sources from the Ministry of Environment Protection. A definition of all variables can be found in table 5 in the appendix.

Changes in air pollution levels can also be affected by time invariant geographical variables, such as elevation or topography. For instance, pollution is harder to disperse in geographical basins than in coastal cities. Other time invariant variables, such as the distance from Beijing, could also impact a city's change in pollution levels. For instance, the cities in Hebei province (the province encircling Beijing) are under constant pressure to keep their air quality under control, whereas distant western provinces that have little impact on Beijing's air quality are less closely observed. I therefore run a first difference regression to control for the effects of these time invariant variables

4.3. Findings

Table 2 presents the results of the first difference model on the impact of blunt force regulation on changes in pollution levels. In model 1, simple bivariate results show a statistically significant negative correlation between the intensity of blunt force measures and reduction in air pollution. This implies that the use of blunt force measures against polluting firms is associated with decreases in air pollution. This finding holds in model 2 when we include controls.

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[42] This data on power plant capacity was hand collected using lists collated from the China Yearbooks data, raw data from the Ministry of Environmental Protection and additional online searches.

[43] This is based on 2005 figures though the ratio may have changed somewhat in the past few years. See Nielson et al. (2013) Chapter 2 in *Clearer Skies Over China.*

Table 2: First Difference Regression of Blunt Force Intensity on Pollution Reduction—with control variables

	Change in SO_2 levels (2012-2015)	
	(1)	(2)
Blunt force intensity 2012-2014 (million tons reduced)	-0.139** (0.058)	-0.095** (0.046)
Change in Neighbor SO2 Levels		1.948*** (0.193)
Change in Coal Power Capacity (1000 MW)		0.107 (0.179)
Change in GDP		-0.002 (0.002)
Constant	-1.630*** (0.220)	-0.859*** (0.229)
Observations	280	276
R^2	0.03	0.33

Note: Robust standard errors are in parentheses. Significance Codes: *p<0.1; **p<0.05; ***p<0.01

To put the above results into perspective, I compare the effect of blunt force regulation to 1) conventional law-based regulatory measures (in the form of pollution penalties) and 2) the use of information disclosures to publicly shame polluting firms into reducing emissions. In table 3 we see the results of this comparison. In model 1, simple bivariate results show that there is no significant correlation between the number of pollution penalties and pollution reduction. In model 2, which regresses pollution reduction on informational disclosure measures, again we see no significant correlation. However, in model 3 where I compare (with controls) the effect of blunt force regulation to the two conventional forms of regulation, we find that only blunt force regulation has a statistically significant effect. Since the PITI index was only developed for 113 cities, the number of observations in models 2 and 3 are restricted to 113 cities. I therefore re-run the comparison between blunt force measures and conventional punitive measures in model 4 for all 283 Chinese cities[44]. Again, we see that of the different regulatory approaches, only blunt force regulation has a statistically significant effect on pollution reduction. This finding is robust to changes in model specifications, including adding additional controls (such as the change in a city's ratio of services) or dropping controls.

[44] Models 1, 3 and 4, all use robust standard errors, clustered by provinces, because they include provincial-level data on administrative fines.

Table 3: First Difference Regression of Different Regulatory Styles on Pollution Reduction with Unstandardized Variables

	Change in SO_2 levels (2012-2015)			
	Models without controls		Models with controls	
	(1)	(2)	(3)	(4)
Blunt force intensity 2012-2014 (million tons reduced)			-0.219**	-0.097**
			(0.109)	(0.040)
Total Number of Administrative Punishments 2012-2014 (thousands)	-0.009		-0.019	-0.012
	(0.016)		(0.015)	(0.009)
Change in PITI Transparency score		0.011	0.014	
		(0.013)	(0.012)	
Change in Neighbor SO2 Levels			1.909***	1.947***
			(0.136)	(0.154)
Change in Coal Power Capacity (1000 MW)			0.061	0.113
			(0.206)	(0.198)
Change in GDP (billion RMB)			0.000	-0.001
			(0.003)	(0.003)
Constant	-1.840***	-2.529***	-0.799	-0.717*
	(0.550)	(0.375)	(0.922)	(0.397)
Observations	280	107	107	276
Clusters	25		25	25
R^2	0.001	0.000	0.325	0.329

Note: robust standard errors, clustered by provinces, are in parentheses for models 1, 3 and 4. Robust standard errors only in parentheses for model 2. Significance Codes: *p<0.1; **p<0.05; ***p<0.01

Of the control variables, only changes in sulfur dioxide levels in neighboring cities are statistically significant. This is result is to be expected: given that sulfur dioxide levels in the air are sensitive to wind, cities with highly polluting neighbors will experience increases in their own pollution levels, while cities with neighbors that have reduced pollution can expect improvement in air pollution levels. This is why the majority of Beijing's efforts to improve the city's air quality are directed at neighboring cities in Hebei province.

In the above models, the independent variables are measured on very different scales, which makes it difficult compare their relative impact on pollution levels. Below I present the same model with standardized variables. Standardization rescales variables to have a mean of zero, and standard deviation of one, which makes it possible to compare the effect sizes of predictors on the outcome variables. The results in table 4 show that one standard deviation change in total tons forcibly reduced in each city leads to a 0.13 standard deviation decrease in sulfur dioxide levels. In contrast, for the variable measuring the number of penalties issued against polluting firms (which is not statistically significant), one standard change in penalties issued only leads to 0.05 standard deviation decrease in sulfur dioxide levels. This means that blunt force measures are approximately 2.5 times more likely to be effect reductions in sulfur dioxide levels than conventional regulatory measures like pollution penalties. We also see that emissions from neighboring cities have the greatest effect on changes in pollution levels; one standard deviation change in neighboring emissions lead to a 0.5 standard deviation increase in sulfur dioxide levels, which means it is almost four times the effect on changes in sulfur-dioxide levels than blunt force measures. This suggests that Chinese cities, especially cities that are closely clustered together, will have to make a greater effort to coordinate regional pollution reduction measures if they intend to improve local pollution levels.

The effect of blunt force regulation may also be underestimated in the above models, because this measure does not include (undocumented) forced closures of small firms—the intervention that has the biggest long-term impact on pollution levels. Moreover, this model measures reduction in satellite-derived SO_2 levels, which is a much noisier measure of emissions, because the connection between reduced SO_2 *emissions* at the factory level and reduced SO_2 *levels* in the air can be affected by wind, geographic features and weather patterns. While these models do control indirectly for wind and weather variables, the fact these 'officially recorded' blunt force measures register a discernable impact on SO_2 levels at all indicates that blunt force regulation must be having some impact on SO_2 emissions at the city level.

Table 4: First Difference Regression of Different Regulatory Styles on Pollution Reduction with Standardized Variables

	Change in SO_2 levels (2012-2015)		
	(1)	(2)	(3)
Blunt force intensity 2012-2014 (million tons reduced)	-0.130** (0.064)	-0.214** (0.107)	-0.132** (0.054)
Total Number of Administrative Punishments 2012-2014 (thousands)		-0.076 (0.062)	-0.052 (0.042)
Change in PITI Transparency score		0.099 (0.087)	
Change in Neighbor SO2 Levels	0. 546*** (0.055)	0.538*** (0.038)	0.546*** (0.043)
Change in Coal Power Capacity (1000 MW)	0.034 (0.056)	0.022 (0.074)	0.035 (0.062)
Change in GDP (billion RMB)	-0.038 (0.038)	0.013 (0.068)	-0.033 (0.046)
Constant	0.000 (0.049)	0.000 (0.089)	0.000 (0.076)
Observations	276	107	276
Clusters		25	25
R^2	0.328	0.313	0.329

Note: robust standard errors, clustered by provinces, are in parentheses for models 2 and 3. Robust standard errors only in parentheses for model 1. Significance Codes: *p<0.1; **p<0.05; ***p<0.01

5. The Inefficiencies of Blunt Force Regulation

The results I present above suggest that local officials in China *are* taking strong measures to reduce emissions, and at significant cost to local employment and the local economy. This finding challenges the conventional wisdom on pollution regulation, which suggest that local officials will almost always invest in the economy at the expense of the environment (Jia 2014; Ward, Cao and Mukherjee 2013; Cao, Kostka and Xu 2016, Zheng et al n.d.). Moreover, by documenting and analyzing the impact of blunt force measures for the first time, I show that they are not an exceptional regulatory tool or a temporary, stopgap measure. In fact, they represent an emerging form of regulation that is having an impact on pollution reduction across China.

China's turn to blunt force regulation has interesting implications for regulating in weak institutional environments. In much of the developing world, we see states struggling to enforce pollution regulation amidst limited fiscal and administrative capacity. Most of these countries have focused on leveraging the power of non-state actors to strengthen their regulatory efforts. (O'Rourke 2004, Keck and Abers 2009, 305-308; Braithwaite 2006, 891; van Rooij, Stern and Furst 2016). Evidence in this chapter suggests that against this trend in developing countries, China is developing a regulatory solution that requires little participation from activist citizens, NGOs, or watchdog groups. Like its developing country counterparts, China struggles to monitor polluting firms. However, unlike these other countries, Chinese authorities have decided to solve this problem by turning to blunt, top-down measures that rely on increasing state control over the economy. And the results above suggest that this state-centered approach to regulation is working. Pollution is declining. In sum, by bypassing information gathering and resorting to direct state action, China does appear to be developing an alternative model for pollution regulation in weak institutional environments.

However, China's blunt force solution also seems enormously inefficient. Studies have shown that in the long run, sustained surveillance and selective punishment is much more efficient at achieving regulatory outcomes than forceful regulatory action. If regulators can get firms to institutionalise pollution reduction in their company operations, over time they can begin to cut down on monitoring and avoid costly lawsuits (Mascini 2013,Yasuda N.d.). This change in company operations is more likely to occur under sustained regulatory surveillance, because firms face a permanent threat of sanctions, and will therefore take independent steps to reduce their pollution (Short and Toffel 2010). In contrast, forceful regulatory action tends to generate distrust between regulators and firms, creating a combative relation that encourages firms to resent and evade regulation (Mascini 2013, Carrigan and Conglianese 2011). Firms may temporarily change their behaviour in the face of direct regulatory threat, but they seldom take independent action to fix pollution in the long term. We see this in oft-reported cases of Chinese firms that install pollution infrastructure during strict enforcement campaigns, but stop operating this infrastructure the minute government attention has waned[45].

[45] China Central Television (CCTV), March 1 2015 report on Linyi (see above); China Energy News, 中国能源报, June 29 2015, MEP launches strong attack against excessive emissions from thermal power stations, see http://paper.people.com.cn/zgnyb/html/2015-06/29/content_1582287.htm, accessed June 30 2016; Chai Jing, Febraury 28 2015. "Under the

In China, distrust between regulators and firms is exacerbated by the state's lack of transparency in determining who will be targeted for blunt force measures. While the enforcement of punitive measures is blunt—all firms in selected categories, including compliant firms, will be punished—the selection of which *categories* of firms will be targeted for punishment is highly discretionary. Consider, for example, the variation in categories of firms targeted for blunt force regulation across China: In Linyi city in 2015 (the case mentioned in the introduction), the 57 companies forced to stop production were chosen for being the largest, most energy-intensive and biggest emitters of pollution in the city[46]. In contrast, the blunt force campaign that took place in Wei county, Hebei province, in the summer of 2014 was directed exclusively at small firms; the county government ordered all 77 factories with coal-fired furnaces below a certain size[47] to demolish and replace their furnaces with gas-fired furnaces within one hundred days.

The standards used for selecting blunt force targets in Wei county also underscore the arbitrary basis by which firms are selected for punitive measures. While the local government was ordering all factories with furnaces of ten steam tons or below to destroy their furnaces, they were also providing funds to factories with furnaces above this size to subsidize infrastructure upgrades[48]. Why should some companies be targeted for pollution control measures because they did not meet a *size* standard? Moreover, why should some companies be helped in upgrading their infrastructure, not because they were less polluting but because their furnaces were above a certain size?

In 2015, Chinese officials from Anhui province were forced to openly acknowledge in the courts that their selection of firms for blunt force sanctions lacked legal foundation: In 2013, the Anhui provincial government had ordered all firecracker companies (including compliant companies) to immediately dismantle their production equipment and close down their businesses. The only justification the government issued was the need to "upgrade and standardize the fireworks industry"[49]. Twenty-four factory owners later sued the provincial government for damages and, in an unprecedented turn of events[50], won their case; the Hefei Intermediate Court ruled that the Anhui provincial government's the decision to close these fireworks factories had 'violated the law'[51], and that these factory owners deserved to be compensated. That the highly compromised

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Dome" (《穹口之下》); interviews X4161215; X1120516; X1130516

[46] These firms represent they entirety of the city's list of "National Supervised Polluting Enterprises" (国家重点监控企业).See Beijing Times, July 4 2015: Linyi stops production in 57 polluting firms to control pollution (临沂治污停产 57 家污染企业 环保部督查组予以肯定). See http://www.chinanews.com/gn/2015/07-04/7384037.shtml, accessed July 4 2015.

[47] Specifically, all factories with furnaces that used 10 tons of steam or below were targeted.

[48] China Environment News (中国环境报), August 6th 2014. Wei county's excess boilers are stopped to bring air pollution under control (冬病夏治几多疗效？魏县乘锅炉停运督促大气污染企业抓紧整治) See http://www.scaes.cn/detail/?mid=2708, Accessed April 13, 2017

[49] 《关于烟花爆竹生产企业整体退出意见的通知》

[50] One prominent legal academic watching this case noted that this outcome was "inconceivable!" because he never thought a Chinese court would be willing to rule against a provincial government (Interview X1010715)

[51] Qianjiang Evening News, April 24 2015: Anhui firecrackers companies win sue provincial government and win case (**安徽花炮企业状告省政府胜诉**). See http://qjwb.zjol.com.cn/html/2015-04/24/content_3027030.htm?div=-1 (accessed Nov 30 2015)

Chinese courts actually sided with these factory owners highlights just how arbitrary and unjust the selection of targets for blunt force measures can be.

These three factors: the variation in the types of firms targeted across China, the state's lack of transparency in the selection of blunt force targets, and their willingness to openly violate due process, means that firms have no way of predicting who will be subjected to sanctions. The only thing that is clear is that compliance with pollution regulation, or significant investments in pollution abatement infrastructure, will not guarantee protection from sanctions. In short, the unpredictability of blunt force targeting, combined with its indiscriminate nature of punitive measures, undermines incentives to invest in pollution reduction. Blunt force regulation may have—to some degree—addressed pollution problems, but it has done so in a way that discourages progress in polluters' efforts to change their practices, or in regulators' efforts to generate incentives that can dissuade pollution.

China's turn to blunt force measures is also puzzling in terms of economic efficiency. Conventional regulation may require significant initial investments in local capacity to monitor and punish firms. However, under threat of these sanctions, firms eventually learn to stay profitable while minimizing damage to the environment. In sum, conventional regulation can deliver environmental change while maintaining economic growth in the long term. In contrast, China's approach of closing down firms may achieve pollution reduction more immediately, but once the firms are gone, it is difficult to develop entirely new industries, or build up entirely news sources of revenue and employment.

In China, the abruptness with which blunt force measures are undertaken only adds to these economic inefficiencies. Blunt force sanctions are often imposed without warning; once firms have been selected for sanctions, they might be forced to stop production overnight, and forced to close down within the space of a few months. This means that firms are never even given the chance to demonstrate to the government how the industry could move towards greener growth overall. In the city of Foshan, for example, the government simply issued a list of ceramics companies that would have to close down by the end of the year. They issued this list without prior warning, without consulting companies, and without ever clarifying the environmental standards that companies were expected to meet. Even in the midst closures, companies were never told what standards they had failed[52]. Factory owners complained that if the government had publicized the new standards, they would have made every attempt to try and meet new environmental standards by the end of the year, because anything would be favorable to closing down their business and losing all their investments. Experts observing this case also argued that under stricter surveillance from the government, Foshan's ceramics industry could have evolved organically into a more advanced, cleaner high-tech industry. Instead, the state's abrupt actions led to the premature end or "massacre" [53] of a profitable, still expanding industry.

[52] Xinhua net (新华网), May 7th 2008: Can Closures Bring About Economic Transformation? (关停能否带来转型？佛山整治传统陶瓷业引发震撼) http://news.xinhuanet.com/energy/2008-05/07/content_8121660.htm, accessed May 5th 2017

[53] Factory owner quoted in Xinhua net (新华网), May 7th 2008

The cases above suggest that with blunt force regulation, the Chinese government has got its priorities backwards. Instead of investing in stronger regulatory surveillance to encourage firms to independently fix their pollution, they have turned to indiscriminate, costly action against polluting (and non-polluting) firms. Instead of rewarding firms that manage to reduce pollution while continuing to contribute to local revenue, they close down these firms and try (amidst an economic slowdown no less) to rebuild their economy anew. These one-off, blunt force interventions may have had a lasting impact on pollution levels, but they may have also undermined the government's ability to tackle pollution crises or upgrade its ailing industries in the future.

Why, then, has China turn to such a counterproductive solution to its pollution problems? In the following chapter, I present an argument for why the particular challenges of regulating in weak institutional environments could give rise to China's counter-productive blunt force solution.

Appendix

Table 5: Definition of Variables	
Variable	**Definition**
Change in SO_2 levels	The absolute difference in annual mean levels of sulfur dioxide (SO2) levels between 2013-2015, and 2010-2012. Data was obtained from the OMSO2e dataset on the NASA website. On advice from experts, annual SO2 levels are only measured for the summer months (when there is no snow coverage) and then averaged across three years to reduce measurement error from severe cloud cover and extreme weather patterns.
Blunt force intensity 2012-2014	The total tons of industrial production ordered by Beijing to be forcibly reduced in each city. This number reflects orders for capacity reduction in industries that contribute to air pollution only. This number does not include tons of production reduced through market slowdowns, or individual firm decisions. This data was hand collected using documents from the Ministry of Environmental Protection and the Ministry of Information and Industry
Total Number of Administrative Punishments 2012-2014	The total number of administrative penalties (本级行政处罚案件) issued against polluting firms between 2012-2014. This data was obtained from the China Environment Yearbooks dataset.
Change in PITI transparency score	The change in a city's mean annual pollution transparency score between the periods 2010-2012 and 2013-2015. This score is assigned according to each city's performance on monitoring polluters, disclosing their emissions levels, and responding to public petitions on pollution. This data is obtained from the Institute of Public and Environmental Affairs (IPE), a well-respected environmental NGO in China that produces the PITI scores.
Change in Neighbour SO_2 Levels	The absolute difference in annual mean levels of sulfur dioxide (SO2) levels between 2013-2015, and 2010-2012 for all neighboring cities within 100km of each city. This variable is weighted by the inverse distance, so the closer a city, the stronger the weight. It is also additive, so for cities with multiple neighbors, this variable represents the sum of changes in neighbor emissions. This variable is calculated using the same NASA satellite dataset used for the dependent variable.
Change in Coal Power Capacity (MW)	The absolute change in the total capacity of all coal-fired power plants in each city between the years 2012 and 2015. This data was obtained by hand, using information collated from the China Yearbooks dataset, raw data from the Ministry of Environmental Protection and additional online searches.
Change in GDP	The absolute difference (in billions) in mean annual GDP between 2010-2012 and 2013-2015. This data was obtained from the China Yearbooks dataset.

Chapter 3

The Origins of Blunt Force Regulation

China's blunt force approach to environmental regulation has succeeded at reducing pollution, but at an immense social and economic cost. Sustained 'stop production' orders and widespread forced closures of firms inevitably decimate local employment and destroy local revenue, leading to an increased risk of strikes and social unrest[54]. Given the Chinese government's immense fear of instability and social unrest and their unwavering commitment to steady growth, why have they chosen such a costly and risky approach to cleaning up the air?

In this chapter, I present three factors that explain why China chose a blunt force solution to its environmental problems. First, I explain how blunt force measures help authorities overcome two characteristics problems of the developing world: perennially weak enforcement institutions, and a perennially dysfunctional bureaucracy. These non-compliant bureaucrats prevent the state from building a sufficient regulatory threat, while weak judicial and watchdog institutions lack the power to oppose blatant violations by polluters. In contrast, I show how blunt force measures help China sidestep these institutional weaknesses by minimizing the need for sustained cooperation from local bureaucrats, and minimizing the opportunities for companies to defy the states orders to reduce pollution. Thus, the unique regulatory tools of blunt force regulation ensure that pollution can be reduced, even in weak institutional environments.

Second, I address why China chose this solution to its capacity problems and not others. Given that most developing countries struggle with these same institutional weaknesses, why do we not see similarly heavy-handed forms of environmental regulation emerging throughout the developing world? I argue that China's practice of blunt force regulation is tied to its legacy of market control. Although China has transitioned away from a command economy, its control of the courts, administrative permits and financial institutions means that it still has enormous leverage over private market actors. State authorities, frustrated by their limited capacity and unaccustomed to the restraint required by conventional regulatory models, turn to these levers of market control to coerce firms into reducing emissions. I further argue that the turn to blunt force measures reflects a common pattern in China's post-reform history; in the face of pressing social or economic crises, well-intentioned legal reforms are swept aside for the blunt effectiveness of temporary, top-down solutions.

Finally, I show how the severity of blunt force regulation could have emerged as an unintended side effect of the government's reliance on temporary, top-down solutions:

[54] For instance, In Tangshan, a city where two thirds of Hebei's forced reduction in steel capacity took place, a labor rights NGO reported a sudden spike in labor protests around the time of widespread closures of steel plants in 2014 (China Labour Bulletin; Straits Times. April 19 2016: Steel City to Still City. See http://www.straitstimes.com/asia/east-asia/qianan-from-steel-city-to-still-city, accessed April 5 2017)

Beijing has chosen to fix its pollution problems through intense, one-off campaigns, because under scrutiny from the center, local authorities are more likely to act on Beijing's orders. However, if Beijing only gets one chance to force local authorities to punish polluters, then the sanctions imposed on polluters must be sufficiently drastic to ensure that improved pollution levels endure, even when Beijing's attention has shifted elsewhere. While this solution is sub-optimal because it imposes such an enormous cost on the economy, the central government's choices are constrained by their decision to keep legal institutions and public accountability mechanisms weak. Instead of using legal sanctions and bottom-up pressure to discipline bureaucrats, the center must rely exclusively on hierarchical authority to keep lower-level bureaucrats in check. While hierarchical authority can be very effective at keeping bureaucrats loyal to the overall regime, it has proven inadequate at compelling bureaucrats to systematically enforce the center's policies. Thus, even if the Center is committed to strengthening the day-to-day enforcement of pollution regulation, it can only really guarantee improved environmental outcomes through top-down, temporary enforcement measures like blunt force regulation.

In sum, I argue that China's combination of strong authority over market actors, weak administrative capacity and weak bureaucratic discipline has pushed them towards a suboptimal 'blunt force' solution. Through China's story, I also highlight some of the difficult choices that developing states face when attempting to address urgent regulatory problems in weak institutional environments.

1. The Frustrations of China's Environmental Regulators

China is currently under a lot of pressure to fix its environmental problems. Setting aside international concerns over climate change, the Chinese leadership still faces mounting domestic pressure to tackle its pollution problems. China's growing environmental activism, often perpetuated by a wealthy, politically-connected urban middle class (Wang 2016, 233-235; Wang and Jin 2007; van Rooij et al. 2016), makes it difficult for the leadership to continue turning a blind eye to widespread pollution violations. In recent years, major protest incidents have been followed by the swift demotion of local leaders (Cai 2010; Deng, O'Brien 2013) or immediate concessions to protestors[55]—all signaling Beijing's fear of pollution-driven unrest. This pressure extends all the way to local government officials. One official I interviewed from the municipal management agency (城管) in a southern Chinese city noted:

> We have residents constantly criticizing us for not doing enough about the environment, and our superiors criticize us because we haven't fixed the pollution problems. But then when we try to fix the problem these small businesses say "we're just trying to make a living, why do you always come and steal our things or harass us?" Sometimes, I feel like our agency has just become an instrument for maintaining social stability and balancing different demands. It is so tiring. (Interview X4090116c)

[55] Well-known cases include: Shifang (BBC, "China factory construction halted amidst violent protests." 7/3/2012); Qidong (BBC "China waste water pipeline scrapped after protest." 7/28/2012)

In recent years, Beijing has made several attempts to address mounting public pressure by strengthening the capacity and enforcement power of conventional regulatory institutions. They have raised the material disincentives to pollute by drastically increasing pollution fees, and by introducing laws that hold factory owners criminally responsible for pollution violations. Beijing has also attempted to improve monitoring capacity by installing real-time monitoring of emissions for all major sources of pollution. The problem is, to truly deter firms from polluting, regulators must consistently monitor firms in order to create a constant risk of discovery. For firms who are caught violating the law, regulators must then be able to provide a credible threat of punishment (Viscusi, Vernon, and Harrington 2000, Short and Toffel 2010). And local officials I interviewed suggested that existing enforcement mechanisms are inadequate in both these respects.

During my fieldwork, I came across several officials from municipal and provincial Environmental Protection Bureaus (EPBs) who independently volunteered stories of companies that had been caught tampering with emissions data: factory owners would build new (unmonitored) emissions pipes to divert the worst of their pollution through these pipes (Interview X4a170116a*,* Interview X6210116). Alternately, they might tamper with the monitoring technology to produce false readings (Interview X4151215*,* Interview X2110815a*,* Interview X1120516). In April 2017, a news report by *Caixin* (a Chinese media outlet renowned for its investigative reporting) exposed the full extent of this cheating: 3100 out of 8500 factories investigated by the EPB were found to have tampered with pollution monitoring equipment. One porcelain manufacturer in Henan province had been so zealous in their tampering that their data even showed *negative* emissions for sulfur dioxide[56]. This shows that even the most advanced technology could not contribute to better surveillance, because local officials lack the technical and administrative capacity to verify emissions data.

Regulating with limited capacity can also begin to seem highly unjust, and biased to protecting non-compliant companies. Firms refuse to comply with the law, and yet they still evade punishment because local officials lack the tools to monitor them, or cannot obtain sufficient evidence to sanction them. As one official complained:

> "Suppose a factory violates pollution standards. Someone alerts us so the next day we go to verify that they had violated the standard. But pollution moves around in the air, in the water, so we can't prove anything. The factory might say, "it wasn't us, it was our neighbors" or "you didn't take accurate measurements, you're trying to frame us!" and then they challenge us in court, and we are held to really high legal standards, and so much time passes for just one small case..."
> (Interview X4090116a)

Aside from the issue of large, powerful companies tampering with emissions data, several local officials also drew attention to the "headache" of monitoring small companies:

> These small ones, you can catch them once, twice or thrice. It's hard to go back and catch them again and again... And even when we go catch them, it won't create an

[56]Caixin, April 6 2017: Northern China Chokes on Fake Emissions Data. See http://www.caixinglobal.com/2017-04-06/101075101.html, accessed April 7 2017.

> overall sense of being monitored and watched, because we don't have the tools. With this kind of situation, we have no hope of improving regulation. And it's probable that we will continue to be stuck in this pattern. (Interview X4090116b)

And yet, these capacity struggles alone cannot explain China's turn to blunt force regulation. Existing capacity limitations do not preclude the development of more effective regulatory institutions. Consider America's case: when Congress first enacted the Clean Air Act in 1970, America's Environmental Protection Agency (EPA) could not raise a credible regulatory threat. Like China, they had limited resources and staff, and they didn't even have the technology to conduct accurate air quality readings or monitor emissions from individual firms. However, in the face of mounting public pressure, the government was determined to find a way to address environmental problems as quickly as possible. Instead of resorting to ad hoc, extra-legal measures (as China did), the US government implemented a stricter form of regulation, which required firms to install fixed types of pollution abatement technology in order to reduce their emissions. This approach—known as means-based regulation—is highly inflexible. It requires both big and small firms to install the same type of technology. However, this also makes it a lot less demanding on regulators, who only have to check if equipment had been installed to determine compliance. Eventually, through means-based regulation, the US was able to achieve a significant drop in emissions despite the initial weaknesses of the EPA (Cole and Grossman 1999).

However, because means-based regulation is so inflexible, it can be especially punishing to smaller firms. Eventually, this disproportionate burden on small firms can take its toll on the economy. In recognition of this, the US made a concerted attempt invest in the EPA's staff and develop more sophisticated monitoring techniques. By the 1990s, monitoring had become sophisticated enough to support a more flexible regulatory regime based on economic instruments—such as pollution taxes and permit trading. Economic instruments are widely considered to be more market friendly: instead of unduly punishing smaller, poorer polluters, these instruments allow companies to choose the most cost efficient means to meet standards, while providing economic incentives to companies that can reduce pollution cheaply (Carrigan and Coglianese 2011, 115). In sum, America's experience with regulating polluters suggests that even if conventional regulation can take decades to build up a sufficient regulatory threat, this does not prevent regulators from pursuing systematic, legal actions that can significantly improve air quality in the meantime. More importantly, in the long run, investments in strong, stable regulatory institutions can lead to the development of more flexible, growth-friendly regulatory styles.

In fact, before the emergence of blunt force regulation, China also relied primarily on conventional, law-based regulatory models to tackle pollution problems. During the last decade, they passed a series laws all aimed at strengthening the enforcement tools available to environmental regulators. A new environmental law introduced in 2015, the strictest law yet, now allows regulators to impose unlimited fines and criminal sanctions against persistent violators[57]. The law also provides for criminal sentences against local officials who fail to punish pollution violations or prevent serious environmental crises[58].

[57]South China Morning Post, June 30 2015: Chinese police arrested thousands of people for environmental crimes in 2014. See http://www.scmp.com/news/china/policies-

Moreover, in its cleanup of the energy sector—the most polluting sector—the Chinese government has shown some success in exercising these conventional enforcement tools. Between 2005-2010, the government passed new regulation requiring the majority of coal-fired power plants to install desulfurization infrastructure. Through a combination of incentives, subsidies and routine inspections, the government succeeded in enforcing this regulation (Seligsohn n.d.; Liu, Lo and Zhan 2014), leading to a 3.9% annual reduction in Sulfur-Dioxide (SO_2) emissions during this period (Itahashi et al. 2010). The improvements in the power sector were so significant that in 2015, the Director of the International Energy Agency applauded China's "state of the art" power plants "[which] should be copied in other developing countries."[59]

However, the evidence I presented in earlier chapters suggests that outside the highly-regulated, largely state-owned energy sector, blunt force regulation has become the predominant approach for cleaning up China's heavy industry. Why has the Chinese government eschewed the more market-friendly, growth-friendly conventional regulatory model for a blunt force approach? The Chinese government's reliance on blunt force enforcement also seems counterintuitive given the leadership's recent emphasis on strengthening environmental laws and regulatory institutions. If the Chinese leadership is so committed to cleaning up the environment, why are they not doing so through the more market-friendly regulatory laws, institutions and incentives schemes that they established explicitly to reduce pollution?

2. The Politics of Regulation in Developing Countries

The Chinese government's ambivalence towards conventional regulatory models can be understood if we take into account the difficulties of regulating in weak institutional environments. Two problems stand out in particular: First, even if these states were able to build up sufficient technical capacity over time, their corrupt, dysfunctional bureaucracies often undermine any credible threat of punishment against regulated entities (Evans 1995, Amengual 2016, 6; Wong and Karplus 2017, Zhang 2017). Second, even in cases where bureaucrats are committed to enforcing regulation, these states often lack the institutional strength and authority to control powerful companies (Blackman and Harrington 2000, Lorentzen et al. 2014).

Compare America's experience of regulating with limited capacity to that of China's: In America, the state was able to overcome their capacity limitations by introducing means-based regulation, which vastly reduced the administrative demands on regulators. With simple checks on the installment of pollution abatement infrastructure, regulators could determine whether or not firms were compliant. However, this approach also succeeded because American regulators had recourse to the law. The backing of America's strong, independent courts ensured that polluters would eventually respond to

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politics/article/1829296/chinese-police-arrested-thousands-people-environmental, accessed July 1 2015.

[58] *Environmental Protection Law of the People's Republic of China*, January 1st 2015 (中华人民共和国环境保护法 (2015 年 1 月 1). See http://www.npc.gov.cn/npc/xinwen/2014-04/25/content_1861279.htm

[59] BBC, June 15th, 2015: China deserves 'more credit' for renewable energy effort. See http://www.bbc.com/news/business-33143176, accessed Jun 17 2015.

the threat of punishment, even if these threats were delivered by a weak, newly created government agency.

In China, however, several local officials and environmental lawyers I interviewed suggested that even if polluters could be exposed in their cheating, or caught openly violating pollution standards, there is still no guarantee that they would respond to the threat of punishment (Interviews X1120516, X4090116a, X2110815b, X6210116, X1100415b, X4a170116c, X1100415c). Without strong, independent courts to back them, China's Environmental Protection Bureau (EPBs) lack the authority to enforce sanctions. For instance, in one county that I visited, residents were in the midst of protesting a company that had been caught secretly dumping chemical waste near their homes. When I interviewed the county EPB official responsible, he told me that in fact, the county had caught and sentenced this company for illegally transporting and dumping waste in the area several months ago, but to no avail. "They are still sending someone to come here and illegally dump waste," he exclaimed in frustration. "We don't know how to stop them, it's been such a headache!" (Interview X4a270116a).

Of course, it could be that this company was brazenly violating the law because it knew it had protection from local officials. This leads to the second institutional problem: in addition to weak courts, the enforcement process is also undermined by widespread bureaucratic corruption. Studies have uncovered numerous cases of local officials protecting polluters for their own gain. For instance, cash-strapped local officials might allow companies to continue violating pollution standards in return for a steady stream of revenue from pollution penalties (Kennedy 2005, 91-92; Zhang et al. 2010, 311-314). In my own research, one factory owner openly acknowledged that when local officials discover pollution violations, factories can "just pay them" to resolve the issue (X10080416).

Bureaucratic corruption is especially prevalent in developing countries because these countries struggle with the weak state dilemma: central authorities may have a strong grip on power but they lack the means to monitor and control local authorities (Migdal 2001). Put simply, these states cannot provide the salaries, stable promotion prospects or social prestige that turn bureaucracies into rational, efficient and effective implementers of state policy (Rauch and Evans 2000). Nor can they leverage the power of independent courts or an active media to police and deter bureaucratic disobedience. Instead, political leaders are often reduced to monitoring corrupt bureaucrats through top-down inspections, or "fire alarm" mechanisms—such as protests—which can alert central officials to egregious violations (McCubbins and Schwartz 1984). These mechanisms are far from adequate. For instance, in a case from China's Hebei province, citizen complaints over a pollution incident did prompt the Ministry of Environmental Protection to demand a clean up from city officials. However, as an MEP official later revealed, when central government officials checked up on the incident months later, they found that city leaders had lied when they said they the problem had been fixed (Interview X1120516).

It is not that bureaucratic corruption or local protectionism is unique to developing countries. In the US, for example, regulators have also been caught blindly issuing permits. For instance, in North Carolina, regulators hastily approved permits for Duke Energy (the nation's largest utility), resulting in a major pollution incident in

2014[60]. The difference is, in the US, corrupt bureaucrats must contend with a watchdog media, which can threaten exposure, and strong courts, which can impose severe punishments. In the Duke Energy case, for example, federal prosecutors immediately began a criminal investigation into the case, focusing on relations between regulators and the company[61]. In China, however, judges are more likely to protect corrupt bureaucrats than to investigate them. Studies of environmental litigation China have shown that judges tend to make rulings that favor the interests of powerful officials (Stern 2010, 83-84). To ensure that cases reach the pre-approved outcomes, these judges resort to tricks such a creative accounting to reduce fines, or tortuous logic to attribute blame to victims (Stern 2013, 82). The ease with which judges and bureaucrats can be 'captured' in China highlights the difference between bureaucratic governance in developed and developing countries. In the former, bureaucratic corruption is isolated incident to be exposed and punished. In the latter, it is an inescapable feature of governing under weak state capacity.

3. Blunt Force Regulation and Weak State Capacity

How, then, might developing countries expect to address regulatory problems in the face of weak state capacity and weak enforcement capacity? In the past, China's response has been to let the central government take over as regulator. For instance, after watching independent regulators try and fail to control China's state-owned behemoths, Beijing created SASAC, a supra-regulatory body that now owns and regulates China's biggest, most powerful and most strategic companies. This top-down solution resulted in increased competition and improved efficiency in China's state-owned sector (Pearson 2011, 30-31, Naughton 2015). China's solution echoes a phenomenon we have seen elsewhere in the developing world: Chaudhry (1993) argues that the nationalization of foreign and domestic assets in the Middle East in the 1950s and 1960s was undertaken as an "administrative shortcut" to address ongoing regulatory problems; lacking the bureaucratic coherence to construct financial institutions, create a strong legal system and prevent monopolies, the state found it easier to simply take over the economy. In short, direct state intervention appears to be a characteristic weak state response to "the political and administrative weakness of the leadership and the bureaucracy." (Chaudhry 1993, 258)

When it comes to regulating China's polluters, a similar logic seems to be at work. Of course, the state cannot nationalize all polluting companies in order to better regulate them. However, China's blunt force pollution reduction measures do demonstrate two characteristic features of this weak state response including 1) direct state control of market actors and 2) administrative shortcuts that minimize the state's reliance on dysfunctional bureaucracies and weak judicial institutions.

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[60] The Charlotte Observer, May 14 2015: Prosecutors: Duke Energy ignored warnings before ash spill. See http://www.charlotteobserver.com/news/local/article20992815.html, accessed Jun 1 2017.

[61] The New York Times, Feb 28th 2014: Ash spill shows how watchdog was defanged. See https://www.nytimes.com/2014/03/01/us/coal-ash-spill-reveals-transformation-of-north-carolina-agency.html?_r=0, accessed Dec 1 2014.

Consider the two defining features of blunt force regulation. First, it is undertaken through 'direct state action'. State authorities don't try to deter firms from polluting by raising fines or threatening lawsuits; instead they physically prevent firms from polluting by cutting off electricity or closing down entire districts of factories. This direct approach addresses China's problems with weak enforcement capacity: instead of delegating control of polluters to weak regulators or weak courts, powerful central and provincial government officials dictate exactly who should be sanctioned, and how. Under this kind of direct pressure from the central government, companies find it harder to resist regulation or seek protection from political connections. In fact, in my two in-depth case studies (outlined in chapter four) companies with connections to the government were forced to voluntarily close down first.

Enforcement effectiveness also comes from the very tactics themselves; how can companies secretly (or brazenly) violate pollution standards when they are not even able to operate their equipment? In effect, these direct tactics close the gap between regulatory punishment and compliance—the gap that normally provides brazen violators and corrupt bureaucrats the greatest room to maneuver. As one municipal official explained:

> Forced pollution reduction tactics are so much more effective at reducing emissions because they can target the source of pollution and even restructure entire industries. When we do 'end-stage' enforcement, we first have to find evidence of pollution, and even then we can only recommend closures. Regulating after pollution has happened is so much more costly and ineffective" (Interview X6210116)

Second, blunt force measures also operate on the basis of 'information shortcuts': when local authorities force firms to relocate, stop production, or close down, it is not because of what individual firms have done, but because they fall into categories or industries that are considered 'most likely' to violate standards. As a result, local authorities can cut out several steps in the regulatory process including: monitoring individual firm performance, compiling sufficient evidence to sanction firms who violate standards, and following-up on firms who fail to comply with sanctions. This use of information shortcuts addresses China's struggles to control a dysfunctional bureaucracy. By eliminating these steps in the process, the central government doesn't just reduce the state's administrative burden; they also reduce their need for everyday compliance from local bureaucrats. When the specific targets of sanctions are dictated from above, bureaucrats can no longer use the excuse of "administrative and technical difficulties" to cover their non-compliance. Moreover, when sanctions are ordered against such clear categories of firms (such as 'all steel companies' or 'all factories with 10 meter tall furnaces') it becomes harder for bureaucrats to justify protecting individual firms, even if those firms have paid them for protection.

Consider, for an example, a case coming from a county in Guangdong province: a large textiles company in the county had long been receiving specials subsidies, tax breaks, and protection from the local government. Then one year, this company was suddenly forced to clean up its act. Reports suggested that under pressure from higher levels to address pollution problems in the textile industry, county officials no longer had the political leeway to protect even this big, powerful company (Huang 2013, 10-12).

What is striking about China's blunt force approach is that it has chosen such a unique path to dealing with a problem that so many other developing countries face. Several developing countries struggle with China's dual problems of weak control over bureaucrats and limited enforcement capacity. However, political leaders in these countries tend to seek solutions based on greater participation from interested stakeholders and non-state actors. In Argentina, for example, labor regulators have leveraged their linkages with local unions to improve monitoring of violations and to overcome resistance to regulation from organized firm owners (Amengual 2014). In Vietnam, central officials have turned to strong local communities who, through their ability to recruit NGO and media support, were able to force powerful state-owned factories to invest in pollution abatement technology (O'Rourke 2004 59-68, 215). This community-based approach is not unknown in China. As one municipal EPB official noted, companies in his city have found that they need to address their "public relations" problems and make sure "local residents approve before they can expand their factories". He argued, "This is why even those small, poor polluting firms might be willing to invest money in pollution reduction! They are scared of local residents protesting." (Interview X6210116).

The path chosen by other developing countries suggests that blunt force was not the only solution to China's inefficient and ineffective environmental regulatory system. They could have overcome their most serious capacity limitations with more collaborative approaches, such as using citizens and non-state actors to put pressure on non-compliant firms. They could also have addressed their most urgent environmental problems with means-based regulation, while laying the ground for more efficient regulation with incremental enforcement strategies. In fact, China's success at overhauling the energy sector through conventional command and control methods suggests that this was a viable option for China. Why, then, did China turn to its unique blunt force strategy?

4. Why China Chose this Path

To put China's decision into context, it helps to understand the evolution of market regulation in China. Prior to market reform, Chinese industries were directly managed by economic ministries. These ministries controlled everything, from industrial policy to the minutiae of economic activity, such as dictating the levels of production and employment for individual firms. In the 1990s, following its transition to a market economy, China began to move towards a more western-style regulatory model; the state would draw up laws and regulations designed to promote growth and protect the public interest, but these laws could only be enforced by impartial, independent regulators. This regulatory model was less prevalent in the state-owned sectors—which still comprises a large proportion of China's economy. However, outside these state-owned sectors, the state would largely refrain from dictating how companies should operate, and withhold from interfering too much in the regulatory process.

The problem is, in practice, the Chinese government never quite completed the transition to a regulatory state. Instead of establishing new regulators wholesale, several regulatory commissions were created out of the leadership and staff of the former economic ministries. Far from establishing independent regulators, this only served to sustain close relation between industries and their former bosses (Pearson 2005, 306-

308). These repurposed regulatory commissions have since struggled to adapt to their new mandate of independent, 'arms length' regulation; faced with complex regulatory problems, they will often fall back into old patterns of acting as a "tough, authoritative boss" (Tsai and Naughton 2015, 28).

Even in the most liberalized sectors of China's economy, the state falls far short of 'hands off' regulation (Pearson 2011, 32-35). These sectors, including the middle (mostly industrial) and lower (mostly export and manufacturing) tiers of the economy, are supposed to be protected from direct state intervention. In reality, local authorities continue to retain a lot of leverage over private business and entrepreneurs, especially through their control of the courts and financial institutions. The Chinese state continues to retain strict control over financial markets in order to give State-Owned Enterprises (SOEs) and joint stock companies preferential access to credit, to the point where 85% of loans from state-owned commercial banks still go to SOEs (Tsai 2015, 7). To succeed amidst this credit scarcity, private firms often rely on close personal ties with the state; studies show that firms with closer connections to the government tend to have better to access to loans (Wang 2016a). Local courts, which are easily swayed by local authorities, are also more likely to rule in favor of firms that contribute a lot to local revenue (Wang 2016b).

Local authorities can also control the fate of firms through administrative permits. These permits do very little in practice; few companies that obtain these permits have complied fully with the requirements[62] and factories often continue operating while waiting for permits to be processed[63]. The problem is, the government is prone to using permit violations to justify randomly closing down factories, or to demanding bribes. For instance, during my fieldwork I came across an asphalt factory that had been abruptly closed down after prolonged protests against their pollution. When I asked a county government official why this factory was closed down while other violators went unpunished, he responded: "we closed down this asphalt factory because there were problems with their administrative permits." (Interview X4a270116a). Another factory owner I interviewed mentioned that ordinarily, they didn't worry too much about complying with environmental standards because the EPB only conducted cursory inspections. However, when it came to obtaining environmental permits, this factory was willing to make a considerable "under the table" payment to obtain the permit, because "if [the EPB] doesn't approve this permit, we are not allowed to operate" (Interview X10080416).

Evidently, through their control over court rulings and access to finance, and their use of permit violations to justify extreme sanctions, local authorities exercise a high

[62] One European livestock company I came across had a made a point of trying to comply fully with Chinese environmental laws; as a recipient of funding from their home government, they were legally bound to comply with both EU and Chinese laws. According to the company's compliance officer, the process of acquiring permits ended up dragging on for two years and even then, despite the company's best efforts, local authorities were not able to assist them in meeting all the legal requirements for the permits. The company was allowed to operate anyway (Interview X8110715)

[63] The owner of pharmaceutical factory I met decided to continue operating even though his permit had not yet been approved because, according to him, the risk of discovery was low (Interview X3230615).

degree of discretionary power—and therefore leverage—over local companies. The Chinese state's unusual leverage over independent market actors helps to explain its turn to blunt force regulation. Authorities may lack sufficient institutional capacity to compel firms to comply with conventional pollution regulation on an ongoing basis. However, they can still achieve the intended goal of pollution reduction by using their discretionary powers to coerce firms into suddenly reduce their emissions output.

We see this in the experience of a waste-recycling factory that I came across in an industrial county in southern China: The factory had previously been located in a city to the south, but after a year of being subjected ad hoc 'stop production' orders by the local government, the factory owner decided to move his entire business to a city known to be more 'relaxed' about pollution. Yet soon after arriving to this new city, he found himself, once again, facing arbitrary sanctions by the government. As he said:

> "We come here, we buy the land, invest in our factories, we even in invest in this pollution reduction technology because there is pressure to comply with emissions standards. But then local leaders decide they don't want us anymore. It may be for environmental reasons, it may be because they want to focus on tourism, but suddenly we are forced to stop production for one out of ten days, then one week a month, then two! Eventually it doesn't make sense for us to stay anymore..." (Interviews X7a190416c, X7a190416d)

When I asked him why he didn't push back, he shook his head and said, "It's easier just to move away." In fact, this factory owner, like a number of his colleagues that I interviewed (Interview X7a190416b), was considering moving his entire business to Vietnam or Southeast Asia, exclaiming *"*It is so much easier to do business in foreign countries because the government can't boss you around in that way!"

Why would it be so much easier to do business in other developing countries? Given their similar struggles to become effective regulatory states, why are these developing countries not applying drastic measures as China? I suggest here that China has chosen this distinct, blunt force path because they can exercise discretionary political tools over market actors to a degree not often seen in other developing countries. This is because, first, these tools to control market actors exist at all levels of the state, from powerful central government ministries to local government authorities. For instance, in the example above, it was county-level authorities that forced several of factories to 'stop production'.

Second China, like most developing countries, struggles with the problem of weak bureaucratic discipline and weak implementation at the local level (Zhou 2010, Ong 2012). However, unlike most developing countries, the Chinese central government does have a record of commanding—and producing—bureaucratic compliance with urgent policy priorities (van Rooij 2006, Biddulph et al.2012, Liu, Lo et al. 2015, Mei and Pearson 2014). This combination of leverage over market actors, and the ability for central leaders to dictate exactly how this leverage should be applied at the local level, makes it easier for China to develop a coordinated enforcement strategy based on the use of discretionary political tools.

To put China's unique situation into context, consider a similar case of blunt force intervention in Argentina: Following the 2001 currency crisis in Argentina, the

government was confronted with the need to freeze utility prices to protect middle and low-income families. Unfortunately, Argentina had already privatized its utilities sector in the 1990s, and these utility companies were now protected by strict contracts drawn up to insulate them from this kind of political pricing. The Argentine government chose to ignore these contracts anyway; they strong-armed the utility companies into freezing prices, and then sidelined independent regulators, taking over the process of renegotiating contracts with investors directly—all in direct contravention of conventional regulatory norms. Yet in Argentina, the government was only able to apply such strong arm tactics because the currency crisis had temporarily increased their leverage over private investors: a sudden increase in import taxes (and therefore government revenue) meant they no longer needed to rely on investors to fund public infrastructure. Their leverage was further aided by a widespread public outcry against the 'predatory' private sector, and considerable popular pressure on investors to concede to government demands (Post and Murillo 2013).

Yet with blunt force pollution regulation in China, an equal violation of firms' rights has taken place without a major economic crisis or a collective public outcry against predatory firms. In fact, the Chinese government's leverage over economic actors seems to be part of the everyday market system. As one central government official confirmed to me:

> "In China, we can get rid of small polluting companies very quickly because we can just close them down. In America, they have to give small companies the chance the clean themselves up first, or wait for them to move away after they have failed to meet compliance standards. All of that takes much longer." (Interview X1120516).

The question is, if Chinese authorities have so much leverage over local companies, why are they not using this leverage to force polluting firms to comply with the stricter environmental laws? Given the impact on employment and the risks to social stability, why has the Chinese government chosen to regulate through such drastic, irreversible measures like the complete closures of entire industries?

5. The Unintended Severity of Blunt Force Measures

In the previous section, I argue that China's limited capacity and unusual leverage over market actors made blunt force regulation seem like a feasible solution to their urgent pollution problems. However, this pathway has also been reinforced by the regime's decision to keep legal institutions weak and apply bureaucratic mechanisms to solve political problems (Liebman 2012, Pearson 2015, 43-44)

While China initially took major steps towards developing a national legal system*,* in recent years, constant political interference in legal procedures indicate that the regime is unwilling to relinquish power so that genuine of rule of law can prevail *(*Nathan 2003, Su and He 2010). Instead, the regime has focused on improving governance through strengthening 'internal' mechanisms of accountability—such as institutionalized leadership turnover and explicit promotion criteria for its bureaucrats (Naughton 2016). This shift to an internal, rule-based accountability over rule of law is especially evident in the sphere of environmental governance: rather than strengthening the courts and legal

institutions to uphold stricter environmental laws, the regime has focused on using a combination of fiscal transfers and increasingly stringent environment targets to incentivize local officials to address environmental problems (Stern 2010**,** Wong and Karplus 2017).

However, one consequence of keeping legal institutions weak is that it becomes harder for the government to police lower-level bureaucrats who shirk their duties or abuse their powers (Moustafa 2007). The central government presides over a vast bureaucracy, but it relies exclusively on hierarchical authority to keep lower-level bureaucrats in check. This makes it easy for local officials to erect a protective information barrier to hide their true actions from their superiors. Absent institutionalized mechanisms to expose and punish non-compliant cadres, the center must rely on the weaker tools of promotion incentives and occasional high-powered campaigns to keep bureaucrats loyal and committed. These tools often fail; aside from the overpowering target of economic growth, local officials prefer to protect local interests, or serve personal corrupt interests, over implementing expensive welfare policies (Naughton 2014, 407; Fewsmith and Gao, 2014).

Local officials are especially prone to shirking pollution reduction policies. This is because the bureaucratic system tends to reward performance on more immediate, 'countable' targets such as birth control, revenue collection and GDP growth instead of more amorphous targets, such as pollution reduction (O'Brien and Li 1999, Fewsmith and Gao 2014, 173). Moreover, extreme pollution crises aside, improvements to the environment are difficult to measures but easy to falsify. For instance, a study by Zhou et al. (2013) found that instead of reporting back actual performance on environmental targets, county, municipal and provincial level EPB officials would first negotiate performance results between themselves before reporting the 'adjusted' numbers back to Beijing. They did this to ensure that no one city would be punished for underperforming on the environmental "hard targets"—which was great for preserving cooperative relations in EPBs but made a mockery of the performance evaluation system.

If local authorities have such weak bureaucratic incentives to reduce pollution, and if performance on pollution reduction can be faked as a matter of course, then it seems unlikely that they will choose to take coercive action against polluting firms, even if they can use discretionary political tools to do so. Why stall economic growth and stir up tensions with firms for such a poorly monitored policy? The Chinese media is full of stories of 'evil' polluters who defy pollution laws, but these stories often fail to mention the complicity of local authorities. For instance the 2017 inspections that led to the discovery of data tampering by 3100 enterprises also uncovered cheating by local officials: In Xian, regulators were caught stuffing cotton wool into air quality detectors to manipulate air quality readings. These regulators were only discovered because the Ministry of Environmental Protection had decided to conduct random spot checks on 18 of China's most polluting northern cities[64]. As one former EPB cadre confessed: "The *only* thing we fear are random spot checks from the MEP." (Interview X4151215).

The truth is, local authorities are reluctant to use coercive political tools against local enterprises, especially when their personal or political interests are at stake. On one occasion, I witnessed a provincial official openly admitting to local activists that

[64] See Caixin, April 6 2017: Northern China Chokes on Fake Emissions Data. See http://www.caixinglobal.com/2017-04-06/101075101.html, accessed April 7 2017

polluting factories would not be punished if favored economic interests were involved: The activist had asked the provincial EPB official for some tips or tricks on how to force the government to take action against a large polluting factory, "because we don't want to resort to unrest". The provincial EPB official responded: "To be honest, if you have been filing complaints for this long, and have gotten the city EPB to spend 200 person hours on inspections, and there is still no response, then it is likely that the local government leaders have some bigger economic interests involved" (Interviews X4090116a, X4a170116a).

Given the reluctance of local authorities to punish polluting firms, and their ability to evade the Center's surveillance, Beijing's only recourse is to temporarily ratchet up the pressure on local authorities to address environmental problems. For instance, in the two case studies of blunt force regulation in chapter four, we see local authorities being subjected to increased scrutiny from the center (such as spot checks from the central government) and relational pressure; provincial and municipal leaders would lean on their local business and bureaucratic contacts to force through the process of blunt force restructuring. In fact, the Chinese leadership is notorious for using temporary, top-down pressure—often accompanied by unexpected sanctions or injections of fiscal resources—to force local officials to address urgent social issues (Mei and Pearson 2014, Wong and Karplus 2017, Thornton 2007)

In the case of environmental governance, the central government's reliance on temporary, top-down pressures, explains not just the discretionary nature of blunt force regulation, but also its severity: if Beijing only gets one chance to exact compliance from local officials, then it makes sense to demand as drastic and irreversible an intervention as possible to make sure the effects of this one-off intervention last. In the past, Beijing has tried to use this combination of sudden scrutiny and strict sanctions against local officials to halt the SARS crisis (Thornton 2009) or to prevent over investment in the steel industry. In both these cases, this approach had a limited long-term effect because bureaucrats were easily restored to their former position once Beijing's attention had waned (Mei and Pearson 2014, 94-95).

However, blunt force regulation, rather than trying to make cadres fall into line, is more focused on the end goal of pollution reduction. This is why it sanctions categories of firms, rather than the cadres responsible. Moreover, its use of extreme sanctions—such as forced closures and forced relocations—ensure that the firms targeted cannot be restored to their former capacity, no matter how much influence they have over local authorities or how easily they evaded pollution laws in the past. However, because Beijing can only achieve lasting results with these extreme measures, they must also condone the systematic use of discretionary, coercive measures against firms, because conventional enforcement tools simply cannot achieve this decisive or direct an outcome.

6. Conclusion

In this chapter, I argue that blunt force regulation is not just a quick fix solution to China's environmental woes, but a deliberate regulatory strategy, developed and promoted by the central government. This strategy may have emerged in response to the urgency of China's pollution problems and the inefficiency of conventional regulatory institutions. But it was also driven partly by China's continued control over independent market actors: four decades into market reform, Chinas still struggles to shake off its

interventionist management of the economy, and this struggle is clearly played out in how it chooses to constrain polluters. Despite its rhetorical commitment to stronger environmental laws, and its growing array of regulatory tools and technologies to monitor and punish polluters, the Chinese government has ultimately resorted to its former approach of direct intervention.

However, I also argue that the severity of blunt force regulation may have been somewhat unintended—a side effect of China's decision to hold bureaucrats accountable through internal, hierarchical mechanisms, instead of through strong judicial institutions or public accountability mechanisms.

Thus, the story of blunt force regulation is also a story on the double-edged sword of authoritarian governance. On the one hand, China seems to have identified a feasible solution to regulating with limited capacity. Unlike other developing countries, they don't have to depend on incremental enforcement strategies or rely on citizen activists to police polluters—a somewhat unwieldy solution, especially for an authoritarian regime with a limited tolerance of open unrest. Instead, through their instruments of direct economic control, they are able to force companies to cut down their production or close down completely. And they do this without any legal foundation—a violation that would be inconceivable in the US. Even in semi-authoritarian developing countries, where leaders must commit to basic protections to reassure investors, this open violation of property rights would be difficult to conceive. Yet in China, polluting companies have more or less complied with the state's blunt force demands.

On the other hand, by discouraging public feedback and by undermining legal institutions, the Chinese leadership has taken away two important instruments of accountability—not just between leaders and citizens but also between leaders and lower-level bureaucrats. Without strong, legal institutions to raise the threat of punishment against firms or to increase the threat of discovery for non-compliant bureaucrats, Beijing has been driven to enacting pollution control through drastic, one-off interventions. These interventions may be the most feasible means to guarantee lasting improvements in air quality, but they have an enormous social and economic cost.

Perhaps Beijing is willing to countenance the economic cost of blunt force regulation, after all, a combination of state-owned assets, high budgetary revenues and windfall land revenues has made Beijing incredibly rich in the last few years (Naughton 2017, 5-7). The question is: why are local officials willing to accept these costs and move ahead with these measures, especially when they must bear the burden of widespread unemployment or take responsibility if protests erupt? Even if Beijing can temporarily turn up the pressure, why would local officials be willing, in some cases, to go so far as to close 90% of their local industry? In the following chapter, I explain why local officials have accepted Beijing's blunt force solution to China's pollution problems.

Chapter 4

Why Blunt Force Regulation Worked

Based on all that we know about local officials in China, their willingness to go along with Beijing's blunt force solution to pollution problems seems surprising. Local officials are known for prioritizing the economy over the environment (Ward, Cao and Mukherjee 2013; Jia 2014; Cao, Kostka, and Xu 2017); for using their powers to demand high taxes or predate on local firms (Bernstein and Lü 2003, Li and O'Brien 2006, Tsai 2007; 47-58, Ong 2012); and for shirking policy implementation (Kung, Cai and Sun 2009, Hillman 2010, Cai 2010, Zhou et al. 2013). Why then, would China's corrupt, disobedient, revenue-hungry officials ever choose to sacrifice local industry and lay off thousands of workers just to clean up the air?

In this chapter, I show how the Center, in providing local officials with some discretion in how to implement blunt force targets, makes these pollution reduction measures more acceptable to local officials. The central and provincial governments still impose enormous pressure on local officials to see through capacity reduction targets, and local officials must still sacrifice part of their economy in order to reduce pollution, but they are allowed to do so selectively. Inevitably, they use these powers to pick on the weaker firms, protect the stronger firms, all the while shielding each other from political retribution. Thus, what may seem like unexpected behavior from the outside, turns out to be business as usual on the ground.

This compromise solution to implementing blunt force regulation may seem paradoxical. Why would China's leaders order their cadres to enforce an extreme policy, only to give them discretion in its implementation? If the central government has so much control over the fate of local bureaucrats, why would they worry about making implementation flexible enough to accommodate local interests? Why not apply their powers of total command towards exacting an implementation strategy that could reduce as much pollution as possible, irrespective of local interests.

The center-local dynamics outlined in this chapter draw our attention back to a central theme of this dissertation: the paradoxical strength and weakness of Chinese state control over the bureaucracy. In the previous chapter I argue that China turns to blunt force measures because it can command bureaucrats to carry out extreme measures on a one-off basis—a capacity that would be the envy of many a weak state. Yet in this chapter, we see that as a regime with long-term horizons, even if the Chinese leadership can exercise temporary, absolute control over bureaucrats, it still prefers to provide bureaucrats with some discretion so as not to alienate its agents of the state. In illustrating exactly how bureaucrats implements these one-off orders from the Center, the case studies in this chapter demonstrate the concessions that the Chinese state must make in order to maintain the loyalty of its bureaucracy.

1. What do local officials in China care about?

Local officials in China care about economic growth. Economic growth serves three

purposes: First, high levels of growth generate high levels of fiscal revenue, and in China, revenue generation is central to a bureaucrat's chances of promotion (Xu, 2011; Shih, Adolph, and Liu, 2012; Lu and Landry, 2014). Economic growth is also conducive to a bureaucrat's personal profit: in conditions of high growth, career-oriented officials are rewarded with bonuses (Naughton 2016, 407) and corrupt officials find it easier to extract rents and under-the-table fees (Olson 1993, Geddes 1994). Finally, growth staves off social unrest. When employment is high and revenue is plentiful, governments can provide for social services and invest in infrastructure to keep their citizens happy. In short, economic growth has evolved into one of the strongest priorities for local officials in China.

Local officials also care about managing social unrest. While the Chinese regime tolerates a degree of public protest to control excessive corruption (Li and O'Brien 2006, Lorentzen 2014), it is still deeply wary of sustained, open unrest. Beijing's increasing control of the media, its investments in stability maintenance forces, and its swift demotion of leaders who have failed to stop unrest, all suggest that the regime's commitment to social stability now outweighs economic growth (Chen X. 2009 467, Cai 2010, 139; Lee 2014, 130; Su and He 2010, 170-171). Thus, local officials—corrupt or not—who want to protect their position will also do their utmost to prevent the outbreak of unrest.

Finally, local officials care about pleasing their immediate superiors (who control their chances of promotion) and protecting bureaucratic relations. Existing studies suggest that bureaucratic promotion is tied to objective measures of performance, such as high GDP growth or revenue collection (Landry 2008, Lü and Landry 2014, Naughton 2016). However, dominant factions can sometimes rig the promotion process in their favor (Hillman 2010). Factional allegiances signal loyalty, not competence. But for higher-level officials who would like to promote loyal cadres, and who lack the time and resources to evaluate the competence of junior bureaucrats, it can be simpler to promote on the basis of factional allegiances. In fact, Shih, Adolph and Liu (2012) argue that factional affiliations are stronger predictors of promotion than even revenue collection. Thus, career-oriented officials must take care to please their superiors, placate their factional allies, and defuse any inter-departmental tension that might threaten these allegiances

The problem is, environmental regulation directly threatens all of the above interests. First, environmental regulation, when properly enforced, imposes an immediate cost on the local economy. When firms invest in pollution abatement their profits suffer, leading to a drop in local government revenue. More onerous forms of regulation—such as command and control or blunt force regulation—can lead to the widespread closure of less profitable firms, causing economic slowdowns. In cases where local companies engage in mutual credit guarantees—a common practice for the credit-starved, privately-owned companies in China—these firms closures can set off a chain of defaults, resulting in local debt crises[65]. Studies have shown that when growth is weak and revenue

[65] For examples, see South China Morning Post, April 23 2017: The county at the center of a Chinese debt crisis. See http://www.scmp.com/news/hong-kong/economy/article/2088807/county-centre-chinese-debt-crisis, accessed April 24 2017; July 2 2015:60,000 jobs, the cost of one Chinese city's cleaner air. See http://www.scmp.com/news/china/policies-politics/article/1831846/60000-jobs-cost-one-chinese-

insufficient, local officials will choose to protect polluting companies over protecting the environment (He and Pan 2013 51, Zhang et al. 2011, van der Kamp, Lorentzen and Mattingly. 2017).

Second, environmental regulation also complicates relations between local officials and entrepreneurs. Local officials tend to shower local companies (especially large profitable firms) with tax breaks, land grants and special subsidies in an effort to retain their investment and promote growth. However, with the advent of pollution reduction policies, local officials must now place constraints on firm production, or demand costly investments from local entrepreneurs. This is problematic for promotion-seeking bureaucrats, who rely on friendly relations with these firms to generate a steady stream of revenue, and even more threatening to corrupt bureaucrats, who may be personally invested in these companies.

Environmental regulation also raises the risk of social unrest. When firm profits suffer and workers are laid-off, local officials must provide social insurance to unemployed workers to stave off unrest. In cities with declining revenue, the fear of unemployment unrest is even greater, because local officials cannot afford to these vast sums in insurance payouts. Local officials also fear unrest over excessive pollution; the rise in environmental activism, perpetuated by a wealthy, well-connected middle class, puts pressure on even the most corrupt or growth-oriented local officials to invest a minimum effort enforcing pollution regulation—or risk losing their jobs (Wang 2016, 233-235; Wang and Jin 2007; van Rooij et al. 2016)[66]. However, in the industrial towns and cities where the bulk of pollution reduction must take place, the risk of unemployment unrest (especially unrest from mass layoffs) often overshadows that of middle class pollution protest.

Finally, effective environmental regulation can threaten bureaucratic relations and challenge factional allegiances. Recent changes to environmental laws mean that local officials can now be held criminally responsible for pollution problems, especially when they are caught condoning outright violations of the law. Thus, when local officials single out individual companies for non-compliant behavior, they might unwittingly implicate their colleagues—or even themselves. Alternately, local officials risk threatening the interests of their superiors by unknowingly targeting firms that are the recipients of provincial investment funds, or firms that are covertly owned by higher-level leaders. We see this in the example presented in chapter three, where local officials were reluctant to pursue a case against large, polluting firms for fear that "higher level interests [were] involved". In general, these political risks make local officials very wary of enforcing environmental regulation against individual firms.

Given these stark tradeoffs between reducing pollution and protecting their political (and personal) interests, why might local officials be willing to enforce Beijing's blunt force approach to reducing pollution?

In this chapter, I argue that local officials concede to Beijing's pressure to carry out blunt force regulation, because it offers them a means to reduce pollution while protecting their interests. This is because blunt force regulation is enacted through extra-

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citys-cleaner-air, accessed July 3 2015

[66] Well-known cases of officials losing their jobs over pollution protest include: Shifang (BBC, "China factory construction halted amidst violent protests." 7/3/2012); Qidong (BBC "China waste water pipeline scrapped after protest." 7/28/2012)

legal, discretionary powers. In conventional regulation, regulators must act impartially; any firm that violates the law can come under scrutiny—including state-owned companies or major revenue contributors. In contrast, under blunt force regulation, local officials can—within generally prescribed limits—select which individual firms and which industries will be targeted for sanctions. This discretionary approach to implementing blunt force regulation therefore allows local officials to concentrate the cost of pollution reduction on those who are least valuable to the economy, and least able to pushback—namely on smaller, private firms or on industries that rely on temporary, transient labor. Moreover, the fact that firms are sanctioned on the basis of size, rather than for previous behavior, means that local officials can carry out punitive measures against polluters without implicating each other. In short, local officials are willing to undertake blunt force measures, despite the significant risks and costs, because they can distribute the costs of pollution reduction in a way that minimizes unrest and protects key bureaucratic interests.

2. What blunt force regulation looks like on the ground: Two cases

This chapter presents two case studies of blunt force regulation, which were chosen for their variation in the types of firms targeted. The first case took place in Guangdong province, one of the wealthiest provinces in China. It represents a more typical case, because blunt force measures were largely directed at small, privately-owned factories with low wage, migrant labor. The second case took place in Hebei, the northern province encircling Beijing that is known for its traditional, highly industrial economy. This case was more unusual, because blunt force measures were also directed against large, profitable, well-established factories including a handful of state-owned factories. The contrast in local officials' attitudes towards the targeted firms in these two cases highlights the significant discretion that local authorities exercise in deciding how blunt force measures will be carried out. In both cases, reduction targets are set by the central and provincial governments, and targeted groups are largely pre-determined. However, as we will see in the case narratives below, local officials in Guangdong chose to pursue relentless, 'scorched earth' tactics against the targeted small firms, whereas in Hebei province, we see them deploying more obsequious, compensatory measures towards the powerful large firms. In each case, local officials chose the strategies that allowed them to best protect their political and economic interests while fulfilling Beijing's demands.

While these two cases showcase very different approaches to blunt force regulation, in terms of outcomes, they are similar. Both cases document more extreme versions of blunt force measures, where local industry was effectively wiped out overnight. This despite the fact that they took place in vastly different regions of China, with the vastly different political economies: The cities of Hebei province frequently top the list of China's "most polluted cities", thanks to region's heavy production of steel, cement and glass[67]. Because of its proximity to Beijing, Hebei has also been the target of severe anti-pollution policies in recent years (Interview X1120516, Wong and Karplus

[67] The province is famous for producing one quarter of China's national steel output. See Reuters, October 15 2015. *China's Hebei imposes 'special emission' limits on steel mills.* See http://www.reuters.com/article/china-pollution-steel-idUSL4N1CL03W. Accessed August 3 2017.

2017). In contrast, Guangdong is known for its high levels of development, its export-oriented economy, and its relatively clean, compliant industry. It is the province where one would least expect blunt force regulation to take place. The similarity in outcomes across these two cases demonstrates that blunt force regulation is not exclusive to the more polluted or less developed regions of China where pollution concerns are more pressing.

Through narrating the turn of events in both cases, I draw attention to four ways in which local officials in China have adapted blunt force measures to 1) minimize political costs (including the impact on revenue intake and local business relations), 2) limit economic costs that directly affect their promotion prospects (or personal investments), 3) reduce the risk of social unrest and 4) protect fellow bureaucrats from political retribution. I use insights from the above case studies and data from my fieldwork to explain, through the eyes of local officials, how the tactics they choose help them achieve these four outcomes.

Case 1: Qingyuan—the garden suburb of Guangzhou?

The city of Qingyuan in Guangdong province is located just 70 kilometers north of Guangzhou. Nestled between green hills and a wide river, Qingyuan been dubbed the 'garden suburb' of Guangzhou. In recent years, real estate developers have flocked to Qingyuan, seeking to entice Guangzhou's middle class with the promise of clean air, open space, and low-priced housing. Hot on the heels of these developers came the tourism industry, setting up golf resorts and luxury hotels. Yet for forty years, Qingyuan has also been the site of one of China's biggest e-waste and electronic recycling industries. Much of this industry is concentrated in Longtang and Shijiao county—the very two counties where the luxury residential properties were built. Since the 1980s, factories in these two counties have taken imported waste and turned it into recycled copper, aluminum and plastic. The overwhelming majority of these factories are small, operating on slim profit margins and with basic technology. However, their combined production output is high; in 2013, approximately 38% of China's recycled copper and 14% of the nation's total copper production came from these two counties[68]. Residents of Qingyuan boast that fluctuations in the local copper industry can influence nationwide, and even worldwide copper prices (Interview X7190416a, X7190416b, X7190416d).

However, Qingyuan's copper, plastic and e-waste recycling factories are also highly polluting, and constantly emitting poisonous air and water pollution. Around 2012 and 2013 the newly arrived residents of Qingyuan's luxury developments began complaining in an online forum about the noxious smells drifting through their community. Startled to find that their 'garden suburb' of Guangzhou was, in fact, one of the country's leading waste recycling sites, they grumbled about respiratory illness and expressed fear for the health of young children at the local primary school. Eventually, disgruntled residents went to the neighboring villages to inspect the source of this smell. In October 2014, a group of residents took their findings to the offices of the Qingyuan

[68] China Environment News (环境日报), December 12 2014: How difficult can it be to supress illegal polluters? (取缔非法拆解真有那么难). See http://news.cenews.com.cn/html/2014-12/12/content_21729.htm, accessed April 27 2017.

Environmental Protection Bureau (EPB), asking local officials to take action against these polluters[69].

In fact, local officials in Qingyuan has been under pressure from higher levels to clean up this industry for almost a decade. In 2007, the government closed down hundreds of factories in Longtang County, but as the demand for recycled waste grew, they were unable to prevent new factories from cropping up. In 2012, with the arrival of tourism and real estate developers, the government again vowed to take a stricter stance against this industry. They announced a new Pollution Control Plan, which aimed to completely eliminate Qingyuan's e-waste industry by 2020[70]. But enforcement was inconsistent and Qingyuan's residents continued to complain about illegal waste incineration in their vicinity.

Finally, on October 30th 2014, in the face of ongoing protests by middle class residents, and in response to an open violation of waste burning laws by a group of factories, local officials took action. The Qingyuan city environmental protection bureau (EPB), Longtang county police, and county electricity supply unit abruptly cut off electricity to this group of violators. But that afternoon, hundreds of factory representatives went to petition the county government, demanding redress for the abrupt punishment. Faced with the prospect of open unrest, local leaders backtracked and decided to restore power to the factories "in order to prevent the situation from escalating"[71]. The government later begged for patience from disgruntled homeowners, claiming that they lacked the resources to forcibly punish non-compliers on such a large scale.

Up until now, we see a conventional story on pollution regulation in China. Local officials occasionally succumb to popular pressure from environmental activists, or accept the need to act on pollution targets, but lose their resolve in the face of pushback from firms. In Qingyuan's case this occurred, even though local officials had strong incentives to clean up the environment so they could continue courting the luxury tourism and real estate industries. This highlights just how much polluters in China manage to evade or undermine regulators in the everyday enforcement of pollution regulation.

However, in early 2015, after years of half-hearted enforcement, the government suddenly changed tack. Early in the year, the government began an audit of land use permits and operation permits of the entire e-waste industry in Shijiao county. They determined that of the 967 factories inspected, only 104 had proper permits, 555 had entered industrial parks, while the remaining 412 operating outside industrial parks were considered to be "operating illegally"[72]. They then conducted a crackdown on the 2358 "illegal" factories in both Longtang and Shijiao counties that were operating outside designated industrial parks. In Shijiao county, 1295 factories were ordered to voluntarily

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[69] Ibid.

[70] See《清远市电子废弃物污染环境整治规划（2012年-2020年）》

[71] Representative from Qingyuan city, Qingcheng district Environmental Protection Bureau, as quoted in China Environment News, Dec 12 2014

[72] Qingyuan City News (清远本市闻), April 25 2015: Qingyuan: forcefully stopping electricity and demolishing production equipment to clean up the environment. (清远：为治理污染对无证企业强制断电拆除生产设备). See http://qingyuan.benshixinwen.com/2015/qingyuanxinwen_0425/35009.html. Accessed April 21 2016

evacuate their premises. Forceful actions were taken against factories that failed to evacuate by a set deadline, including cutting off electricity, seizing raw materials, and destroying factory equipment[73]. In Longtang county, local cadres and party members involved in the industry were asked to take the lead in stopping production outside industrial parks, and to refrain from renting out land to "illegal" factories[74]. In total, these measures affected 29 village associations, 302 village groups and approximately 20,000 workers[75].

Two things should be noted from this turn of events. First, local authorities' change in tack came shortly after they announced that "We are currently requesting special funds from the central government to carry out clean up [治理] measures. Once the funds arrive, we will be able to destroy this e-waste industry."[76] This suggests that it was not just higher level orders that the provoked them to engage in blunt force measures, but also the sudden influx of fiscal resources from higher levels.

Second, while just months earlier, local officials had backtracked on punishments against protesting factory representatives, once blunt force measures began, they made no concessions to firms. Moreover, while in 2014, local officials had waited for a clear violation of pollution laws before applying punitive sanctions, under blunt force regulation in 2015, any manner of justification was used to label firms as "illegal" and deserving of blunt force measures. For instance, according to reports on the county website[77], the standard separating "illegal" from "legal" enterprises was whether or not companies had moved into industrial parks. In effect, it was a firm's compliance with a policy measure, not its compliance with environmental laws, that determined whether or not they were operating "illegally". Moreover, earlier that year, the government had announced a policy of "closures first and relocations second" (关停为主，入园为辅), indicating that firms would only be forced to move into industrial parks as a last resort[78] . This suggests that the government was determined to find any pretext for closing down firms rather than punishing firms for actual violations of the law. The government also cut off electricity to entire districts in Longtang and Shijiao counties without any notice, prompting complaints from factory owners. On these occasions, the Longtang county spokesman clarified that "when we cut off electricity to the factories, we made sure to preserve electricity connection to their houses so as not to affect their daily life."[79]—as if this somehow added a layer of justice to their abrupt actions. All these violations of due process suggest that the language of legality was simply used to steamroll the firms that had been targeted for blunt force measures.

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[73]The Southern Daily (南方日报), July 26 2016: The transformation of a 40 year old e-waste industry in Qingyuan, Guangzhou. (广东清远 40 年电子拆解业转型 垃圾焚烧污染重). See http://www.chinanews.com/sh/2016/07-26/7951598.shtml. Accessed July 28 2016.

[74] Longtang county party member and leader of district office in charge of crackdown, as quoted in The Southern Daily, July 26 2016.

[75] The Southern Daily, July 26 2016.

[76] Longtang county government official, as quoted in China Environment News, Dec 12 2014

[77] Shijiao TV(石角频道). April 24th 2015: Shijiao calls in 45 permit-less plastics dissolving factories (石角 47 间无牌无证塑胶溶解场被叫). See http://sj.qyzf.gov.cn/oneNew.aspx?newid=2940&&id=2940&&newlbid=7 (accessed July 2016).

[78] Qingyuan City News, April 25 2015

[79] China Environment News, December 12 2014

When I visited Qingyuan's Longtang and Shijiao counties in the spring of 2016, the aftermath of the crackdown was evident: the roadside were lined with abandoned factories, and industry insiders claimed that only a handful of the oldest and most compliant factories had survived outside the industrial park (Interview X7190416a*)*. The majority of workers and small factory owners in this industry had come from outside the province, and as the government crackdown intensified, several retreated to Southeast Asia or other parts of China to find work elsewhere (Interview X4050316*,* Interview X4120316, Interview X7a190416b*)*. For instance, a couple from Hunan province, who's small recycling business had been destroyed in the crackdown, simply drifted off to other parts of China; the husband immediately went elsewhere in Guangdong to look for temporary work, and the wife was preparing to leave with her son to see if they could start a business in another province[80]. When I later asked the local boss of a large factory (that had survived) "what is going to happen to all these workers and small factory owners?" he laughed and said "Oh them! They are just going to have to change their jobs. What else do you think they can do?" (X7a190416d).

This acquiescence of Qingyuan's factory owners may seem surprising, especially when a handful of factory workers had been so ready to protest punitive measures months before in 2014. Yet as I clarify later, the scorched earth tactics used in Qingyuan (where almost all factories are demolished simultaneously) can it make harder for factories to push back. Small factory owners in China have almost no rights or leverage against the state. While there may be some negotiation and greasing of hands in their everyday interactions, when it comes to hardline campaigns, these small companies have little recourse. The fact the Qingyuan's officials dressed up this campaign in the language of legality, and applied these measures universally, also made it harder for factories to protest the government's actions; while the factories targeted in 2014 could protest that they were being unjustly targeted because neighboring factories were continuing to pollute with impunity, this reasoning no longer applied in 2015 when all factories were being punished across the board.

The silent retreat of Qingyuan's workers may also seem surprising. Yet these mass layoffs are part of broader trend in China. Workers employed by small, privately-owned factories tend to be migrant workers, and are accustomed to frequent turnover in their employment. This usually happens en masse after the spring festival, especially in southern China, when workers come back to seek new jobs, and factory owners must completely replace their ranks of workers (interview X10080416). Alternately, workers might also be laid-off by employers after a couple years, and forced to seek new jobs because their constant exposure to chemicals has made them "too sick" or "unemployable"(interview, X7190416a). This practice of frequent turnover in the labor force explains why local officials are ready to risk mass layoffs through blunt force measures: they expect this quiescent attitude from workers, especially because they deliberately target the transient, informally employed migrant population that are used to changing jobs. This could be why, as I show the analysis below, blunt force measures in China are disproportionately focused on factories that employ these types of workers.

However, not all cases follow the same pattern of blunt force regulation that we see in Qingyuan. Across China, we see enormous variation in the categories of firms

[80] The Southern Daily, July 26 2016

targeted for blunt force measures, and sometimes also in the size of firms. Evidently, the stakes are much higher when trying to close down large, well-established firms than when deploying scorched earth tactics against small, helpless firms. The following case addresses what local officials might do when forced to apply blunt force measures to large firms.

Case 2: Shijiazhuang and the "Cement Corridor" of China

The counties of Pingshan and Luquan, situated just outside the city of Shijiazhuang, are known as the "cement corridor" of China. Located in the northern industrial province of Hebei, these two counties have been major producers in Hebei's cement industry for over 50 years. Yet in the space of few short years, this once bustling industry was reduced from hundreds of factories to just two, leading to a reported loss of 28,000 jobs[81] and a 52% drop in local government revenue[82].

Over the years, Pingshan and Luquan counties had developed a diversified cement industry: large, established companies (including SOEs) operated alongside hundreds of smaller cement factories. Abutting the limestone quarries of the nearby Taixing hills, these companies thrived on their proximity to raw limestone materials, and to the once booming city of Shijiazhuang—the provincial capital of Hebei province. Cement production brought prosperity and growth to the area, and revenue intake was so high that these counties frequently showed up on Hebei's list of top-performing counties. By the early 2000s however, this cement industry also began to provoke ire in the residents of Shijiazhuang, who attributed the city's terrible air quality to the pollution blowing in from this 'cement corridor'.

In 2007, the city government decided to address this problem by ordering a cleanup of the industry, even though the market for cement was then at its height. Local leaders drew up a policy to "close the small to advance the big" (关小上大). The goal was to forcibly shut down smaller, highly polluting factories, and concentrate production capacity into the remaining larger, more technologically advanced companies[83]—in effect, to reduce pollution while maintaining the same overall levels of production. Approximately 90 small factories were forcibly closed in this first stage of restructuring in 2007. Then in 2011-2012, a second wave of closures took place, targeting all factories operating cement mills of less than 3 meters in diameter (Interview X1060516*)*.

Up until now, we see a close parallel to the chain of events in Qingyuan. Under pressure from below, local authorities begin a wave of closures that largely target smaller firms. These closures are initially haphazard, but become more blunt in their targeting

[81] Hebei News (河北新闻网), April 6 2017: How might workers from phased out industries be effectively reemployed (去产能职工如何顺利再就业—三个重点群体求职记). See http://hbrb.hebnews.cn/html/2017-04/06/content_164276.htm. Accessed April 17 2017.

[82] China Enterprise News (中国企业报), March 8 2014.
Economic Daily (经济日报), December 17 2014: Farewell to the "Cement Corridor" (告别"水泥走廊). See http://www.ce.cn/xwzx/gnsz/gdxw/201412/17/t20141217_4138023.shtml. Accessed April 16 2017

[83] Hebei Daily (河北日报) May 26 2010: Luquan: the end of the "cement era" (鹿泉：走出"小水泥时代"). See http://online.yswkj.com/rhtjl/506.html. Accessed April 18 2017.

and more strictly enforced under pressure from higher levels. However, by 2013 Shijiazhuang's "close the small" policy was deemed insufficient for tackling pollution problems. As concerns over pollution in Beijing escalated, the State Council launched its Air Pollution Prevention and Action Plan[84]; Hebei, the province encircling Beijing that had long been blamed for Beijing's suffocating pollution, became one of the plan's main targets[85]. The Hebei provincial government agreed, amongst other thing, to reduce cement production by 61 million tons, and determined that one eighth of Hebei's total reduction in cement output (approximately 7.5 million tons), would take place in the cement corridor, that is, in Luquan and Pingshan counties[86]. Here is where we begin to see a departure from what occurred in Qingyuan. While local authorities in Qingyuan focused almost exclusively on small companies, in Pingshan and Luquan counties, the large, profitable, technologically advanced cement companies that had once been protected by the local officials were now being targeted for blunt force measures.

What happened next was striking. Instead of abruptly cutting off electricity to factories, or aggressively destroying factory equipment—as we saw in Qingyuan—county officials were far more deferential to factory owners and made an effort to keep the process transparent. Most notably, they offered clear terms of compensation to all factory owners: for every 10,000 tons of reduced production, owners would receive 170,000 RMB. An additional 10,000 to 50,000 would be provided to compensate the destruction of warehouses[87]. To formalize this process, factory owners were asked to sign a "demolishment agreement"; owners that agreed to close down before February 17, 2014 would receive an additional one million RMB in compensation. In addition to offering clear terms of compensation, the government also drew up a map identifying which cement factories and which sites would be targeted for closures, and then put this map up for public display

Firms in Luquan and Pingshan initially pushed backed against these blunt measures, just as we saw in Qingyuan. Factories were being asked to close even though they were still profitable, with orders lined up for the next year[88]. Other factories had recently made major investments to upgrade their infrastructure. For instance, Dingxin

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[84] State Council, September 10 2013: Notice on State Council Air Pollution Prevention and Action Plan 《国务院关于印发大气污染防治行动计划的通知, 国发〔2013〕37 号》

[85] Specifically, the Hebei government signed a letter with Beijing agreeing to cut coal production by 40 million tons, plate glass production by 36 million tons, steel production by 60 million tons, and cement production by 61 million tons, all by 2017. For details, see Hebei Provincial Government, Plan for Dividing up Targets of Reducing Coal Consumption and Iron and Steel Production Capacity in Hebei 《河北省削减煤炭消费及压减钢铁等产能任务分解方案》

[86] China Comment (半月谈网), June 6 2014: Hebei supresses production capacity: smashing the people's rice bowl for the 'black hats'(河北压制产能：为了乌纱帽砸别人饭碗?). See http://www.cssn.cn/jjx/jjx_bg/201406/t20140606_1200233.shtml, Accessed April 18 2017; 中国企业报 2014

[87] Ibid.

[88] CCTV "Economy Time" (中央电视台《经济半小时》) April 13, 2016: Report from the frontlines of reform: the aftermath of demolishing cement factories (来自改革一线的报道：水泥厂爆破之后). See http://tv.cctv.com/2016/04/13/VIDEVLZLeyoYiLIDWFpQgDKz160413.shtml. Accessed April 23 2017.

Cement, an SOE, had just acquired three new factories for 300 million RMB in 2010, and invested a further 100 million RMB in infrastructure upgrades. Now, a mere three years after these major investments, the government was asking them to voluntarily close down and offering only 45 million in compensation. At first, Mr. Feng, the owner of Dingxin Cement, refused to accede to government demands. Several other factories quickly followed suit claiming, "Dingxin is an SOE! If they won't shut down, we won't either" [89].

However, instead of simply imposing closures under the guise of a ruthless "legal campaign", as they did in Qingyuan, county officials pursued a more obsequious approach. First, they visited every single factory to explain the compensation process, to solicit feedback on reinvestment in new industries, and to listen to factory owners' complaints. One local official even recounted visiting a factory owner's mother in hospital to pay his respects—all part of the process of persuasion[90]. Local officials also decided to lean on their closest connections in the industry; those who had formerly been protected by government connections were now being asked to close down first. For example, Dingxin cement, the SOE, was asked by the government to take in lead in signing the demolishment contracts, because as an SOE, they had "social responsibility" to do so. Eventually, the owner of Dingxin conceded, and other factories fell into line[91].

Second, throughout the process, local officials openly acknowledged the unfairness of these forced closures. Instead of trying to dress up these measures the language of legality—as they did in Qingyuan—local officials openly sympathized with factories about the difficulties they faced. One official from Hebei's provincial environmental protection bureau admitted that, "In order to complete these reduced production orders from Beijing, a portion of compliant enterprises will also have to be eliminated."[92] A county official in charge of the Bureau of Information and Industry (经信局) noted that "Luquan's cement industry has gone from 166 factories to just two. Most of these factories were profitable, so you can only imagine how hard it was to close them down."[93]

Third, local authorities even arranged a "demolition ceremony" to commemorate the factory owners' sacrifices. The demolition of Luquan and Pingshan's counties remaining 35 factories took place on two separate occasions: On December 17, 2013, 17 factories were destroyed and on February 17 2014, the final 18 factories were destroyed. Explosives were set to entire factory premises, which had been vacated weeks before. On the day of the destruction, local authorities set up a stage for speeches by the party secretary of Shijiazhuang, and invited twenty journalists to come witness the explosions. Again, throughout the ceremony, these firms were applauded for their "sacrifice" rather than berated for their "illegality". For instance, the party secretary called on the people of Hebei to "accept this sacrifice of our local needs and short term interests so that we can focus on the long-terms gains and serve the fundamental interests of our nation's people"[94]

The Shijiazhuang Propaganda Department estimated that in total, this closure of

[89] 中国企业报 2014; Economic Daily December, 17 2014
[90] CCTV "Economy Time", April 13, 2016
[91] Economic Daily, December 17 2014
[92] China Comment, June 6 2014
[93] Ibid.
[94] Sun Ruibin, Party Secretary of Shijiazhuang, as quoted in Economic Daily, December 17 2014

35 large firms in 2013-2014 cost the economy 1.8 billion RMB, directly affected 3780 workers, reduced output value by 6.1 billion RMB, and led to 300 million RMB in lost revenue[95]. For Yi'an Township, the administrative center of Luquan and Pingshan counties, this meant a loss of 90% of local revenue[96]. Meanwhile, Shijiazhuang paid out a total of 1.7 billion RMB in compensation to factory owners, 700 million of which came from Pingshan and Luquan's county revenue.

However, in the aftermath of these demolitions, the local government continued to provide support for the owners of these large factories, encouraging them to reinvest in new, cleaner industries in order to rebuild the local economy. Since 2014, they have sent these factory owners on a ten separate "business tours" (考察项目) around China to develop new investment ideas and acquire contacts from different industries[97]. An Zhongpin, a factory owner who had worked twenty years in the cement industry decided to reinvest in a walnut processing facility on the site of his former cement factory. When he suddenly ran out of investment funds, the district government provided a further 3 million RMB in compensation to help cover his start-up costs. Reports suggest that a significant portion of the funding for new investments come from one-off central transfers[98].

In the summer of 2015, I visited the stretch of highway that had once formed the "cement corridor" of China. Empty shells of factories were visible on either side. Former factory bosses confirmed they had received compensation from the government, and were now considering which industry they should invest in to begin anew (Interview X2110815). However, it quickly became clear that the biggest losers of the entire process were the workers. While the government had provided clear compensation rules for factory owners, they did not provide any direct compensation to workers, and only requested that factory owners provide some form of payment to workers[99]. Dingxin Cement, the state-owned enterprise, spent 2 million of the 45 million it received in compensation to pay off its workers. Each worker was given a sum based on how long they had worked at the company, and an additional 10,000 RMB bonus (approximately five months salary for line workers) to assist them while they found new jobs[100].

However, as with in Qingyuan, most workers were left uncompensated, and most acquiesced to this outcome. The majority of workers in this industry were only on temporary contracts, and unable to claim formal compensation. Several workers had come from neighboring villages, and simply returned to their villages to try and find seasonal work. The restaurants and shops that had once served this bustling cement industry also closed down, contributing to further unemployment woes. In 2014 the county government had promised to hold a job fair to help resettle these workers, but by the end of 2015 several of these villagers were still unemployed. Younger and more

[95] 中国企业报 2014
[96] Economic Daily, December 17 2014
[97] Ibid.
[98] See Yang, L. 2015. *Analysis of the impact of firm closures on the livelihood the local informal workforce* (企业关停对当地临时就业人员的生计影响研究)
[99] China Comment, June 6 2014
[100] Economic Daily, December 17 2014, 中国企业报 2014

educated workers had already left the county, seeking employment elsewhere[101].

In sum, in Shijiazhuang, the additional efforts that local authorities took to support large firms—from compensating factory owners, to negotiating the terms of factory closures, or supporting reinvestment opportunities—all emphasize the contrast in the state's attitude to large versus small firms. Even in the aftermath of the closures, local officials continued to appease the former factory owners by sending them on business tours, or providing special subsidies to help their new ventures. This was a far cry from the fate of Qingyuan's factory owners, who were left to their own devices, and had little choice but to move away to find work elsewhere. Yet despite handling their firms with kid gloves, the cement industry of Shijiazhuang was ultimately subjected to the same, irreversible fate as the waste recycling industry of Qingyuan, that is, the complete demolishment of local industry. Moreover, as in Qingyuan, we see that local authorities' showed little sregard for workers rights, which could be tied to their expectation that laid-off workers would simply move away.

3. Minimizing the costs of Blunt Force Regulation

The two cases above show situations where local authorities faced intensifying pressure to implement blunt force measures, and yet were still able to craft implementation strategies that minimized the costs of these measures. The difference in the above strategies highlights the degree of discretion that local officials exercise, especially when choosing how to approach and gain acquiescence from firms that have been targeted for blunt force measures. The similarities in strategies draw attention to more universal advantages that local officials share—such as a disorganized labor market, or frequent bureaucratic turnover—that make blunt force regulation easier to implement. The following section explains how these features make local officials more willing to go along with the center's demand for blunt force measures.

3.1 Minimizing Political Costs

From the two cases above, it is clear that local officials disproportionately target smaller firms in blunt force measures. In some cases, this focus on small firms is covert. In Qingyuan, for example, only the larger, wealthier companies that could afford to move into the government-approved industrial parks were spared from the crackdown. However, small firms can also be targeted through explicit government policies. We see this in the "close the small" policy in Shijiazhuang, where the government initially targeted small factories in an attempt to concentrate production into larger, more efficient firms.

Data I obtained on blunt force measures demonstrates that this practice of targeting small firms is widespread: In China, each city is required to draw up a list of "Key Monitored Enterprises" (重点监控企业) that account for 65% of the city total industrial emissions[102]. This list must also include *all* coal-fired power plants (the biggest

[101] See Yang, L. 2015 report for details on worker's reactions to the changes.

[102] This is calculated according to emissions recorded in the previous year. City governments list all polluting enterprises in order of biggest to smallest polluters, and include those companies (starting from the biggest polluters) that make up to 65% of total emissions. On top of this 65%,

producer of industrial pollution by far) as well as all large firms in cement, crude oil processing, coking, ferrous and non-ferrous metal smelting, and plate glass industries. This means that the final list of Key Monitored Enterprises can account for much more than 65% of emissions in each city. To assess the extent to which small polluting firms were targeted in blunt force regulation, I compared this list of Key Monitored Enterprises from 2010-2015 to the list (which I use in chapter two) of enterprises forced to reduce industrial production between 2010-2015. I found that in more than half of Chinese cities, specifically in 149 out of 283 cities, the number of Key Monitored Enterprises targeted for forced reductions was zero. In the remaining 134 cities where at least one Key Monitored Enterprises was targeted, they make up only 8.5% of all enterprises targeted. Summary statistics of this comparison can be seen in Table 1 below.

Table 1: Statistics comparing targeting of small firms: large firms (Key Monitored Enterprises)

Measure	Statistic
Total number of firms targeted for blunt force measures	5447
Number of Key Monitored Enterprises targeted	362
% targeted that are Key Monitored Enterprises	6.65%
Number of cities with NO Key Monitored Enterprises targeted	149
Total number of cities where blunt force measures took place	269

Of course, the companies on this list Key Monitored Enterprises tend to be very big. In terms of overall industrial emissions, closure of just one is equivalent to the closure of multiple small companies. It therefore makes sense that there should be a higher number of small companies targeted for closures. Moreover, small companies tend to have less advanced abatement technology, so it is likely that per unit of production, they pollute far more than large companies. To assess the scale of the contribution from Key Monitored Enterprises, I compared the amount of production (in tons) that these Key Monitored Enterprises were forced to reduce to each city's total forced reduction in industrial output. I found that in the 134 cities where Key Monitored Enterprises were targeted, they reduced only 25% to the total amount of industrial output that forcibly reduced. Moreover, the median percent reduction by Key Monitored Enterprises was only

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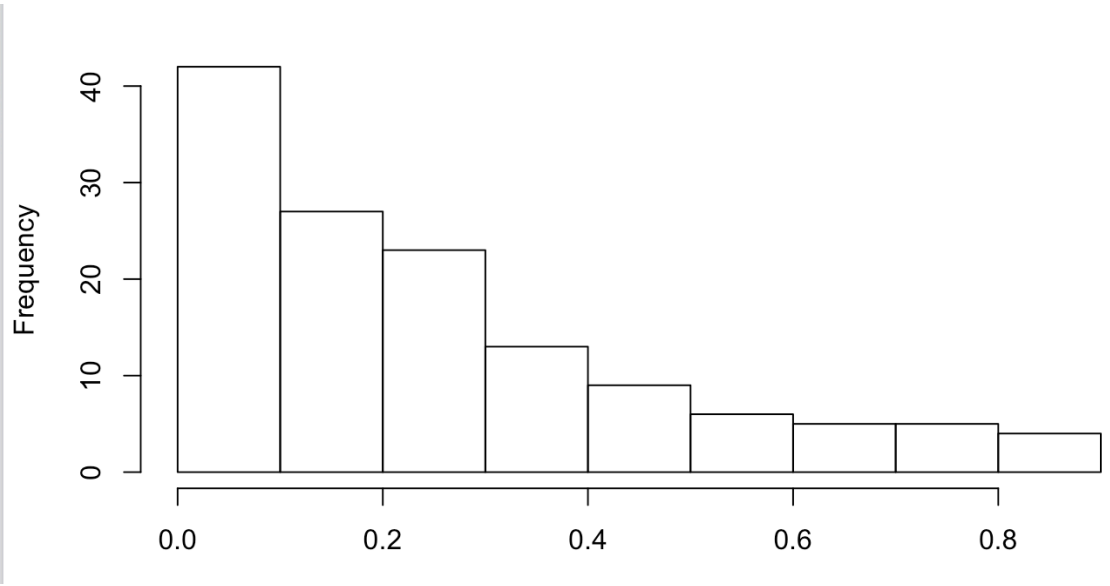
they then include *all* coal-fired power plants, as well as all large firms in cement, crude oil processing, coking, ferrous and non-ferrous metal smelting, and plate glass industries *(Interview* X6210116*)*. For details, see 《2012 年国家重点监控企业筛选原则和方法》*2012 Selection Criteria and Method for 2012 Key Monitored Enterprises.*

19%—this despite the fact that these enterprises collectively produce well over 65% of local emissions. In Table 2 below, I present the summary statistics of this comparison, and in Figure 1, I show the distribution of proportion of tons reduced by Key Monitored Enterprises in the 269 cities where blunt force regulation took place. These statistics, combined with the fact that in more than half of Chinese cities, not a single Key Monitored Enterprise was targeted, suggests that large polluting firms are generally spared from blunt force measures.

Table 2: Descriptive Statistics
% Tons Reduced by Key Monitored Enterprises (with example cities)

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum
0.25%	8.12%	18.8%	25.2%	35.8%	89.7%
Hanzhong, Shaanxi	Baise, Guangxi	Yichang, Hubei	Wuhai, Inner Mongolia	Ningxia, Yichuan	Yichun, Heilongjiang

Figure 1: Histogram showing distribution of proportion of tons reduced by Key Monitored Enterprises in 269 cities



In terms of minimizing political costs, this focus on small firms is hardly surprising. First, smaller, weaker firms are much less likely to push back against forceful government measures. In studies of when firms choose to resist or comply with regulation, one long-standing finding is the importance of firm size; large firms, regardless of sector or ownership structure, are more likely to subvert restrictive regulation or successfully lobby for regulation that advances their interests (Kennedy 2005, Deng and Kennedy 2010, 106-107). This is because large firms are better connected and can use these high-level connections to protect themselves from repercussions for non-compliance (Deng and Kennedy 2010:106-113, Wang 2015, Huang 2013, 12-14). As established businesses with higher profit margins, large firms also contribute more to local government revenue. This makes local officials reluctant to meddle in the operations of large companies. For instance, Lorentzen et al. (2014) find that holding pollution levels constant, bureaucrats in China are less likely to expose and punish polluters when the local economy revolves around one large, dominant firm rather than many small firms. In short, for officials seeking to protect revenue streams and preserve important political connections, it is more expedient to sacrifice many small firms to reduce pollution than it is to sanction one large firm.

Second, corrupt local officials also have an interest in targeting small firms, because they are less likely to have a direct, personal stake in these firms. While local officials may secretly own majority shares in local companies or demand kickbacks from firms (Bernstein and Lü 2000, Ong 2012)[103], they tend to focus on large, more profitable firms where the payoffs for corruption are higher. Local officials might also seek to protect firms that have been awarded special government grants or investments, because they are evaluated for performance on these investments. However, these grants also tend to go to large, established firms (Huang 2013, 7-10; Interview X9160316a, Interview X5201015).

This difference in the political (and personal) cost of closing small versus large firms can be seen in the vastly different tactics and language that local officials used against small firms in Qingyuan and large firms in Shijiazhuang. When we consider local officials' disproportionate focus on punishing small polluters, and the difference in measures taken against small firms (uncompromising) versus large firms (conciliatory), their actions begin to seem more rational. In the midst of destroying local industry, they have found a way to appease the biggest, most profitable and most influential companies. In short, they have developed a means to reduce pollution that minimizes the political cost of punishing local businesses.

However, even if local officials can minimize political costs in this way, blunt force measures will still have an impact on economic growth and revenue intake. While small firms contribute very little to local government revenue, the sudden closure of hundreds of small firms—as we saw in Qingyuan—can destroy local growth statistics. In more extreme cases where even large firms must be targeted—as we saw in Shijiazhuang—blunt force measures can lead to significant losses in revenue. If revenue and growth rates are essential to a local officials' performance record and promotion prospects, why are they being so readily sacrificed?

[103] For more information on this topic, see Tsai, 2007, pp.148-149 and Ong 2012, p.196

3.2 Limiting economic costs

The literature on bureaucratic incentives in China suggests that local officials have an overall tendency to prioritize economic growth and revenue intake. However, in exceptional circumstances, such as with blunt force regulation, these priorities can be displaced. First, this is because blunt force measures are undertaken as one-off campaign, in response to sudden pressure from provincial or central leaders. Thus, for this short period of intense scrutiny, performance on pollution reduction targets supersedes all other targets. This was confirmed during my interviews with an official from the National Development and Reform Commission (one of China's most powerful government departments) in Shijiazhuang, who conceded that Hebei was set to fall short of its 6.5% GDP growth target in 2015. However, because of the economic slowdown and recent forced closures of so many firms, he claimed that Beijing had more or less excused Hebei from trying to reach their growth targets that year (Interview X2140515a*,* Interview X2140515b).

Second, blunt force campaigns are usually accompanied by a sudden injection of fiscal resources, either from Beijing or from higher levels of government. Instead of forcing cash-strapped counties to further sacrifice revenue intake by closing down firms, the central government will transfer special funds to offset the costs of carrying out these closures. In Qingyuan, for instance, officials openly stated that they had to wait for special funds from the provincial government to arrive before they could begin punishing polluting enterprises. In Shijiazhuang, special funds from the city and central accounts were transferred to Luquan and Pingshan counties to cover compensation costs[104]. In fact, Beijing has even developed a special fund to assist Hebei province through this difficult transitional period. According to reports from Hebei's government finance department, of the 7.02 billion RMB that Hebei's spent on air pollution control in 2014, 6.22 billion was paid for by central governments funds (Wong and Karplus 2017, 14). Thus, while in everyday circumstances local officials might face a difficult choice between collecting sufficient revenue to cover costs, or punishing polluters that provide this revenue, under blunt force regulation, one-off fiscal transfers help to ease this tradeoff.

Of course, it is unlikely that these fiscal transfers will be sustained in the long-term. Once the Center's attention has waned, special earmarked pollution funds will be diverted to other priority projects in health or social welfare. However, local officials may be willing to sacrifice revenue from polluting firms when there is the potential for new cleaner industries to replace the polluting industries. We see this in Qingyuan, where the government destroyed its 40 year-old waste recycling industry in anticipation of a boom in the local real estate and tourism industry.

Even in cases where there are few investment prospects on the horizon, local officials still hold to the idea that new industries and new revenue will come to replace the old. There is a degree of irrationality to this belief: In Luquan, one of the cement corridor counties, county and township officials are planning to build up a new 'rural tourism' industry, complete with "walnut farm tours" and rustic getaways for city dwellers. In an optimistic speech, the mayor of Shijiazhuang claimed "by demolishing these 35 cement factories, Shijiazhuang will improve its air quality, which it means it can

[104] See 中国企业报 2014, Yang L. 2015.

begin to develop ecological tourism, and build the favorable conditions for 'green' development"[105]. County officials in Luquan and Pingshan have certainly made an effort to attract new industries to the area, promising tax breaks and cheap rents to investors from cleaner industries. However, as of 2015, only a handful of new companies have moved in, and of the 35 companies closed, only three have managed to reinvest in new ventures[1].

Perhaps there is a genuine belief that tourism can revive local economies. And perhaps China's cadres are tiring of the 'growth at all costs' model, and willing to sacrifice for these greener, cleaner, more prestigious forms of growth. Yet with most of China's industrial heartland attempting to rebrand itself as a center of tourism, it seems unlikely that the former "cement corridor" of Shijiazhuang can be rebuild itself from tourism alone. However, thanks to short bureaucratic term limits, the local officials charged with closing down polluting industries have little professional motivation to focus on the future revival of these counties. With postings lasting an average of three to five years (Kostka and Eaton 2014), so long as county officials fulfill their short-term political obligations to close factories, they can pass on the long-term revenue problems to their successors. For instance, one of the 'cement corridor' county leaders who was most vocal about investing in tourism projects seemed to know little about the data and statistics when interviewed about this project. This leader was not local, had been appointed from elsewhere, and was preparing to leave to a new posting soon. This leader's attitude contrasted sharply with that of another local leader who had grown up in the area, knew all the facts and figures, and seemed deeply concerned about the fate of unemployed workers (Interview X1060516).

In sum, the exceptional, one-off nature of blunt force regulation, combined with the center's revenue support for these measures, can explain why local officials are willing to temporarily give up their focus on growth and revenue to undertake drastic pollution reduction measures. However, even if local officials are willing to accept this loss in revenue, why are they willing to risk widespread unrest by laying off worker en masse, especially when they know that workers are unlikely to receive compensation for these abrupt closures?

3.3 Reducing the risk of social unrest

In blunt force regulation, aside from disproportionately targeting small firms, local officials also concentrate the most extreme interventions (forced closures, demolishing equipment) on companies with an informal labor force, or companies that will readily relocate elsewhere. This appears to be part of a coordinated government strategy to limit unemployment unrest.

I first got the sense that this was a coordinated strategy when interviewing the NRDC official in Shijiazhuang. When asked how the government planned to minimize the social costs of this anti-pollution campaign, he volunteered that private firms had been the main targets of government efforts to clean up the local cement industry, because this lowered the potential for unrest (X2140515a). Specifically, private firms tend to employ temporary, migrant workers who are unlikely to receive compensation or

[105] Economic Daily (经济日报), December 17 2014

social insurance payments. When laid off, these workers often to move away elsewhere, or to seek jobs in other industries. In contrast, workers from SOEs or very large firms are offered formal employment contracts, which entitles them to compensation and unemployment benefits. As a result, SOEs tend to attract younger, more educated workers who are more competitive on the job market[106]. However, when mass layoffs occur, these SOE workers also pose a greater risk to the local government; the state is contractually obliged to pay social insurance to these workers, but if local officials cannot afford the payouts, they risk provoking collective protests from this educated group of workers. This is exactly what happened in the era of SOEs restructuring in the northeast, when mass layoffs escalated into mass protests. In sum, local officials target smaller, private firms because they know that workers from these firms are less likely to protest in response to layoffs.

Consider the responses of workers in two cases I outlined above: In Qingyuan, the factories targeted for closure were all small-scale, relying on cheap, informal labor. Several of the factory owners were migrants themselves, merely renting the premises from local residents who had left the business long before[107]. Following the crackdown, many of the workers simply returned to local villages to await new opportunities, while the factory owners moved to other provinces to set up new investments (Interview X4050316, Interview X4120316, Interview X7190416d). Likewise, in Shijiazhuang's Luquan County, only one of the 35 factories forced to close in 2013-2014 was a SOE[108]. The rest of the closed factories were all privately-owned, and workers from these factories simply returned to villages to seek seasonal work in the construction industry, or domestic services, or they left to other provinces to seek work elsewhere. In fact, of the 35 companies closed in Luquan, only the SOE was reported to have paid compensation (in addition to wages owed) to their workers.

During my interview, this NRDC official posited that Hebei province's deep restructuring of polluting industries was unlikely to cause the same dislocation as the mass layoffs in the 1990s, because the state would not have to provide the same level of social security. The majority of workers who lost their jobs in Shijiazhuang were transient, informally employed, and expected to move away to other cities and provinces to find new jobs (Interview X2140515a). His predictions have so far proven correct: aside from occasional reports of strikes in Tangshan province (where 40 million of Hebei's 60 million tons of reduced steel production took place[109]), Hebei seems to have evaded the threat of mass unrest, despite major industrial restructuring over the last few years.

How widespread is this strategy of targeting privately owned firms to limit unemployment unrest? To assess the degree of protection towards SOEs, I collected data on the ownership characteristics of targeted firms. Based on my analysis of the list of firms forced to reduce production between 2010-2015, two pieces of evidence suggest that private firms are disproportionately targeted over SOEs: First, I focus on the list of

[106] In Shijiazhuang's Luquan county, for example, SOEs were able to advertise for and get workers with a high school diploma because they offered insurance and benefits. In contrast, Luquan's privately-owned cement companies were only able to attract less educated villagers or migrant workers, because they can only offer a basic salary.

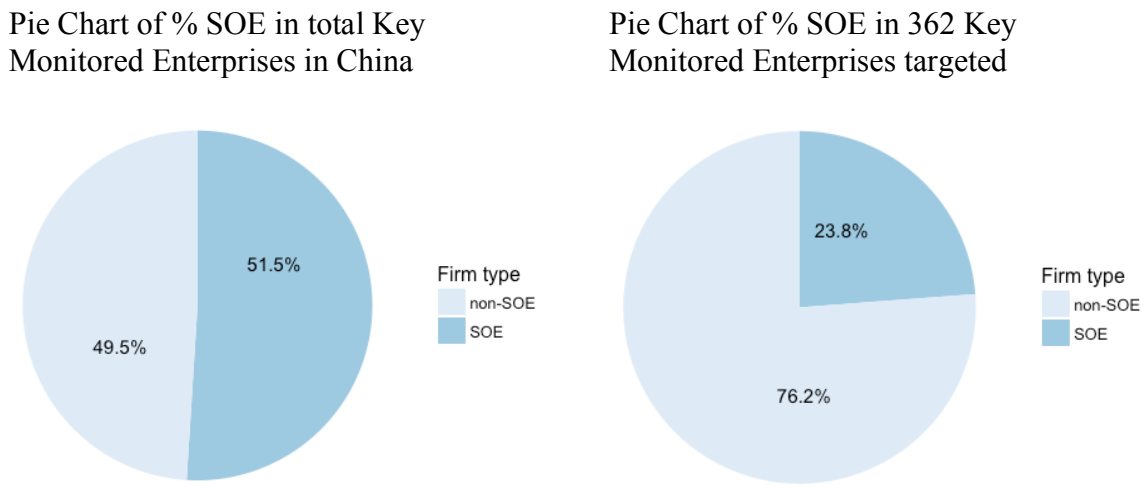
[107] The Southern Daily (南方日报), July 26 2016

[108] Reports further suggest that the 2 factories remaining out of the original 166 are SOEs

[109] China Comment (半月谈网), June 6 2014

Key Monitored Enterprises that were targeted for forced reductions, because we are more likely to find SOEs in this list of large companies. In an earlier section, I show that out of thousands of targeted companies, only 362 Key Monitored Enterprises were targeted for forced reductions in China. Out of these 362 Key Monitored Enterprises targeted for forced reductions, approximately 23% were SOEs. In contrast, on the full list of China's Key Monitored Enterprises for 2010-2015 (not including industries, such as the power sector, that were excluded from forced reductions), approximately 51% of companies on the list are SOEs. In other words, compared to the proportion of SOEs in the total population of large, polluting enterprises in China, a much lower proportion of large, polluting companies targeted for blunt force measures were SOEs (see figure two—pie chart—for illustration).

Figure 2: Pie chart comparison of % SOE



Second, I selected two cities where we are most likely to find SOEs on the list of targeted firms. Specifically, I identified two provinces where SOEs produce a high proportion of the province's total industrial output. These include Shaanxi province, where SOEs produce 61.6% of total output, and Shanxi province, where SOEs produce and 51.2% of total industrial output. From each of these provinces, I then selected the city with the highest number of firms targeted. The final cities chosen were Yulin in Shaanxi province, and Lüliang in Shanxi province. I then identified ownership structure of every single firm that was ordered to reduce production in these two cities. For the city of Yulin (Shaanxi province) where SOEs produced 61% of total industrial output, only 6.81% of

firms targeted were SOEs. In the city of Lüliang in Shanxi province, only 4.3% were SOEs. Moreover of (albeit limited) total number of Key Monitored Enterprises targeted in these cities, in Lüliang, only 1 out of 6 Key Monitored Enterprises was an SOE, and in Yulin the only key polluting enterprise targeted was a private company (See Table 3 below for descriptive statistics on firm closures in these two cities). Together, this evidence suggests that private, non-state owned companies are disproportionately targeted in blunt force regulation.

Table 3: Descriptive Statistics on Proportion of SOEs targeted in two cities

Measure	Lüliang, Shanxi province	Yulin, Shaanxi province
% SOE industrial output/ total provincial industrial output	51.2%	61.6%
% SOEs targeted by blunt force	4.3%	6.81%
Total number of firms targeted	102	61
Number of Key Monitored Enterprises targeted	6	1
Number of Key Monitored Enterprises targeted that are SOEs	1	0

There is nothing new about this phenomenon of local officials taking extra steps to protect SOEs. Existing studies suggest that SOEs tend to be protected from government interventions because of their size, ability to influence policy, and distinct political connections (Lorentzen et al, 2014, 185; He and Pan 2013, 50, Kennedy 2009). However, these cases of blunt force regulation also suggest that SOEs (as well as very large, established private companies) might be protected from pollution regulation in order to minimize the risk of unemployment unrest.

Targeting private firms and protecting SOEs—who are notorious for their inefficiency and bloated finances—is not necessarily the best choice for the economy. With access to subsidized credit, preferential access to worker compensation funds, and greater guarantees against market failure (Tsai 2015), SOEs are often insulated from market risk, and therefore from the need to innovate. In contrast, private firms, with their low profit margins and risky business environments, must innovate to survive. For instance, during my research, I interviewed the representative of a large conglomerate that had become an industry leader in cutting-edge recycling techniques. This firm had received many major government innovation awards, and was frequently held up as an example to visiting foreign dignitaries. However, the representative I interviewed admitted that most of their cutting edge technology—including techniques for recycling scrap cars or producing high-end recycled plastic—had come from acquiring smaller companies in the business (Interview X9160316a, Interview X9160316b*)*.

Once again, then, we see that blunt force regulation allows local officials to pursue a pollution reduction strategy that is politically expedient. Instead of pursuing an approach that is beneficial to the economy (such as supporting more innovative companies) or efficient at reducing overall pollution (such as closing down the worst polluters), they have chosen a strategy that imposes the least social cost, targeting informal workers in the private sector. However, even if this strategy does ease the risk of social unrest, it still does not explain why local officials are agreeing to close down so many factories over a short period of time, effectively compounding the impact on the local economy. Instead of staggering closures, or targeting the most extreme polluters first, why are local officials choosing to close down all companies at once?

3.4 Protecting bureaucratic relations

In a perverse way, blunt force regulation, while costly for the local economy, can be beneficial to bureaucratic cooperation. In normal circumstances, when local officials attempt to address pollution problems by singling out major violators for punishment, they risk implicating their colleagues, or stirring up tensions between different departments. As one provincial EPB official explained:

> "Suppose a firm is caught polluting, then we have to go and investigate who in our administration [the EPA] ignored the regulations or who didn't know how to enforce the regulations. That's the problem with trying to punish non-compliant firms individually, you have to find who's responsible in your own ranks; you have to go chase after local cadres below you, or question your superiors, or sometimes you just end up sacrificing your own brothers. Who is willing to do that? Who is willing to enforce the law when you punish your own people? ... (Interview X4090116a)

In contrast, blunt force regulation carries no punitive measures for bureaucrats. If firms are being sanctioned on the basis of size or type of industry, then when targeting firms for sanctions, there is no risk of implicating colleagues for bureaucratic malfeasance. Nor is there is any risk of threatening higher level interests, because the list of firms targeted for sanctions must be pre-approved by provincial (and sometimes even central) government officials (Interview X2140515a*;* China Comment, June 6 2014). As this provincial EPB official continued:

> When you apply a unilateral enforcement policy [where all companies in one category are punished]*,* it doesn't matter what happened before or who is responsible. Firms are punished because they didn't meet a standard. You don't have to find out who failed at monitoring them" (Interview X4090116a)

Compare this with the complaints of another provincial EPB official who was being forced to investigate firms for excessive pollution:

> Suppose a factory secretly emits polluted water at night. Once pollution hits the water, it also becomes the responsibility of the water bureau (水利部). So now we

> have to chase down the water bureau and get their cooperation for inspecting the water and cleaning up the pollution. It is such a headache! In my eyes, once the pollution hits the water, it should be the water bureau's responsibility. The EPB should only be responsible for checking if factories have installed the correct equipment. (Interview X2110815a)

In ordinary circumstances, blame for "who failed at monitoring [polluting factories]" or "who is responsible [for cleaning up pollution]" is one the biggest sources of inter and intra-departmental conflict. However, blunt force regulation absolves local officials of the need to find blame. This allows for an unusually high degree of cooperation between different departments. Consider the cases of Qingyuan and Shijiazhuang: blunt force campaigns were carried out jointly by the environmental agencies, the bureau of industry and development, the electricity bureau, and law enforcement officers. In other cases I came across, these different bureaus even signed contracts to guarantee immediate support once the campaign begins[110].

However, this preference for unilateral enforcement policies also explains why local officials must close down all companies at once. When companies are sanctioned for an arbitrary, size-based standard (for example, for operating cement mills below three meter in diameter, as we saw in Shijiazhuang) then sanctions must be carried out unilaterally to avoid complaints of government favoritism. Consider again the case of Luquan county in Shijiazhuang: when the one SOE targeted for closures refused to comply, all other factories followed suit complaining that it was unfair for the SOE to be exempted simply for being SOE. This eventually pushed local officials to put pressure on the SOE to take the lead in closing down. Consider also the case of Qingyuan: In 2014, when local officials decided to cut off electricity to factories that had been caught illegally burning waste, they were eventually forced to backtrack when factory owners went to the county offices to protest. However, by 2015, when the blunt force crackdown had begun, local officials were impervious to pushback. In fact, cadres and party members involved in the recycling industry were asked to take the lead in dismantling local factories. Why this change in tune? If local officials were committed to carrying out this unilateral enforcement policy against *all* targeted firms, then it makes sense that they would lean on their closest connections—the very connections that once protected these firms—to take the lead.

In sum, local officials prefer blunt force measures to address pollution problems, because the arbitrary standards for punishment help them to avoid blame and absolve each other of responsibility. However, this use of arbitrary standards to justify closures means that local officials must apply sanctions swiftly and unilaterally—to *all* firms that fall under this standard—to ensure that there is no pushback from firms for perceived unfairness.

[110] Hebei Legal News (河北法制网), August 26 2014: Wei county cracks down on 78 heavily polluting small recycling companies. (魏县取缔七十八家再生重污染小企业). See http://news.hbfzb.com/2014/benwangyuanchuang_0826/62953.html. Accessed April 2 2017.

4. Conclusion

In this chapter, we see that local officials have conceded to Beijing's demands to reduce pollution overnight by deploying range of discretionary, extra-legal tactics against polluters: they disproportionately target small firms, reserving the most irreversible sanctions for these powerless companies; they also disproportionately target non state-owned companies, or companies that don't offer workers social insurance. And in applying these extra-legal measures, local officials evade responsibility for their past bureaucratic misdeeds, forcing polluting firms to shoulder the blame for China's urgent environmental problems.

None of these tactics represent the most efficient way to deal with present or future pollution. First, the closure of hundreds of small firms does not always produce the intended effect on pollution levels, because their contribution to overall pollution is so small in the first place. We see this in Shijiazhuang, where clever plans to "close the small and advance the big" polluters ultimately did not solve local pollution problems; eventually, even the big firms had to be closed to achieve a noticeable impact on air quality. In previous chapters, regulators also complained that small firms—the main targets of blunt force regulation—are the hardest to police in the long-term, because they can easily set up shop or begin again from scratch. In Qingyuan, for example, the government had to go through three phases of small firm closures before they could completely destroy the recycling industry in 2015. Even in the aftermath of the closures, local officials had to take extra measures to prevent new factories from springing up: over a period of several months, the county government deployed six roaming inspections teams of 150 officers to prevent raw materials from being secretly transported into the area[111]. All of these efforts to police and destroy small firms end up draining local resources.

The closure of large firms in Shijiazhuang does seem to have been more enduring. After all, it would be difficult to rebuild a large company when its infrastructure and equipment has been destroyed by explosives. The closure of large firms can therefore ensure more lasting reductions in pollution levels. However, the data suggests that these large firms are rarely targeted, and even when they are targeted, the least efficient class of these firms (the state-owned enterprises), are more likely to be spared. This only exacerbates the long-term economic costs of pollution reduction. And yet local officials are willing to accept these costs because they anticipate an influx of revenue from cleaner, modern industries, or because they will shortly be transferred to another post, where the fate of these counties is no longer their concern.

In sum, local officials do not prioritize pollution reduction or economic efficiency when deciding how to pursue blunt force regulation. Instead, they apply the most politically expedient solutions which focus, above all, on minimizing pushback from local companies and from unemployed workers. This approach is hardly surprising. Given the cross pressures on local officials to fulfill Beijing's demands while containing local discontent, and given local officials tendency to be treated as scapegoats for systemic problems (O'Brien and Li 2006, 36; Stern 2010, 89), it is only rational that they would do their utmost to limit the political risks of pollution reduction. But what results is

[111] The Southern Daily (南方日报), July 26 2016

a highly unjust process, where individual business that contribute the least to overall pollution levels are the first to be punished, and where individual workers with the least protections are the first to be sacrificed.

Chapter 5

Conclusion: Blunt Force Regulation—A Model for Weak States?

Blunt force regulation is a striking phenomenon. For those who have seen it on the ground, the sheer scale of demolition is striking. Anyone who has witnessed the roadsides lined with empty factories, the factory owners standing amidst their dead assets, or the abrupt suspension of smokestacks, would have a hard time doubting China's commitment to its "war on pollution".

Blunt force regulation is also striking on a purely theoretical basis, because it encapsulates the paradoxes of authoritarian rule. First, it shows us what can happen when a strong, experienced authoritarian state sets its mind (and resources) to the task of fixing pollution problems. And yet, it also reveals a central weakness of the authoritarian state: its fear of popular participation, and its reluctance to cede power to institutions that could strengthen governance. If the Chinese leadership had not been so wary of leveraging public protests to improve its regulatory efforts, nor so committed to obstructing courts from acting independently, it could have applied the more incremental, positive-sum regulatory strategies that weak states are using elsewhere. In other words, the ruthless implementation of blunt force measures actually stems from a deep insecurity of authoritarian rulers.

Second, in the implementation of blunt force regulation, we see how even the strongest authoritarian leaders must exercise a combination of command and deference in their relations with local bureaucrats. Over decades, China has developed a bureaucracy where hierarchal control is sufficiently institutionalized that Beijing can, when it choose, have enormous control over a bureaucrat's fate. This is why, as we see in preceding chapters, Beijing was able to force local officials to shut down entire local industries in the space of a few months. And yet, Beijing was only driven to these lengths because the everyday operations of the bureaucracy are so porous, that it could not compel its cadres to enforce pollution laws on a day-to-day basis. Moreover, the porousness of the bureaucracy meant that if Beijing wants to preserve the future loyalty of its cadres, they would have to appease local officials, even while ordering them to close down polluting firms. In chapter three, for example, we see that as part of its blunt force strategy, Beijing had to condone inefficient implementation strategies that favored protecting local business interests over maximizing pollution reduction. In this way, blunt force regulation demonstrates the extraordinary reach, and inescapable limits, of governing in strong, authoritarian states.

In this chapter, I elaborate on these authoritarian underpinnings of blunt force regulation, and examine the long-term costs of the compromises the regime had to make to push through blunt force regulation. Specifically, I address what the state's decision to engage in blunt force regulation implies for 1) China's developmental trajectory 2) regulating in weak institutional environments and 3) solving complex governance problems in authoritarian states.

1. The End of 'Growth at all Costs'?

From the outset, one of the most puzzling aspects of blunt force regulation was the willingness of local authorities to sacrifice their economies in the name of pollution control. In these chapters, I demonstrate that what may look like a costly sacrifice from the outside was, in fact, one of the most feasible and expedient means for local officials to deal with escalating pollution problems: a combination of discretionary political powers and practiced repression allowed local officials to enforce extreme changes in firms' polluting behavior at minimal cost to themselves. At the same time, Beijing's financial support for these measures helped to insulate local officials from the longer-term consequences of their actions.

However, beyond explaining local officials' actions in terms of their rational self-interest, these chapters also suggest that China may be moving beyond the era of 'dirty growth'. After decades wedded to a 'growth at all costs' model, Chinese authorities may be coming round to an economic model that prioritizes cleaner, greener, high-tech growth, even if it requires some painful economic restructuring.

Readers acquainted with the politics of bureaucratic promotion and corruption in China might still ask why a rational, driven local official would ever forsake growth for the environment. But perhaps there is a degree of irrationality driving the calculations of these local officials. Evidently, officials who resolutely destroy pillar industries in the hope that their counties and cities might transform into a "rural tourism hub"[112], or a "center for ceramics research and development"[113] are not seeking only to fill public (or private) coffers. Instead, there seems to be an aspirational element to their actions, a desire to become part of an elite club of clean, green cities with innovative industries and skilled, contented workers (van der Kamp, Lorentzen and Mattingly 2017). More and more, we hear examples of former industrial hubs planning to transform—somewhat improbably—into major tourism destinations[114]. Similar aspirational thinking can be seen in the emergence of China's 'ghost cities'—vast urban developments built in anticipation of a migration and developmental boom that never occurs (Looney and Rithmire 2016)

Of course, some officials might still be wedded to the easy prosperity of dirty development. As one man declared to me while surrounded by pools of factory effluent:

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[112] See the Luquan county case described in Chapter three. Details can be found in: Economic Daily (经济日报), December 17 2014: Farewell to the "Cement Corridor" (告别"水泥走廊). See http://www.ce.cn/xwzx/gnsz/gdxw/201412/17/t20141217_4138023.shtml. Accessed April 16 2017

[113] See the Foshan city case described in Chapter one. Details can be found in: Xinhua net (新华网), May 7th 2008: Can Closures Bring About Economic Transformation? (关停能否带来转型? 佛山整治传统陶瓷业引发震撼) http://news.xinhuanet.com/energy/2008-05/07/content_8121660.htm, accessed May 5th 2017

[114] See, for example: South China Morning Post, August 22 2016. Chinese city lauded as model of economic transformation struggling as nation's economy cools. http://www.scmp.com/news/china/economy/article/2007253/chinese-city-lauded-model-economic-transformation-struggles, accessed August 22 2016;
The Economist, June 18 2016. You're stir-fried squid. http://www.economist.com/news/china/21700687-youre-fired-chinese-officials-meet-apprentice-youre-stir-fried-squid, accessed June 19 2016.

"I've been eating and sleeping amidst this waste for thirty years now! Do you really think I care that much about pollution?" (Interview X7a190416a). However, others might tire of endless grey skies and smoggy air and decide, irrespective of the cost, to undertake a complete economic turnaround that could set their city on a 'clean growth' trajectory.

But can a clean growth trajectory be built from the ashes of demolished industry? Early on, in 2008, in the initial stages of China's blunt force pollution reduction strategy, industry insiders argued that it would be far easier to move to a cleaner, more advanced stage of development by investing in and upgrading existing companies[115]. This leads to core theoretical puzzle of this project: why did China choose such a zero sum approach to pollution control? Specifically, why would the state seek to clean up the air through the (sometimes irreversible) destruction of its industries?

2. Effective Enforcement Amidst Weak State Capacity?

In these chapters, I show that China's decision to control pollution through blunt force interventions was neither ideal nor just. It was a sub-optimal solution, arising from China's combination of weak state capacity, but strong control over markets and labor. Nevertheless, my analysis demonstrates that in terms of reducing pollution, this sub-optimal solution was successful. The surprising effectiveness of China's of blunt force approach has wider theoretical implications. It suggests that even in countries with corrupt, dysfunctional bureaucracies, regulatory problems can be addressed on vast scale and over a short period of time.

Political scientists have long argued that persistent developmental failures—including regulatory crises—can be attributed to dysfunctional bureaucracies. Drawing on Weber's seminal theories, scholars argue that only bureaucrats who are recruited and rewarded on merit will refrain from using their powers towards personal, corrupt aims (Evans and Rauch 1999). Moreover, only bureaucrats who are offered stable, predictable career paths will apply their technical expertise towards long-term developmental goals (Evans, 1995, Woo-Cummings 1999). Thus, one thread that unites scholarly prescriptions for well-regulated markets (Bates 1981), sustained growth (Skocpol 1985), improved public good provisions (Herbst 2000), and improved environmental governance (Economy 2014) is the need to foster disciplined, rational, and meritocratic bureaucracies.

It is clear that few developing countries can deliver this bureaucratic ideal. Political leaders lack the economic resources to reward bureaucrats, the political control to appoint positions based exclusively on merit, and the institutional stability to guarantee predictable career paths. Even China, a comparatively 'strong state' that was able to restructure its entire economy in the space of decades has never managed to control its bureaucracy. In fact, bureaucrats in China are so poorly monitored and so inadequately remunerated that corruption has run rampant, necessitating a multi-year anti-corruption campaign under Xi Jinping. Moreover, the regime's top-down efforts to control bureaucrats are easily thwarted by factional allegiances, which are used to shield bureaucrats from retribution for their wrongs (Hillman 2010, Shih, Adolph and Liu 2012,

[115] Xinhua, May 7 2008. Can factory closures bring about industrial transformation? (关停能否带来转型？佛山整治传统陶瓷业引发震撼). See http://news.xinhuanet.com/energy/2008-05/07/content_8121660.htm, accessed May 5 2017.

Fewsmith 2011)

What is less clear is whether these ideal-type bureaucracies are truly necessary for overcoming persistent developmental problems. For instance, despite approximating none of the bureaucratic ideals, China was still able to effectively implement a solution to one of the most pressing problems of the developing world—that of environmental pollution. Previous studies have shown other cases where effective labor or environmental regulations were implemented in spite of highly dysfunctional and corrupt bureaucracies. In all these cases, the participation of non-state actors—including mobilized communities, unions, informal networks, and NGOs—contributed to effective enforcement; politicians were able to leverage the organizational and political resources of these actors to create the enforcement capacity that bureaucrats could not (or would not) build amongst themselves (Amengual 2016, Chng 2012, Johnson 2016). But this networked governance approach places a heavy expectation on developing countries. Few developing countries have produced civil society groups with the technical expertise or organizational resources to challenge poor regulation (Eskeland 1992, Hochstetler 2013, 270). Sometimes, the only civil society groups available are international NGOs (Braithwaite 2006, 890-891), and they are unlikely to produce the sustained political pressure of indigenous groups.

The Chinese case adds one key distinction to existing findings. It shows that neither rational bureaucracies, nor public participation are necessary to implement solutions to severe regulatory problems. In fact, it was authoritarian institutions that contributed to the success of the regime's pollution reduction measures. This contradicts a prevailing view that China's authoritarian system is one of the central obstacles to bureaucratic control, and therefore effective environmental governance.

3. The Authoritarian Underpinnings of Blunt Force Regulation

Existing theories suggest that, compared to democracies, authoritarian states have a much harder time implementing policies (such as environmental policies) that requires a high degree of decentralized administration (Faguet 2014, Weingast 2014). Authoritarian states must choose between centralizing political authority to prevent leadership challenges, and strengthening public accountability institutions to keep bureaucrats compliant. Often, authoritarian states will favor the former over the latter, leading to weak bureaucratic oversight. For instance, while China initially experimented with strengthening judicial institutions, in recent years, it has retreated from legal reforms (Liebman 2014) and recentralized fiscal and administrative control (Huang 2008, Ong 2012, Kennedy 2013) to consolidate central authority. This means that the regime must now rely on weak, internal mechanism to control its bureaucrats. These include short bureaucratic term limits to reduce opportunities for corruption, and a system of 'countable' implementation targets to measure bureaucratic performance (Edin 2003). Bureaucrats do respond to these targets, because promotions are clearly connected to performance on targets (Landry 2008, Naughton 2016, 408-409) However, the combination of short term limits and an emphasis on countable targets has encouraged bureaucrats to prioritize short term, visible, goals (such as economic growth) over policies that only produce visible outcomes in the long term (such as pollution control) (O'Brien and Li 1999, Kostka and Eaton, 2014).

Bureaucrats discounting policies with long-term payoffs is common in the developing world. Without strong internal incentives in the form of promotions, career satisfaction or social prestige, bureaucrats will inevitably de-prioritize the policies that produce little immediate benefit to themselves (Weber, Economy and Society, pp.973-979). However, in China, the combination of semi-rationalized but weakly monitored bureaucracy has led to an especially stark tradeoff between growth and social policies. If promotions, bonuses *and* personal rent extraction all rest on a bureaucrat's ability to deliver high growth rates, why would any career-oriented, self-serving bureaucrat invest in policies that undermine growth? The starkness of this tradeoff has led scholars to conclude that as China moves beyond the era of growth-driven development, its semi-rationalized bureaucracy will be incapable of responding to non-economic policy issues such as social welfare, or the environment (Fewsmith and Gao 2014, 173-174; Economy 2014, 193; Naughton 2017). In effect, this is the price that China's pays for choosing strong, authoritarian institutions over systematic political accountability.

However, these theories assume that pollution problems can only be resolved or mitigated through sustained attention by disciplined, committed local bureaucrats. This is why they argue that systemic political accountability is so important for resolving China's social and environmental problems. Yet China has managed to tackle its pollution problem without reforming its bureaucracy. Instead, it showed us that extreme, one-off interventions could overcome bureaucratic intransigence to deliver lasting improvements in pollution levels. The success of blunt force pollution regulation in China therefore highlights an alternative approach to regulation that is not so easily undermined by weak bureaucratic discipline or inadequate political accountability.

Moreover, China's blunt force strategy succeeded through a key feature of its authoritarian regime, namely, the power of central authorities to exert direct pressure on local bureaucrats. The regime's decision to concentrate power in strong, central institutions means that its bureaucrats, while only weakly compliant on everyday basis, are especially sensitive to direct scrutiny from the center, and especially responsive to sudden "hold to account" orders (Edin 2003, Mei and Pearson 2014). In this dissertation, I show how the regime uses this concentrated central authority to their advantage when tackling governance problems. For example, through sudden, direct demands for pollution reduction, Beijing was able to displace the counter-incentives that normally encourage bureaucrats to de-prioritize pollution reduction, or allow firms to evade pollution regulation. In effect, it was the state's supreme authoritarian control that forced bureaucrats and polluters to respect environmental targets over growth. This suggests that in contrast to the democratic, participatory tools that have been used to strengthen environmental regulation elsewhere in the developing world, it is authoritarian tools in China that are enabling pollution problems to be addressed.

4. Blunt Force Regulation and Authoritarian Resilience

The importance of authoritarian tools in China's successful pollution reduction measures has implications for debate on regime resilience in China. China's weak bureaucratic governance is often considered the Achilles Heel of its authoritarian regime: widespread bureaucratic corruption dissuades investment, undermines growth and contributes to high levels of distrust in the regime (Bernstein and Lu 2003, Tsai 2007, Huang 2008, Li 2008, Li 2011, Birney 2014) Limited bureaucratic accountability also contributes to frequent

regulatory crises—and Beijing's rapid, ruthless response, including jailing or executing bureaucrats, does little to fix the systemic causes of crises. Scholars therefore suggest that China pays too high a price for refusing to invest in the rational-legal institutions that could hold bureaucrats and their political leaders more accountable (Smith 2010, Zhou 2010, Ong 2012, Naughton 2017).

However, the success of China's blunt force approach to its pollution problems—arguably one of China's greatest regulatory crises—suggests that governance mechanisms in China are surprisingly flexible and resilient, despite the dysfunctions of its bureaucracy. The failure of conventional regulatory institutions did not prevent the regime from finding a solution to its pollution problems; instead, the state cycled through a range of non-traditional tactics, ranging from restrained to forceful, until it discovered of set of tactics that could effectively reduce emissions. Moreover, the state was able to use forceful, top-down policy interventions to ensure this success was replicated nationwide. In fact, a group of scholars, led by Perry and Heilmann (2011) argue this practice of experimentation followed by nationwide implementation is a hallmark of China's authoritarian governance approach, and a sign of its adaptability. They propose that the weakness of China's bureaucracies actually contributes to the regime's flexibility and innovation because it allows for a high degree of local discretion. Discretion may enable corruption and everyday policy shirking, but it also allows bureaucrats to experiment with new tactics and policies that can accommodate the regime's limited institutional and fiscal resources (Perry and Heilmann 2011, 13-14). In other words, if not for the weakness of China's bureaucracies, we might have never seen the emergence of unusual but effective blunt force pollution control tactics.

Perry and Heilmann further argue that the regime's limited political accountability contributes its resilience. While bureaucrats are more likely to implement policies when bound by legal-contractual obligations, or when observed by independent judicial institutions, these rules and institutions could also be turned against a regime. As O'Brien and Li (2006) show, the more a regime uses the law to legitimate its rule, the more easily citizens can use these laws and institutions to challenge discretionary authority and expose abuses of power. In contrast, by refraining from clearly stated rules or independent institutional checks, regime leaders increase their room to maneuver while limiting the channels for pushback (Perry and Heilmann 2011, 12-13). This mode of governance sacrifices greater control of the bureaucracy for greater political discretion.

In blunt force regulation, we see how this sacrifice may prove worthwhile: the state was forced to take drastic action against polluters because it was the only way to guarantee that bureaucrats would enforce pollution reduction measures. However, despite arbitrarily closing down firms or unjustly targeting weaker groups, neither the cadres who implemented the policies, nor the central officials who directed them, were held responsible for the unjust, illegal methods used. In sum, it was the authoritarian characteristics of high local discretion and limited political accountability that contributed to the success of China's blunt force solution to pollution problems. But does blunt force regulation truly exemplify an adaptive and resilient mode of authoritarian governance?

5. The Limits of Blunt Force Regulation

Blunt force regulation may have demonstrated the adaptability of the Chinese state, but it has not demonstrated its resilience. In fact, the aftermath of blunt force regulation

suggests that heavy-handed solutions to systemic governance problems can lead to further crises, contributing to greater instability. In this case, for example, despite China's success in reducing overall emissions through blunt force regulation, we see that there is still widespread distrust in the regulatory system, and a rising tide of environmental activism (Wang 2016, 233-235; Wang and Jin 2007; van Rooij et al. 2016). Why have citizens not been appeased by the state's drastic attempts to reduce pollution?

I propose that citizens remain skeptical because blunt force regulation fails to deal with the deeper problem of regulatory capture. Unlike the participatory methods used to keep bureaucrats in accountable in other developing countries, blunt force regulation simply sidesteps the problem of corrupt bureaucrats; high-profile, one-off campaigns may reduce pollution, but they do not prevent cadres from reverting to their old habits of shielding firms from everyday environmental regulation. And it is these old habits, the shirking of policy implementation, and the protection of non-compliant firms, that give rise to China's frequent regulatory crises. Time and time again, when chemical spills poison rivers[116], schools collapse in earthquakes[117], or chemical explosions rip apart city districts[118], we find it is because bureaucrats have turned a blind eye to ongoing regulatory violations.

In China, the frequency of regulatory crises is eroding trust in the Central government. Consider, for example, the rising number of protests against waste incineration plants in China. Whenever the government decides to build a new plant, citizens from Guangzhou to Zhengzhou, Beijing to Shenzhen, will adamantly oppose constructions with demonstrations and protests[119]. These waste incinerations plants are part of a new, nationwide policy to simultaneously fix China's energy shortages and save overflowing landfills by burning waste (in as clean a manner as possible) to generate electricity. The state has therefore invested vast amounts of money and technology into building these state-of-the-art plants, even inviting supervision from Danish and German companies[120]. And yet, despite repeat official assurances on the safety of these plants, China's middle class continue to be deeply suspicious, convinced that waste incineration will poison a city's air and water.

It seems strange that China's urban middle class would fixate on these high-tech, well-funded waste incineration plants when the air, water, and soil of these cities is already being poisoned by unregulated, outdated industrial factories. However, given citizens' general distrust of the government's ability to regulate pollution and enforce

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[116] See New York Times, November 26 2005. Spill in China brings danger, and cover-up. See http://www.nytimes.com/2005/11/26/world/asia/spill-in-china-brings-danger-and-coverup.html?_r=0, accessed Jun 17 2017.

[117] See New York Times, September 4 2008. China Admits Building Flaws in Quake. http://www.nytimes.com/2008/09/05/world/asia/05china.html, accessed March 20 2017.

[118] See South China Morning Post, August 12 2016. Has China Failed to Learn the Lessons of Deadly Tianjin Explosions? http://www.scmp.com/week-asia/politics/article/2002987/has-china-failed-learn-lessons-deadly-tianjin-explosions, Accessed August 13 2016.

[119] See Michael Standaert, April 20 2017. As China Pushes Waste-to-Energy Incinerators, Protests Are Mounting. http://e360.yale.edu/features/as-china-pushes-waste-to-energy-incinerators-protests-are-mounting, accessed June 15 2017.

[120] Interview X1a160516; China Dialogue, January 26 2012, China Waste: The Burning Issue. https://www.chinadialogue.net/article/show/single/en/4739-Chinese-waste-the-burning-issue, accessed March 24 2017.

safety checks, it understandable that they would respond to repeat government assurances with suspicion, and seek to prevent any new projects where possible. This state of affairs has proven incredibly frustrating to policy makers, who have expended vast amounts of political and scientific resources to try and win citizen support for this policy—with little success. As one MEP official grumbled:

> The problem is, ordinary people only react to pollution that they can see, smell or hear... we made this big effort to close down small, polluting factories, but now citizens want us to close down the big factories because they seem "more polluting". I have seen citizens protest when they see a factory emitting a white-colored water, and then when regulators conduct tests it turns out this water is actually clean! But because citizens lack trust in the government, they don't believe us when we show that the water is clean or that these big factories are compliant.

Evidently, blunt force regulation has done little to appease overall citizen distrust of regulators. Moreover, this kind of deep distrust makes it very hard for the state to appease protestors. It is telling that construction on several of waste incineration projects had to be postponed following public protests[121] (Johnson 2016). But frequent concessions to disgruntled, distrustful citizens are hardly the mark of a 'resilient', stable authoritarian state.

Blunt force regulation has also eroded firms' trust in the government. The constant uncertainty over when governments will issue 'stop production' orders or seize factory assets has contributed to a highly unstable business environment. Firms are reluctant to make new investments or expand their businesses if they might suddenly be closed down or have their assets seized. In fact, a number of companies I interviewed claimed that in the face of this constant uncertainty, they were considering leaving China altogether. Labor costs and startup costs might be higher elsewhere, but at least they could expect less interference from the government (Interviews X7a190416b, X7a190416c, X10080416, X4050316). The constant uncertainty that these business face challenges established theories that property rights in China are stable enough to encourage investment, despite the weak rule of law and an all powerful central leadership (Montinola, Qian and Weingast 1995, Oi 1999).

Moreover, the indiscriminate nature of blunt force regulation sends a counterproductive message to polluting firms. If firms—compliant or not—are sanctioned for being 'too polluting' or for falling into a targeted category, then those who have seen and survived the cull of blunt force regulation will have very little incentive to comply with pollution standards in the future. Why bother investing in pollution abatement infrastructure if the government will still punish you for being a 'hopeless' small firm or a member of an 'outdated' heavy industry?

This potential backlash became apparent during my interviews with factory owners in the southern Chinese county where blunt force regulation had decimated a 40-

[121] Specific cases include Hangzhou city in 2014 (see Financial Times, May 11 2014: China waste incineration protest turns violent. See https://www.ft.com/content/7035866e-d8ca-11e3-a1aa-00144feabdc0 (accessed August 3 2016)) and Hunan province in 2016. (see Reuters, June 27 2016: China shuts down waste-burning plant project over protests. See http://www.reuters.com/article/us-china-protests-idUSKCN0ZD0HU (accessed August 3 2016))

year-old waste recycling industry. Months after the crackdown, local officials were still urging all remaining small factories to move into the 'cleaner' industrial parks. Some 400 factory owners were still stoically resisting government orders[122], choosing instead to take their chances against a further crackdown. As one surviving factory owner retorted "why should I move into that industrial park? Why should I pay higher rent to go to that place? Even if I do move into that industrial park, will that really make me clean enough? I don't trust these guys [the government]!" (Interview X7a190416a). His concerns were justified. When I later interviewed the owner of one of these designated industrial parks, he revealed that he, not regulators, was responsible for monitoring and testing factory emissions and delivering reports to the local environmental bureau. To cut costs on testing, he would only test a small sample of firms, meaning that a majority of firms in this park could operate with minimal surveillance. Moreover, while the government had urged factories to move into these industrial parks to take advantage of new pollution abatement infrastructure, only the most basic infrastructure was available. Yet firms were not penalised for lacking the correct infrastructure in their new abode (Interview X7b200416). Clearly, in corralling factories into an industrial park, local officials were less concerned with streamlining future monitoring than with making it harder for polluting firms to operate.

Evidently, the Chinese government must find a more lasting solution to its regulatory problems. If the state wants to appease distrustful citizens, reassure investors, and encourage compliance, it will eventually have to invest in conventional regulatory institutions and address the systemic issues, such as regulatory capture. The problem is, China's blunt force solution to pollution problems may be exacerbating the weakness of its regulatory institutions. This is because blunt force regulation violates all the established norms of interaction—whether informal or formal—between regulators and firms, making it harder for regulators build up trust with firms. It also sidelines regulators, making them appear ineffectual and irrelevant, which undermines the authority of China's notoriously weak environmental protection agencies.

The state's disregard for its regulators is problematic because China's regulatory institutions, although adopted from the west, could represent the best means to improve governance and prevent regulatory crises. Conventional regulatory models are often based on decentralized administration, where local regulators are responsible for the day-to-day monitoring of local firms. Decentralized administration has two key governance advantages: first, regulators are far more aware of what is going on locally, and therefore more likely to identify and prevent regulatory crises from occurring Second local regulators are also more accountable, because they are more visible and easily reachable to local constituents (Bardhan and Mookherjee 2006, Faguet 2012, Faguet 2014, Weingast 2014). Thus, by actively undermining the authority of conventional regulatory institutions, China's blunt force pollution control measures sabotages one of the few means available for the state to improve citizens' trust in regulators, and encourage firms' respect for regulation. In effect, blunt force regulation sacrifices the possibility of improved governance for immediate solutions to pollution problems.

[122] The Southern Daily (南方日报), July 26 2016: The transformation of a 40 year old e-waste industry in Qingyuan, Guangzhou. (广东清远 40 年电子拆解业转型 垃圾焚烧污染重). See http://www.chinanews.com/sh/2016/07-26/7951598.shtml. Accessed July 28 2016.

6. Clean Air at Too High a Cost?

China's preference for immediate solutions reflects a pattern of "pervasive short-termism" we see emerging in China's response to its governance problems (Tsai and Naughton 2015, 28). The state plucks out an available, immediate solution that undermines the steps being taken to build up more lasting, effective institutions. In the sphere of market regulation, for example, the state often turns to old management bodies (such as former economic ministries) to control firms when independent but weak regulators have failed. While this might, for example, force China's financial institutions or airline industries to meet necessary global standards (Pearson 2015, Naughton and Tsai 2015), it also prevents regulatory bodies from ever building up the authority to control these sectors.

China also exhibits a short-termism in its approach to the social and economic costs of blunt force regulation. The state succeeds in its forceful pollution reduction strategy by intentionally targeting the weakest and most vulnerable firms and workers. This reflects a wider pattern of institutional favoritism towards large, state-owned enterprises and their workers. Normative problems aside, this type of institutionalized favoritism contributes to weaker innovation and productivity. The Chinese government recognizes these problems, leading to frequent assertions that they will strengthen regulation to improve market competition, especially amongst private firms and SMEs (Pearson 2005, Naughton and Tsai 2015). Yet this dissertation suggests that, in the sphere of environmental regulation at least, the Chinese state is more likely to stifle competition and sacrifice innovation in order to protect the most powerful companies.

If China's increasing tendency to top-down, state-centered solutions do indeed reflect a 'short-termism', its governance style begins to seem less experimental, less adaptive, and more inflexible. Perhaps the state can evade open contention or implement its policy priorities when necessary, but when it seeks to resolve more complex or systemic problems, it is often defeated by the heavy-handed nature of its own 'adaptability'. In this way, China may eventually find that with blunt force regulation, it has paid too high a cost for clean air.

Bibliography

Abers, R. N., & Keck, M. E. (2009). Mobilizing the state: The erratic partner in Brazil's participatory water policy. *Politics & Society*, *37*(2), 289-314.

Amengual, M. (2014). Pathways to enforcement: Labor inspectors leveraging linkages with society in Argentina. *Industrial & Labor Relations Review*, *67*(1), 3-33.

Amengual, M. (2015). *Politicized enforcement in Argentina: Labor and environmental regulation*. Cambridge University Press.Bates 1981

Ang, Y. Y., & Jia, N. (2014). Perverse complementarity: Political connections and the use of courts among private firms in China. *The Journal of Politics*, *76*(2), 318-332.

Ayres I, Braithwaite J (1992) *Responsive Regulation: Transcending the Deregulation Debate*. Oxford University Press, New York.

Badran A (2013) "Understanding the Egyptian Regulatory State: Independent Regulators in Theory and Practice". In Dubash, N. K., & Morgan, B. (Eds.). *The rise of the regulatory state of the south: Infrastructure and development in emerging economies*. OUP Oxford, 2013

Bardhan, P., & Mookherjee, D. (2006). Decentralisation and accountability in infrastructure delivery in developing countries. *The Economic Journal*, *116*(508), 101-127.

Bates, R. (1981). Markets and states in tropical Africa. Berkeley. *Cal.: University of California Press*.

Bernstein, T. P., & Lü, X. (2003). *Taxation without representation in contemporary rural China* (Vol. 37). Cambridge University Press.

Biddulph, S., Cooney, S., & Zhu, Y. (2012). Rule of law with Chinese characteristics: The role of campaigns in lawmaking. *Law & Policy*, *34*(4), 373-401.

Birney, M. (2014). Decentralization and veiled corruption under China's "rule of mandates". *World Development*, *53*, 55-67.

Blackman, A. (2000). Informal sector pollution control: what policy options do we have?. *World Development*, *28*(12), 2067-2082.

Blackman, A., & Harrington, W. (2000). The use of economic incentives in developing countries: Lessons from international experience with industrial air pollution. *The Journal of Environment & Development*, *9*(1), 5-44.

Braithwaite, J. (2006). Responsive regulation and developing economies. *World Development*, *34*(5), 884-898.

Cai, Yongshun. (2010). Collective Resistance in China: Why Popular Protests Succeed or

Fail. Stanford: Stanford University Press

Cao, X., Kostka, G., & Xu, X. (2016). Environmental Political Business Cycles The Case of PM2. 5 Air Pollution in Chinese Prefectures. *Unpublished Working Paper, Pennsylvania State University*, *8*, 26. Carrigan, C., & Coglianese, C. (2011). The politics of regulation: From new institutionalism to new governance. *Annual Review of Political Science*, *14*, 107-129.

Carrigan, C., & Coglianese, C. (2011). The politics of regulation: From new institutionalism to new governance. *Annual Review of Political Science*, *14*, 107-129.

Chaudhry, K. A. (1993). The myths of the market and the common history of late developers. *Politics & Society*, *21*(3), 245-274.

Chen, X. (2009). The Power of "Troublemaking": Protest Tactics and Their Efficacy in China. *Comparative Politics*, *41*(4), 451-471.

Chng, N. R. 2013 (2013) "Regulatory Mobilization and Service Delivery at the Edge of the Regulatory State". In Dubash, N. K., & Morgan, B. (Eds.). *The rise of the regulatory state of the south: Infrastructure and development in emerging economies*. OUP Oxford, 2013.

Cole, D. H., & Grossman, P. Z. (1999). When is command-and-control efficient-institutions, technology, and the comparative efficiency of alternative regulatory regimes for environmental protection. *Wis. L. Rev.*, 887.

De Soto, Hernando. *The mystery of capital: Why capitalism triumphs in the West and fails everywhere else*. Basic books, 2000.Deng and O'Brien 2013

Deng, G., & Kennedy, S. (2010). Big business and industry association lobbying in China: The paradox of contrasting styles. *The China Journal*, (63), 101-125.

Deng, Y., & O'Brien, K. J. (2013). Relational repression in China: using social ties to demobilize protesters. *The China Quarterly*, *215*, 533-552.

Dubash, N. K., & Morgan, B. (2012). Understanding the Rise of the Regulatory State of the South. *Regulation & Governance*, *6*(3), 261-281.

Dubash, N. K., & Morgan, B. (Eds.). (2013). *The rise of the regulatory state of the south: Infrastructure and development in emerging economies*. OUP Oxford.

Eaton, S., & Kostka, G. (2014). Authoritarian environmentalism undermined? Local leaders' time horizons and environmental policy implementation in China. *The China Quarterly*, *218*, 359-380.

Ebenstein, A., Fan, M., Greenstone, M., He, G., Yin, P., & Zhou, M. (2015). Growth, pollution, and life expectancy: China from 1991–2012. *The American Economic Review*, *105*(5), 226-231.

Economy, E. (2014). Environmental governance in China: State control to crisis management. *Daedalus*, *143*(2), 184-197.

Edin, M. (2003). State capacity and local agent control in China: CCP cadre management from a township perspective. *The China Quarterly*, *173*, 35-52.

Eskeland, G. (1992). Attacking air pollution in Mexico City. *Finance and Development*, *29*(4), 28.Evans and Rauch 1999

Evans, P. B. (1995). *Embedded autonomy: States and industrial transformation*. Princeton University Press.

Evans, P. B., Rueschemeyer, D., & Skocpol, T. (1985). *Bringing the state back in*. Cambridge University Press.

Faguet, J. P. (2012). *Decentralization and popular democracy: Governance from below in Bolivia*. University of Michigan Press.

Faguet, J. P. (2014). Decentralization and governance. *World Development*, *53*, 2-13.

Feswmith, J. (2011). "The elusive search for effective sub-country governance," in Heilmann, S., & Perry, E. J. (Eds.). (2011). *Mao's invisible hand: the political foundations of adaptive governance in China* (p. 320). Cambridge, MA: Harvard University Asia Center.

Fewsmith, J., & Gao, X. (2014). Local Governance in China: Incentives & Tensions. *Daedalus*, *143*(2), 170-183.

Fioletov, V. E., McLinden, C. A., Krotkov, N., Moran, M. D., & Yang, K. (2011). Estimation of SO2 emissions using OMI retrievals. *Geophysical Research Letters*, *38*(21).

Fioletov, V. E., McLinden, C. A., Krotkov, N., & Li, C. (2015). Lifetimes and emissions of SO2 from point sources estimated from OMI. *Geophysical Research Letters*, *42*(6), 1969-1976.

Gandhi, J., & Przeworski, A. (2006). Cooperation, cooptation, and rebellion under dictatorships. *Economics & Politics*, *18*(1), 1-26.

Geddes, B. (1994). *Politician's dilemma: building state capacity in Latin America* (No. 25). Univ of California Press.

Ghanem, Dalia, and Junjie Zhang (2014). "'Effortless Perfection:'Do Chinese cities manipulate air pollution data?." *Journal of Environmental Economics and Management* 68.2 203-225.

Haber, S. (2006). Authoritarian government. In *The Oxford handbook of political economy*.

Han, D., Currell, M. J., & Cao, G. (2016). Deep challenges for China's war on water pollution. *Environmental Pollution*, *218*, 1222-1233.

He Canfei and Fenghua Pan. 2013. “Decentralization and the Environment: Industrial Air Pollution in Chinese Cities,” in Man, Joyce ed. 2013. China’s Environmental Policy and Urban Development. Cambridge, Massachusetts, Lincoln Institute of Land Policy: 41-58

Heilmann, S., & Perry, E. J. (Eds.). (2011). *Mao's invisible hand: the political foundations of adaptive governance in China* (p. 320). Cambridge, MA: Harvard University Asia Center.

Helmke, G., & Rosenbluth, F. (2009). Regimes and the rule of law: Judicial independence in comparative perspective. *Annual Review of Political Science*, *12*, 345-366.

Herbst, J. (2000). Economic incentives, natural resources and conflict in Africa. *Journal of African Economies*, *9*(3), 270-294.

Hochstetler, Kathryn. “Civil Society and the Regulatory State of the South” in Dubash, Navroz K., and Bronwen Morgan, eds. *The rise of the regulatory state of the south: Infrastructure and development in emerging economies*. OUP Oxford, 2013.

Huang, Dongya. (2013) “How do entrepreneurs influence local government policy processes: A state-centered categorization and case analysis,” (企业家如何影响地方政策过程：基于国家中心的类型建构和案例分析), *Sociological Analysis* (社会学研究) 5 (2013): 172-196.

Huang, Y. (2008). *Capitalism with Chinese characteristics: Entrepreneurship and the state*. Cambridge University Press.

Huntington, S. P. (1991). Democracy's third wave. *Journal of democracy*, *2*(2), 12-34.

Itahashi, S., Uno, I., Yumimoto, K., Irie, H., Osada, K., Ogata, K., ... & Ohara, T. (2012). Interannual variation in the fine-mode MODIS aerosol optical depth and its relationship to the changes in sulfur dioxide emissions in China between 2000 and 2010. *Atmospheric Chemistry and Physics*, *12*(5), 2631-2640.

Jia, Ruixue. "Pollution for promotion." *Unpublished paper* (2012).

Johnson, T. R. (2016). Regulatory dynamism of environmental mobilization in urban China. *Regulation & Governance*, *10*(1), 14-28.

Kennedy, S., & Kennedy, S. (2009). *The business of lobbying in China*. Harvard University Press.

Kennedy, J. J. (2013). Finance and rural governance: centralization and local challenges. *Journal of Peasant Studies*, *40*(6), 1009-1026.

Konisky and Teodoro, (2016). When governments regulate governments. *American Journal of Political Science.* Vol. 60, No. 3, July 2016, Pp. 559–574

Kung, J., Cai, Y., & Sun, X. (2009). Rural cadres and governance in China: incentive,

institution and accountability. *The China Journal*, (62), 61-77.

Landry, P. F. (2008). Decentralized authoritarianism in China. *New York: Cambridge University Press*, *6*, 31.

Lü, X., & Landry, P. F. (2014). Show me the money: Interjurisdiction political competition and fiscal extraction in China. *American Political Science Review*, *108*(3), 706-722.

Lee, C. K. (2007). *Against the law: Labor protests in China's rustbelt and sunbelt*. Univ of California Press.

Lee, C. K. (2014). State & Social Protest. *Daedalus*, *143*(2), 124-134.

Levi-Faur, D. (2009). Regulatory capitalism and the reassertion of the public interest. *Policy and Society*, *27*(3), 181-191. *Levy and Spiller 1996*

Li, L. (2008). Political trust and petitioning in the Chinese countryside. *Comparative Politics*, *40*(2), 209-226.

Li, L. (2011). Distrust in government leaders, demand for leadership change, and preference for popular elections in rural China. *Political Behavior*, *33*(2), 291-311.

Liebman, B. L. (2014). Legal reform: China's law-stability paradox. *Daedalus*, *143*(2), 96-109.

Liu, N. N., Lo, C. W. H., Zhan, X., & Wang, W. (2015). Campaign-Style Enforcement and Regulatory Compliance. *Public Administration Review*, *75*(1), 85-95.

Lo Wing-Hung, C., & Tang, S. Y. (2006). Institutional reform, economic changes, and local environmental management in China: The case of Guangdong Province. *Environmental Politics*, *15*(02), 190-210.

Lo, C. W. H., Fryxell, G. E., van Rooij, B., Wang, W., & Li, P. H. (2012). Explaining the enforcement gap in China: Local government support and internal agency obstacles as predictors of enforcement actions in Guangzhou. *Journal of environmental management*, *111*, 227-235.

Looney, K., and Meg Rithmire. (2016) "Urbanization with Chinese Characteristics? China's Gamble for Modernization." Harvard Business School Working Paper, No. 16-083, January 2016.

Lorentzen, P. (2014). China's strategic censorship. *American Journal of Political Science*, *58*(2), 402-414.

Lorentzen, P., Landry, P., & Yasuda, J. (2013). Undermining authoritarian innovation: the power of China's industrial giants. *The Journal of Politics*, *76*(1), 182-194.

Malesky, E., & London, J. (2014). The political economy of development in China and Vietnam. *Annual Review of Political Science*, *17*, 395-419.

Mascini, Peter. "Why was the enforcement pyramid so influential? And what price was paid?." *Regulation & Governance* 7.1 (2013): 48-60.

Mei, C., & Pearson, M. M. (2014). Killing a chicken to scare the monkeys? Deterrence failure and local defiance in China. *The China Journal*, (72), 75-97.

Migdal, J. S. (2001). *State in society: Studying how states and societies transform and constitute one another*. Cambridge University Press.

Migdal, J. S., Kohli, A., & Shue, V. (Eds.). (1994). *State power and social forces: domination and transformation in the Third World*. Cambridge University Press.

Montinola, G., Qian, Y., & Weingast, B. R. (1995). Federalism, Chinese style: the political basis for economic success in China. *World politics*, *48*(1), 50-81.

Moustafa, T. (2007). *The struggle for constitutional power: law, politics, and economic development in Egypt*. Cambridge University Press.

Nathan, A. J. (2003). Authoritarian resilience. *Journal of Democracy*, *14*(1), 6-17.

Naughton, B. (2014). China's economy: complacency, crisis & the challenge of reform. *Daedalus*, *143*(2), 14-25.

Naughton, B. (2015). The transformation of the state sector : SASAC, the market economy, and the new national champions, in Naughton, B., & Tsai, K. S. (Eds.). (2015). *State capitalism, institutional adaptation, and the Chinese miracle*. Cambridge University Press.

Naughton, B. (2016). Inside and outside: The modernized hierarchy that runs China. *Journal of Comparative Economics*, *44*(2), 404-415.

Naughton, B. (2017). Is China Socialist?. *The Journal of Economic Perspectives*, *31*(1), 3-24.

Naughton, B., & Tsai, K. S. (Eds.). (2015). *State capitalism, institutional adaptation, and the Chinese miracle*. Cambridge University Press.

Nielsen, C. P., & Ho, M. S. (2013). *Clearer skies over China: Reconciling air quality, climate, and economic goals*. MIT Press.

O'Brien, K. J., & Li, L. (1999). Selective policy implementation in rural China. *Comparative Politics*, 167-186.

O'Brien, K. and Li, L. (2006) *Rightful Resistance in Rural China.* Cambridge University Press. New York

O'Brien, Kevin J. and Yanhua Deng. (2017). "Preventing Protest One Person at a Time: Psychological Coercion and Relational Repression in China," *China Review* 17:2 June 2017: 179-201

O'Rourke, D. (2004). *Community-driven regulation: Balancing development and the*

environment in Vietnam. MIT Press.

Oi, J. C. (1999). *Rural China takes off: Institutional foundations of economic reform*. Univ of California Press.

Olson, M. (1993). Dictatorship, democracy, and development. *American political science review*, *87*(3), 567-576.

Ong, L. H. (2012). Between developmental and clientelist states: Local state-business relationships in China. *Comparative Politics*, *44*(2), 191-209.

Pearson, M. (2011). "Variety Within and Without: The Political Economy of Chinese Regulation," in Kennedy, S. ed. Beyond the Middle Kingdom. Stanford: Stanford University Press

Pearson, M. (2015). State-owned business and party state regulation in China's modern political economy. In Naughton, B., & Tsai, K. S. (Eds.). (2015). *State capitalism, institutional adaptation, and the Chinese miracle*. Cambridge University Press.

Pearson, M. M. (2005). The business of governing business in China: Institutions and norms of the emerging regulatory state. *World Politics*, *57*(02), 296-322.

Peck, M. J., Levin, R. C., & Goto, A. (1987). Picking losers: public policy toward declining industries in Japan. *Journal of Japanese Studies*, *13*(1), 79-123.

Post, A. and Murillo, V. (2013). The regulatory state under stress: economic shocks and regulatory bargaining in the Argentine electricity and water sectors. In Dubash, N. K., & Morgan, B. (Eds.). (2013). *The rise of the regulatory state of the south: Infrastructure and development in emerging economies*. OUP Oxford

Rohde, R. A., & Muller, R. A. (2015). Air pollution in China: Mapping of concentrations and sources. *PloS one*, *10*(8), e0135749.

Rooij, B., Stern, R. E., & Fürst, K. (2016). The authoritarian logic of regulatory pluralism: Understanding China's new environmental actors. *Regulation & Governance*, *10*(1), 3-13.

Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press.

Seligsohn, D. n.d. "Corporate Concentration and air pollution governance in the Chinese power sector" Unpublished paper (2017)

Short, Jodi L., and Michael W. Toffel. "Making self-regulation more than merely symbolic: The critical role of the legal environment." *Administrative Science Quarterly* 55.3 (2010): 361-396.

Shih, V., Adolph, C., & Liu, M. (2012). Getting ahead in the communist party: explaining the advancement of central committee members in China. *American Political Science Review*, *106*(1), 166-187.

Slater, D. (2008). Can leviathan be democratic? Competitive elections, robust mass politics, and state infrastructural power. *Studies in Comparative International Development*, *43*(3-4), 252-272.

Smith, G. (2010). The hollow state: rural governance in China. *The China Quarterly*, *203*, 601-618.

Solinger, D. J., & Jiang, T. (2016). When Chinese central orders and promotion criteria conflict: Implementation decisions on the destitute in poor versus prosperous cities. *Modern China*, *42*(6), 571-606.

Stern, R. E. (2010). On the frontlines: making decisions in Chinese civil environmental lawsuits. *Law & policy*, *32*(1), 79-103.

Stern, R. E. (2013). *Environmental litigation in China: a study in political ambivalence*. Cambridge University Press.

Su, Y., & He, X. (2010). Street as courtroom: state accommodation of labor protest in South China. *Law & Society Review*, *44*(1), 157-184.

Thornton, P. (2007) "Crisis and Governance". In Elizabeth Perry, "Studying Chinese Politics: Farewell To Revolution?", The China Journal, No. 57 (January 2007), pp. 1–22.

Thornton, P. (2009) "Crisis and Governance: SARS and the Resilience of the Chinese Body Politic", The China Journal, No. 61: pp. 23–48.

Tilly, C. (1985). War making and state making as organized crime. *Violence: A reader*, 35-60.

Tilton, M. (1996). *Restrained trade: Cartels in Japan's basic materials industries*. Cornell University Press.

Tsai, K. S. (2007). *Capitalism without democracy: The private sector in contemporary China*. Cornell University Press.

Tsai, K.S. (2015). "The Political Economy of State Capitalism and Shadow Banking in China," HKUST IEMS Working Paper No. 2015-25

Tsai, L. L. (2007). *Accountability without democracy: Solidary groups and public goods provision in rural China*. Cambridge University Press.

Van de Walle, N. (1989). Privatization in developing countries: a review of the issues. *World Development*, *17*(5), 601-615.

van der Kamp, Denise, Peter Lorentzen and Daniel Mattingly. (2017) "Racing to the Bottom or to the Top? Decentralization, Revenue Pressures, and Governance Reform in China," *World Development.* (2017)

Van Rooij, B. (2006). Implementation of Chinese environmental law: regular enforcement and political campaigns. *Development and Change*, *37*(1), 57-74.

van Rooij, B., Stern, R. E., & Fürst, K. (2016). The authoritarian logic of regulatory pluralism: Understanding China's new environmental actors. *Regulation & Governance*, *10*(1), 3-13.

Van Rooij, B. (2006). Implementation of Chinese environmental law: regular enforcement and political campaigns. *Development and Change*, *37*(1), 57-74.

van Rooij, Benjamin. "The Politics of Law in China: Enforcement Campaigns in the Post-Mao PRC." (2009).

Viscusi, V., & Vernon, J. Harrington, 2000 Economics of Regulation and Antitrust.

Walker, K. L. M. (2008). From covert to overt: Everyday peasant politics in China and the implications for transnational agrarian movements. *Journal of Agrarian Change*, *8*(2-3), 462-488.

Wang, Hua and Yanhong Jin. 2007. "Industrial Ownership and Environmental Performance: Evidence from China," Environmental & Resource Economics (2007) 36:255–273

Wang, Y. (2015). Politically connected polluters under smog. *Business and Politics*, *17*(1), 97-123.

Wang, Xinhong. 2016. "Requests for Environmental Information Disclosure in China: an understanding from legal mobilization and citizen activism," *Journal of Contemporary China.* 25 (98): 233–247

Wang, Y. (2016a). Beyond Local Protectionism: China's State–Business Relations in the Last Two Decades. *The China Quarterly*, *226*, 319-341.

Wang, Yuhua. (2016b). "Relative Capture: Quasi-Experimental Evidence from the Chinese Judiciary." Working paper.

Ward, H., Cao, X., & Mukherjee, B. (2014). State capacity and the environmental investment gap in authoritarian states. *Comparative Political Studies*, *47*(3), 309-343.

Weber, M., Roth, G., & Wittich, C. (1978). *Economy and society: an outline of interpretive sociology. Vol. 2*. University of Calif. Press.

Weingast, B. R. (2014). Second generation fiscal federalism: Political aspects of decentralization and economic development. *World Development*, *53*, 14-25.

Wengle, S. A. (2015). *Post-Soviet Power*. Cambridge University Press.

Wong, C., and Karplus, V. (2017). "China's War on Air Pollution: Can Existing Governance Structure Support New Ambitions?". *China Quarterly*. Forthcoming

Woo-Cumings, M. (1999). *The developmental state*. Cornell University Press.

Xu, C. (2011). The fundamental institutions of China's reforms and development. *Journal of Economic Literature*, *49*(4), 1076-1151.

Yang, L. 2015. *Analysis of the impact of firm closures on the livelihood the local informal workforce* (企业关停对当地临时就业人员的生计影响研究). *Unpublished paper* (2015).

Yasuda, John. "On Regulatory Governance," *Unpublished paper* (2016).

Yeung K (2010) The Regulatory State. In: Baldwin R, Cave M, Lodge M(eds) The Oxford Handbook of Regulation, pp. 64–85. Oxford University Press, Oxford, UK.

Zhang, Li and Zheng, Xinye. 2011. "The Determinants of Intergovernmental Transfer," in Man, Joyce, Yanyun and Hong, Yu-Hung ed. 2011. China's Local Public Finance in Transition. Lincoln Institute of Land Policy: 191-202

Zheng, Siqi, et al. "Incentives for China's urban mayors to mitigate pollution externalities: The role of the central government and public environmentalism." *Regional Science and Urban Economics* 47 (2014): 61-71.

Zhou, X. (2010). The institutional logic of collusion among local governments in China. *Modern China*, *36*(1), 47-78.

Zhou, X., Lian, H., Ortolano, L., & Ye, Y. (2013). A behavioral model of "muddling through" in the Chinese bureaucracy: The case of environmental protection. *The China Journal*, (70), 120-147.

Appendix

List of Interviews

No.	Location	Administrative Level	Position	Date (d/m/y)
X10061114	Hong Kong	City	Professor	6/11/14
X10101114	Hong Kong	City	Professor	10/11/14
X1071214	Beijing	City	NGO (international) representative	7/12/14
X10120115	Hong Kong	City	Entrepreneur	12/1/15
X1150115	Beijing	City	Environmental Lawyer	15/1/15
X1190115	Beijing	National	Researcher	19/1/15
X1200115	Beijing	National	Professor	20/1/15
X1270115	Beijing	City	NGO (international) representative	27/1/15
X1090215	Beijing	City	NGO (local) representative	9/2/15
X1040315a	Beijing	City	NGO (international) representative	4/3/15
X1040315b	Beijing	City	NGO (international) representative	4/3/15
X1170315	Beijing	City	Reporter (environment)	17/3/15
X1280315	Beijing	City	Professor	28/3/15
X1300315	Beijing	City	Environmental consultant	30/3/15
X10415	Beijing	National	Professor, Government advisor	9/4/15
X1100415a	Beijing	City	Government advisor (environment)	10/4/15
X1100415b	Beijing	City	Environmental lawyer	10/4/15
X1100415c	Beijing	City	Environmental lawyer	10/4/15
X1100415d	Beijing	City	Environmental lawyer	10/4/15
X1100415e	Beijing	City	NGO (local) representative	10/4/15
X1130415a	Beijing	City	Professor	13/4/15
X1130415b	Beijing	City	Professor	13/4/15
X1070515	Beijing	National	Professor, Government advisor	7/5/15
X1090515	Beijing	City	Environmental consultant to business	9/5/15
X1110515	Beijing	City	NGO (local) representative	11/5/15
X1110515	Beijing	National	Government advisor (economic)	11/5/15
X2140515a	Shijiazhuang	Provincial	Government official	14/5/15

			(economic)	
X2140515b	Shijiazhuang	City	Government official (economic)	14/5/15
X1140515	Beijing	National	Researcher, Government advisor	14/5/15
X2140515a	Hebei	Provincial	Professor	14/5/15
X2140515b	Hebei	Provincial	Researcher	14/5/15
X3230615	Handan	City	Entrepreneur	23/6/15
X3a240615a	Handan	County	Government official (environment)	24/6/15
X3a240615b	Handan	County	Government official (administration)	24/6/15
X1010715	Beijing	National	Professor, Government advisor	1/7/15
X8110715	Suzhou	City	Environmental consultant to business	11/7/15
X1160715	Beijing	National	Professor, Government advisor	16/7/15
X2160715	Hebei	Provincial	Professor, Government advisor	16/7/15
X2110815a	Shijiazhuang	Provincial	Government official (environment)	11/8/15
X2110815b	Shijiazhuang	Provincial	Government official (environment)	11/8/15
X2110815	Shijiazhuang	City	Factory owner	11/8/15
X2230815	Hebei	Provincial	Professor	23/8/15
X1230915a	Beijing	National	Professor, Government advisor	23/9/15
X1230915b	Beijing	City	Professor	23/9/15
X5201015	Dongguan	City	Factory owner	20/10/15
X4121115	Guangdong	National	Professor	12/11/15
X1171112	Beijing	National	Government advisor (business)	17/11/15
X4101215	Guangdong	National	Professor	10/12/15
X4151215	Guangdong	National	Professor	15/12/15
X4171215	Guangdong	National	Professor	17/12/15
X4221215	Guangdong	National	Professor	22/12/15
X4090116a	Guangzhou	Provincial	Government official (environment)	9/1/16
X4090116b	Guangzhou	Provincial	Government official (land and administration)	9/1/16
X4090116c	Guangzhou	City	Government official (administration)	9/1/16
X4a140116d	Guangzhou	County	Environmental activist	14/1/16
X4a170116a	Guangzhou	County	Environmental activist	17/1/16

X4a170116b	Guangzhou	County	Environmental activist	17/1/16
X4a170116c	Guangzhou	County	Environmental activist	17/1/16
X6210116	Foshan	City	Government official (environment)	21/1/16
X4a270116a	Guangzhou	County	Government official (environment)	27/1/16
X4a270116b	Guangzhou	County	Government official (environment)	27/1/16
X4050316	Guangzhou	City	Entrepreneur	5/3/16
X4120316	Guangzhou	City	Entrepreneur/ Environmental consultant	5/3/16
X9160316a	Wuxi	City	Entrepreneur	16/3/16
X9160316b	Wuxi	City	Factory owner	16/3/16
X10050416	Hong Kong	City	Environmental consultant to business	5/4/16
X10080416	Hong Kong	City	Factory owner	8/4/16
X10170416	Hong Kong	City	Entrepreneur	17/4/16
X7a190416a	Qingyuan	County	Factory owner	19/4/16
X7a190416b	Qingyuan	County	Factory owner	19/4/16
X7a190416c	Qingyuan	County	Factory owner	19/4/16
X7a190416d	Qingyuan	County	Factory owner	19/4/16
X7190416a	Qingyuan	City	Entrepreneur/ Environmental consultant	19/4/16
X7190416b	Qingyuan	City	Entrepreneur/ Environmental consultant	19/4/16
X7190416c	Qingyuan	City	Entrepreneur/ Environmental consultant	19/4/16
X7190416d	Qingyuan	City	Entrepreneur/ Environmental consultant	19/4/16
X7b200416	Qingyuan	County	Industrial park owner	20/4/16
X1060516	Beijing	City	Professor	6/5/16
X1120516	Beijing	National	Government official (environment)	12/5/16
X1130516	Beijing	City	NGO (local) representative	13/5/16
X1a160516	Beijing	County	Environmental consultant to business	16/5/16
X1160516	Beijing	City	NGO (local) representative	16/5/16
X4081216	Guangzhou	City	NGO (local) representative	8/12/16
X4161216	Guangzhou	City	NGO (local) representative	16/12/16
X10171216	Hong Kong	City	Environmental consultant	17/12/16
X10040217	Hong Kong	City	Entrepreneur	4/2/17
X10050517	Hong Kong	City	Professor	5/5/17