Property rights, transaction costs, and social gains:
An analysis of China’s first land development rights market

Lu Zhou
The University of Hong Kong

Abstract
Chinese government has been arbitraging between different institutions governing collective-owned rural land and state-owned urban land. It threatens land use efficiency, social stability, national food security, municipal income sustainability and legitimacy of the Party. One of the most celebrated reform is land development rights market in Chongqing. However, systematically analyze policy design and procedure illustrates that the goals of farmland conservation, integrated rural-urban development, and social equality are compromised, if not failed.

High transaction costs have put many rights trading market inactive. However, China’s first land development rights market experienced high trading volume and frequency. While active government intervention is effective in lowering transaction costs, it also gives government the greatest influence on policy outcome. When rural households are the residual claimant, government has incentives to sell land rights from locations closer to urban center. Government minimize its costs at the expense of social gain. Geographically weighted regression shows this spatial-temporal hypothesis was true in some areas, but not in others. This paper concludes Chongqing reform does not correct the fundamental reason of government’s distorted incentives of using land, and suggest further property rights reform.
Introduction

China’s urbanization is a process of converting collective-owned rural land into state-owned urban land through eminent domain. It is driven by the arbitrage opportunity between different land institutions over rural and urban land. This dual land system is developed from accommodating secured private property rights in market economy without violating socialist ideology of public ownership (Lin and Ho, 2005). The socioeconomic importance of an integrated rural-urban land market has long been recognized (citations). But little progress has been made because land leasing and related fees constituted averagely 30% of local fiscal income. The number went up to 70% in some cities (citations).

Rural farm land is collectively owned by a village. It is contracted to rural households for 30 years and cannot be used for non-agricultural purpose. When facing expropriation, it is hard for all villagers in a village to collectively execute ownership. Therefore, city governments compensate households based on use rights and agricultural output. After taken by government, land title changes to state-owned. Property rights are strengthened because state land is not subject to expropriation anymore. City government also changes zoning and enhances land’s use value. Then, city governments can lease the land at a much higher price than compensation paid to rural households. City government captured all the value appreciation due to change of property rights.

This also comes with huge social costs. Majority mass protests in China were land expropriation related (citations). Farm land has been losing at an alarming speed which may threaten national food security. In the last 30 years, city governments have been leasing land on terms of 30 to 70 years. It leaves current and future governments little income from land but responsibilities to serve large amount of existing urban areas. Because city governments’ private cost is lower than social costs, they also tend to over supply land. It lowers land use efficiency.

Despite State benefits from local governments’ lucrative land business, she also bears the negative impact on land use efficiency, social stability, national food security, and legitimacy of the Communist Party of China. Therefore, she issued Annual Land Use Plan in 1999. It sets upper bound of farmland city governments can develop each year. It immediately raised outcry from local governments worrying about accommodating new economic activities and decrease in fiscal
income. Lin and Ho (2005) recorded how the State efforts have been contested, mediated, and circumvented by local governments.

The most celebrated local initiative is land development rights market established in Chongqing 2008. It gained popularity from both city governments nationwide and the State. March 2018, State announced its plan to establish a national land development rights market based on Chongqing experiment. Chongqing policy allows rural households to reclaim idled or under-utilized housing land to farmland. This is shown as the blue dots in the outer circle of Map 1. Then government issues certificates of land development rights to rural households based on the area of farmland created. Buyers of certificates have the rights to convert the same amount of farmland to construction land in the urban fringe. It is shown as the blue dots in the middle circle of Map 1. By design, there is no net increase of construction land and net decrease of farmland. But there is increased state-owned land and decreased collective-owned land.

![Map 1. Spatial exchange of farm land and construction land](image)

**Policy goal and unintended consequences**
One of the reasons for State to constrain farmland development is that China needs 1.8 billion mu farmlands to feed its population in time of emergency. Though the number is under debate, national food security is important without doubt. When municipal government uses quota from State to
develop farmland, she also needs to create farmland somewhere else. This land development rights market twists this concept. Municipal creates farmland in the rural first, then claim the rights to develop farmland in the urban fringe. The quality of newly created farmland from construction land is inferior to lost farmland in urban fringe. Cities originated in areas having the most fertile farmland developed over thousands of years. In addition, creating new farmland through other channels, like unexploited land, could be cheaper, faster, and higher quality.

Then why State has to put centrally planned quota at the first place? In addition, State regulates the amount of additional land development rights created by Chongqing each year. It is around 10% of the quota. This is because State cares about social stability too. Municipal government can change State’s equilibrium point by benefiting a new set of players: households in the remote rural. But it cannot change State’s preferences too far because it also increases the number of households would be expropriated in the urban fringe.

Rural households in China have been sacrificed for almost a century. They supported Chinese Communist Party to win the second Sino-Japanese War and Civil War. In the first 30 years of People’s Republic of China, their agricultural output was used to subsidize industrialization. Last 40 years, they were the source of China’s cheap labor. Yet, it is extremely hard for them to become a formal citizen in the city where they work due to Hukou system and lack of financial means. Therefore, they are excluded from most government provided public goods, like education, medical, and even housing in some cities.

This policy affected two groups of villagers differently. It benefits villagers in the remote rural areas. Their rural houses have low use value because many of them worked in the city most of the year. They cannot sell their residential land. Their land are only allowed to be traded within the village. Their fellow villagers have low demand due to outmigration. Even they do, they can build on their farmland with little chance to be punished. This policy allows them gain income by tearing down their houses, reclaiming housing land as farmland, and promising not to develop the reclaimed farmland again.
But these rights are used to develop farm land in the urban fringe. Rural households in the urban fringe would not be expropriated without this policy. Some studies recorded expropriation brought households windfall income and opportunities (references needed). But we do not know what the price would be if sell to developers directly. General literatures show the compensation tended to be unfair (reference needed).

Chongqing reform also aims to facilitate urban growth without losing farmland. It is expected to stimulate rural to urban migration and reduce rural-urban inequality with income from selling rural land development rights to urban developers. It is hoped to provide a benchmark for rural land value in order to help rural households get access to mortgage. It also signals government’s efforts to narrow the gap between rural and urban land rights by increasing rural households’ rights.

What has been overlooked and less obvious policy outcome is the efficiency of maximizing gains from trade. High transaction costs exist widely in various rights trading market (citations). Chinese government is powerful enough to integrate various stakeholders, adapt hybrid organizational structure, and utilize institutions and political norms to lower transaction costs. When government is actively involved in organizing the market, she also has the greatest influence on policy outcome. But she is not residual claimant. Therefore, she has no incentives to search for sellers have the lowest supply costs and buyers who are willing to pay most.

Using Chongqing as a case study, this paper investigates the channels through which transaction costs and property rights allocation influence the maximization of gains from trade.

**Transaction costs and land development rights market**

Land development rights market is very similar to Transferable Development Rights as a planning tool. But they are originated from and operated in very different legal and political context. In the last 50 years, U.S. local governments operated more than 250 Transferable Development Rights programs in 36 states (citation). Majority of them were inactive because of high transaction costs (citations).
Chongqing faces the same problem. High transaction costs are associated with searching and matching sellers and buyers, negotiating contracts, monitoring and enforcing contracts, and settling disputes (Allen, 1999). First of all, we do not know who are willing to pay highest. Land development rights allows a piece of farm land to be converted to non-agricultural usage. But it has to be used with eminent domain practice. Then the land has to be auctioned publicly. It is impossible to predict who are the buyers ex ante. It is almost impossible to know who have the least housing land value and lowest opportunity costs of rural to urban migration among 17 million rural population. Buyers are also physically distance from, and need to negotiate with a large number of rural households. Chongqing has a size of Austria. It takes whole day driving from municipal center to some rural households. From 2008 to the end of 2017, around 260,000 rural households sold their land development rights. Each rural household supplies averagely 330 square meters land development rights. The benefits generally do not justify their costs to hold distanced urban buyers accountable. Rural households are scattered in remote rural and worked in the city most of the year. It is hard for them to collectively organize a law suit or leverage on economies of scale of reclamation projects. Lastly, neither buyers nor rural households have incentives to create high quality farmland.

Due to information asymmetry, municipal government has difficulties to know the amount of land development rights a county can supply and needs to buy. In addition, there are conflict of interests among counties. Counties are competing with each other for economic growth (Chung’s and Mei’s articles). Land is the most important endowment to attract investment opportunities. Selling land development rights to other counties means giving away investment opportunities. Land development quota from State is allocated free of charge. All counties want to get free land development quota instead of buying land development rights.

However, Chongqing experienced high volume and frequency of trading. Table 1 summarizes yearly transaction data from 2008 to 2016. The total volume was 127 million square meters, worth 39.62 billion RMB. Around 31% area was provided by collective land used by township and village enterprises, public utilities and public welfare. 228,870 rural households provided the remaining 69%. The unit price tripled in first four years, then dropped 20% over next three years, and stabilized around 285 RMB per square meter in the last three years.
### Table 1. Trading records summary

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume</strong> (Million square meters)</td>
<td>0.73</td>
<td>8.3</td>
<td>14.8</td>
<td>35.3</td>
<td>14.8</td>
<td>13.7</td>
<td>13.6</td>
<td>17.8</td>
<td>7.8</td>
<td>127</td>
</tr>
<tr>
<td>Provided by collectives</td>
<td>100%</td>
<td>95%</td>
<td>58%</td>
<td>35%</td>
<td>29%</td>
<td>13%</td>
<td>20%</td>
<td>23%</td>
<td>8%</td>
<td>31%</td>
</tr>
<tr>
<td>Provided by households</td>
<td>0%</td>
<td>5%</td>
<td>42%</td>
<td>65%</td>
<td>71%</td>
<td>87%</td>
<td>80%</td>
<td>77%</td>
<td>92%</td>
<td>69%</td>
</tr>
<tr>
<td>Number of households involved</td>
<td>-</td>
<td>855</td>
<td>17,863</td>
<td>57,689</td>
<td>30,139</td>
<td>35,067</td>
<td>28,047</td>
<td>46,519</td>
<td>12,691</td>
<td>228,870</td>
</tr>
<tr>
<td>Unit price (RMB/Per square meter)</td>
<td>122</td>
<td>145</td>
<td>225</td>
<td>366</td>
<td>313</td>
<td>331</td>
<td>287</td>
<td>281</td>
<td>285</td>
<td>298 (average)</td>
</tr>
<tr>
<td>Amount (Billion RMB)</td>
<td>0.09</td>
<td>1.2</td>
<td>3.33</td>
<td>12.9</td>
<td>4.7</td>
<td>4.5</td>
<td>3.9</td>
<td>3.9</td>
<td>5.1</td>
<td>39.62</td>
</tr>
</tbody>
</table>

Data source: Chongqing government agency website [http://www.ccle.cn](http://www.ccle.cn). This agency responsible to improve land use and allocation efficiency in rural Chongqing. It carries rural land reform experiments and aims to establish a rural-urban integrated land market.

The active market was contributed by government’s ability to integrate resources and motive stakeholder to reduce the friction of trade. To create demand, municipal government required all commercial developments to use land development rights. Generally, commercial land has the highest value comparing other types of land, such as infrastructure, industrial, residential. Municipal agency organized auctions of land development rights. It had two purposes. It used market to discover the highest prices. Second, it revealed the real demand of commercial land in each county. Lastly, municipal government also gave county governments political pressure and order to buy.

Existing governmental administration system was used to organize supply. A detailed implementation procedure is described in Appendix I. Supply was organized by four levels of governments: municipal, county, township, and village. Village officers know households in their village well. County governments aggregated sales from various villages to reduce reclamation and administration costs. It is easier for government to collect payment from buyers. It is also
easier for rural households to hold local government accountable than distanced urban developers. Municipal government supervised the quality of newly create farmland and payment. This form of organization reduced information and enforcement costs, and leveraged on economies of scale. Before each auction, municipal government set floor prices for land development rights. It reduced the negotiation costs between government and rural households. Most rural households thought they were selling their land to government. Most of them did not know this creates land development rights would be used in urban. They were giving a standard contract. It was important for them to have a price before selling their land. They would not mind final price is higher. If they had to accept lower payment later, they needed to understand how the market works. Then they might want to negotiate each contract based on who were the buyers, where it was used, what was the value created. This would increase negotiation costs significantly.

It is relatively easier to create supply because some people get paid. Floor prices were higher than the value of many rural housing land. The problem was how to incentivize county government to organize rural households. At the beginning, municipal government assigned each county the quantity of rights needed to be created. This administrative order was not codified and not part of officers’ responsibilities before taking office. But it is a norm among Chinese politicians that if a higher-level governor promotes a new policy, lower level governors will support it. Even some policy would benefit some counties by drawing resources out of others. But higher-level governor could decide lower level governors’ tenure and promotion. It also raised public concerns that households would be forced to tear down their houses for land development rights. Soon this administrative order got canceled. But once bureaucratic agencies are created, they will strive to survive and thrive. This is especially obvious in counties deep in debt, have lower opportunity costs, and abundance of low value housing land. According to municipal agency, it would take 10 years to sell the amount of land development rights already created or in the pipeline at the end of 2016. Since 2017, county agencies were told to slow down, basically stop, accepting new reclamation applications.

**Allocation of property rights**

Sell price is distributed among government, rural household, and collective. Table 2 demonstrates the distribution using average price from 2008 to 2016. Government charges a fixed rate per mu
for organizing the trade. It is shared among four levels of government agencies: municipal, county, township and village. Sell price minus this fixed fee is net price. 85% of the net price is paid to rural households to compensate their use rights. 15% of the net price is given to collective to compensate their ownership. The village government generally represents collectives and receives the payment.

**Table 2. Sell Price Distribution Example**

<table>
<thead>
<tr>
<th>Average sell Price</th>
<th>Government fixed fee</th>
<th>Household</th>
<th>Collective</th>
</tr>
</thead>
<tbody>
<tr>
<td>189,700</td>
<td>37,000</td>
<td>85%*(189,700-37,00) = 129,795</td>
<td>15%*(189,700-37,00) = 22,905</td>
</tr>
</tbody>
</table>

Despite detailed and clear official procedure described in Appendix I, governments still have considerable discriminations over who can supply, when and prices.

The supply process starts with village officers inform, explain, and encourage rural households to apply reclaiming their housing land to farmland. Two main factors determine who get informed. First is the distance to village center. Officers have better information of closer households, such as housing land value, the possibility of appeal to court or higher-level government when things went wrong. In addition, administration costs increase with distance. The second factor is clustering. Information spills over among neighbors. Clustering of supply also reduces officers’ administrative and reclamation costs. To minimize their transaction costs, officers would start to inform clusters of households who are closer to their office first.

Rural households take 1 to 4 years to receive final payment after application. This is because county governments want to take advantage of the economies of scale of reclamation. Therefore, they pack applications into one project based on their locations rather than application time. As soon as they get certificate of acceptance of reclamation projects, county governments applied to sell the rights. They generally did not delay in this step because counties are in competition for the limited quantity demanded. However, municipal government also wants to minimize her administration costs and social stability risks. Therefore, she packs various projects in one auction based on their location rather than first come first service. One auction has many deals and different
sell prices. To create equality, households involved in one auction were paid the average price. Apparently, households have different supply costs were ignored.

Therefore, we are expecting that selected households are close to urban center, have higher asset value, and are clustered. This means, on average, they have higher value of housing land, higher opportunity costs for migration, and cost efficient for government to provide public service.

**Theoretic framework**

Barzel (1997) lays the general principle to maximize allocation of ownership: the greater a party’s power to influence the income generated from an asset, the greater is the share of the residual that party should claim. Apparently, rural households are the residual claimant. But government has the greatest power to influence supply and demand. This section develops a testable implication of how the allocation of property rights in Chongqing compromised the maximization of social gains.

In Graph 1, S is the supply curve, with price represented on the vertical axis and quantity represented on the horizontal axis. Q1 is the ceiling quantity regulated by State. P is the floor prices determined by municipal government based on farmland creation costs, negotiation between supply and demand counties, and previous prices.

![Graph 1. Gains realized with and without transaction costs](image-url)
In a free market with zero transaction costs, households furthest away from urban center should have the strongest incentive to supply first because they have lowest land costs. The maximum gain for villagers is ODEP where households with lowest land values supplied. However, when there are transaction costs, it increases with distance. Distance increases the costs of searching, negotiation, and enforcement between buyers and sellers. Buyer, in the quota generating process, is government who locate in urban center.

In an administratively organized supply system, government officers have to travel to households, explain the policy, encourage households to apply, organize reclamation projects, and solve disputes. In addition, government officers and households have better information about each other when they are closer. Therefore, government has incentives to organize supply from locations close to urban center first. That is from Q2 to Q3. Q3 minus Q2 equals Q1. Government’s minimum costs is area ABC. However, there are transaction costs to identify, negotiate and contract with households in the area of ABC. Also, information spillovers among villagers within and outside of ABC.

**Economic model**
The hypothesis developed from theoretical framework is that “government started land rights generating from households closer to urban center”.

Distances from a location to the town, county, and municipal government all have impact on different levels of governments’ decision about selling sequences. But other factors also influence their decision, like percentage of collectively owned public land and number of households. Both collectively owned households’ residential land and public land are eligible to be used for land development rights generating. Households receive majority of income from their residential land. Government receive all income from public land. Government might give priority to projects with larger number of households. Large number of people generally associated with bigger social pressure and benefits.

Unit prices and land size diversity among households have impact on households’ decision to sell. The higher unit price, households are more willing to sell. If a household had residential land
higher than the average size of the neighbors. It is more likely to supply. However, government would worry inequality among households in a project. Government prefers to pick households with similar land size first. Therefore, the effect of land size diversity within a project is undetermined.

\[
\text{AgeY} = \alpha_0 + \alpha_1 \text{DisT} + \alpha_2 \text{DisC} + \alpha_3 \text{DisM} + \alpha_4 \text{UPV} + \alpha_5 \text{PerCol} + \alpha_6 \text{No.V} + \alpha_7 \text{SDT} + \epsilon
\]

Where:
\(\alpha_0\) and \(\epsilon\) are the intercept and idiosyncratic errors. \(\alpha_1\) to \(\alpha_7\) are the coefficients we want to estimate.
AgeY: project year minus the first year of land reform, 2008, is the dependent variable. For example, for a project was carried out in the year of 2012, the dependent variable is 4. the difference between the year a project sold and 2008 which is the first year of this policy. The larger the number, the later the land develop rights generated from the project was sold.
DisT: distance between one of the villages in a project and its corresponding town government, measured in unit of kilometers. Coefficients are expected to be positive in some locations while negative in other locations.
DisC: distance between the town where project happened and its corresponding county government, measured in unit of kilometers. Coefficients are expected to be positive in some locations while negative in other locations.
DisM: distance between the county hosting the project and municipal government, measured in hours of driving. Coefficients are expected to be positive in some locations while negative in other locations.
UPV: unit price paid to villagers in a project, measured in RMB/per M2. Coefficients are expected to be negative.
PerCol: percentage of collectively owned public land in a project. Coefficients are expected to be negative.
No.V: number of households in a project. Coefficients are expected to be negative.
SDT: the standard deviation of households’ areas supplied in a project. Coefficients are undetermined.
Data collection

To test this hypothesis, ideally, we need to collect 4.3 million (17 million rural population / average household size 4) households’ information. Even we have time and fund to do such a survey, not every household would reveal real land value. They may even not know value of their lands because there is no market for rural land.

The best alternative is project level analysis. On average, 67 households were packed by county government into one project to execute reclamation and payment. To leverage on economy of scale and prevent complain over different sale prices, these households were neighbors. Therefore, our theoretical framework applies to project level data too.

Total 4,215 projects were traded from 2008 to 2016. After cleaning and matching data, 3,410 projects are used in this test. Project information are collected from government agency website (http://www.ccle.cn). It announces prices, the number of households and their land areas, and collectively owned land areas in each project. UPV, No.V, PerCol, and SDT are calculated from these announcement. DisT and DisC are measured from their coordinates. Their coordinates are searched on Google map based on the names of the villages and towns. DisM is the driving time from counties to the municipal government.

Geographically weighted regression (GWR)

The traditional OLS and Poisson Regression have two assumptions do not hold in this research: homogeneity and independence. In addition, there are omitted administrative, political or other contextual issues that different across spaces.

Figure 5.3 demonstrates local heterogeneity. Dark purple lines in the scatter plot matrix are global regression. It gives one coefficient for whole sample. Then I select a sub-set of samples as shown in lower left corner. Red line in the scatter plots are regression lines for the selected area. Majority of them are drastically from the global regression lines. Some of them even change signs.
Figure 5.3. Global and local regression coefficients

Map 5.1, Local Indicator of Spatial Association, identifies both positive (high-high and low-low clusters) and negative (high-low and low-high outliers) spatial dependence. Neighboring projects affected a project in two directions. When projects were established around the same time, neighboring projects were more likely to be packed together to reduce the price difference among villagers. If one project just sold, the following projects in the same or nearby locations might be delayed because government tend to give opportunities to towns had no recent supplies.
GWR take the above concerns through estimating parameter for each location by assigning different weights to variables based on their geographic locations. The Quasi-global R-square is 0.7955 comparing it is only around 0.3 in OLS and Poisson regression. Table 5.3 summaries the coefficient statistics for each variable. For each variable, we can see they range from negative to positive values in different locations.

Table 5.3 Comparing GWR results statistics and Global coefficient

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Min.</th>
<th>1st Qu.</th>
<th>Median</th>
<th>3rd Qu.</th>
<th>Max</th>
<th>Global_OLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DisT</td>
<td>-0.34</td>
<td>-0.04</td>
<td>-0.005</td>
<td>0.02</td>
<td>0.13</td>
<td>0.0076</td>
</tr>
<tr>
<td>DisC</td>
<td>-0.07</td>
<td>-0.01</td>
<td>-0.0006</td>
<td>0.02</td>
<td>0.09</td>
<td>0.0052</td>
</tr>
<tr>
<td>DisM</td>
<td>-11.2</td>
<td>-0.45</td>
<td>0.29</td>
<td>0.94</td>
<td>7.96</td>
<td>-0.0383</td>
</tr>
<tr>
<td>UPV</td>
<td>-0.18</td>
<td>-0.1</td>
<td>-0.05</td>
<td>-0.004</td>
<td>0.07</td>
<td>-0.0265</td>
</tr>
<tr>
<td>PerCol</td>
<td>-0.11</td>
<td>-0.04</td>
<td>-0.02</td>
<td>-0.006</td>
<td>0.009</td>
<td>-0.0313</td>
</tr>
<tr>
<td>No.V</td>
<td>-0.08</td>
<td>0.0001</td>
<td>0.003</td>
<td>0.007</td>
<td>0.02</td>
<td>0.0052</td>
</tr>
<tr>
<td>SDT</td>
<td>-0.01</td>
<td>-0.003</td>
<td>-0.001</td>
<td>-0.0004</td>
<td>0.003</td>
<td>-0.0011</td>
</tr>
</tbody>
</table>

Visualization Results

This section maps the coefficients and whether they are significant at 1% level. Putting 3,410 coefficients value in one map would look messy. What we care most is the sign of the coefficients. Therefore, I group coefficients into negative or positive. In coefficients maps, blue circle represents negative value, and red represents positive value. In significance maps, blue means insignificant and red means significant in 1% level.
Figure 5.4 shows both positive and negative coefficients. It means, in some areas, projects started from locations further away from town government. In some other areas, projects started from locations nearby town government. But this impact is only significant in less than 10% locations.

As shown in Figure 5.5, there are clusters of both positive and negative coefficients. It means, in some areas, projects started from locations further away from county government. In some other areas, projects started from locations near county government. This impact is significant in around one third of the locations.
Figure 5.6 illustrates clusters of both positive and negative coefficients. It means, in some areas, projects started from locations further away municipal center. In other areas, projects started from locations nearby municipal center. This impact is significant in around half of the locations.

From Figure 5.7 we can see that majority areas have negative coefficients. When unit price was higher, household supplied their land development rights earlier. This is consistent with our expectation. However, we also find two large positive red cluster in the coefficient maps are significant. It needs further investigation why households delayed supplied their land rights when the prices were higher.
From Figure 5.8 we can tell that coefficient between supply timing and percentage of collectively owned public land is negative. The red positive values are not significant. It means government gives priority to sell this type of land first. This is consistent with our expectation.

Figure 5.8. Coefficients and significances of PerCol

Figure 5.9 shows only positive coefficients were significant. It indicates project with a larger number of households were giving lower priority to be sold. It is opposite to our expectation and needs further investigation.

Figure 5.9. Coefficients and significances of No.V
In Figure 5.10, only negative coefficients are significant. It means land areas varied wider among households in early projects.

![Figure 5.10. Coefficients and significances of SDT](image)

**Discussions (to be finished)**
Refer to previous studies why there were regional differences of parameters

**Conclusion (to be finished)**
Identify land institutions created government’s distorted incentives
Further property rights reform suggestions.
Selected References:


Cheung, Steven NS. "Roofs or stars: the stated intents and actual effects of a rents ordinance." Economic Inquiry 13, no. 1 (1975): 1-21.


Appendix I _ Policy Procedure

This appendix depicts the complicated and length policy procedure. It includes 5 stages and 20 steps. These details are important to identify the rights, benefits and incentives of stakeholders. Parenthesis in the end of each step lists the minimum working days needed.

1. Application
   1) Village officer *initiates policy propaganda and explanation.* (according to situation)
   2) Villagers fill out application and provide certificate of title. (according to situation)
   3) Representatives of collective economic organizations approve the application. Then village officer inspects the application and status of the housing land. (15 days)
   4) Township collects 30 to 50 applications, and then submits them to county government agency. (according to situation)
   5) County agency verifies information and issues acceptance/rejection comments. (5 days).

2. Farmland creating plan and implementation (159 days)
   6) County agency packs neighboring applications into one reclamation project, surveys the fields, and makes maps.
   7) Municipal bureau reviews and revises the survey and mapping. County agency implements revisions if there are any.
   8) County agency notifies villagers survey and mapping results. If there is no objection, villagers, township officer, and county agency sign a tripartite reclamation agreement.
   9) County agency formulates reclamation plan.
   10) Municipal bureau reviews and notifies acceptance or rejections.
   11) County agency implements reclamation plan. (90 days or according to the situation)

3. Inspection and acceptance (85 days)
   12) County agency inspects completed reclamation.
   13) Municipal bureau reviews surveying and mapping of completed reclamation made by county government. County agency implements revisions if there are any.
   14) County agency issues certificate of acceptance. The certificate is the formal document of amount of land development rights created.
   15) Municipal bureau conducts spot check.

4. Selling land development rights (48 days)
   16) *County government agency submit application to municipal bureau for selling land development rights* based on the certificate of acceptance.
   17) Municipal bureau organizes transactions, including planning, reviewing, notification to bidders, organize auction, payment from buyers. (44 days)
   18) Municipal bureau calculates average prices of each auction as the bases of payment.

5. Payment (15 days)
   19) Municipal government reviews payment.
   20) Municipal bureau directly transfers final payment to villagers’ bank accounts.