The effects of land-rights reform on local interactions: A study of land reallocation in land consolidation and land transfers

Xiaobin ZHANG, China

Abstract: China has undergone liberalistic land-rights reform, enhancing tenure security and transfer rights, which aims to promote agricultural industrialization and rural development. This paper investigates the impacts of land-rights reform on the behaviour of local governments and the possibility of rural collective action in land reallocation in land consolidation (LRiLC) and land transfers. By employing an evolutionary game theoretical approach alongside case studies, our study finds that land-rights reform hinders the reach of collective action in LRiLC by weakening farmers' shared beliefs in farmers' inclination to participate and in local government's enforcement, as well as undermining the mobilization incentives and ability of local governments. On the other hand, despite shirking from LRiLC in the name of respecting farmers' property rights, local governments intensively intervene in land transfers, pursuing disproportionate land-transfer benefits generated by the reform. Therefore, we provide a more comprehensive picture of the interaction between local actors in response to land rights reform by considering land transfers and LRiLC together. In contrast to recent findings that land-rights reform strengthens farmers' autonomy and reduces administrative intervention in rural land markets, our findings suggest that the reform hinders farmers' ability to act collectively and solve local problems. We believe that demarcating property boundaries between private and public entities based on a country's development stage and agricultural production demands should be the focal point in future reform, and a comprehensive legal framework combining land consolidation, land transfers, and land property rights is indispensable to achieve this goal.

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1. INTRODUCTION

Land-rights reform is a central agenda for rural development in developing countries (Bernstein, 2010). Since the 1980s, China has followed a neoliberal trajectory (Akram-Lodhi, 2007), evolving from decollectivization to the formal prohibition of egalitarian land reallocation (ELR) in 2003 (Chari et al., 2021). In 2013, the central government launched a new round of reform to facilitate agricultural industrialization. This reform established a three-tier rights system, completed nationwide land titling (over 96% by 2020), and extended contracts for another 30 years, reinforcing the mandate that land tenure should remain "stable and unchanged" (Meng, 2020).

Scholars of property rights economics contend that such reforms improve efficiency by mitigating misallocation. They argue that eliminating administrative ELR encourages long-term investment and labor migration (Bai et al., 2014; Giles and Mu, 2018), while formalized transfer rights facilitate land transfer from low-productivity households to productive operators (Gao et al., 2021). These market-based arguments, supported by evidence from China and other contexts like Mexico (de Janvry et al, 2015) and Ghana (Goldstein and Udry, 2008), suggest that enhanced tenure security reduces transaction costs and stimulates land markets.

However, critics argue that these reduced-form empirical strategies overlook local political dynamics. In reality, land transfers in China are rarely purely market-driven. Local governments and village cadres often actively intervene, sometimes employing coercion, to accelerate transfers for modernization targets (Gong and Zhang, 2017; Luo and Andreas, 2020). Consequently, critical agrarian studies suggest that rather than empowering farmers, the reform has paradoxically strengthened administrative power and marginalized smallholders (Andreas and Zhan, 2016).

Existing literature, however, predominantly focuses on land transfers, leaving a critical gap regarding other land issues that require collective action, specifically Land Reallocation in Land Consolidation (LRiLC). Unlike transfers, LRiLC ameliorates fragmentation by spatially rearranging parcels without changing total entitlements. It is indispensable for China's fragmented landscape but heavily relies on collective action, which is easily blocked by holdouts (Hong and Needham, 2007). While LRiLC has traditionally been a state-legitimized

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tool in countries such as Germany and the Netherlands (Thomas, 2006; Vitikainen, 2004; Zhang et al., 2021), it remains unclear how the new land-rights reform, which emphasizes individual rights and limits administrative adjustment, affects local government behavior and the feasibility of collective action in LRiLC in China.

To fill this gap, this study examines the interactions between local governments and farmers in both LRiLC and land transfers using evolutionary game theory and case studies. We reveal a mechanism of "selective intervention": local governments are incentivized to enforce land transfers to pursue reform-driven benefits actively, yet they strategically retreat from LRiLC by citing the protection of farmers' rights. Consequently, while land transfers expand, voluntary collective action in LRiLC struggles to survive due to weakened shared beliefs and rising mobilization costs.

2. LRILC, LAND TRANSFERS, AND THE INFLUENCES OF LAND-RIGHTS REFORM

LRiLC and land transfers are both profoundly influenced by the land-rights reform and are structurally interrelated. They can function as substitutes: transferring land to a single operator eliminates the need for reallocation, or as complements, where LRiLC reduces transaction costs for transfers. This section delineates the institutional practices of both and their evolving relationship with the reform.

2.1 The Practices of LRiLC and Institutional Constraints

LRiLC is an indispensable instrument for mitigating land fragmentation (Demetriou, 2013). By restructuring scattered plots, it typically reduces the number of parcels per household to one-fourth or even one-tenth of the original quantity, substantially lowering management costs (Zhang et al., 2018). Implementation in China generally falls into three categories: government-dominated, self-organized, and individual exchange (Zhang et al., 2021; Wang and Tan, 2020). The government-dominated approach, akin to the comprehensive model in Europe (FAO, 2003; Veršinskas et al., 2020), relies on majority rule, implying a necessary element of compulsion against minorities to achieve spatial optimization.

However, the institutional legitimacy for such intervention differs significantly between China and Europe. In countries like Germany and the Netherlands (Thomas, 2014; Leenen, 2014), despite strong private property protections, land consolidation laws explicitly frame participation as a landowner's obligation, thereby legitimizing administrative reallocation. In contrast, China lacks a comprehensive land consolidation law. Although promoting consolidation is a national strategy incorporated into bureaucratic appraisal systems, LRiLC has historically been viewed as an optional, ad-hoc task without strong statutory backing.

The new land-rights reform has further eroded the legitimacy of government-led LRiLC. By

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prioritizing individual tenure security, the revised Land Administration Law (2019) and Rural Land Contracting Law (2018) prescribe that certificated land rights may not be infringed upon by any organization. The reform emphasizes that land contracting relationships must remain stable and unchanged. Unlike the European framework that balances rights with obligations, China's reform effectively delegitimizes the administrative coordination required for LRiLC, shifting public beliefs to view any non-voluntary reallocation as a violation of property rights.

2.2 The promotion of land transfers in China

In stark contrast to the constraints placed on LRiLC, land transfers have shifted from strict prohibition in the 1980s to aggressive state promotion (Zhan, 2019). Legalized by the 2003 Rural Land Contracting Law, land transfers are now identified by the central government as the primary vehicle for agricultural modernization. The current reform aims to separate "land management rights" specifically to facilitate the amalgamation of farmland for "new agricultural business entities."

While the reform nominally advocates for voluntary markets, it constructs a high-stakes incentive structure that compels local governments to intervene actively. First, upper-level governments link fiscal funding and agricultural subsidies directly to the scale of land transfers and the establishment of agribusinesses (Zhu, 2020). Second, introducing large-scale commercial agriculture augments the local tax base and GDP, which are critical performance metrics for officials (Luo and Andreas, 2020). Third, large operators are easier to manage for implementing specific production policies, such as the double-cropping mandates, which are often tied to career appraisals (Gong and Zhang, 2017).

Driven by these incentives, the scale of land transfers surged from 5.2% of contracted farmland in 2007 to 35.1% in 2016. Although national policy requires transfers to be based on farmer consent, an asymmetric accountability mechanism exists: local governments are heavily rewarded for meeting transfer targets but are typically investigated for violations only if their intervention triggers mass protests (Zhan, 2019). This creates a paradox where the reform enhances tenure security on paper while simultaneously incentivizing local administrators to push for land transfers in practice.

3. GAME THEORETICAL MODEL SETTINGS

To investigate the micro-mechanisms of local interactions under land-rights reform, we construct two evolutionary game models. Model I analyzes the collective action problem among farmers and local administrators within LRiLC. Model II examines the strategic choices of local administrators and farmers between LRiLC and land transfers.

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3.1 Model Settings and Payoffs

In Model I, farmers choose between Participation (y) and Holding out ($1 - y$), while local administrators choose between Enforcement (z) and Quitting ($1 - z$). We define LRiLC as a coordination game ($r_1 > h$). Mutual participation yields the highest payoff r_1 for farmers. However, unilateral participation yields a lower payoff r_0, while holdouts receive h ($h > r_0$).

To capture the institutional context of the reform, we introduce specific parameters:
- Δ: The local administrator's ability to balance payoffs (transferring benefits from holdouts to participants).
- b: The payoff for holdouts when enforcement is applied (reflecting that even coerced participation yields benefits in successful projects).
- $\delta_r(n_h)$ and $\delta_l(n_r)$: The political costs of enforcing LRiLC or Land Transfers, respectively, which increase with the number of dissenters.
- g and l: Bureaucratic benefits for administrators and economic returns for farmers.

The detailed payoff matrices for both models are presented in **Table 1**.

Table 1 Strategies and payoffs for the actors in the models

Model I		Local administrators			
		Enforce (z)		Quit (1-z)	
		Farmers		Farmers	
		Participate (y)	Hold out (1-y)	Participate (y)	Hold out (1-y)
Farmers	Participate (x)	r_1 , r_1 , $g_r(2) - c$	$r_0 + \Delta$, $h - \Delta$, $g_r(2) - c - \delta_r(1)$	r_1 , r_1 , $g_r(2)$	r_0 , h , $g_r(1)$
	Hold out (1-x)	$h - \Delta$, $r_0 + \Delta$, $g_r(2) - c - \delta_r(1)$	b , b , $g_r(2) - c + \delta_r(2)$	h , r_0 , $g_r(1)$	$0, 0, 0$

Model II		Local administrators			
		LRiLC (z)		Land transfers (z)	
		Farmers		Farmers	
		LRiLC (y)	Land transfers (1-y)	LRiLC (y)	Land transfers (1-y)
Farmers	LRiLC (x)	r_1 , r_1 , $g_r(2) - c$	r_1 , $l + \varepsilon_1$, $g_l(1) + g_r(2) - c - \delta_r(1)$	$l + \varepsilon_2$, $l + \varepsilon_2$, $g_l(2) - \delta_l(2)$	$l + \varepsilon_2$, l , $g_l(2) - \delta_l(1)$
	Land transfers (1-x)	$l + \varepsilon_1$, r_1 , $g_l(1) +$	$l + \varepsilon_1$, $l + \varepsilon_1$, $g_l(1) +$	l , $l + \varepsilon_2$, $g_l(2) -$	$l, l, g_l(2)$

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| | $g_r(2) - c - \delta_r(1)$ | $g_r(2) - c - \delta_r(2)$ | $\delta_l(1)$ |

Note: the first term in every cell denotes the payoff for the row farmers, and the second term for the column farmers; the third term denotes the payoff for the local administrators. We use (x, y, z) to indicate the equilibrium strategies. These models are symmetry for farmers, therefore, we only need to analyze either row or column farmers (the value of x/x_0 or y/y_0) but not both of them. We use $\delta_r(1)$ to denote $\delta_r(n_h)$ where either column farmers or row farmers but not both of them are holdouts in the model and $\delta_r(2)$ to denote $\delta_r(n_h)$ where both of them are holdouts. The same goes for $\delta_r(n_l)$, $\delta_l(n_r)$, $g_r(n_r)$ and $g_l(n_l)$.

3.2 Analysis of Model I: The Collapse of Collective Action in LRiLC

In Model I, we assume $h < r_1$. The realization of collective action depends on farmers' shared beliefs and local administrators' incentive structures. Farmers are conditional cooperators. Their choice depends on the saddle point of the system.

When local administrators choose to quit ($z = 0$), the saddle point x^* is derived as:

$$x^* = \frac{-r_0}{-r_0 + (r_1 - h)} \quad (1)$$

When local administrators choose to enforce ($z=1$), the saddle point shifts to x_1^*:

$$x_1^* = \frac{b - (r_0 + \Delta)}{r_1 - h + b - r_0} \quad (2)$$

Formulas (1) and (2) reveal that the reform hinders collective action by lowering the initial shared belief of participation (x_0) below the saddle point. Furthermore, we find that the participation strategy ($x = 1$) is an ESS only when the initial belief in government enforcement (z_0) satisfies the following condition:

$$z_0 > \frac{y(h + r_0 - r_1) - r_0}{\Delta + (y - 1)b} \quad (3)$$

Formula (3) establishes a critical link between government capacity and public belief. It indicates that the required threshold for z_0 decreases as the balancing ability Δ increases. Historically, a high Δ meant that even a low probability of enforcement (z_0) was sufficient to induce participation (as shown in Fig. 1c). However, the land-rights reform restricts Δ and lowers z_0 simultaneously, making it impossible to satisfy condition (3), thus leading to the collapse of collective action.

Local administrators compare the expected payoffs of enforcement (E_{enf}) versus quitting (E_{quit}).

$$RD(z)_g = z(1 - z)\left[E_{enf} - E_{quit}\right] \quad (4)$$

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Substituting the payoffs, enforcement ($z = 1$) becomes an ESS only if the political cost $\delta_r(1)$ is sufficiently low:

$$\delta_r(1) < \frac{x*y(g_r(2)-2*g_r(1))+(y-x)g_r(1)-g_r(2)-c}{(x+y-2)} \quad (5)$$

This inequality (5) implies that administrators will only enforce LRiLC when the cost is manageable. The reform, by legitimizing resistance, drastically raises $\delta_r(1)$, forcing administrators to quit.

The numerical simulation results (Fig. 1) validate these theoretical derivations. Fig. 1a visualizes the baseline mechanism where a lowered shared belief ($x_0 < x^*$) leads to the failure of spontaneous collective action. Fig. 1b and 1c show that the collapse of collective action is driven by the dual decline of shared beliefs (z_0) and balancing ability (Δ). Fig. 1d illustrates that as δ_r exceeds the threshold defined in (5), local administrators switch to the "Quit" strategy ($z \rightarrow 0$), causing a cascading failure in farmers' participation.
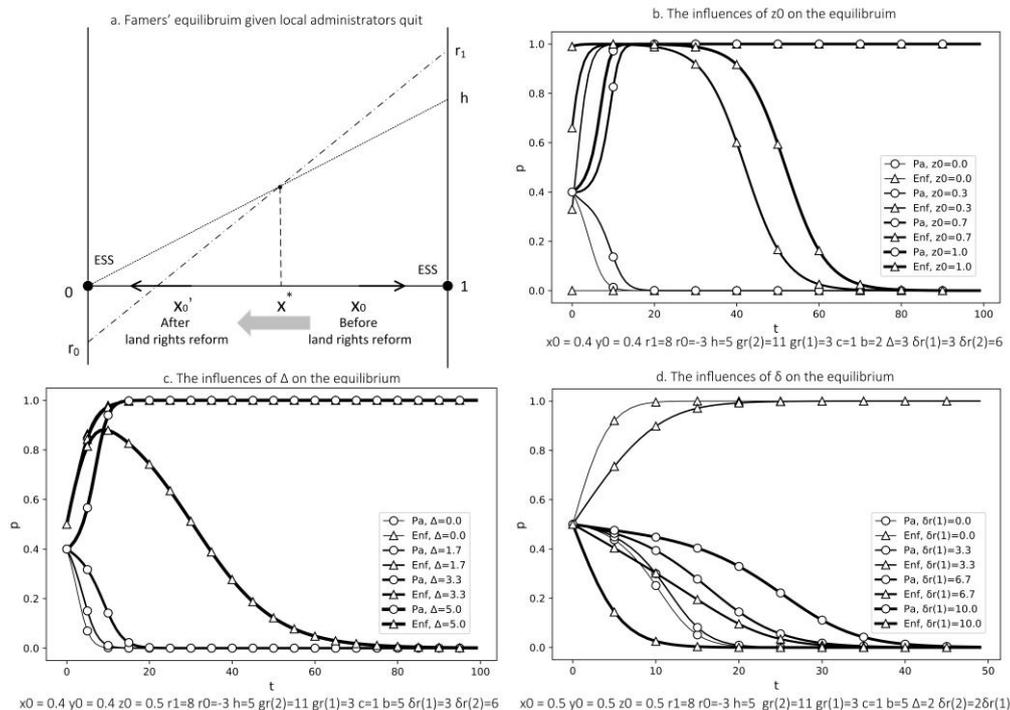

Fig. 1. Evolutionary dynamics of Model I. "Pa" and "Enf" denote the probabilities of farmers' participation and local administrators' enforcement, respectively. (a) Impact of farmers' initial shared belief (x_0) without enforcement; (b) Impact of the belief in enforcement (z_0); (c) Impact of balancing ability (Δ); (d) Impact of enforcement costs (δ).

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To summarize, the new land rights reform precludes local administrators' enforcement in LRiLC by raising enforcement costs. It limits local administrators' role in LRiLC by weakening their balancing ability and lowering the shared belief that local administrators will participate. The new land rights reform also lowers farmers' shared belief regarding their peer fellows' participation, which, when combined with local administrators' quitting, leads to the collapse of collective action in LRiLC.

3.3 Analysis of Model II: Selective Intervention in Land Transfers

Model II investigates the strategic selection between LRiLC and land transfers. Unlike Model I, which focuses on coordination failure within a single domain, Model II examines whether local administrators respect farmers' preferences or enforce their own agenda when facing substitution choices.

In this model, farmers' behavior is assumed to be straightforward and economically rational. Given local administrators' choice, farmers simply compare the payoffs: if administrators choose LRiLC, farmers participate if $r_1 > l + \varepsilon_1$; if administrators choose land transfers, farmers prefer LRiLC only if $\varepsilon_2 > 0$ (meaning the utility of holding onto land outweighs the transfer rent). Since farmers' strategies are deterministic based on these parameters, the system's evolution is primarily driven by the local administrators' replicator dynamics, defined as:

$$RD(z)_g = z(1-z)\big[E_{lrg} - E_{ltg}\big] \quad (6)$$

Substituting the specific payoffs from Table 1 and assuming linear scaling for simplifications $(g_l(2) = 2g_l(1), \delta(2) = 2\delta(1))$, we verify when choosing LRiLC $(z = 1)$ constitutes an Evolutionary Stable Strategy (ESS). Our derivation shows that local administrators will choose LRiLC only if the following boundary conditions derived from Eq. (6) are met simultaneously:

$$g_r(2) > \delta_r(2) - (x+y)(\delta_0 + \delta_1 - g_l(1)) + c \quad (7)$$

$$g_l(2) < \frac{\delta_r(2) + g_r(2) - c + (x+y)(g_l(1))}{0.5(x+y)} \quad (8)$$

$$\delta_r(1) < \frac{g_r(2) - c + (x+y)(\delta_l(1) - g_l(1))}{2 - x - y} \quad (9)$$

$$\delta_l(1) > \frac{\delta_r(2) + g_r(2) - c - (x+y)(\delta_r(1) - g_l(1))}{x+y} \quad (10)$$

These inequalities reveal an "Asymmetric Constraint" mechanism: for local administrators to consistently choose LRiLC, either the benefits of LRiLC (g_r) must be sufficiently high, or the cost of enforcing transfers (δ_l) must be prohibitive.

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The land-rights reform fundamentally alters these parameters, leading to divergent outcomes as shown in the simulation results (Fig. 2). When the reform successfully raises the political cost of violating farmers' will (specifically, when $\delta_l(n_r)$ is extremely high), the condition for mandatory transfers is violated. As shown in Fig. 2a and 2b, administrators align with farmers' preferences regardless of whether farmers prefer LRiLC ($\varepsilon_2 > 0$) or transfers ($\varepsilon_2 < 0$), indicating that high enforcement costs (δ) force administrators to respect farmers' autonomy. However, the reform also provides disproportionate bureaucratic rewards for land transfers (increasing g_l). If g_l becomes large enough to satisfy $g_l(n_l) - c > \delta_l(n_r)$, the incentive to capture benefits overrides the cost of resistance. Fig. 2c demonstrates that even if LRiLC offers substantial benefits to farmers (high r_1), local administrators ignore this and enforce land transfers to capture g_l. Furthermore, Fig. 2d shows that this decision is insensitive to shared beliefs (z_0); even if farmers expect LRiLC, the high administrative payoff g_l drives the system irrevocably toward land transfers. Thus, Model II confirms that while the reform raises enforcement costs, the massive bureaucratic benefits attached to land transfers incentivize local administrators to override these costs, leading to selective intervention: withdrawing from the costly LRiLC while aggressively intervening in profitable Land Transfers.
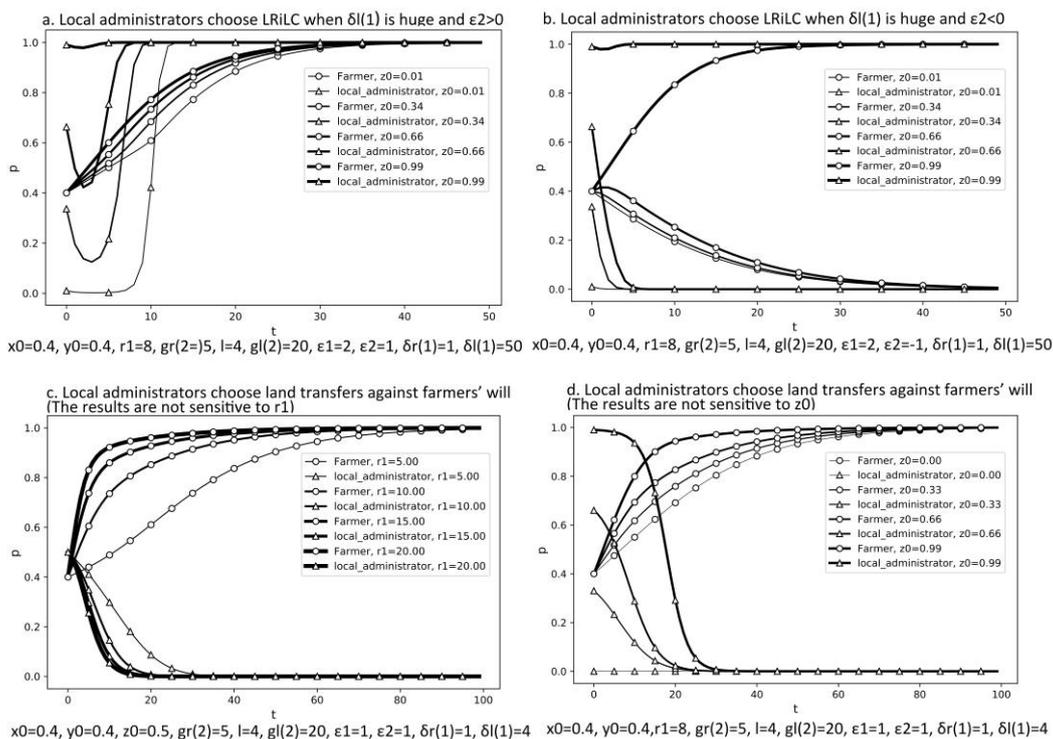

Fig. 2. Evolutionary dynamics of Model II: Strategic selection between LRiLC and Land Transfers. The curves represent the probability of choosing LRiLC. (a-b) Scenario of rights-based compliance (high enforcement cost δ_l): Administrators align with farmers' preferences, choosing LRiLC if $\varepsilon_2 > 0$ (a) or transfers if $\varepsilon_2 < 0$ (b). (c-d) Scenario of profit-driven

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override (high bureaucratic benefits g_l): Administrators enforce land transfers regardless of farmers' potential benefits from LRiLC r_1 (c) or initial shared beliefs z_0 (d)

To summarize, although land rights reform generally incentivizes local administrators to act according to the will of farmers by increasing enforcement costs, it also readily induces local administrators to enforce land transfers on farmers because of the disproportionate land transfer benefits. Such reform may only erode the likelihood that local administrators enforce LRiLC, which leads to selective enforcement.

4. EMPIRICAL VERIFICATION: CASE STUDIES

To validate the theoretical propositions derived from our evolutionary game models, we analyze three primary cases from Shandong and Jiangxi provinces, supplemented by secondary evidence from existing literature. These cases, spanning different stages of the land-rights reform, offer a comparative lens to observe the shifting behavioral patterns of local actors. The basic characteristics of the investigated cases are summarized in Table 2.

Table 2 Basic facts about the cases investigated

Project	Situation	Scale (ha)	Villages and Households involved	Duration	Main crop
Liubao	Wudi County, Shandong Province	1862.09	11 villages, 2700 households	2005-2006	Corn, wheat
Chewang	Wudi County, Shandong Province	887.57	17 villages, 1300 households	2017-2018	Corn, wheat
Huangling	Pengze County, Jiangxi Province	183.49	2 villages, 705 households	2013-2016	Cotton, rice, sesame

Data for cases in Wudi were obtained during a 5-week field survey from May to June, and data for the Huangling project were collected through two field surveys in 2015 and 2016. We conducted unstructured interviews with local government officials in charge of the projects (including the leaders and staff at the county level bureau of land resources management, officials in township government and the land resource management department), village cadres, and farmers who lived in the villages when the project was implemented. Regarding farmers specifically, we selected two villages in each case and applied snowball sampling strategies to gather enough information. The interviews investigate the following factors: The process and method of LRiLC; the roles and behaviour of local governments, village cadres, and farmers during LRiLC and land transfers; the problems and conflicts they are faced with, and how they solved the problems and resolved the conflicts; and the final outcomes.

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4.1 Verification of Model I: The Evolution of Collective Action in LRiLC

The Narrative: From Government-Led Success to Laissez-Faire Failure. The evolution of LRiLC in Wudi County, Shandong Province, offers a natural experiment contrasting two distinct eras. In the Liubao project (2005-2006), implemented before the comprehensive land titling, the local government played a dominant role. Officials not only initiated the project but also enforced a "majority rule" policy, where the consent of 75% of households legitimized the reallocation for the whole village. To incentivize participation, they designed a priority mechanism where early adopters received better parcel locations. Despite minor conflicts, the project successfully consolidated fragmented land, reducing the average number of parcels per household from roughly 8 to 3. In stark contrast, the Chewang project (2017-2018) in the same county faced a different institutional reality. By this time, the land-rights reform had been fully implemented. Citing the central mandate to keep land rights "stable and unchanged," local administrators explicitly declared that LRiLC was now the villagers' private business and refused to intervene or mediate. Left to organize themselves, farmers failed to build trust; many feared that without government guarantees, they would be exploited by opportunistic neighbors. Consequently, despite a universal demand for defragmentation, the initiative in Chewang stalled and eventually collapsed. Theoretical Interpretation (Model I) Interpreting these narratives through Model I, the Liubao case represents the equilibrium enabled by strong administrative coordination. The local government's ability to prioritize allocations effectively transferred potential benefits from holdouts to participants, maintaining a high balancing ability (Δ). The credible threat of enforcement under "majority rule" ensured that the shared belief in participation (x_0) remained above the critical threshold (x^*). Conversely, the Chewang case validates the mechanism of "rights-based withdrawal." The reform drastically increased the political cost of enforcement (δ_r), forcing administrators to adopt the "Quit" strategy ($z = 0$).

The government's retreat signaled a collapse in Δ and destroyed the shared belief (x_0) among farmers. As predicted by the saddle point dynamics in Fig. 1a, without the external leverage of the state, the system was trapped in the holdout equilibrium ($x \to 0$), leading to the failure of collective action.

Table 3 Changes in land tenure after LRiLC in the Liubao, Chewang and Huangling projects

Village	Project	The average holding size before LRiLC(ha)	The average number of parcels per household before LRiLC	The average number of parcels per household after LRiLC	Change (%)
Huliu	Liubao	0.72	8	3	57.5
Dawangliu	Liubao	0.36	10	4	60
Pianyidian	Chewang	0.26	9	9	0

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Houliudong	Chewang	0.33	7	7	0
Jinhuang	Huangling	0.218	3.76	1	73
Fanrong	Huangling	0.165	3.89	1	74

Note: This table does not include information of the Dongying District because the Dongying case does not involve LRiLC

4.2 Verification of Model II: Selective Intervention and Land Transfers

The Narrative 1: From Deadlock to Marketization (The Huangling Case).

The Huangling project (2013-2016) in Pengze County, Jiangxi Province, illustrates how local governments pivot when facing resistance. Initially, the local government attempted to implement a traditional LRiLC to consolidate scattered plots. However, emboldened by the new land-rights certification, many villagers acted as holdouts, leveraging their strengthened property rights to demand exorbitant compensation (some claiming up to 10,000 yuan per mu). Lacking the authority to enforce compliance, the government's initial plan reached a deadlock. The breakthrough came only when the government shifted its focus to land transfers. Officials actively brokered deals between farmers and large agribusinesses. Once the majority of land was transferred to large operators, the fragmentation problem was resolved for these parcels, and the remaining minority of farmers were easily coordinated.
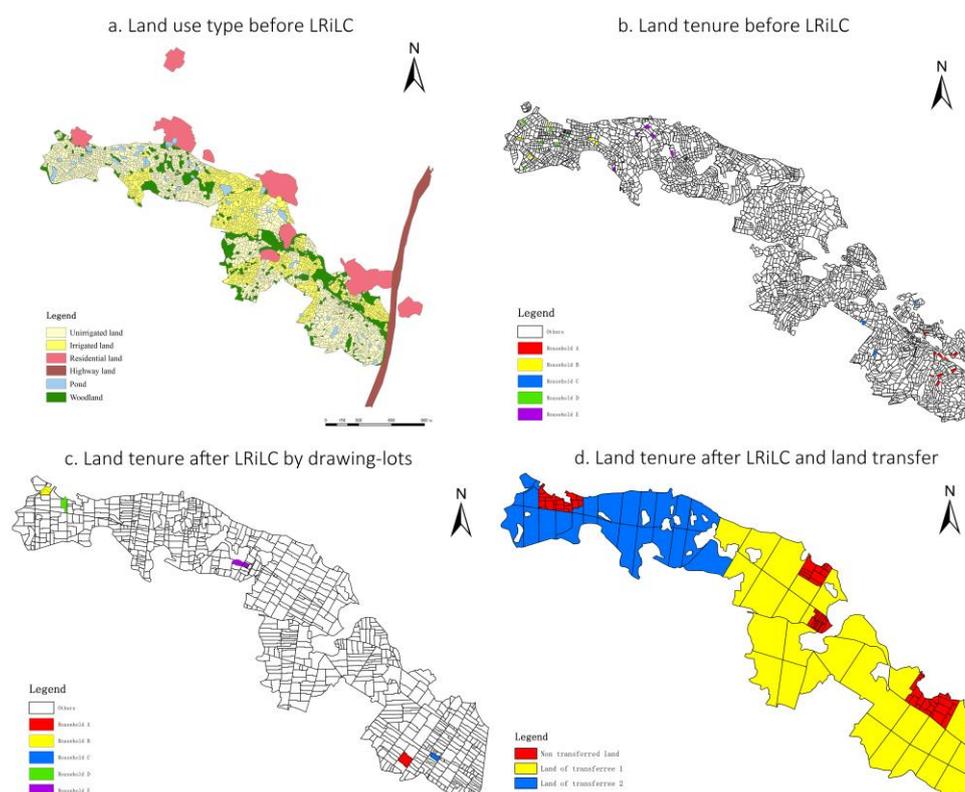

Fig. 3 Land use type and land tenure change before and after LRiLC in the Huangling project area

The Narrative 2: Mandatory Transfers in the Reform Era (Secondary Evidence)

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Beyond the mediated success in Huangling, evidence from other regions reveals that local administrators often resort to more aggressive tactics to achieve land transfer targets, effectively overriding the reform's rights-protection mandate.

Tactics of Coercion: In Ningxia, Luo and Andreas (2020) documented that when smallholders refused to transfer land, township governments mobilized "kinship pressure," leveraging the careers of relatives working in the public sector to force compliance. More severely, in Guilun village, officials transferred canal operations to an agribusiness company, which then cut off irrigation water to self-farming households, leaving them no choice but to transfer their land. Similarly, in Hunan Province, Gong and Zhang (2017) found that local governments blocked access to irrigation to compel minorities to accept land transfers for a double-cropping policy. In extreme cases, Tian and Chen (2013) even reported local governments hiring gangsters to intimidate farmers.

Scale of Intervention: These are not isolated incidents. A 2011 Landesa survey across 17 provinces showed that 11.4% of land transfers were conducted against farmers' will. Furthermore, Ye et al. (2018) found that coercion is particularly prevalent when transferees are agribusiness companies: in such cases, 40.8% of unwilling farmers were forced to transfer their land.

Theoretical Interpretation (Model II). The Huangling case and the widespread mandatory transfers described above empirically verify the "Selective Intervention" hypothesis in Model II. First, the initial failure in Huangling confirms that high enforcement costs (δ_r) induced by the reform effectively curb administrative power in community-based LRiLC.

Second, and more importantly, the aggressive interventions in land transfers align with Scenario B (Profit-Driven Override) in our simulation. The land-rights reform attaches substantial bureaucratic rewards (g_l)—including project funding, tax revenue from agribusiness, and modernization metrics—to large-scale farming. As observed in the coercive tactics (water cuts, kinship pressure), these benefits are often large enough to outweigh the political costs of resistance ($g_l(n_l) - c > \delta_l(n_r)$). This explains the paradox: while the reform nominally protects property rights, it creates a high-stakes incentive structure that motivates local administrators to override these very rights when it serves the agenda of agricultural modernization. Thus, the state retreats from low-reward coordination tasks (LRiLC) but aggressively intervenes in high-reward marketization (Land Transfers).

5. DISCUSSION

Our evolutionary game analysis and case studies reveal that land-rights reform hinders collective action in LRiLC by weakening farmers' shared beliefs in participation and enforcement, while simultaneously increasing mobilization costs for local administrators.

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Although the reform indiscriminately raises enforcement costs, the disproportionate bureaucratic benefits associated with land transfers drive local administrators to retreat from LRiLC but actively intervene in land transfers. Consequently, LRiLC survives only when it serves as an ancillary instrument to land transfers.

These findings challenge the conventional wisdom of property rights economics, which assumes that enhanced tenure security automatically displaces administrative intervention with market forces (Chari et al., 2021; Gao et al., 2021). Instead, we argue that administrative intervention has not disappeared but shifted—from the difficult coordination of LRiLC to the profitable promotion of land transfers. This nuances the debate on local state behavior: rather than a uniform restraint (Rozelle and Li, 1998) or intensification (Andreas and Zhan, 2016) of state power, we identify a "selective intervention" mechanism where local governments strategically navigate rights-based constraints based on the specific payoff structure of different land affairs.

Furthermore, this study contributes to the collective action literature by highlighting the negative externalities of rigid individual rights on community coordination. Consistent with Hong and Needham (2007), our findings suggest that a degree of legitimized enforcement is essential for LRiLC. While land transfers can facilitate LRiLC by reducing the number of actors (as seen in the Huangling case), the reform creates a dilemma where independent collective action becomes increasingly difficult without the option of land transfers (Su et al., 2020).

Policy-wise, the reform risks inducing a dual welfare loss: blocking necessary land fragmentation amelioration for smallholders while exposing them to coercive land transfers. To mitigate this, we suggest moving beyond a monolithic "unchanged" property rights doctrine. Future reforms should clearly demarcate the boundary between private rights and public obligations based on development stages. A comprehensive legal framework is needed to provide local governments with the legitimacy to coordinate collective action in the public domain (like LRiLC) while establishing institutionalized compensation to protect minorities, rather than relying on ad-hoc selective interventions.

6. CONCLUSION

By employing evolutionary game theory and comparative case studies, this research reveals the "asymmetric" impact of China's land-rights reform on local governance. We find that while the reform aims to enhance tenure security, it inadvertently hinders collective action in LRiLC by weakening the shared beliefs essential for coordination and raising the political costs of mobilization. Paradoxically, the same institutional changes incentivize local administrators to retreat from the costly coordination of LRiLC, citing respect for property rights, while aggressively intervening in profit-driven land transfers. This pattern of selective intervention leads to a dual failure: the collapse of necessary land fragmentation amelioration and the

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potential welfare loss of smallholders through coerced transfers. Consequently, we argue that a monolithic "unchanged" property rights doctrine is insufficient. To reconcile these tensions, a comprehensive legal framework is urgently needed to clearly demarcate the boundaries between private rights and public obligations, ensuring that tenure security does not come at the expense of the collective capacity for agricultural development.

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BIOGRAPHICAL NOTES

Xiaobin Zhang is a professor at the School of Management, Lanzhou University. Xiaobin received a Ph.D. degree (2020) in Land resource management from Zhejiang University. His research fields include land consolidation, property rights, and institutional analysis. In addition, he is the PI of research projects funded by the Ministry of Education of China and the National Natural Science Foundation of China.

CONTACTS

Prof. Xiaobin Zhang
Lanzhou University
Tianshuinan Road 222
Lanzhou
China
Tel. +86 18768114725
Email: zxb@lzu.edu.cn
Website: https://scholar.google.com/citations?user=qlHPFp4AAAAJ&hl=en

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