Subordinates in Charge: Does Delegation Improve Banking Supervision?*

Wouter Dessein
Columbia University and CEPR

Di Gong
University of International Business and Economics

Thomas Lambert
Erasmus University Rotterdam

Wolf Wagner
Erasmus University Rotterdam and CEPR

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Abstract

We study a policy reform that delegated supervisory decision-making authority for a subset of bank branches to a lower hierarchy. Consistent with a model of information loss in supervisory communication, we find improved supervisory outcomes following the reform: Supervisory interventions indicate better detection of misconduct by banks as well as a better assessment of the severity of misconduct. The effects are more pronounced when i) centralized decision-making deters access to local information, ii) uncertainty about the local environment is high, aligning with theoretical predictions. Our findings highlight decentralization benefits within a supervisory hierarchy.

Keywords: Bank supervision, hierarchical supervision, decentralization, financial architecture

JEL classification: G21, G28

1 Introduction

A central question in the design of the financial architecture is how powers should be allocated among central and local entities. A large part of the discussion has focused on whether supervision should be carried out by a central authority or by independent local authorities. Prior studies have broadly found better and stricter outcomes under centralized supervision.[1] This is explained by central supervisors having better incentives. Local supervisors, by contrast, may fail to consider externalities and may be captured by local interests, resulting in too lenient supervision.

A common alternative in practice to delegation to an independent entity is delegation to a subordinated entity.[2] The latter offers a potentially important advantage: a hierarchical structure facilitates the distribution of tasks. Information-gathering can be delegated to the local supervisor who then communicates with the central supervisor who takes the decisions. In fact, this seems to be the best of both worlds as each entity specializes in the activity in which it has a comparative advantage.

In this paper we show that we may be able to do even better, by also delegating decision-making to the subordinated entity. The reason why full delegation may be preferred is, broadly, that divergent incentives of central and local supervisors make communication among them less informative. This results in a loss of information when decision-making remains centralized. Full delegation can restore this information and hence improve supervisory outcomes even if local supervisors are biased.

We examine the effect of a decentralization reform in China and interpret the findings

[1] See Ampudia et al. (2019) for an overview of the debate. While theory makes different predictions regarding whether centralized or decentralized settings are preferred (see, e.g., Dell'Ariccia and Marquez (2006); Calzolari et al. (2019); Lóránth et al. (2022)), the empirical literature has predominantly found more stringent outcomes when a more central supervisor makes the decisions (Agarwal et al., 2014; Haselmann et al., 2022; Beck et al., 2023).

[2] In the U.S., both FED and FDIC have headquarters and regional offices. Similar decentralized structures exist for instance in Germany (Bundesbank), India (Reserve Bank of India), Canada (the Office of the Superintendent of Financial Institutions) and China (People's Bank of China and National Administration of Financial Regulation).

through the lens of a model of supervisory communication and bias. The results confirm the predictions of the model and indicate that decentralization significantly improved supervisory outcomes, by increased detection of misconduct by banks. This delivers an important message. The current policy discussion (for example, in the Eurozone) often centres around centralization of policies vis-à-vis independent supervisors. Our paper by contrast speaks to benefits of decentralization vis-à-vis subordinated supervisors. In a hierarchical structure such as present in many countries, biases of local supervisors are less likely to play a role, favouring decentralization. Lower biases of local supervisors also speak towards a benefit of hierarchical supervision generally. Among others, this informs the debate in the Eurozone where frictions arise due to (independent) national supervisors having different objectives than the central supervisor.

The policy reform we are exploiting shifted supervision of bank branches from the national to the prefecture level. In 2015, China decentralized supervision for branches belonging to banks classified as "local" but not for branches belonging to "national" banks.[3] Prior to 2015 all the branches were supervised in a hub-and-spoke system in which information was predominantly collected by local supervisors, but decisions were predominantly made by the central supervisor, thus requiring communication among both entities. The reform then fully transferred decision-making to local supervisors. Importantly, the reform did not change the overall objective of supervision, as local supervisors are fully subordinated to the central supervisor and accountable to the latter.[4] This makes the reform a suitable setting to study our research question. The setting also offers empirical richness: there are more than 300 local supervisory offices that have received more decision-powers as a result of the reform.

We make use of a large, partly hand-collected, data set covering 5,429 prefecture-

[3]The Chinese banking sector is the largest in the world with about $40 trillion in assets. It serves more than 800 million individuals through more than 4,000 commercials banks.

[4]Through the lens of the principal-agent problem, the reform involves the principal (central supervisor) allocating responsibilities and powers to carry out supervisory decisions to an agent (local supervisor) who has better access to information.

level branches over a 10-year window around the 2015 policy reform. We measure supervisory outcomes through formal declarations of banking misconduct ("supervisory interventions")[5]. For this we make use of novel bank branch- and supervisory-office-level data on supervisory interventions. The granularity of the data allows us to exploit both variations across branches of the same bank but also within a supervisory office (regarding decisions about branches belonging to different banks).

Our analysis indicates that misconduct at branches of local banks is more likely detected following the reform as compared to branches of national banks. Specifically, the probability for a branch receiving a supervisory intervention increases by 6.3-8.8 percentage points (pp) following the reform, which corresponds to 57-80% of the unconditional probability of intervention.

What can explain that decentralization leads to more supervisory interventions, even though local supervisors are usually thought to be more lenient? We present a model where local supervisors are better informed about potential misconduct but are biased against interventions. This bias impedes communication between local and central supervisor under centralization. Specifically, the local supervisor wants to avoid intervention by the central supervisor when the risk of misconduct is perceived to be intermediate. This results in him not relaying such incidences to the central supervisor. This leads to a loss of information and deters supervisory intervention even though such an intervention is desirable. Decentralization restores information in supervisory decision-making and lowers the risk that a desirable intervention does not take place. In other words, decentralization results in more interventions even though the local supervisor is biased against them.[6]

[5] In our context, a supervisory intervention is a formal step taking when a bank is suspected of not adhering to rules or good practice. It corrects misconduct, declares the specific violation and issues a punishment.

[6] Importantly, supervisory interventions and efficiency only increase in our model when the bias of the local supervisor is not too large. Our empirical finding of increased interventions thus indicate that we are in the parameter space in which delegation is efficiency-improving. The situation may be different in the context of delegation to independent supervisors as the bias may then be substantially larger.

Our model delivers two important empirical predictions in this respect. First, more minor misconduct is now also detected. Such misconduct warrants lower penalties. We hence expect that the average penalty following an intervention (conditional on an intervention to take place) to decline. This contrasts with predictions that would arise if supervisors were to become stricter following the reform, or if banks were to become riskier, in which case both likelihood and severity of interventions should increase. The model also predicts that, conditional on an intervention, the penalty to become more variable. This is because under centralized supervision, the local supervisor partitions information (that is, he converts a continuum of information into, say, two states), resulting in supervisory actions becoming less responsive to information. Using information on fines issued in supervisory interventions, we find both predictions to be fulfilled in the data.

Our mechanism identifies two factors that determine the extent to which decentralization of decision authority improves outcomes. First, the benefit to using decentralized decision-making is making better use of local information. We thus expect supervisory outcomes to improve more when usage of local information was more impeded under centralized supervision. We approximate the latter by the geographical distance between Beijing (the location of the central supervisor) and the capital of the prefecture where the branch and its local supervisor are. Consistent with predictions, we find that interventions increase more for branches with a higher informational loss under centralized supervision. Second, decentralization is more beneficial when local information is more important. This is the case when the local environment is less predictable. Using proxies for economic and policy uncertainty, we also find this prediction to be confirmed.

Our findings regarding the likelihood, severity and dispersion of supervisory intervention as well as the proxies for the value of information loss speak to a better usage of local information under decentralization, resulting in better supervision. They are inconsistent with several alternative explanations. First, there may be a confounding

effect around the time of the reform that has increased risk specifically for branches of local banks (though both types of branches are very comparable prior to the reform). Whereas this may lead to more supervisory interventions for local branches, average fines should increase then as well, inconsistent with our findings. The risk explanation is also inconsistent with findings in the paper described below, indicating that banks become more risk-averse following the reform. In addition, our results also hold controlling for proxies of bank risk as well as for allowing for differential effects of the reform for banks with different characteristics more generally. Second, the preferences of local supervisors regarding interventions in local banks may have changed around the reform. This may lead to more interventions if for some reason supervisors have become stricter, but this would again suggest average fines to increase, not decrease. Third, supervisory capacity may have changed following the reform. For instance, higher manpower may allow the supervisor to investigate more banks for possible misconduct. This may also increase supervisory interventions (Eisenbach et al., 2022) but there is no reason for why (average) fines should decrease in this case. In addition, our results are robust to controlling for changes in supervisory capacity as proxied by new hires at the local level.

We conclude our analysis of decentralization by investigating whether improved supervision mitigates risk-taking by banks. Using individual (loan-level) lending decisions, we find that branches of local banks become more conservative in their lending after the policy reform. That is, they require higher compensation for taking on risk, and they reduce the amount they lend, that is, the amount of credit risk they take on. We also find that this has aggregate consequences: prefectures with a higher share of branches from local banks experience lower credit growth in the aftermath of the reform. This result suggests that national banks do not take up the slack arising from conservative lending by local banks. In other words, better supervision that is applied to only a subset of branches still has real effects at the aggregate level.[7]

[7]The scope of this analysis differs from prior literature that has examined bank-level implications of

Our findings have implications for the design of the supervisory architecture. Bank supervision for larger banks moved toward centralization in the aftermath of the global financial crisis (Ampudia et al., 2019). However, as previously discussed, this was predominantly in the context of allocating powers away from local independent supervisors for which biases are more pronounced. In the euro area, in particular, centralized supervision is considered to have significant benefits by lowering the influence of local interests. Haselmann et al. (2022) provide support for this view, showing that supervisory stringency improved for the large significant banks included in the SSM.[8] In the United States, the stronger effectiveness of federal supervision over state supervision is explained by local supervisors overweighing economic conditions and, to some extent, differences in supervisory capacity (Agarwal et al., 2014). Our analysis suggests that the effect on supervisory outcomes maybe reversed when centralization within a hierarchy is considered. Such a reversal seems plausible, first, because biases of local supervisors can be more easily contained in a hierarchy. Second, and closely related, it is less likely that the central supervisor is per se stricter.

Our paper is related to theoretical papers analyzing supervisory architectures involving multiple supervisors. A large part of this literature has studied trade-offs between a centralized and an independent decentralized regulator (Dell'Ariccia and Marquez, 2006; Kara, 2016; Foarta, 2018; Calzolari et al., 2019; Colliard, 2020; Lóránth et al., 2022). A part of the literature has also analyzed hierarchical supervision (Repullo, 2018; Carletti et al., 2021), emphasizing informational losses due to communication between different supervisors. Our framework is most closely related to the work by Dessein (2002), who, using a general principal-agent framework, analyzes the benefits of delegating decision-powers to a biased agent who is endowed with superior information. Our model adapts

supervisory standards: in terms of profitability, risk taking, and lending (Delis et al., 2017; Kandrac and Schlusche, 2021; Granja and Leuz, 2024; Hirtle et al., 2020) as well as by affecting loan supply (Fiordelisi et al., 2017; Danisewicz et al., 2018; Kim et al., 2018; Altavilla et al., 2020; Passalacqua et al., 2021; Kleymenova and Tomy, 2022; Abbassi et al., 2025; Bonfim et al., 2023; Ivanov and Wang, 2024).

[8] Our model predicts such an outcome in case the bias of the local supervisor is relatively large, for example due to capture by local interests.

the analysis in Dessein (2002) to the setting of banking supervision, and derives predictions for supervisory interventions (likelihood, severity and dispersion) that can be confronted with the data. In contrast to Dessein (2002), in Aghion and Tirole (1997) information acquisition is endogenous and is affected by decentralization. Other papers that consider decentralization in a general principal-agent context are Melumad and Reichelstein (1987), Bolton and Dewatripont (1994), Alonso et al. (2008) (and many others). In contrast to the extant theoretical literature, empirical work is limited. See, for example, Huang et al. (2017), for a study on the Chinese experience of decentralizing state-owned firms.

Whereas in our context an informational loss arises due to communication, several papers have also documented informational losses from closing of supervisory offices. Lim et al. (2023) analyze the closures of local offices of federal supervisors, resulting in an increase in the distance between banks and the (same) supervisor. They find that banks increase their lending and risk following office closures, suggesting that geographical proximity between banks and supervisors improves supervision and financial stability. Gopalan et al. (2021) focus instead on the closure of the Office of the Comptroller of the Currency's (OCC) field offices and provide consistent evidence that proximity to supervisory field offices mitigates risk-taking incentives of banks through higher capital ratios.

2 Institutional Background

2.1 An overview of the China's banking sector

The Chinese banking system has experienced substantial growth over the past decade and is now the world's largest ($38.98 trillion assets as of the end of 2020, compared to $27.71 trillion in the United States). There are over 4,000 commercial banks. Eighteen of them operate on a nationwide scale (the six largest state-owned banks and the 12

national joint-stock banks). These national banks collectively held $26.96 trillion assets, accounting for 69.5% of all commercial bank assets. In addition to the national banks, there is a diverse range of regional institutions that we refer to as local banks: 134 prefecture-level commercial banks; approximately 1,600 rural commercial banks; several hundred of rural credit cooperatives; and numerous village banks.

Commercial banks are predominantly organized through branches. The typical organizational structure consists of a headquarter, a branch ("Fenhang" in Chinese) in each prefecture where the bank is active, numerous lower-level offices ("Zhihang"), and even more local branches. The prefecture-level branch is responsible for all banking activities in the prefecture, including the offices and the local branches. The prefecture-level branch is the level of our analysis. A prefecture is an administrative unit similar to a Metropolitan Statistical Area in the United States and has a median population of more than 3.3 million (larger than the median US state).

2.2 Regulatory and supervisory framework

The China Banking Regulatory Commission (CBRC) was created in 2003 as the main authority regulating and supervising the Chinese banking sector. In 2018, the CBRC merged with the China Insurance Regulatory Commission (CIRC), to become the China Banking and Insurance Regulatory Commission (CBIRC). The CBRC has a hub-and-spoke structure akin to the OCC in the United States. Headquartered in Beijing, the CBRC supervises all commercial banks through a network of local supervisory offices. This network comprises provincial offices (CBRC bureaus) in the capitals of the 31 provinces and in five major metropolitan areas (Dalian, Ningbo, Xiamen, Qingdao, and Shenzhen), and municipal offices (CBRC sub-bureaus) in 306 prefectures (see Figure 1, Panel A). Comparable to the field offices of the OCC in the United States, these offices (bureaus and sub-bureaus) serve as local entities overseeing the banks within their respective jurisdictions.

The CBRC has a fully hierarchical management structure. The CBRC's head (or central) office in Beijing establishes rules, guidelines, and policies. It also directly appoints the heads of local offices. There is, in principle, full alignment of the objectives between central and local supervision. This setting is similar to the one in many other countries, see footnote 2.

2.3 The decentralization reform of 2015

In January 2015, the CBRC had its first major reform. The primary objective of the reform is to decentralize administrative powers, bringing supervisors closer to financial institutions, thus reinforcing oversight over local banks. The reform transfers the supervisory responsibilities and powers for local banks to local supervisors, without changing the organization of supervision for national banks.

Prior to reform, the central office and local offices of CBRC jointly supervised all banks.[9] However, the ultimate authority was with the central supervisor. The most common case regarding supervisory intervention[10] is that local offices provided recommendations to the central office, which then made the final decision. In other cases, local offices decided on an intervention first and informed the central office afterwards, possibly leading to an overruling of the lower-level decision. In a few cases, investigations by a local office were also joined by staff from the central office, and joint decisions were reached. The reform fully transferred supervision for local banks, and specifically decisions on interventions, to the local offices. The local offices now independently decide on interventions, without reporting obligations to the central office. Figure 1, Panel B, illustrates the change in the supervisory architecture as a result of the 2015 reform. While the reform makes supervision of local banks the sole task of local supervisors, it

[9] With the exception of the headquarters of the national banks, which are solely supervised by the central office.

[10] Official supervisory interventions result from misconduct by individuals and violations of banking laws and regulations. They play a vital role in China, incentivizing banks to promptly rectify identified problems.

does not modify who sets the overall objectives of supervision. Those remain in the full realm of the CBRC's head office, to which the local offices are reporting.

3 A Model of Supervisory Communication and Bias

The previous section has described the institutional setting around the 2015-reform. In the Chinese financial architecture, the local supervisor is fully subordinated to the central supervisor, who sets the overall objectives of supervision. The setting can thus be likened to a principal-agent relationship. Prior to the reform, the central supervisor had ultimate authority over decisions (even though supervision was carried out jointly). Information about the banks was primarily in the hand of the local supervisor, who communicated this information to the central supervisor (either directly, or indirectly through an initial decision). The reform then fully delegated decision-making authority to the local supervisor.

In this section we develop a model that allows analyzing the impact of the reform on supervisory decision-making. The main tension in this model is that the local supervisor has better information about banks, but has distorted incentives in the form of bias that makes him more reluctant to intervene (Section 5.5 provides evidence for such a bias). A central insight from the model is that local bias substantially distorts decision-making under centralized decision-making. The reason is that it makes the local supervisor communicate strategically to the central supervisor, in order to influence the latter's decisions. This results in two costs. First, also decisions by the central supervisor are subject to a bias (that goes in the same direction as the local supervisor's bias). Second, as the local supervisor does not fully transmit information, there is an informational loss, making supervisory decision less tailored to actual conditions.

A main result that arises is that delegation is optimal unless the local bias is large. Importantly, for our purpose, the model also allows to empirically exclude the range in

which delegation is suboptimal. Generally, delegation can either increase or decrease the likelihood of supervisory intervention. However, whenever delegation is suboptimal, delegation lowers supervisory interventions. Thus, observing that supervisory interventions in fact increase following the reform, allows us to conclude that we are in a part of the parameter space where delegation is optimal. The model also delivers additional predictions about the range where supervisory interventions increase (and thus when delegation is optimal).

3.1 Setup

The type of a bank is given by $\theta+\delta$, where θ is i.i.d. uniformly distributed on $[-1,1]$ and $\delta \in \{-\varepsilon, \varepsilon\}$ with $\varepsilon > 0$ but small. There is a central supervisor, also called the principal (she), and a local supervisor, also called the agent (he). We assume that δ is observed by both principal and agent. The agent always observes θ. Bank type can be given two interpretations. First, it can be interpreted as indicator of how likely it is that the bank has violated supervisory guidelines (that is, committed misconduct). Second, it can be seen as an indicator of general risk-taking by the bank.

The central supervisor would like to impose a fine (penalty) on the bank whenever $\theta + \delta > 0$, and its ideal fine is

$$F^*(\theta) = \max\{0, \theta + \delta\}.$$

The local supervisor would like to impose a fine whenever $\theta + \delta > b$ ($b > 0$) and its ideal fine is given by

$$F_A^*(\theta) = \max(0, \theta + \delta - b\}. \tag{1}$$

Preferences over fines are represented by a loss function which is linear in the absolute distance between the actual fine F ($F \geq 0$) and the supervisor's ideal fine. In particular,

the central supervisor's preferences over fines are given by

$$U(F,\theta) = -\left|F - F^*(\theta))\right|.$$

Similarly, the local supervisor's preferences over fines are given by

$$U_A(F,\theta) = -\left|F - F_A^*(\theta)\right|.$$

We refer to an outcome with a positive fine ($F > 0$) as a supervisory intervention.

3.2 Organization design

We consider two institutional settings: (1) Decentralized supervision: Under delegation, the local supervisor decides on the fine. It follows that under delegation, the fine always equals $F = \max\{0, \theta + \delta - b)\}$. (2) Centralized supervision: Under centralization, the central supervisor decides on the fine, but she can consult the local supervisor. Any communication is modeled as cheap talk (Crawford and Sobel, 1982; Dessein, 2002). The local supervisor then sends the central supervisor a cheap talk message m and the principal imposes a fine

$$F = \arg\max E(U(F,\theta)|G(\theta,m))$$

where $G(\theta, m)$ is the distribution of θ conditional on the local supervisor sending message m (determined in equilibrium).

3.3 Equilibrium under centralization

We now study the outcome under centralization with cheap talk. As is common, we focus on the most informative cheap talk equilibrium (see, e.g. Dessein (2002)) as this equilibrium is preferred by both principal and agent. As is well known, there always

exists an equilibrium in which any communication is uninformative (babbling). Define

$$n^* = \left\lfloor 1 + \sqrt{\frac{1+\delta}{2b}} \right\rfloor$$

where $\lfloor X \rfloor$ is the largest integer smaller or equal to X. The following lemma holds

Lemma: Whenever $b > \frac{1+\delta}{2}$, there is a unique equilibrium in which any communication by the agent is uninformative, and the principal issues a fine whenever $\delta = \varepsilon$. Whenever $b < \frac{1+\delta}{2}$, the most informative cheap talk equilibrium in characterized by

- a set of n^* messages $M = \{m_1, ...m_{n^*}\}$ with $m_j \neq m_k$ whenever $j \neq k$,
- a partition $(a_0, a_1, a_2, ..., a_{n^*})$ of $[-1, 1]$, with $a_0 = -1, a_{n^*} = 1$, and $a_{k-1} < a_k$ for $k \in \{1, .., n^*\}$

such that

- the agent sends message m_k whenever $\theta \in (a_{k-1}, a_k)$ so that $F(\theta|m_k) = U[a_{k-1}, a_k]$.
- upon receiving the message m_1, the principal issues no fine whenever $\frac{a_1-1}{2} + \delta < 0$, [11] or still $a_1 + \delta < 1 - \delta$. As we show below, this will satisfied whenever $b < \frac{1}{2} - \delta$.
- upon receiving message m_k with $k > 1$, the principal issues a fine

$$F_k = \frac{a_{k-1} + a_k}{2} + \delta,$$

- at $\theta = a_k$ with $0 < k < n^*$, the agent must be indifferent between F_k and F_{k+1} :

$$(\theta + \delta - b) - F_k = F_{k+1} - (\theta + \delta - b)$$

[11] Indeed,

$$E(U(F, \theta)|m) = -\int_{-1}^{\delta} F d\theta - \int_{\delta}^{F+\delta} (F - \theta + \delta) d\theta - \int_{F+\delta}^{a} (\theta - \delta - F) d\theta$$

which has a corner solution of $F = 0$, whenever $\frac{a_1-1}{2} < \delta$.

from which

$$\begin{aligned} a_1 + \delta &= b \cdot (n^* - 1)\left(\frac{2n^*}{2n^* - 1}\right) + \frac{1+\delta}{2n^* - 1} \\ a_2 - a_1 &= 2(a_1 - \delta) - 4b \\ a_{k+1} - a_k &= a_k - a_{k-1} - 4b, \text{ for } k > 1 \end{aligned}$$

Comment: Note given the expression for $a_1 + \delta$, the condition $a_1 + \delta < 1 - \delta$ will be satisfied whenever

$$b \cdot (n^* - 1)\left(\frac{2n^*}{2n^* - 1}\right) + \frac{1+\delta}{2n^* - 1} < 1 - \delta$$

For $n^* = 2$, this is equivalent to $b < \frac{1}{2} - \delta$

Lemma 2: Assume $b < \frac{1}{2} - |\delta|$. Then there is intervention whenever $\theta > a_1 \in (\delta, 1)$, where a_1 is increasing in b and satisfies

$$a_1 + \delta \in \left(\frac{1+\delta}{n^*}, \frac{1+\delta}{n^* - 1}\right)$$

Comment: Whenever $n^* > 2$, there also exist cheap talk equilibria with $n \in \{1, .., n-1\}$ messages characterized by the same condition. The cheap talk equilibrium with $n = n^*$, however, is the most informative equilibrium and ex ante preferred by both the agent and the principal.

3.4 Optimality of delegation

We can now examine under which circumstances delegation is preferred (from the principal's perspective) to centralization, and what this implies for (observable) supervisory outcomes. Supervisory outcomes under delegation are described in the previous subsection, under centralization they are given by $F = \max\{0, \theta - \delta\}$.

Proposition 1. *For $|\delta|$ sufficiently small, delegation is optimal whenever $b < 1$.*

Intuitively, for $|\delta|$ sufficiently small, the principal is indifferent between intervention and not in the absence of any communication (which will be the case for $b > \frac{1}{2}$). Under delegation, there will be intervention as long as $b < 1$. Whenever the agent intervenes, the principal also strictly prefers intervention (and derives positive utility from it). It follows that for $b \in (\frac{1}{2}, 1)$, delegation is strictly preferred over centralization with no communication. One can verify that delegation is also strictly preferred for centralization when $b < \frac{1}{2}$ and there is informative cheap talk communication between agent and principal. These results mirror those in Dessein (2002) in a related setting.

The following proposition derives the implications for the likelihood of supervisory interventions:

Proposition 2. *(i) Whenever $b > 1$, centralization is optimal, and there is more intervention under centralization than delegation.*

(ii) Whenever $b \in (\frac{1}{2} - \frac{|\delta|}{2}, 1)$, delegation is optimal, but under centralization, there is strictly more intervention by the center than by the agent.

(iii) Whenever $b < \frac{1}{2} - \frac{|\delta|}{2}$ delegation is optimal, and under centralization there is strictly less intervention by the center than by the agent as the agent can credibly communicate when the risk-level of the bank is low or moderate.

Proof. Expected pay-off under delegation (note that $f(\theta) = 1/2$ on $[-1, 1]$) :

$$-\frac{1}{2}\int_{-\delta}^{b-\delta} (\theta + \delta)\, d\theta - \frac{1}{2}\int_{b-\delta}^{1} b d\theta = -\frac{1}{2}b(1+\delta) + \frac{1}{4}b^2$$

Assume $\delta = \varepsilon$, then principal is almost indifferent between issuing a fine or not. Assume no fine is issued, then expected pay-off under centralization utility equals

$$\frac{1}{2}\left(-\int_{-\varepsilon}^{1}\left((\theta+\varepsilon) - \frac{\varepsilon}{2}\right) d\theta\right) = -\frac{1}{4}(1+\varepsilon)$$

In the limit as $\delta = 0$, we have that the expected pay-off under delegation is higher than

under centralization with no communiction whenever:

$$-\frac{1}{2}b(1+\delta)+\frac{1}{4}b^2 > -\frac{1}{4} \iff b < 1$$

□

Two properties are especially noteworthy about the proposition. First, delegation can be optimal even when it leads to a larger bias in decisions: when $b \in (\frac{1}{2} - \frac{|\delta|}{2}, 1)$, delegation results in fewer interventions, which is inefficient as those are all interventions valued by the principal. The reason is the informational benefit of delegation: delegation allows to fully make use of local information, changes in θ are then fully reflected in supervisory decisions. Second, why are there more interventions under delegation than under centralization when $b < \frac{1}{2} - \frac{|\delta|}{2}$, even though the local supervisor is more lenient (has a higher threshold)? Intuitively for $\theta - \delta \in (0, a_1)$, local supervisor would like to issue a fine, but she prefers a much smaller fine in those cases compared to what the central supervisor would impose (a big fine). As a result, the local supervisor prefers not to reveal these types are above even her own threshold (she prefers no fine over big fine, given her preferences for small fine).

This proposition allows us to infer from our empirical results that we are in the parameter range where delegation is optimal: The proposition shows that whenever delegation is suboptimal, supervisory interventions decrease, which is inconsistent with the evidence. In fact, interventions are increasing only in the third range where the bias is small, there is informative communication, and delegation is optimal.

In the following analysis we will restrict ourselves to the third range. In this range, variability in δ does not play a role, hence we can set $\delta = 0$.

Proposition 3. *Assume $b < 1/2$ and $\delta = 0$. Under delegation, the expected fine under supervisory intervention ($E(F|F > 0)$) declines*

There are two reasons why expected fines decline. First, the threshold for intervention declines (see previous proposition). That is, there are now also interventions in banks with lower θ, which warrant lower fines. Second, under delegation the local supervisor sets the fines, and his preferred fine is lower.

3.5 Example: Two message equilibrium

To derive more intuition, we now consider the cheap talk equilibrium with two messages (note that, as explained previously, this equilibrium is not necessarily preferred as more informative equilibria may exist). In such an equilibrium, the agent sends a high message m_2 if the state is above some threshold cut-off a_1 and a low message m_1 otherwise. Assume for now that following a low message, m_1, the principal sets a fine

$$F_1 = 0.$$

Given this communication strategy of the agent, the principal intervenes (sets a positive fine) only if the agent sends a high message. The resulting fine will be equal to

$$F_2 = \frac{1 + a_1}{2}.$$

For a_1 to be the threshold above which the agent sends the high message, we must have that at $\theta = a_1$, the agent is indifferent between no fine (and sending message m_1) or a fine equal to F_2. Recall that the agent's preferred fine is

$$F_A(a_1) = a_1 - b.$$

It follows that for indifference, we must have that

$$\begin{aligned} F_A(a_1) - F_1 &= F_2 - F_A(a_1) \\ &\Leftrightarrow \quad 2(a_1 - b) = \frac{1 + a_1}{2} \\ &\Leftrightarrow \quad a_1 = \frac{4}{3}b + \frac{1}{3} \end{aligned}$$

Note that the assumption $b < \frac{1}{2}$ guarantees that $a_1 < 1$, that is, that the two message equilibrium exists. Moreover, we will have that $F_1 = 0$ is optimal following m_1 since $a_1 < 1$.

Numerical example: Assume that $b = 0.2$ (which fulfills $b < \frac{1}{2}$). Then $a_1 = \frac{2}{3} > b$. Under delegation, there are then supervisory interventions whenever $\theta > 0.2$, whereas under centralization, there are only interventions whenever $\theta > \frac{2}{3}$. The average fine under centralization is $F_2 = \frac{1+a_1}{2} = 0.83$, the average fine under decentralization is $E(F|F > 0) = \frac{0+1-b}{2} = 0.45$ and hence lower. Fine dispersion under centralization is 0 (as there is only a single fine set) whereas under delegation we have that the average distance from the mean fine is $\frac{0+1-b}{2} - \frac{0+1-b}{4} = 0.22$.

3.6 Extensions and alternative channels

In the following we consider two extensions that deliver comparative statics that can be empirically examined. We also consider alternative channels that may result in delegation leading to a higher incidence of interventions.

3.6.1 Access to local information

Suppose that the principal sometimes also has access to local information. Specifically, assume that with probability $p \in [0, 1]$ the principal observes the local state as well. In this case she no longer requires information from the agent under centralization and sets her preferred fine $F = \max\{0, \theta\}$, implying that interventions take place when $\theta > 0$.

Under decentralization, the fine will be set by the agent and interventions take place when $\theta > b$. The expected impact of delegation on interventions is then $(1-p)\frac{a_1-b}{2}-p\frac{b}{2}$. Taking derivative wrt. p gives $-\frac{b}{2}-\frac{a_1-b}{2} < 0$. That is, when the central supervisor has better (own) access to local information, the impact of delegation on supervisory interventions is more muted. The intuition is that when the central supervisor is more informed, the agent's bias will play less a role in centralized supervisory decisions. Thus interventions under centralization become more efficient, lowering the impact of delegation.

3.6.2 Local uncertainty

The benefit of having access to local information is higher when local conditions are less predictable, that is, when they are more uncertain. We can capture the magnitude of local uncertainty though the size of the interval on which θ is distributed. Lets denote uncertainty with $L > 0$ and assume that θ is uniformly distributed on $[-L, L]$. The baseline model is the special case of $L = 1$. We have that $a_1'(L) > 0$, that is, uncertainty lowers interventions under centralization (still to be shown). Under decentralization, uncertainty plays no role (as the agent observes θ). It follows that higher uncertainty leads to a larger increase in interventions following delegation. The intuition is that when there is higher local uncertainty, information loss due to strategic communication is more costly, resulting in less efficient decisions under centralized decision-making.

3.6.3 Alternative channel: Higher risk of local banks

Around the reform, there may have been a potentially confounding effect that has increased risks of local banks (but not national banks). This may explain why supervisory interventions have increased following the reform, unrelated to the informational channel.

To investigate, assume that informational frictions are absent. That is, the central supervisor also observes θ (either because it directly observes it, or because the local supervisor relays it truthfully to the central supervisor). Consider now, that for exogenous

reasons, the risks of banks increases after the reform. Specifically, assume that the state θ is now uniformly distributed on $[-1+r, 1+r]$ ($r \in (0,1)$) instead of $[-1,1]$.

Prior to the reform (centralization) the fee is set according to $F = \max\{0, \theta\}$. The likelihood of intervention is $\frac{1}{2}$ and the average fine is $\frac{1+0}{2} = \frac{1}{2}$. Following the reform (decentralization), the fee is set according to $F = \max\{0, \theta - b\}$. The likelihood of intervention is $\frac{1}{2}\frac{1+r-b}{2}$ and the average fine is $\frac{1+r-b+0}{2}$. We can see that interventions can indeed increase when the risk effect is sufficiently large ($r > b$). However, in this case, fees should also increase, inconsistent with the evidence. The intuition is simple: higher interventions require local banks to become sufficiently more risky, but in this case, this would also imply higher fees.

3.6.4 Alternative channel: Higher stringency of local supervisors

The reform may also have increased the stringency of the local supervisor, specifically towards local banks. Again, this may cause more interventions into local banks, unrelated to the informational channel.

To investigate, we now assume that the reform lowers the bias of the local supervisor by $\triangle b$ ($\triangle b > 0$). Outcomes prior to the reform, that is, outcomes under centralization, are unchanged and identical to above (the likelihood of intervention and the average fine are both $\frac{1}{2}$). Following the reform, the fee will be set according to $F = \max\{0, \theta - b + \triangle b\}$. The likelihood of intervention is $\frac{1-b+\triangle b}{2}$ and the average fine is $\frac{1-b+\triangle b}{2}$. We see that interventions can indeed increase when $\triangle b$ is sufficiently large ($\triangle b > b$), but in this case the average should increase as well (the change is given by $\frac{\triangle b - b}{2} > 0$) not decrease.

4 Data and Research Design

4.1 Sample composition and data sources

Supervisory interventions and resulting penalties are disclosed on the CBRC/CBIRC websites. The information disclosed contains the date of the action, the institution or individual to which the action applies, the supervisory authority responsible for the action, the reasons underlying the action, the specific laws or regulations violated, and the penalty (or penalties) imposed.

There are five types of penalties. First, a warning is a formal letter issued by a supervisor stating non-compliance with laws or regulations. Second, a fine entails a monetary penalty imposed on a bank (like the civil money penalty in the US context), along with the confiscation of any illegal proceeds. Third, a disqualification refers to barring bank managers from holding senior positions in the banking sector (for a specified period or permanently). Fourth, a prohibition refers to barring bank staff from working in the banking sector (for a specified period or permanently). Fifth, a license revocation is the withdrawal of the authorization to operate the branch. Figure 2 provides an example of a penalty as disclosed on the CBRC/CBIRC website.[12]

We construct the sample of supervisory interventions using textual analysis of penalty announcements. Our sample includes 12,078 penalty events during the period between 2010 and 2020. Table 1 shows statistics on penalties. Panel A reports the frequency of penalties by types, highlighting that warnings and fines are the most issued type of penalties. Panel B breaks down penalties based on their underlying reasons, showing that in more than 50% of the cases the main reason is loan related (note that a bank may receive a penalty for several reasons).[13] Panel C breaks down penalties based on their

[12] In 2015, the Yichang branch of Bank of Hubei was punished for inaccurately classifying loans based on their risk level and withholding a certain percentage of the loan as a deposit when the loan was granted. Consequently, the branch received a fine of RMB 400,000 from the local supervisory office, Yichang Bureau (Figure 2).

[13] We identify nine reasons (or categories) for which banks may face penalties. The loan-related rea-

recipient (an individual or a bank), showing that banks are the most frequent recipients.

The information on penalties is manually collected at the disaggregated levels of (prefecture-level) branches and their subordinated offices. Since local supervisors operate at the prefecture level, we aggregate penalties at this level and allocate it to the (single) prefecture-level branch. The final sample covers 5,429 (prefecture) branches of 1,074 banks in 342 prefectures for ten years surrounding the 2015 reform. As shown in Table 2, the 1,074 banks consist of 1,056 local banks (127 prefecture commercial banks and 929 rural commercial banks[14]) and 18 national banks (6 large state-owned banks and 12 joint-stock banks). Overall, our sample represents about 90% of the assets of the Chinese banking sector.

Table 2 presents several information about local and national banks. One takeaway from this table is that local and national banks are fairly comparable at the prefecture level. Across the sample, branches of local and national banks are of similar size and have profitabilities, and operate in prefectures of similar market concentration, credit availability and distance to Beijing. Branches of national banks have a slightly higher market share (6.6% compared to 5%).

We supplement the penalty data with bank-level, firm-level, prefecture-level, and

sons encompass instances in which banks inaccurately classify loans based on their risk level, conceal non-performing loans, fail to identify illegal use of loan funds, fail to conduct ex ante screening and ex post monitoring, and more. Deposit-related reasons include cases of over-reporting deposits, engaging in illegal deposit-taking through kickbacks or offering interest rates exceeding regulatory limits, misclassifying interbank deposits as retail deposits, and so forth. Interbank-related reasons involve improper conduct in interbank business, providing implicit guarantees for interbank investments, omitting certain interbank transactions from the balance sheet, and similar issues. Acceptance-related reasons entail the issuance of bank acceptance bills without genuine business transactions, conversion of loan funds into bank acceptance deposits, and others. Credit card-related reasons encompass instances in which credit cards are issued to applicants who provide false information, failure to detect credit card loans flowing into the real estate market, and similar cases. Guarantee-related reasons involve banks providing inappropriate (implicit) guarantees to third parties, among other factors. Prudential regulation-related reasons refer to violations of prudential regulation rules. Internal control-related reasons include instances of internal control failures resulting in staff misconduct, operational risks, criminal fraud, and more. Governance-related reasons encompass the appointment of senior management personnel without undergoing the qualification review by the CBRC, lack of review and approval by the Board of Directors for significant connected transactions, banks' shareholders using loans as equity investments in the bank, and so forth.

[14]We exclude rural credit cooperatives, village banks, foreign banks, internet banks, and similar institutions.

loan-level data from the Chinese Research Data Services (CNRDS) and the China Stock Market and Accounting Research (CSMAR). Sample summary statistics are presented in Table 3. All variable definitions are given in Table A1 in the Appendix.

4.2 Empirical Specification

We use a difference-in-differences design to examine the impact of the decentralization reform of 2015 on supervisory interventions. We estimate the following specification at the bank-prefecture-year level:

$$Penalty_{ijt} = \alpha_i + \alpha_j + \alpha_t + \beta Localbank_i \times Post_t + \varepsilon_{ijt}, \tag{2}$$

where the subscript i denotes a specific bank i, j the prefecture of the bank branch, and t the year. The dependent variable, $Penalty_{ijt}$, is a one of our measures of penalties imposed on branch belonging to bank i in prefecture j in year t. We use two main variables capturing supervisory activity. The first variable is a dummy taking the value of 1 if a bank branch receives at least one penalty in year i, and 0 otherwise. The second variable is the log of 1 plus the number of penalties received by a bank branch in year i. In further tests, we also create similarly constructed variables for each type and each recipient of penalties. $Localbank_i$ is a dummy taking the value of 1 for branches of local banks i (treated group), and 0 for branches of national banks i (control group). $Post_t$ is a dummy taking the value of 1 from 2015 onwards, and 0 otherwise. The bank fixed effects (α_i) control for differences across banks, while the prefecture fixed effects (α_j) control for differences in local conditions. Since each prefecture has one supervisory office, the prefecture fixed effects also account for any (time-invariant) differences in local supervisory stringencies. We also include year fixed effects (α_t)) to control for any macro movements. In some specifications, we further include prefecture $\times$ year fixed effects, which control for time-varying prefecture-level heterogeneity. For instance, there may be

a turnover of supervisory officers, resulting in a change in local supervisory leniency. In other specifications, we also include bank × prefecture fixed effects (equivalent to branch fixed effects), which control for heterogeneity across branches of the same bank. Following Gormley and Matsa (2014), our main specification does not include endogenous bank-level controls to avoid the "bad control" problem (see also Angrist and Pischke (2009)). ε_{ijt} is the error term. The coefficient of interest is β, which measures the effect of the 2015 decentralization reform on treated branches. We expect β to be positive if local banks are subject to tighter supervision following the reform. Throughout, we report robust standard errors clustered at the level of the prefecture where the branch is located.[15]

5 Decentralization and penalties

5.1 Basic results

We begin our analysis by examining the effect of the 2015 decentralization reform on supervisory interventions. Table 4 presents the results from estimating equation 2. The first four columns focus on the likelihood of receiving a penalty. In column 1, we run the regression without any fixed effects. In column 2, we add separate bank, prefecture, and year fixed effects, implying that only the interaction between $Localbank_i \times Post_t$ is estimated. In column 3, we include prefecture × year fixed effects to absorb any time-varying local shocks, meaning that we compare branches of national versus local banks in the same prefecture of the same year. In column 4, we include bank × prefecture fixed effects and year fixed effects, which controls for differences across branches. In columns 1 to 4, the estimated coefficients on the interaction term (statistically significant at the 1% level) show that local banks are 6.3 to 8.8 pp more likely than national banks to receive

[15] We experiment with alternative clustering levels—in particular, clustering by bank and double clustering by prefecture and year. Clustering by prefecture used in the reported results produces the most conservative standard errors.

a penalty following the decentralization reform. Given the unconditional probability of getting a penalty of 11.1%, the effect represents an increased probability ranging from 57 to 80%.[16]

The last four columns focus on the number of interventions as outcome. The results confirm the ones from the previous columns. The estimated coefficients on the interaction term (statistically significant at the 1% level) imply that local banks receive relatively more penalties following the decentralization as compared to national banks. We take the log of 1 plus the number of penalties to retain observations with zero-valued outcomes. However, linear regressions where the dependent variable is the log of 1 plus the count outcome are biased and may even produce the opposite sign of the true relationship (Cohn et al., 2022). An alternative to estimating equation 2 is to rely on Poisson regressions as they can accommodate count outcomes with a mass of values at zero. Poisson regressions produce consistent and reasonably efficient estimates under standard exogeneity conditions, even with multiple levels of fixed effects as we have. Table A3 in the Appendix reports the coefficient of a Poisson regression model. As can be observed in column 1, the Poisson regression confirms the finding of column 8 in Table 4.

Table 5 presents the results for each type and each recipient of penalties employing a specification similar to column 4 of Table 4. In Panel A, we examine each type of penalties, that is, fines, warnings, disqualification, and prohibition.[17] Columns 1 to 8 show that all types of penalties are more likely, and more often issued, against local banks than national banks after the reform. Regarding the fines, we use the log of the dollar amount instead of their counts. The size of fines post-reform is larger for local than

[16] We carry out some robustness checks that are shown in Table A2 of the Appendix. First, these results are unchanged if we drop branches of state-owned banks. State-owned banks may have specific means to influence supervisory interventions, and may generally operate differently, while the remaining national banks (the joint-stock banks) operate in a more market-oriented manner as local banks. Second, these results are also unchanged if we exclude penalties issued by the local offices of the CBRC in Beijing. In this case, both central and local office are in the same prefecture, possibly blurring the analysis of decentralization.

[17] We do not conduct regressions for license revocations as there are only three instances of such type of penalties.

national banks. In Panel B, we split penalties according to whether they are imposed on individuals or institutions. The results show that local supervisors issue more penalties towards both. Table A3 in the Appendix reports the coefficients of Poisson regression models for count outcomes. Again, the Poisson regressions confirm the findings of Table 5.

Table 6 then gauges the robustness of our results by controlling for several bank characteristics and differential trends based on bank characteristics. In Panel A, we control for bank size, capital adequacy ratio, Z-score, net interest margins, loan-to-deposit ratio, and loan-to-asset ratio. The inclusion of these bank covariates reduces sample size. We indeed lose 734 local banks—mostly small banks and banks that are not obligated to publicly disclose their financial statements because they are not listed. Panel A confirms the results reported in the first two columns of Table 4. However, these regressions should be interpreted with caution, as bank characteristics are likely endogenous to supervisory activity (Angrist and Pischke, 2009).

Adding bank covariates helps restoring randomness if banks with certain characteristics have different trends in outcome (that is, penalties). However, banks with certain characteristics could potentially be affected by the 2015 reform or other confounding events. For example, China had previously strict limits on the loan-to-deposit ratio, which capped the amount of loans that banks could make relative to their deposits. The mandatory limit was set at 75%, meaning banks could not lend more than 75% of their deposits. This ratio was considered as a crucial regulatory indicator, equivalent to capital adequacy ratio, with the aim of ensuring that banks had sufficient liquidity. In 2015, China removed the loan-to-deposit ratio as a mandatory requirement and turned it into a monitoring indicator instead.[18] We address this concern by interacting covari-

[18]See Bloomberg, "China Moves to Scrap Rule Limiting Bank Loans to 75% of Deposits", https://www.bloomberg.com/news/articles/2015-06-24/china-moves-to-cancel-cap-limiting-bank-loans-to-75-of-deposits; and Reuters, "China to scrap commercial banks' loan-to-deposit ratio", https://www.reuters.com/article/business/china-to-scrap-commercial-banks-loan-to-deposit-ratio-idUSL3N0ZA3SA/ (last accessed: September 2024).

ates (measuring various bank characteristics) averaged over the pre-reform period with $Post_t$. Doing so controls for non-random assignment (based on bank characteristics) and differential trends (based on bank characteristics). Panel B shows that including our interaction term of interest remains unaffected even after accounting for the differential effects of the 2015 reform on penalties across banks, which vary in size, capital adequacy ratio, Z-score, net interest margins, loan-to-deposit ratio, and loan-to-asset ratio.

Whereas so far we have controlled for bank-level controls, we next control for branch-level covariates. For this we utilize firm-level data originating from the National Tax Survey Database (NTSD), which is jointly collected by the State Administration of Taxation of China and the Ministry of Finance of China (SAT-MOF) based on the stratified random sampling method (Liu and Mao, 2019). It covers 700 thousand corporate tax payers annually from 2012-2020. A fraction of surveyed firms are banks and bank branches. We match bank (branch) name and city with our penalty sample, eventually end up with 3,037 branches of 559 banks across 333 prefecture-level cities. Based on the information available from the NTA, we construct a set of branch covariates, including branch size (log of branch total asset in RMB) and ROA (net income over total asset).[19] The results are presented in Panels C and D in Table 6 and show that our main results are unchanged.

5.2 Parallel trends

We now examine the dynamics of the effect. Figure 3 shows a version of our baseline specification that interacts the variable $Localbank_i$ with the time in years relative to the decentralization reform. Panel A plots the estimated coefficients for the likelihood of a penalty, while Panel B does the same for the number of penalties. The parallel trends assumption holds as there are no visible differences between the treated group

[19]The purposes of the dataset is for the Chinese authority to have better information on the tax base. As such, data quality is very variable. For instance, reported equity is negative for a large fraction of firms, and we have thus not included controls based on equity. For more detailed description of the NTSD, see Liu and Mao (2019).

and control group prior to the reform. At the same time, an increase is evident in the years subsequent to the reform. Table A4 in the Appendix also shows the regressions of the dynamics of the effect of decentralization (omitting the year 2015 as the benchmark). Again, no statistically significant effect exists in the years prior to the reform, and a clear increase appears following it.

5.3 Placebo tests

A potential concern in difference-in-differences analysis is that serial correlation may bias standard errors, in turn leading to over-rejection of the null hypothesis of no effect (Bertrand et al., 2004). We address this concern by performing a permutation test following Chetty et al. (2009) and Ohrn (2018), among others. We start the procedure by randomly selecting a placebo implementation year between 2010 and 2020 for each permutation. Then, we randomly designate 18 banks from the entire sample and assign them (and their branches) the status of national banks, while treating the remaining banks and their branches as local banks. The baseline regression (specification 4 of Table 4) is then re-estimated for each of our two dependent variables using the placebo treatment. Point estimates are recorded, and the procedure is repeated another 499 times to produce the plots in Figure 4. Both panels of Figure 4 display the empirical distribution of placebo effects for both dependent variables. Reassuringly, the estimated coefficients are normally distributed around 0 and are far away from the actual estimated effects.

5.4 Average fees and fee dispersion

The model of communication and supervisory interventions predicts that the severity of interventions declines following decentralization (even though interventions become more likely). This is because now more minor misconduct is punished, and thus misconduct that deserves a lower penalty.

Our data contains information on the size of fines issued, which allows us to test this prediction. Table 7 column (1) and (2) contain the results. The regression now only includes bank-prefecture-year observations with fines, and the dependent variable is the average fine in that bank-year (a bank may receive more than one fine in a year). As fines display a very skewed distribution, we use next to fines itself also the log of the fine. As can be observed, the interaction term is negative and statistically significant at the 10% and 5% level, respectively. This supports the prediction of, on average, more minor violations being punished following decentralization.

A second prediction of the model is that the severity of punishment becomes more variable following decentralization. This is because under decentralization, more granular information is used for supervisory decision. Thus fines can be well tailored to varying levels of misconduct. By contrast, under centralization information that reaches the central supervisor is more partitioned. In the extreme, in the two-message equilibrium, there is only one information-level that leads to a punishment, and consequently there is only one fine-level issued.

Columns (3) and (4) apply this prediction to the dispersion of fine. The dependent variable is now the standard deviation of the fine using either the fine itself (column 3) or the log of the fine (column 4). The interaction effect is now positive (significant at 5% and 10%), indicating higher fine dispersion following the reform.

5.5 Local bias

Our model is predicated on local supervisors having a bias in their decision-making. As shown in Section 3, this bias distorts interventions regardless of centralized and decentralized decision-making, and does so in the same direction.

Such bias may arise from local supervisors being more susceptible to influence from local political interests. As the local supervisor is closer to the supervised bank, it has incentives to collude with local banks' stakeholders (Gopalan et al., 2021; Lim et al.,

2023), resulting in lax supervisory outcomes (Correia, 2014; Lambert, 2019; Lim et al., 2019; Yue et al., 2022). Although local supervisory offices in China are in principle independent of the government, local governments (that is, provincial-level or prefecture-level governments) might interfere in the supervisory process to protect their banks. This may particularly be so when local governments have an equity ownership, or even are the controlling shareholders of local banks.

We examine the presence of such a bias in Table 8. Our proxy is the total share of local governments among the top three shareholders of the bank. We obtain information on bank shareholders and their equity ownership from CNRDS. Shareholders are identified as being affiliated with the central or local government based on their names and registration information.[20] The estimated coefficients on local bias are negative (significant at 10% and 5% level), thus less interventions take place when local government are more likely to be subject to a bias. This is consistent with our model.

6 Local information

6.1 Access to information

Our model shows that under centralized decision-making local information is lost as the local supervisor communicates this information strategically and selectively with the central supervisor. The extent to which this worsens decision-making by the central supervisor depends on how much own information she has about local banks. Our model thus predicts that decentralization is more beneficial when it is carried out in a situation where the central supervisor had limited (own) access to local information. In this case, decentralization entails a greater informational gain.

We examine this prediction in Table 9. We proxy the informational gain induced

[20]Examples of local government entities that serve as shareholders for certain local banks on behalf of the local governments are Local Bureau of Public Finance, State-owned Assets Supervision and Administration Commission, Management Committee of Development Zones.

by the reform using the (log) distance in kilometres between the prefecture where the branch (of a local bank) is located and Beijing.[21] We then examine the differential effect of the reform on penalties across local banks that differ in terms of their distance to the central supervisor (proxying for informational gain). In columns 1 and 2, the specification includes year and bank × prefecture fixed effects. Whether we look at the likelihood of a penalty in column 1 or the number of penalties in column 2, the estimated coefficients on the triple interaction term are positive and statistically significant at the 1% level. In columns 3 and 4, we only exploit within-bank variation arising because different branches of a bank have different locations, and hence varying distances to the central supervisor. The specification in these two columns includes bank × year and prefecture × year fixed effects. The estimated coefficients on the triple interaction term are again positive and statistically significant at the 1% level. The implied effect is sizeable. Using the estimated coefficient on the triple interaction term of 0.022 in column 3, we find that a one-standard-deviation increase in the log distance (that is, 0.854 in Table 3) is associated with an increase of 1.9 pp in the probability of getting a penalty for local banks after the reform (that is, $0.022 \times 0.854 = 0.019$). We obtain implied effects in similar ranges once calculated from the estimated coefficients of the other columns. Together, these estimation results indicate that supervisory outcomes improve more when the central supervisor is more at an informational disadvantage, consistent with limited communication under centralization.[22]

In columns 5 and 6 of Table 8, we examine whether the informational gain is a linear one, or whether it predominantly arises for branches that are very far from Beijing. We create distance dummies (long, intermediate, and short) based on the tercile distribution that we interact with $Localbank_i \times Post_t$. The estimated coefficients on the triple

[21] Previous literature has offered US evidence that the distance from the firm location to the banking regulator, the Department of Justice, or the Securities and Exchange Commission, affects the costs of monitoring and information acquisition (see, e.g., Kedia and Rajgopal (2011); Wilson and Veuger (2017); Ganduri (2019); Gopalan et al. (2021); Ha et al. (2023); Lim et al. (2023)).

[22] Our results are robust to using travel distance (measured by travel time between two prefectures of the supervisor and the bank) instead of distance in kilometres.

interaction term are increasing from short, to intermediate, and eventually to long distance. It is noteworthy that already the coefficient on the triple interaction term for a short distance is sizeable. This speaks to the importance of eliminating even small informational frictions.

6.2 Uncertainty

The previous section considered a proxy of the amount of information that is lost under centralization. In this section we consider the importance of local information. In particular, our model predicts that information is more valuable when local conditions are more variable and hence more difficult to predict (for the central supervisor). In such situations, delegation should be more beneficial, resulting in a large improvement in detection of misconduct.

We measure local uncertainty through economic and political uncertainty at the prefecture-level. We approximate economic uncertainty by the standard deviation (SD) and coefficient of variation (CV) of prefecture-level city GDP growth rate over an event window of past three years (year $t-3$ to year $t-1$).[23] Then, we classify cities of high uncertainty if one has standard deviation or coefficient of variation higher than sample median each year. That is, the high uncertainty is a dummy variable equals one for higher SD or CV for a city than the sample median in each year, and 0 otherwise.

We report the results of local economic uncertainty in Panel A in Table 10. The first two columns report the results employing the penalty dummy as the dependent variable, while the last two columns employ the log of number of penalties as the dependent variable. Column 1 reports the regression with standard deviations (SD) of past GDP growth rates as the measure for local economic uncertainty. Having been interested in the triple interaction term of local bank, post, and high uncertainty, we confirm the prediction that local supervisors become tighter for local banks after the decentralization

[23] Our findings are insensitive to alternative event window of past five years and are available upon request.

reform if local economic uncertainty is high. The results are stronger when uncertainty is measured by CV of GDP growth rates in column 2 and remain similar when using the log of number of penalties as the dependent variable in columns 3 and 4.

We measure local political uncertainty using leadership vacancy or change in leadership less then mandatory term in local government. We manually collect the names and tenures of the top Party and government leaders at the prefecture-level over our sample period, including the precise dates of appointment and termination. First, if a leadership vacancy persists for more than six months for prefecture-level units within a given year, we classify it as a high-uncertainty period for a given prefecture. In specific, we define a dummy for High uncertainty (Vacancy $> 6m$). Second, following China's five-year term norm, we identify high-uncertainty episodes as leadership turnover within three years. In specific, we define a dummy for High uncertainty (Turnover $< 3y$).[24] We report the results of local political uncertainty in Panel B. Consistent with predictions, the persistently positive and significant coefficients on the local bank $\times$ post-reform $\times$ high uncertainty interaction terms indicate that decentralization reforms amplify supervisory stringency toward local banks in high-uncertainty political environments.

7 Other channels

Our findings regarding the likelihood, severity and dispersion of supervisory intervention as well as the importance of proxies for information speak to a better usage of local information under decentralization, resulting in better supervision. In this section we discuss whether alternative explanations are consistent with our evidence.

Bank risk-taking. A higher frequency of supervisory interventions may reflect higher risk-taking by banks. However, in Table 6 we have controlled for bank risk. In addition, the analysis in the following Section 8 shows that bank risk-taking has declined

[24] Alternative four-year cutoff yields consistent results.

following the reform, not increased.

Supervisory capacity. A first alternative explanation for our results relates to potential changes in the capacity of local supervisors (Eisenbach et al., 2022). Following the 2015 reform, local supervisors may have hired additional staff. More staff at local supervisory office may have allowed to improve risk detection irrespective of an informational benefit due to the reform. To examine this channel, we include as a control the (log) number of new hires of supervisory officials at the provincial level. We manually collected the data from the CBRC/CBIRC's official website. Table 11 displays the results. In columns 1 and 2, we can observe that our main effect remains after controlling for potential changes in supervisory capacity. We also note that the number of new hires does not enter significantly in the regression model, ruling out a "supervisory-capacity" channel in our setting. In addition, we restrict the sample to the period before 2018. The reason is the 2018 merger between the CBRC and the CIRC (see Sub-section 2.2 for institutional details), which does not allow identifying post-2018 hires specifically for bank supervision. In columns 3 and 4, we show that our results are unchanged when restricting the sample prior to 2018.

Accountability. Another explanation for our results could be that the 2015 reform clearly reassigned oversight responsibilities and powers to local supervisors, making them more accountable for their actions. This could lead to a fear of punishment by the central supervisor if problems at supervised banks arise, incentivizing local supervisors to adopt stricter oversight. While we cannot rule out the possibility of a fear-of-punishment motive, we observe that increased strictness contradicts our findings on average fines reported in Sub-section 5.4. In fact, fines decline rather than increase, which is consistent with improved risk detection following the 2015 reform.

Confounding reforms. Confounding policy reforms introduced in 2015 may have also affected local and national banks differently. Specifically, in 2015, the loan-to-deposit ratio ceiling was downgraded from a mandatory requirement to a voluntary monitoring

indicator, marking a significant reform in China's banking regulation (cf. Footnote 16). If branches of local and national banks display different loan-to-deposit ratio prior to the reform, they may be differentially impacted by it. In Table 5, Panel B, we controlled for the loan-to-deposit ratio (measured prior to the shock) interacted with the post-reform dummy. As explained in Sub-section 5.1, this approach allows us to effectively control for differential trends based on various bank characteristics, including the loan-to-deposit ratio. From Panel B, we saw that the interaction of interest between $Localbank_i$ and $Post_t$ keeps its positive sign and high statistical significance, suggesting that the ceiling downgrade on loan-to-deposit ratio does not affect our key results.

8 Decentralization and lending

A better ability to punish misconduct should lower banks' incentives to take on risks. We test this prediction by examining individual lending decisions of branches.[25] Specifically, we consider loan announcements of all listed firms in China over our sample period. We use textual analysis to extract information on the identity of borrowers, the loan origination date, the loan amount, the loan spread, and the entity of loan issuing bank branches. We start with 16,184 loans taken out by 1,678 firms from 327 banks. We obtain borrower financial information using CNRDS, namely size, leverage, tangibility, cash holdings, and ROA. We then merge this borrower financial information with information on branches, leaving us with 13,358 loans.

We use loan spreads (i.e., interest rates) and loan quantities (log of loan amounts) to measure conservativism in lending. Conditional on borrower characteristics, a more conservative branch is expected to charge a higher compensation for taking on credit risk, and to issue smaller loans, that is, take on less risk. All the variable definitions are

[25] We cannot examine the impact on the riskiness of branches themselves as balance sheet information is not available. However, studying their loan extensions offers arguably a more suitable empirical setting as the granularity of the individual loan data allows to control for many factors, such as borrower fixed effects. In addition, this more directly measures risk-taking behavior as it focuses on new decisions.

provided in Table A1 of the Appendix and summary statistics on firm characteristics and loan terms are presented in Panels C and D of Table 3.

We report the loan-level estimation results in Table 12. We first examine loan spreads. In column 1, the specification contains lagged borrower characteristics together with year, bank, and borrower fixed effects (identification thus arises from different banks lending to the same borrower). In column 2, we add prefecture fixed effects. In both columns, the number of observations is relatively small given that loan spreads are often missing. The estimated coefficients on the interaction term (statistically significant at the 1% level) indicate that local banks charge higher loan spreads following the 2015 reform. The coefficients of interest are 31.3-31.5 basis points, a remarkable effect of about 29% of the standard deviation of loan spreads. Thus, local banks show less aggressive lending behaviour post-reform by requiring higher compensation for identical borrowers. This result is consistent with our prediction that tighter supervision following decentralization is effective at reducing risk-taking incentives at banks. It should also be noted that most borrower controls are insignificant, suggesting that borrower risk is fairly time-invariant and hence well captured by the borrower fixed effects.

In columns 3 and 4, we look at loan quantities. The estimation results provide further support to our prediction. The estimated coefficients on the interaction term (statistically significant at the 1% level) show that local banks significantly reduce the amount they lend after the 2015 reform. The coefficients of interest are 3.3-3.9, that is, about 9% of the standard deviation of loan amounts. Since smaller loan size implies lower risk, this result is consistent with our prediction.[26]

The findings reported in Table 12 suggest that branches of local banks became more conservative in their lending because of decentralization. We next investigate whether such conservative lending at the bank level has real consequences for the aggregate,

[26]The number of listed firms has increased sharply during our sample period, suggesting that the sample of borrowers before and after the reform may differ substantially. To address this concern, we run the regressions in Table 12 restricting ourselves to borrowers already being listed prior to the reform and obtain similar results.

prefecture level. Specifically, we test whether loan supply in prefectures with a higher presence of local banks is lower relative to other prefectures. It is not clear ex ante that such effects happen in the aggregate. First, more conservative lending by local banks post-reform might be compensated by more accommodating lending by national banks. Second, as our analysis exploits variation across prefectures, we may fail to empirically identify a significant effect if prefectures do not vary significantly regarding the importance of local banks.

We use prefecture-level information on loan supply, GDP, and fiscal balance to construct a panel of 287 prefectures over the same sample period as before. We capture loan supply using the ratio of credit over GDP. The interaction term of interest is here between the share of local banks in the prefecture (measured by their share of offices) and the dummy $Post_t$. Our specification includes GDP growth and the fiscal balance of the municipal governments as controls. Robust standard errors are clustered at the prefecture level.

Table 13 displays the estimation results. In column 1, the estimated coefficient on the interaction term (statistically significant the 1% level) is negative, meaning a reduction in loan supply in prefectures with a higher share of local banks. In column 2, we obtain a similar result when including province fixed effects.

To deal with endogeneity, we rely on an instrumental variable (IV) that captures exogenous variations in the actual share of local banks. We closely follow Gilje et al. (2016) by using the predetermined share of local banks in 2010 as an IV. We first show that our IV is powerful, easily passing tests for weak instruments. It also meets the exclusion restriction because in 2010 banks (or prefectures) could not plausibly have anticipated the decentralization reform of 2015 and therefore adjust the structure of local banking markets. The IV results are presented in columns 3 and 4. We observe that they are very similar to the ones in the previous two columns.

Overall, the findings in this section imply that tighter supervision resulting from the

decentralization reform has real aggregate effects. This is noteworthy as the change in supervisory stringency is only applied to a subset of bank branches: the local ones.

9 Conclusion

This paper studies the effect of decentralization in the world's largest banking sector, China. In 2015, China shifted responsibilities and powers for undertaking supervisory interventions from central (national) to local (prefecture) supervisors. We find that local supervisors are more likely to intervene into branches of local banks following the decentralization reform. Economically, the likelihood of a penalty increases by 57% to 80%. This result, and a large set of others, are consistent with the prediction of a model of supervisory communication in the presence of local information, and suggests improved supervision due to better usage of local information.

Our paper has an important message. The current policy discussion (for example, in the Eurozone) often centres around centralization of policies vis-à-vis independent supervisors. Our paper by contrast speaks to benefits of decentralization vis-à-vis subordinated supervisors. In a hierarchical structure such as present in many countries, biases of local supervisors are less likely to play a role, favouring decentralization. Lower biases of local supervisors also speak towards a benefit of hierarchical supervision generally. Among others, this informs the debate in the Eurozone where frictions arise due to (independent) national supervisors having different objectives than the central supervisor.

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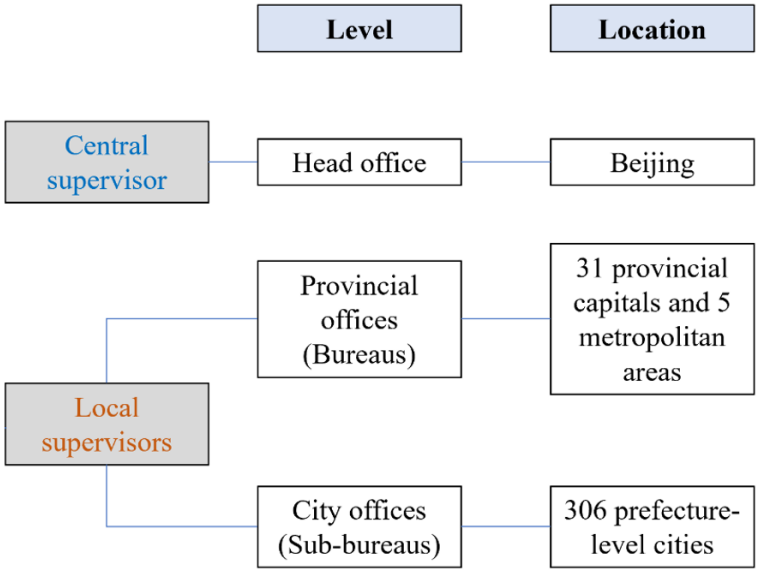
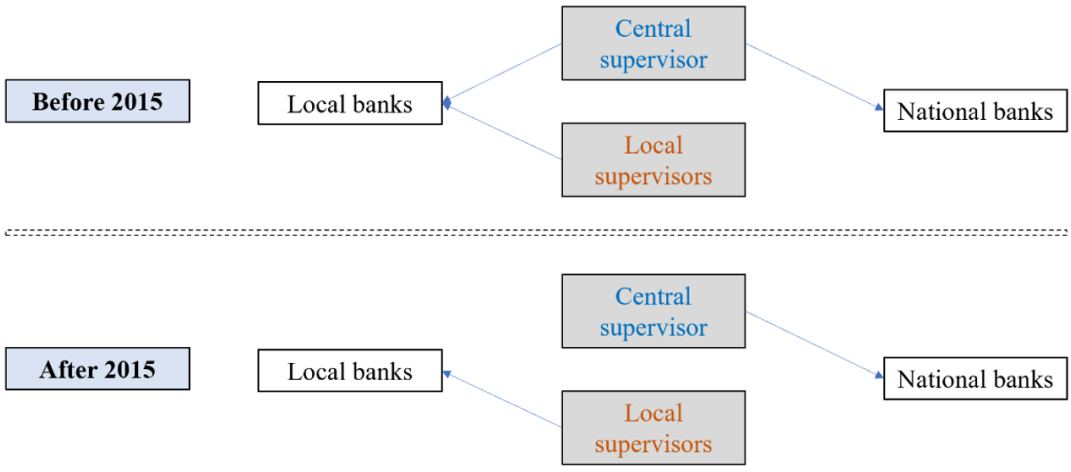
Figure 1: Supervisory architecture
Note: The figures show the structure of China Banking Regulatory Commission (Panel A) and the allocation of responsibilities and powers before and after the decentralization reform of 2015 (Panel B).



(a) Structure of China Banking Regulatory Commission (CBRC)



(b) Responsibilities and powers for supervisory interventions before and after 2015

Figure 2: Example of a penalty

Note: The figure shows a snapshot of a randomly chosen penalty from the website of the CBIRC (source: www.cbirc.gov.cn/branch/hubei/view/pages/common/ItemDetail.html?docId=107940&itemId=1437&generaltype=0; last accessed: August 2023).

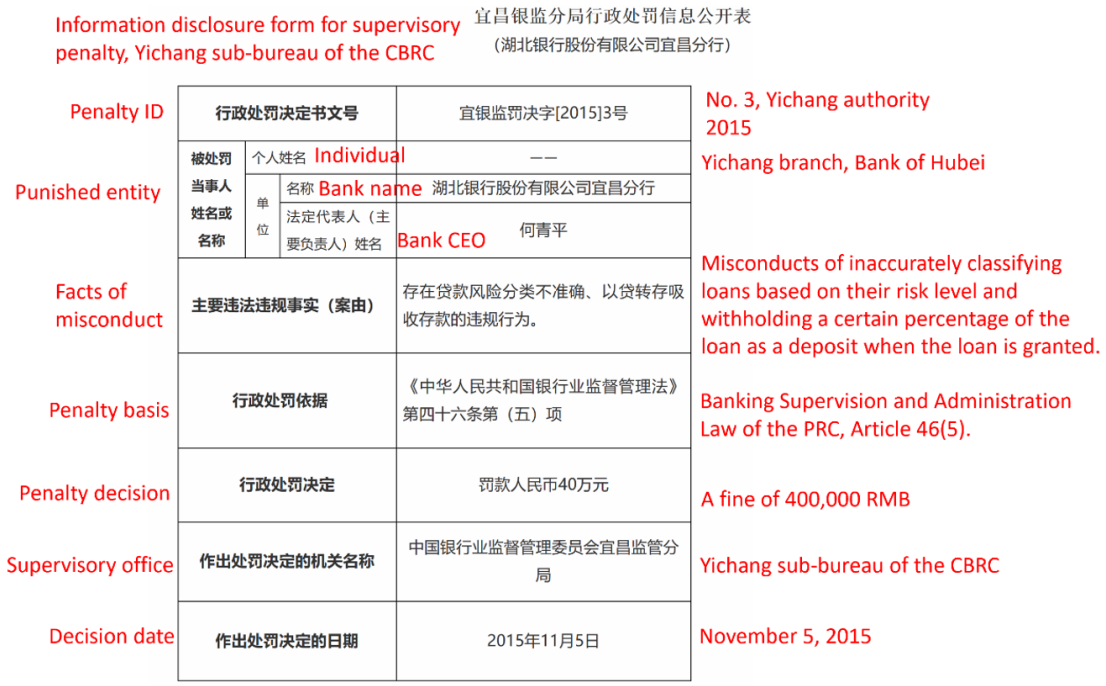
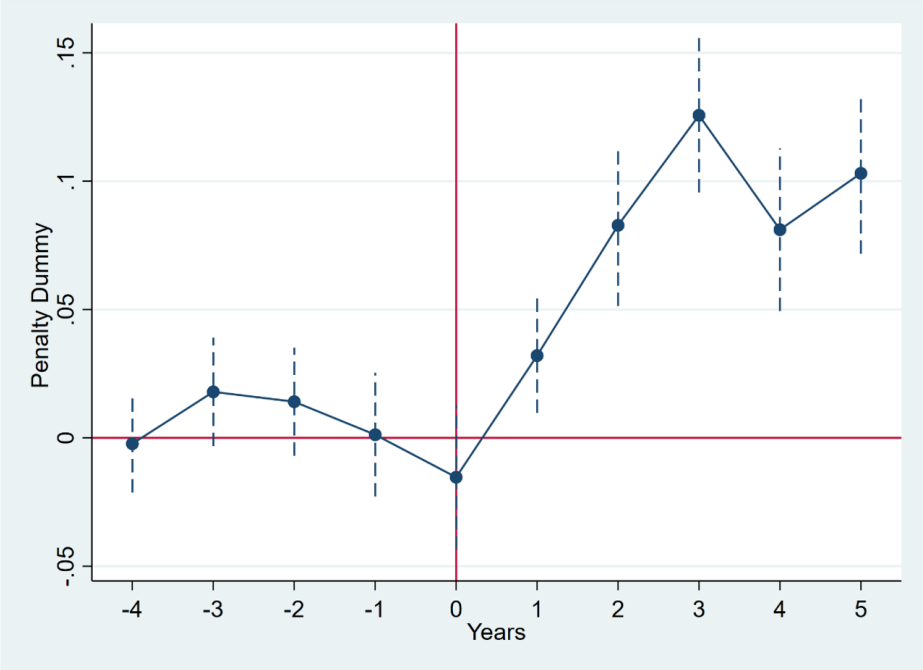
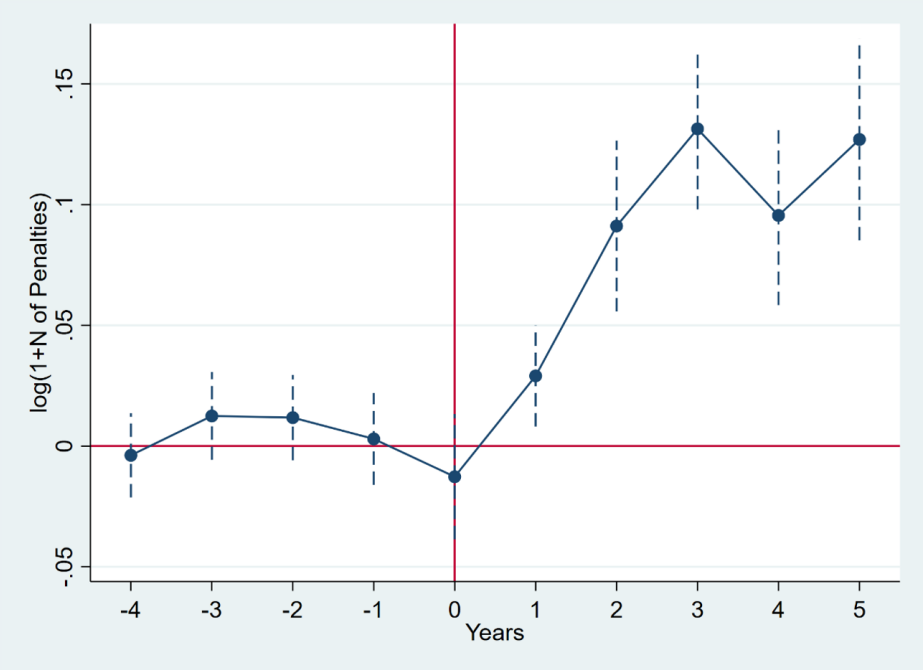


Figure 3: Parallel trends

Note: The figures show the parallel trends for the penalty dummy (Panel A) and number of penalties (log) (Panel B) over our the period surrounding the 2015 decentralization reform. Year 0 refers to year 2015.



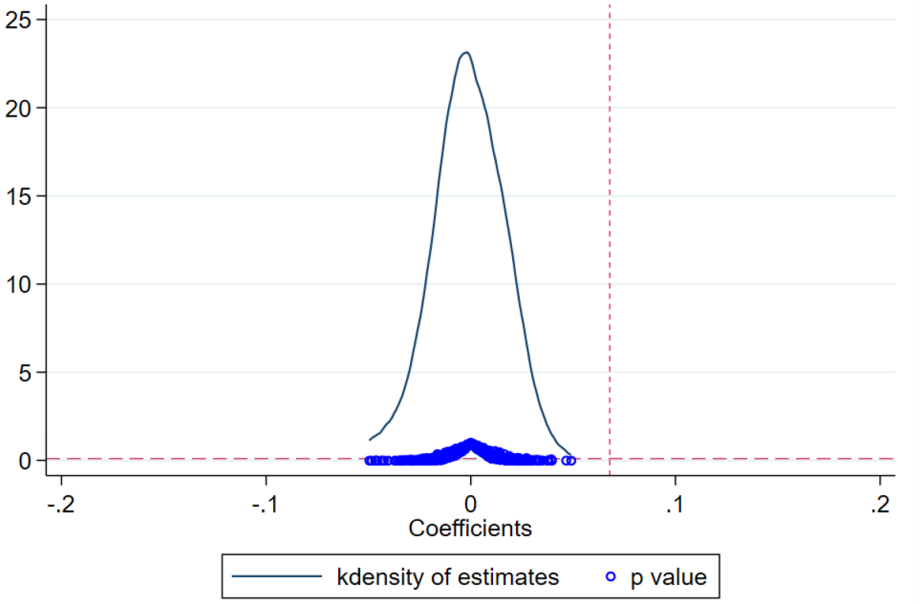
(a) Likelihood of a penalty



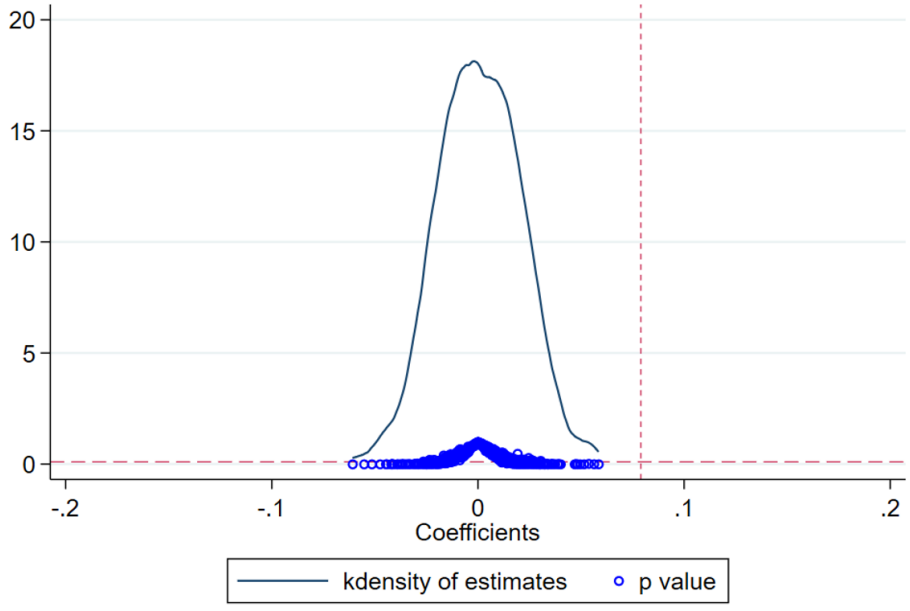
(b) Number of penalties

Figure 4: Distribution of placebo estimates

Note: The figures show the empirical distributions of placebo effects for each of the two dependent variables of interest as described in Sub-section 5.3. The vertical red dash line is the actual estimated coefficient of specificaiton 4 in Table 4, the horizonal red dash line is p-value of 10%, and the solid blue line (blue circles) is the distribution of coefficients (p-values) resulting from the 500 placebo tests for the penaly dummy (Panel A) and number of penalties (log) (Panel B).



(a) Likelihood of a penalty



(b) Number of penalties

Table 1: Summary statistics for the penalty sample

Note: The table presents summary statistics on penalties imposed on local and national banks. Panel A shows the breakdown by type, Panel B by reason, and Panel C by recipient. All variables are defined in Table A1 of the Appendix.

Panel A: Type of penalties	N	Local banks	National banks
Warning	4,341	2,431	1,910
Fine	8,589	4,050	4,539
Disqualification	365	192	173
Prohibition	376	194	182
License revocation	3	0	3
Panel B: Reason of penalties	**N**	**Local banks**	**National banks**
Loan-related reasons	6,872	3,638	3,234
Deposit-related reasons	816	266	550
Interbank-related reasons	464	284	180
Acceptance-related reasons	1,536	664	872
Credit Card-related reasons	182	27	155
Guarantee-related reasons	358	149	209
Prudential regulation-related reasons	1,577	751	826
Internal control-related reasons	973	289	684
Governance-related reasons	298	269	29
Panel C: Recipient of penalties	**N**	**Local banks**	**National banks**
Individuals	4,749	2,693	2,056
Banks	7,919	3,430	4,489
Both individuals and banks	457	240	217

Table 2: Sample composition
Note: The table presents the composition of national and local banks in our sample and summarizes some information at the branch, bank, and aggregate levels.

Bank type	Local banks	National banks
Branch-level statistics		
Average branch size (log of total assets in billion RMB)	11.76	11.79
Average branch ROA	0.98%	1.00%
Average market share (% offices)	5.03%	6.56%
Average number of penalties per branch	2.8	1.85
Average dist. of branches' pref. capital to Beijing (km)	1101.98	1183.73
Average credit/GDP of branches' prefecture	108.04%	112.79%
Average HHI of branches' prefecture (% offices)	0.09	0.1
Bank-level statistics		
Average number of branches per bank	2.03	182.56
Average number of penalties per bank	5.68	337.78
Aggregate-level statistics		
Number of banks in the full sample	1056	18
Number of penalties in the full sample	5,998	6,080
Total fine amount (million)	1761.7	3690.69

Table 3: Summary statistics for the full sample

Note: The table presents summary statistics for the full sample. Panel A reports them for branch-level variables, Panel B for bank-level variables, Panel C for loan-level variables, and Panel D for prefecture- and province-level variables. All variables are defined in Table A1 of the Appendix.

Panel A: Branch-level variables	N	Mean	SD	P1	Median	P99
Local bank	52,773	0.383	0.486	0	0	1
Penalty dummy	52,773	0.11	0.313	0	0	1
Number of penalties	52,773	0.229	1.05	0	0	4
Fine dummy	52,773	0.105	0.307	0	0	1
Fine amount	52,773	103.318	3,361.84	0	0	1,200
Average fine	3,871	679.844	8704.643	26	300	4513.333
Average fine (log)	3,871	5.696	0.887	3.258	5.704	8.415
Fine dispersion	3,871	0.337	0.32	0	0.26	0.984
Fine dispersion (log)	3,871	0.41	0.441	0	0.266	1.478
Warning dummy	52,773	0.082	0.67	0	0	1
Number of warnings	52,773	0.005	0.068	0	0	2
Disqualification dummy	52,773	0.007	0.117	0	0	0
Number of disqualifications	52,773	0.005	0.071	0	0	0
Prohibition dummy	52,773	0.007	0.118	0	0	0
Number of prohibitions	52,773	1,152.45	602.336	0	0	0
Distance (km)	52,773	6.845	0.854	47.225	1,080.20	2,771.43
Distance (log)	52,773	0.783	0.393	3.876	6.986	7.927
Share of offices outside the prefecture	52,773	0.383	0.486	0	0.993	1
Branch size (log)	18,819	11.777	1.294	9.14	11.756	14.1
Branch leverage ratio (%)	18,823	8.699	22.002	-1.999	1.48	90.837
Branch ROA (%)	18,823	0.996	1.371	-2.03	0.986	4.095
Panel B: Bank-level variables	**N**	**Mean**	**SD**	**P1**	**Median**	**P99**
Bank size (log)	44,722	7.636	1.97	2.014	8.675	9.134
CAR (%)	44,028	13.259	2.022	8.48	13.17	17.72
Z-score	42,671	5.413	0.909	3.338	5.39	7.471
NIM (%)	44,595	2.115	0.582	0.225	2.099	4.075
Loan-to-deposit (%)	44,594	71.796	15.761	33.163	73.046	111.223
Loan-to-asset (%)	44,459	49.486	8.955	25.112	51.812	64.152
Local ownership (%)	37,793	1.503	4.964	0	0	21.03
Panel C: Loan-level analysis	**N**	**Mean**	**SD**	**P1**	**Median**	**P99**
Loan spread	7,474	26.625	106.298	-335	15	369
Loan amount	13,358	106.177	623.442	0.5	30	1,000.00
Firm size	13,358	8.653	1.15	6.347	8.542	11.716
Firm leverage (%)	13,358	51.253	18.436	10.709	51.239	93.989
Firm tangibility (%)	13,358	20.812	16.264	0.138	17.268	66.911
Firm cash holdings (%)	13,358	15.162	9.592	1.177	13.091	49.742
Firm ROA (%)	13,358	2.349	6.618	-38.937	2.807	14.848
Panel D: Prefecture- and province-level variables	**N**	**Mean**	**SD**	**P1**	**Median**	**P99**
Share of local banks	3,136	0.381	0.154	0.008	0.382	0.688
Credit-to-GDP (%)	3,136	99.935	57.851	30.199	82.423	335.777
GDP growth (%)	3,136	8.704	4.164	-4.8	8.4	18.2
Fiscal balance (%)	3,136	12.345	10.279	-0.083	9.787	56.609
High uncertainty (SD of GDP growth)	3,653	0.501	0.5	0	1	1
High uncertainty (CV of GDP growth)	3,653	0.501	0.5	0	1	1
High uncertainty (Vacancy¿6m)	3,718	0.02	0.142	0	0	1
High uncertainty (Turnover¡3y)	3,718	0.317	0.465	0	0	1
Province NPL (%)	52,773	1.677	0.875	0.54	1.46	4.57
New hires (log)	52,773	3.561	0.624	1.099	3.664	4.431

Table 4: Decentralization and penalties: Basic results

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2. Columns 1-4 present results using the likelihood of a penalty as dependent variable, while columns 5-8 present results using the number of penalties (log) as dependent variable. Observations are bank-prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Penalty dummy				Number of penalties			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local bank	-0.015***				-0.012***			
	(0.003)				(0.002)			
Post	0.105***				0.110***			
	(0.007)				(0.008)			
Local bank×Post	0.067***	0.075***	0.063***	0.088***	0.078***	0.088***	0.073***	0.104***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.009)	(0.010)	(0.009)	(0.010)
Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Bank FE	No	Yes	Yes	No	No	Yes	Yes	No
Prefecture FE	No	Yes	No	No	No	Yes	No	No
Prefecture×Year FE	No	No	Yes	No	No	No	Yes	No
Bank×Prefecture FE	No	No	No	Yes	No	No	No	Yes
Observations	52773	52773	52756	52769	52773	52773	52756	52769
R^2	0.047	0.144	0.245	0.213	0.046	0.141	0.239	0.208

Table 5: Decentralization and penalties by type and recipient

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2. Panel A presents results on each type of penalties, while Panel B presents results on each recipient of penalties. Observations are bank-prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Type of penalties	Fine dummy	Fine amount (log)	Warning dummy	Number of warnings	Disqualification dummy	Number of Number of	Prohibition dummy	Number of prohibitions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local bank×Post	0.084***	0.491***	0.049***	0.057***	0.007***	0.006***	0.004***	0.004***
	(0.008)	(0.047)	(0.005)	(0.007)	(0.002)	(0.001)	(0.002)	(0.001)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	52,769	52,769	52,769	52,769	52,769	52,769	52,769	52,769
R^2	0.212	0.222	0.148	0.149	0.102	0.104	0.110	0.110

Panel B: Recipient of penalties	Individual penalty dummy	Number of individual penalties	Bank penalty dummy	Number of bank penalties
	(1)	(2)	(3)	(4)
Local bank×Post	0.049***	0.060***	0.081***	0.069***
	(0.005)	(0.007)	(0.008)	(0.007)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	52,769	52,769	52,769	52,769
R^2	0.155	0.153	0.210	0.212

Table 6: Decentralization and penalties: Bank / branch covariates and differential trends

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2 further controlling for bank characteristics and differential trends. Columns 1 and 3 present results using the likelihood of a penalty as dependent variable, while columns 2 and 4 present results using the number of penalties (log) as dependent variable. Columns 1-2 in Panel A presents results controlling for several bank characteristics, while columns 3-4 present results controlling for the average pre-2015 values of various bank characteristics interacted with the post dummy. Columns 1-2 in Panel B present results controlling for several branch characteristics, while columns 3-4 present results controlling for the average pre-2015 values of various branch characteristics interacted with the post dummy. Observations are bank-prefecture-years from 2010 to 2020 for Panel A, while branch-years from 2012 to 2020 for Panel B. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Bank covariates and differential trends	Penalty dummy	Number of penalties	Penalty dummy	Number of penalties
	(1)	(2)	(3)	(4)
Local bank×Post	0.023***	0.033***	0.037**	0.065***
	(0.009)	(0.009)	(0.017)	(0.019)
Bank size (log)	0.012	0.004		
	(0.009)	(0.009)		
CAR	-0.004***	-0.006***		
	(0.002)	(0.002)		
Zscore	0.004	0.006**		
	(0.002)	(0.003)		
NIM	0.009	0.003		
	(0.006)	(0.007)		
Loan-to-deposit	0.000	-0.000		
	(0.000)	(0.000)		
Loan ratio	-0.001	-0.000		
	(0.001)	(0.001)		
Pre Bank size (log)×Post			0.005	0.009**
			(0.004)	(0.005)
Pre CAR×Post			0.001	0.002
			(0.001)	(0.002)
Pre Zscore×Post			-0.032***	-0.033***
			(0.009)	(0.010)
Pre NIM×Post			-0.002	0.003
			(0.009)	(0.011)
Pre Loan-to-deposit×Post			-0.002*	-0.002
			(0.001)	(0.001)
Pre Loan ratio×Post			0.002*	0.001

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Table 6: Decentralization and penalties: Bank / branch covariates and differential trends (Continued)

			(0.001)	(0.001)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	42,556	42,556	42,098	42,098
R^2	0.219	0.214	0.215	0.211
Panel B: Branch covariates and differential trends	Penalty dummy	Number of penalties	Penalty dummy	Number of penalties
	(1)	(2)	(3)	(4)
Local bank×Post	0.074***	0.106***	0.075***	0.107***
	(0.013)	(0.014)	(0.012)	(0.014)
Branch size (log)	-0.015***	-0.019***		
	(0.005)	(0.006)		
Branch ROA	-0.002	-0.003		
	(0.002)	(0.003)		
Pre Branch size (log)×Post			0.043***	0.049***
			(0.006)	(0.007)
Pre Branch ROA×Post			-0.000	0.004
			(0.004)	(0.004)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	17,238	17,238	18,721	18,721
R^2	0.257	0.251	0.254	0.255

Table 7: Fine severity and dispersion

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on fines. The dependent variable in column (1) and (2) are average fines (and log of fines) in a bank-prefecture-year with fines. The dependent variable in column (3) and (4) are the absolute value of fines (and log of fines) relative to the mean, normalized by the mean, in a bank-prefecture-year with fines. Observations are bank-prefecture-years with positive fines from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Average fine (1)	Average fine (log) (2)	Fine dispersion (3)	Fine dispersion (log) (4)
Local bank×Post	-465.083*	-0.272**	0.107**	0.068*
	(276.252)	(0.116)	(0.041)	(0.040)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	3,871	3,871	3,871	3,871
R^2	0.333	0.545	0.505	0.470

Table 8: Local bias

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2 Columns 1-2 present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable and further interacting Local bank×Post by the bank-level Local ownership. Observations are bank-prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Penalty dummy	Number of penalties
	(1)	(2)
Local bank×Post	0.023***	0.034***
	(0.008)	(0.009)
Local ownership	-0.002*	-0.003**
	(0.001)	(0.002)
Year FE	Yes	Yes
Bank×Prefecture FE	Yes	Yes
Observations	37,763	37,763
R^2	0.227	0.226

Table 9: Access to local information

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2. Columns 1-4 present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable and further interacting Local bank×Post by the log distance (in km) between the prefecture of the branch and Beijing. Columns 5-6 present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable and further interacting Local bank×Post dummies taking the value of 1 for short, intermediate, and long distance, respectively. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Distance (log)				Distance dummies	
	Penalty dummy (1)	Number of penalties (2)	Penalty dummy (3)	Number of penalties (4)	Penalty dummy (5)	Number of penalties (6)
Local bank×Post	-0.118*	-0.189**			0.082***	0.100***
	(0.068)	(0.074)			(0.010)	(0.012)
Post×Distance	-0.019*	-0.022				
	(0.011)	(0.014)				
Local bank×Post×Distance	0.030***	0.043***	0.022***	0.032***		
	(0.010)	(0.011)	(0.005)	(0.007)		
Local bank×Post×Long distance					0.094***	0.122***
					(0.014)	(0.021)
Local bank×Post×Intermediate distance					0.094***	0.111***
					(0.010)	(0.013)
Local bank×Post×Short distance					0.077***	0.079***
					(0.011)	(0.014)
Bank FE	No	No	No	No	No	No
Year FE	Yes	Yes	No	No	Yes	Yes
Bank×Year FE	No	No	Yes	Yes	No	No
Prefecture×Year FE	No	No	Yes	Yes	No	No
Bank×Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	52,769	52,769	43,064	43,064	52,769	52,769
R^2	0.213	0.209	0.379	0.370	0.213	0.209

Table 10: Local uncertainty

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2. Panel A present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable and further interacting Local bank×Post by the proxies for local economic uncertainty, measured by standard deviation (SD) and coefficient of variation (CV) of prefecture-level GDP growth rates. Panel B present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable and further interacting Local bank×Post by the proxies for local political uncertainty, measured by either vacancy of leadership exceeding 6 months (Vacancy>6m) or changes in leadership less than 3 years (Turnover<3y). Observations are bank-prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Economic uncertainty	Penalty dummy		Number of penalties	
	(1)	(2)	(3)	(4)
Local bank×Post	0.069***	0.067***	0.083***	0.080***
	(0.012)	(0.012)	(0.014)	(0.014)
High uncertainty (SD of GDP growth)	0.025***		0.033***	
	(0.009)		(0.010)	
Local bank×High uncertainty (SD of GDP growth)	-0.028***		-0.039***	
	(0.010)		(0.013)	
Post×High uncertainty (SD of GDP growth)	-0.031**		-0.034**	
	(0.014)		(0.014)	
Local bank×Post×High uncertainty (SD of GDP growth)	0.039**		0.041**	
	(0.016)		(0.019)	
High uncertainty (CV of GDP growth)		0.019**		0.031***
		(0.009)		(0.010)
Local bank×High uncertainty (CV of GDP growth)		-0.021**		-0.028**
		(0.010)		(0.013)
Post×High uncertainty (CV of GDP growth)		-0.021*		-0.029**
		(0.012)		(0.013)
Local bank×Post×High uncertainty (CV of GDP growth)		0.042***		0.048***
		(0.014)		(0.018)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	51,999	51,999	51,999	51,999
R^2	0.213	0.213	0.209	0.209
Panel B: Political uncertainty	Penalty dummy		Number of penalties	
	(1)	(2)	(3)	(4)
Local bank×Post	0.086***	0.077***	0.101***	0.091***
	(0.008)	(0.010)	(0.010)	(0.012)
High uncertainty (Vacancy>6m)	0.019		0.017	
	(0.013)		(0.012)	
Local bank×High uncertainty (Vacancy>6m)	-0.012		-0.003	
	(0.014)		(0.016)	
Post×High uncertainty (Vacancy>6m)	-0.058**		-0.054**	
	(0.024)		(0.021)	
Local bank×Post×High uncertainty (Vacancy>6m)	0.088**		0.116*	
	(0.042)		(0.064)	
High uncertainty (Turnover<3y)		0.017**		0.020***
		(0.007)		(0.007)
Local bank×High uncertainty (Turnover<3y)		-0.017**		-0.017**
		(0.008)		(0.008)
Post×High uncertainty (Turnover<3y)		-0.028**		-0.028**
		(0.011)		(0.012)
Local bank×Post×High uncertainty (Turnover<3y)		0.033**		0.035**
		(0.014)		(0.016)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	52,553	52,553	52,553	52,553
R^2	0.213	0.213	0.209	0.208

Table 11: Supervisory capacity

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2 further controlling for local supervisory capacity. Columns 1-2 present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable for the full sample. Columns 3-4 present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable for the truncated sample before 2018 merger of the CBRC and CIBC. Observations are bank-prefecture-years from 2010 to 2020 for the full sample and 2010-2017 in the truncated sample. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Full sample		Before 2018 merger	
	Penalty dummy	Number of penalties	Penalty dummy	Number of penalties
	(1)	(2)	(3)	(4)
Local bank×Post	0.088***	0.104***	0.068***	0.075***
	(0.008)	(0.010)	(0.008)	(0.009)
Log of new hires	-0.004	-0.003	-0.002	0.001
	(0.006)	(0.006)	(0.006)	(0.005)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	52,769	52,769	41,856	41,856
R^2	0.213	0.208	0.240	0.233

Table 12: Decentralization and lending: Loan-level analysis

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on loan conditions based on the model similar to equation 2. Columns 1-2 present results using loan spreads as dependent variable, while columns 3-4 present results using loan amounts (log) as dependent variable. Observations are loan-branch-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan spreads		Loan Amounts	
	(1)	(2)	(3)	(4)
Local bank×Post	31.477**	31.257**	-0.385***	-0.329**
	(13.315)	(12.448)	(0.139)	(0.139)
Firm size	4.595	6.563	-0.022	-0.051
	(6.432)	(5.934)	(0.074)	(0.059)
Firm leverage	0.278	0.102	0.002	0.002
	(0.304)	(0.366)	(0.002)	(0.002)
Firm tangibility	-0.388**	-0.523***	0.001	0.000
	(0.193)	(0.183)	(0.003)	(0.002)
Firm cash holdings	0.042	0.095	0.002	-0.001
	(0.344)	(0.406)	(0.003)	(0.003)
Firm ROA	0.040	-0.373	0.001	0.001
	(0.356)	(0.371)	(0.004)	(0.003)
Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Prefecture FE	No	Yes	No	Yes
Observations	7,229	7,203	13,012	12,986
R^2	0.602	0.657	0.396	0.458

Table 13: Decentralization and lending: Prefecture-level analysis

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on loan supply at the prefecture level based on a (OLS and IV) model similar to equation 2. Columns 1-4 present results using credit to GDP at the prefecture level as dependent variable. In columns 2-3, the IV is the predetermined share of local banks in 2010 (as in Gilje et al. (2016)). Observations are prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

City-level	Credit/GDP			
	OLS		IV	
	(1)	(2)	(3)	(4)
Local bank share	-70.729***	-41.114**	-73.159***	-35.427*
	(17.093)	(18.554)	(17.874)	(20.028)
Local bank share×Post	-31.245**	-35.624***	-43.634***	-32.137**
	(15.558)	(12.240)	(16.437)	(14.063)
GDP growth	-0.427	-0.561	-0.387	-0.572
	(0.706)	(0.349)	(0.706)	(0.350)
Fiscal balance	-0.122	-0.792**	-0.100	-0.824**
	(0.303)	(0.381)	(0.302)	(0.397)
Year FE	Yes	Yes	Yes	Yes
Province FE	No	Yes	No	Yes
Observations	3,136	3,136	3,136	3,136
R^2	0.153	0.440	0.061	0.060
F statistics			201.85	195.47

Internet Appendix

Table A1: Variable definitions and sources

Variable name	Definition	Source
Branch-level variables		
Local bank	Dummy variable equals to one if a bank is not a state-owned bank or joint-stock bank.	CBRC/CBIRC
Penalty dummy	Dummy variable equals to one if a bank receives a penalty. A penalty is punitive measure on a bank enforced by a supervisor as a consequence of significant non-compliance with laws or regulations.	CBRC/CBIRC, authors' calculation
Number of penalties	Log of 1 plus number of penalties.	CBRC/CBIRC, authors' calculation
Fine dummy	Dummy variable equals to one if a bank receives a fine. A fine includes a monetary penalty imposed on a bank and confiscation of its illegal proceeds.	CBRC/CBIRC, authors' calculation
Fine amount	Log of 1 plus fine amount (in thousand RMB).	CBRC/CBIRC, authors' calculation
Average fine	Aggregate fine amount divided by the number of fine incidences.	CBRC/CBIRC, authors' calculation
Fine dispersion	Absolute value of (fine amount - sample mean of fine amount) / sample mean of fine amount. The sample mean is defined as average fine amount for local/national banks in a prefecture-year.	CBRC/CBIRC, authors' calculation
Fine dispersion (log)	Absolute value of (log of fine amount – log of sample mean of fine amount).	CBRC/CBIRC, authors' calculation
Warning dummy	Dummy variable equals to one if a bank receives a warning. A warning is a formal notification letter issued by a supervisor, alerting a bank of its non-compliance with laws or regulations.	CBRC/CBIRC, authors' calculation
Number of warnings	Log of one plus number of warnings.	CBRC/CBIRC, authors' calculation
Disqualification dummy	Dummy variable equals to one if a bank receives a penalty that its manager is disqualified and barred from holding positions of senior managers in the banking industry for a specified period or permanently.	CBRC/CBIRC, authors' calculation

Table A1: Variable definitions and sources (continued)

Variable name	Definition	Source
Number of disqualifications	Log of 1 plus number of disqualifications.	CBRC/CBIRC, authors' calculation
Prohibition dummy	Dummy variable equals to one if a bank receives a penalty that its staff is prohibited or banned from working in the banking industry for a specified period or indefinitely.	CBRC/CBIRC, authors' calculation
Number of prohibitions	Log of 1 plus number of prohibitions.	CBRC/CBIRC, authors' calculation
Distance	Log of distance (in kilometers) between the bank branch and Beijing.	Baidu Map, authors' calculation
Share of offices outside the prefecture	The proportion of the number of bank offices located outside the prefecture where the bank branch operates.	CBRC/CBIRC, authors' calculation
Branch size	Log of a bank's total assets (in million RMB).	NTSD
Branch Leverage ratio	Equity over total assets (%).	NTSD
Branch ROA	Net income over total assets (%).	NTSD
Bank-level variables		
Bank size	Log of a bank's total assets (in billion RMB).	CNRDS
CAR	Capital adequacy ratio (%).	CNRDS
Z-score	Sum of equity to asset ratio and ROA divided by standard deviation of ROA. We use 3-year rolling window when calculating the standard deviation of ROA.	CNRDS
NIM	Net interest margin (%).	CNRDS
Loan-to-deposit	Gross loans to total deposits (%).	CNRDS
Loan-to-asset	Gross loans to total assets (%).	CNRDS
Local ownership	The sum of equity ownership (%) by local (provincial-level or prefecture-level) governments in top three shareholders.	CNRDS
Loan-level variables		
Loan spread	Loan spread over the benchmark interest rate in basis points.	Authors' collection
Loan amount	Log of loan amount (in million RMB).	Authors' collection
Firm-level variables		
Firm size	Log of total assets (in million RMB) of a borrower.	CNRDS
Firm leverage	Total liabilities to total assets (%) of a borrower.	CNRDS
Firm tangibility	Total property, plant, and equipment to total assets (%) of a borrower.	CNRDS

Table A1: Variable definitions and sources (continued)

Variable name	Definition	Source
Firm cash holdings	Cash holdings to total assets (%) of a borrower.	CNRDS
Firm ROA	Return on assets (%) of a borrower.	CNRDS
Prefecture-level variables		
Share of local banks	Share of local banks in terms of number of bank offices in a prefecture.	CBRC/CBIRC, Authors' collection
Credit to GDP	Private credit to GDP (%) of a prefecture.	CNRDS
GDP growth	Growth rate of GDP (%) of a prefecture.	CNRDS
Fiscal balance	A municipal (prefecture) government's revenue minus its expenditure, divided by its GDP.	CNRDS
High uncertainty (SD of GDP growth)	Dummy variable equals to one if the standard deviation of GDP growth rates over the past three years is greater than sample median in a year.	CNRDS
High uncertainty (CV of GDP growth)	Dummy variable equals to one if the coefficient of variation of GDP growth rates over the past three years is greater than sample median in a year.	CNRDS
High uncertainty (Vacancy>6m)	Dummy variable equals to one if the local leadership if vacant for over six months.	Manually collected and calculated
High uncertainty (Turnover<3y)	Dummy variable equals to one if the local leadership if leadership turnover within three years.	Manually collected and calculated
Province-level variables		
Regional NPL	Province-level nonperforming loan ratios (%).	CSMAR
New hires	Province-level log of number of annual new hires.	CBRC/CBIRC

Table A2: Additional robustness checks

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2. Columns 1-2 present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable and excluding from the sample state-owned banks. Columns 3-4 present results using either the likelihood of a penalty or the number of penalties (log) as dependent variable and excluding from the sample penalties issued by the local offices of the CBRC in Beijing. Observations are bank-prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Excluding state-owned banks		Excluding penalties in Beijing	
	Penalty dummy	Number of penalties	Penalty dummy	Number of penalties
	(1)	(2)	(3)	(4)
Local bank×Post	0.063***	0.086***	0.090***	0.106***
	(0.012)	(0.014)	(0.008)	(0.010)
Year FE	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes
Observations	31,914	31,914	52,439	52,439
R^2	0.223	0.217	0.211	0.206

Table A3: Poisson regressions

Note: The table presents Poisson estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2. Columns 1-8 present results using the number of each type or recipient of penalties as dependent variable and implementing Poisson pseudo maximum likelihood regressions with (multiple levels of) fixed effects as described by Correia et al. (2020). Observations are bank-prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Number of penalties	Number of warnings	Number of disqualifications	Number of prohibitions	Number of individual penalties	Number of bank penalties
	(1)	(2)	(3)	(4)	(5)	(6)
Local bank×Post	1.173***	1.537***	1.268***	1.518	1.162***	1.032***
	(0.141)	(0.279)	(0.406)	(1.186)	(0.381)	(0.130)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank×Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,906	15,573	2,515	2,218	14,790	32,720
Pseudo R^2	0.321	0.350	0.136	0.299	0.392	0.242

Table A4: Decentralization and penalties: Dynamic effects

Note: The table presents difference-in-differences estimates of the effect of the 2015 decentralization reform on penalties based on the model in equation 2 with $Localbank_i$ interacted with $Year_{(2015-[+]1)}$, that is, each year before and after 2015 (excluding 2015). Column 1 presents results using the likelihood of a penalty as dependent variable, while column 2 presents results using the number of penalties (log) as dependent variable. Observations are bank-prefecture-years from 2010 to 2020. All variables are defined in Table A1 of the Appendix. Robust standard errors are clustered by prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Penalty dummy	Number of penalties
	(1)	(2)
Local bank×year 2010	-0.000	-0.005
	(0.015)	(0.013)
Local bank×year 2011	-0.000	-0.005
	(0.014)	(0.013)
Local bank×year 2012	0.019	0.011
	(0.014)	(0.013)
Local bank×year 2013	0.019	0.015
	(0.014)	(0.013)
Local bank×year 2014	0.012	0.011
	(0.015)	(0.013)
Local bank×year 2016	0.053***	0.050***
	(0.014)	(0.013)
Local bank×year 2017	0.120***	0.129***
	(0.016)	(0.018)
Local bank×year 2018	0.158***	0.167***
	(0.018)	(0.018)
Local bank×year 2019	0.114***	0.132***
	(0.015)	(0.017)
Local bank×year 2020	0.149***	0.180***
	(0.019)	(0.023)
Year FE	Yes	Yes
Bank×Prefecture FE	Yes	Yes
Observations	52,769	52,769
R^2	0.217	0.213