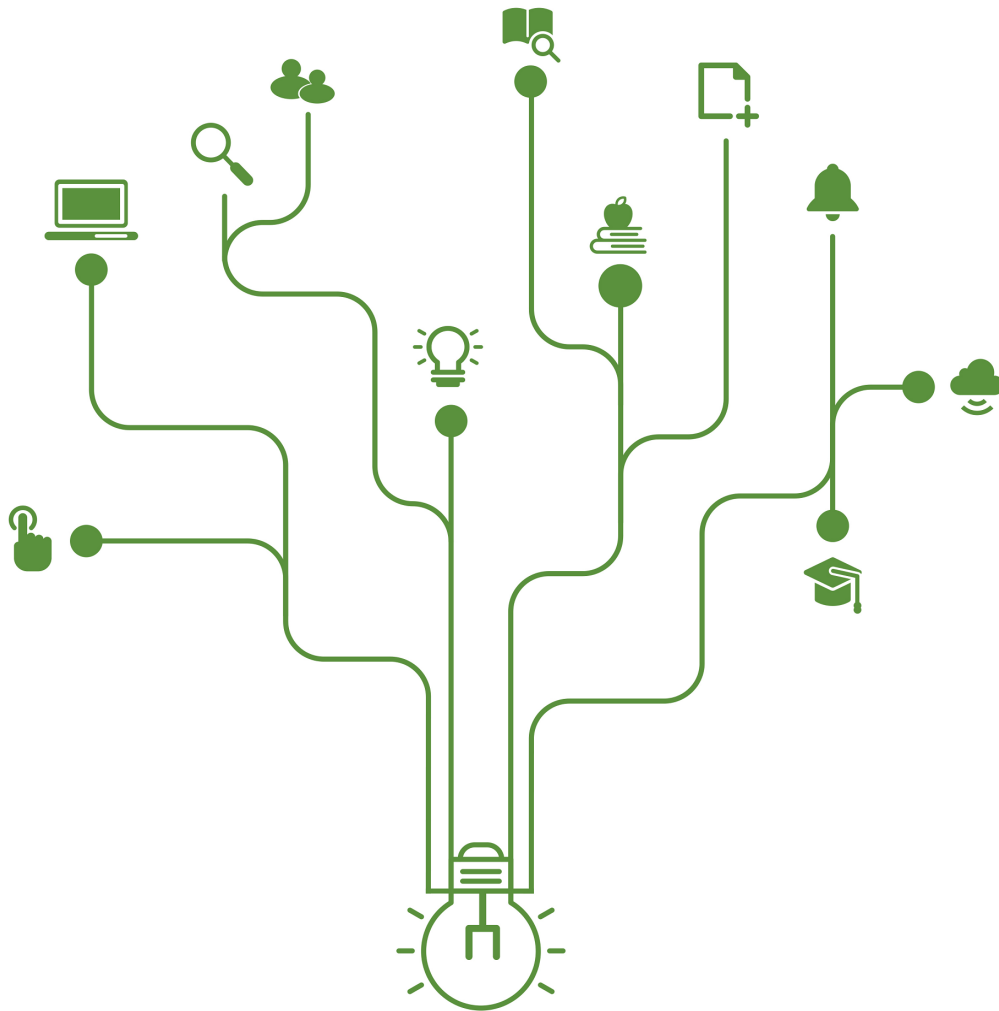


Tenancy, Land Redistribution, and Economic Growth A Case of Korea, 1920-1960

Jea Hwan Hong, Duol Kim



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Executive Summary

Agriculture is the largest and the most important industries in many developing countries. A typical pattern observed in these countries is high inequalities of land ownership, that is, a small number of people own large portion of arable lands and large number of farmers have a small piece of land or even don't have anything. Farmers usually lease land wholly or partially from large landowners and pay typically 50% of their harvest. This tenancy or sharecropping contract imposes heavy burden on farmers, which results in their poverty. Scholars and policymakers claimed that the burden of rent lowers productivity of farmers and that the low income further prevents the farmers from investing for the future. These factors aggravate living condition of farmers and ultimately economic growth of the country.

Land reform is regarded as a solution to break this vicious circle. Land redistribution can improve farmers' income, and this allows them to invest for improve quality of land or for educating their children. Therefore, it is very important to examine how would land reform is implemented, how would land reform changes level of inequality, and how would it change production activities and investment, and so forth.

The goal of this study is to investigate, arguably, a successful case of land reform, the land reform of Korea. During the colonial period from 1910 to 1945, almost 50% of farmers were tenants without having any land at all and 20% were partial tenants. After the liberation in 1945, the Korean government made efforts to perform land reform, and it was completed by 1951. Investigating the impact of land reform on agricultural productivity and human capital investment will contribute to better understanding Korean economic development. And it will provide important implications for many developing countries.

For this goal, we reviewed previous studies on land reform. And then, we explored the impact of land reform on agricultural productivity and its contribution to human capital accumulation. Using prefecture level data, we estimated the impact of land ownership in this period. Our estimation shows that land reform improved agricultural productivity. This implies that land reform could contribute to economic growth after the liberation.

We then performed empirical analysis on the relationship between the land reform and the secondary school enrollment rate is conducted to examine whether the land reform has contributed to the accumulation of human capital in Korea by utilizing the gun level data. The possibility of effect being different on gender is also evaluated. The results imply that the region with higher increase in share of independent farmers during the land reform show higher increase in secondary school enrollment rate. This proves the hypothesis that land reform influenced positively on the accumulation of human capital. Also, the secondary school enrollment rate of female increased as the share of independent farmers rose, when the increase in enrollment rate of male proved to be statistically insignificant. This result is interpreted as when the income level of farmers went upwards by the land reform, female, who was neglected in education due to male offspring preference, relatively gained more opportunity for education than male did.

Introduction

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We will first review previous studies on land reform (Chapter 2). And then, we will explore the impact of land reform on agricultural productivity and its contribution to human capital accumulation (Chapter 3 and 4).

Tenancy and Land Reform: Literature Review

Basic Structure

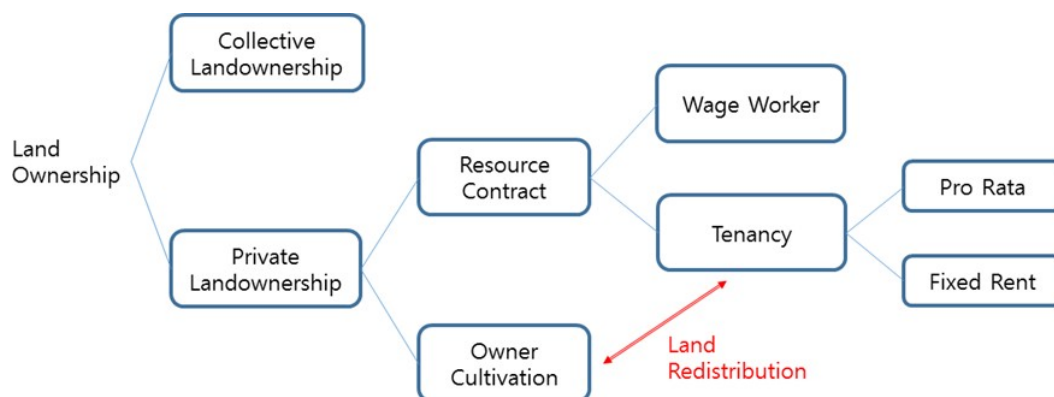
Land and labor are two indispensable inputs for agricultural production. If a farmer cultivates his land without any help of others, things will be simple. However, if he leases land or hires workers, various contractual issues will emerge. A big complication is that land contract and labor contract are interlinked. For example, if a landowner decides to hire agricultural workers rather than leasing lands with tenancy contract, it means that the landowner compares contractual arrangements in labor and land markets. Partial equilibrium approach that focus either only on land contract abstracting labor contract or the opposite, might fall into a proposition that belies actualities.¹ It is indispensable, therefore, to consider these two dimensions together.

It might be convenient to provide a basic set-up for avoiding confusion and accommodating productive discussion (Figure 2 -1). Let's consider a country where the land was owned equally by hundred farmers. And let's assume that they cultivate their own land without getting any help or leasing their lands to others. We can call it independent landed farmers and put it as a base case.

Now, we consider a case of large landholder. For simplicity, we assume that the whole land of this country is owned by one large landowner. If the government collectivizes the land, the large owner can be the government. Let's focus on the case of

a large private landowner. The large landowner cannot cultivate the whole land alone. He should choose one of two alternatives. First, he can hire agricultural workers, supervise them, and cultivate his land. The landowner pays wage to the agricultural workers, but appropriates the whole outcome.¹⁾

Figure 2-1| Efficiency of Tenancy: An Illustration



Second, he can divide the land in piece and make tenant contracts. It is broadly

called sharecropping or tenancy. Under this contract, the tenant pays a certain portion of the harvest.² Two prevalent forms of sharecropping contract is pro rata rule and fixed rents. The landowner should decide which way he collect rent and what amount he will charge on sharecroppers.

Efficiency of Sharecropping

Sharecropping is a prevalent form of agricultural production from the past to the present in various parts of the world. A basic question is why the sharecropping contract has been adopted so widely in agriculture. There are basically two possible answers, which are efficiency- and inefficiency explanations.

Efficiency explanation suggests that tenant contract is adopted because it is better than other available alternatives. Here, efficiency has static- and dynamic dimension. Static efficiency implies that sharecropping is superior to or more productive than other available contractual forms. Dynamic efficiency concerns about investment for improving production in the future. Sharecropping is better for investment for preservation or improvement of land quality than alternatives.

Inefficiency explanation implies the opposite, that is, sharecropping is inefficient than

1) Otsuka, Chuma, and Hayami (1992), p.1968.

other forms of cultivation. The reason why this inefficient institution persists is because political or cultural factors hinder landowners from choosing non-sharecropping arrangements. Or non-economic benefit might outweigh the benefit from choosing other forms of contracts.

Founders of modern economics favored inefficiency view. Adam Smith claimed that tenants don't have incentives to improve the quality of leasing land.³ Alfred Marshall also suggested a similar view.⁴

However, various scholars challenged this view. For example, Cheung (1968, 1969) contested this traditional view and concluded that "inefficiency argument is illusory". He suggested that the owner cultivation, wage worker or tenancy should bring about the

same output per worker.⁵ Since Cheung's study, various theoretical analyses have been done. They broadly focused on three aspects, which are²⁾ risk sharing,³⁾ moral hazard,⁴⁾ long-term nature of contract.⁶

Although informative, these theoretical analyses usually highlight certain aspects of contractual arrangements and derive a general conclusion. However, they don't usually provide rationale on why a specific aspect is more crucial than others. Then, collection of these theoretical analysis might not provide comprehensive answer for fully understanding the nature of sharecropping contract and its persistence. It means that empirical analysis is crucial. Empirical analysis can be various ways, but studying land reform is important for various reasons.⁵⁾

Land Reform

Land reform is a political measure that government redistributes property rights of land. When property rights are redistributed under the name of land reform, it usually means redistribution of land from the current landowner to landless parties such as sharecroppers.

Various countries performed land reform and it is a continuing issue in many developing countries.⁶⁾ Developing countries are mostly agricultural, and majority of people are farmers. However, land is owned by small number of landowners, and most people leased land for cultivation. This inequality is broadly criticized as the source of poverty in

2) "Sharecropping is a form of land leasing contract in which the tenant shares the final product with the landlord as a partial or total payment of the rent." Dubois (2008), p.455.

3) Smith (1776), Book 3, Chapter 2.

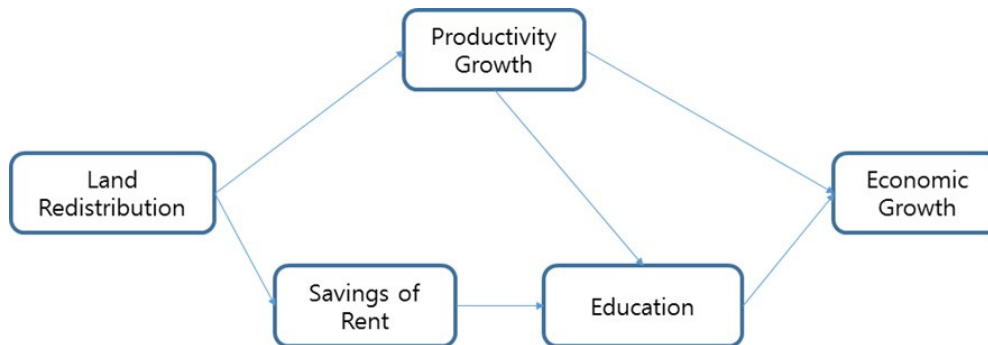
4) Marshall (1959), Book 5, Chapter 105 Cheung (1968), pp.1107-1108.

5) Dubois (2008). There are various papers that reviewed literature. Representative are Otsuka and Hayami (1992).

6) Yoo (2014) surveys land reform in East Asian countries.

this country for two reasons (Figure 2-2).

Figure 2-2| Potential Impact of Land Redistribution on Economic Growth: An Illustration



First is static inefficiency. As sharecroppers cannot appropriate the whole output, they are less incentivized. This causes low productivity, and this low productivity combined with heavy burden of rent ends up with poverty. Second is dynamic inefficiency. As farmers don't own their land, they are not motivated to improve quality of the land, and this lowers productivity.

Proponents of land reform claim that land redistribution resolves these inefficiencies. Land redistribution will relieve the farmers from heavy burden and improve their living standard. At the same time, this will motivate farmers to work harder and to invest on improving performances. This will end up with increase of agricultural production and economic growth of the country. They claim that land redistribution improves economic growth as well as inequality.

Extensive empirical studies have been done on the effect of land redistribution, and two streams of literature are noteworthy. First are studies on sharecropping in post-bellum South of the United States. A series of studies Reid (1973, 1977), Alston and Higgs(1982), and Garrett and Xu (2003) analyzed efficiency of sharecropping in postbellum South. They all claimed that sharecropping is not inefficient.

Second is studies done by development economists. Recently, Besley and Burgess (2000) and Banerjee and Iyer (2005) explored Indian sharecropping. Deninger, Jin, and Yadav (2013) explored plot-level data of West Bengal farmers.

Korean case can shed a new light on this literature. As introduced, Korea has a relatively good data to studying the condition before the land reform, its process of implementation, and its impact. At the same time, this can contribute to uncovering the causes of Korean economic growth.

Land Redistribution and Agricultural Productivity

Introduction

For last two to three decades, rising inequality has been discussed as one of the most important social problems all over the world. Many scholars have focused on economic consequence of high inequality and have warned that too much inequality can damage the economic growth. However, due to data problem and other reasons, few studies have corroborated convincingly the causal relation between inequality and productivity growth.⁷⁾

Does reduction of inequality enhance economic growth? Then, how much? We answer to this question by analyzing a historical experience of Korea. We examined the impact of land redistribution (1945-1951) on the agricultural productivity. During the colonial period (1910-1945), landed farmers were only 20% in Korea. 50% of whole farmers didn't own land at all and 30% cultivated both their own land and leased land. After the liberation in August 1945, land redistribution that was stimulated by land reform act occurred and by 1951 the share of landed farmers had increased from 20% to 90%. Did this change improve agricultural productivity and ultimately promote economic growth? Answering this question can shed a new light on the aforementioned problem, the relation between inequality and economic growth.

Investigating this problem can contribute to economic development and related policies. Large number of developing countries are agricultural, and land reform has been considered a major economic and political agenda. Large number of former socialist economies also have a similar land ownership problem; How to redistribute collectivized land to the people is the key issues in these countries. In spite of such importance, empirical studies on land reform is relatively rare.⁸⁾ Detailed analysis on the Korean experience help understanding the nature of the land reform and planning a successful implementation.

The paper goes as follows. First, we overview the history, that is, to review agriculture and sharecropping of Korea during colonial period and examine how the land reform proceeded after the liberation. Then, using prefecture (Gun, 郡) level data, we explore the correlation between the level of sharecropping and productivity during the colonial era. And we will measure the impact of land reform on productivity growth.

7) Acemoglu and Robinson (2013), Cingano (2014), OECD (2014), Ostry, Berg, and Tsangarides (2014), Piketty (2014), Stiglitz (2013).

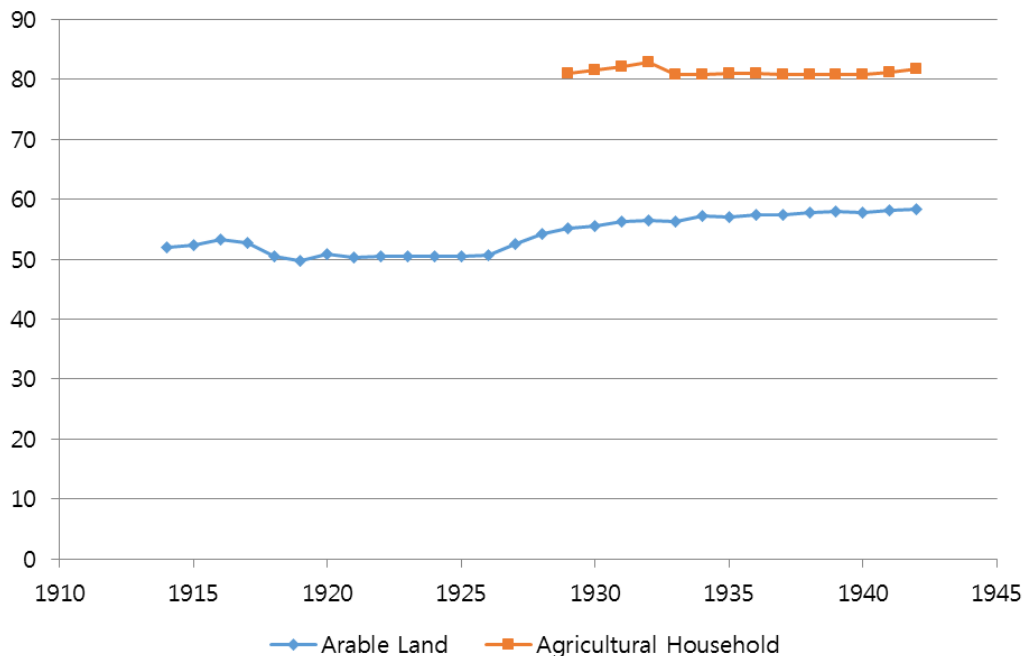
8) Exception is Besley and Burgess (2000).

After discussing some implications, we will conclude.

Land Ownership of Colonial Korea

Colonial Korea (1910-1945) was an agricultural economy. 70% of whole household were farmers, and 50-60% of total value added came out of agriculture.⁹⁾ Sharecropping was the dominant form of agricultural production during the colonial era. Landed farmers were only 20%. 50% of whole agricultural household didn't own land at all, and 20-30% were partial sharecroppers. 50-60% of the arable land was cultivated by tenants who didn't own land at all (Figure 3-1).¹⁰⁾

Figure 3-1| Share of Arable Land Cultivated by Sharecroppers and Share of Sharecroppers out of Agricultural Households (%)



Source: Statistical Yearbook of Colonial Korea, years.

The rent in the contract of sharecropping varied across time and region, but the sharecropping contract was usually 50% of the output. This heavy burden was blamed the major source of poverty in rural area. If we consider the average size of cultivating land

9) Statistical Yearbooks of Colonial Korea, Kim et al (2006). Industrialization also proceeded during this period. See Kim and Park(2007). Also English readers can refer to Kim and Park (2012) for a brief review of recent historiography on Korean economic history.

10) Kim (1993) and Lee (2013) claimed that the Cadastral Survey (1912-1918) executed by the colonial government increased landlords and spread tenancy. They propose that the governor-general tried to spread landlord system for accommodating Japanese migrants to the colony and for ruling Korean people more efficiently. However, this claim does not fit well with the evidence. As shown in Figure 3-1, the share of sharecropping was quite high even before the end of the cadastral survey. The share of sharecropping was stable throughout the whole period.

combined with the 50% rent, the average income of tenants is inferred as one-third of landed farmers.¹¹⁾ This harsh condition was a cause of explosive increase in litigation on rent contracts and farmer protests in the 1930s.¹²⁾

Governor-General made some efforts to ameliorate this problem. For example, they performed some policies like “creation of landed farmers”. However, they were not successful, and the share of tenants out of whole farmers even increased throughout the 1930s. Fundamental changes like land reform cannot be discussed and implemented under the colonial regime where Korean people didn’t have any political rights. The liberation was, therefore, imperative not only for political freedom but also for improvement of economic welfare.

Land Redistribution after the Liberation

Korea was liberated in August 1945. The United States and the Soviet Union governed southern and northern parts of Korean Peninsula for a certain period of time. In case of the south, the Korean government was established in August 1948. For both South and North, land reform was considered *prima facie* the most important political agenda since the liberation. From now on, we will focus on the land reform in South Korea.¹³⁾

From 1945 to 1951, land redistribution occurred in South Korea, and it made a profound change in land ownership (Figure 3-2 and Table 3-1). The share of land owned by landed farmer was 35% in December 1945, but it surpassed 90% by the end of 1951.

Land redistribution was done in various ways, and they can be categorized into three. First was redistribution of vested land. The U.S. Military government and succeeding Korean government took over the land left by Japanese farmers and companies, and allocated them to Korean farmers. The total size of vested land redistributed during this period was 27 thousand hectares. About 73% of this redistribution was done by the U.S. military government until 1948, and the remaining 27% was done by the Korean government. Under the both regimes, the redistribution was basically sales of lands to farmers who cultivated those land as sharecroppers.

Second was land sales by the landlords. Expecting radical land reform, many landlords negotiated with tenants and sold their lands. The total amount of land redistributed in this way was 71 thousand hectares. As shown in Figure 3-2, the share of redistributed land in

11) Kim and Hong (2016) provided a detailed discussion.

12) See footnote 4.

13) North Korean government (DPRK) executed land reform as well in the late 1940s. However, late 1950s, North Korean government performed collectivization of all arable lands. For the impact of collectivization on agricultural productivity, see Kim and Wee (2016).

this way is the largest, and it was mostly done right before the establishment of the Korean government. It is widely regarded that the landlord and the tenant traded land at market price.

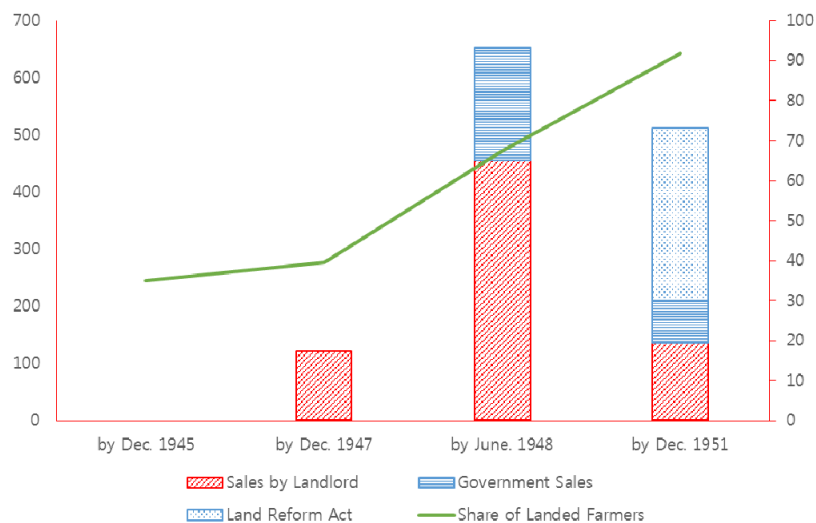
Third is redistribution by the Land Reform Act. After a long debate, the parliament passed the law in June 1949, and the law was actually enforced from March 1950. According to the law, the government took over the land from the landlord and compensate them for 150% of average annual production for five years. A farmer can get land up to 3 hectare, and the farmers should pay 150% of average annual production for five years to the government, which is equivalent to the compensation of the government to the landlords. The total amount of land redistributed in this way was 30 thousand hectares.

Many scholars like Kang (1989) evaluated the land redistribution negatively. Main criticism is on the fact that the redistribution was basically purchase of tenants rather than free disposal. Furthermore, scholars including Kang (1989) compared land reform of South and North, and claimed that South Korean one was inferior.

However, recently more and more scholars give positive evaluations. Especially, studies that analyzes the economic impact of land reform generally propose positive impacts. Jeon and Kim (2000), Park (2013), and Woo (2015) suggest that land reform contributed to human capital accumulation, rise of income, and economic growth ultimately.

Few studies examined impact of land reform on productivity growth. Cho (2015) investigated this agenda, but the result was not clear. We go beyond the previous studies, and figure out the impact of land reform more rigorously.

Figure 3-2| Changes of Landed Farmers, South Korea (Jungbo, %)



Source: Korea Rural Economic Institute (1989).

Table 3-1| Land Redistribution, 1945-1951

Categories	Size of Land (thousand hectare)
Redistribution of Vested Land	271
Sales by Landlords	707
Redistribution by the Land Reform Act	300
Total	1,278

Source: Korea Rural Economic Institute (1989).

Strategy and Data

For measuring the impact of land reform, we examined change of ownership structure and output before and after the land reform. This is basically done by estimating production function. A typical production function that we can use for estimating impact of ownership structure and inputs on output is

If landed farmer is more productive than sharecroppers, α_1 should have a positive value.

In our estimation, we use prefecture level data. After investigating data condition, we chose 1940 and 1960 for the time before and after the land reform. Table 3-2 provides descriptive statistics of the variables used for our estimation.

Table 3-2| Descriptive Statistics

Variable	Obs	Mean	s.e	Min	Max	References
1940						
Output (thousand)	141	121.3	75.0	0.5	413.5	
Share of Landed Farmers	141	0.37	0.13	0.11	0.95	
Land (thousand Jungbo)	141	83.5	48.9	0.4	241.0	year 1938
Farmer (thousand household)	84	14.2	10.9	0.7	99.2	
1960						
Output (thousand)	141	205.2	138.8	0.8	713.6	
Share of Landed Farmers	141	0.87	0.07	0.48	0.97	
Land (thousand Jungbo)	141	68.2	42.6	0.3	200.6	year 1960
Farmer (thousand household)	139	14.7	8.5	1.2	61.2	year 1963

Note: Farmer variable in 1940 is not available for Chonbuk, Chonnam, Kyongbuk Provinces

Tenancy and Productivity during the Colonial Period

For estimating the impact of land reform, we first estimated equation (1). It is an investigation of our presumption that sharecropping is less productive than landed farmers.¹⁴⁾ The approach is similar with Woo (2000), but data is different. Whereas Woo used experiment results from agricultural research institute, we used prefecture data described above.

Figure 3-3 and Table 3-3 shows estimation results. First, the figure shows positive correlation between the share of owned land and productivity. The coefficients of the share of landed farmers are statistically significant at the 5% and 1% each. The Equation (1) and (2) imply that at the mean level, 1%p. increase in the share of landed farmers would enhance productivity by 0.25 to 0.41%. Considering that this is just a simple change of ownership structure, this is not a small impact at all.

Of course, this estimation result has endogeneity problem. Farmers of the more

14) Woo (2000) proposed that productivity of tenants was not lower than landed farmers. If it is true, the impact of land reform will be distributional and it won't make a significant productivity growth.

productive region could be more innovative, and they might run their lands with more productive way, for example, direct cultivation with agricultural labor. This inference implies that the above result might underestimate true value.

However, this is not a big concern at this stage for two reasons. First, the goal of this regression was to show that land reform matters for productivity growth. Second, the land reform works as a kind of exogenous variable. As land redistribution reduced the share of landed farmers independent of productivity, this can work as a kind of instrumental variable. It means that if we estimate equation (2), this will allow us to measure α_1 that is free from the endogeneity problem.

Figure 3-3| Share of Owned Land and Agricultural Productivity, c.1940

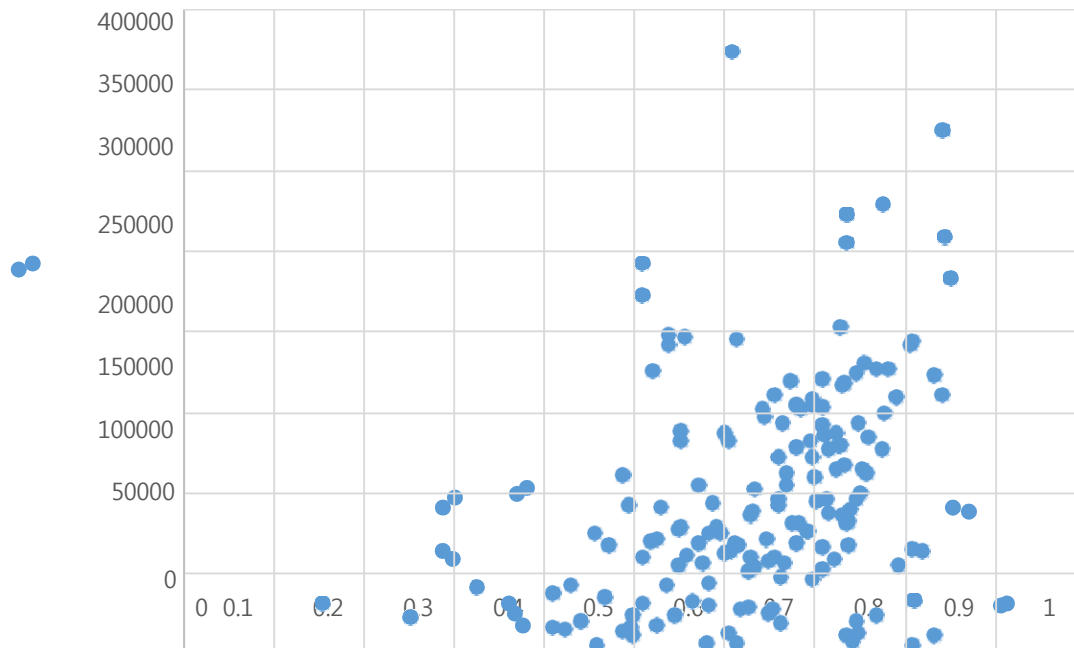


Table 3-3| Agricultural Productivity and Land ownership in circa 1940 Dependent Variable = ln(output)

	Eq(1)	Eq(2)
Share of Landed Farmers	0.255 (0.1181)**	0.4118 (0.1546)***
ln(land)	0.9779 (0.011)***	1.0067 (0.0295)***
ln(farmer)		-0.0398 (0.038)
Constant	0.5227 (0.1338)***	0.551 (0.2096)*
Fixed Effect	Yes	Yes
Obs	141	84
R Square	0.9836	0.9838

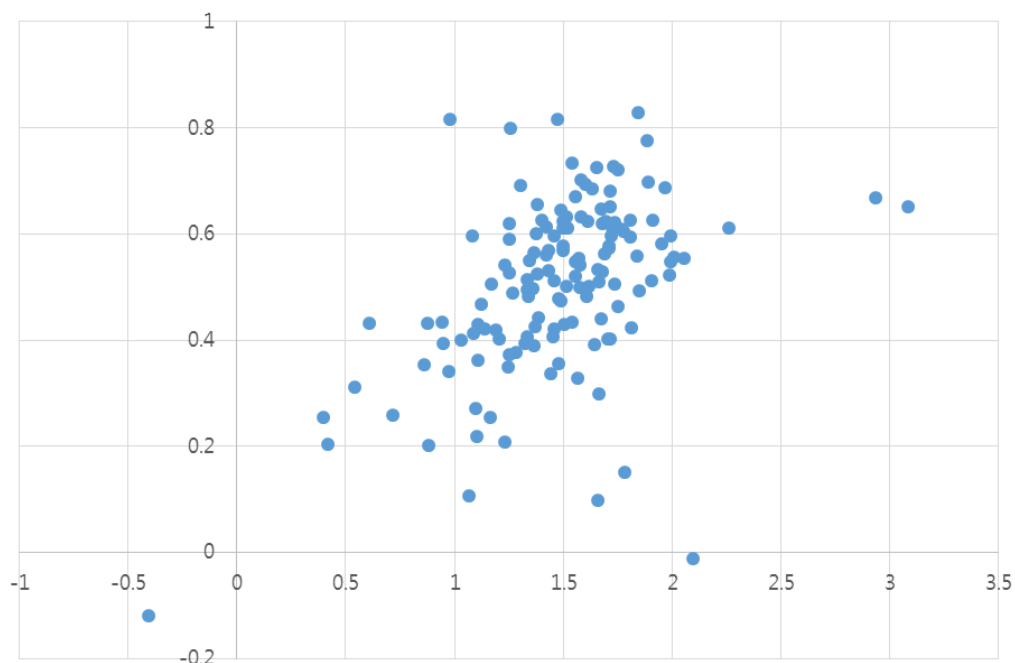
Source: Number in parenthesis are standard errors.

Land Reform and Agricultural Productivity

Now, we estimate the impact of land redistribution on productivity. This is done by measuring correlation between change of ownership structure and change of output using prefecture level data. Figure 3-4 shows the correlation between changes in land ownership and agricultural productivity measured by output per land. This shows a strong positive correlation, which supports our inference.

We further examine the correlation by estimating equation (2), and Table 3-4 shows regression results. This also support the positive impact of land redistribution on productivity growth. The coefficient is 0.51. It means that 1%p. increase of landed farmer in a prefecture increased production by 0.5%.

Figure 3-4| Changes in Owned Land and Agricultural Productivity, 1940–1960



Note: Agricultural productivity was measured as output per land.

Table 3-4| Changes of Land ownership and Agricultural Productivity
Dependent Variable = $\Delta \ln(\text{output})$

	Eq(1)	Eq(2)
Δ Share of Landed Farmers	0.5111 (0.0934)***	0.4521 (0.1092)***
$\Delta \ln(\text{land})$	0.971 (0.02)***	0.9786 (0.0355)***
$\Delta \ln(\text{farmer})$		0.0134 (0.03)
Constant	0.4359 (0.0504)***	0.4527 (0.0557)***
Obs	141	83
R Square	0.9515	0.9442

Source: Number in parenthesis are standard errors.

Conclusion

Korean was agricultural society during the colonial period. Sharecropping was the dominant form of production in this period, and it was criticized as the major source of poverty. Since Korea was liberated in 1945, land redistribution proceeded in various ways. Using prefecture level data, we estimated the impact of land ownership in this period.

We provided two important results. First, using prefecture level data, we examined whether sharecropping lowered agricultural productivity. The regression result suggests that

the productivity of sharecroppers was lower than landed farmers. This strongly implies that land reform could improve agricultural productivity. Second, we investigated the impact of land reform on agricultural productivity. The statistical analysis shows that land reform improved agricultural productivity. This result implies that land reform contributed to rapid economic growth after the liberation.

Land Reform and Human Capital Accumulation

Introduction

The Republic of Korea (hereinafter referred to as Korea) has been one of the fastest growing countries to achieve economic success during the past half-century and its burgeoning economic growth was possible mainly due to the successful accumulation of human capital. According to the estimation conducted in Jang (2007), the contribution of education on economic growth between 1975 and 2004 reached remarkable 40.7 percent. After independence, the Korean government emphatically promoted the public education expansion policy on top of the education fervor of Korean parents. As a result, the well-educated human capital has accumulated very rapidly, so that Korea was able to match the increasing labor demand required during the industrialization process.

Another reason why Korea was able to accumulate human capital at a rapid rate was due to its successful land reform, which reduced inequality in Korean society, allowing a large number of parents to afford the tuition needed for their children's education. Also, lowered inequality meant that parents could expect their children to climb the social ladder of success through the means of education.

Indeed, with the land reform, myriads of former tenant farmers acquired tenant lands at a low price and have become independent farmers. As a result, they were not obliged to pay the rent for tenancy that reached as high as 50 percent of total production. This obviously allowed the farmers to accumulate their wealth and even get a loan using their newly acquired land as collateral when needed. Such improved earnings and alleviated financial restrictions plausibly played an important role in enhancing the education level of the farmers' children.

Numerous literatures on land reform also agree on the argument that it led to accumulation of human capital by redistribution of wealth (Kwon [1984], Seo [1987], Jang [2000], KREI [2003], Park [2013a], Park [2013b], Woo [2015]). Empirical studies on the

cases of the Philippines and India such as Hayami and Kikuchi (1999), Deininger et al. (2000), Deininger et al. (2009), and Deininger et al. (2011) also provide evidence on the role of land reform on human capital accumulation. In addition, empirical study on the relationship between inequality in land distribution and human capital accumulation confirms that there is indeed a close relationship between the two (Deininger and Squire [1998]; Galor et al. [2009]; Vollarth [2013]; Jun and Kim [2014]). Therefore, it would be rational to say that the Korean land reform contributed to the accumulation of human capital.

However, aside from Woo (2015), there is no literature that empirically studies the Korean case. The most literatures on the relationship between the Korean land reform and the accumulation of human capital are based on the mere fact that the reform and the burgeoning of public education occurred around the same time. In case of Woo (2015), there is a limitation as it analyzes the relationship between primary school enrollment rate and the land reform. Because the elementary school enrollment rate has already reached almost 100 percent by 1960, due to a widespread of compulsory education policy in the 1950s, it is difficult to assess the impact of the land reform on human capital accumulation using the primary school enrollment rate data. Also, the sample is limited to 40 gun (county) in Gyeongsang Province.

This paper attempts to examine the impact of the land reform on human capital accumulation in Korea by empirically analyzing the reform data of all gun in Korea and enrollment rate of secondary school. It especially takes an extended look at whether the level of impact differs between the genders, because the preference for male offspring was still prominent at that time. Therefore, if the land reform indeed resulted in increase in household incomes, it could have comparatively benefited females more who were previously neglected in education.

The paper is organized as follows. Section II presents the historical background with the emphasis on the land reform process and the expansion of secondary education. Section III examines the main framework of the empirical analysis. Section IV presents the result of empirical analysis and its implications. Lastly, Section V concludes the paper.

Land Reform

In late 1945 after independence, tenant land accounted for approximately 144.7 million chungbo (one chungbo is equivalent to 2.45 acres) of total 222.6 chungbo in Korea (65 percent). In the case of paddy field, the proportion was 71 percent. Also, among 206

million agrarian households, nearly half of them were pure tenant farmers who did not own any land and 35 percent of them were landowners, who, however, needed to borrow more land to farm in order to eke out a living. Landed farmers, including landlords accounted for only 14 percent. With such circumstances, there was a wide spread of social consensus that the landlord system should be abolished through a land reform and distribute land to farmers.

The problem was how to determine the distribution method, the ceiling on the ownership of land, the price of land, as well as the compensation and the reimbursement method. There had been numerous lengthy discussions after independence and in the meantime, distribution of the government-vested lands was executed. The government-vested lands were previously Japanese land owned by New Korea Company (郡 郡郡郡) and the distribution was executed by the US Military Government in Korea. The size of the disposed land reached approximately 199,000 chungbo.¹⁵⁾ The farmers could receive up to 2 chungbo and were asked to reimburse 300 percent of average annual production in 15 years, which was not too far off from the price of land at that time.

Meanwhile the landlords voluntarily sold their land before the reform, as they were concerned that they might have to dispose their land at an unfavorable rate under the reform. The scale of such voluntary disposal was approximately 713,000 chungbo (Table 1). And the price was around the same or a little higher than the price at the time of the land reform. As vast size of land was on the market, the price was estimated to be lower than the usual price (300 percent of average annual production). However, the farmer purchasing land was relatively more burdened with reimbursement pressure, as he was obliged to pay the lump-sum price within three months (at the latest within two years) (Jang et al. [2009]). On the other hand, the farmer was able to make reimbursement on the installment plan within five years at the time of the land reform.

The Land Reform Act was enacted in June 1949, after long discussions. And its implementation began in earnest after the revised law had been promulgated in March 1950. The main points of the Land Reform Act were as follow. First, only paddy fields were the target and others such as mountains and forests and orchards were excluded.

The upper limit for ownership was 3 chungbo per a household, and the compensation for land purchase was the reimbursement of 150 percent of average annual production in five years on the equal installment plan. The households that received distributed land also

15) The total size of previously Japanese-owned land is estimated to be 273,000 chungbo, including those sold by the Korean government. (Table 1)

had to reimburse the same amount in five years equally. And the same reimbursement condition also applied to the land distributed by the US Military Government. Until the reimbursement was made, distributed land was not permitted any transaction, donation, mortgage or security rights.

Yet, the size of distributed land to the farmers through the reform was only about 302,000 chungbo, which is less than half of the size of voluntarily sold land. Even if the land disposed by the US Military Government is included in count, the total distributed land was 575,000 chungbo by the late 1951, which accounted for only 39.7 percent of the total tenant land of 144.7 million chungbo in late 1945. This is the main reason why the evaluation on the land reform so far has been generally negative. Recently, there has been a new point of view that not only the disposal of Japanese-owned land, but also the voluntary disposal by the landlords was a part of the land reform (KREI [1989]¹⁶; Lee [2015]). However, it seems not every scholar agrees with such a view.¹⁷)

As Table 1 shows, 89.1 percent of tenant lands (128.8 million chungbo) out of total 144.7 million chungbo, including land previously owned by Japanese, converted to independent land through the means of the US Military Government distribution, the Korean government distribution, and voluntary disposal by landlords. As a result, only 8.1 percent of total arable lands (158,000 chungbo) remained as tenant lands by late 1951.¹⁸) (4.3% or 74,000 chungbo if land not subject to distribution are excluded.)

The proportion of independent land and farmers burgeoned as a result of the land reform. However, the problem of small-scale farm management was worsened. Table 2 shows the change in size of farm management before and after the land reform. Compared to year 1945, the number of households owning less than 0.5 chungbo actually increased by 250,000 in year 1951, thus the proportion also rose by nine percent point. And almost 80 percent of the total farming households managed a small-sized land of less than one

16) KREI (1989: 1031), the most renowned study on the land reform, also seems to be on the same side of the view that voluntary disposal of land by landlords could be considered as a part of the land reform. Because it states that “no matter which means were used to reform, the land eventually became independent. The land reform in Korea was deployed in two ways, one by Government distribution and another by voluntary disposal of landlords.

17) For instance, Park (2013; 2014) denotes the sales of Japanese-owned land as the first land reform and the enactment of the Land Reform Act as the second land reform. But he does not mention the voluntary disposal of land by landlords at all.

18) As this paper, other literatures generally offer this value as the proportion of tenant lands after the land reform. It is derived from estimation conducted in KREI (1989: 1030) that is considered as one of the most conspicuous study on the land reform. However, the estimation process seems excessively bold and simple, because the value of 8.127 percent in 1951 is simply derived by conducting a linear regression with the values of 14.1 percent in 1962 and 17.9 percent in 1969.

Also, non-tenant land and 91.9 percent of arable land are assumed to be converted to independent land. And all independent land excluding those distributed by the government is assumed to be those voluntarily disposed by the landlords. In sum, the proportion of tenant lands after the land reform is derived from an extremely bold assumption, therefore, is prone to serious error, as is the size of land voluntarily disposed by the landlords. These values need to be scrutinized in the future.

chungbo. It implies that the land reform was not able to solve the problem of small-scale farm management at all, though the problem could not have been easily solved due to rapidly growing population after independence. Nevertheless, such problem limited the impact of the land reform.

Table 4-1 Change in size of farm management before and after the land reform

Area (chungbo)	Year 1945		Year 1947		Year 1951	
	Number of Household s	Proportio n	Number of Household s	Proportio n	Number of Household s	Proportio n
Less than 0.5	676,805	33.7	894,775	41.2	932,615	42.7
0.5~1.0	671,186	33.4	724,167	33.3	781,910	35.9
1.0~2.0	459,443	22.9	409,204	18.8	372,970	17.1
2.0~3.0	154,571	7.7	113,194	5.2	93,401	4.3
More than 3.0	47,072	2.3	31,095	1.4	3,034	0.1
Total	2,009,077	100.0	2,172,435	100.0	2,183,930	100.0

Source: KREI (1989).

School Education

When Korea was under Japanese rule, the Japanese Colonial Government of Korea concentrated on providing only primary education. As a result, by the year 1945 when Korea gained independence, primary school enrollment rate of South Korean region was up to 64 percent. And the Korean government also devoted itself to spread primary education through the country. Gratuitous compulsory primary education is clearly stated in the Constitution and the Education Law and the government intended to implement it from June 1950. However, the Korean War broke out, delaying the implementation until 1954, in which a six-year compulsory education completion plan was promoted. The goal of six-year compulsory education completion plans was to raise the enrollment rate of school-aged children to 96 percent by 1959, the target year. It also aimed to build classrooms and raise secure education funds needed to build them. In fact, the proportion of funds for compulsory education in education budget reached approximately 70~80 percent. With such efforts, the Korean government was able to complete the goal of six-year compulsory education completion plan and by 1959; the enrollment rate of school-aged children was 96.4 percent, when it was only 69.8 percent in 1951. The result was astonishing considering that the average primary school enrollment rate was only 48

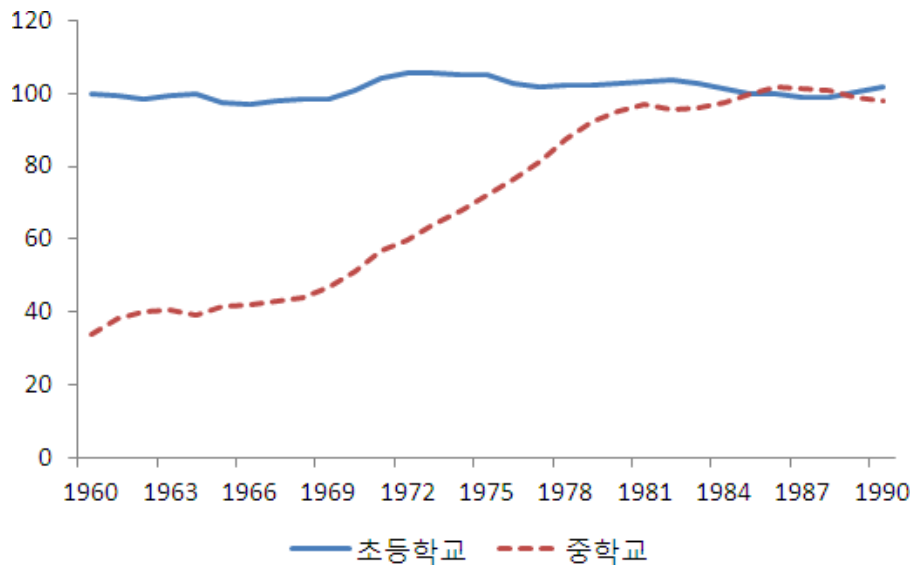
percent among the developing countries in 1960 (Kim et al. 1997). Korea was able to provide primary education both rapidly and successfully.

On the other hand, the spread of secondary education progressed relatively at a slow rate. The basic cause for this phenomenon can be found in the education policy of Japanese Colonial Government. Even in the times of colonial state, credentialism was already such prominent a factor that one's academic background was already one of the main determinants for finding a job. For that reason students wished to further their education, the Japanese Colonial Government did not seem as keen on spreading secondary education. By the 1930s, the competition for secondary education became so high that only one out of five was able to advance. Some students even moved to Japan in order to enter secondary school. And in one extreme case, it was reported that a young student committed suicide after failing to enter a secondary school.

Although the enrollment rate of primary education in Korea far exceeded that of developing countries as mentioned earlier, the enrollment rate of secondary school was more or less stagnant even after independence until the 1950s. In fact, the enrollment rate of secondary school was below that of average developing countries in 1960 (Kim et al. 1997). In the 1950s, the government concentrated its attention and investment on establishing compulsory primary education system, which eventually led to a relatively stagnated spread of secondary education.

As the 1950s was the period of compulsory primary school education establishment, the 1960s and 1970s can be described as the expansion of secondary education. The main reason was that the number of students advancing to secondary education dramatically increased, after the compulsory primary education has settled down. However, the government simply could not supply enough education facilities to meet the ever-increasing demand for secondary education. A social problem arose from this gap that there was overheated competition for entering the secondary school. To solve this problem, the Ministry of Education adopted a new admission policy that required no entrance examination in July 1968. Starting with schools in Seoul in 1969, the new policy was adopted by other metropolises such as Busan and Daegu in 1970, and finally national wide in 1971. As Figure 1 shows, the increase in enrollment rate of secondary school is conspicuous from 1970 and by the mid 1980s, it reached near 100 percent.

Figure 4-1 Change in Primary and Secondary School Enrollment Rate (1960~90)



Source: Statistics Korea (2005).

Note: The primary school enrollment rate is attained by dividing the number of students by population aged from 6 to 11 and the secondary school enrollment rate is attained by dividing the number of students by population aged 12 to 14.

Methodology and Data

In this paper, we hypothesize whether the land reform indeed contributed to the accumulation of human capital; the increase in enrollment rate of secondary school would be larger in the area that was more influenced by the reform. The following model

(1) is used to examine this hypothesis.

$$\begin{aligned} \Delta enroll_i = & \beta_0 + \beta_1 \Delta ownedland_i + \beta_2 \Delta schooldensity_i \\ & + \beta_3 \Delta schoolagedensity_i + \beta_4 \Delta areaperhouse_i \\ & + \beta_5 \Delta sharepaddy_i + \beta_6 citydummy_i \\ & + \beta_7 provincedummy_i + \Delta e_i \end{aligned}$$

In the equation above, i represents the region (gun). The dependent variable $\Delta enroll_i$ represents the change in secondary school enrollment rate from 1940 to 1960 (differenced variable). The main reason for utilizing the data in 1940 and 1960, in order to analyze the impact of the land reform, is as follows.

Year 1960 was the point when the farmers, who have begun to own their own land because of the reform, were at the end of due date for paddy reimbursement. Therefore, it was the time that could be interpreted as end of the land reform. Also, the data on education and agriculture at a gun level have become available around 1960. On the other

hand, year 1940 was set to represent the period of pre-reform, as gun level data were unavailable due to various reasons such as turmoil after independence and war in the 1940s.

The explanatory variable Δ ownedlandi, the most important one in this study, is the change in share of independent land from 1940 to 1960. The variables representing change in level of provision of education and demand for education between 1940 and 1960 are included as control variables in this model. Also, the other included control variables consist of dummy variable ci tydummyi, the regions that had used to be a gun in 1940 but divided into a shi (city) and a gun in 1960, and provincedummyi, representing province.

The level of provision of education is expressed by school density (schooldensityi) and it is computed as (number of schools $\times 4 \times 4 \times 3.14$) / area of gun(km²). And in order to represent the demand for education, school-aged population density is calculated using population aged 12~14 / area of gun(km²). Other variables such as area per house (areaperhousei) and share of paddy in farm (sharepaddyi) are also included, because they are important determinants of income level of farmers along with proportion of independent land.

Each data are based in gun level, and the criterion for gun dictated by administrative districts in 1940. In this case, there is a problem of how to treat those gun in which status were different between 1940 and 1960. The most changes in status were in a form that a gun was divided into a shi and a gun. In this study, even if a region was divided into distinct shi and gun in 1960, if it had been one gun in 1940, it is considered to be a single gun in this study. For example, even though Sacheon gun in Gyeongnam Province was divided into Sacheon shi and Samcheonpo gun in 1956, they will be assumed as Sacheon gun in this study, as it was a single gun in 1940.

The city (that used to be called bu(郡)) in 1940) such as Seoul, Busan, Incheon, Daegu, Daejeon, Gwangju, Mokpo, Masan and Gunsan are excluded in this study as agriculture was not prominent in those areas so that they were determined to be influenced less by the land reform. In the case of Ongjin gun, though it became a part of Gyeonggi Province after independence, it had been under the jurisdiction of Hwanghae Province in 1940 and as the data on Hwanghae Province are not available, it is excluded from this study. Thus, data on total of 137 gun are gathered and analyzed.

Finally, the secondary school enrollment rate of all gun in 1940 is assumed to be zero for two reasons in this study. The main reason is that there is no reliable data on

secondary school enrollment rate at a gun level in 1940. It is possible to identify the location of schools and number of students from “Chosunjehakgyoillam” (『조선제학교일람』), but unfortunately not every gun had secondary school at that time.

There were only ten teachers' colleges at that time and all of them were located in major shi. Because the cases of students transferring to secondary school in other gun or shi had occurred frequently, it would be a dangerous interpretation to assume the students in schools stated in “Chosunjehakgyoillam” (『조선제학교일람』) were in fact the students who attended the same school, thus distorting the enrollment rate of secondary school in gun.

Another reason is due to extremely low secondary school enrollment rate at that time. There is a possibility that assuming the secondary school enrollment rate in all gun in 1940 to be zero has less variation than using the data from “Chosunjehakgyoillam”. As stated above, the Japanese Colonial Government limited access to secondary education to the Koreans, so that the number of students in secondary school, including training schools with condensed curriculum, was less than 70,000 when the number of students in elementary school reached almost 1.4 million. Considering the fact that the population aged between 12 and 14 was 1.57 million, the secondary school enrollment rate was only four percent. In addition, since the enrollment rate probably would have been higher in shi, that of gun would have been much lower than four percent. Difference among gun would have been also minute.

Since the secondary enrollment rate of all gun in 1940 is assumed to be zero, the factor on provision of education in 1940 would not be considered. The modified model is as follows.

$$\begin{aligned} enroll_{i,t+1} = & \beta_0 + \beta_1 \Delta ownedland_i + \beta_2 schooldensity_{i,t+1} \\ & + \beta_3 schoolagedensity_{i,t+1} + \beta_4 \Delta areaperhouse_i \\ & + \beta_5 \Delta sharepaddy_i + \beta_6 citydummy_i \\ & + \beta_7 provincedummy_i + \Delta e_i \end{aligned}$$

The data used in this model can be divided into two parts, one education-related and another agriculture-related. Firstly, in order to calculate the secondary school enrollment rate in 1960, data on number of students in secondary school and school-aged population are needed. However, since there is no available data on both categories, data on number of students in secondary school stated in “Statistics on Educational

Administration 1958” (『문교행정통계일람』) and data on age composition of population conducted in “1955 Population Census of Republic of Korea” can be used. In this

case, there is a discrepancy in time when two data were produced. Therefore, population aged 9~11 in 1955 “Population Census of Republic of Korea” is assumed to be congruent to population aged 12~14 in 1958 in this study.

To estimate school density and school-aged population density, data on number of schools, students and area per gun are necessary. Number of schools and students can be found in aforementioned “Statistics on Educational Administration 1958” and area of gun can be found in “Korea Statistical Yearbook 1960”.

On the agriculture-related side, data on change in share of independent farmers, area of farms per house, share of paddy fields in 1940 and 1960 are required. For the data of year 1960, the results from “Agricultural Census Statistics of Shi Gun Eup & Myeon 1960” can be used.

Table 4-2 Comparison between the Year of Available Statistics for Each Province and Tenancy Rate in 1940 (Unit: %)

Province	Reference year	Share of tenant land(Total)			Share of tenant land(Paddy field)		
		Reference year(A)	1940 (B)	B-A	Reference year(A)	1940 (B)	B-A
Gangwon	1939	49.5	49.8	0.3	56.4	57.1	0.7
Gyeonggi	1940	71.5	71.5	0.0	74.0	74.0	0.0
Gyeongnam	1935	63.7	63.2	-0.5	67.4	66.6	-0.8
Gyeongbuk	1938	55.7	56.0	0.3	58.0	58.2	0.2
Jeonnam	1937	53.4	52.9	-0.5	67.4	67.3	-0.1
Jeonbuk	1934	77.1	77.1	0.0	79.9	79.5	-0.4
Chungnam	1938	71.9	72.4	0.5	75.2	75.7	0.5
Chungbuk	1939	66.4	66.6	0.2	67.7	67.2	-0.5

Source: Refer to the main text and reference page on details of used data. Data on tenancy rate in 1940 is from Statistics Korea (kosis.kr).

However, not every gun published such data in 1940, so the data published by each province should be utilized. Unfortunately, the provinces do not publish agriculture-related statistics every year and only few remain available among published statistics. Thus, it is basically impossible to gather data for every gun in 1940.

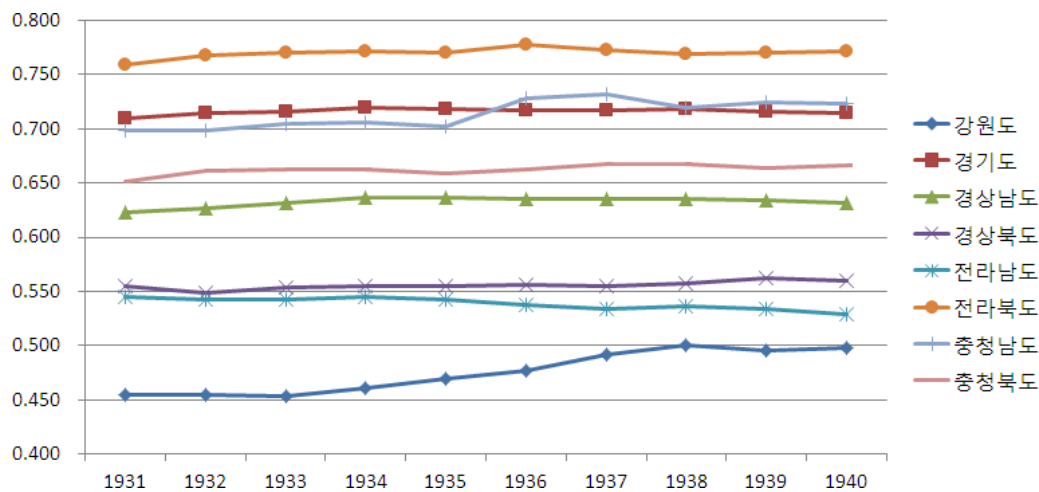
Due to such limitation, available data from “Doseilban” (『郡郡 郡郡 』) or “Statistics on Agriculture” (『 농업통계 』), that were published closest to 1940 in each province, are utilized. For example, in the case of data of Gyeonggi Province, the data of year

1940 stated in “Statistics on Farming” (『 농사통계 』) published by Gyeonggi Province in 1940 is used as reference. On the other hand, in the case of data of Jeonbuk Province, the data of year 1934 stated in “Statistics on Agriculture” published by Jeonbuk Province in 1935 are utilized.

Although the reference year differs among provinces, this would not influence the result greatly, as there seems to be no huge change in agricultural sector between mid 1930s and 1940. For example, Table 3 shows the change in share of tenant lands in provincial level.

Even though the reference year of Jeonbuk Province is at the earliest with 1934, the share of tenant lands does not differ much between 1934 and 1940 data. Other provinces also show very minute change in share of tenant lands between the reference year and 1940, with ± 0.8 percent point. This phenomenon is due to rapid spread of the landlord system before 1930. In the 1930s, the share of tenant land generally remains stagnant in every province except Gangwon Province (Figure 4 -2). Although the difference would be larger in gun level than in provincial level, such difference would not have a great impact on the result.

Figure 4-2 Share of Tenant Land in Each Province, 1931~1940



Source: Statistical Yearbook of Governor-General

Estimation Results

In this section, empirical analysis on the relationship between the land reform and the accumulation of human capital is conducted and implication of the results is discussed. Before conducting the analysis, data summary of variables used is shown in Table 4.

Firstly, average share of independent land in gun level increased greatly from 34.7

percent in 1940 to 87.0 percent in 1960. On the flip side, this implies that 13 percent of land still remained tenant land even after the land reform. However, considering the fact that there were some land that were difficult to convert due to certain characteristics as stated before, the share of independent land converted back to tenant land would not differ much at least until the end of the land reform.

Table 4-3 Basic Statistics

variable	obs	mean	sd	min	max
1940					
ownedland	137	0.347	0.125	0.087	0.820
areaperhouse	137	10.749	2.760	5.098	20.694
sharepaddy	137	0.555	0.176	0.010	0.857
1960					
enroll (all)	137	0.203	0.075	0.039	0.377
enroll (male)	137	0.302	0.109	0.064	0.547
enroll (female)	137	0.093	0.050	0.000	0.237
ownedland	137	0.870	0.070	0.434	0.972
schooldensity	137	0.437	0.251	0.063	1.364
schoolageddensity	137	13.902	7.311	1.062	42.199
areaperhouse	137	8.223	1.609	4.567	12.090
sharepaddy	137	0.609	0.161	0.026	0.876

Note: Unit for area of land per house is danbo.

The average area of land per house was decreased from 10.75 danbo in 1940 to 8.22 danbo in 1960. The main reason was due to increased population after independence, when the land area did not increase much. Also, urban area was not yet industrialized in the 1950s and population was concentrated in rural area. The decrease also implies that the farmers were not able to overcome the problem of small-scale farm management at all as aforementioned.

The average secondary school enrollment in gun level in 1960 was over 20 percent. But there was a huge gender difference that male enrollment rate was 30.2 percent and female enrollment rate was only 9.3 percent. For reference, according to data from Statistics Korea (2005) shown in Figure 1, the secondary school enrollment rate in 1960 was over 30 percent that there is a huge discrepancy to the same figure in Table 4. There are two possible explanations. Firstly, the enrollment rates of major metropolitan area such as Seoul and Busan are not included in Table 4. Secondly, the reference year of the figures in Table 4 is 1958. Since compulsory primary education policy began to be genuinely implemented from 1954, this could have led to increase in secondary school

enrollment rate in the late 1950s.

Table 4-4 shows the results of the empirical analysis to evaluate the impact of the land reform on the secondary school enrollment. According to the results, school density and school-aged population density that represent demand and supply of education are both statistically significant at one percent level, with coefficient of school density showing positive and that of school-aged population density showing negative sign. Thus, the enrollment rate increases as number of schools increases and decreases as population density increases. The possible reason for increased school-aged population density leading to lower enrollment rate would be either there were not enough schools or there were myriads of households that were unable to send every child and selected only few to attend school due to poverty. The latter reason would probably have larger effect at that time. Two income-related control variables are included in Equation (2), but the variables representing change in area of land per house and share of paddy fields both turn out to be not statistically significant.

Table 4-4 Determinant of Increase in Secondary School Enrollment Rate: Result of Empirical Analysis 1

Dependent Variable Δ enrolli	All	
	Eq(1)	Eq(2)
Δ ownedlandi	0.075 (0.037)**	0.082 (0.040)**
Δ schooldensityi	0.247 (0.029)***	0.245 (0.029)***
Δ schoolageddensityi	-0.006 (0.001)***	-0.006 (0.001)***
Δ areaperhousei		-0.002 (0.003)
Δ sharepaddyi		-0.024 (0.099)
citydummyi	0.074 (0.013)***	0.067 (0.013)***
provincei	yes	yes
constant	0.169 (0.023)***	0.162 (0.027)***
obs	137	137
Adj. R2	0.626	0.621

For the most important ownedlandi variable, the coefficient shows positive sign and is statistically significant at 5 percent level in both models. The more the share of independent farmers increased by the land reform, the more the increase in secondary school enrollment rate in 1960. This result implies that the land reform did contribute to

the accumulation of human capital.

The effect of the land reform on secondary school enrollment rate is divided by gender difference this time. As mentioned before, secondary school enrollment rate of male and female might be influenced differently by the land reform. At that time, the preference for male offspring was very prominent that if the reform indeed led to increased income of farmers, female might have gained access to education relatively more than male did as female was generally excluded from education.

The results of this empirical analysis shown in Table 4-5 do not differ much from those of Table 5. However, the result on Δ ownedlandi is interesting. Although the coefficients of Δ ownedlandi variable of both male and female are positive, only the coefficient of female is statistically significant at five percent level and that of male is not. This implies that the increase in share of independent farmers after the land reform led to the increase in secondary school enrollment rate of female. Thus, the land reform contributed to the accumulation of ‘female’ human capital, rather than male human capital.

Table 4-5 Determinant of Increase in Secondary School Enrollment Rate: Result of Empirical Analysis 2

Dependent Variable Δ enrolli	Male		Female	
	Eq(3)	Eq(4)	Eq(5)	Eq(6)
Δ ownedlandi	0.080 (0.057)	0.096 (0.060)	0.062 (0.027)**	0.060 (0.028)**
Δ schooldensityi	0.356 (0.043)***	0.352 (0.044)***	0.129 (0.020)***	0.129 (0.021)***
Δ schoolageddensityi	-0.009 (0.002)***	-0.009 (0.002)***	-0.003 (0.001)***	-0.003 (0.001)***
Δ areaperhousei		-0.004 (0.004)		0.000 (0.002)
Δ sharepaddyi		-0.041 (0.150)		-0.010 (0.071)
citydummyi	0.089 (0.019)***	0.087 (0.020)***	0.058 (0.009)***	0.058 (0.009)***
provincei	yes	yes	yes	yes
constant	0.276 (0.035)***	0.261 (0.041)***	0.052 (0.017)***	0.054 (0.020)***
obs	137	137	137	137
Adj. R2	0.595	0.591	0.566	0.559

Conclusion

In this study, the empirical analysis on the relationship between the land reform and the secondary school enrollment rate is conducted to examine whether the land reform has contributed to the accumulation of human capital in Korea by utilizing the gun level data. The possibility of effect being different on gender is also evaluated.

The results imply that the region with higher increase in share of independent farmers during the land reform show higher increase in secondary school enrollment rate.

This proves the hypothesis that land reform influenced positively on the accumulation of human capital. Also, the secondary school enrollment rate of female increased as the share of independent farmers rose, when the increase in enrollment rate of male proved to be statistically insignificant. This result is interpreted as when the income level of farmers went upwards by the land reform, female, who was neglected in education due to male offspring preference, relatively gained more opportunity for education than male did.

The significance of this study is it empirically proves the hypothesis that the land reform has contributed to the accumulation of human capital using gun level data. Previously, such hypothesis was argued only with circumstantial evidences in other literatures. Also, it is significant that the results suggest the contribution of the land reform on the accumulation of human capital is more conspicuous in female than in male. However, reliable data on secondary school enrollment rate before the land reform could not be gathered, so that the enrollment rates of all gun in 1940 are assumed to be zero. This, of course, is prone to statistical error in analyzing the results. Also, due to lack of data, the analysis was conducted without reflecting various other variables that might have significant effect on enrollment rate. Such limitation cannot be overcome unless a new set of data is discovered though.

The land reform in Korea was indeed extremely important in economic development after independence. Although the effect has not been analyzed enough empirically due to lack of data, there have been various recent efforts to approach this issue empirically. With such continuous efforts, if new data were to be discovered, the economic implication of the land reform would become more apparent.

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