Land Reform, Human Capital Accumulation, and Structural Transformation*

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Abstract

We evaluate the impact of land reform on human capital investment, agricultural productivity and sectoral labor allocation, focusing on South Korea's 1950 land redistribution program. Despite the widespread adoption of such policies globally, evidence on their role in fostering human capital accumulation remains limited. We find a significant association between pre-reform land distribution patterns and post-reform educational and economic outcomes with the data. The overlapping generations model confirms that land reform facilitates structural transformation, particularly through stimulating human capital investment among poor households.

Keywords: Land Reform, Human Capital Accumulation, Structural Transformation
JEL Codes: O1, O4

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1 Introduction

Programs whereby governments facilitate the redistribution of agricultural land are being carried out in many countries, with the promise of reducing poverty and fostering broad-based agricultural growth (Binswanger-Mkhize, Bourguignon and van den Brink, 2009). While land reform may have provided an opportunity for poor parents to send their kids to school, empirical and theoretical evidence on whether land reform promotes human capital accumulation remains scarce. Because human capital plays a key role in the process of structural transformation (Caselli and Coleman, 2001; Porzio, Rossi and Santangelo, 2022), land reform may facilitate structural transformation.

In this paper, we quantitatively assess the effects of a land reform policy on human capital investment and sectoral labor allocation. Specifically, we examine the 1950 land reform in South Korea. Since the end of World War II, landlord estates in Bolivia, large areas of China, Eastern India, Ethiopia, Iran, Japan, Korea, and Taiwan have been transferred to tenants as part of successful land reforms (Binswanger, Deininger and Feder, 1995). In Korea, the reform constituted an extensive redistribution program aimed at addressing high inequality in land ownership. Post-reform, the share of tenancy farming within agriculture dropped from over 70% to basically zero (Shin, 1976).

The 1950 land reform in Korea primarily transferred ownership to cultivators, leaving farm sizes almost unchanged. After the reform was implemented nationally, regions with a higher share of tenant-farmers were more significantly affected. By exploiting regional variations in tenant land share in the late 1930s, we investigate whether a greater exposure to the land reform was associated with increased schooling and industrial development. Our analysis reveals a significant correlation between a higher share of tenant land pre-reform and increased primary and secondary school enrollment rates in 1955. Additionally, a higher share of tenant land was associated with a larger increase in the number of non-agricultural companies post-reform.

Motivated by empirical findings, we develop a model with overlapping generations, where parents select a sector to work in (agriculture or non-agriculture) and determine the level of education investment in their children (none, primary, or secondary education). Consistent with Caselli and Coleman (2001) and Porzio et al. (2022), we posit that human capital is more valued in non-agriculture, thus contributing to labor allocation in that sector. We assume that parents make education investment decisions while exhibiting warm-glow altruism towards their children.

We implement the land reform as an exogenous land redistribution program led by the government, mirroring the South Korean land reform. Our analysis indicates that the land reform contributes to structural transformation both immediately and over time. Particularly, the reform stimulates parents' investment in human capital for their children, facilitating labor reallocation to non-agriculture in subsequent generations. Our quantitative model findings align with empirical evidence.

Related literature This paper contributes to the macroeconomics literature examining the aggregate consequences of land reform across various contexts. Recent studies have highlighted the potential for efficient land reallocation to significantly enhance agricultural productivity (Chen, Restuccia and Santaeulàlia-Llopis, 2023), while cautioning that centralized land redistribution, in the absence of a well-functioning land market, may exacerbate misallocation issues and decrease agricultural productivity (Adamopoulos and Restuccia, 2020). These works primarily focus on the static misallocation effects of land reform. Our paper extends this literature by simultaneously exploring both the static misallocation effects and the dynamic impacts of land reform on structural transformation, particularly through its influence on human capital accumulation. In doing so, our study complements existing research on structural transformation, particularly studies emphasizing the pivotal role of education and human capital in driving such transformation (Caselli and Coleman, 2001; Hobijn, Schoellman and Vindas, 2018; Porzio et al., 2022).

Empirically, we provide new insights into how land reform shapes long-term human capital accumulation and industrialization. Numerous researchers have examined land reforms in various contexts, often focusing on their effects on poverty reduction (Besley and Burgess, 2000; Besley, Leight, Pande and Rao, 2016), agricultural productivity, and welfare (Banerjee, Gertler and Ghatak, 2002; Ghatak and Roy, 2007; Mendola and Simtowe, 2015; Kitamura, 2022; Kim and Wang, 2024). Our contribution lies in adding to a growing body of literature documenting the impact of land reform on human capital accumulation (Deininger, Jin and Yadav, 2011; Albertus, Espinoza and Fort, 2020; Galán, 2020; Hong and Kim, 2020; Montero, 2023). Specifically, we offer additional evidence on whether and how land reform influences human capital accumulation and subsequently fosters industrialization in the long run, using the successful case of land reform in Korea. While Korea's land reform is often cited as a success story, disentangling its effects from other concurrent economic changes, such as overall productivity growth or industrial policy implementations, poses challenges. To address this issue, we employ a combination of a structural quantitative model and empirical estimates derived from historical data. In doing so, we align with the recent trend in macro-development literature, utilizing causal estimates from microdata to inform and validate the quantitative model (Kaboski and

Townsend, 2011; Buera, Kaboski and Shin, 2021).

The remainder of the paper is structured as follows: Section 2 provides an overview of the land reform context in Korea and presents empirical evidence on its effects on human capital accumulation and industrialization. Section 3 outlines the quantitative model employed in the analysis. Section 4 describes the calibration strategy and reports the model fit. Section 5 presents the quantitative findings regarding the aggregate consequences of land reform. Finally, Section 6 concludes the paper.

2 Empirical Analysis

2.1 Land Reform in Korea

During the Japanese colonial period, the proportion of independent farmers declined and the proportion of tenant farmers increased. In 1942, more than 70% of agricultural households were tenant farmers (Shin, 1976). When Korea was liberated from Japanese colonial rule in 1945, tenant farmers demanded land reform. When the Republic of Korea (South Korea) government was established in 1948, land reform became one of the most urgent tasks. The Land Reform Act of 1950 was designed and implemented starting on April 10, 1950.

The Land Reform Act of 1950 redistributed two types of farm lands: (i) government-purchased lands and (ii) government-vested lands. Government-purchased lands included farmlands owned by absentee landlords and non-self-cultivators, and farmlands which exceeded 3 *chungbo* (hectares) per farm household. Government-vested lands included farmlands owned by the government and ownerless farmlands. The government purchased the lands of absentee landlords and large farmers with Land-value Bills called *Chika Chungkwon* (地價證劵) for the land value compensation in five annual payments. Lands were sold to tenant farmers who had been actually cultivating the tenant lands. In general, the land reform merely transferred ownership to cultivators, leaving the size of farms almost unchanged. The government provided for the transfer of ownership of the distributed lands to the cultivators. However, any sale, donation, and mortgage of the distributed lands were prohibited until the distributed land was completely paid off. The act also permanently abolished any forms of land tenancy, though some land tenancy was left illegally.

2.2 Data

We exploit pre-reform regional variations to evaluate the contribution of land reform on human capital accumulation, agricultural productivity, and structural transformation. Therefore, we collect land distribution before the reform, school enrollment rates before and after the reform, rice yield per land or household and industry distribution before and after the reform for each county.

First, we rely on the share of tenant land in the late 1930s to measure differential sizes of land reform shock in each county. We focus on the area of South Korea because we don't have information on outcome variables from North Korea. The data is hand-collected from agricultural statistics published by each of the eight provinces between 1935 and 1940. The average share of tenant land in 154 counties was 61% with a standard deviation of 13%. Appendix A.1 provides more information on data sources. Figure C1 shows the distribution of tenancy shares across countries in Korea.

Second, we collect the number of children in primary school in 1938 from *Chosŏn Jibang Jaejeong Yoram* (Chosŏn Chongdokbu, 1938) (Korea Local Government Finance Report[1]) and the number of primary school-age population from the 1935 Census for each county. It allows us to calculate primary enrollment rates before the land reform. We use the 1955 Census to calculate primary school enrollment rates after the land reform. The average primary school enrollment rate increased from 22% in 1938 to 61% in 1955. The number of students in secondary school before the land reform for each county is not known. However, in our calculation combining the 1935 Census and 1937 學事參考資料 (Academic Reference Materials), the secondary school enrollment rate in Korea (combining South and North Korea) is only 1.8%. In 1955, the average secondary school enrollment rate across counties increased to 23%. Appendix A.2 and A.3 provides further discussions on data sources.

Third, agricultural productivity is measured as rice output per hectare or rice output per household. Before the land reform, we collect rice yield, total area cultivated, and total number of households for each county from the survey in 1933 (Government of Colonial Korea, 1940). After the reform, we collect the same information from the 1960 Census (National Statistical Office of South Korea, 1960). Appendix A.4 provides further discussions on data sources.

[1]Joseon is the name of the dynastic kingdom of Korea that existed until the Japanese occupancy in 1910. During the Japanese occupancy, colonial Korea was typically referred as Choson, a Japanese pronounciation of Joseon.

Lastly, information on industry development at the county-level is limited, especially before the land reform. We rely on the list of companies published by a newspaper company in 1942 (Tongagyŏngjeshibosa, 1942) and by Korea Chamber of Commerce and Industry in 1957. It contains the name, address, and industry information for each company. Even though the lists were collected by a newspaper company or an association of firms, all large-sized companies are expected to be covered. The number of companies increased from 4,383 in 1942 to 7,658 in 1957. The average number of non-agricultural companies across countries increased from 24 to 44. Refer to Appendix A.5 for more information.

2.3 Land Reform and Schooling

We run the following regression to test the effect of land reform on primary school enrollment rates.

$$\Delta s_{cp}^{\text{primary}} = \alpha + \beta \text{Tenant Share}_{cp,\text{before}} + s_{cp,\text{before}}^{\text{primary}} + X_{cp} + \delta_p + \epsilon_{cp} \quad (1)$$

where $\Delta s_{cp}^{\text{primary}}$ is the change in primary school enrollment rate in county c in province p, and Tenant Share$_{cp,\text{before}}$ is the share of tenant farming in county c before the land reform. X_{cp} are county-level control variables. We include rice productivity and population growth rate as controls. δ_p are province-level fixed effects.

Because we don't have secondary school enrollment rates before the land reform, we rely on the secondary enrollment rates after the land reform, given that the rates were close to zero before the land reform. The regression becomes

$$s_{cp,\text{after}}^{\text{secondary}} = \alpha + \beta \text{Tenant Share}_{cp,\text{before}} + X_{cp} + \delta_p + \epsilon_i \quad (2)$$

where $s_{i,after}^{\text{secondary}}$ is the secondary school enrollment rate in county i after the land reform. We use the same control variables and province-level fixed effects.

Table 1 and 2 present the regression results of tenant shares on the change in primary school enrollment rates and secondary school enrollment rates after the reform, respectively. The effects on the change in primary school enrollment rates turn out to be positive, though it is only significant at the 10% level with paddy-fields tenant share. The effects on secondary enrollment rates are positive in all specifications and significant in two specifications. The land reform facilitated human capital accumulation by increasing primary and secondary school enrollment rates. One standard deviation (10 percentage points) higher tenant share was associated with a 0.3 to 1.0 percentage point increase in

Table 1: Regression of Tenant Shares on Change in Primary School Enrollment Rates

	Change in primary school enrollment rates		
	(1)	(2)	(3)
Tenant share (total)	0.069		
	(0.064)		
Tenant share (paddy-fields)		0.106*	
		(0.063)	
Tenant share (dry-fields)			0.030
			(0.057)
$s^{\text{primary}}_{cp,\text{before}}$	-0.508***	-0.515***	-0.485***
	(0.174)	(0.171)	(0.173)
log(Rice productivity)	0.055*	0.054*	0.059*
	(0.031)	(0.031)	(0.032)
Population growth rate (in logs)	0.021	0.020	0.022
	(0.028)	(0.028)	(0.028)
Observations	125	125	125
Province FEs	Yes	Yes	Yes
R-squared	0.620	0.626	0.617

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the regression of tenant shares on change in primary enrollment rates as in equation (1). Column 1 uses total tenant shares, column 2 uses tenant shares in paddy-fields, and column 3 uses tenant shares in dry-fields.

primary school enrollment rates and a 0.20-0.26 percentage point larger secondary school enrollment rates after the reform.

2.4 Land Reform and Agricultural Productivity

Next, we run the following regression to test the effect of land reform on agricultural productivity.

$$\Delta \ln \text{Prod}_{cp} = \alpha + \beta \text{ Tenant Share }_{cp,\text{ before}} + \ln \text{Prod}_{cp,\text{ before}} + X_{cp} + \delta_p + \epsilon_{cp}$$

Table 2: Regression of Tenant Shares on Secondary School Enrollment Rates after the Reform

	Change in secondary school enrollment rates		
	(1)	(2)	(3)
Tenant share (total)	0.110**		
	(0.051)		
Tenant share (paddy-fields)		0.122**	
		(0.051)	
Tenant share (dry-fields)			0.058
			(0.047)
log(Rice productivity)	0.016	0.017	0.020
	(0.026)	(0.025)	(0.026)
Population growth rate (in logs)	0.075***	0.074***	0.076***
	(0.023)	(0.023)	(0.023)
Observations	125	125	125
Province FEs	Yes	Yes	Yes
R-squared	0.417	0.422	0.401

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the regression of tenant shares on secondary enrollment rates after the reform as in equation (2). Column 1 uses total tenant shares, column 2 uses tenant shares in paddy-fields, and column 3 uses tenant shares in dry-fields.

where $\Delta \ln \text{Prod}_{cp}$ denotes the change in agricultural productivity, measured as rice yield per hectare or household. We use the same control variables as used in the school enrollment regressions and include province-level fixed effects.

Table 3 presents the regression result of tenant shares on the change in agricultural productivity, measured as rice yield per hectare and rice yield per household. The results from our preferred specification are in column 2, where we use the tenant share in paddy-fields, because our measure depends on rice. However, coefficients are positive and significant in other specifications as well. One standard deviation (10 percentage points) higher tenant share was associated with a 5 percentage point higher growth in rice yield per hectare and a 10 percentage point higher growth in rice yield per household.

2.5 Land Reform and Industrialization

We use the number of non-agricultural companies before and after the land reform as a proxy for the degree of industrialization in each county. We run the following regression to test the effect of land reform on primary school enrollment rates.

$$\Delta \ln N_{cp} = \alpha + \beta \text{Tenant Share}_{cp,\text{before}} + \ln N_{cp,\text{before}} + X_{cp} + \delta_p + \epsilon_{cp} \tag{3}$$

where $\Delta \ln N_{cp}$ is the change in the number of non-agricultural companies in county c at province p before and after the reform and Tenant $\text{Share}_{cp,\text{before}}$ is the share of tenant farming in county c before the land reform. X_{cp} are county-level control variables. As before, we include rice productivity and population growth rate as controls. δ_p are province-level fixed effects.

Table 4 presents regression results. The effects of land reform on industrialization are positive and significant. One standard deviation (10 percentage points) higher tenant share was associated with 16-17 percentage point further increase in the number of non-agricultural companies.

Taking stock, the empirical results indicates the land reform increased agricultural productivity, and facilitated human capital accumulation and movement of labor force out of agriculture. In the next section, we develop a quantitative model to synthesize these findings.

Table 3: Regression of Tenant Shares on Change in Agricultural Productivity

	Change in rice yield per hectare		
	(1)	(2)	(3)
Tenant share (total)	0.539***		
	(0.106)		
Tenant share (paddy-fields)		0.549***	
		(0.106)	
Tenant share (dry-fields)			0.363***
			(0.101)
$\ln \text{Prod}_{cp,\text{ before}}$	-0.900***	-0.892***	-0.891***
	(0.053)	(0.053)	(0.056)
Population growth rate (in logs)	0.046	0.044	0.052
	(0.048)	(0.047)	(0.050)
Observations	125	125	125
Province FEs	Yes	Yes	Yes
R-squared	0.753	0.754	0.728
	Change in rice yield per household		
	(1)	(2)	(3)
Tenant share (total)	1.137***		
	(0.263)		
Tenant share (paddy-fields)		1.078***	
		(0.271)	
Tenant share (dry-fields)			0.695***
			(0.239)
$\ln \text{Prod}_{cp,\text{ before}}$	-0.398***	-0.398***	-0.344***
	(0.067)	(0.068)	(0.068)
Population growth rate (in logs)	0.011	0.009	0.026
	(0.113)	(0.115)	(0.118)
Observations	125	125	125
Province FEs	Yes	Yes	Yes
R-squared	0.450	0.438	0.404

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the regression of tenant shares on secondary enrollment rates after the reform as in equation (2). Column 1 uses total tenant shares, column 2 uses tenant shares in paddy-fields, and column 3 uses tenant shares in dry-fields.

Table 4: Regression of Tenant Shares on Change in the Number of Non-agricultural Companies

	Change in the number of non-agri. companies		
	(1)	(2)	(3)
Tenant share (total)	1.623*		
	(0.961)		
Tenant share (paddy-fields)		1.708*	
		(0.865)	
Tenant share (dry-fields)			1.694*
			(0.958)
$\ln N_{cp,\text{before}}$	-0.220***	-0.216***	-0.224***
	(0.074)	(0.073)	(0.073)
log(Rice productivity)	-0.552	-0.597	-0.509
	(0.521)	(0.519)	(0.512)
Population growth rate (in logs)	1.216***	1.193***	1.208***
	(0.452)	(0.450)	(0.452)
Observations	109	109	109
Province FEs	Yes	Yes	Yes
R-squared	0.351	0.358	0.353

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the regression of tenant shares on the number of non-agricultural companies as in equation (3). Column 1 uses total tenant shares, column 2 uses tenant shares in paddy-fields, and column 3 uses tenant shares in dry-fields.

3 Model

The economy is populated with overlapping generations, where each generation lives for two periods: as children and as adults. Each generation is composed by a continuum of individuals. There are two sectors in the economy: agriculture and non-agriculture. We normalize price of non-agricultural good to one, and denote the relative price of the agricultural good by p. To simplify notations, we present the model in a recursive formulation and let a variable with a prime denote its value in the next period.

3.1 Technology

The agricultural good is produced by farms which use land (l) and labor $(z_a n)$ as inputs:

$$y_a = A_a(z_a n)^{1-\gamma} l^{\gamma}$$

where A_a is the agricultural sector TFP, z_a is the farmer's ability of operating the farm and γ governs the return to scale. We assume that the agricultural productivity z_a is independently drawn from a Pareto distribution with the shape parameter α_z. Following Chen (2017), we assume that farmers do not hire any labor from the labor market, and the labor input of a farm is inelastic and hence normalized to one (i.e., $n = 1$).

The economy is endowed with fixed amount of L land units, which is exogenously distributed across households, reflecting the highly unequal distribution of land ownership in the pre-reform economy. Specifically, land endowment takes the form of $l = (1 - x)\tau$. The Bernoulli(p_l) random variable x controls the extensive margin of land ownership, while $\tau \sim$ LogNormal(μ_l, σ_l) determines the intensive margin of land sizes. Separately modelling the extensive and intensive margins of land endowment is necessary to generate the substantial fraction of landless households in the pre-reform economy.

Landownering farmers can use their land for agricultural production or, if they are not using the land, rent it out through the land rental market at rental rate r^l. When using their own land, farmers do not pay anything. In this setting, tenants (or tenancy farmers) are defined as landless farmers who rent in the land.

The nonagricultural good is produced by a representative firm, which uses labor as input:

$$Y_n = A_n H_n$$

where A_n is the nonagriculture-sector specific productivity. H_n is an aggregate efficiency unit employed in the nonagricultural sector that will be defined in detail later.

3.2 Profit Maximization

Given the rental rate of land r^l and the price of agricultural good p, a farmer with productivity z_a and land holding l^e choose the demand for land, l, by solving the following profit maximization problem:

$$\max_{l} \quad pA_a(z_a n)^{1-\gamma} l^{\gamma} - r^l(l - l^e)$$

The term $r^l(l - l^e)$ demonstrate that if the amount of land used for production l is smaller than l^e, then the remaining part can be rented out for capital income. This extra income further generates heterogeneity among farmers with different land endowment.

The profit maximization problem of the representative firm in the nonagricultural sector is given as follows:

$$\max_{H_n} A_n H_n - wH_n$$

where w is the wage per efficiency unit of labor.

3.3 Schooling and Human Capital

Parents choose education investment in their children through sending them to school, which determines the human capital of the children once they are adults. The schooling system consists of primary (P) and secondary (S) school, and parents choose the schooling level of their children.

Each school increases the human capital of each child deterministically by η_s, where $s \in \{P, S\}$. The actual amount of human capital children acquire depends also on the child's learning ability, θ_k. The human capital of a child with ability θ and schooling s is summarized by

$$h'_k = \begin{cases} \theta_k \eta_S \eta_P h_k & \text{if } s = S \text{ (secondary education)} \\ \theta_k \eta_P h_k & \text{if } s = P \text{ (primary education)} \\ h_k & \text{if } s = N \text{ (no education)} \end{cases}$$

Sending children to school is also costly. The cost encompasses not only the various costs (e.g., school fees, school uniform, meals, etc.) but also the opportunity cost of forgone child labor. We model the schooling costs as κ_p for primary schooling and κ_s for secondary schooling.

Following Cunha and Heckman (2007) and subsequent literature on childhood human capital accumulation, we interpret ability to be a function of inherited capabilities and parental inputs. In particular, the learning ability within a household follows a AR(1) process:

$$\log \theta_k = \rho_\theta \log \theta_p + \varepsilon_\theta$$

where ε_θ is an indiosyncratic i.i.d. ability shock, which follows $N(0, \sigma_\theta^2)$. Therefore, learning abilities are inherited across generations but only imperfectly.

3.4 Preferences

We specify the utility function of parents, as children make no choices but residing with their parents. Parents' utility depends on consumption expenditures on agricultural (c_a) and non-agricultural goods (c_n). Following Herrendorf, Rogerson and Valentinyi (2021) and Ngai, Olivetti and Petrongolo (2024), we assume a log-CES preference with subsistence consumption of agricultural good. A parent's instantaneous utility is given as $U_t = \log C_t$, where C_t is the composite consumption good defined as follows:

$$C_t = \left[\omega_a \left(c_{at} - \bar{c}\right)^{\frac{\varepsilon-1}{\varepsilon}} + \left(1 - \omega_a\right) c_{nt}^{\frac{\varepsilon-1}{\varepsilon}}\right]^{\frac{\varepsilon}{\varepsilon-1}}$$

where ε is the elasticity of substitution between agricultural and non-agricultural goods and ω_a is the utility weight on agricultural consumption. The parameter $\bar{c} > 0$ represents the subsistence requirement, which implies the income elasticity of agricultural good is below one and hence generate non-homotheticity. This preference ensures Engel's Law holds and helps us match the high agricultural employment share when income is low.

3.5 Education and Occupation Choice

The timing within a period is as follows. Parents enter the period endowed with land l and human capital h. They draw their agricultural productivity z_a and observe their children's learning ability θ_k. The parents then makes decisions on occupation, consumption, and the level of education their children receive. Given these timing assumptions, the value function of a parent conditional on becoming a farmer is defined as follows:

$$\begin{aligned}
\mathcal{V}_F &= U(h, z_a, \theta, l^e) + \delta \mathbb{E}\left[\mathcal{V}(h', z_a', \theta', l^e)\right] \\
\text{s.t.} \quad & pc_a + c_n + \kappa_P \mathbf{I}_{(s=P)} + (\kappa_P + \kappa_S)\mathbf{I}_{(s=S)} = pA_a z_a^{1-\gamma} l^\gamma - r^l(l - l^e)
\end{aligned}$$

where $s \in \{N, P, S\}$. The value of being a worker is defined in a similar way:

$$\mathcal{V}_F = U(h, z_a, \theta, l^e) + \delta \mathbb{E}\left[\mathcal{V}(h', z_a', \theta', l^e)\right]$$
$$\text{s.t.} \quad pc_a + c_n + \kappa_P \mathbf{I}_{(s=P)} + (\kappa_P + \kappa_S)\mathbf{I}_{(s=S)} = wh + r^l l^e$$

Parents compare the values of two occupations and choose the one with the higher value:

$$\mathcal{V}(h, z_a, l, \theta_k) = \max\left\{\mathcal{V}_F(h, z_a, l, \theta_k), \mathcal{V}_W(h, z_a, l, \theta_k)\right\}$$

As seen from the value functions, we model intergenerational altruism as in (Becker and Barro, 1988), where parents care about the utility of their children. In other words, we assume that children's utility is evaluated using the same utility function with the altruistic weight δ. The dynastic altruism gives parents incentive to invest in their children's education, at the expense of their own consumption.

3.6 Equilibrium

We focus on a balanced growth path of the economy where the distribution of households' state variables remain constant over time. To save notations, define the vector of individual state variable (h, z_a, l, θ_k) as $\mathbf{X}$ and let $\mu(\mathbf{X})$ be the distribution of the state variables. The recursive competitive equilibrium consists of:

1. Parents' value function $\mathcal{V}(\mathbf{X})$ and policy functions $c_a(\mathbf{X}), c_n(\mathbf{X}), s(\mathbf{X})$, and $l(\mathbf{X})$.
2. Price for agricultural good p and rental rate for land r^l.

such that

1. The value function $\mathcal{V}(\mathbf{X})$ and policy functions $c_a(\mathbf{X}), c_n(\mathbf{X}), s(\mathbf{X})$, and $l(\mathbf{X})$ solve the parents' utility maximization problem conditional on p and r^l
2. The representative non-agricultural sector firm maximizes the profit
3. Goods and land rental markets clear

$$\int c_a(\mathbf{X})\mu(\mathbf{X}) = A_a \int_{o=F} z_a^{1-\gamma}(l^d)^\gamma \mu(\mathbf{X})$$
$$\int c_n(\mathbf{X})\mu(\mathbf{X}) = A_n \int_{o=W} h\mu(\mathbf{X})$$
$$L = \int_{o=F} l\mu(\mathbf{X})$$

3.7 Inspecting the Mechanism

Figure 1 illustrates how a farmer's education choice varies by the amount of land she is endowed with. The x-axis represents the child's learning ability draw, and the y-axis is the farmer's agricultural productivity. For each pair of learning ability and agricultural productivity, which translates into income. The color represents the optimal choice of child's school level, with darker colors meaning higher levels of education.

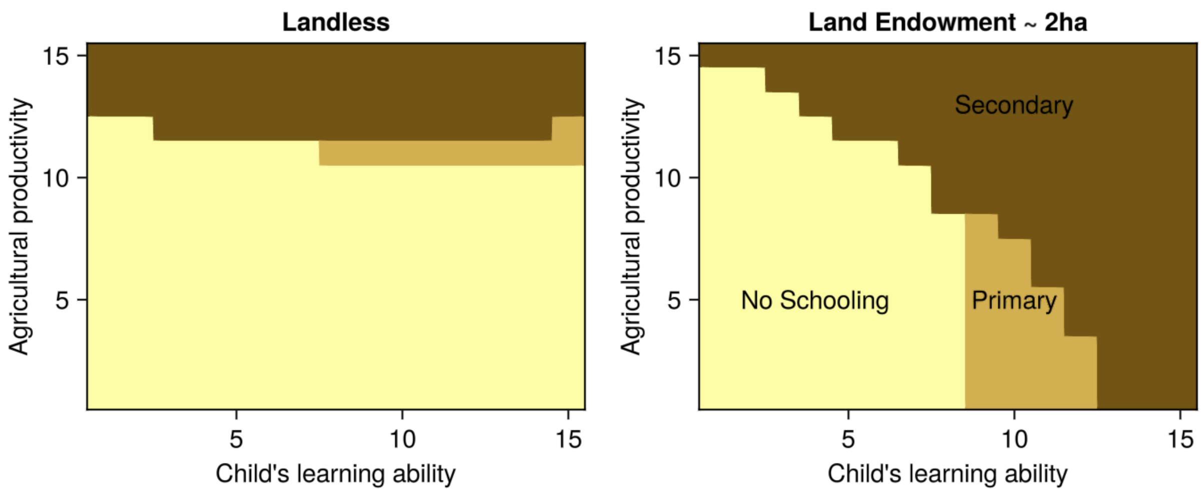

Figure 1: Education Policy of Farmers

The two panels of Figure 1 contrast the education policy for landless and land-endowed households. The right panel shows that households choose the level of education for their children largely on the basis of the child's learning ability; children with higher learning ability tends to receive more education. This is intuitive, because higher learning ability raises the returns to education.

However, the left panel of Figure 1 highlights that for landless households, those with low agricultural productivity are less likely educate their children *regardless of* their learning ability. In other words, landless households prefer using the income for their own consumption, over investing it into the future generation's human capital. This implies low aggregate stock of human capital when the majority of the households are either landless or have little land holdings.

The education policy rule demonstrates how the macroeconomic consequences of land reform on human capital accumulation and structural transformation depends on how the land is redistributed across households. If the land is redistributed in a way that largely raises the income for the landless households, one should expect the reform to have a positive effect on educational attainment. On the other hand, if the reform did not favor the landless households or the income gain was too small, it may not induce the increase in educational attainment. In the next section, we use a calibrated version model to assess the quantitative implications of the land reform.

4 Calibration

We now parameterize the model and use it to assess the impacts of land reform on agricultural productivity, human capital investment, and the sectoral reallocation of labor. Specifically, we calibrate the benchmark economy to pre-reform Korea, guided by the data from Section 2. The calibration proceeds in two steps. First, some parameter values are chosen externally based on direct data counterparts or related literature. Second, the remaining parameters are chosen to match relevant data moments to discipline the quantitative importance of mechanisms through which the land reform affects human capital, agricultural productivity, and the sectoral labor allocation.

4.1 Externally Calibrated Parameters

Table 5 summarizes the externally calibrated parameters. One model period corresponds to 25 years in reality, so that two periods roughly correspond to a life span of a generation. Agricultural TFP is normalized to one. The parameter ω, representing the utility weight on the agricultural consumption, is normalized to 0.5. The land income share γ is set to one-half, reflecting that the tenant's share of revenue was 50% in a typical tenancy contract in Korea.[2]. For the intergenerational altruism factor δ, we assume that parents fully internalize their children's future utility, but discount it by annual discount factor of 0.99. With one period being 25 years, the number for δ roughly corresponds to 0.75. The parameter μ_l, which governs the mean of the land endowment distribution, is also normalized to zero. Lastly, we take the elasticity of substitution between sectoral consumption goods, ε, from Herrendorf et al. (2021), which estimated a near-Leontief utility between agriculture and non-agricultural consumption.

4.2 Internally Calibrated Parameters and Model Fit

The remaining 12 parameters, $A_n, \bar{c}, \kappa_P, \kappa_S, \eta_P, \eta_S, \sigma_z, \rho_\theta, \sigma_\theta, p_l, \sigma_l, L$ are jointly calibrated to match twelve targeted moments. We choose parameters to minimize the distance be-

[2] It is also consistent with the estimated parameters in Valentinyi and Herrendorf (2008)

Table 5: Externally Calibrated Parameters

Parameter	Description	Value	Source
A_a	Agriculture sectoral TFP	1	Normalization
ω	Utility weight on agri. consumption	0.5	Normalization
γ	Land income share	0.5	Tenant's share of output (50%)
δ	Intergenerational altruism	0.75	Annual discount factor 0.99
μ_l	Lognormal mean of initial land draw	0.0	Normalization
ε	Elasticity of substitution b/w sectoral goods	0.01	Herrendorf et al. (2021)

tween the data and their counterparts generated by the model. These moments are reported in Table 6, and Table B1 reports the value of calibrated parameters. While all the parameters will jointly determine the model's ability to match the data, each set of parameters is discussed in conjunction with their most closely associated data targets to help build intuition.

Table 6: Targeted Moments in the Model and Data

Moments	Data	Model
Agricultural employment share	79.2%	71.3%
Pre-reform primary enrollment rate	19.9%	22.8%
Pre-reform secondary enrollment rate	1.8%	7.9%
Primary school premium	90.0%	90.3%
Secondary school premium	60.0%	54.9%
Intergenerational education correlation	0.25	0.26
Average farm size (hectare)	1.19	1.14
Farm size distribution	See Figure	
Pre-reform top 1% income share	17.0%	6.4%
Share of tenancy farmers in agriculture	76.6%	82.1%
Land ownership distribution coeff. of variation	1.13	1.16
Expenditure share of subsistence consumption	33%	43%

Note: This table reports the targeted moments in the calibration and their values in the calibrated model

Recall that, to account for the unequal distribution of land ownership as well as the substantial fraction of landless households in the pre-reform era, the model allows both extensive and intensive margins of land ownership. The two associated parameters, $\{p_l, \sigma_l\}$, are jointly tuned so that the model replicates (i) the share of tenancy farming within agriculture of 76.6% and (ii) the coefficient of variation of land ownership distribution of 1.13, calculated from the 1942 Korean Economic Yearbook (ŭnhaeng, 1942).

Another set of parameters, $\{\kappa_P, \kappa_S, \eta_P, \eta_S\}$, affects parents' education decision. The cost of primary and secondary education, κ_P and κ_S, respectively, and the returns to education parameters, η_P and η_S, jointly affects both enrollment and premium of primary and secondary education. The school enrollment rates are calculated from 1935 Census. Cha, Hwang and Lee (2014) estimate skill premium in the Korean financial industry from 1922-1944 using personnel records left by the Development Bank of Colonial Korea, and report 90% and 60% of primary and secondary education premia. Given that primary and secondary schools ran for six and three years in 1930s, the numbers translates to 15% returns to additional years or primary education, and 20% for secondary education. The top four rows of Table 6 summarize the model fit on the education dimension. To be consistent with how the skill premium is calcualted in the data, we also calculate the average ratio of wage income among the non-agricultural workers in the simulated data.

The standard deviation of the agricultural productivity distribution, σ_z, is is disciplined to match the size distribution of farms. We choose $\sigma_z = 1.11$, to match the pre-reform size distribution reported in 1938 Korean Economic Yearbook (Bank of Chōsen, 1938), as shown in Figure 2.

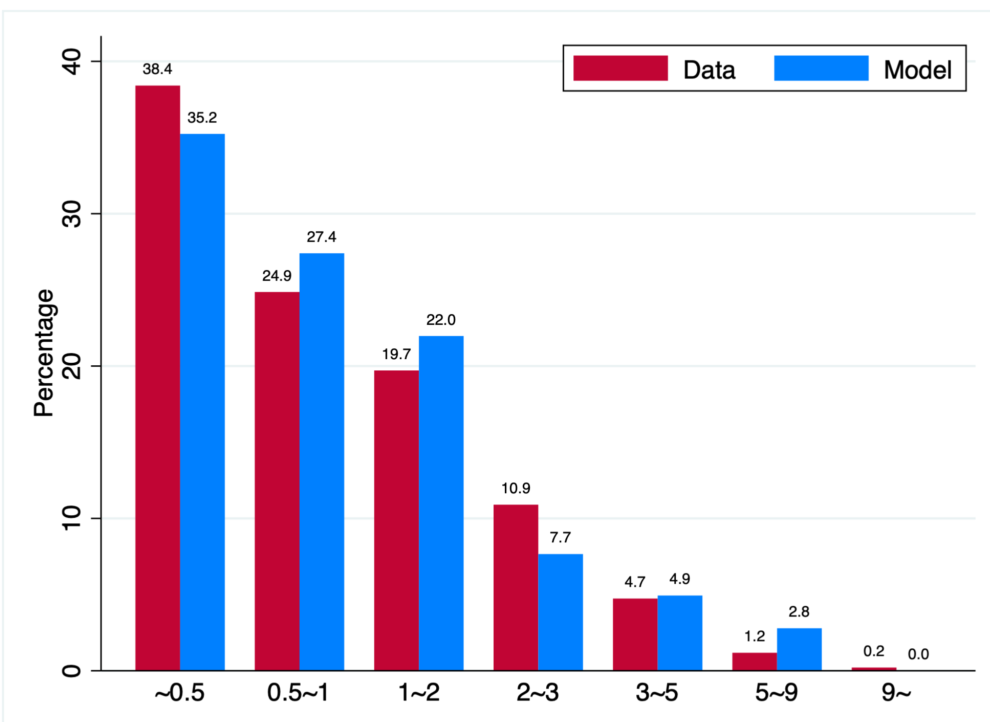

Figure 2: The Size Distribution of Farms

Among the remaining parameters, σ_θ and ρ_θ govern the dispersion and intergenerational persistence of the learning ability draws. They are disciplined to match income inequality and intergenerational correlation of educational attainment, respectively. We choose $\sigma_\theta = 0.33$ so that the model generates the top 1 percent share of income of 17%, calculated using the first wave of the Survey on the Inequality and Justice of Korean Society (Seok, Cha, Hong, Kim, Sohn and Chung, 2004). The persistence parameter, ρ_θ is calibrated at 0.65, so that the likelihood that children born to parents that have primary or above level of education to also attain primary or above level of education is 0.25.

Lastly, the level of subsistence agricultural consumption requirement, $\bar{c}$, and the relative TFP of the non-agricultural sector, A_n, are jointly calibrated to match the agricultural employment share and the expenditure share of subsistence consumption. The resulting parameter $\bar{c}$ implies the subsistence consumption need is 43% of the average income. Although there is no direct data counterpart of this number, it is consistent with estimates of the size of the subsistence consumption requirement in developing countries. Specifically, Rosenzweig and Wolpin (1993) use panel data from rural households in India and estimates that around 33% of the average income is used for subsistence consumption. Without comparable measure in Korea in the 1930s, we use 33% as our target for calibration.[3]

5 Quantitative Results

We now use the calibrated model to quantify the aggregate consequences of land reform on human capital accumulation and sectoral allocation of labor. To simplify the computation, we first consider a partial equilibrium effects by fixing the price to the pre-reform level. In other words, we solve for the market-clearing price for agricultural good p and the rental rate for land r^l at the pre-reform balanced growth path, and do not allow p to adjust after the reform.

5.1 Implementation of the Land Reform in the Model

The land reform in South Korea is characterized by several distinctive features. The Korean government bought above-ceiling (3 hectare) farmlands at forced prices and re-sold it to farmers at below-market rates. To reflect the restrictive ceiling of 3 hectares on land holdings and the fact the redistribution aimed to provide tenancy farmers with the land

[3] Ngai et al. (2024) adopts a similar, model-based approach and reports subsistence consumption requirement was about a third of agricultural output in the U.S. in the 1950s.

ownership on the farms they were already cultivating, we impose the same ceiling on land (3 hectares per household) and redistribute the forfeited land ti the landless tenancy farmers, with the amount of land each farmer receives depending on their pre-reform farm sizes. In other words, those who were operating larger farms before the reform received larger amount of land from the reform. The land awarded to each farmer under the reform is treated as an endowment.

When taking over the above-ceiling farmland from the landlords, the Korean government also compensated the land owners for 150% of average annual production, paid over five years. While the 150% of average annual product is well below the market price of land, the compensation must have protected the landowners from losing a vast portion of their wealth. In the model, we reflect this compensated forfeiture by also compensating the landowners for 150% of average annual revenue per land, evaluated by the equilibrium price at the time of the reform.

Lastly, the reform also banned farmland ownership by non-farmers and hence eliminated tenancy farming.[4] To reflect this feature, we model that the landlords who were not working in the agricultural sector had their entire land forfeited, while only the above-ceiling portion was subject to forfeiture for those working as farmers themselves (and renting out the excess land). We also eliminate the land rental market after the reform, so the farmers who receive the land cannot rent out the land through the rental market.

5.2 Aggregate Consequences of Land Reform

5.2.1 Human Capital and Structural Transformation

Table 7 summarizes the impact of the land reform on the human capital (educational attainment) and sectoral allocation of labor of the next generation. Compared to the pre-reform balanced growth path, the generation who were young when the reform took place receive more educational investment and hence have higher primary and secondary school completion rates. The higher educational attainment induces more workers in the subsequent generations to sort into the non-agricultural sector, resulting into lower agricultural employment share. In summary, the results suggest that the land reform contributed to structural transformation by stimulating human capital investment.

Table 8 shows how the policy's impact varies with the pre-reform land ownership status. The comparison shows that the human capital accumulation effects of the reform largely

[4]The reform aimed to eliminate so called *absentee landlords*, the landlords who are not residing in the village nor working in the agricultural sector, which was prevalent in the pre-reform periods.

Table 7: Effects of Land Reform on Human Capital Accumulation and Labor Allocation

	Pre-Reform	Post-Reform
Agricultural employment share	71.3%	52.1%
Primary school enrollment rate	22.8%	33.2%
Secondary school enrollment rate	7.9%	25.3%

stem from the higher educational investment from the previously landless households. As shown in the first column, primary education increased disproportionally from the previously landless households, who were likely to be too poor before the reform and hence did not consider educational investment profitable. Indeed, the reform raises the income by 133% for the previously landless households, allowing them to invest part of their additional income into paying schooling costs.

On the other hand, the second column of Table 8 shows that the reform was a large negative income shock for the households who owned land. Their income goes down by 33% post reform, even with the compensation from the forfeiture. As a result, there is little change in the share of households sending their children to primary school. However, the increase in secondary enrollment from the landed households is quantitatively similar to that of the landless households. One reason is the deprivation of land makes investment in human capital more attractive, since now these households do not have an option to pass over their wealth to the next generation in the form of land.

Table 8: Heterogeneous Effects of the Reform by Pre-Reform Land Ownership Status

	Landless (48%)	**Landed** (52%)
Income gain from reform (%)	**133.3**	**-33.1**
Pre-reform, % Primary Enrollment	14.9	30.1
Post-reform, % Primary Enrollment	34.7	31.8
Pre-reform, % Secondary Enrollment	9.1	6.8
Post-reform, % Secondary Enrollment	26.5	24.3

5.2.2 Agricultural Productivity

While the previous section focused on the longer-run effects of the land reform by focusing on the outcomes of the next generation, this section investigates the instantaneous effects of the land reform on agricultural productivity. Table 9 shows the effect of land reform on agricultural employment share and productivity, and the distribution of farms. To be consistent with the measure of agricultural productivity in the data (rice yield per land), agricultural productivity in the model is calculated as agricultural output per land, and averaged across farmers.

Table 9: Effects of Land Reform on Agricultural Productivity

	Pre-Reform	Post-Reform
Agricultural productivity	1 (Normalized)	1.06
Average farm size	1.14	1.11
Variance farm size	1.57	0.79

The results show that the reform increases agricultural productivity by 6% while reducing the average farm size by 3%. The reduction of the average farm size stems from the restrictive ceiling (3 hectare per household) imposed by the reform. Figure 3 compares the distributions of farm size before and after the reform. As shown in the figure, the reform eliminates the above-ceiling size farms, while increasing the fraction of smallholder farms in turn. Such pattern is consistent with the change in the farm size distribution in reality, as illustrated in Figure C3. As a result, the dispersion in farm size is reduced significantly, as indicated by the variance of farm size being reduced by half.

Despite the reduction in the average farm size, agricultural productivity measured by output per land increases on average in response to the reform. The increase in agricultural productivity reflects a better allocation of land among farmers. Since the redistribution of land was proportional to the pre-reform demand for land, landless farmers with high agricultural productivity (and hence, renting in more land before the reform) receive bigger portion of land.

5.3 Importance of Forfeiture and Redistribution Rules

In the baseline simulation, we replicated the land reform in Korea by redistributing the forfeited land to the landless farmers based on their pre-reform farm sizes. In this section,

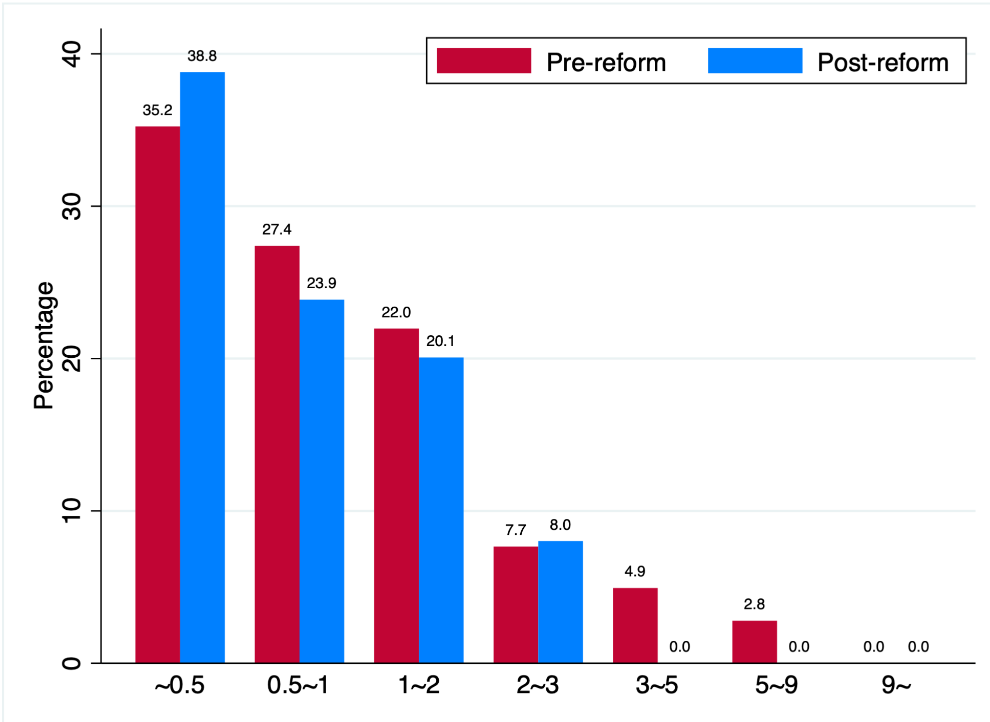

Figure 3: The Size Distribution of Farms, Pre- vs. Post-Reform

we examine the alternative modes of land reform by simulating different forfeiture and distribution rules. The first is a reform with uncompensated forfeiture, where the government takes over the excess land without paying to the landlords. The second is an equal distribution rule, where the redistribution of excess land is equal across all landless households. The computational results are reported in Table 10.

Table 10: Effects of Alternative Land Reforms

	Baseline	**Without Compensation**	**Equal Re-distribution**
Δ% Agricultural Productivity	6.1	6.1	-14.0
Δ%p Primary Enrollment	10.4	9.8	19.6
Δ%p Secondary Enrollment	17.3	17.2	24.2

It is not surprising that when there is no compensation for the forfeited land, households owning land before the reform experience even larger drop in their income. As a result, fewer households among them choose to send their children to school. As shown in the Table 10, the expansion of primary and secondary school enrollment rates are both small than the baseline simulation. Agricultural productivity growth is unaffected, since the redistribution rule remains unchanged under this counterfactual reform.

In contrast, the third column highlights that the change in agricultural productivity is more sensitive to how the collected land is redistributed across landless households. When the excess land is redistributed equally regardless of the pre-reform farm sizes, agricultural productivity drops by 14 percent. It is clear that the coercive, equal redistribution of land is not able to replicate the increase in agricultural productivity observed in the data. However, the results suggest that the equal redistribution reform might have increased the educational attainment even further. The reason is the equal redistribution rule gives out larger amount of land to farmers with low agricultural productivity, enabling them to afford sending children to school. However, this positive results in education should be interpreted with caution, as the large drop in agricultural productivity signals potentially large increase in agricultural price in general equilibrium, which is not considered in the current exercise.

6 Conclusion

This paper studies the effects of a large-scale nationwide land reform in 1950s Korea on human capital accumulation, agricultural productivity, and structural transformation using a quantitative model and historical data. We first collect county-level data on the prevalence of tenancy farming, school enrollment, and industrialization in both pre- and post-reform periods. We use the regional variations in the prevalence of tenancy farming in the pre-reform periods as a proxy for the intensity of the land reform, and evaluate the effects of the land reform.

Guided by the empirical evidence, we develop a quantitative overlapping generations model in which the initial unequal distribution of land creates misallocation of resources. Lowered income due to such inefficiency subsequently lowers parents' educational investment in children due to lowered income. We show that in the model, land reform increases average farm size and agricultural productivity by allocating lands to more productive farmers. The model also suggests that the land reform stimulated human capital investment, hence contributing to the structural transformation by equipping the younger generations with higher human capital and allowing them to enter the non-agricultural sector.

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Farm size distribution for 1942.

A Data Appendix

A.1 Share of Tenant Land

The share of tenant land (rice paddies (답), dry paddies (전) and total (총)) serves as the independent variable for this study. Data are collected from agricultural reports of the 8 provinces, all of which are issued by the Chosŏn Chongdokbu. For instance, in the case of Gyeonggi-do, detailed statistics are sourced from the “Gyeonggi-do Nongsa Tonggye" report of 1940. Similarly, data for Gangwon-do, Chungcheongnam-do, Chungcheongbuk-do, Gyeongsangnam-do, Gyeongsangbuk-do, Jeollanam-do, and Jeollabuk-do are sourced from respective publications from the late 1930s and early 1940s. All numbers are collected at the prefecture (부군, 府郡) level, for 154 prefectures in total.

English Title	Korean Title	Japanese Title	Year	Pages
Gyeonggi-do Nongsa Tonggye	경기도 농사통계	京畿道 農業統計	1940	21-22
Gangwon-do Nongeop Tonggye	강원도 농업통계	江原道 農業統計	1937	2-3
Chungcheongnam-do Nongeop Tonggye	충청남도농업통계	忠淸南道 農業統計	1938	11
Chungcheongbuk-do Nongeop Tonggye	충청북도 농업통계	忠淸北道 農業統計	1937	10
Gyeongsangnam-do Dose Gaeram	경상남도 도세개람	忠淸北道 農業統計	1939	76
Gyeongsangbuk-do Dose Ilban	경상북도 도세일반	慶尚南道 道勢概覽	1939	42-44
Jeollanam-do Nongeop Tonggye	전라남도 농업통계	全羅南道 農業統計	1938	19
Jeollabuk-do Nongeop Tonggye	전라북도 농업통계	全羅北道 農業統計	1935	2-3

Table A1: Sources of tenant land data by region

The process of calculating the share of tenant land involves manual extraction from primary sources, a method necessitated due to observed calculation errors in the original figures. Taking Gyeonggi province as an example, data are extracted from the bottom half of “Table 6. Area by Landed Farmers and Sharecroppers" (Figure A1) from the aforementioned source material. The four columns on the bottom half of the left page indicate “Non-tenant land of landed & sharecroppers," “Tenant land of landed & sharecroppers", “Non-tenant land of landed farmers," and “Tenant land of sharecroppers." Numbers pertaining to rice paddies and dry fields are recorded separately in each of the subcolumns. The share of tenant land is calculated through the division of the total sharecropping area by the total farming area, the latter of which is calculated by the sum of sharecropping and landed farmer areas. Similar methodologies are applied to other provinces.

$$Share\ of\ tenant\ land = \frac{Total\ tenant\ land}{Total\ farming\ land} \tag{4}$$

where $Total\ tenant\ land$ = (Tenant land of landed & sharecroppers) + (Tenant land of sharecroppers) and $Total\ farming\ land$ = (Tenant land of landed & sharecroppers) + (Tenant land of sharecroppers)+(Non-tenant land of landed & sharecroppers) + (Non-tenant land of landed farmers).

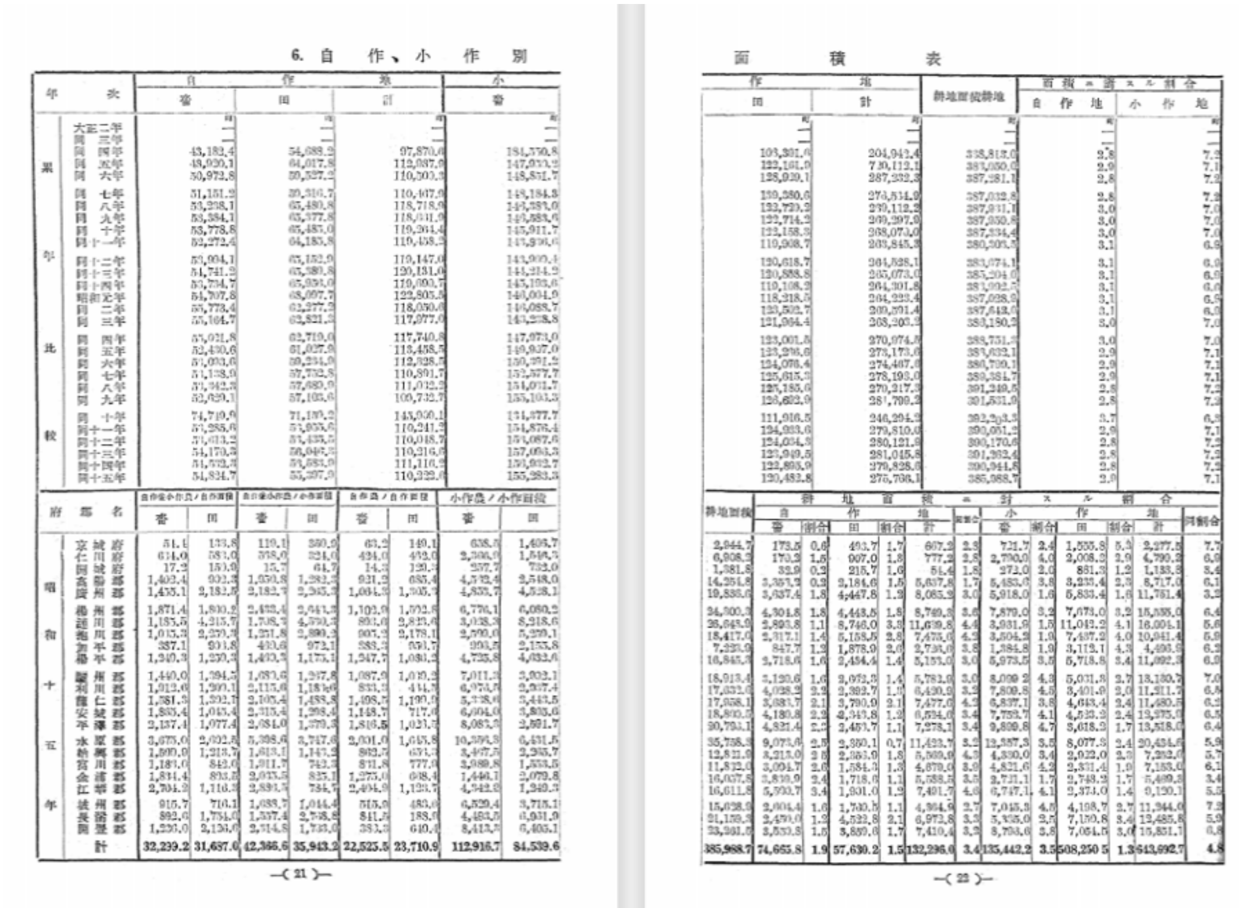

Figure A1: Farming land data from *Gyeonggi-do Nongsa Tonggye*

A.2 School Enrollment Rate

Regarding school enrollment rates, numbers are retrieved from the “Chosŏn Jibang Jaejŏng Yoram" publication of 1938 issued by the Chosŏn Chongdokbu. Numbers are provided for 143 prefectures (부군, 府郡). For reasons unknown, numbers for the 11 Bu (부, 府)’s are not available.

From the primary source,“Table 1. 각도학교비별일람표, 各道學校費別一覽表"" from “Section 8. School Expenses (학교비 일람표, 學校費一覽表)," pp.212-222 is used. Taking Figure A2 as an example, which contains data for Gyeonggi-do and Chungcheongbuk-do,

214 學校費一覽表

2 各道學校費

		邑面數	普通學校數	普通學校學級數	普通學校兒童數	歲入 財產收入	歲入 使用料及手數料	歲入 繰越金
					人	円	円	円
京畿道	抱川郡	12	12	41	2,830	303	15,156	800
	加平郡	6	6	18	1,295	170	7,394	4,004
	楊平郡	12	12	45	3,317	760	16,522	5,000
	驪州郡	10	11	44	3,508	1,414	16,899	7,800
	利川郡	11	11	53	4,022	304	21,876	1,500
	龍仁郡	12	12	61	4,399	108	25,011	7,000
	安城郡	12	13	67	4,963	1,012	26,566	65,043
	平澤郡	10	10	52	4,010	199	21,289	44,088
	水原郡	20	22	112	8,159	2,849	41,930	8,000
	始興郡	8	8	40	3,054	401	17,355	1,324
	富川郡	14	14	57	4,052	373	20,194	4,000
	金浦郡	9	9	40	2,860	222	14,580	2,500
	江華郡	13	13	59	4,171	1,420	21,460	4,462
	坡州郡	10	11	44	3,151	106	16,460	6,000
	長湍郡	10	10	43	3,166	305	17,170	9,516
	開豊郡	14	15	58	4,600	748	22,669	2,400
	合計	236	243	1,060	78,165	13,798	411,131	184,931
忠清北道	清州郡	17	18	114	8,612	3,653	52,107	1,700
	報恩郡	10	11	47	3,481	501	16,208	4,055
	沃川郡	9	9	52	3,745	478	18,890	3,188
	永同郡	11	11	57	4,189	2,597	22,790	3,000
	鎭川郡	7	7	37	2,591	456	11,339	9,900
	槐山郡	14	14	63	4,654	1,059	21,987	6,561
	陰城郡	9	9	47	3,491	404	17,633	10,200
	忠州郡	13	14	70	5,381	465	29,506	3,594
	堤川郡	9	9	41	2,947	650	14,192	5,000
	丹陽郡	7	7	36	1,787	253	7,231	731
	合計	106	109	554	40,978	10,516	211,889	47,999

Figure A2: Enrollment rates from *Chosŏn Jibang Jaejeong Yoram*

numbers are retrieved from the fourth column, where the number of children in primary school (보통학교아동수, 普通學校兒童數) are recorded.

A.3 Census Data (1935, 1955)

Population census data describing the education levels for individuals by age, gender, and region were downloaded from the KOSIS website (kosis.kr). The primary sources are "Chosŏn Guksejosa (조선국세조사, 朝鮮國勢調査)" for 1935 and "Kani'ingu chongjosa (간이인구총조사)" for 1955.

A.4 Rice Output and Area Cultivated

Prefecture-level data on rice output and the area cultivated are sourced from "Nongka Gyŏngje Kaehwang Chosa" (농가경제개황조사, 農家經濟槪況調査), published by the Government of Colonial Korea in 1940. In an effort to evaluate the effectiveness of its pro-peasant tenancy reform in 1934, the surveys were carried out in 1933 and 1938, collecting data from 3,587 rural households, including 1,728 tenant farmers and 1,859 part-owner farmers. The findings were published in 1940, providing valuable insights into peasants' consumption and production behavior during a period of significant agrarian distress.

The survey is published in two volumes: the first contains information on tenant farmers, and the second focuses on part-owner farmers. Total numbers for rice output and area cultivated for all farmers were thus calculated by aggregating the data from both volumes according to the tenancy rates. The pages from which data are retrieved for both volumes on each province are as follows: Gyeonggi-do (pp.148-149), Gangwon-do (pp.176-177), Chungchŏngnam-do (pp.166-167), Chungchŏngbuk-do (pp.160-161), Gyŏngsangnam-do (pp.134-135), Gyŏngsangbuk-do (pp.120-121), Jeollanam-do (pp.106-107), Jeollabuk-do (pp.96-97). From these pages, the columns "Farming Area (作村面積)" and "Output (生高)" for rice under the "Agricultural Output (農作物生高)" column were retrieved for the years 1933 and 1938 respectively, as shown in Figure A3.

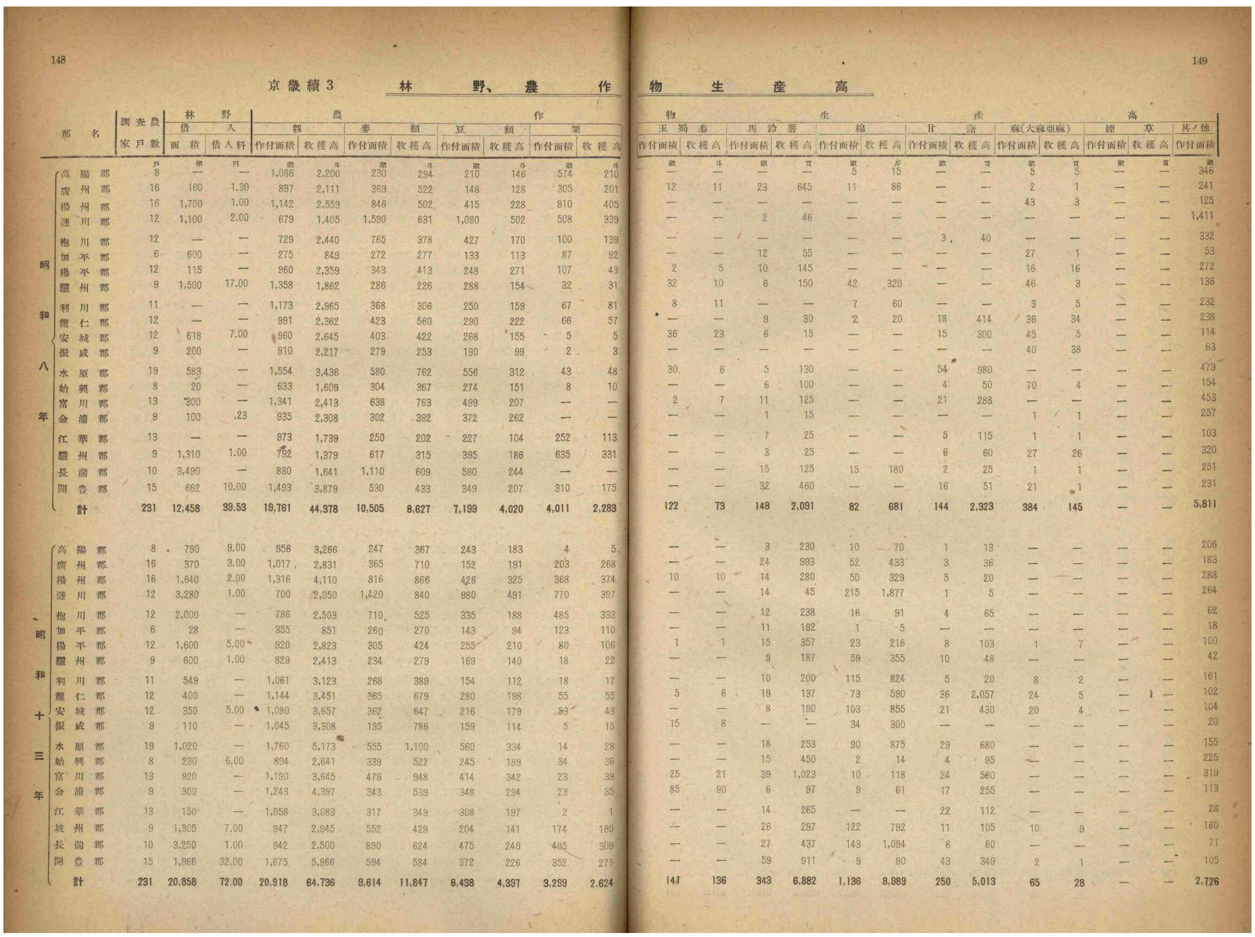

Figure A3: Rice output and area cultivated from *Nongka Gyŏngje Kaehwang Chosa*

The data for rice output and area cultivated in 1960 are drawn from the South Korean agricultural censuses (농림어업총조사), which can be accessed online through the website of National Statistical Office of South Korea (KOSIS).

To ensure consistency across datasets, the units are standardized as follows. For area cultivated, the unit in the 1940 source was "mu(畝)" (1 mu = 30 pyŏng), while the unit in the

1960 source was “dan(段)" (1 dan = 300 pyŏng). Given that 1 hectare(ha) is equivalent to 3,000 pyŏng, all area measurements are standardized to hectares (ha). As for rice output, the unit is standardized to litre(L), As the unit in the 1940 source is “du (斗)," where 1 du = 18L, the numbers are adjusted accordingly to match the 1960 dataset.

A.5 Number of Companies per Industry

Another dependent variable pertains to the number of companies per industry, in the years 1942 and 1957. The data sourcing process for this variable involves accessing the “Korean Modern and Contemporary Corporate Association Database" hosted on the National Institute of Korean History’s website, a comprehensive repository of information regarding enterprises during the Japanese occupation period and the immediate aftermath of liberation.

Pre-liberation data are sourced from the publication of “Chosŏn ŭnhaenghoesajohap yorok (조선은행회사조합요록, 朝鮮銀行會社組合要錄)" edition of 1942, which is published by “Tongagyŏngjeshibosa (동아경제시보사, 東亞經濟時報社)." Post-liberation data is based on “Chŏn’guk kiŏpch’e ch’ongnam (전국기업체총람, 全國企業體總攬)" from the “Taehan Sanggong Hoeŭiso," and offer a glimpse into the evolving business environment post-liberation. Data on 4,383 and 7,658 companies and cooperatives, each for pre-liberation and post-liberation, across 158 prefectures (부군, 府郡) are collected and used for analysis.

The companies are classified into 15 industries each for 1942 and 1957. For 1942, the list of industries, sorted by frequency, are: commerce, manufacturing, brewing, transportation and warehousing, agriculture and forestry, mining, financial trust, rice milling, printing, fisheries, electricity, railroad, banking, insurance, and others (상업, 제조공업, 양조업, 운수창고, 농림업, 광업, 금융신탁, 정미업, 인쇄업, 수산업, 전기, 철도, 은행, 보험, 기타). For 1957, also sorted by frequency, the industries are: textile, food manufacturing, metal machinery, commerce and trade, chemical, transportation and warehousing, other manufacturing, publishing, ceramic, mining, civil engineering and construction, financial securities, fisheries, electrical, and others (섬유공업, 식료품제조업, 금속기계공업, 상업무역, 화학공업, 운수창고업, 기타제조업, 출판업, 요업, 광업, 토목건출업, 금융증권, 수산업, 전기공업, 기타).

A.6 Farm size distribution

Information on farm size distribution is retrieved from the “Chosŏn Gyŏngje Yŏnbo (조선경제연보, 朝鮮經濟年報)" published in the years 1938 and 1942. Figure A4 shows Table

10 of the 1938 publication, which contains information on the number of farming households by farm size and ownership type. The first column indicates the farm size, starting from “less than 3 dan (段)" to “more than 20 chŏngbo (町)," where 1 chŏngbo (町) translates into 10 dan (段). The first row displays the ownership type: “landed", “landed and sharecropping", “sharecropping and landed", and “sharecropping".

For 1942, information is available for the number of farming households by farm size per province(도,道), as seen in Figure A5. In this dataset, farm size ranges from “more than 5 chŏngbo (町) & less than 10 chŏngbo (町)" to “more than 200 chŏngbo (町)."

(第10表) 1938年度耕作面積別農家戶數表

	自作	自兼小	小兼自	小作	合計
	戶	戶	戶	戶	戶
3段未滿	71,686	48,164	67,566	300,893	488,309
3段—5段	91,667	74,106	94,342	353,264	613,379
5段—1町	114,398	92,893	115,968	390,005	713,264
1町—2町	114,933	82,819	96,130	271,735	565,617
2町—3町	86,879	47,479	46,812	131,619	312,789
3町—5町	47,177	20,004	18,274	50,653	136,108
5町—9町	14,190	4,518	4,194	11,098	34,000
10町—20町	2,172	521	536	2,112	5,341
20町以上	343	44	25	45	457
合計	543,445	370,548	443,847	1,511,424	2,869,264

Figure A4: Number of farming households by farm size and ownership type (1938)

(第12表) 1942年度道別朝鮮人土地所有形態表

	5町以上10町未滿	10町以上50町未滿	50町以上100町未滿	100町以上200町未滿	200町以上	合計
	人	人	人	人	人	人
京畿	8,208	5,710	317	85	13	14,333
忠北	3,345	1,787	66	7	2	5,207
忠南	4,451	2,661	116	30	2	7,260
全北	3,923	2,809	143	30	4	6,909

Figure A5: Number of farming households by farm size per province (1942)

B Additional Tables

Table B1: Internally Calibrated Parameters

Parameters	Explanation	Value
A_n	Non-agriculture sectoral TFP	24
$\bar{c}$	Consumption endowment of non-agricultural good	0.55
κ_P	Primary schooling cost	30.6
κ_S	Secondary schooling cost	50.5
η_P	Human capital gain from primary educ.	1.60
η_S	Human capital gain from secondary educ.	1.75
ρ_θ	Intergenerational correlation of learning ability	0.65
σ_z	StDev of agricultural productivity draw	1.11
σ_θ	StDev of ability draw	0.33
p_l	Probability of having land	0.53
σ_l^2	Lognormal StDev of initial land distribution	0.96
L	Total size of land in the economy	0.95

C Additional Figures

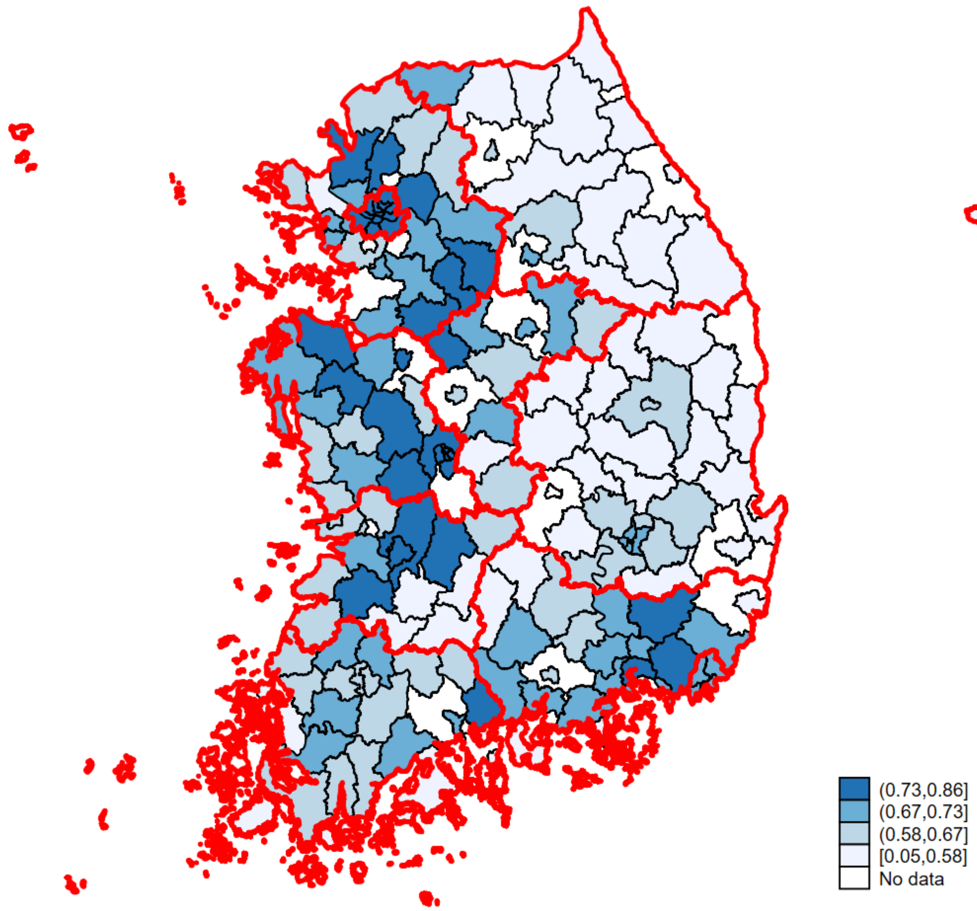

Figure C1: Share of Tenancy Farming in 1935-1940

Note: Black boundaries represent counties and red boundaries represent provinces.

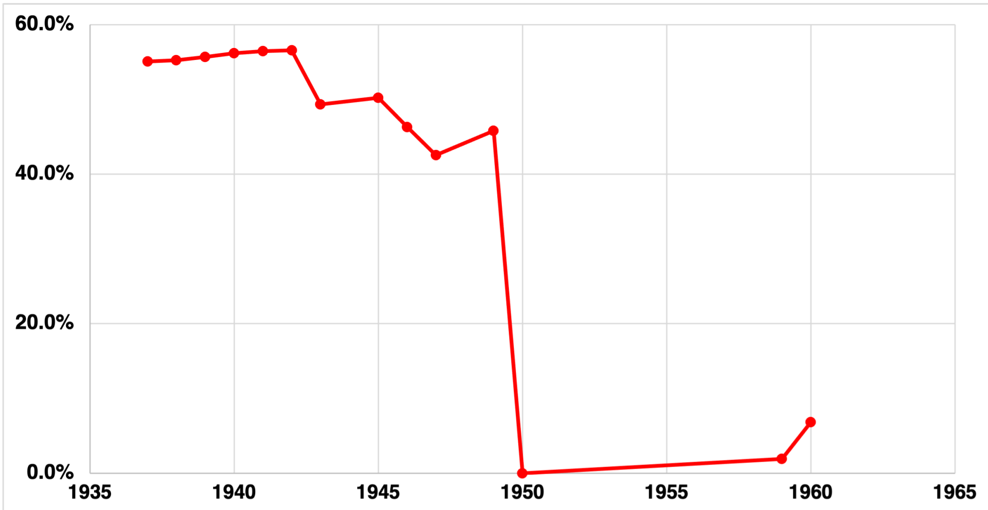

Figure C2: Share of Tenancy Farming over Time

Note: Sourced from Hong and Kim (2020)

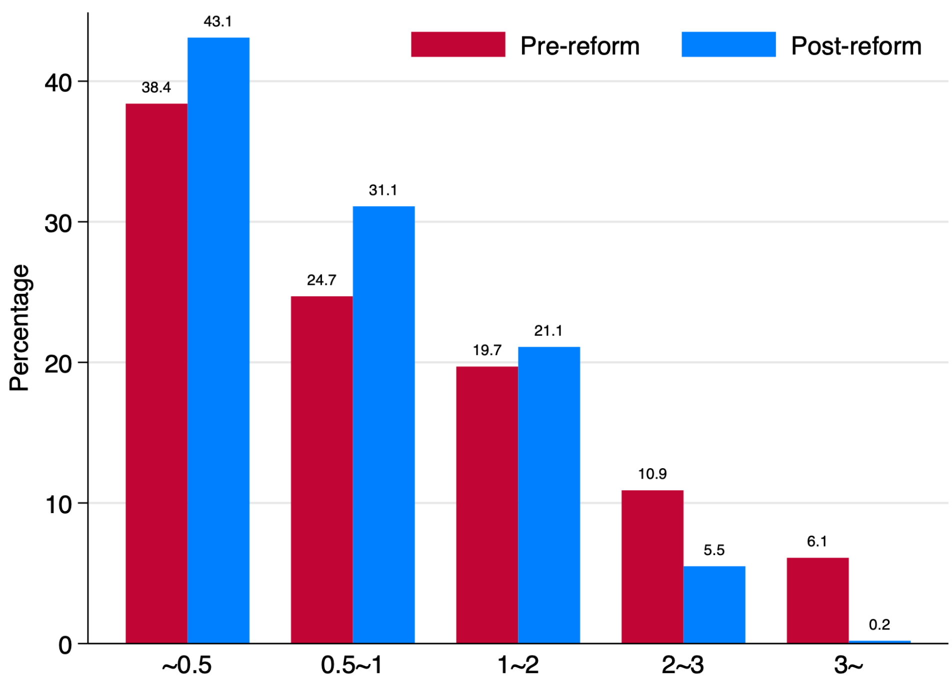

Figure C3: Farm Size Distribution, Pre- and Post-Reform (Data)

Note: Farm size distribution in 1938 was taken from Bank of Chōsen (1938), and the 1955 distribution is taken from Pak et al. (1967), p.92