Land Reform and Structural Transformation: Evidence from East Asia

by

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To my parents and grandparents

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ABSTRACT

Land reform is closely related to agricultural development and the whole development process. This thesis examines the impacts of land reform on asset distribution, agricultural productivity, and the process of structural transformation. By investigating land reforms in Japan, Taiwan, and South Korea after World War II, I find that land reform has positive and long-run influences on the structural transformation. Through redistributing farmland from large landholders to small farmers, land reform is viewed as an effective instrument for the achievement of low levels of asset inequality. Land reform also provides small owner-cultivators incentives to work harder and invest more in their own farmlands, leading to an increase in agricultural productivity. The rapid growth in agricultural productivity stimulates the reallocation of labor from agricultural to non-agricultural occupations, which is the key part of structural transformation.

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Chapter 1: Introduction

The relationship between income inequality and economic growth has been of interest for many decades. Traditional opinion contends that concentration of income is positively associated with economic growth, especially at early stages of development. For instance, Kuznets (1955) advanced the hypothesis of an inverted "U" relationship between inequality and per capita national income. He argues that inequality would rise in the early phase of economic development and during industrialization, and the level of inequality will stabilize for a while, and then decline in the later stage of economic development. This hypothesis is based on the assumption that the savings rate of the poor is much lower than that of the rich. Therefore, a transfer of resources from the poor to the rich would raise the aggregate savings rate, the investment rate, and the capital formation (see Kuznets, 1955; Kaldor, 1981; and Kalecki, 1971).

The conventional view has been challenged in recent decades. Increasing evidence from cross-sectional regressions suggests that higher levels of income inequality may hurt overall growth. Main channels of this correlation include: credit constraints of the poor, which impede the accumulation of both physical and human capital (Perotti, 1996; Galor and Zeira, 1993); high costs of extensive redistribution (Alesina and Rodrik, 1994); and sociopolitical instability as a result of an unequal income distribution (Perotti, 1996; Alesina and Perotti, 1996).

Most of these studies that explore the relationship between inequality and economic growth use data on income inequality rather than asset distribution. However, theoretical

models that study the inequality-growth relationship are more based on asset distribution. Assets are the underlying factor that generates wealth and income, and has an impact on growth prospects. Asset distribution in the form of land is particularly important for less-developed countries (LDCs) and developing countries, where land is the most important input to production and represents economic and political power (Deininger and Squire, 1998). In many countries, the initial access to future income stream is the ownership of land (Dorner, 1972). Also, as there are large variations in the measurement of income inequality across countries due to large differences in methods, definitions and standards of income inequality, the empirical results may be inaccurate.

A number of studies using data on asset distribution find that it is asset inequality rather than income inequality that has a negative impact on a country's economic growth (Birdsall and Londono, 1997; Deininger and Squire, 1998; Fort, 2007). However, these studies have been largely based on cross-sectional data, which may be problematic. First, cross-country regressions tend to be based on ad hoc specifications and highly fragile results (Temple 1999). Second, using dummy variables to capture country or region-specific factors usually overestimate actual effects. Third, country-specific attributes, such as climate, institutions, and culture, may have significant impacts on the country's economic development path and may be correlated with the explanatory variables included in those models. Fourth, worldwide cross-country analyses may suggest correlations between inequality and economic growth but fail to explain underlying mechanisms about how inequality affects economic growth, so are not informative about economic policies. De Doninicis et al. (2008) suggest that regional level analysis is more

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informative than worldwide cross-country analysis with regard to the inequality-growth relationship.

This thesis thus collects empirical evidence from a set of homogeneous economies to explore the impact of asset distribution on economic growth. The three economies are: Japan, Taiwan, and South Korea. These three East Asian economies have combined rapid economic growth with relatively low levels of inequality. They also share similar demographic, geographic and social characteristics. For example, all these economies have large and dense populations and few natural resources, and these economies all followed labor-intensive development strategies at the early stages of industrialization.

Most importantly, Japan, Taiwan, and South Korea have gone through substantial land reforms after World War II. The measures of land reforms in these economies were designed similarly and executed under the same auspices. After land reforms, all three economies achieved remarkably low levels of land inequality in rural areas. These policy changes serve as quasi-natural experiments to evaluate the impact of the initial level of asset distribution on economic performance.

The major contribution of this thesis is that it links land reform with the process of structural transformation. Structural transformation is a process of transferring agricultural, rural based economy into an industrial, urban based economy. Almost every industrialized economy has experienced successful structural transformation (Timmer and Akkus, 2008). This thesis examines key indicators of structural transformation using data on Japan, Taiwan, and South Korea after their land reforms in an attempt to explain the mechanisms of the impact of land reform on structural transformation.

The thesis is organized as follows. Chapter 2 builds a conceptual framework on the relationships among land reform, agricultural productivity growth, and structural transformation. Chapter 3 discusses land reforms in Japan, Taiwan and South Korea, including the context, policies and implementations, and their impacts on wealth distribution. The results show that all the three economies have successfully redistributed farmlands from large landholders to small farmers, and the distributions of rural income have also been improved dramatically.

Chapter 4 focuses on the changes of key variables related to structural transformation and agricultural development. The data on Japan, Taiwan, and South Korea suggest that land reform is positively associated with structural transformation. Rapid productivity growth has been achieved both in agriculture and non-agricultural sectors. Moreover, the shares of agricultural employment and output to the overall economy have declined significantly.

Chapter 5 further investigates differences in the three economies with regard to their paces of structural transformation. The findings show that governments' sustained supportive programs of agriculture are important. Chapter 6 concludes by drawing out major findings and political implications.

Chapter 2: Conceptual Framework

The level of agricultural productivity and output depends largely upon the influences of two types of interacting factors: proximate factors and conditioning factors. The former refers to farm level factors, which are determined by the decisions and performance of farmers, including the adoptions of technological innovations, and increased inputs of labor and capital. The conditioning factors depend on government measures and other outside impacts that would affect the production possibilities available to farmers and their desire and capacity to act upon the opportunities that exist. For instance, government-support agricultural research, extension-education programs, and general education would influence the level of farmers' technical knowledge and skills. The infrastructure of physical facilities also affects the level and efficiency of agricultural production. Moreover, financial conditions, such as land tenure arrangements[1] and farmers' access to credit or subsidies, would have influences on farmers' incentives and their ability to acquire resources (Johnston and Nielsen, 1966).

A well-designed land reform will have positive impacts on both the proximate and conditioning factors. First, the immediate effect of land reform is the changes in the patterns of land distribution and land tenure system. In the case of most LDCs and developing countries with abundant labor and scarce capital, the redistribution of farmland from large landholders to small family farmers has a direct incentive impact (Gillis et al., 2001). A secured owner-cultivator system encourages cultivators to

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[1] Land tenure is the mode by which land is held or owned, and the set of rules that determines how land or its products distributed (Payne, 2001).

undertake productivity-enhancing investments and offers them incentives to increase

inputs of land and labor, while alternative tenure arrangements lead to poor utilization of

both land and labor (Berry and Cline, 1979).

For example, in the case of sharecropping[2], the most prevalent form of tenancy in Asia,

the rent is regularly as high as 50 percent of the yield, and landlords can force tenants to

pay even higher rent by threatening the tenants with eviction. Under this circumstance,

tenant-cultivators have no incentive to invest in the land or even to improve irrigation and

drainage systems. Large-scale farming or plantation farms also face difficult incentive

problems since hired cultivators are usually paid in fixed wages and are not benefited

with extra product (Gillis et al., 2001).

Second, with regard to conditioning factors that affect agricultural productivity, a

successful land reform also involves a series of programs and services that support

agricultural development, such as technical assistance for cultivation, adequate credit,

education, and cooperative marketing facilities (Ladejinsky, 1964; Warriner, 1969).

2.1 Land reform and agricultural productivity

However, since land reform generally implies smaller plots of cultivated farmland, there

is always a debate from economists and politicians that centers on whether small farm

operations are more efficient than large farm operations. Returns to scale and land

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[2] Sharecropping is a form of tenancy in which the farms shares the crops with the
landlord (Gillis et al., 2001).

utilization are the two main concerns.

2.1.1 Returns to Scale

Returns to scale, in economics, describes a situation where a quantitative change in output results from a proportionate increase in all inputs (Berry and Cline, 1979). In this paper, "returns to scale" refers to the changes in agricultural output when all inputs, such as land, labor, and fertilizers, proportionately increase. For instance, increasing returns to scale in agricultural production means that a one percent increase in every input creates an increase in output larger than one percent. If this is the case, then increases in farmland and labor will contribute to a higher output, and therefore land redistribution would be less favorable, since larger farms would be preferred. In reality, both theoretical analyses and empirical studies demonstrate nearly constant returns to scale in agricultural production in early stages of development.

Berry and Cline (1979) advance the following theoretical arguments. First, the sources of productivity growth, such as seed varieties, fertilizers, and selective small-scale mechanization, are neutral with regard to farm size. Thus, if inputs used in agriculture are the sole factor being considered, one would expect approximately constant returns to scale in the early stages of development.

Second, however, if the farming operation involves large machinery, then one would anticipate increasing returns to scale in agricultural production. This possibility would be against land reform since large farm size is a guarantee of full utilization of machinery while land redistribution is generally used to separate large tracts of land into small plots.

In early phases of development, however, the scarcity of capital and the abundance of labor restrain the use of costly large machines.

Another reason that might make people expect increasing returns to scale in agriculture is livestock production. Nevertheless, livestock production can still be conducted either on an extensive or an intensive basis, such as feedlot activities. Consequently, it is not necessary to have a minimum-scale requirement for either machinery use or livestock operation.

A third possibility based on the assumption that small owner-cultivators are more devoted to farm production than hired workers in large farms, one would expect decreasing returns to scale in agricultural production. With secured property rights, small owner-cultivators have incentives to invest in improvements and work harder as owner-cultivators than as tenants. Additionally, owner-cultivators with limited farmland have thorough knowledge in terms of the choices of inputs, techniques, and products, thus they can make better investments to their own farmlands than large landholders, and achieve higher output.

In terms of empirical studies, most researchers have found approximately constant returns to scale in developing countries. In an early study, Heady and Dillon (1961) find constant returns to scale in both developing and developed economies. The estimations of production functions using data on Brazil and India also imply either constant or decreasing returns to scale (Berry and Cline, 1979; Sidhu, 1974; and Bardhan, 1973). A recent study conducted by Wan and Cheng (2001) do not find any increasing returns to scale in Chinese farming using 1990s household survey data. Hayami and Ruttan (1985)

also find that the agricultural production function of the LDCs is neutral with respect to scale based on the results of a cross-sectional analysis. In the case of Japan, Taiwan, and South Korea, returns to scale is unlikely to be a determinant factor in the evaluation of their land reforms since their agrarian structures are always featured by small peasant farms, with high rates of insecure tenancy and absentee landlords[3] (Gillis, 2001).

In summary, from the perspective of returns to scale, the shift from large units of farmland to small plots would not affect agricultural productivity, due to the approximately constant returns to scale in agricultural production during early stages of development.

2.1.2 Farm Size and Land Utilization

The absence of economies of scale alone may not be a sufficient reason to implement land reform. Another question is worth being evaluated: Are small farm operations more productive than large farm operations?   Supporters of land reform contend that large landholders tend to have poor utilization of their land resources (Berry and Cline 1979; Johnson and Kilby 1975; Vollrath 2007). The differences in factor prices (e.g., the effective price of labor, land, and capital) between small and large farms are the primary reason for the productivity gap. Advocates of land reform argue that small farmers can achieve higher productivity in land if they are entitled to well-defined property rights.

First, the effective price of labor, or the marginal product of labor on the farm, is lower

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[3] Absentee landlords refer to persons who own that farmland but are not working on it.

for small farm households than for large farm households (Berry and Cline, 1979). On the

one hand, for a small farm household, each family member shares the total family output.

Because of their limited farmland and of relatively abundant labor, the marginal product

of labor on small farms is quite low. When an individual of a small farm household

decides to hire out his labor or to migrate, his supply price of labor would be close to the

"average product" of labor on the small farm, which is likely to exceed his marginal

product of labor (Berry and Cline 1979; Johnson and Nielsen 1966).

On the other hand, a large landowner would like to hire a laborer whose marginal product

of labor equals or exceeds the average product of labor (Berry and Cline, 1979). Thus, it

follows that the marginal product of labor or the effective price of labor on large farms is

higher than that on small farms. Therefore, large landlords tend to hire fewer workers and

produce less than a group of small family farmers operating on the same total area.

Other factors might further widen the gap of effective price of labor between large and

small farms. For example, the likelihood of labor strikes, the risks of establishment of

workers' claims to property rights in the event of land reforms, and the high costs of

supervising hired labor make the real cost of hiring a laborer higher than the nominal

wage (Berry and Cline, 1979).

In contrast to the effective price of labor, the effective prices of land and capital are

cheaper for large landholders than for small farm households, which lead to an emphasis

on the use of capital on large farms. The unit price for small plots is usually higher than

the unit price of large tracts of land. This is because (1) the total price for small plots is

more affordable than large farmlands, thus the demand for small plots is higher than for large ones; (2) it is more convenient to sell large tracts of land than a small separate fragment of farmland, thus landowners are more willing to sell large parts or all of their lands, and thus the supply of small plots is less compared to that of large ones (Berry and Cline, 1979).

Moreover, the imperfections in capital markets seem to reinforce the differences in land price since purchasing land generally involves borrowing or taking out a mortgage. Large farm households have easier access to capital, including some government credit programs and machinery import subsidies, while small farms can only go to local moneylenders and pay higher interest. As a result, the effective price of land is higher for small farms when taking interest and maturity into consideration (Berry and Cline, 1979).

Other factors also have negative influences on land utilization of large farms. Large landowners might hold the land for the purposes of speculative gain, store of value, or prestige and political power, rather than for production (Berry and Cline, 1979). Also, in the fear of driving food prices down, some large farm households with local market monopoly power will prefer to produce less than what is capable from fully using their land (Berry and Cline, 1979). In sum, the higher effective price of labor and the lower effective prices of land and capital for large farms keep large farm households from hiring enough workers to exploit marginal land, and producing larger output with their land resources.

In addition to the concerns of returns to scale and land utilization, there are fears about losses of dynamic growth effects through land reform. For example, one would argue

that large farmers with higher educations and easier access to capital are more likely to adopt new technologies. However, there is no empirical evidence to show that large farm households have greater receptivity to innovations (Berry and Cline, 1979). Moreover, in terms of small farms' disadvantages in access to capital and credit, the policy implication should be to improve the channels of credit to small farms, rather than to discourage land redistribution.

A series of studies found an inverse farm-size productivity relationship (IFSP). Berry and Cline (1979) conducted an empirical analysis focusing on a set of six parallel studies: Brazil, Colombia, the Philippines, Pakistan, India, and Malaysia. Their major finding is that large farms utilize land less intensively and thus produce comparatively less per unit of land. They also find that when there is more unequal distribution of the land, the more severe the relative underutilization of the land will be. Bardhan (1973) and Feder (1985) find that the high cost of supervision is the main reason that drives the IFSP relationship. In a recent study, Vollrath (2007) uses cross-country distributional data on farmland from Deininger and Squire (1998) to examine the relationship between land distribution and agricultural productivity. He finds that the degree of unequal distribution in operational holdings of farmland and the agricultural productivity is negatively associated.

On the basis of the above analyses, the important policy conclusion is that land redistribution from large landholders to small farm households should be expected to raise agricultural productivity. First, land reform solves the problem of resource misallocation, the poor utilization of land on large farms in particular, by combining the underused land from large farms with underemployed labor on small farms. Second,

because there is no evidence for increasing returns to scale in agricultural production, it is unlikely that small farm size would have negative influences on potential productivity, especially in early stages of development. Third, by transferring land ownership from large landlords to small farm families, land reform provides small farm households with incentives to make better use of their farmland.

2.2 Land Reform and Structural Transformation

Land reform not only increases agricultural productivity, but also has far-reaching effects on structural transformation, which is the focus of this thesis. As an integral part of the development process, structural transformation is the cause and consequence of economic growth (Syrquin, 2006). It is a process by which an agrarian economy evolves into a diversified industrial economy (Johnston and Kilby, 1975). Structural transformation has four main features: a declining share of agriculture in output and employment, a rising share of non-agriculture, a high degree of urbanization, and changes in the attitudes towards family size that resulted in a low birth rate and reduced mortality rate (Johnson and Nielsen 1966, Timmer and Akkus, 2008).

As the most important feature of structural transformation, the mobilization of labor surplus from rural areas to urban settings could be explained by three sources. The term "labor surplus" is closely related to the term "rural underemployment" or "disguised unemployment". In most LDCs and developing countries, rural workers are not very productive since there is not enough work to employ the entire rural labor force full time (Gillis et al., 2001).

The first is Engel's law, which describes a phenomenon that the proportion of budget spent on food declines as the income of the household increases (Gillis et al., 2001). Under the effect of Engel's law, the demand for agricultural products would not grow as rapidly as the demand for non-agricultural goods and services. Correspondingly, as income rises, the share of agricultural products and labor force declines (Gillis et al., 2001; Dennis and Iscan, 2009).

The second explanation for the decline in agriculture's share of a growing economy is the productivity growth in agriculture both in absolute and relative terms (Dennis and Iscan, 2009). With an absolute agricultural productivity growth, the agricultural sector has the ability to produce more food and raw materials. At the same time, due to the effect of Engel's law, there is a declining demand for agricultural products as income increases. Consequently, the supply of farm products exceeds the demand. This serves as a prerequisite condition for rural surplus labor to move out of agriculture.

If technological advance were sufficiently biased in favor of agriculture, relatively higher productivity growth in the agricultural sector will lead to a relative increase in the demand for industrial goods and services. As a result, there would be a rise in the price of non-agricultural products relative to agricultural products, which pushes rural workers to hire out their labor for more income. This effect is also refered to as the "Baumol effect" (Dennis and Iscan, 2009). By investigating the role of agricultural productivity growth in the process of structural transformation, Dennis and Iscan (2007) find that the increase in relative agricultural-non-agricultural productivity is responsible for one-fifth to one-third of the observed rural-urban labor migration in the U.S.

The third factor that drives the movement of labor resource is called the "Rybczynski effect". This theorem implies that an increase in the endowment of capital will lead to a more than proportional expansion of the production of capital-intensive goods, and will cause a decrease in the production of the labor-intensive goods. Traditionally, agriculture is labor-intensive while manufacturing is more capital-intensive. Thus, when an economy's factor endowment begins to include more capital, there would be an absolute decline of the output of agriculture, and resources, such as labor and capital, will be withdrawn from agriculture and transferred to the more capital-intensive non-agricultural sectors (Sun et al., 2007).

Among the three explanations of labor mobilization, the rising agricultural productivity is essential. This factor has channeled land reform with structural transformation due to the positive effect of land reform on agricultural productivity growth: (1) the increased agricultural productivity guarantees adequate food supplies with low food costs; (2) surplus agricultural products can be exported to finance non-agricultural sectors; and (3) rapid agricultural productivity growth facilitates labor migration out of agriculture (Johnson and Mellor, 1961; Johnston and Kilby, 1975; Gillis et al., 2001, and Gollin et al., 2002). Detailed explanations are as follows.

First, by transferring land from large landholders to small family farms, land reform provides an incentive to small farmers to work harder on their own farmland. The increased agricultural production ensures the supply of food, which is of major economic significance in an underdeveloped country with rapid population growth. The failure to provide enough agricultural products will most likely drive up food prices and wage

rates, which would have adverse effects on industrial profits, and eventually bring growth to a halt (Johnston and Mellor, 1961). Moreover, if the domestic market cannot provide enough food as it needs, some developing countries will choose to import agricultural products from the international market using their limited foreign exchange or even through borrowing. Correspondingly, the available funds for industrial development are reduced.

Second, land reform makes an indirect significant contribution to capital formation for modern economic growth, especially in the early stages of development. As mentioned above, large farms tend to emphasize the use of capital instead of labor (Berry and Cline, 1979). Under this circumstance, agriculture obtains more capital resources than necessary and leaves less capital for non-agricultural development. This type of operation leads to social inefficiency, especially for capital-scarce and labor-abundant underdeveloped countries. Land redistribution alleviates such inefficiency by making agricultural production follow a labor-intensive approach (Dovring, 1970). Consequently, capital resources for non-agricultural sectors increase.

The increase in agricultural productivity also enables agricultural exports, which have an important role to play in the growth of rural income and serve as a major earner of foreign exchange. Higher rural income not only enlarges rural markets for industrial goods and services, but also finances industrial expansion and infrastructural development through tax collection (Johnston and Mellor, 1961). Also, the capacity of providing food supplies in pace with the growth in demand reinforces capital accumulation by improving the terms of trade on which the non-agricultural sectors

obtain food and raw materials (Johnston and Mellor, 1961).What is more important, the inflow of capital from exporting agricultural products can be used to import manufacturing equipment and technologies.

Before analyzing the relationship between land reform and labor migration, some restrictions that might hinder the movement of labor out of agriculture should be addressed. First, the marginal product of labor is quite low on small farms due to their "income sharing" character. Meanwhile, non-agricultural sectors offer job opportunities only to the point that the marginal product of labor equals or exceeds the average product of labor. Thus, it is difficult for a surplus laborer from a small farm to find a job in the non-agricultural sector (Koo, 1968). Second, labor migration incurs costs, such as transportation cost and settlement fees (Koo, 1968). As a result, rural laborers generally have low preferences for migrating to urban settings.

Land reform could stimulate labor migration from both the supply and the demand side through its positive effect on agricultural productivity growth. In the view of the supply side, an increase in absolute agricultural productivity enables a small farm household to keep or even expand agricultural production with less labor. Thus, there is an underemployed labor force that can be drawn from agriculture. Additionally, evidence suggests a negative relationship between farm size and the dependence on off-farm sources of income (Chinn, 1979). Hence, the smaller farm size after land reform combined with the impact of relative productivity growth encourages farm households to obtain off-farm job opportunities. Also, due to the positive association between income and educational attainment, higher rural income generally results in higher human capital

accumulation in rural areas (Deininger and Nagarajan, 2009). This will help rural labor achieve the skill requirement of modern sectors. Furthermore, the improvement of infrastructure, such as transportation, makes it easier for the rural labor force to migrate to urban areas.

On the demand side, agricultural development facilitates industrialization and thus results in a rising demand for labor in non-agricultural sectors. The increased capital accumulation and the enlarged domestic market, which partly resulted from agricultural development, promote the expansion of non-agriculture sectors (Johnston and Kilby, 1975). Also, sufficient food supplies help to keep food prices and urban wage rates low, so that non-agricultural sectors can afford to hire more labor (Johnston and Kilby, 1975). Additionally, some land reform policies provide incentives for former landowners to develop small businesses. The development of small family entrepreneurships creates many off-farm job opportunities for rural surplus labor.

In summary, land reform facilitates agricultural productivity growth and indirectly promotes structural transformation. First, raising agricultural productivity guarantees adequate food supplies and helps to keep food prices and wage rates low. Second, increased agricultural production facilitates both physical and human capital accumulation. Third, absolute and relative agricultural productivity growth stimulate the rural labor surplus to migrate and to support industrial development.

Chapter 3: Land Reforms in Japan, Taiwan, and South Korea

After World War II, Japan, Taiwan, and South Korea underwent aggressive land reforms in rural areas with the assistance of U.S. military force. At that time, agriculture was the predominant sector in all three economies. Their agrarian structures were characterized by large rural populations, few natural resources, and limited farmland. The following chapter discusses the contexts and measures in which land reforms were implemented country by country. The impact of land reforms on the distributions of land and income are also examined.

3.1 Japan

Before World War II, Japanese agriculture was characterized by an extreme scarcity of arable land and an abundant rural population. It also featured unequal land distribution and prohibitively high tenancy rates. For example, while only 16 percent (nearly 15 million acres) of the total land area was under cultivation, approximately 47 percent of Japan's population was rural (Grad, 1948). Among the large volume of rural population, the wealthiest 3.2 percent of the farm households owned 30 percent of the cultivated land. Moreover, on average, 46 percent of the cultivated land was under a tenure arrangement in 1940 (Ryoo, 1980). Under these circumstances, landowners usually took advantage of their bargaining power to set the terms of the tenure contract in favor of themselves. Tenants paid more than 50 percent (mostly in kind) as rent, and had no protection against the tenure contract.

The tension between landowners and tenants had accelerated after World War I, when a rapid decline in farm prices affected rural society, especially for the poor small farmers and tenants. One symptom of the tension was the increasing number of tenant-landlord disputes, with tenants demanding rent reductions and the protection of their cultivating rights. [4] These disputes caused social instability and political conflict (Takigawa, 1972).

The land reform in postwar Japan was executed from 1947 to 1949 under the guidance of the American Occupation Forces. Before the reform, land tenure conditions were thoroughly surveyed. Aiming at equalizing the wealth of rural society through the redistribution of farmland, drastic measures were taken. [5] Owner cultivators were limited to keep no more than 3 *cho* of farmland on average. [6] Absentee landowners, who did not reside in the same village of the leased out land, were forced to sell their farmland to the government. The purchase price was calculated by multiplying the rental value by a fixed factor and the payment to landlords was amortized for 30 years at an interest rate of 3.6%. Some government-owned lands, such as former military land, were also sold to tenants and part-owner farmers. For the remaining tenants, they were given guarantees of security of tenure and low rents. Finally, the government took measures to maintain the price of rice at a level well above the world prices to support farm incomes.

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[4] As a result, tenancy disputes increased dramatically from a total of 326 cases in 1919 to 6,824 cases in 1935 (Takigawa, 2007).
[5] For details about Japanese land reform see Dore (1959).
[6] 1 *cho* = 10 *tan* = 0.99174 hectare = 2.45072 acres.
Except for Hokkaido (one of Japan's prefectures), where landowners can keep at most 12 *cho* of agricultural land.

The Japanese land reform was implemented effectively. Tuma (1965) argues that the American Occupation Forces were instrumental in the execution of the land reform.

The legal foundation of the land reform was the Agricultural Land Adjustment Law Revision. It regulated the implementation of land reforms and land tenure arrangements. The Agricultural Land Commissions were responsible for specific executions of the land reform. The Commission had three tiers: Central, Prefectural, and Local. Local Land Commissions were the actual executors of the reform, which was formed by five tenants, three landlords and two owner-cultivators. Only with the consensus of the Local Land Commission could the property rights of land be transferred. This structure prevented land from reverting back to landlords (Grad, 1948).

The results of Japan's postwar land reform were remarkable. By August 1950, 1,337,000 *cho* of rice land and 796,000 *cho* of upland had been transferred from 2,341,000 landlords to tenants and owner-cultivators. It benefited 4,748,000 tenants. The ratio of owner-cultivated land to total cultivated land increased from about 47 percent in 1941, to 61 percent as of August, 1947, and to 93 percent in 1950. The ratio of tenant farmers, including part-tenants, to total farmers decreased from 43.5 percent in 1947, to 9 percent in the end of 1950. On the other hand, the number of owner-cultivators, with part-owners, increased from 56.5 percent in 1947 to 91 percent in the end of 1950 (see Table 1). Although distributional data on land ownership are unavailable (Tuma, 1965), one can presume that land distribution was equalized significantly based on the large scale land redistribution and the reduced average size of plots. As a consequence of the land reform, the class of landlords in Japan was effectively abolished (Kawagoe, 1999).

In addition to land ownership, the condition of rural income distribution had been improved. On the one hand, over 50 percent of ex-tenants had been removed from the heavy burden of land rents. For the remaining tenants, the rental rate dropped from 50 percent of the production cost of rice before land reform to around 3 percent. As a result, former tenants' farm income increased by more than 40 percent as compared to prewar times (Ryoo, 1980). On the other hand, the rapid inflation during the postwar disarray caused a significant depreciation of payments made to former landlords (Kawagoe, 1999). Additionally, due to land redistribution, large landlords lost their major sources of income, such as interest on land capital and crop rents. The share of land rental income to national agricultural income decreased from 30-40 % before the reform to only 3-4% after the reform (Ryoo, 1980). In contrast, the labor income of cultivators increased to about 90% of total national agricultural income from the 50-60% that was recorded before the land reform (Ryoo, 1980).

3.2 Taiwan

Taiwan has experienced two different stages of agricultural development. The first stage was from 1895 to 1945, when Taiwan was under Japanese administration. In the hope of turning Taiwan into a food supply base for Japan, the colonial government implemented large-scale irrigation and flood-control projects, and pushed the adoption of chemical fertilizer and new seed varieties (Cheng, 1983). These technological advances resulted in an increase in total agricultural output by 150 percent between 1910 and 1937 (Myers and Ching, 1964).

In spite of the rapid agricultural growth, Taiwan's agriculture had widespread tenancy and uneven land distribution. There was about 55-60 percent of the total population engaged in agriculture, of whom 70 percent were tenants or part-tenants (Koo, 1968). In terms of land distribution, 6 percent of the farm households owned half of the cultivated land, while 43 percent of the farm households possessed only 6 percent of the farmland (Ryoo, 1980).

After World War II, Chiang Kai-shek, the military leader of the Chinese Nationalists (Kuomingtang, KMT), and his government in Taiwan set their priority as the development of Taiwan's agriculture in order to safeguard their political control (Thompson, 1984). With the assistance of the Sino-American Joint Commission on Rural Reconstruction (JCRR) ,[7] the Nationalist Government carried out an effective land reform between 1949 and 1953.

The reform proceeded in three stages.[8] The initial stage was the farm rent reduction program. In 1949, the government limited the rents to 37.5% of the total main crop (usually rice) yield. Prior to the land reform, the rental was approximately 50% to 70% of the total annual main crop yield. The government also set regulations for farm lease contracts to protect tenants' rights.

The second stage involved the sale of public land. From 1948 to 1958, arable public farmlands were sold to the incumbent cultivators at a price of 2.5 times the average

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[7] The JRCC was an institution for administering U.S.'s aid to Taiwan. It effectively promoted and monitored Taiwan's land reform (Moore, 1993).
[8] See Cheng (1961) for details of the Taiwanese land reform.

annual yield of the main crop. Farmers could pay the sale price in 20 semiannual

installments. Each farm household was limited to 0.5 to 2 *chia* of paddy and 1 to 4 *chia*

of dry public land.[9] According to Koo (1968), the annual installment would be about 25

percent of the annual main crop yield. When added to the land tax, which ranged from

4.5 percent to 7.5 percent of the total annual main crop yield, the burdens of farmers who

purchased public land would not exceed tenant rents (37.5 percent of the annual yield

after rent reduction program).

The third and final stage of land reform in Taiwan, the land-to-the-tiller program, was

promulgated in 1953. Similar to the program in Japan, the Taiwanese government set a

ceiling on the acreage of farmland that one household could keep. According to the

regulations, each farm household could own at most three *chia* of medium-grade paddy

field or six *chia* of dry land. Any excess land was purchased by the government and sold

to the current tenants at a price of the annual yield of the main crop multiplied by 2.5.

Farmers who purchased the land were allowed to pay in installments over a 10-year

period. In addition, the Taiwanese government provided a production fund with low rates

of interest. For the interests of former landlords, they were encouraged to convert their

landholdings into industrial holding by enjoying a favorable price of stocks of state-

owned industries (Koo, 1968).

Efficient administration guaranteed the success of Taiwan's land reform. Each level of

government, the JCRR, and farmers' organizations contributed to the effective execution

of land reform. For example, the government conducted massive inspections and

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[9] 1 *chia* = 0.96992 hectare = 2.39680 acres.

supervisions in an attempt to enforce law throughout rural areas. Moreover, since

programs in Taiwan were enacted in a sequence, the process of implementing the reform

was smooth and peaceful (Ryoo, 1980).

Land reform in Taiwan also achieved huge success from the perspective of more

equalized distributions of land. As an intermediate effect of land reform, about 70 percent

of all the public and private leased land had been transferred (Ryoo, 1980). By area, the

share of tenanted land to total land decreased from 40% to 14% (Ryoo, 1980) (see Table

1). As to tenure status of farm household, the change is more dramatic. Table 1 shows

that almost 40 percent of the farmers were tenants before the reform. This percentage

decreased sharply over the years and became 17% in 1955 and 11% in 1970. According

to You (2008), the land Gini coefficient for rural Taiwan decreased from 0.58-0.62 in

1950 to 0.39-0.46 in 1960.

As in Japan, the land reform not only led to a wider distribution of land ownership, but

also to a smaller size of holdings. After the reform, the percentage of land holding size

below 3 hectares increased from 58 percent in 1952 to 77 percent in 1955, and amounted

to 85 percent in 1960 (Ryoo, 1980). In summary, the uneven and concentrated

distribution of land ownership had been improved remarkably after Taiwan's land

reform.

In addition to a more equal land distribution, the rural society of Taiwan saw a significant

change in the pattern of income distribution. On the one hand, the tenants and the new

owner-cultivators experienced increasing incomes. At first, the effect of the rent

reduction program contributed significantly to the increased income. In later years, the impact of the switch of landownership became much more pronounced (Koo, 1968). According to a report from the Taiwan Provincial Food Bureau, 85 percent of the total increase of farmers' income came from reduced rent in 1949; in 1960, the proportion decreased to 24 percent. On the other hand, due to the rent reduction program, landlords received less rent than before. The reduced rent also lowered land prices, which resulted in a decline in the return of investment in farmland. Altogether, ex-landlords suffered a capital loss. The income Gini for rural Taiwan dropped from 57.4 in 1953 to 32.7 in 1964 (You, 2008).

3.3 South Korea

Prior to 1945, when South Korea was under Japanese rule, it was largely a rural-based country with over 75 percent of its population living in rural areas (Kay, 2002). The land tenure system in Korea was highly skewed such that 2.7 percent of farm households possessed nearly two-thirds of the land, yet most of the land was cultivated by tenants (You, 2008). Tenants were mainly sharecroppers struggling to make ends meet. With respect to the income distribution, 4 percent of the rural population received almost half of the main crop or around one-quarter of farm income (Ban et al., 1980). The relationship between tenants and landlords was strained. Once the Japanese colonization ended, there were widespread peasant-based protest movements involving the refusal to make rental payments and strikes by tenants (Jeon and Kim, 2000).

After 1945, the U.S. military government implemented the first phase of land reform in South Korea.[10] In order to enhance political control, the U.S. occupation was in general supportive of tenants. They distributed over 280,000 hectares of former Japanese land, which was bout 13-15 percent of total arable hectares, to 588,000 former tenant-cultivators (Dorner and Thiesenhusen, 1990). In addition, the U.S. military government set the rental rate at a maximum of one third of the annual crop yield, which was much lower than the 60 percent that prevailed before 1945.

When South Korea became independent, its government implemented the second phase of the land reform in 1950. The implementation of land reform was based on a nationwide farm household survey. According to the Agricultural Land Reform Amendment Act (ALRAA), individuals were limited to own three *jungbo*[11] of land at most and only if they cultivated or managed the farmland themselves. Moreover, in order to strengthen the achievements of land reform, the law made it illegal to rent out farmland (Jeon and Kim, 2000).

Additionally, the government purchased nearly 330,000 hectares of farmland from ex-landlords and sold it to tenant farmers. The ex-landlords were paid 1.5 times the annual yield over 5-year annual installments. However, the actual reimbursement period lasted for more than 10 years and the payments were made in cash at cheaper prices than stated in the contract. Under these circumstances, landlords found it more attractive to sell their lands directly to tenants at a 'negotiated price' instead of going through the government

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[10] The United States controlled South Korea from October 1945 to August 1948 (Jeon and Kim, 2000).
[11] 1 jungbo = 0.992 hectare.

intermediation. As a result, over 500,000 hectares of farmland were sold voluntarily from landlords to tenants (Ban et al., 1980).

Execution of the South Korean land reform was facilitated by the existence of a relatively competent bureaucracy. The land reform was quite fruitful in terms of equalizing land and income distribution. In 1944, 64 percent of the farmland was owned by only 2.9 percent of farm households. After the completion of land reform, approximately the same proportion of farmlands belonged to 51 percent of households (see Table 2). By land tenure status, in 1945 the ratio of tenant-cultivated land to total farmland was about 64 percent; this figure decreased to 18% by the end of the land reform. Similar to Taiwan, the improvement in farmers' tenancy status was more notable. While 48.9% of farm families were tenants in 1945, only 7% of farm households were tenants after the land reform (see Table 1).

On the side of income distribution, since the government compensated former landlords at a price lower than the market price, the landowners received reimbursement valued only between one-sixth and one-quarter of their former assets (Ban et al., 1980). By contrast, ex-tenants, who purchased land from the government, paid less than the contract price as a result of a large discount offered by the government. Ex-tenants, who paid the entire land price and were removed from the burden of rents, enjoyed an increase of 33 percent of per-capita income (Ban et al., 1980). All in all, the top 4 percent of the rural population (ex-landlords) lost 80 percent of their income, which correspond to a 20 to 30 percent increase in the income of the bottom 80 percent of ex-tenants (Ban et al., 1980).

To sum up, after their thorough land reforms, Japan, Taiwan, and South Korea all achieved low levels of inequality in terms of the land and income distributions. The following chapter will estimate the impact of land reforms on structural transformation by investigating the changes in agricultural productivity and agricultural employment.

Table 1

Land tenancy before and after land reform in Japan, South Korea, and Taiwan

Tenancy Status of Farm Households (percentage)			Tenancy Status of Cultivated Land (percentage)		
	Owner Cultivator	Tenant Cultivator		Operated by Owner Farmers*	Operated by Tenant Farmers**
Japan			*Japan*		
1947 (Before land reform)	56.5	43.5	1941	47	
1950 (After land reform)	91	9	1947	61	39
1965	95	5	1950	93	6.2
Taiwan			*Taiwan*		
1946 (Before land reform)	60.9	39.1	1949	61.27	38.73
1955 (After land reform)	82.6	17.4	1961	85.93	14.07
1970	89.1	10.9	-	-	-
South Korea			*South Korea*		
1945	51.1	48.9	1945	36.7	63.6
1965	93	7	1965	82	18

Note: * Owner farmers include owner-farms, who own 90% or more of the land they

cultivate, and owner-tenants, who own 50% to 90% of the land they cultivate.

** Tenant farmers include tenant-owners, who own 10%-50% of the land they cultivate,

and tenants, who own less than 10% of the land they cultivated.

Source:

Data for Japan is taken from Ryoo (1978) and Dore (1959);

Data for Taiwan is taken from Ryoo (1978) and Cheng (1961);

Data for South Korea is taken from Ban et al. (1980).

Table 2

South Korea: distribution of land before and after reform

Period	% of Household	% of Farmland	Area(ha) per household
Pre-Reform (1944)	48.6	0	0
	48.5	36.6	0.8
	2.9	63.4	26
Post-Reform (1956)	42.8	17.6	0.3
	51.1	64.8	1.1
	6.1	17.6	2.6

Source: Putzel (2000, Table 3).

Chapter 4: Structural Transformation

The last chapter estimated distributional effects of land reforms in Japan, Taiwan, and South Korea. As analyzed in Chapter 2, land reform has positive impacts on structural transformation. The main mechanism by which land reform affects the pace of structural transition is agricultural productivity growth. Expanded agricultural productivity and output allow labor surplus to migrate out of agriculture to support manufacturing development; productivity growth provides food for the growing population, and by exporting agricultural products, it supports industrial augmentation with more foreign exchange and an expanded domestic market for non-agricultural goods.

Prior to land reforms, all three societies were highly rural with abundant labor supplies and scarce capital. After land reforms, these economies transformed into industrial-based economies within a relatively short time. The purpose of this chapter is not to empirically estimate any causal links between land reforms and the three economies' remarkable success in structural transformation, but to illustrate some quantitative facts related to structural change before and after land reforms.

Variables that will be examined in this chapter are: agricultural output and productivity, agriculture's share in the total labor force and in the total output, and educational attainment. First, as addressed in the conceptual framework, by redistributing farmland from large landholders to small farmers, land reform provided new owner-cultivators with incentives to invest more and work harder in farmland. Also, with supportive programs and services, land reform is thought to be effective in raising agricultural

efficiency. Thus, one would expect to see increases in agricultural output and productivity in the three economies after land reforms.

Growth in agricultural productivity can be captured by the measurement of total factor productivity (TFP), which is the ratio between total output and total inputs. Growth in TFP is then the difference between aggregate output growth and aggregate input growth (Oshima, 1986). TFP can be taken as a measure of the underlying rate of technological change. With regard to structural transformation, I also examine data on average labor productivity – output per worker in agriculture. Only when agricultural labor productivity increases can the labor surplus be shifted out of agriculture without reducing output.

Second, the decline of agriculture's share in employment and total output are the central features of structural transformation. Sources of agricultural decline in overall employment can be summarized as nonhomothetic preferences (Engel's law), relative productivity growth in agriculture (Baumol effect), and factor endowments (Rybczynski effects). As analyzed in Chapter 2, land reform indirectly affects all three channels and the process of structural transformation. First, land reform has a positive impact on raising rural income. Under the effect of Engel's law, higher income means a growing demand for industrial goods and a declining demand for agricultural goods. Second, with secured property rights as a result of land reform, small farmers have motivations and capacities to invest in their own farmland, including applying more advanced technologies in farming. This technical change reinforces agricultural productivity growth, and stimulates the movement of rural labor to urban areas. Third, land reform facilitates capital accumulation in non-agricultural sectors. If manufacturing is more

capital intensive, then when an economy's factor endowment begins to include more capital, resources will be withdrawn from agriculture and transferred to manufacturing sector (the Rybczynski effect) (Sun et al., 2007).

Third, the increased accumulation of rural human capital after land reform accelerates the process of labor migration and makes the reallocation of labor efficiently. By increasing agricultural income, land reform reduces the financial barriers to education for the rural population (Koo, 1968). Thus, one would expect increases of educational attainment after land reforms in the three economies.

On the rural side, higher education makes it easier for cultivators to accept new technology and to invest more in their farmland. Consequently, agricultural productivity rises. The likelihood of skilled labor being hired in non-agricultural sectors increases. Thus, they are more likely to migrate to the urban areas. On the urban side, the endowments of cheap but relatively well educated labor facilitate these economies' industrialization process. One of the primary reasons that led to the three economies' remarkable success in economic development was their ability to borrow technology from advanced economies (Honma and Hayami, 2008). The large amount of skilled labor that had migrated from agriculture made the initial borrowing of labor-intensive technologies more efficient and the later switching to capital/knowledge-intensive technologies smoother.

4.1 Japan

After land reform, Japan experienced rapid growth in agricultural output and productivity. In the period from 1880 to 1935, the average annual growth rate of agricultural output was 1.6 percent. This figure increased to 3.6 percent during the period from 1955 to 1965 (see Table 3). Almost 81 percent of this output growth can be explained by the growth in TFP, which indicates the fast technical change in Japan's agricultural sector.

The growth of TFP came from two possible sources. First, the Japanese government heavily invested in agricultural infrastructure, including irrigation, drainage facilities, and road construction. Second, after ex-tenant farmers became owner-cultivators, they had elevated incentives to invest on their own farmland, such as improving land qualities and applying small farm machines (Kawagoe, 1999).

The remarkable advances in technical change caused rapid agricultural labor productivity growth: from 1.2 percent in the 1901-37 period to 5.9 percent after the land reform. The change in labor productivity in agriculture is almost the same as in the non-agricultural sectors (6.1% for non-agriculture) (see Table 4).

Rapid productivity growth stimulated the labor migration in Japan. Before land reform, the labor force in agriculture was constant at 14 million, which accounted for approximately 64 percent of total employment in Japan (Hayashi and Prescott, 2008). After land reform, the share of the labor force employed in agriculture decreased to about 49 percent in 1950, and to 11 percent by 1980 (see Table 5). Hayashi and Prescott (2008)

argue that Japan's pre-World War II stagnation was largely due to its limited labor

migration. With regard to agriculture's contribution to the overall economy, the share of

agriculture in gross domestic product (GDP) decreased over time after the land reform,

from 17 percent in 1955 to 9 percent in 1960 (see Table 6).

4.2 Taiwan

Taiwan experienced notable agricultural development after land reform. The annual

growth rate of agricultural output reached 3.6 percent during 1952-80, which was the

highest among the three economies (see Table 4). The improvement in TFP accounted

for about 60 percent of total output growth. The remaining 40 percent of the output

growth came from the substantial increases in labor and capital inputs.

For the input of labor, not only there were more farm workers in 1960 than in 1953, but

also each worked harder than before (about eight more days a year on the average) (Koo,

1968). The annual growth rate of labor productivity was 4.2% during the period from

1952 to 1980 (see Table 4). Moreover, capital inputs increased even more dramatically,

especially in materials and fertilizers (Koo, 1968). During the period of 1952-80, the

annual growth rate of capital inputs in agricultural production was 6.2 percent (see Table

4).

The increased agricultural productivity and output after land reform contributed to labor

out-migration from agriculture. At the beginning of land reform, agriculture accounted

for 63 percent of the total labor force. By 1980, this figure dropped to only 28 percent

(see Table 5). This change indicates that about 35 percent of the labor force was

transferred to the non-agricultural sector within only 30 years. Young (1995) argues that the rural-to-urban migration was the main cause of Taiwan's rapid structural transformation.

In line with the decreased share of labor force, agriculture's share in output also decreased after land reform. When the Taiwanese land reform was just completed, agriculture's share of GDP was about 29 percent. Within only 15 years, the ratio dropped to approximately 15 percent in 1970 (see Table 6). Sun et al. (2007) examine the three drivers of agriculture's declining share in total output as mentioned above. Their results show that the changes in factor endowments in the whole economy play the major role, and the influence of Engel's law is positive but small. For instance, during the period from 1952 to 1980, the growth rate of capital per worker in agriculture was 6.8 percent, and it was higher than the rest of the economy (4.3% in whole economy, 6.5% in the secondary sector and 1.6 % in the tertiary sector) (see Table 4).

4.3 South Korea

Since 1954, Korean agriculture has entered a long-run steady and sustained growth path. The annual growth rate of total agricultural output increased from 1.4 percent during 1920-1939 to 2.4 percent from 1953 to 1980 (see Table 4). For a shorter time span, the average growth rate of agricultural output was 3.19 percent between 1954 and 1973 (Ban et al., 1980). While the primary source of output growth in Japan and Taiwan was the improvements in TFP, the substantial increase in capital inputs was the most important contributor to South Korea's agricultural output growth. Before the land reform, the annual growth rate of capital inputs to agricultural production was only 1.5 percent, while

after land reform this figure increased to 7.9 percent. Moreover, the annual growth rate of capital per worker in agriculture was 7.6 percent, which was higher than that of non-agricultural sectors (see Table 4).

Upon closer examination of agricultural productivity data, during the period from 1954 to 1973, labor productivity increased at a rate of 2.85 percent and land productivity increased at 2.65 percent. According to Ban et al. (1980), the increase in land productivity resulted from improvements in land quality, increased application of fertilizer and changes in the product mix. The influences of land reform on farmers' incentives to invest in their own farmland are thought to be a major cause.

In spite of its sustained growth both in output and productivity, agriculture made a smaller and declining contribution to the South Korean economy. Agriculture's share in GDP decreased over the years after land reform. In the mid-1950s, agricultural output made up almost 47 percent of total GDP. When industry and exports took off after 1964, the share of agriculture had fallen to 29 percent of GDP in 1970 (see Table 6).

After the land reform, agricultural labor force became a much smaller fraction of the total labor force than in the pre-war period. For instance, while the share of employment in agriculture was 77 percent in 1950, by 1980 only 37 percent of the labor force was employed in agriculture (see Table 5).

In sum, Japan, Taiwan, and South Korea all experienced rapid structural transformation from predominantly agricultural societies to industrial-based economies. After land reforms, these economies not only achieved rapid increases in agricultural output, but

also attained rapid productivity gains. Meanwhile, agriculture's share in the total labor force and overall output decreased dramatically in all three economies.

4.4 Educational Attainment

As analyzed above, the sustained impact of land reform on structural transformation starts with the accumulation of rural human capital. In the case of Japan, Taiwan, and South Korea, all witnessed increases in the educational level of farm households after land reforms.

In Japan, there is a positive relationship between personal income and school enrollment (see Table 7). Although separate data for rural areas is unavailable, given its large share in total population, the national data for educational attainment as a whole still suggests a rising trend of school enrollment in rural areas. In fact, in the early 1970s, the urban-rural variance in school enrollment almost vanished (Ryoo, 1980). According to Barro and Lee (2010)'s estimation, the average years of schooling in Japan increased from about 6.9 years in 1950 to 8.2 years in 1970. The share of population without education reduced to 0.7 percent in 1970 from 4.4 percent in 1950. Taiwan and South Korea experienced even more rapid increases in the accumulation of human capital after land reforms. Within 20 years, the average number of years of schooling increased nearly two years (from 4.3 to 6.1 in Taiwan and from 4.5 to 6.3 in South Korea) (Barro and Lee, 2010) (see Table 8).

Table 3

Japan: annual agricultural compound rates of growth

Period	(1) Agricultural output	(2) Agricultural inputs	(3) Agricultural TFP	(4) (3)/(1)
1880-1900	1.6	0.4	1.2	75.0%
1900-1920	2	0.5	1.5	75.0%
1920-1935	0.9	0.5	0.4	44.4%
1955-1965	3.6	0.7	2.9	80.6%

Source: Johnston and Kilby (1975, p. 237).

Table 4

Average annual growth of output, inputs, and TFP in Japan, Taiwan, and South Korea,

pre- and postwar years (%)

	Product	Labor	Capital	Total Inputs	Product per	Product per Capital	Capital per Worker	Total Factor Productivity
Overall Economy								
Japan								
1908-38	3.5	0.8	3.4	1.8	2.7	0.1	2.6	1.6
1953-80	7.4	1.4	9.8	3.9	6	-2.4	8.4	3.5
Taiwan								
1911-20 to 1931-38	3.8	1.5	5.3	3	2.3	-1.5	3.8	0.8
1952-80	9.1	3.1	7.4	4.4	6	1.7	4.3	4.7
South Korea								
1920-38	3.5	0.6	7.9	2.8	2.9	-4.4	7.3	0.7
1953-80	7	3	8.9	4.8	4	-1.9	5.9	2.2
Agriculture								
Japan								
1901-37	1.1	-0.1	1.2	0.5	1.2	-0.1	1.3	0.6
1955-80	1.9	-4	7.4	-0.6	5.9	-5.5	11.4	2.5
Taiwan								
1952-80	3.6	-0.6	6.2	1.4	4.2	-2.6	6.8	2.2
South Korea								
1920-39	1.4	0.5	1.5	0.4	0.9	-0.1	1	0.9
1953-80	2.4	0.3	7.9	2.6	2.1	-5.5	7.6	-0.2
Non-agriculture								
Japan								
1908-38	4.5	2	5.5	3.4	2.5	-0.9	3.5	1.1
1953-80	9	2.9	9.8	5	6.1	-0.8	6.9	4
Taiwan (secondary sector)								
1952-80	12	5.3	11.8	7.3	6.7	0.2	6.5	4.7
Taiwan (tertiary sector)								
1952-80	9.3	4.7	6.3	5.2	4.6	3	1.6	4.1
South Korea								
1920-38	5.9	4.3	-	-	1.6	-	-	-
1953-80	9.1	5.8	8.9	6.7	3.3	0.2	3.1	2.4

Source: Oshima (1986, Table 1).

Table 5

Agriculture's share of total labor

Coutry	1950	1960	1970	1980	1990
Japan	0.49	0.33	0.2	0.11	0.07
Taiwan	0.63	0.56	0.44	0.28	0.22
South Korea	0.77	0.61	0.49	0.37	0.18

Source: Larson and Mundlak (1997, Table B2).

Table 6

Share of agriculture in GDP (percent)

	Japan	Taiwan	South Korea
1955	17.4	28.9	46.9
1960	9	28.2	39.1
1970	4.2	15.3	29.2
1980	2.4	7.5	16.2
1990	1.7	4	8.9
2000	1.1	2	4.9

Note: Shares of agriculture in GDP include forestry and fisheries.

Source: Honma and Hayami (2008, Table 1).

Table 7

Japan: comparison between national income per capital and full-time upper secondary

school enrolment, 1950-58 (1950=100)

School Year	1951	1952	1953	1954	1955	1956	1957	1958
Index of per capita Income	109	117	123	124	136	146	155	163
Index of school enrollment	112	119	128	131	135	142	156	166

Source: Ryoo (1978).

Table 8

Educational attainment for total population, 1950 – 1970: Japan, Taiwan, and South

Korea

(Age group: 15 +)

	Japan			Taiwan			South Korea		
Year	No schooling (%)	Average Years of schooling	Population (1000s)	No schooling (%)	Average Years of schooling	Population (1000s)	No schooling (%)	Average Years of schooling	Population (1000s)
1950	4.4	6.894	53981	41.7	4.308	4525	27.8	4.506	11003
1955	3.4	7.386	59662	37.2	4.688	5137	22.8	5.127	12993
1960	2.4	8.007	65669	33.5	4.971	5888	42.6	4.338	14518
1965	1.4	7.825	73234	28.2	5.471	6961	31.7	5.471	16194
1970	0.7	8.199	79260	23.6	6.102	8853	24.3	6.343	18495

Source: Barro and Lee (2010).

Chapter 5: Supportive Policies

Land reform is not a one-shot, once-and-for-all cure for agricultural development and structural transformation. The objective of this chapter is to analyze the importance of supportive agricultural policies. Though Japan, Taiwan, and South Korea all started out in the postwar era with extensive land reforms, their pace of structural change was different, with Japan as the fastest and South Korea as the slowest. The differences of the three economies' development strategies might lead to these disparities.

Among the three economies, Japan experienced the fastest speed of structural transformation. For example, in 1980, only 11 percent of the total labor force was employed in agriculture in Japan, which was less than half of the share in Taiwan and less than one third of that in South Korea (see table 5). With regard to agriculture's contribution to the overall economy, in the year of 1970, agriculture only accounted for approximately 4 percent of Japan's total GDP, while the levels for Taiwan and South Korea were about 15 percent and 29 percent, respectively (see Table 6).

The extraordinary progress of structural transformation was largely due to Japan's long industrial experiences before World War II, extensive institutional reforms, and effective development strategies. [12] Before the postwar land reform, the Japanese government had recognized the importance of agricultural development. The government promoted the use of relatively high-yielding and fertilizer-responsive varieties of seeds, invested in

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[12] Kim (2001) and Oshima (1986) suggested that Japan may have gone through the initial industrialization between 1880 and 1920. However, the large volume of labor migration out of agriculture started only after the 1950s.

irrigation and drainage infrastructures, and encouraged agricultural research and technical innovations (Johnston and Kilby, 1975).

In the case of Taiwan and South Korea, the two economies share many similarities. First, before World War II, their rural societies were traditionally stratified across landlords, land-owning cultivators and tenants. Second, Taiwan and South Korea were both under Japan's administration in the prewar period. Japan had brought its institutions to the two economies – Taiwan since 1895 and South Korea since 1910. The primary institution was to grant titles to landowners through cadastral surveys, in return for landowners' payment of land tax (Honma and Hayami, 2008). Third, both Taiwan and South Korea implemented land reforms under the U.S. government's strong guidance and assistance.

Despite much similarity, the process of transformation in South Korea was slower than Taiwan, which might be due to historical differences and institutional disparities. First, given its sub-tropical climate, Taiwan is more suitable for agricultural production than South Korea. Thus, the Japanese colonial government built more agricultural infrastructure and research institutions in Taiwan, including irrigation and drainage systems, and the adoptions of new seed varieties and the use of chemical fertilizer (Dorner and Thiesenhusen, 1990). South Korea, on the other hand, inherited more industrial equipments since the colonial government of Japan found South Korea to be a good staging ground for the invasion of North China (Oshima, 1986). The Korean War in the early 1950s also had a devastating effect on South Korea's modernization process. These historical and natural differences, to some extent, might have influenced South Korea's lagged agricultural development (Oshima, 1986).

Second, there were significant differences in the two economies' industrialization strategies. The South Korean government set the development of capital-intensive heavy industry as a priority and neglected agriculture. Large volumes of financial capital flew into heavy industries which were located in a few big cities. In contrast, investments in labor-intensive agriculture and light industries were largely reduced. Infrastructure, such as road and agricultural research and extension systems, was less developed in rural areas. Moreover, the strong and strict control of the central government led to an inefficient allocation of resources at the local level. Consequently, there was a high concentration of industrial production in urban areas, and rural development was neglected (Oshima, 1986; Honma and Hayami, 2008).

Unlike South Korea, Taiwan focused on the development of labor-intensive manufacturers based on farm-supplied materials (Honma and Hayami, 2008). Many of the small/medium industries were located in rural areas, which created many off-farm employment opportunities for rural labor. Also, the export of agricultural products played an important role in Taiwan's structural transformation. The higher income earned through exports improved rural households' living standards and generated greater demand for industrial goods.

The disparities in the two economies' industrialization strategies resulted in different paces of their agricultural development, and further influenced their structural transformation processes. First, the concentration of large-scale industries in a few cities negatively affects the reallocation of rural labor surplus. Specifically, it prevents the expansion of off-farm employment. Larson and Mundlak (1997) suggest that the distance

to new employment opportunities is one of the critical factors that affect rural-urban migration. The closer the job opportunities, the lower the migration costs, and the higher the off-farm employment.

The limited off-farm employment in South Korea relative to Japan and Taiwan is reflected in its low share of off-farm income in total farm household income. In all three economies, this ratio increased as off-farm employment for the member of farm households increased (Honma and Hayami, 2008). In Japan, off-farm income accounted for more than half of the total farm income for small farm households in 1957. This ratio increased to about 92 percent in 1980. In Taiwan, the ratio was about 50 percent in 1958 and rose to 70 percent in 1980. In contrast, in South Korea, the off-farm income was still less than half of its total farm income in 1980 (see Table 9).

The smaller size of off-farm employment combined with a slower spread of mechanization in agriculture caused the relatively lower growth rate of South Korean agricultural TFP (2.5 percent for Japan, 2.2 percent for Taiwan, and -0.2 percent for South Korea during the two to three decades after land reforms) (Oshima, 1986). This in turn hampered rural labor migration.

In sum, South Korea's development strategy after land reform neglected agricultural development and failed to provide sufficient off-farm job opportunities to rural surplus labor. This is the main source of the relatively slower pace of structural transformation in South Korea compared to Japan and Taiwan after the land reforms.

Table 9

Average farm family income, off-farm income, and savings by size of farm in Japan,

Taiwan, and South Korea (in local currency)

Farm size	Farm family income (1)	Off-farm Income (2)	Savings (3)	(2)/(1) (4)	(3)/(1) (5)
Japan (Y 1,000)					
Large (>1.5 ha)					
1957	516.7	77.1	37.7	14.90%	7.30%
1980	4514.6	2415.5	708	47.50%	15.70%
Medium (1.0-1.5 ha)					
1957	373.2	92.5	21.2	24.80%	5.70%
1980	4379.7	3091.4	741.8	70.60%	16.90%
Small (<1.0 ha)					
1957	301.7	162.5	14.6	53.90%	4.80%
1980	4565	4215.9	971.6	92.40%	21.30%
Taiwan (NT$1,000)					
Large (>1.5 ha)					
1958	28.5	4.1	10	14.40%	35.10%
1980	363.4	154.2	157.1	42.40%	43.20%
Medium (1.0-1.5 ha)					
1958	21.5	5.2	6.4	24.20%	29.80%
1980	269.8	145	83	53.70%	30.80%
Small (<1.0 ha)					
1958	17.9	9	4.4	50.30%	24.60%
1980	224.2	157	56.2	70%	25.10%
South Korea (W 1,000)					
Large (>1.5 ha)					
1968	301.7	43.1	67.4	14.30%	22.30%
1981	7271	1185.4	3625	16.30%	49.90%
Medium (1.0-1.5 ha)					
1968	202.1	38.3	36.8	19%	18.20%
1981	5066.1	1195.6	2277.7	23.60%	45%
Small (<1.0 ha)					
1968	131.1	45.9	11.1	35%	8.50%
1981	3478.8	1572.9	1199.7	45.20%	34.50%

Source: Oshima (1986, Table A2).

Chapter 6: Concluding remarks

This thesis examines impacts of land reform on an economy's structural transformation process using Japan, Taiwan, and South Korea as examples. Land reforms in the three economies are complete and successful. The results suggest that land reform has a positive and long-run influence on structural transformation.

By redistributing land ownership from large landholders to small farm households, land reform resulted in more equal land and income distributions in rural areas of the three economies. With secured property rights, small farm households have incentives to work harder and invest more in their own farmland. The agricultural productivity measured by TFP and labor productivity had experienced notable increases after the land reforms.

The rising agricultural productivity is the fundamental mechanism that channelled land reform with structural transformation. The rapid growth of agricultural productivity after land reform contributed to the overall economy by releasing workers for employment in industry without reducing food supplies and guaranteed low cost of labor input. Meanwhile, the increase in rural income brought by land reforms resulted in higher educational attainment among rural populations and expanded domestic market for manufacturing products. The accumulation of human capital not only promotes the widespread dissemination of technology in agricultural production, but also makes the reallocation of labor surplus from agriculture to non-agricultural sectors more efficient.

In the case of Japan, Taiwan, and South Korea, the completed land reforms promoted a widened domestic market, more efficient labor allocation, more profitability for domestic

industry, and a faster structural transformation process. The three economies had witnessed rapid decline of agriculture's share in total output and employment after land reforms. The relatively slow pace of structural transition of South Korea compared to Japan and Taiwan suggests the importance of agricultural development and the balance between agricultural and industrial growth.

The land reform experiences in these three economies are instructive to LDCs and developing countries with abundant labor and scarce resources. However, land reform is not a once-and-for-all effort. The government needs to provide accompanied programs in favor of agriculture since agricultural development is vital for the overall development of the economy.

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