

Ch. 3

Discipline without Slack: Anti-Corruption in China's Health Sector

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Abstract

Anti-corruption reforms are expected to improve public services by reducing waste and private extraction, yet services do not always improve even when corruption is genuinely constrained. This chapter argues that the service outcome depends on how corruption was organized before reform. When corrupt exchange becomes repeated and embedded in organizational roles, it can generate discretionary resources and trusted relationships that help public organizations operate despite weaknesses in their formal support systems. Such corruption remains costly and distorting, but removing it may also disrupt the informal capacity that had sustained routine work. I examine this argument in China's health sector, where the National Volume-Based Procurement program and the 2023 anti-corruption campaign constrained drug-related corruption. Province-level expenditure data from 2010 to 2023 show that outpatient care did not become more affordable and that expenditure rose more where hospitals had relied more heavily on the drug-centered system weakened by reform. Firm records and field interviews provide complementary evidence that the reforms disrupted both financial and relational supports. The findings show that suppressing corruption and building the formal capacity needed to replace it are separate political tasks.

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3.1 Introduction

Anti-corruption reform often carries both moral and practical hopes. Because corruption distorts allocation, weakens accountability, and raises the cost of public services, reducing it should improve what public organizations deliver (Hicken 2011). Yet the empirical record is less consistent, as some interventions improve downstream outcomes while others reduce observable corruption without producing corresponding gains in service delivery (e.g., Ferraz and Finan 2008; Avis, Ferraz, and Finan 2018; Björkman et al. 2008; Raffler, Posner, and Parkerson 2018). Existing explanations often question whether the apparent success of reform was genuine, attributing weak service responses to incomplete or politicized enforcement and problems of measurement (e.g., Manion 1997, 2004; Fang 2023; Schütte, Ceballos, and David-Barrett 2023). Those explanations matter, but they leave unanswered why public services may still fail to improve even when reform genuinely constrains the corruption it targets.

This chapter argues that the answer depends on how corruption was organized before reform and what functions it had come to perform inside public organizations. When corrupt exchanges recur through stable organizational roles, repeated interaction can generate discretionary resources and trusted relationships that participants use beyond private extraction. These arrangements create a form of informal capacity that helps organizations operate despite weaknesses in their formal support systems (e.g., Persson, Rothstein, and Teorell 2013; Marquette and Peiffer 2018; Ang 2020; Shirk 2023). Corruption remains costly and distorting, but the resources and relationships embedded within it may also sustain routine work. Reform that dismantles these arrangements may remove opportunities for extraction along with part of the organizational infrastructure through which employees had obtained support and coordinated their activities.

I develop and test this argument in China's health sector, where drug-related corruption became deeply embedded in a public hospital system operating under persistent financial strain. In response, the Chinese government introduced the National Volume-Based Procurement program in 2018 and launched a health-specific anti-corruption campaign in 2023, which together substantially constrained drug-related corruption across the sector. Using province-level health expenditure data covering 2010 through 2023, I examine whether these reforms produced corresponding improvements in healthcare affordability.

The results show that constraining drug-related corruption did not produce corresponding improvements. Following NVBP, average outpatient expenditure increased more in provinces where public hospitals had previously relied more heavily on the drug-centered system than the reform

weakened, rather than falling as conventional accounts would predict. The secondary analysis of the 2023 campaign points toward further disruption where NVBP had already weakened these arrangements. Firm expenditure records and field interviews provide complementary evidence about the organizational changes underlying these results.

This chapter contributes to three existing literatures. First, a longstanding literature asks when corruption can facilitate economic or political development by circumventing rigid rules or performing functions that formal institutions do not reliably provide (e.g., Huntington 2006; Nye 1967; Scott 1972). Research on China's corruption-growth paradox further shows that the consequences of corruption vary across its different forms (e.g., Wedeman 2020; Ang 2020). I add organizational embeddedness as a separate dimension: the consequences of corruption depend not only on its type, but also on how deeply organizations rely on the functions it performs. Second, scholarship on adaptive governance in China shows how informal communication and local coping practices allow institutions to operate and adjust despite formal constraints (e.g., Oksenberg 1974; Tsai 2006). I extend this work to an explicitly illicit form of adaptation—corrupt workarounds—and show how removing such practices after they become entrenched can disrupt the organizations built around them. Finally, research on anti-corruption and political control examines how campaigns transform disciplinary regimes (e.g., Manion 2016; Li 2019) and how selective or intensive enforcement can purge political rivals or chill bureaucratic initiative (e.g., E. H. Wang 2022; Zhu and Zhang 2017; Wang and Yan 2020). I build on these findings by showing that removing embedded corrupt arrangements can itself have adverse consequences for service delivery, even when enforcement is nonselective and does not induce fear-driven inaction.

The chapter proceeds as follows. Section 2 reviews the empirical gap between corruption reduction and service improvement and situates the argument within the institutional literature on corruption. Section 3 develops the theory and its testable implications. Section 4 describes the institutional background of China's health sector and the two reforms examined here. Sections 5 and 6 present the data and empirical results. Section 7 presents qualitative evidence. Section 8 concludes.

3.2 Literature Review

3.2.1 The Empirical Gap: Corruption Reduction Without Service Improvement

Governments around the world pursue anti-corruption efforts partly in the hope that curbing corruption will improve what public organizations deliver. Corruption can divert public resources, distort

their allocation, and weaken government performance (Keefer and Stasavage 2003; Hicken 2011). If reducing corruption removes these distortions, cleaner government should in theory deliver better public services.

Yet the empirical record does not consistently support this expectation. In Brazil, the public disclosure of municipal audits strengthened electoral accountability (Ferraz and Finan 2008), and municipalities that had previously been audited exhibited less corruption in subsequent audits (Avis, Ferraz, and Finan 2018). Nevertheless, these gains did not translate into corresponding improvements in municipal health service provision (Nishijima, Ellis, and Cati 2016; Ferraz et al. 2025). In Uganda, a randomized experiment showed that bottom-up monitoring reduced corruption (Björkman et al. 2008), yet subsequent research on the same intervention found no corresponding improvement in health service outcomes (Raffler, Posner, and Parkerson 2018).

Nor is the record uniformly disappointing. Electronic procurement in India and Indonesia reduced favoritism toward local suppliers and improved public works at the same time. Road quality increased in India, while implementation delays declined in Indonesia (Lewis-Faupel et al. 2016). In China, research finds that Xi Jinping's anti-corruption campaign substantially constrained official corruption and also strengthened environmental regulatory enforcement, contributing to lower urban air pollution (Wedeman 2020; Zhou, Wang, and Chen 2020).

These studies examine different anti-corruption instruments, institutional settings, and service domains, and their authors address different questions. The downstream consequences of successful corruption control are notably inconsistent across studies. Service delivery improves in some settings but remains largely unchanged in others. What accounts for this variation?

Existing explanations often begin by questioning whether disappointing anti-corruption efforts genuinely suppressed corruption. One line of argument holds that enforcement may be selective, politicized, or directed against particular networks while leaving other forms of corruption intact (e.g., Manion 1997, 2004; Shirk 2023; Cheeseman and Peiffer 2022). Another cautions that observed reductions may reflect concealment, displacement, or compliance with visible requirements rather than meaningful changes in underlying behavior (e.g., Ding 2017; Fang 2023; Ko and Weng 2012; Schütte, Ceballos, and David-Barrett 2023).

These concerns are important, but they do not cover the full empirical pattern. Politicized enforcement can coexist with a genuine institutional interest in suppressing corruption, particularly when corruption undermines service delivery and imposes legitimacy costs on the state (e.g., Dickson et al. 2016; Pan 2020). Selective targeting is also less persuasive as an explanation in settings

where assignment to audits or monitoring is randomized.

The measurement-error explanation also has limits. The accountability instruments studied in these settings, such as audits, are some of the most well-validated instruments with credible effects on corruption. The gap between corruption reduction and service improvement persists even under rigorous measurement designs. And even if enforcement drives corruption into more clandestine forms, that adaptation is itself analytically important, as it implies that anti-corruption pressure reshapes organizational behavior without necessarily improving organizational performance. The question, then, extends beyond whether anti-corruption reduces individual corrupt transactions to what happens inside public organizations afterward.

3.2.2 From Individual Extraction to Organizationally Embedded Corruption

This chapter follows the standard definition of corruption as the misuse of public power for private gain (e.g., Rose-Ackerman 1978; Nye 1967). In its simplest form, corruption refers to an illicit transaction in which an official uses their public authority to confer a particularistic benefit in exchange for a private reward.

The most pervasive and consequential forms of corruption rarely consist of isolated transactions. Instead, corruption can become interwoven with organizational routines and political hierarchies. Wade's studies of canal-irrigation departments in India, for example, show how corruption structured access to water, public contracts, and valuable personnel postings, with illicit proceeds distributed through administrative and political hierarchies (Wade 1982, 1985). In China, predictable and regularized corruption has similarly shaped the operation of local governments and the country's economic growth trajectory (Ang 2020; Shirk 2023).

Once corruption is understood as embedded in organizational activity rather than as a series of individual transactions, its resistance to reform is less surprising. A broad literature documents the difficulty of uprooting corruption once it has become entrenched in political and administrative systems (e.g., He 2000; Cao, Wang, and Zhou 2018; Gans-Morse et al. 2018; Johnston 2014; Rothstein 2011). When corruption is pervasive, participants expect others to engage in it and may see little benefit in abstaining individually. Corruption consequently reproduces itself through shared expectations and interdependent participation, making reforms centered only on monitoring and individual sanctions insufficient (e.g., Persson, Rothstein, and Teorell 2013; Marquette and Peiffer 2018).

The recognition that corruption can become interwoven with political and economic life has

also led scholars to question whether its consequences are uniformly extractive and destructive. An established literature argues that illicit payments may sometimes expedite administrative decisions, circumvent rigid regulations, and provide access to goods and opportunities when formal channels are slow or unreliable (e.g., Huntington 2006; Nye 1967; Li and Wu 2010; Saha and Sen 2021; Rose-Ackerman 2001; Ang 2020). These arguments certainly do not imply that corruption is beneficial on balance. Circumventing a formal constraint may resolve an immediate problem while reproducing inequality and weakening institutions in the long run. They nevertheless establish that corruption need not be uniformly paralyzing and that some actors may rely on it because it enables activities that formal arrangements do not reliably support.

Marquette and Peiffer move this functional insight closer to the persistence of systemic corruption. They argue that prevailing accounts overlook the practical problems that corruption appears to solve, especially in resource-scarce settings with weak formal institutions (Marquette and Peiffer 2018). From this perspective, corruption is sustained not only because monitoring is weak or because participants expect others to behave corruptly. It can also take root and persist as an informal response to gaps in formal institutions.

Building on these insights, this chapter seeks to understand the organizational arrangements produced through repeated corrupt exchanges. The following section examines how organizationally embedded corruption channels illicit resources and generates durable relationships and expectations, and how these by-products can become incorporated into and sometimes support daily organizational operations. The goal is not simply to show that corruption can facilitate activity, but to identify the conditions under which it becomes capacity-bearing and to examine what its successful removal means for service delivery.

3.3 Theory: Capacity-Bearing Corruption

3.3.1 How Repeated Corruption Produces Informal Order

The illicit nature of corruption creates an acute enforcement problem for its participants. They must coordinate exchanges that cannot be openly recorded or enforced through courts. Because the promised official action and the corresponding private benefit may occur at different times, one participant can accept what was offered and then refuse to reciprocate. Participants must also conceal the exchange from outside scrutiny. These problems multiply when corruption expands from a bilateral transaction into a network of bribe payers, recipients, intermediaries, and protectors.

Repeated interaction can help participants build informal rules that manage these risks without

recourse to law (e.g., Lambsdorff 2007; Della Porta and Vannucci 2012). As participation expands, corrupt networks can develop differentiated roles and, in some cases, internal hierarchies (e.g., Della Porta and Vannucci 2012; Jancsics and Costa 2024; Martins et al. 2022). Some participants provide payments, intermediaries transmit information and benefits, and public officials use their authority to grant access or favorable decisions. More powerful participants may shield the arrangement from investigation or interference. As these arrangements become established, participants develop shared expectations about how benefits will be calculated and distributed, how exchanges will be concealed, and what will happen when someone defects. Compliance may be sustained through reputation, exclusion from future dealings, reciprocal exposure, and threats of retaliation. In more organized networks, intermediaries or powerful superiors have been shown to enforce illicit commitments (e.g., Lambsdorff 2007; Della Porta and Vannucci 2012; Gambetta 1993). Corrupt exchange can therefore become governed by recognizable rules even though no formal institution guarantees them.

In public organizations, this informal order is built through the formal distribution of authority and responsibility. The actions and resources being exchanged are valuable precisely because particular offices confer control over hiring, procurement, authorization, public funds, or service provision. This allocation of responsibilities establishes the structure around which participants organize illicit exchange. An official who directly controls access becomes the predictable point of contact for those seeking a favor. Superiors who control appointments, approvals, audits, or disciplinary action may coordinate the arrangement, protect its participants, or enforce their commitments. Through repeated interactions, participants learn what they can expect from officials in particular positions, and illicit roles become tied to the authority and relationships attached to those positions. The informal order is thereby reproduced through the organization itself and becomes intertwined with its formal hierarchy and processes.¹

I call this phenomenon *organizationally embedded corruption*: an informal order that grows out of the formal distribution of authority, becomes intertwined with organizational roles and processes, and endures through repeated exchanges.

1. For example, Wade's studies of South Indian irrigation departments show how formal responsibilities assigned participants distinct places within a corrupt system. Supervisors prepared maintenance estimates, assistant engineers coordinated those estimates and controlled water releases, and executive engineers approved contracts. Contractors performed the work and returned conventionally allocated shares of contract payments to the officials and staff involved. Senior administrators and politicians also used their control over personnel transfers to sell access to lucrative posts. Engineers occupying those posts then collected money from contractors and irrigators to recover their costs, retain their own returns, and satisfy demands from above. Formal authority over water, contracts, and transfers thus structured both the collection and distribution of illicit revenue (Wade 1982, 1985).

3.3.2 From Informal Order to Organizational Capacity

The previous section explains how repeated corruption can produce an informal order deeply embedded in a formal organization. This section considers whether such an order merely facilitates private extraction or also shapes how the organization carries out its tasks.

Organizationally embedded corruption often takes root in settings whose institutional deficiencies extend beyond weak monitoring of corruption itself. Research has identified inadequate compensation, broad discretion, and opaque or burdensome rules as conditions that lead to corruption (e.g., Olken and Pande 2012; Rose-Ackerman and Palifka 2016). The same deficiencies can also deprive organizations of the support they need to perform their assigned tasks. Public organizations must still retain employees when compensation is inadequate, obtain essential supplies under rigid procurement rules, and coordinate work across fragmented authorities.

Such deficiencies do not automatically generate corruption, and corruption is certainly not the only possible response to them. Nevertheless, research suggests that informal institutions can substitute for ineffective formal ones and that systemic corruption may persist partly because it solves practical problems for its participants (e.g., Helmke and Levitsky 2004; Marquette and Peiffer 2018). Where corrupt exchange is already repeated and organizationally embedded, the informal order surrounding it may supply resources and relationships that participants can use to address problems left unresolved by the formal system.

Mechanism 1: Resource Laundering The first mechanism is financial. When corruption happens repeatedly, direct payments of rents are often too visible and risky to sustain at scale. Illicit gains are often routed through formal channels that provide cover, such as inflated procurement contracts, padded expense lines, bonus funds, or other administratively legible vehicles (e.g., Brogaard, Denes, and Duchin 2021; He 2000; Olken 2009; Lord, Wingerde, and Campbell 2018).

Once illicit revenue is routed through the formal channels, not all of it disappears immediately into private hands. Some share is privately captured, but some remains inside the organization as retained fees, service-charge revenue, and off-budget surpluses that can be used to finance staffing, small purchases, maintenance, and other routine shortfalls (e.g., Jia et al. 2021; Ogbozor et al. 2023). Over time, administrators plan against this realized resource environment rather than against the formal budget alone. What begins as a concealment strategy becomes a shadow supplement to formal capacity.

This routing through formal channels is neither incidental nor altruistic. It follows the basic

anti-detection logic that corrupt revenue needs to be disguised before it is appropriated. Laundering illicit revenue is itself costly, and some of it remains in the system as part of the price of concealment, coordination, and keeping the books plausible (e.g., Olken 2009; Gutiérrez-Urtiaga, Hadjigavriel, and Gago-Rodriguez 2020). Officials may leave part of the revenue within the organization because they also face incentives tied to organizational performance (e.g., Assefa 2018; Li and Gore 2018; Roziqin et al. 2026). When officials have incentives both to extract rents and to maintain organizational performance, using some of the routed revenue to sustain operations may serve their private interests.

Mechanism 2: Complicity Network The second mechanism is relational. Repeated corruption requires participants to solve a commitment problem without enforceable contracts, courts, or publicly verifiable guarantees. Stable corrupt networks address this problem by turning shared legal vulnerability into a basis for credible commitment. Because participants possess incriminating knowledge about one another, defection carries not just reputational costs but concrete legal and political risks (e.g., Gambetta 1993; Rithmire and Chen 2021). Illegality forms a harsh but credible basis for insider trust.

Trust born out of corrupt networks could also help to generate stable patterns of collaboration and control that sustain coordination under risk (e.g., Diviák and Lord 2022; Popa 2019; Chang 2018; Li and Wu 2010; Wang and Yan 2020). Officials and private actors bound within the same corrupt network are more willing to cooperate on tasks that formal rules do not specify clearly. What the network supplies is not simply secrecy, but a form of low-friction coordination sustained by mutual dependence.

An example of this low-friction coordination is access to privileged information (Portes and Sensenbrenner 1993). Repeated dealings with contractors and intermediaries generate knowledge that formal reporting systems often capture poorly: who can deliver under pressure, which bids are nominal, where real prices lie behind formal offers, and which procedural obstacles can be worked around. Yet this knowledge is difficult to formalize precisely because it is produced within an illicit relationship. Officials may know that a supplier is reliable because they have colluded with that supplier for years. The information is therefore operationally useful but institutionally unattainable. It circulates within the informal network that produced it, while remaining unsafe to translate into official records.

These informal arrangements become organizationally consequential as organizations adapt to their continued availability. As corrupt practices persist, administrators and employees begin to

plan around the resources and relationships available in practice rather than those formally authorized on paper. Informal payments that repeatedly supplement formal compensation may become necessary for retaining staff. Procurement routines may come to depend on a familiar supplier who provides credit, information, or rapid delivery through a corrupt relationship. Over time, expectations about workloads, staffing, purchasing, and service provision develop on the assumption that these forms of support will remain available. What began as a by-product of illicit exchange becomes part of how ordinary tasks are accomplished (Greif, Mokyr, and Tabellini 2025). Corruption is still extractive, but it also becomes capacity-bearing within the organization.

3.3.3 When Anti-Corruption Disrupts Organizational Capacity

Successful anti-corruption, by definition, reduces the corruption it targets. It need not eliminate every illicit transaction, but it must meaningfully constrain the exchanges and relationships sustaining the corrupt arrangement. Institutional reforms may reduce opportunities for extraction, while investigations and punishment may make continued participation more costly. In either case, successful efforts make corruption harder to sustain.

Standard accounts of accountability expect such success to improve organizational performance. Corruption diverts resources into private hands, and reducing corruption should preserve public resources, bring officials' conduct back to formal mandates, and improve the delivery of public services (e.g., Olken and Pande 2012; Rose-Ackerman and Palifka 2016). This expectation treats corruption as an obstacle whose removal leaves the organization better able to perform its assigned tasks.

Capacity-bearing corruption complicates this expectation because private extraction and organizational support have become partly bundled together. Shadow resources exist as part of a rent-generating arrangement, while coordinating relationships arise from repeated illicit exchange. Anti-corruption cannot eliminate private extraction without disrupting some of the resources and relationships that have grown around it. Crackdowns can contract discretionary funds and make continued contact among participants too risky, weakening both sources of informal support. Research on Chinese local government, for example, shows that restrictions on banqueting and gift exchange reduced corrupt and extravagant practices but also weakened personalized relationships officials had used to mobilize resources and coordinate across bureaucratic boundaries (Wang and Yan 2020).

Whether these losses undermine organizational performance depends on the formal supports

that remain. Where formal budgets, procedures, and professional relationships already perform the same functions, removing informal resources and ties should impose few operational costs. The more difficult case arises where corruption became capacity-bearing precisely because formal supports were inadequate and the organization had adapted around informal substitutes. Anti-corruption instruments target the corrupt arrangement but do not necessarily repair the institutional deficiencies that made those substitutes useful. When enforcement happens without corresponding institution-building, informal support disappears while formal support remains inadequate. The organization must continue performing its assigned tasks with fewer usable resources and weaker coordinating relationships, making an immediate deterioration in service delivery possible even as corruption declines.

3.3.4 Testable Implications

The argument yields two testable implications for service delivery. When anti-corruption removes capacity-bearing resources and relationships without replacing their organizational functions, performance should deteriorate most where organizations previously relied more on that informal capacity or where reform removes more of it.

Implication 1: Prior Dependence Among organizations facing comparable reforms, those that relied more heavily on capacity-bearing corruption before reform should experience weaker improvement or greater deterioration in service delivery. Organizations that were less dependent on these informal supports should face smaller adjustment costs and respond more consistently with standard accountability expectations.

Implication 2: Magnitude of Capacity Loss Among organizations with comparable pre-reform dependence, those that lose more capacity-bearing resources or relationships should experience worse service outcomes. Greater losses may result from more intensive enforcement or from successive reforms that remove multiple components of the same informal support system.

Both patterns should weaken where formal replacements provide the resources and coordination that reform removes. The standard accountability account yields the opposite expectation: organizations with greater initial corruption or larger reductions in corruption should realize greater improvements in service delivery.

3.4 Background: Anti-Corruption in China's Health Sector

Healthcare affordability has become a major concern in China, as medical spending has risen faster than the country's economy (Zhang et al. 2022). Corruption is widely viewed as an important contributor, particularly through pharmaceutical kickbacks and fraud against public insurance funds (e.g., Rose-Ackerman and Tan 2014; Xu and Yuan 2022; Fu et al. 2023). The scale of improper fund use is substantial: by April 2023, the National Healthcare Security Administration had recovered more than RMB 80.5 billion in misused medical insurance funds (Xinhua 2023a). Since 2013, President Xi Jinping has made anti-corruption a defining political priority (e.g., Y. Wang 2020; Cao, Wang, and Zhou 2018; Busting 2019; Fang 2023). Between 2013 and 2024, more than 5.7 million Party members received disciplinary sanctions (Wedeman 2025; CCDI 2026). The health sector became a prominent target of this campaign in 2023, when ten central agencies launched a year-long nationwide campaign against medical corruption (National Commission of Supervision of China 2024; Chinacom Finance Channel 2024).

3.4.1 Roots of Drug-Related Corruption in Chinese Public Hospitals

The prevalence and scale of pharmaceutical corruption in China cannot be explained solely by the misconduct of individual physicians. Corruption grew out of a basic contradiction in the financing of public hospitals. Public hospitals provide most hospital-based care in China: in 2019, they accounted for 85.2% of all hospital visits and 82.6% of hospital admissions (National Health Commission of China 2021). Yet government support covered only a fraction of their operating costs. As market reforms proceeded after 1978, the share of public hospital revenue supplied by government subsidies fell from 32.2% to roughly 10% by the late 2000s (e.g., Yip and Hsiao 2014; Xu et al. 2019; Jakovljevic et al. 2023). At the same time, the legacy of socialist provision remained embedded in state-administered prices intended to keep basic care broadly affordable. Many clinical services were priced below the cost of providing them (Zang, Zhou, and Zhao 2021). Public hospitals were thus charged with responsibilities that their formal funding did not cover.

Historically, the state attempted to address this financing gap by allowing hospitals to add a regulated markup to the drugs they dispensed, an arrangement known as *yiyaoyangyi*, or “using drugs to support medicine.” By the early 2000s, drug sales accounted for more than 40% of public hospital revenue (Xu et al. 2019).

This dependence on drug revenue intersected with a fragmented pharmaceutical market in which suppliers competed intensely for hospital access. Because patients generally filled prescrip-

tions at the hospitals where they received care, hospitals were major gatekeepers to pharmaceutical sales and retained substantial discretion over procurement and prescribing. Firms had strong incentives to influence those decisions through personal relationships, commissions, and other benefits.

This arrangement partly eased hospitals' financing problem, but it did so by tying their revenue to drug sales. When procurement and prescribing followed private financial incentives rather than medical need, patients and public insurance funds bore the costs of unnecessary prescriptions and more expensive drugs (e.g., Tam 2011; Rose-Ackerman and Tan 2014).

Beginning in 2009, China sought to weaken this system by gradually introducing a Zero-Markup Drug Policy to reduce hospitals' dependence on pharmaceutical sales (e.g., Fang et al. 2021; Cheng et al. 2021; National Health and Family Planning Commission of China 2017). Under the policy, hospitals could no longer sell covered drugs above their procurement cost. The lost income was supposed to be replaced through higher prices for medical services, increased government support, and improvements in hospital efficiency.

In practice, however, these replacements proved largely insufficient. A nationwide study of 136 tertiary public hospitals found that the share of revenue derived from medicines declined after the policy, but the government-subsidy share changed little overall (Cheng et al. 2021). The same concern with affordability that had kept clinical-service prices low also constrained how far they could be raised to replace lost drug income (Zang, Zhou, and Zhao 2021).

The Zero-Markup Drug Policy removed the authorized markup but did not close the underlying financing gap. Nor did it eliminate the sales-based pharmaceutical model or hospitals' discretion over procurement and prescribing. Informal exchanges between pharmaceutical firms and hospital personnel therefore remained deeply embedded. A study of 3,546 medical-corruption cases between 2013 and 2019 found that bribery accounted for 68.1% of the cases. Nearly 80% of bribe recipients were healthcare providers, while most bribe payers were suppliers of pharmaceuticals, medical equipment, or medical consumables seeking to promote their products (Fu et al. 2023).

3.4.2 Cracking Down on Corruption: NVBP and the 2023 Campaign

Persistent corruption in pharmaceutical sales and the continued rise in drug and healthcare expenditure prompted further government intervention. Specifically, this chapter focuses on two major interventions: the National Volume-Based Procurement (NVBP) program, which centralized procurement for selected drugs to lower their prices while reducing hospitals' discretion over market access; and the 2023 anti-corruption campaign, which directly targeted corrupt conduct in the sector

through investigation and punishment.

National Volume-Based Procurement (NVBP) The National Volume-Based Procurement (NVBP) program reorganized the purchase of selected drugs by pooling demand across hospitals and awarding supply contracts through centralized bidding. The program emerged in response to rapidly rising pharmaceutical expenditure. Between 2009 and 2017, pharmaceutical spending in China more than doubled, reaching RMB 1.82 trillion. Drugs accounted for 34% of total healthcare spending, compared with an OECD average of 16% and shares of 18% in Japan and 20% in South Korea (Chen et al. 2021). NVBP sought to use the government’s purchasing power to lower the prices of widely used, mostly off-patent drugs.

Winning bids for the initial “4+7” pilot were announced in December 2018, and implementation began in March 2019.² The pilot centralized procurement for 25 drugs across 11 cities: Beijing, Tianjin, Shanghai, Chongqing, Shenyang, Dalian, Xiamen, Guangzhou, Shenzhen, Chengdu, and Xi’an (State Council 2019). Hospitals submitted purchase commitments in advance, manufacturers competed through a centralized bidding process, and winning firms received committed purchase volumes (Yang et al. 2021).

Although NVBP did not state anti-corruption as its main goal, the reform significantly disrupted the informal exchanges surrounding pharmaceutical procurement. For covered drugs, decisions over suppliers, prices, and committed volumes shifted from individual hospitals to the centralized bidding process. This reduced hospitals’ leverage over market access and made informal payments to hospital procurement officials less valuable. In short, NVBP narrowed the discretion on which informal exchanges had depended (Zhu et al. 2023).

The 2023 National Anti-Corruption Campaign In 2023, the health sector became a prominent target of Xi Jinping’s broader anti-corruption campaign. At the January plenary session of the Central Commission for Discipline Inspection (CCDI), Xi Jinping called for deeper rectification in sectors “where power is concentrated, funds are abundant, and resources are rich,” explicitly naming pharmaceuticals (Xinhua 2023b). In July, the National Health Commission and nine other central agencies launched a nationwide campaign targeting corruption throughout pharmaceutical production, supply, sales, use, and reimbursement (National Commission of Supervision of China 2024).

Enforcement increased sharply after the campaign began. As Figure 3.1 shows, publicly re-

2. NVBP subsequently expanded nationwide through additional procurement rounds covering an increasingly large set of drugs. See Appendix Figure 3.5.

ported investigations of municipal-level and more senior healthcare officials rose markedly in 2023. By December 2024, the National Commission of Supervision reported that authorities had opened cases against 52,000 people in the medical sector, disciplined 40,000, and referred 2,634 for prosecution ([National Commission of Supervision of China 2024](#)). As enforcement intensified, participating in drug-related corruption became substantially riskier and more costly for both hospital personnel and pharmaceutical firms.

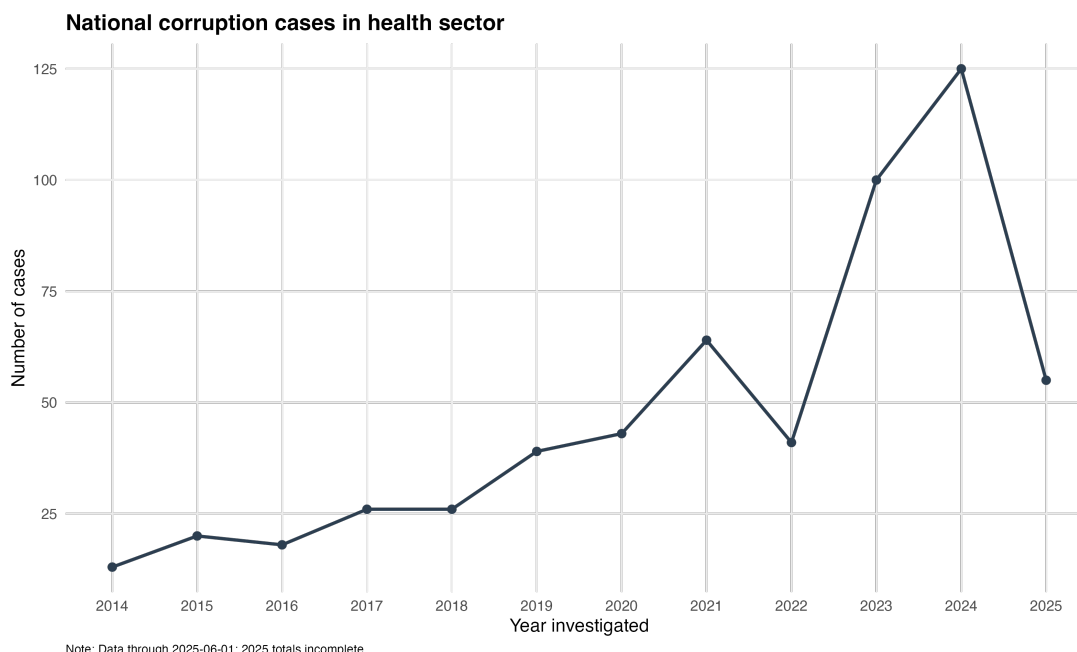


Figure 3.1: Publicly reported healthcare corruption cases, 2014–June 2025. The figure plots hand-collected counts of cases involving municipal-level and more senior healthcare officials disclosed by the CCDI and provincial disciplinary inspection authorities across 31 provincial-level units, excluding Hong Kong, Macau, and Taiwan. See Appendix A1.3 for details on data collection.

3.4.3 Did Healthcare Affordability Improve?

Both interventions were expected to reduce the financial burden of healthcare. NVBP centralized procurement and reduced local discretion in order to lower drug prices, while the 2023 campaign targeted corrupt practices widely blamed for increasing costs to patients and public insurance funds.

In some sense, both policies produced visible results on their own terms. In the first round of NVBP, winning prices fell by an average of 52% relative to the lowest 2017 procurement prices, with reductions ranging from 25% to 96% across drugs (e.g., Tang et al. 2019; Yuan et al. 2021).³

3. Lower procurement prices do not necessarily mean equivalent reductions in patient-facing expenditure. Hospitals

The 2023 campaign likewise sharply increased enforcement against medical corruption (see Figure 3.1). But did they ultimately reduce the financial burden of care?

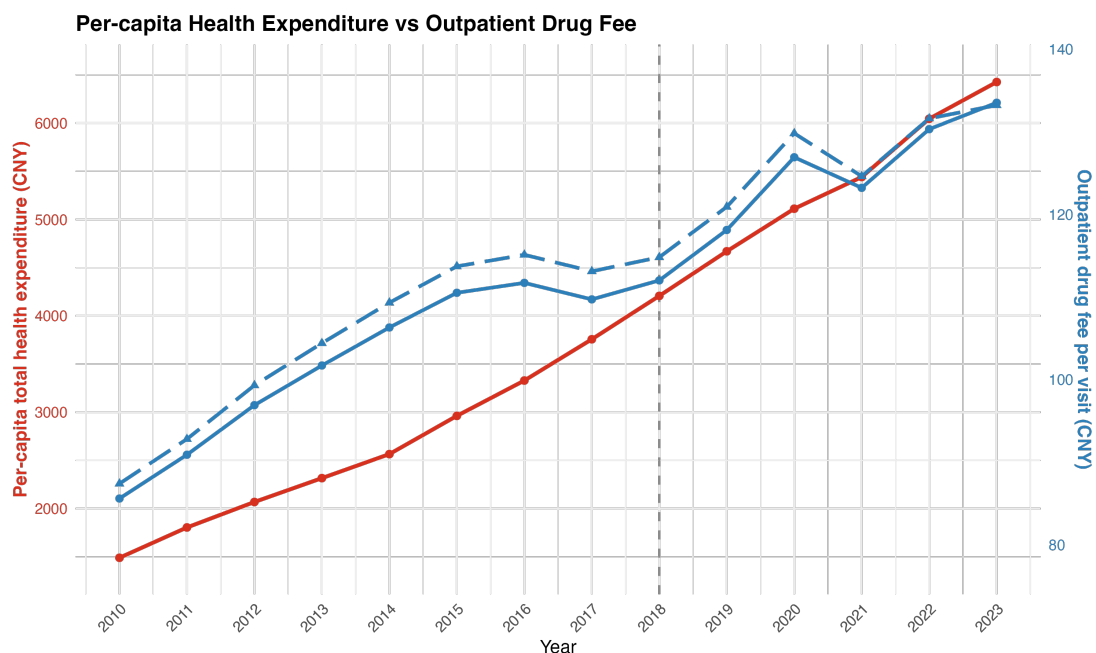


Figure 3.2: Trends in per-capita health expenditure and outpatient drug fees, 2010–2023. The red line, measured on the left vertical axis, shows per-capita total health expenditure in RMB. The blue lines, measured on the right vertical axis, show outpatient drug fees per visit in RMB: the solid line represents public hospitals, and the dashed line represents hospitals overall. Data are drawn from the China Health Statistics Yearbooks. See Appendix A1.2 for details.

The national expenditure trends show no clear evidence that healthcare indeed became more affordable. Figure 3.2 shows that health expenditure continued to increase after the introduction of NVBP. Outpatient drug fees paused briefly but did not enter a sustained decline. By the time the 2023 campaign began, the sharp reductions in procurement prices achieved through NVBP had not produced a similarly clear improvement in the overall affordability of care.

These discouraging trends make China’s health sector a useful case for rethinking conventional accountability expectations. If lower drug prices and reduced corrupt extraction simply removed waste, healthcare should have become more affordable. Capacity-bearing corruption offers a possible explanation for why it did not. Both interventions disrupted informal arrangements through which hospitals obtained resources and coordination, without replacing those supports or closing

and physicians may increase the quantity of treatment, substitute toward drugs not covered by NVBP, or expand other chargeable services.

the underlying financing gap.

The next sections evaluate the argument using complementary evidence. The quantitative analysis focuses on the financial channel, estimating how the interventions affected patient-facing expenditure and whether the effects were larger where hospitals had depended more heavily on drug revenue. The qualitative analysis focuses on the relational channel, tracing how repeated ties between hospitals and pharmaceutical actors supported everyday coordination and what happened when reform made those ties harder to sustain.

3.5 Data and Empirical Strategy

The quantitative analysis combines a balanced province-year panel from the China Health Statistics Yearbooks, official records of NVBP implementation, and hand-collected disclosures of healthcare-corruption investigations. The expenditure panel covers all 31 provincial-level units from 2010 through 2023.⁴

3.5.1 Data

Treatment: NVBP Exposure The principal treatment is exposure to the initial “4+7” NVBP pilot. The pilot began implementation in March 2019 and covered four provincial-level municipalities and seven other cities ([State Council 2019](#)). In participating locations, procurement of covered drugs shifted to nationalized competitive bidding, which reduced hospitals’ discretion and narrowed the opportunities for kickbacks and other corrupt exchanges surrounding procurement. Because the health-expenditure data are reported at the province-year level, I classify a province as exposed if it contained at least one original pilot city. The eleven pilot locations correspond to nine province-level units. The resulting measure captures early province-level exposure to a reform initially implemented at the city level.⁵

Dependent Variable: Healthcare Affordability Healthcare affordability is the primary outcome of interest because both NVBP and the anti-corruption campaign were expected to reduce the financial burden of care by lowering pharmaceutical costs and curbing corrupt extraction. I measure affordability using average total health expenditure per visit and average drug expenditure per out-

4. See Appendix [A1.2](#) for details on the collection and harmonization of the data.

5. The treatment does not imply that every hospital in an exposed province entered the pilot simultaneously or that other provinces remained permanently outside NVBP, which subsequently expanded nationwide.

patient visit at public hospitals,⁶ with higher values indicating lower affordability. These measures capture the total cost associated with an average outpatient encounter, regardless of how that cost is ultimately distributed.⁷ Total expenditure provides a broad measure of the cost of care, while drug expenditure isolates the component most directly affected by pharmaceutical procurement and prescribing.

Moderator: Pre-Reform Drug Dependence as a Proxy for Corruption-Related Informal Capacity The moderating variable of interest captures the financial dimension of pre-reform informal capacity: the extent to which public hospitals depended on drug-centered transactions through which corruption-linked resources could be generated. Ideally, this dependence would be measured using the commissions, side payments, and other informal resources available to hospitals before reform. Because such transfers are designed to evade formal oversight, I instead use the pre-reform importance of outpatient drug expenditure as an observable proxy for hospitals' exposure to this financial channel.

The proxy follows from the organization of outpatient pharmaceutical sales. Patients generally consulted physicians and filled the resulting prescriptions at the same hospital, directly connecting prescribing decisions, hospital dispensing, and suppliers' access to the hospital market. Because commissions and kickbacks were commonly tied to procurement and prescribing volumes, greater dependence on drug sales could generate more informal revenue (e.g., Tam 2011; Rose-Ackerman and Tan 2014). The Zero-Markup Drug Policy removed hospitals' authorized margin on drug sales but did not eliminate informal payments tied to procurement and prescribing. Drug sales should therefore no longer have provided a formal source of hospital profit, but they could still generate informal resources through commissions and kickbacks.

For each province p , let $D_{p,2017}$ denote average drug expenditure per outpatient visit in public hospitals. Let $H_{p,2017}$ denote average total healthcare expenditure per outpatient visit. I calculate pre-reform drug dependence as:

6. I retain corresponding measures of inpatient expenditure per admission for the later analysis of alternative explanations. Inpatient admissions involve a broader combination of drugs, procedures, diagnostic tests, medical consumables, and other services. The inpatient measures provide a useful comparison for assessing whether the results are concentrated in drug-centered outpatient encounters or reflect broader changes in hospital expenditure.

7. For reference, in 2017, government health expenditure accounted for 28.91% of total health expenditure, social health expenditure for 42.32%, and individual out-of-pocket expenditure for 28.77%. By 2023, the corresponding shares were 26.7%, 46.0%, and 27.3%. Social health expenditure includes public health insurance but also commercial insurance and other social spending. These are system-wide shares, drawn from the China Health Statistics Yearbooks, and do not directly decompose each outpatient bill. The shares remain relatively stable over time.

$$\text{Drug Dependence}_p = \frac{D_{p,2017}}{H_{p,2017}}. \quad (3.1)$$

The ratio captures the share of total expenditure for an average outpatient visit attributable to drugs. A higher value indicates greater reliance on the drug-centered financial channel that NVBP subsequently disrupted. I use this measure as a proxy for dependence on corruption-linked financial resources rather than as a direct measure of corruption. Across provinces, the mean baseline share was 41.6%, with an interquartile range of 39.2% to 44.0%.

The measure is fixed using data from 2017, the last calendar year entirely preceding the announcement and implementation of the initial NVBP pilot. Measuring drug dependence before reform prevents subsequent hospital adjustments from affecting the proxy. It captures how heavily hospitals depended on the relevant financial channel before NVBP, rather than how strongly that channel was later disrupted.

Secondary Intervention: Measuring Anti-Corruption Campaign Enforcement NVBP had already reduced hospitals' discretion over pharmaceutical procurement when the 2023 anti-corruption campaign increased the risks associated with the corrupt exchanges that remained. Because the campaign was nationwide, the secondary analysis uses differences in observed enforcement intensity across provinces rather than a treated-versus-untreated comparison.

I measure enforcement intensity using hand-collected cases involving municipal-level and more senior healthcare officials disclosed by the CCDI and provincial disciplinary inspection authorities. In 2023, 23 provinces reported at least one qualifying case. Because data collection covered all 31 provincial-level units, the remaining eight provinces are coded as having zero publicly reported cases. The resulting counts are standardized across all 31 provinces.

The investigation count captures the intensity of publicly observed enforcement rather than the underlying prevalence of corruption or the value of informal resources lost. It is conceptually distinct from the 2017 drug-share measure. The drug share captures hospitals' prior dependence on the drug-centered channel, whereas the investigation count captures the strength of the subsequent effort to disrupt corrupt exchanges.

3.5.2 Empirical Strategy

The primary analysis uses a difference-in-differences design comparing early-exposure provinces with other provinces before and after NVBP began in 2019. The competing hypotheses are:

H₁ Conventional accountability account: NVBP should improve affordability by reducing inflated drug prices and corrupt extraction. The largest improvements should occur where pre-reform drug dependence was highest because those provinces had the most distorted activity to remove. For expenditure outcomes, this implies a negative average effect and a negative moderating effect.

H₂ Capacity-bearing account: The effect of NVBP should depend on hospitals' prior reliance on the drug-centered financial channel. Where that dependence was greater, removing the channel should produce smaller affordability gains or even increases in expenditure. This implies a positive moderating effect.

Difference-in-Differences Let Pilot_p indicate the early-exposure provinces defined above, and let Post_t equal one from 2019 onward. Their interaction, $\text{NVBP}_{pt} = \text{Pilot}_p \times \text{Post}_t$, is the treatment indicator. Let $\widetilde{\text{DD}}_p$ denote the mean-centered 2017 drug-dependence measure defined in Equation 3.1. I estimate:

$$Y_{pt} = \alpha_p + \lambda_t + \rho \left(\text{Post}_t \times \widetilde{\text{DD}}_p \right) + \beta \left(\text{Pilot}_p \times \text{Post}_t \right) + \theta \left(\text{Pilot}_p \times \text{Post}_t \times \widetilde{\text{DD}}_p \right) + \varepsilon_{pt}. \quad (3.2)$$

The baseline difference-in-differences specification omits both terms involving $\widetilde{\text{DD}}_p$ and estimates the average post-2019 difference associated with early exposure. Equation 3.2 adds the lower-order interaction between the post period and baseline drug dependence. This term allows high-dependence provinces in both groups to follow a different post-2019 path, so θ isolates whether that relationship changed differentially in early-exposure provinces. The time-invariant lower-order terms are absorbed by province fixed effects, while the post-period indicator is absorbed by year fixed effects.

Because drug dependence is mean-centered, β is the estimated early-exposure effect at the sample mean of pre-reform dependence. Negative coefficients indicate improved affordability, while positive coefficients indicate increased expenditure. The principal theoretical coefficient is θ . The conventional account predicts $\theta < 0$, whereas the capacity-bearing account predicts $\theta > 0$. Standard errors are clustered by province.

Dynamic Effects and Parallel Trends I estimate an event-study version of the moderated difference-in-differences model to examine the timing of the effect on total outpatient expenditure and assess

parallel trends. Let E_t^k indicate event year k relative to the 2019 implementation of NVBP. The specification is:

$$\begin{aligned}
 Y_{pt} = & \alpha_p + \lambda_t + \sum_{\substack{k \in \mathcal{K} \\ k \neq -1}} \rho_k \left(E_t^k \times \widetilde{\text{DD}}_p \right) \\
 & + \sum_{\substack{k \in \mathcal{K} \\ k \neq -1}} \beta_k \left(\text{Pilot}_p \times E_t^k \right) \\
 & + \sum_{\substack{k \in \mathcal{K} \\ k \neq -1}} \theta_k \left(\text{Pilot}_p \times E_t^k \times \widetilde{\text{DD}}_p \right) + \varepsilon_{pt}.
 \end{aligned} \tag{3.3}$$

Here, Y_{pt} is total outpatient expenditure per visit at public hospitals. The dynamic analysis covers 2010–2023, with 2018 ($k = -1$) as the omitted reference year. The specification includes the two lower-order interactions associated with the triple interaction. The coefficients of interest, θ_k , show how the expenditure effect of early NVBP exposure varied with pre-reform drug dependence in each year relative to 2018.

Identification requires that, absent early NVBP exposure, the relationship between baseline drug dependence and changes in total outpatient expenditure would have evolved similarly in early- and later-exposure provinces. The pre-2019 coefficients θ_k provide a direct test of this moderated parallel-trends assumption, while the post-2019 coefficients trace when the heterogeneous effect emerged and whether it persisted.

Secondary Analysis of the 2023 Campaign To evaluate the cumulative exposure to NVBP and the campaign, I add three campaign terms to the moderated NVBP specification:

$$\begin{aligned}
 Y_{pt} = & \alpha_p + \lambda_t \\
 & + \delta \left(\text{Post}_t \times \widetilde{\text{DD}}_p \right) + \beta \text{NVBP}_{pt} \\
 & + \theta \left(\text{NVBP}_{pt} \times \widetilde{\text{DD}}_p \right) \\
 & + \gamma_1 \left(\text{Pilot}_p \times \text{Campaign}_t \right) \\
 & + \gamma_2 \left(\text{Campaign}_t \times \widetilde{C}_p \right) \\
 & + \gamma_3 \left(\text{Pilot}_p \times \text{Campaign}_t \times \widetilde{C}_p \right) + \varepsilon_{pt}.
 \end{aligned} \tag{3.4}$$

Here, $\text{NVBP}_{pt} = \text{Pilot}_p \times \text{Post}_t$ is the early-exposure treatment indicator defined above. Campaign_t

equals one in 2023, and $\tilde{C}_p$ is standardized enforcement intensity. The campaign indicator is absorbed by the year fixed effects, while the time-invariant enforcement measure and its interaction with pilot status are absorbed by the province fixed effects.

The coefficient γ_1 captures the additional 2023 difference between early- and later-exposure provinces at average enforcement intensity. The coefficient γ_2 captures the association between enforcement intensity and expenditure among later-exposure provinces. The triple-interaction coefficient γ_3 shows whether that association differed in provinces that had already experienced the original NVBP pilot. A positive γ_3 would be consistent with cumulative disruption: stronger enforcement would produce less improvement, or greater deterioration, where the drug-centered channel had already been weakened by earlier NVBP exposure.

Because the campaign began in 2023 and the expenditure data end that year, the analysis captures only its onset.⁸ The three-way interaction is also identified from only 31 provinces, including nine early-exposure provinces. This analysis is a secondary test of the compounding argument.

3.6 Results

3.6.1 Average and Moderated Effects on Outpatient Expenditure

Table 3.1 reports the baseline and moderated difference-in-differences estimates. Columns 1 and 2 provide the average early-exposure comparison. Rather than falling after NVBP, total outpatient expenditure increased by RMB 46.23 per visit in early-exposure provinces relative to other provinces, while outpatient drug expenditure increased by RMB 12.41. These average estimates run counter to the conventional expectation that reducing drug prices and procurement rents would translate directly into lower expenditure.

Columns 3 and 4 report the principal test. At the mean level of pre-reform drug dependence, early NVBP exposure was associated with RMB 33.82 more in total outpatient expenditure and RMB 7.86 more in drug expenditure per visit. A 10-percentage-point increase in the 2017 drug share was associated with an additional RMB 76.25 in total outpatient expenditure and RMB 18.42 in outpatient drug expenditure after early exposure. The estimates contradict the conventional accountability prediction and are consistent with the capacity-bearing account.

The implied effects also increase across the observed distribution of baseline dependence. At the twenty-fifth percentile of drug dependence, the estimated early-exposure effect on total outpa-

8. The annual expenditure measures combine months before and after the campaign's July 2023 launch.

Table 3.1: Early NVBP Exposure, Pre-Reform Drug Dependence, and Outpatient Expenditure

	Baseline DID		Moderated DID	
	Total expenditure	Drug expenditure	Total expenditure	Drug expenditure
Early exposure $\times$ Post	46.23** (15.67)	12.41* (4.97)	33.82*** (7.56)	7.86* (2.94)
Post $\times$ Drug dependence	—	—	-36.93 (118.79)	54.12 (67.59)
Early exposure $\times$ Post $\times$ Drug dependence	—	—	762.51** (251.49)	184.21* (72.80)
Effect of a 10-percentage-point higher drug share	—	—	76.25** (25.15)	18.42* (7.28)
Province fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	434	434	434	434
Within R^2	0.233	0.114	0.442	0.277

Notes: Dependent variables are measured in RMB per outpatient visit at public hospitals. Drug dependence is the mean-centered 2017 share of total outpatient expenditure attributable to drugs. The penultimate row rescales the triple-interaction coefficient to a 10-percentage-point increase in the baseline drug share. Positive coefficients indicate higher expenditure and thus lower affordability. Province-clustered standard errors are in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

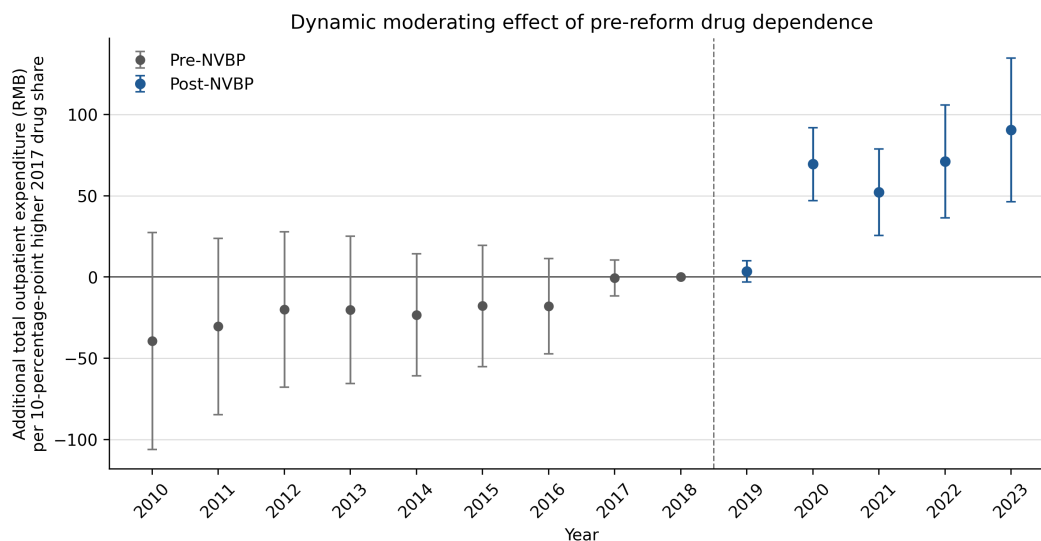
tient expenditure was RMB 15.48 and was not statistically distinguishable from zero. The corresponding effect rose to RMB 30.38 at the median and RMB 52.27 at the seventy-fifth percentile; both were statistically significant. The same ordering appears for drug expenditure. This suggests that deterioration in affordability was concentrated in provinces that had depended more heavily on the drug-centered channel before NVBP.

The total-expenditure estimates are substantially larger than the drug-expenditure estimates. This pattern suggests that the consequences of disrupting the drug-centered channel were not confined to the price of medicines themselves. It is consistent with hospitals adjusting through other components of the outpatient encounter.

3.6.2 Dynamic Moderating Effects

Figure 3.3 traces the moderating effect of baseline drug dependence on total outpatient expenditure. The coefficients are rescaled to show the additional expenditure associated with a 10-percentage-point higher 2017 drug share. None of the individual pre-2019 estimates is statistically distinguishable from zero, and the estimates are close to zero immediately before the reform. The moderating

effect also remains small in 2019. It becomes positive and statistically significant in 2020 and remains so through 2023, ranging from approximately RMB 52 to RMB 91 per visit.



Reference year: 2018. Points show coefficients; bars show 95% confidence intervals. Province and year fixed effects; standard errors clustered by province.

Figure 3.3: Dynamic moderating effect of pre-reform drug dependence on total outpatient expenditure. Points report the estimated additional effect of early NVBP exposure associated with a 10-percentage-point higher 2017 outpatient drug share. The omitted reference year is 2018. Bars show 95% confidence intervals based on standard errors clustered by province. All specifications include province and year fixed effects.

The delayed emergence of the relationship is consistent with an organizational adjustment process rather than an immediate mechanical response to lower procurement prices. Hospitals more exposed to the disrupted financial channel did not show a clear change in the first implementation year, but average expenditure per outpatient visit subsequently increased more in provinces with greater baseline dependence. This temporal pattern suggests that the consequences accumulated as the procurement reform took hold.

3.6.3 The 2023 Anti-Corruption Campaign and Cumulative Disruption

The secondary analysis examines whether the 2023 anti-corruption campaign operated differently in provinces that had already experienced the original NVBP pilot. Table 3.2 reports models that interact the campaign year, prior pilot exposure, and province-level enforcement intensity while retaining the terms from the moderated NVBP specification.

The campaign estimates point in the direction anticipated by the compounding argument. At average enforcement intensity, provinces exposed to the original NVBP pilot experienced an addi-

Table 3.2: Campaign Enforcement, Prior NVBP Exposure, and Outpatient Expenditure

	Total expenditure	Drug expenditure
<i>Existing NVBP terms</i>		
Early exposure $\times$ Post	31.57*** (7.32)	7.37* (3.09)
Post $\times$ Drug dependence	-49.41 (112.80)	49.28 (66.94)
Early exposure $\times$ Post $\times$ Drug dependence	773.10** (248.40)	189.10* (72.14)
Effect of a 10-percentage-point higher drug share	77.31** (24.84)	18.91* (7.21)
<i>Campaign terms</i>		
Prior early exposure $\times$ Campaign year	13.87 (10.30)	3.09 (3.52)
Campaign year $\times$ Enforcement intensity	-7.60 (6.03)	-2.94 (1.57)
Prior early exposure $\times$ Campaign year $\times$ Enforcement intensity	5.91 (7.88)	2.96 (2.07)
Province fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	434	434
Within R^2	0.449	0.282

Notes: Dependent variables are measured in RMB per outpatient visit at public hospitals. Drug dependence is the mean-centered 2017 outpatient drug share. The campaign year is 2023. Enforcement intensity is the standardized number of publicly reported cases involving municipal-level and more senior healthcare officials in each province during 2023. Provinces with no qualifying reported cases are coded as zero. Province-clustered standard errors are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

tional RMB 13.87 increase in total outpatient expenditure and an additional RMB 3.09 increase in drug expenditure during 2023 relative to later-exposure provinces. Stronger enforcement was associated with lower expenditure among later-exposure provinces: a one-standard-deviation increase in observed enforcement corresponded to RMB 7.60 less in total expenditure and RMB 2.94 less in drug expenditure per visit.

The positive three-way interactions indicate that these reductions were attenuated in provinces that had already experienced the original NVBP pilot. For every standard-deviation increase in enforcement intensity, prior pilot exposure offset the estimated reduction by RMB 5.91 for total expenditure and RMB 2.96 for drug expenditure. At one standard deviation above average enforcement, the implied additional campaign-year difference associated with prior pilot exposure was RMB 19.78 in total expenditure and RMB 6.05 in drug expenditure.

This pattern is consistent with the capacity-bearing account. Enforcement intensity was associated with lower costs in later-exposure provinces, as a conventional accountability account would anticipate, but those apparent gains largely disappeared where hospitals had already experienced the earlier procurement disruption. The estimates suggest that the consequences of a second intervention depended on whether the drug-centered channel had already been weakened.

I am cautious in interpreting this evidence because the estimates remain imprecise. None of the campaign coefficients or three-way interactions is individually statistically significant. The campaign began in 2023, so the expenditure data capture only its onset, and the three-way interaction relies on a small number of early-exposure provinces. Investigation counts may also reflect underlying corruption and disclosure practices in addition to enforcement intensity. These results should be treated as suggestive evidence consistent with cumulative disruption, not as a definitive estimate of the campaign's effect.

Importantly, adding the campaign interactions leaves the principal NVBP result almost unchanged. A 10-percentage-point higher baseline drug share remains associated with an additional RMB 77.31 in total outpatient expenditure and RMB 18.91 in outpatient drug expenditure after early NVBP exposure. These estimates are nearly identical to those in the primary specification, indicating that the geographic distribution of campaign enforcement does not account for the main relationship between pre-reform drug dependence and post-NVBP affordability.

3.6.4 Corroborating Evidence from Firm Expenditure Patterns

One possible interpretation of the above results is that NVBP failed to meaningfully disrupt corruption. To assess this possibility, I examine complementary expenditure patterns among more than 200 listed Chinese pharmaceutical firms, using financial data collected from their annual reports.⁹

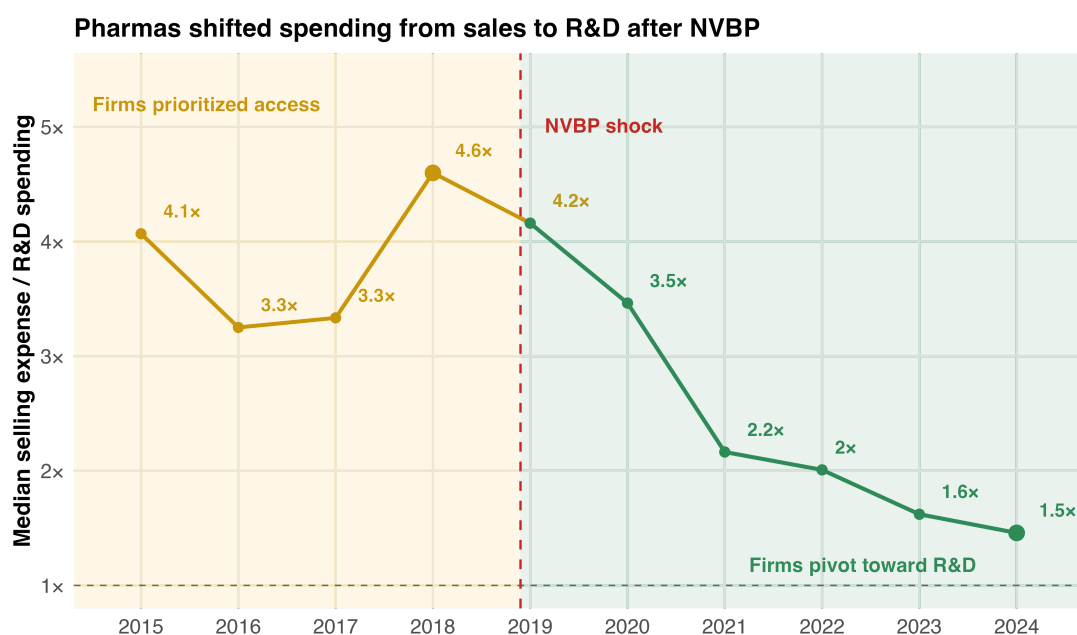


Figure 3.4: Selling expenditure relative to R&D expenditure among listed Chinese pharmaceutical firms, 2015–2024. The figure shows the annual ratio of selling expenditure to R&D expenditure constructed from firms’ disclosed financial statements. The red dashed line marks the implementation of NVBP in 2019.

Selling expenditure is not a direct measure of corruption. It includes legitimate marketing, distribution, sales personnel, and other commercial activities. Yet pharmaceutical commissions and kickbacks were commonly organized through sales departments, marketing intermediaries, and hospital-facing promotional activities (e.g., Tam 2011; Rose-Ackerman and Tan 2014; Fu et al. 2023). Changes in selling expenditure relative to other firm activities consequently provide an indirect measure of firms’ reliance on the commercial channels through which informal payments had operated.

Figure 3.4 shows a pronounced change after NVBP. Before the reform, listed pharmaceutical firms devoted between 3.3 and 4.6 times as much to selling expenditure as to R&D. The ratio remained 4.2 in 2019 but subsequently declined, approaching 1.5 by 2024. The change indicates

9. See Appendix A1.1 for details on data collection.

a sustained decline in selling expenditure relative to R&D after the introduction of centralized procurement.

This descriptive pattern does not establish the causal effect of NVBP or reveal what portion of selling expenditure had financed corrupt activity. It does, however, make it less plausible that NVBP left supplier-side commercial practices entirely untouched. By determining supplier access and committed volume through centralized bidding, NVBP reduced the value of cultivating individual hospitals and prescribers. The declining relative weight of selling expenditure is consistent with firms devoting fewer resources to those relationship-based channels.

3.7 Qualitative Evidence: How Reform Disrupted Informal Relationships

The quantitative analysis examines the financial dimension of informal capacity, showing that after early NVBP exposure, the amount charged for the average outpatient visit increased more in provinces whose public hospitals had depended more heavily on the drug-centered channel before reform. The qualitative analysis turns to the relational dimension of informal capacity: the trust and channels of coordination that developed through repeated corrupt exchange, and how they were subsequently affected by anti-corruption efforts.

The evidence comes from fieldwork conducted at multiple sites across China between 2023 and 2026. I interviewed physicians, hospital administrators, pharmaceutical employees, and officials involved in regulation and procurement, while also observing everyday work and interactions in public and private hospitals and pharmaceutical companies, including the work of pharmaceutical representatives.¹⁰ I use this evidence to trace processes rather than estimate the prevalence of particular practices, focusing on how participants understood the relationships surrounding pharmaceutical sales, how those relationships supported routine hospital activity, and what happened when reform disrupted them.

3.7.1 From Collective Exchange to Fragmented Coordination

Before NVBP, drug-related corruption in many public hospitals was organized collectively through clinical departments. Pharmaceutical firms often approached department heads or other senior physicians, who could coordinate participation across prescribers. Commissions linked to prescription volume were pooled and distributed as supplementary bonuses to everyone in the de-

10. Because the research concerns potentially incriminating conduct and ongoing enforcement, I withhold respondents' names, institutional affiliations, and field sites. Respondents are identified only by their general institutional roles.

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partment. Given the relatively limited formal compensation of public-hospital physicians, respondents described these payments as having become part of routine income. One physician called the arrangement a “shared crime”: its participants shared the proceeds, understood how the system operated, and faced a common risk if it was exposed.

Mutual implication also made the department a protected space for exchanging information. Senior doctors taught junior colleagues which offers involved products they considered clinically reliable and warned them against “bad bribes” attached to products of questionable quality. These distinctions neither legitimized the payments nor ensured that prescribing followed medical need, but they reduced uncertainty about suppliers and products. Because exposure threatened everyone involved, participants could discuss such matters candidly within the group.

Pharmaceutical firms also financed conference registration, travel, academic meetings, and research collaborations for which hospitals and physicians had limited formal resources. This support was especially valuable because research output and publications have commonly been tied to promotion and bonuses in Chinese tertiary public hospitals (Shen et al. [2022](#)). Illicit commercial relationships supported activities with legitimate professional functions, including clinical exchange, research, and the maintenance of professional networks.

Corruption thus operated as a form of departmental infrastructure. A durable relationship with a department head gave a firm access to a group of prescribers while providing physicians with compensation, information, and professional support that the formal organization did not fully supply.

NVBP weakened this infrastructure significantly. As centralized procurement expanded to cover more widely used medicines, procurement discretion shifted away from individual hospitals and departments. Firms had less reason to pay department heads for access allocated through centralized bidding, making prescription-linked pools increasingly difficult to sustain.

The opportunities that remained were narrower and less evenly distributed. Physicians described a shift toward self-pay drugs and services outside public insurance coverage, where hospitals retained greater discretion. Access depended heavily on specialty and patient population. Dermatology departments, for example, could combine self-pay products with cosmetic and other specialized services, whereas departments centered on common insured treatments had fewer comparable options. A broadly shared departmental pool was replaced by resources tied to particular specialties and individual physicians, fragmenting the earlier collective arrangement.

The 2023 campaign further changed the consequences of mutual implication. Healthcare security bureaus investigated inappropriate insurance claims, fraudulent billing, and other misuse of

public funds, sometimes imposing repayment demands or penalties at the departmental level. Respondents described recently hired physicians being expected to contribute toward penalties for practices that had begun before they joined the hospital. What had once bound colleagues through shared gains could now expose them to liabilities for conduct they had neither initiated nor benefited from.

These risks changed everyday interactions. Physicians became more guarded when discussing prescriptions, billing practices, and inherited departmental routines because they could not know whether a colleague's prior decision was part of a corrupt arrangement. As a result, physicians increasingly looked for reasons to avoid cross-departmental consultations, or *huizhen*, even when a patient had a legitimate medical need. Joining a case could implicate the consulting physician in a corrupt arrangement they knew nothing about, so doctors often preferred to decline rather than assume that risk. In the past, a physician might have agreed to help a colleague and maintain a good relationship with another department. Under heightened enforcement, that informal expectation of reciprocity weakened, leaving some patients without specialist input they might otherwise have received.

Together, these changes weakened the relationships on which collaborative patient care had relied. Information moved less freely, consultation carried greater personal risk, and physicians had stronger incentives to protect themselves rather than assume collective responsibility for difficult cases. Some respondents also connected the growing pressure and uncertainty to physicians leaving public hospitals, further weakening continuity within departments. The reforms curtailed corrupt exchange, but they did not replace the compensation, information, and coordination that had traveled through the same relationships.

3.7.2 The Loss of Hospital–Firm Information Channels

A second disruption affected relations between hospitals and pharmaceutical firms. Its effects were visible at hospital entrances and outside clinical offices, where signs prohibiting pharmaceutical representatives became increasingly common. These restrictions targeted relationships associated with kickbacks and prescription-based commissions, but they also made legitimate contact with representatives a source of suspicion.

Before the crackdown, pharmaceutical representatives carried more than payments and promotional materials. They also moved information through a technically complex market that hospitals often lacked the personnel to evaluate independently. A senior official involved in local procure-

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ment described one department in which only two staff members reviewed procurement applications covering roughly one hundred drugs. Determining whether a drug was appropriately priced or a new piece of equipment represented a meaningful upgrade required detailed knowledge of manufacturers, production processes, local distributors, and competing products. Differences that appeared minor on paper could matter considerably in practice.

Physicians had clinical expertise but not necessarily access to commercial and manufacturing knowledge. Representatives and local agents often knew which factories had persistent quality problems, how domestic products compared with multinational alternatives, whether quality checks could be manipulated, and whether a purported improvement offered meaningful clinical value.

Although representatives had obvious commercial interests, many were playing a long game. Local pharmaceutical markets operated as small, stable professional circles. Representatives might change employers and products, but they continued selling to the same hospitals, physicians, and administrators, so their reputations followed them across jobs. Respondents distinguished those seeking “long money” from those pursuing a quick sale. Concealing a serious problem might secure one transaction but jeopardize future access to the entire local market.

Corrupt exchange deepened this reputational trust by making representatives, physicians, and hospital administrators members of the same insider circle. Meals, excursions, and fishing trips paid for by pharmaceutical firms sustained improper influence, but they also created settings in which participants interacted as friends rather than arm’s-length buyers and sellers. Within these relationships, representatives sometimes disclosed weaknesses in their own products, problems inside particular bids, or advantages held by competitors. Such information was valuable precisely because it would rarely appear in official documents. Without the trust and mutual implication created by a durable insider relationship, representatives had little reason to reveal information that could undermine their own immediate sales.

NVBP reduced the value of cultivating hospitals for drugs covered by centralized procurement. The 2023 campaign went further by making the relationship itself risky. Physicians avoided representatives because even a legitimate meeting could attract suspicion, while representatives lost access to the informal settings in which frank conversations had occurred. The crackdown restricted illicit payments, but it also interrupted the flow of information embedded in the same relationships.

Formal channels did not readily replace what had been lost. Physicians who had once learned about products through industry contacts described turning instead to WeChat articles and Douyin videos. One contrasted information previously obtained “from the source” with online claims

whose reliability was difficult to assess. Procurement rules could establish approved prices and suppliers, but they could not give understaffed officials the specialized knowledge needed to evaluate every product, manufacturer, or proposed equipment upgrade. Some respondents complained that NVBP left hospitals with products they considered cheap and of poor quality, even when they knew of manufacturers offering better alternatives that had failed to win the bid.

The deterioration of trust also reduced the credit pharmaceutical firms extended to hospitals. Firms routinely delivered medicines before receiving payment, but familiar hospitals had previously been allowed longer payment periods because reimbursement and internal approval procedures moved slowly. After the campaign, pharmaceutical firms began demanding payment sooner and collecting outstanding balances more aggressively. Employees worried that a familiar hospital leader might suddenly come under investigation, leaving payments delayed or contested, while an unusually long payment period could itself attract suspicion. The delivery-first system remained, but the shortened payment periods placed greater pressure on hospital cash flow.

Pharmaceutical representatives certainly did not provide neutral advice, and their relationships with hospitals distorted prescribing and imposed costs on patients and public insurance funds. The problem was that enforcement removed these compromised channels without creating independent sources of information or replacing the commercial trust.

3.8 Conclusion

This chapter asks why successful corruption control does not always produce corresponding improvements in public services. I argue that the answer depends not only on how much corruption a reform removes but also on how corruption was organized before reform. When corrupt exchanges recur through stable organizational roles, they can generate resources and relationships that participants use for purposes extending beyond private extraction. In Chinese public hospitals, drug-linked payments pooled discretionary resources and sustained trusted channels through which physicians, administrators, and pharmaceutical firms exchanged information and coordinated their work. Such corruption remained costly, exclusionary, and distorting, but it had also become capacity-bearing.

The empirical evidence shows what happened when two interventions disrupted these arrangements. NVBP reduced hospitals' discretion over suppliers, prices, and procurement volumes for covered drugs, weakening the financial basis of hospital-firm exchange. Following early exposure to the reform, average outpatient expenditure increased more in provinces whose public hospitals

had higher baseline drug shares. A 10-percentage-point higher baseline drug share was associated with an additional post-reform increase of approximately RMB 76 in total expenditure and RMB 18 in drug expenditure per outpatient visit. The secondary analysis of the 2023 campaign points toward additional disruption where NVBP had already weakened these arrangements. Field evidence provides further support by showing how the reforms weakened both cooperation within hospitals and relationships between hospitals and pharmaceutical firms.

These findings broaden how disappointing anti-corruption outcomes should be interpreted. Existing explanations often emphasize failures of enforcement, but this chapter identifies another possibility in which reform genuinely constrains the corruption it targets while service improvement remains limited because removing illicit transactions does not by itself reorganize the institutions in which they had become embedded. The organizational consequences of anti-corruption depend on whether corrupt exchanges were isolated acts of extraction or part of an organization's working infrastructure, not only on the severity of corruption or the intensity of enforcement.

Although corruption can become capacity-bearing, reliance on it may delay the construction of formal alternatives by making underlying deficiencies harder to observe and eventual replacement more difficult to design. When employees and suppliers absorb organizational shortfalls informally, supervising authorities face fewer immediate consequences from inadequate funding and have less visibility into the resources and relationships sustaining performance. Because these supports operate outside formal budgets and procedures, authorities may not know exactly which functions they perform, while the resources and relationships themselves cannot simply be transferred into a clean system. Organizations can appear capable until reform removes the arrangements that had concealed their deficiencies, exposing those weaknesses at precisely the moment when they must operate without the supports on which they had come to rely.

Several questions remain open, since the evidence identifies the organizational consequences that followed the disruption of capacity-bearing corruption but cannot determine whether or how quickly formal institutions eventually replace the functions that were lost, or directly measure every relational mechanism implicated in that process. Comparative research combining administrative data with more granular organizational evidence could show how reform sequencing and institutional context shape longer-run adjustment.

The broader policy lesson is that anti-corruption reform cannot be designed solely as an exercise in behavioral deterrence. Where corruption has become organizationally embedded, reformers must also identify and replace the functions carried by corrupt arrangements, which may require

formal sources of discretionary financing and reliable information as well as legitimate channels through which organizational actors can coordinate their work. Without such replacements, successful enforcement may expose organizational weaknesses without equipping public institutions to function through cleaner means. Anti-corruption reform succeeds fully only when public organizations can perform necessary functions through clean and accountable arrangements.

A1 Data Collection and Cleaning

A1.1 Listed Pharmaceutical Companies' Annual Reports Data Collection and AI-Assisted Extraction

The annual-report dataset is built from the universe of pharmaceutical firms listed on the Shanghai and Shenzhen stock exchanges as of 2026 March. The firm roster contains 262 firms, using the exchange-sector definition of pharmaceutical companies (医药卫生板块).

I then download annual reports for these firms from Sina Finance (新浪财经), which provides firm-year report filings in downloadable PDF or Word format. In total, I have collected 1965 annual-report files in supported formats. To ensure the final panel is based on firms with consistent temporal coverage, I exclude companies with fewer than 3 annual reports, which leaves a retained extraction corpus of 1954 firm-year reports. The retained reports span between 2015 and 2024, although coverage is unbalanced because some firms list later, restructure, or have corrected filings.

The reports are then processed in four stages. First, the corpus is audited locally for searchability. For each file, I record its meta data (firm name, report year, file type, document length, and whether the report is machine-searchable). PDFs are parsed page by page, and for each page, I measure the amount of recoverable text to classify reports as either searchable or image-heavy. On average, the searchable ratio is 98%, which justified a text-first extraction strategy rather than full-report OCR. For Word files, I extract text directly where possible and convert to PDF only when needed for model-based extraction.

Second, I randomly draw a diversified sample of 20 reports across firms and years to determine which variables are disclosed in a sufficiently standardized way for full-corpus extraction. Third, I use those pilot results to define a narrow extraction schema, centered on variables that are both substantively informative and consistently reported, as well as to inform prompt generation.

Fourth, I run structured model-based extraction on the full corpus and compile the results into a firm-year panel. The extraction itself uses ChatGPT 5.4-mini through a structured file-input workflow. Each report is passed with a strict extraction prompt (see below) and a JSON schema that require field-level outputs, source evidence, and explicit missingness. The pipeline first identifies local pages, searching for section headers and keywords associated with variables of interests including financial statements, R&D, patent disclosure, employee structure, pipeline products, and policy discussions. These “mini-PDFs” are then sent to ChatGPT 5.4-mini to perform extraction. The model is instructed never to infer absent values and to mark any field as `not_found` or

ambiguous unless the reported number is explicit.

The key variables constructed can be categorized into three groups. First, I extract core numeric firm-year variables, such as operating revenue, net profit (attributable to the parent company), total assets, net cash flow, selling expense, administrative expense, finance expense, R&D expense, capitalized R&D, R&D personnel count, and patent counts. From these numeric variables, I also compute derived variables such as profit margin, R&D intensity, selling-expense ration, and growth rates in revenue and net profit. The second group contains list-style variables such as key pipeline products and key products listed in national health insurance. The third group of variables include raw text snippets, including business models, policy environment (especially mentionings of NVBP, NRDL, health insurance, drug approvals, anti-corruption, and the COVID-19 pandemic), innovation strategy (clinical trials or IND activity), overseas exposure, and financing narratives.

A central design principle in ChatGPT prompt is conservative coding. The extractor is tuned to prefer missing data over hallucination. In the pilot and sample validations, the best-captured fields are operating revenue, net profit, cash flow, various expenses, R&D personnel measures, and patents. The less stable fields such as total liabilities and net profit are retained but flagged as lower-confidence. As the use of generative AI faces the risk of contamination from nearby numbers, mislabeled statements, or generic narrative text, the pipeline addresses this by combining ex ante field selection, local page filtering, schema-constrained extraction, and conservative treatment of ambiguous values. The used JSON prompt is listed below.

Extraction Prompt

```

1 {
2   "purpose": {
3     "question": "Build scalable annual-report panel data with cost control and
      ↪ high capture of central metrics.",
4     "focus": [
5       "revenue level and growth",
6       "net profit level and growth",
7       "R&D vs selling / marketing spending",
8       "innovation inputs and outputs",
9       "overseas exposure and license-out",
10      "stock-market financing / investment narratives",
11      "policy environment including 疫情/新冠",
12      "reimbursement dependence and portfolio structure",

```

```

13     "R&D PhD / high-skill workforce structure"
14 ]
15 },
16 "core_numeric_fields": [
17     "operating_revenue",
18     "net_profit_parent",
19     "total_assets",
20     "net_cash_operating",
21     "selling_expense",
22     "administrative_expense",
23     "finance_expense",
24     "rd_expense",
25     "rd_personnel_count",
26     "rd_personnel_share_percent",
27     "invention_patent_total"
28 ],
29 "optional_numeric_fields": [
30     "net_profit",
31     "total_liabilities",
32     "net_cash_financing",
33     "cash_from_absorbing_investment",
34     "rd_capitalized",
35     "employee_count",
36     "rd_phd_count"
37 ],
38 "list_fields": [
39     "revenue_composition",
40     "star_pipeline_products",
41     "core_reimbursed_products"
42 ],
43 "text_topics": [
44     "business_model",
45     "policy_environment",
46     "overseas_and_license_out",
47     "drug_portfolio_and_reimbursement_dependence",
48     "innovation_strategy",

```

```
49     "clinical_and_ind_activity",
50     "equity_financing_and_market_story"
51 ],
52 "cost_controls": {
53     "use_gpt": true,
54     "use_gpt_for_lists": true,
55     "use_gpt_for_text_topics": false,
56     "use_gpt_for_missing_high_priority_numerics": true,
57     "use_mini_pdf": true,
58     "mini_pdf_max_pages": 12,
59     "model": "gpt-5.4-mini"
60 }
61 }
```

A1.2 Health Yearbook Data Collection and AI-Assisted Extraction

This study uses the China Health Statistics Yearbook (中国卫生健康统计年鉴), published by the National Health Commission of the People’s Republic of China, for national and province-level information on health system capacity, hospital finance, service delivery, and medical expenditure. According to the National Health Commission’s official statistics archive, the yearbook is an annual statistical compilation covering health-sector development and population health across China’s 31 provinces, autonomous regions, and municipalities (excluding Hong Kong, Macau, and Taiwan).

Because the yearbooks were distributed as separate PDFs, I built the dataset through a supervised AI-assisted extraction workflow. The extraction script processed yearbook PDFs for 2010–2024, split each PDF into 25-page chunks, and stored both intermediate chunk files and structured outputs in a reproducible directory tree. The script used a two-stage pipeline: a first survey pass with `gpt-5-nano` to identify relevant tables within each PDF chunk, followed by a more targeted extraction pass with `gpt-5-mini` to transcribe the selected tables into structured JSON and CSV outputs.

In the survey pass, the model was instructed to scan a PDF chunk for all tables related to predefined “families”, record the likely table title, page, unit, row structure, and probable family match. The prompt instructed the model to keep province-by-row tables, relevant national summary tables, time-series tables, and hospital-type comparison tables. In the extraction pass, the model received a family-specific prompt containing that family’s description, known title variants, common headers, expected measures, units, and output fields, and was explicitly instructed to extract only clearly visible values, preserve total rows, return `null` when a field was absent, without guessing.

The family configuration was assembled from prompt blueprints and then consolidated into a cleaned JSON dictionary. A separate script parsed blueprint text files into structured configuration objects containing the family description, title variants, header keywords, detected measures, units, and row structures. The cleaned family JSON indicates that the original broader categories were split into more precise families to reduce cross-family contamination, that title variants were preserved while year-specific wording was normalized using `data_year` placeholders. The resulting 15 families are listed in Table 3.3.

Table 3.3: Health yearbook extraction families

Family	Content	Example variables
cost	Patient cost tables on outpatient and inpatient spending, including drug, exam, and surgery components.	drug_cost_share , exam_cost_share , inpatient_daily_cost
disease_cost	Disease-specific inpatient cost tables, usually by diagnosis category.	disease , hospital_scope , unit
hospital_finance	Hospital revenue and expenditure tables, including revenue composition and financing sources.	total_revenue , drug_revenue
health_expenditure_macro	Macro-level health expenditure tables on total, government, social, and personal spending.	total_health_expenditure , personal_health_expenditure
insurance_admin	Administrative insurance tables on enrollment, fund flows, reimbursement, and medical assistance.	fund_income , fund_expenditure , maternity_insured
insurance_survey	Survey-based insurance coverage tables across population groups and regions.	urban_share , west_share , uninsured_share
outpatient_service	Outpatient and emergency service tables, including visits, health checks, and physician workload.	outpatient_visits , emergency_visits , resident_avg_visits
inpatient_service	Inpatient service tables on admissions, discharges, surgery, mortality, and stay length.	admissions , discharges , mortality_rate
bed_utilization	Bed-use tables on occupancy, turnover, bed-days, and average stay.	bed_turnover , bed_occupancy_rate , avg_length_of_stay
bed_stock_capacity	Bed stock and bed-size distribution tables, including total beds and bed groups.	beds_total , licensed_beds

Continued on next page

Table 3.3: Health yearbook extraction families

Family	Content	Example variables
hospital_assets_liabilities	Hospital balance-sheet tables on assets, liabilities, and net assets.	total_assets , total_liabilities
equipment_buildings	Tables on equipment stock and hospital buildings, including area and equipment counts.	equipment_count , building_area
informatization	Hospital information infrastructure tables, such as servers, storage, and terminals.	computer_terminals , distribution_share
workforce_capacity	System capacity tables on institutions, hospitals, staffing, and beds.	hospitals_count , physicians_count , nurses_count
hospital_workload_efficiency	Hospital workload and efficiency tables, especially physician workload and utilization indicators.	bed_occupancy_rate , avg_length_of_stay

After extraction, the script flattened row-level outputs into standardized records with common metadata, including source PDF, chunk location, book year, data year, table title, page number, table level, and row structure. It then separated province-level rows from non-provincial rows and wrote both family-specific outputs and batch-level master files to disk. AI was used as a structured extraction and harmonization assistant, but the National Health Commission yearbooks remained the authoritative source documents. In the final dataset construction, extracted outputs were reviewed and cleaned under researcher supervision before being used for analysis.

A1.3 Anti-Corruption Case Data Collection

The anti-corruption data were hand collected from the websites of central and provincial-level discipline inspection and supervision authorities, primarily provincial Commissions for Discipline Inspection and Supervision (CCDI/纪委监委). The collection period runs from 2014 through June 2025. The unit of collection is the publicly reported corruption case announcement. These announcements typically identify the official under investigation or sanction, the official's organizational affiliation, and the timing of the announcement.

The dataset is designed to capture anti-corruption activity in the health sector. I therefore include only cases in which the subject of the investigation worked in a health-related organization or held a health-related administrative position. This includes hospital leaders and administrators (for example, hospital presidents, vice presidents, and party secretaries), officials in health commissions (*weijianwei/卫健委*), and officials in the drug regulatory system (*yaojianju/药监局*). The dataset includes both incumbent and retired officials whenever they were publicly identified in connection with a health-sector post.

Because reporting practices differ somewhat across provincial CCDI websites, the data should be understood as a hand-collected record of publicly announced cases rather than a complete administrative census of all investigations. For each province, I recorded the timing and sectoral affiliation of each case announcement and then aggregated these announcements to the province-year level. The resulting health-sector series is used to characterize the intensity and timing of anti-corruption activity directed at the health system.

In addition to the health-sector sample, I also collected the total number of publicly announced corruption cases from the same provincial CCDI sources, regardless of sector, over the 2014–June 2025 period (17,489 cases in total). These totals serve as a contextual benchmark for overall anti-corruption activity and provincial reporting intensity. They are useful because provinces differ not only in the number of health-sector cases, but also in the overall volume of disciplinary case announcements made public on their CCDI websites. Comparing health-sector cases to the broader all-sector total helps distinguish health-sector targeting from general differences in provincial anti-corruption intensity or disclosure practices.

A1.4 Expansion of NVBP

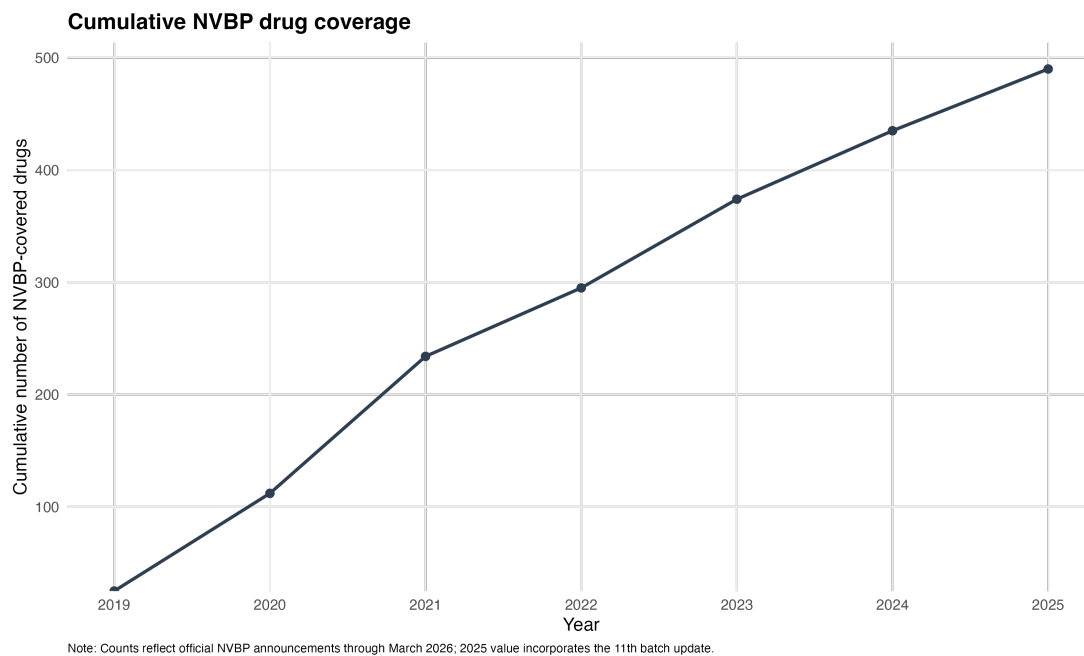


Figure 3.5: Cumulative number of drugs covered by China's National Volume-Based Procurement (NVBP), 2019–2025. Since the initial pilot in 2019, NVBP has expanded steadily year by year to cover an increasingly large set of drug (mainly off-patent generics). The figure illustrates the progressive widening of the policy's scope over time.

A2 Robustness Check

A2.1 Inpatient Expenditure as a Placebo Comparison

The main analysis measures pre-reform dependence using the outpatient drug share because outpatient prescribing and hospital dispensing were closely connected to supplier access and informal pharmaceutical payments. As a placebo comparison, I construct an analogous measure using the share of inpatient expenditure attributable to drugs in 2017. Inpatient drug share should be a much noisier proxy for dependence on supplier-linked informal exchanges, because inpatient admissions include a broader mix of tests, procedures, surgery, and consumables, through which hospitals can generate revenue without relying on pharmaceutical suppliers.¹¹ If the outpatient proxy captures a distinct drug-centered corruption channel, the inpatient measure should not reproduce the same positive moderating relationship, particularly for inpatient drug expenditure.

Table 3.4: Early NVBP Exposure, Inpatient Drug Share, and Inpatient Expenditure

	Baseline DID		Moderated DID	
	Total expenditure	Drug expenditure	Total expenditure	Drug expenditure
Early exposure $\times$ Post	1,602.16* (645.48)	142.03 (109.60)	1,079.33* (469.35)	190.25 (127.63)
Post $\times$ Inpatient drug share	—	—	8,455.84 (4,165.65)	2,352.91 (1,904.23)
Early exposure $\times$ Post $\times$ Inpatient drug share	—	—	-32,166.87* (12,639.90)	-1,447.90 (2,754.15)
Effect of a 10-percentage-point higher inpatient drug share	—	—	-3,216.69* (1,263.99)	-144.79 (275.41)
Province fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	434	434	434	434
Within R^2	0.186	0.020	0.263	0.037

Notes: Dependent variables are measured in RMB per inpatient admission at public hospitals. The moderated specifications use the mean-centered 2017 share of total inpatient expenditure attributable to drugs. The final coefficient row rescales the triple-interaction estimate to a 10-percentage-point increase in the baseline inpatient drug share. Positive coefficients indicate higher expenditure and thus lower affordability. Province-clustered standard errors are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3.4 first shows that total inpatient expenditure increased after early NVBP exposure by an average of RMB 1,602 per admission, while the corresponding increase in inpatient drug expenditure was not statistically significant. This aggregate pattern is consistent with an organization-wide adjustment that operated through non-drug components of inpatient care rather than through higher

11. For reference, in 2017, drugs accounted for an average of 31.3% of expenditure per inpatient admission, compared with 41.6% per outpatient visit.

drug expenditure.

The moderated inpatient results do not reproduce the outpatient pattern. At mean baseline inpatient drug share, early NVBP exposure was associated with RMB 1,079 more in total expenditure per admission. A 10-percentage-point higher inpatient drug share reduced this difference by RMB 3,217. The moderating effect is opposite in direction to the outpatient result. For inpatient drug expenditure, neither the early-exposure estimate nor the moderating effect is statistically distinguishable from zero.

The contrast supports the interpretation of the outpatient drug share as a setting-specific proxy for dependence on drug-linked informal resources. In outpatient care, a higher drug share predicted larger increases in both total and drug expenditure after early NVBP exposure. In inpatient care, a higher drug share did not predict greater drug expenditure and instead attenuated the increase in total expenditure. This is consistent with inpatient admissions relying more heavily on non-drug revenue margins, such as tests, procedures, and consumables, which were not directly compressed by NVBP. The main outpatient result does not appear to arise simply because any pre-reform drug-share measure predicts subsequent expenditure growth.

References

- Ang, Yuen Yuen. 2020. *China's Gilded Age: The Paradox of Economic Boom and Vast Corruption*. Cambridge University Press, 285. <https://play.google.com/store/books/details?id=J13bDwAAQBAJ>.
- Assefa, H. 2018. "Recruitment and promotion practices in the Ethiopian civil service." *Public Policy and Administration Research* 8 (7): 27–37. <https://www.iiste.org/Journals/index.php/PPAR/article/view/43551>.
- Avis, Eric, Claudio Ferraz, and Frederico Finan. 2018. "Do government audits reduce corruption? Estimating the impacts of exposing corrupt politicians." *J. Polit. Econ.* 126, no. 5 (February): 1912–1964. <https://doi.org/10.1086/699209>. <http://dx.doi.org/10.1086/699209>.
- Björkman, M, J Svensson, Abel Ojoo, Anthony Wasswa, James Kanyesigye, Carolyn Winter, and Ivo Njosa. 2008. "Power to the people: Evidence from a randomized field experiment on community-based monitoring in Uganda." *Q. J. Econ.*, <https://www.jakobsvensson.com/uploads/9/9/1/0/99107788/124-2-735.pdf>.

- Brogaard, Jonathan, Matthew Denes, and Ran Duchin. 2021. “Political influence and the renegotiation of government contracts.” *Rev. Financ. Stud.* 34, no. 6 (21 5): 3095–3137. <https://doi.org/10.1093/rfs/hhaa093>. <http://dx.doi.org/10.1093/rfs/hhaa093>.
- Busting, Chen. 2019. *Princelings’: Campaign Against Corruption China’s Primary Land Market*. 134:185–226.
- Cao, Xiaping, Yuchen Wang, and Sili Zhou. 2018. “Anti-corruption campaigns and corporate information release in China.” *Journal of Corporate Finance* 49 (January): 186–203. <https://doi.org/10.1016/j.jcorpfin.2018.01.008>. <https://www.sciencedirect.com/science/article/pii/S0929119917305400>.
- CCDI. 2026. *CCDI and NSC Report on Oversight Inspections and Case Review/Investigations by Discipline Inspection and Supervision Organs Nationwide [2025 中央纪委国家监委通报 2025 年全国纪检监察机关监督检查、审查调查情况]*. https://www.ccdi.gov.cn/toutiaon/202601/t20260117_470450.html. Accessed: 2026-4-9, 17 1.
- Chang, Zheng. 2018. “Understanding the corruption networks revealed in the current Chinese anti-corruption campaign: A social network approach.” *J. Contemp. China* 27, no. 113 (March): 735–747. <https://doi.org/10.1080/10670564.2018.1458060>. <http://dx.doi.org/10.1080/10670564.2018.1458060>.
- Cheeseman, Nic, and Caryn Peiffer. 2022. “The curse of good intentions: Why anticorruption messaging can encourage bribery.” *Am. Polit. Sci. Rev.* 116, no. 3 (August): 1081–1095. <https://doi.org/10.1017/s0003055421001398>. <http://dx.doi.org/10.1017/S0003055421001398>.
- Chen, Yilin, Xu Ji, Hong Xiao, Joseph M Unger, Yi Cai, Zongfu Mao, and Kai Yeung. 2021. “Impact of the pilot volume-based drug purchasing policy in China: Interrupted time-series analysis with controls.” *Front. Pharmacol.* 12 (22 12): 804237. <https://doi.org/10.3389/fphar.2021.804237>. <http://dx.doi.org/10.3389/fphar.2021.804237>.
- Cheng, Hanchao, Yuou Zhang, Jing Sun, and Yuanli Liu. 2021. “Impact of Zero-Mark-Up Medicines Policy on Hospital Revenue Structure: A Panel Data Analysis of 136 Public Tertiary Hospitals in China, 2012–2020.” *BMJ Global Health* 6 (11): e007089. <https://doi.org/10.1136/bmjgh-2021-007089>. <http://dx.doi.org/10.1136/bmjgh-2021-007089>.

- Chinacom Finance Channel. 2024. “国家医保局, 点名多家大三甲 [National Healthcare Security Administration names multiple top-tier hospitals].” 中华网财经 Chinacom Finance Channel (26 11). <https://finance.china.com/yiyao/13004692/20241126/47654412.html>.
- Della Porta, Donatella, and Alberto Vannucci. 2012. *Hidden Order Corruption: Institutional Approach*. Farnham, UK: Ashgate.
- Dickson, Bruce J, Pierre F Landry, Mingming Shen, and Jie Yan. 2016. “Public Goods and Regime Support in Urban China.” *China Q.* 228 (December): 859–880. <https://doi.org/10.1017/S0305741016001156>. https://www.cambridge.org/core/product/identifier/S0305741016001156/type/journal_article.
- Ding, Iza. 2017. “Corruption: The State of the Field.” In *Memo for Harvard Chinese Politics Workshop*, Harvard University. 15 12.
- Diviák, Tomáš, and Nicholas Lord. 2022. “Tainted ties: the structure and dynamics of corruption networks extracted from deferred prosecution agreements.” *EPJ Data Sci.* 11, no. 1 (September): 7. <https://doi.org/10.1140/epjds/s13688-022-00320-2>. <https://link.springer.com/article/10.1140/epjds/s13688-022-00320-2>.
- Fang, Hanming. 2023. “Measurements, Determinants and Causes of Corruption: Lessons from China’s Anti-Corruption Campaign,” Working Paper Series, no. 31276 (May). <https://doi.org/10.3386/w31276>. <http://www.nber.org/papers/w31276>.
- Fang, Hanming, Xiaoyan Lei, Julie Shi, and Xuejie Yi. 2021. *Physician-induced Demand: Evidence from China’s Drug Price Zero-markup Policy*. National Bureau of Economic Research. <https://play.google.com/store/books/details?id=MNXrzgEACAAJ>.
- Ferraz, Claudio, and Frederico Finan. 2008. “Exposing corrupt politicians: The effects of Brazil’s publicly released audits on electoral outcomes*.” *Q. J. Econ.* 123, no. 2 (May): 703–745. <https://doi.org/10.1162/qjec.2008.123.2.703>. <https://dx.doi.org/10.1162/qjec.2008.123.2.703>.
- Ferraz, Claudio, Luiz Moura, Lars Norden, and Ricardo Schechtman. 2025. “The real costs of washing away corruption: Evidence from Brazil’s lava jato investigation.” *SSRN Electron. J.*, <https://doi.org/10.2139/ssrn.5341587>. <http://dx.doi.org/10.2139/ssrn.5341587>.

- Fu, Hongqiao, Yi Lai, Yuanyuan Li, Yishan Zhu, and Winnie Yip. 2023. “Understanding medical corruption in China: a mixed-methods study.” *Health Policy Plan.* 38, no. 4 (November): 496–508. <https://doi.org/10.1093/heapol/czad015>. <http://dx.doi.org/10.1093/heapol/czad015>.
- Gambetta, Diego. 1993. *Sicilian Mafia: Business Private Protection*. Cambridge, MA: Harvard University Press.
- Gans-Morse, Jordan, Mariana Borges, Alexey Makarin, Theresa Mannah-Blankson, Andre Nickow, and Dong Zhang. 2018. “Reducing bureaucratic corruption: Interdisciplinary perspectives on what works.” *World Dev.* 105 (May): 171–188. <https://doi.org/10.1016/j.worlddev.2017.12.015>. <http://dx.doi.org/10.1016/j.worlddev.2017.12.015>.
- Greif, Avner, Joel Mokyr, and Guido Tabellini. 2025. *Two Paths to Prosperity: Culture and Institutions in Europe and China, 1000–2000*. Princeton, NJ: Princeton University Press.
- Gutiérrez-Urtiaga, María, Stavriana Hadjigavriel, and Susana Gago-Rodriguez. 2020. “Bribes and audit fees.” *European Corporate Governance Institute–Finance Working Paper*, no. 683, <https://www.sciencedirect.com/science/article/abs/pii/S0278425424001005>.
- He, Zengke. 2000. “Corruption and anti-corruption in reform China.” *Communist Post-Communist Stud.* 33, no. 2 (January): 243–270. [https://doi.org/10.1016/s0967-067x\(00\)00006-4](https://doi.org/10.1016/s0967-067x(00)00006-4). [http://dx.doi.org/10.1016/s0967-067x\(00\)00006-4](http://dx.doi.org/10.1016/s0967-067x(00)00006-4).
- Helmke, Gretchen, and Steven Levitsky. 2004. “Informal institutions and comparative politics: A research agenda.” *Perspect. Politics* 2, no. 04 (December): 725–740. <https://doi.org/10.1017/S1537592704040472>. <http://dx.doi.org/10.1017/S1537592704040472>.
- Hicken, Allen. 2011. “Clientelism.” *Annu. Rev. Polit. Sci. (Palo Alto)* 14, no. 1 (15 6): 289–310. <https://doi.org/10.1146/annurev.polisci.031908.220508>. <http://dx.doi.org/10.1146/annurev.polisci.031908.220508>.
- Huntington, Samuel P. 2006. *Political order in changing societies*. The Henry L. Stimson Lectures. New Haven, CT: Yale University Press.
- Jakovljevic, Mihajlo, Hanyu Chang, Jay Pan, Chao Guo, Jin Hui, Hao Hu, Danko Grujic, Zhong Li, and Lizheng Shi. 2023. “Successes and challenges of China’s health care reform: a four-decade perspective spanning 1985–2023.” *Cost Eff. Resour. Alloc.* 21, no. 1 (30 8): 59. <https://doi.org/10.1186/s12962-023-00461-9>. <http://dx.doi.org/10.1186/s12962-023-00461-9>.

- Jancsics, David, and Jacopo Costa. 2024. "Organizational Forms of Corruption Networks: The Odebrecht–Toledo Case." *International Public Management Journal* 27 (4): 559–582. <https://doi.org/10.1080/10967494.2023.2260368>. <https://doi.org/10.1080/10967494.2023.2260368>.
- Jia, Junxue, Yongzheng Liu, Jorge Martinez-Vazquez, and Kewei Zhang. 2021. "Vertical fiscal imbalance and local fiscal indiscipline: Empirical evidence from China." *Eur. J. Polit. Econ.* 68, no. 101992 (June): 101992. <https://doi.org/10.1016/j.ejpoleco.2020.101992>. <http://dx.doi.org/10.1016/j.ejpoleco.2020.101992>.
- Johnston, M. 2014. *Corruption, Contention Reform: Power Deep Democratization*. Cambridge, UK: Cambridge Univ. Press.
- Keefer, Philip, and David Stasavage. 2003. "The limits of delegation: Veto players, central bank independence, and the credibility of monetary policy." *Am. Polit. Sci. Rev.* 97, no. 03 (August). <https://doi.org/10.1017/s0003055403000777>. <http://dx.doi.org/10.1017/s0003055403000777>.
- Ko, Kilkon, and Cuifen Weng. 2012. "Structural changes in Chinese corruption." *China Q.* 211 (September): 718–740. <https://doi.org/10.1017/s0305741012000793>. https://www.cambridge.org/core/product/identifier/S0305741012000793/type/journal_article.
- Lambsdorff, Johann Graf. 2007. "Making corrupt deals: contracting in the shadow of the law." In *The Institutional Economics of Corruption and Reform*, 136–163. Cambridge: Cambridge University Press, August. <https://doi.org/10.1017/cbo9780511492617.007>. <http://dx.doi.org/10.1017/cbo9780511492617.007>.
- Lewis-Faupel, Sean, Yusuf Neggers, Benjamin A Olken, and Rohini Pande. 2016. "Can electronic procurement improve infrastructure provision? Evidence from public works in India and Indonesia." *Am. Econ. J. Econ. Policy* 8, no. 3 (January): 258–283. <https://doi.org/10.1257/pol.20140258>. <http://dx.doi.org/10.1257/pol.20140258>.
- Li, Hui, and Lance L P Gore. 2018. "Merit-based patronage: Career incentives of local leading cadres in China." *J. Contemp. China* 27, no. 109 (February): 85–102. <https://doi.org/10.1080/10670564.2017.1363021>. <http://dx.doi.org/10.1080/10670564.2017.1363021>.
- Li, Ling. 2019. "Politics of Anticorruption in China: Paradigm Change of the Party's Disciplinary Regime 2012–2017." *Journal of Contemporary China* 28 (115): 47–63. <https://doi.org/10.1080/10670564.2018.1497911>. <http://dx.doi.org/10.1080/10670564.2018.1497911>.

- Li, Shaomin, and Jun (Judy) Wu. 2010. "Why some countries thrive despite corruption: The role of trust in the corruption–efficiency relationship." *Review of International Political Economy* 17, no. 1 (25 2): 129–154. <https://doi.org/10.1080/09692290802577446>. <https://doi.org/10.1080/09692290802577446>.
- Lord, Nicholas, Karin van Wingerde, and Liz Campbell. 2018. "Organising the monies of corporate financial crimes via organisational structures: Ostensible legitimacy, effective anonymity, and third-party facilitation." *Adm. Sci.* 8, no. 2 (19 5): 17. <https://doi.org/10.3390/admsci8020017>. <http://dx.doi.org/10.3390/admsci8020017>.
- Manion, Melanie. 1997. "Corruption and corruption control: more of the same in 1996." *China Rev.*, 33–56.
- . 2004. *Corruption Design: Building Clean Government Mainland China Hong Kong*. Cambridge, MA: Harvard University Press.
- . 2016. "Taking China's Anticorruption Campaign Seriously." *Economic and Political Studies* 4 (1): 3–18. <https://doi.org/10.1080/20954816.2016.1152094>. <http://dx.doi.org/10.1080/20954816.2016.1152094>.
- Marquette, Heather, and Caryn Peiffer. 2018. "Grappling with the "real politics" of systemic corruption: Theoretical debates versus "real-world" functions." *Governance (Oxf.)* 31, no. 3 (July): 499–514. <https://doi.org/10.1111/gove.12311>. <http://dx.doi.org/10.1111/gove.12311>.
- Martins, Alvaro F, Bruno R da Cunha, Quentin S Hanley, Sebastián Gonçalves, Matjaž Perc, and Haroldo V Ribeiro. 2022. "Universality of political corruption networks." *Sci. Rep.* 12, no. 1 (27 4): 6858. <https://doi.org/10.1038/s41598-022-10909-2>. <https://www.nature.com/articles/s41598-022-10909-2>.
- National Commission of Supervision of China. 2024. *Report on the Rectification of Misconduct and Corruption Affecting the Public* (关于整治群众身边不正之风和腐败问题工作情况的报告), December. https://www.ccdi.gov.cn/toutiaon/202412/t20241225_396429.html.
- National Health and Family Planning Commission of China. 2017. *Public Hospital Reform to Be Extended Nationwide and Drug Markups Eliminated by September 30* (9月30日前推开公立医院改革, 取消药品加成), April. <https://www.nhc.gov.cn/wjw/mtbd/201704/b5c485318de04ea58e434d90d5c4c042.shtml>.

- National Health Commission of China. 2021. *Reply to Recommendation No. 5272 of the Third Session of the Thirteenth National People's Congress* (对十三届全国人大三次会议第 5272 号建议的答复), February. <https://www.nhc.gov.cn/wjw/jiany/202102/6b37dba14a0044d3af5d404890b74222.shtml>.
- Nishijima, Marislei, Randall P Ellis, and Regina Celia Cati. 2016. "Evaluating the impact of Brazil's central audit program on municipal provision of health services." *SSRN Electron. J.*, <https://doi.org/10.2139/ssrn.3104895>. https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3462082_code1322667.pdf?abstractid=3104895&mirid=1.
- Nye, J S. 1967. "Corruption and political development: A cost-benefit analysis." *Am. Polit. Sci. Rev.* 61, no. 2 (June): 417–427. <https://doi.org/10.2307/1953254>. <http://dx.doi.org/10.2307/1953254>.
- Ogbozor, Pamela Adaobi, Eleanor Hutchinson, Catherine Goodman, Martin McKee, Obinna Onwujekwe, and Dina Balabanova. 2023. "The nature, drivers and equity consequences of informal payments for maternal and child health care in primary health centres in Enugu, Nigeria." *Health Policy Plan.* 38, no. Supplement_2 (16 11): ii62–ii71. <https://doi.org/10.1093/heapol/czad048>. <http://dx.doi.org/10.1093/heapol/czad048>.
- Oksenberg, Michel. 1974. "Methods of Communications within the Chinese Bureaucracy." *China Q.* 57 (January).
- Olken, Benjamin A. 2009. "Corruption perceptions vs. corruption reality." *J. Public Econ.* 93, nos. 7-8 (November): 950–964. <https://doi.org/10.1016/j.jpubeco.2009.03.001>. <https://economics.mit.edu/sites/default/files/publications/090310PerceptionsPaper.pdf>.
- Olken, Benjamin A, and Rohini Pande. 2012. "Corruption in Developing Countries." *Annual Review of Economics* 4:479–509. <https://doi.org/10.1146/annurev-economics-080511-110917>. <http://dx.doi.org/10.1146/annurev-economics-080511-110917>.
- Pan, Jennifer. 2020. "Introduction." In *Welfare for Autocrats: How Social Assistance in China Cares for Its Rulers*.
- Persson, Anna, Bo Rothstein, and Jan Teorell. 2013. "Why anticorruption reforms fail-systemic corruption as a collective action problem: Why anticorruption reforms fail." *Governance (Oxf.)* 26, no. 3 (July): 449–471. <https://doi.org/10.1111/j.1468-0491.2012.01604.x>. <http://dx.doi.org/10.1111/j.1468-0491.2012.01604.x>.

- Popa, Mircea. 2019. "Uncovering the structure of public procurement transactions." *Bus. Polit.* 21, no. 3 (September): 351–384. <https://doi.org/10.1017/bap.2019.1>. <https://www.cambridge.org/core/journals/business-and-politics/article/uncovering-the-structure-of-public-procurement-transactions/9278E0C88F3B11027053B8E1C3FEDEF2>.
- Portes, Alejandro, and Julia Sensenbrenner. 1993. "Embeddedness and immigration: Notes on the social determinants of economic action." *Am. J. Sociol.* 98, no. 6 (May): 1320–1350. <https://doi.org/10.1086/230191>. <http://dx.doi.org/10.1086/230191>.
- Raffler, Pia J, Daniel N Posner, and Doug Parkerson. 2018. "The weakness of bottom-up accountability: Experimental evidence from the Ugandan health sector." *Unpublished Working Paper* (August). <https://poverty-action.org/sites/default/files/publications/The%20Weakness%20of%20Bottom-Up%20Accountability.pdf>.
- Rithmire, Meg, and Hao Chen. 2021. "The Emergence of Mafia-like Business Systems in China." *China Q.* 248, no. 1 (December): 1037–1058. <https://doi.org/10.1017/S0305741021000576>. <https://www.cambridge.org/core/journals/china-quarterly/article/abs/emergence-of-mafialike-business-systems-in-china/ECE021618421F00B05E7DBF402CC400B>.
- Rose-Ackerman, Susan. 1978. *Corruption: a study in political economy*. New York: Academic Press.
- . 2001. "Trust, honesty and corruption: reflection on the state-building process." *Arch. Eur. Sociol.* 42, no. 3 (December): 526–570. <https://doi.org/10.1017/S0003975601001084>. <https://www.cambridge.org/core/journals/european-journal-of-sociology-archives-europeennes-de-sociologie/article/trust-honesty-and-corruption-reflection-on-the-statebuilding-process/EECD058A8C4C540F7318E65BDBE7B6BA>.
- Rose-Ackerman, Susan, and Bonnie J Palifka. 2016. *Corruption and Government: Causes, Consequences, and Reform*. 2nd ed. New York: Cambridge University Press.
- Rose-Ackerman, Susan, and Yingqi Tan. 2014. "Corruption in the procurement of pharmaceuticals and medical equipment in China: The incentives facing multinationals, domestic firms and hospital officials." *UCLA Pac. Basin Law J.* 32 (1). <https://doi.org/10.5070/p8321028003>. https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/uclapblj32%C2%A7ion=5.

- Rothstein, Bo. 2011. "Anti-corruption: the indirect 'big bang' approach." *Rev. Int. Polit. Econ.* 18, no. 2 (May): 228–250. <https://doi.org/10.1080/09692291003607834>. <http://dx.doi.org/10.1080/09692291003607834>.
- Roziqin, Ali, Muhammad Kamil, Resky M Ma'mur, and Rifki Muhammad Bintang. 2026. "Merit system in Indonesian government: Policy implementation and determinant factors." *Publ. Adm. Q.*, no. 07349149251413245 (14 2). <https://doi.org/10.1177/07349149251413245>. <http://dx.doi.org/10.1177/07349149251413245>.
- Saha, Shrabani, and Kunal Sen. 2021. "The corruption–growth relationship: does the political regime matter?" *Journal of Institutional Economics* 17, no. 2 (April): 243–266. <https://doi.org/10.1017/S1744137420000375>. <https://www.cambridge.org/core/journals/journal-of-institutional-economics/article/corruptiongrowth-relationship-does-the-political-regime-matter/F1FD9AAF3BE72B25D64D792358D29D6C>.
- Schütte, Sofie, Juan Camilo Ceballos, and Elizabeth David-Barrett. 2023. *Measuring effectiveness of anti-corruption agencies*. Technical report. Global Programme on Measuring Corruption, International Anti-Corruption Academy, August. https://www.iaca.int/measuring-corruption/wp-content/uploads/2023/09/GPMC_Measuring_ACAs_19092023.pdf.
- Scott, James C. 1972. *Comparative Political Corruption*. 3rd ed. Old Tappan, NJ: Prentice Hall, April. <https://archive.org/details/comparativepolit0000scot>.
- Shen, Menghan, Xiaoxia Liang, Linyan Li, Yushan Wu, Yuanfan Yang, and Raphael Zingg. 2022. "The Association of Attending Physicians' Publications and Patients' Readmission Rates: Evidence from Tertiary Hospitals in China Using a Retrospective Data Analysis." *International Journal of Environmental Research and Public Health* 19 (15): 9760. <https://doi.org/10.3390/ijerph19159760>. <https://doi.org/10.3390/ijerph19159760>.
- Shirk, Susan L. 2023. *The political logic of economic reform in China*. California Social Choice and Political Economy. University of California Press, 28 4. <https://doi.org/10.1525/9780520912212>. <http://dx.doi.org/10.1525/9780520912212>.
- State Council. 2019. *Notice on Issuing the Pilot Program for the Centralized Procurement and Use of Drugs Organized by the State* [国务院办公厅关于印发国家组织药品集中采购和使用试点方案的通知]. http://www.gov.cn/zhengce/content/2019-01/17/content_5358604.htm. Accessed: 2026-4-10, January.

- Tam, Wai Keung. 2011. “Organizational Corruption by Public Hospitals in China.” *Crime, Law and Social Change* 56 (3): 265–282. <https://doi.org/10.1007/s10611-011-9290-9>. <http://dx.doi.org/10.1007/s10611-011-9290-9>.
- Tang, Mi, Jiangjiang He, Minxing Chen, Lixuan Cong, Yuan Xu, Yan Yang, Zhiying Hou, Peipei Song, and Chunlin Jin. 2019. ““4+7” city drug volume-based purchasing and using pilot program in China and its impact.” *Drug Discov. Ther.* 13 (6): 365–369. <https://doi.org/10.5582/ddt.2019.01093>. <http://dx.doi.org/10.5582/ddt.2019.01093>.
- Tsai, Kellee S. 2006. “Adaptive informal institutions and endogenous institutional change in China.” *World Polit.* 59, no. 1 (October): 116–141. <https://doi.org/10.1353/wp.2007.0018>. <https://muse.jhu.edu/article/216247>.
- Wade, Robert. 1982. “The system of administrative and political corruption: Canal irrigation in South India.” *J. Dev. Stud.* 18, no. 3 (April): 287–328. <https://doi.org/10.1080/00220388208421833>. <http://dx.doi.org/10.1080/00220388208421833>.
- . 1985. “The market for public office: Why the Indian state is not better at development.” *World Dev.* 13, no. 4 (April): 467–497. [https://doi.org/10.1016/0305-750x\(85\)90052-x](https://doi.org/10.1016/0305-750x(85)90052-x). [http://dx.doi.org/10.1016/0305-750X\(85\)90052-X](http://dx.doi.org/10.1016/0305-750X(85)90052-X).
- Wang, Erik H. 2022. “Frightened Mandarins: The Adverse Effects of Fighting Corruption on Local Bureaucracy.” *Comparative Political Studies* 55 (11): 1807–1843. <https://doi.org/10.1177/00104140211060276>. <http://dx.doi.org/10.1177/00104140211060276>.
- Wang, Peng, and Xia Yan. 2020. “Bureaucratic slack in China: The anti-corruption campaign and the decline of patronage networks in developing local economies.” *China Q.* 243 (September): 611–634. <https://doi.org/10.1017/s0305741019001504>. <http://dx.doi.org/10.1017/s0305741019001504>.
- Wang, Yuhua. 2020. *China’s Corruption Investigations Dataset*. <https://doi.org/10.7910/DVN/9QZRAD>. <https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/9QZRAD>.
- Wedeman, Andrew. 2020. “Anticorruption Forever?” In *Fateful Decisions*, edited by Thomas Finagar and Jean Oi, 82–106. May.

- . 2025. *Xi Jinping's corruption quagmire*. <https://www.chinacenter.net/2025/china-currents/24-1/xi-jinpings-corruption-quagmire/>. Accessed: 2026-4-10, 13 5.
- Xinhua. 2023a. *China to improve regulation on medical insurance funds*. <https://en.people.cn/n3/2023/0610/c90000-20030060.html>. Accessed: 2026-4-10, October.
- . 2023b. “Xi stresses need to promote full, rigorous Party self-governance” (September). <https://english.news.cn/20230109/1a48ef121feb47ad8f3b015ea205350b/c.html>.
- Xu, Hanhui, and Mengci Yuan. 2022. “The red packet phenomenon from the perspective of young Chinese doctors: a questionnaire study.” *BMC Med. Ethics* 23, no. 1 (30 5): 56. <https://doi.org/10.1186/s12910-022-00793-w>. <http://dx.doi.org/10.1186/s12910-022-00793-w>.
- Xu, Jin, Weiyan Jian, Kun Zhu, Soonman Kwon, and Hai Fang. 2019. “Reforming public hospital financing in China: progress and challenges.” *BMJ* 365 (21 6): 14015. <https://doi.org/10.1136/bmj.14015>. <http://dx.doi.org/10.1136/bmj.14015>.
- Yang, Ying, Ruiwen Tong, Shicheng Yin, Lining Mao, Luxinyi Xu, Siyu Hao, and Zongfu Mao. 2021. “The impact of “4 + 7” volume-based drug procurement on the volume, expenditures, and daily costs of antihypertensive drugs in Shenzhen, China: an interrupted time series analysis.” *BMC Health Serv. Res.* 21, no. 1 (26 11): 1275. <https://doi.org/10.1186/s12913-021-07143-3>. <http://dx.doi.org/10.1186/s12913-021-07143-3>.
- Yip, Winnie, and William Hsiao. 2014. “Harnessing the privatisation of China’s fragmented health-care delivery.” *Lancet* 384, no. 9945 (30 8): 805–818. [https://doi.org/10.1016/S0140-6736\(14\)61120-X](https://doi.org/10.1016/S0140-6736(14)61120-X). [http://dx.doi.org/10.1016/S0140-6736\(14\)61120-X](http://dx.doi.org/10.1016/S0140-6736(14)61120-X).
- Yuan, Jing, Z Kevin Lu, Xiaomo Xiong, and Bin Jiang. 2021. “Lowering drug prices and enhancing pharmaceutical affordability: an analysis of the national volume-based procurement (NVBP) effect in China.” *BMJ Glob Health* 6, no. 9 (September). <https://doi.org/10.1136/bmjgh-2021-005519>. <http://dx.doi.org/10.1136/bmjgh-2021-005519>.
- Zang, Wenbin, Mei Zhou, and Shaoyang Zhao. 2021. “Deregulation and pricing of medical services: a policy experiment based in China.” *BMC Health Serv. Res.* 21, no. 1 (25 5): 501. <https://doi.org/10.1186/s12913-021-06525-x>. <http://dx.doi.org/10.1186/s12913-021-06525-x>.

- Zhang, Fangkai, Jianjun Jiang, Min Yang, Kun Zou, and Dandi Chen. 2022. “Catastrophic health expenditure, incidence, trend and socioeconomic risk factors in China: A systematic review and meta-analysis.” *Front. Public Health* 10:997694. <https://doi.org/10.3389/fpubh.2022.997694>. <http://dx.doi.org/10.3389/fpubh.2022.997694>.
- Zhou, Mengling, Bing Wang, and Zhongfei Chen. 2020. “Has the anti-corruption campaign decreased air pollution in China?” *Energy Econ.* 91 (January): 104878. <https://doi.org/10.1016/j.eneco.2020.104878>. <https://www.sciencedirect.com/science/article/pii/S0140988320302188>.
- Zhu, Jiangnan, and Dong Zhang. 2017. “Weapons of the Powerful: Authoritarian Elite Competition and Politicized Anticorruption in China.” *Comparative Political Studies* 50 (9): 1186–1220. <https://doi.org/10.1177/0010414016672234>. <http://dx.doi.org/10.1177/0010414016672234>.
- Zhu, Zheng, Quan Wang, Qiang Sun, Joel Lexchin, and Li Yang. 2023. “Improving access to medicines and beyond: the national volume-based procurement policy in China.” *BMJ Glob. Health* 8, no. 7 (July): e011535. <https://doi.org/10.1136/bmjgh-2022-011535>. <http://dx.doi.org/10.1136/bmjgh-2022-011535>.