Land Concentration and Land Market in Japan: An International Perspective

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Motivation

- A major characteristic of Japanese agricultural landownership is that farmers own small, geographically scattered fields. To improve food self-sufficiency potential in Japan, farmland consolidation are necessary.

- Merit of farmland consolidation
  - Scale economy; Resolution of the fragmented farmland inefficiency (Kawasaki, 2010)

- The small-scale farming is commonly observed in Asia. Thus, the struggling experience of Japan provides important lessons for rapidly growing economies—especially in Asia, which faces similar agro-economic land conditions.
Outline of my presentation

1. How has the agricultural economics seen the farmland market?
2. Gap between the image of a perfectly competitive farmland market and the reality
3. Policies regarding farmland consolidation in Japan
4. Market design for farmland consolidation
5. Concluding remark: An international perspective
How has the agricultural economics seen the farmland market?
Perfectly competitive farmland market

- Farmers maximize their profit:
  \[
  \max_{\{l^a, A\}} \quad p\alpha f(l^a, A) + w(\bar{L} - l^a) + (\bar{A} - A)r
  \]

- Implication
  1. \( \frac{\partial A}{\partial \alpha} > 0 \): When farmers’ productivity rises, their optimal management scale \( A^* \) increases.
  2. \( \frac{\partial A}{\partial w} < 0 \): When off-farm wage rises, their optimal management scale \( A^* \) decreases.
Perfectly competitive farmland market

The amount of farmland demand (supply) of each farmer is determined:

\[ A^{in} = A^* (\alpha; r, w) - \bar{A} \]
\[ A^{out} = \bar{A} - A^* (\alpha; r, w) \]

By adding up the farmland demand (supply) of individual farmers, total farmland demand (supply) in the farmland market can be obtained.

The \( r^* \) should be set at the level that ensures a balance between the supply and demand.
Gap between the image of a perfectly competitive farmland market and the reality
Characteristics of farmland as a good

1. Locational immovability
   - Farmland cannot be moved → Farmland market is geographically constrained.

2. Economy of consolidation
   - Consolidated farmland lots have higher use efficiency than independent lots of the same area.

3. Externality
   - Externality of location (connected plots)

4. Symbolic or political good
   - Household norms, rural community norms
Do farmers behave based on profit maximization?

- Farmers do not always behave for the purpose of maximizing their profits.

- Household norms and rural community norms
  - Succession of family name, family business, family industry

- Cultivation as a consumption good
  - Unprofitable farmland use by hobby farmer
Is farmland market competitive?

- Trading of farmland is geographically constrained.
  - Locational immovability
  - Economy of consolidation

- The farmland market tends to be thin, inevitably causing an oligopoly on both the lender and borrower sides.

- Does farm rent function to adjust the imbalance between supply and demand in farmland trading?
  - Farm rent is decided through negotiation between the lender and the borrower in view of the standard farm rent as the reference point.
  - The standard rent system was introduced in 1970 in which local agricultural committees announce the standard rent and advise land owners to lower the rent if it is significantly higher than the announced rent.
Are there no institutional strains surrounding farmland?

- Institutional strains surrounding farmland
  - expectation of land conversion
  - farmland taxation system (inheritance tax moratorium, etc.)

- These problems help increase reservation demands of lessors, and thus decrease supply of farmland, resulting consequently in a delay in the progress of farmland consolidation.
Are there no farmland transaction costs?

- The Subjective evaluation of farmland is different among farmers.
  - The cost of examining the farmland conditions

- Search cost, Matching cost
  - It is difficult to search for a suitable trading partner or farm plot.
  - “double coincidence of wants”

Difficulty in transaction is to find two farmers whose disposable possessions mutually suit each other’s wants
Policies regarding farmland consolidation in Japan
Farmland policies in Japan

<table>
<thead>
<tr>
<th>Year</th>
<th>Act</th>
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<tr>
<td>1947</td>
<td>Land reform</td>
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<td>1952</td>
<td>Agricultural Land Act</td>
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<td>1961</td>
<td>Basic Law on Agriculture</td>
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<td>1980</td>
<td>Agricultural Land Use Promotion Act</td>
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<td>New Agricultural Policy Scheme</td>
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<td>1993</td>
<td>Act on Promotion of Improvement of Agricultural Management Foundation</td>
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<td>2000</td>
<td>New Basic Law on Food, Agriculture and Rural Areas</td>
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<td>Intermediate and Conservation Organization for Farmlands</td>
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Area of farmland cultivated by core farmer

Source: Ministry of Agriculture, Forestry and Fisheries
Trend in abandoned land

Source: Ministry of Agriculture, Forestry and Fisheries
Market design for farmland consolidation
Example of fragmented farmland

Land highlighted in pink belongs to single farm operation.

Source: Municipal Statistics of Farmland Consolidation, Ministry of Agriculture, Forestry and Fisheries
Production costs of rice by farm size

Crop year 2012

Japanese yen per 60kg

Source: Rice Production Cost Statistics, Ministry of Agriculture, Forestry and Fisheries
Farmland consolidation project

Before. Plots had irregular shapes, and their sizes averaged 0.05-0.07 ha each.

After. Plots were reshaped and enlarged to a mean plot size of 0.5 ha each.

Source: Niigata Prefecture Website: http://www.pref.niigata.lg.jp/HTML_Article/003kajikawaugann.pdf
kanchi: farmland replotting
kanchi: farmland replotting
Transplanting
Harvesting
Direct seeding on drained paddy field
Strengthen producer side

- In the last two decades, abandoned farmland has been doubled to 400 thousand ha.  
- 50% of farmland is cultivated by business farmers.

**Farmland consolidation for business farmers**

1. **Establish the public intermediate organizations, which consolidate farmland to reduce production costs.**

   - **Advantages for lenders**
     - Feel secure since it is a public body
     - Can develop infrastructure without any expense for the owners

   - **Advantages for borrowers**
     - Can gather more farmland
     - Can consolidate farmland
     - Firms and new farmers can borrow farmland in good condition

   - **Regional government supported institution (Farmland consolidation bank)**
     - The institution rents a significant amount of farmland from farmers in the area (semi-publicly-owned)
     - The institution develops infrastructure including increasing the size of each parcel at its expense
     - Lease farmland so that business farmers can use larger amount of farmland according to each farmers’ situation

2. **Strengthen countermeasures to solve the abandoned farmland issue**

3. **Develop farmland and irrigation facilities to support farm consolidation and improve productivity**

**Target**

In the next decade, 80% of farmland to be consolidated to business farmers, with a reduction in average rice production costs by 40%, along with efforts to reduce input costs by industry. Increase the number of agro-firms to 50,000.

Source: Ministry of Agriculture, Forestry and Fisheries
Structural Reform of Producer Side

Farmland consolidation (image)

Scattered farmland  
<Each parcel is 30a>

Consolidated farmland for business farmers  
<Each parcel is 1ha>

Reduce production costs through farmland consolidation

Source: Ministry of Agriculture, Forestry and Fisheries
Market design for farmland consolidation

- Proposition of more efficient farmland consolidation measure
  - Arimoto, Nakajima and Tomita (2014)

Market resource allocation based on individual, decentralized decision-making

↓

**Proposition**: Trading cycle method
Organizational resources allocation associated with group decision-making
The purpose of the exchange is to turn the outlying land (a distant plot) into a plot next to the main farm (several connected plots).
“Double coincidence of wants”
“Double coincidence of wants”

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Farmer 2 can turn the outlying land into a plot next to the main farm. However, there is no benefit for farmer 3.

Not exchangeable!
Farmer cannot exchange plots

Top Trading Cycle (TTC) algorithm (Shapley and Scarf, 1974)
# Trading cycle method

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Trading cycle method

Exchanging plots at the same time within a trading cycle of 2→3→4→2
Trading cycle method

exchanging plots at the same time within a trading cycle of $2 \rightarrow 3 \rightarrow 4 \rightarrow 2$
Trading cycle method

If many farmers join the exchange at the same time and form a “cycle of exchange,” plot exchange will become available even though the double coincidence of wants is not directly satisfied.
Simulation of the trading cycle method

- 30 farm households
- \(30\text{ha} = 0.1\text{ha} \times 300\) plots

× randomly created
10,000 patterns of farmland layout
Performance of the trading cycle method

- Result: Rate of farmland consolidation
Proposing the cycle trading method

1. To facilitate smooth plot exchange, properties of each plot, including area, soil type, shape, and adjacent roads, must be accurately measured to ensure monetary equivalence of the subject plots.

2. If plot exchange is conducted periodically, the period during which a farmer cultivates the same plot becomes shorter, which may undermine the incentive for investment in farmland (problem with beneficial expenses).
Conclusion: An international perspective

1. In Asia, organizational resources allocation is superior to market resource allocation.
   
   - Construction of the farmland consolidation model in Asian monsoon
   
   - Organizational resources allocation associated with group decision-making is more likely to generate conflicts between farmers than market resource allocation, which is based on individual, decentralized decision-making. This makes consensus-building rather difficult.
   
   - In the past, each rural community’s innate adjustment function has worked effectively in consensus-building. As we cannot expect such a function to work in the future, it is necessary to rely on an external facilitator.
Conclusion: An international perspective

2. Understanding of the reality based on proper quantitative analysis is certainly useful in the international comparison of policy evaluation.

- It is crucial to share and theorize the findings obtained in case studies and conduct quantitative analysis using highly representative micro-data with a large sample size, so as to raise the evidence level.
- Econometric techniques, such as regression analysis, are effective in describing or presenting the reality.
Reference


