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Economic Development and Cultural Change is currently published by The University of Chicago Press.

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I. Introduction

The purpose of this study is to investigate the effects of agricultural land reform on the Korean economy. In addition to the land ownership transfer and the socioeconomic causes of the land reform, its effects on income redistribution and rice production will be addressed. This study emphasizes economic forces in terms of transaction costs as the cause of land reform, while most of the previous studies, by M. A. Taslim, for example, attributed its cause only to political factors.[1]

Most of the previous studies on land reform in Korea also have put emphasis only on the transfer of land ownership established by the Agricultural Land Reform Amendment Act (ALRAA) of 1950. In fact, the ratio of owner-cultivated land to total arable land reached about 96% in 1951 as a result of the ALRAA.[2] Unlike earlier work, however, we will investigate not only the sale of vested land by the U.S. military administration but also the transactions of land in the market pre-ALRAA.[3] The vested and redistributed land amounted to approximately 40% of the total land to be reformed, whereas the land sold by landlords in the market represents about 50% of the total, which is considered to be indirectly affected by the ALRAA. Also, there are noticeable effects of land reform on income redistribution and agricultural production. Therefore, we examined the entire process of the reform in order to identify its effects on the Korean economy.

Results of the analysis are summarized as follows. First, we claim that land reform evolved to reduce transaction costs. High transaction costs between landlords and tenants prevented the smooth functioning of the tenancy system. As a large majority, tenants gained political power

at the cost of landlords. Thus, ALRAA, a new and formal institutional arrangement, was established. Second, land reform redistributed income from landlords to other economic agents, including tenants, government, and the general public. This income redistribution is comparable to the predictions of the median voter theorem.[4] Finally, the abolition of the tenancy system increased agricultural production and positively affected economic growth.

The remainder of the article is organized as follows. In Section II we briefly explore the history of land reform and investigate the transfer of land ownership. Section III examines the political and economic causes of the land reform. In Section IV we discuss the effect of land reform on income redistribution, and its effect on rice production is analyzed in Section V. Finally, some closing remarks are offered in Section VI.

II. The History of Agricultural Land Reform

Agricultural land reform has been an important social and economic issue in Korea since the end of the Chosun Dynasty. A small number of the ruling class possessed most of the agricultural land, and high rental rates seriously deteriorated the economic life of tenants who comprised most of the population.

An article of agricultural land reform was listed in the Constitution of the Republic of Korea in 1948. Based on the Constitution, the ALRAA was drafted and actually became effective on March 10, 1950.[5] The ALRAA contains three main features: first, any individual can own agricultural land but only if he or she cultivates or manages it for himself or herself; second, one can own three *jungbo* of land at maximum;[6] and third, tenancy arrangements and land-renting activities are legally prohibited.

The land reform proceeded as follows. After surveying landlord-tenant relationships in June 1949, the government purchased the land from landlords with land securities under the provision of the ALRAA. Land securities specified the compensation period (5 years) as well as the price of land as a percentage of annual crop yields from the land. However, actual compensation was made by cash, and the compensation period was prolonged to more than 10 years for some of the land under reform. Generally, land reform was completed by the beginning of the 1960s, and 97.3% of the compensation for landlords was completed by the end of 1961.[7] Altogether, it took well over 10 years to complete the land reform process. In addition, the government sold the land to tenants who made payments with rice and, in fact, acted as an arbitrageur between landlords and tenants.

Previous studies maintain that the impact of the ALRAA on land reform is negligible at best, since the amount of land sold by landlords on the free market was larger than that of the land redistributed.[8] How-

TABLE 1

OWNERSHIP CHANGE IN AGRICULTURAL LAND AS A RESULT OF REFORM

Classification of Land	1,000 Jungbo (%)	
Redistributed land through ALRAA by the Korean government	302	(21.0)
Vested land owned by the Japanese and sold to individuals by the U.S. military government	273	(18.9)
Land freely sold by landlords in the market before ALRAA	714	(49.2)
Land excepted by ALRAA*	74	(5.1)
Hidden land, not reformed	85	(5.9)
Total land targeted for reform in 1945†	1,447	(100)

SOURCE.—Korea Agricultural Economic Research Institute (KAERI), *Nongchikae-hyoksa Yonku* (A study on the history of agricultural land reform) (Seoul: KAERI, 1989), pp. 1030–31.
    * 90% of the excepted land was for the management of private cemeteries.
    † Total land is not exactly equal to the sum of each item due to round-off error.

ever, such a claim does not take into account the indirect effect of the ALRAA. Although agricultural land ownership had to be transferred from landlords to tenants as provided by the ALRAA in 1950, it is evident that land reform actually started in 1945, when a majority of the sharecropping land was transacted in the market while the legislation for land reform was still in process. S. H. Chang shows that about 60% of the total land sold in rural areas from 1945 to 1950 was transacted from 1948 to 1949.[9] The sale of sharecropping land to tenants before the enactment of the ALRAA provided a good environment for success because it eliminated to a significant degree the resistance of landlords against agricultural reform.[10]

    A survey on the transfer of land ownership is presented in table 1. It shows that the vested and redistributed land amounted to 40%, while the market-transacted land reached 50% of the total land to be reformed. Table 2 shows the number of farmer households by tenure status. The number of owner-cultivating households increased drastically to 1,812,000 in 1950 from 349,000 in 1949, whereas the number of tenant farmer households decreased to almost zero in 1950. Since 1950, the number of tenant households gradually increased although the tenancy is illegal.[11]

III. Causes of Land Reform

There were two major forces that brought about agricultural land reform in Korea: economic and political. Prohibitively high transaction costs between landlords and tenants, and the strong political motives of land reform prevented the smooth functioning of the share tenancy system. There was a movement toward denying rental payments in the 1930s. Strikes against the tenancy system were frequent as well as destructive. While such disorder occurred in the agricultural sector, Korea in general

TABLE 2

NUMBER OF FARMER HOUSEHOLDS BY TENURE STATUS
(Unit = 1,000)

Year	Owner Cultivation	Tenancy	Mixed	Total
1937	550	1,581	738	2,869
1938	552	1,583	729	2,864
1939	540	1,583	719	2,842
1940	551	1,617	711	2,879
1941	548	1,647	723	2,918
1942	530	1,642	729	2,901
1943	536	1,481	984	3,001
1945	285	1,010	716	2,011
1946	337	990	810	2,137
1947	401	914	834	2,149
1949	349	1,133	992	2,474
1950	1,812	0	158	1,970
1959	1,808	43	406	2,257
1960	1,729	160	460	2,349
1965	1,742	176	589	2,507
1970	1,625	237	581	2,443

SOURCES.—Korea Agricultural Economic Research In-
stitute (KAERI), *Nongopsashipnyonsa* (The forty year history
of agriculture) (Seoul: KAERI, 1989), p. 106; The Chosun
Bank, *Chosun Kyongje Yongam* (Annual economic review of
Korea) (Seoul: The Chosun Bank, 1948), pp. iii–25.

was well controlled by the police and military forces of Japan during the
colonial period, from 1919 to August 1945. Immediately after the colo-
nial period, however, almost no social order was maintained. Later, the
social order of rural areas was preserved only by local committees, con-
sisting of tenants and small landowners. With the beginning of the U.S.
military administration, a movement of denying rental payments as well
as strikes demanding redistribution of the land previously owned by the
Japanese became frequent and violent in regions that were dominated by
committees and agricultural cooperatives. The target of the strikes was
soon extended to include land owned by Korean landlords.

    As Douglass C. North pointed out, an essential part of the function-
ing of institutions is the costliness of ascertaining violations and the se-
verity of punishment.[12] Such institutional costs varied significantly be-
tween pre- and post-1945. Although political motives of land reform had
been strong ever since the 1930s, land sales in the market did not occur
to a significant degree before 1945. Law enforcement costs were rela-
tively low before August 1945, as a result of the Japanese presence in
Korea. However, costs of negotiation and law enforcement rose due to
the weak or protenant government that prevailed in local areas from Au-
gust 1945 to the beginning of the U.S. military administration. The gov-
ernment was so weak that landlords had no means of ascertaining and

punishing violations of tenancy contracts, particularly in rural areas. For example, a landlord could collect as a share rent 1,500 *suk* of rice during the colonial period, 100 *suk* right after August 1945, and 400–500 *suk* after 1946 for the same acreage of sharecropping land.[13] This means that the share rent after 1945 was determined by tenants' discretion, not by a contract or negotiation. The decrease in share rent that the landlords could collect reflects increased transaction costs.

In addition, the landlords' political power became severely limited because of their pro-Japanese activities during the colonial period. At times even the personal security of landlords was in severe danger immediately after the colonial period. Transaction costs and law enforcement costs, in particular, rose so high by 1945 that landlords lost the incentives to keep their land. This phenomenon suggests that economic forces combined with political factors should explain the voluntary sale of land by landlords before the ALRAA became effective. In short, an inability of the government to secure socioeconomic order, combined with the political motives of land redistribution, were the reasons primarily responsible for the increase in transaction costs, which eventually broke down the tenancy system.

The ALRAA was made primarily for the purpose of income redistribution toward tenants at the cost of landlords. Tenants represented the largest portion of the population in the 1940s and 1950s. They were monolithic and strongly against sharecropping tenancy since the 1930s. As a large majority, they gained strong political power under the U.S. military administration. Furthermore, South Koreans with different ideologies, such as capitalism and socialism, were in severe confrontation, which resulted in social disorder after the colonial period. Approximately 77% out of 8,453 respondents in sample surveys that were conducted by the U.S. military administration in August 1946 responded "yes" in support of socialism and communism.[14] Also in 1946 the government of North Korea took landlords' land without compensation and distributed it to the people at no charge. Under such circumstances, the U.S. military administration wanted the South buffered from socialism and communism. Thus, it set the rental rate for tenancy at one third of annual crop yields, which was much lower than that before 1945. It also sold part of the vested land to individuals, which led landlords and tenants to expect that land reform would certainly materialize in the near future. In general, the agricultural policy of the U.S. military administration was in favor of tenants and against landlords.[15]

In 1948, when the new democratic government was established, the main socioeconomic issue was still land reform. Under democracy, the threat of communism and the redistribution of land in North Korea reinforced the political power of tenants, while the political power of landlords became increasingly limited, even though the Han-Min party, the ruling party of the South, represented the landlords. Without land reform

the government would not have been able to prevent most tenants from shifting to communism. Finally, the government of South Korea made the ALRAA effective. Both the agricultural policies of the U.S. military administration and the ALRAA were an endogenously determined governmental policy consistent with the intuition of the median voter theorem.

In sum, the increase in transaction costs combined with strong political motives of tenants for land reform led the landlords to sell their land voluntarily, and eventually these factors broke down the tenancy system.

IV. The Impact of Land Reform on Income Redistribution

The land reform also redistributed income among those involved, as the median voter theorem generally predicts. In this section, we examine this issue of income redistribution.

Demand for and supply of agricultural land increased simultaneously after August 15, 1945. The population of South Korea increased substantially because of the immigration of North Koreans and from foreign countries such as China. The population size increased to roughly 20.2 million in 1949 from approximately 16.9 million in 1945. This demographic change increased demand for land. However, landlords only sold 714,000 *jungbo* in the market, approximately 37% of the total arable land.

Had that amount of land not been sold in the market during such a short period, the price of the redistributed land would have been much higher. Redistributed land was priced by the National Assembly at 1.5 times its annual crop yields, slightly lower than the market price. The survey on the market price of land demonstrates that its median value was 1.5 to two times its annual crop yields, and its weighted average was approximately 1.52 times its annual yields. However, the price was much lower than its market price during the colonial period, approximately five times the annual crop yields from the land. This significant shift in land price seems to reflect the fact that the increase in the supply of land was greater than the increase in the demand for land.

Although the explicit value of the redistributed land does not seem to be much different from the market price, we get a quite different result if we calculate the present value, 1.5 times the annual yields. Landlords who sold their land in the market were usually paid in cash at the time of sale. Tenants who purchased redistributed land from the government had to pay 30% of the annual crop yields within 1 year and then the same amount annually for the subsequent 4 years. The present value of all such payments amounts to 0.795 times annual crop yields if the market interest rate is applied as the discount factor and to 1.123 times the annual yields if the discount rate of a bill is applied.[16] Subsequently, the government prolonged the payment period to 8 years. Approximately

70% of the total payment (cumulated) were made by 1954, 95% by 1960, and 100% by 1970. If we incorporate this extension of the payment period into calculating the present value, then the present value becomes much smaller than what we obtained from our previous calculations.

Redistribution was also accomplished when the government acted as an arbitrageur between landlords and tenants. It purchased land from landlords with cash and sold the land to tenants who made payments with rice and cash.[17] The payments in terms of rice amounted to 78% of the total, while the cash payments amounted to 20% of the total. The government applied the regulated price not only to the cash compensation to the landlords but also to the cash payments by the tenants. The point is that in the 1950s the regulated price of rice was much lower than the market price. Thus, the difference between the two prices was redistributed among the tenants, the government, and the general public. Table 3 provides the market price and the regulated price of rice, 1950–70. The regulated price converged to the market price that prevailed at the end of the 1960s.

To be specific about the income transfer from landlords to tenants and the government, we used the government's 1950–70 Special Accounts for the Agricultural Land Reform Project, shown in table 4. Column A shows total receipts from tenants that equal the sum of columns B, C, and D. Approximately 78% of total receipts was in terms of rice, 20% cash, and 1.4% land securities. When cash and land securities were used for payment, the government applied the regulated price of rice. Therefore, the difference between the market price and the regulated price of rice was transferred from landlords to tenants. Column E shows the amount of compensations made by the government to landlords. It was made in cash not rice. One-fifth of the total compensation was to be made the first year followed by the same amount each year for the subsequent 4 years. However, compensation was actually stretched out over a longer period than 5 years, since tenants were unable to make their payments due to a bad harvest and the Korean War. The government's compensations to landlords amounted to only 26.3% of total receipts by the government because the regulated price of rice was much lower than the market price.

Column F indicates the sum of administrative costs of land reform and agricultural investment for remodeling of arable land. In principle, both costs should have been paid by the tenants, since they were prime beneficiaries of land reform. However, they were actually paid by the landlords. This, too, illustrates the redistribution of income from landlords to tenants.

Subtracting columns E and F from column A, we obtain column G. In particular, subtracting columns C and D from column G results in the transfer of income to the government. It amounts to approximately 38% of total receipts. The general public benefited from land reform in that

TABLE 3

THE MARKET AND THE REGULATED PRICE OF RICE: 1950–1970
(Unit = *Won* per *Suk*, %)

Year	Market Price (A)	Regulated Price (B)	B/A (× 100)
1950	29.1	14.8	50.8
1951	115.7	58.8	50.8
1952	419.4	180.6	43.6
1953	436.5	297.9	68.2
1954	354.9	475.5	134.0
1955	851.1	629.0	73.9
1956	1,336.7	953.1	71.3
1957	1,537.3	953.1	62.0
1958	1,255.7	953.1	75.9
1959	1,106.1	953.1	86.2
1960	1,283.3	953.1	74.3
1961	1,463.2	1,394.9	95.3
1962	1,594.5	1,489.3	93.4
1963	2,526.5	1,850.0	73.2
1964	3,130.0	2,377.3	76.0
1965	2,998.0	2,701.0	90.1
1966	3,122.0	2,889.7	92.6
1967	3,432.0	3,220.1	94.2
1968	3,868.7	3,779.6	97.7
1969	4,636.3	4,634.3	99.9
1970	5,217.2	5,686.9	109.0

SOURCES.—S. H. Chang, "Nongchikaehyok Kwachonge Kwan-han Shilchungjok Yonku" (An empirical examination of the process of land reform), in *Haebangchunhusaui Inshik* (The perspective of the history about the time of liberalization), M. K. Kang et al. (Seoul: Hankilsa, 1985), 2:350 and table 28. Some errors are corrected. Ministry of Agriculture, Forest, and Fishery (MAFF), *Hankukyangchon-gsa* (Rice policy history) (Seoul: MAFF, 1978), pp. 264, 308, 309.
NOTE.—1 *suk* = 180.4 liters (4.9629 bushels). The old currency unit is converted into *won*. The series of market prices after 1966 may seem to be somewhat underestimated. The regulated price is the price at which the government purchased the rice.

without it they would have had to pay much more. In sum, land reform mainly redistributed income from landlords to tenants, but the government and the general public benefited from it as well.

V. The Impact of Land Reform on Agricultural Production

Until recently, the theoretical modeling of sharecropping tenancy has followed two basic approaches. The first approach, called Marshallian productive inefficiency, assumes a prohibitively high cost of monitoring the tenants' activities and predicts lower input intensities on rented land than on owned land.[18] A fraction of marginal product is taxed away by the landowner under sharecropping, whereas owner-cultivators are presumed to receive the entire marginal product (Marshallian effect). Hence sharecropping results in an inefficient allocation of resources. In con-

TABLE 4

TOTAL RECEIPTS AND COMPENSATION (Unit = 1,000 Suk)

Total Receipts = Total Compensation (A)	Receipts in Rice (B)	Receipts in Cash (C)	Receipts in Land Security (D)	Compensation to Landlords (E)	Administration and Agricultural Investment (F)	Remainder (G)
11,578 (100)	9,022 (77.9)	2,291 (19.8)	165 (1.4)	3,048 (26.3)	1,680 (14.5)	6,850 (59.2)

SOURCE.—Korea Agricultural Economic Research Institute (KAERI), *Nongchikaehyoksa Yonku* (A study on the history of agricultural land reform) (Seoul: KAERI, 1989).

NOTE.—Total receipts = B + C + D (= A). E is annual compensation divided by the market price of rice. F is the sum of administrative costs and agricultural investment divided by the market price of rice. A is not exactly equal to the sum of B, C, and D, since the original data set has some errors. Numbers in parentheses are percentages.

trast, the "new school" or "monitoring approach," established by Steven Cheung and based on the Coasian framework, argues that landlords can monitor the tenants' activities effectively and inexpensively.[19] According to this approach, landlords can stipulate the intensity of inputs, and they have a sufficiently effective and inexpensive way of monitoring to ensure that the stipulation is fulfilled. Thus productive efficiency is achieved. In addition, sharecropping is used as an arrangement to share risks between the two parties, landlords and tenants, and to provide effort incentives to tenants. In testing the two theories, Radwan Shaban, among others, supports the productive inefficiency approach.[20]

The question arises then as to why sharecropping is more widespread. It is argued that if sharecropping is an inefficient contractual arrangement, landlords and tenants can make a fixed-rent contract, or landlords can sell their land to tenants. However, the fixed-rent contract is not frequently observed because landlords need to share risks with their tenants. Also, the tenants' limited wealth might cause them to default on fixed-rent obligations in times of a bad harvest. In addition, empirical findings suggest that land markets are thin. D. Mookherjee suggests that there would never be a mutually beneficial scope for land sales from landlords to tenants because of the tenants' inability to finance the land purchase. He indicates that this may arise from endogenous credit market imperfections in the presence of distortions such as moral hazard. He also suggests that the coercive transfer of land ownership from landlords to tenants will result in an increase in agricultural productivity and in welfare improvement, though it is not Pareto improvement. Therefore, landlords will presumably be losers while tenants will be winners.[21] As described in Section IV, income was actually redistributed from landlords to tenants in the case of Korea.

In a study on Korea, I. H. Yoo, for example, argues that the effect of land reform on agricultural production is insignificant, but this has not been tested systematically.[22] Note that tenancy arrangements in Korea were not based on fixed rent but on sharecropping. Therefore, our empirical test of the effect of the tenancy rate on agricultural production pertains to contractual arrangements, not to tenancy per se. Since land reform was mainly related to land for rice production, an investigation of its effect on rice production would provide some useful evidence.

To investigate the effect of land reform on agricultural production, we specify the rice production function as follows:

$$Q = Ae^{\lambda t}L^{b_1}N^{b_2}K^{b_3}e^{\epsilon}, \tag{1}$$

where Q represents rice output, A constant, λ productivity growth rate, t time trend, L labor, N cultivating land, K capital, e exponent, and ϵ error term. In addition, three dummies are included in the regression to cap-

ture, respectively, the effect of weather condition (WD), the effect of a decrease in cultivating land due to the political separation of the Korean peninsula and the Korean War (SEPD), and the effect of an abrupt decrease in the tenancy rate for 1943–44 (DU). We also added the tenancy rate variable (RSC) in the equation to determine whether a decrease in tenancy rate increases rice production. Thus, the regression equation is of the following form:

$$\ln Q = \ln A = \lambda t + b_1 \ln L + b_2 \ln N + b_3 \ln K$$
$$+ b_4 WD + b_5 SEPD + b_6 DU + b_7 RSC + \epsilon. \tag{2}$$

The data used are annual observations recorded during 1937–44 and 1955–74.[23] The observations for 1945–54 are not included because consistent time series data are not available, since Korea's independence from Japanese rule and the Korean War occurred during this period. Thus, the sample contains 28 observations. The data in the Appendix were obtained from a 1978 publication by the Ministry of Agriculture, Forest, and Fishery.[24]

Average annual growth rates of the variables used are shown in table 5 for the three subperiods. After the land reform, rice production and inputs of labor and arable land increased, whereas capital input decreased at a lower rate. With the first 5-year economic development plan, started in 1962, rice production and inputs of arable land and capital increased, while the labor force devoted to the rice production decreased due to migration from rural to urban areas.

The definition of variables and the expected signs of the estimated coefficients are presented in table 6. Variables Q, L, and N are measured, respectively, using the quantity of rice produced, number of people employed for rice production, and the land designated for rice production in terms of hectare. The variable K is the sum of costs of working capital and depreciation indexed to the constant price of 1965. The time trend runs from 1 to 38, excluding from 9 to 18. The weather dummy variable,

TABLE 5

AVERAGE ANNUAL GROWTH RATES IN AGRICULTURE
(Unit = %)

Subperiod	Rice Production	Labor	Land	Capital
1937–44	−7.32	−.23	−2.99	−3.60
1955–61	2.62	6.10	.59	−1.14
1962–74	3.24	−3.82	.53	5.85

SOURCE.—Ministry of Agriculture, Forest, and Fishery (MAFF), *Hankukyangchongsa* (Rice policy history) (Seoul: MAFF, 1978).

TABLE 6

DEFINITION OF THE VARIABLES AND THEIR EXPECTED SIGNS

Variable	Definition	Expected Sign
LnQ	Logarithm of annul rice production	. . .
T	Time: from 1 to 38 (excluding 9–18)	Positive
LnL	Logarithm of annual labor input for rice production	Positive
LnN	Logarithm of annual cultivating land for rice production	Positive
LnK	Logarithm of the sum of working capital and depreciation costs	Positive
WD	Weather dummy with one for bad and zero otherwise	Negative
SEPD	Dummy for the drastic decrease in arable land due to the political separation of Korea: one for the years after 1955 and zero otherwise	Uncertain
DU	Dummy capturing an abrupt change in tenancy rate: one for the years 1943–44 and zero otherwise	Negative
RSC	Tenancy rate	Uncertain

WD, is included with the value of one assigned to bad weather and zero otherwise. The second dummy variable, *SEPD,* is added to capture the effect of a decrease in arable land that resulted from the political separation of the Korean peninsula and from the Korean War. It is conjectured that the separation of the peninsula and the Korean War changed the structure of rice production. The value of one is given to the years after 1955 and zero otherwise. The final dummy variable, *DU,* reflects the effect of a sharp decrease in the ratio of sharecropping land in 1943 and 1944. Although we do not know exactly what happened in those years, *DU* is included in the equation to control for such a change, giving it the value of one for 1943–44 and zero otherwise. Finally, the data series for the tenancy rate, *RSC,* is incomplete, and since it is the key variable in this study, the missing observations were generated by interpolation.[25]

The problem with the single equation estimation of the production function by ordinary least squares (OLS) is that the estimates are inconsistent because of the endogeneity of the input variables $(L, N,$ and $K)$. If agricultural firms try to maximize current money output, the level of use of inputs will depend not only on the price of output and inputs but also on the error term, ϵ. However, if we assume that the firms attempt to maximize anticipated money output, the solution for the inputs will not contain the error term. If this argument is assumed, then the single equation estimates obtain consistency.[26]

The regression results are reported in table 7. The coefficient on *RSC* is estimated to be negative and is significantly different from zero at the 5% level. This suggests that the abolition of tenancy due to land reform favorably influenced rice production. Therefore, the hypothesis is incorrect that land reform failed to increase agricultural production.

TABLE 7

PARAMETER ESTIMATE OF RICE PRODUCTION
FUNCTION (OLS) DEPENDENT VARIABLE: LnQ

Constant	2.75	(1.84)
T	.02	(3.45)**
LmL	.09	(.99)
LnN	1.21	(6.23)**
LnK	−.03	(−.24)
WD	−.14	(−5.59)**
$SEPD$	−1.88	(−2.51)*
DU	−.36	(−3.68)**
RSC	−3.57	(−2.68)*
Adjusted R^2	.93	

NOTE.—t-values are given in parentheses.
* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

Rather, the result supports the proposition that agricultural land reform raised agricultural production by enhancing economic incentives. This is similar to Justin Lin's finding that market-oriented institutional reforms contributed to China's agricultural output growth in 1978–84, although his context is different from ours.[27]

The estimated coefficient on time trend is significantly positive to imply that agricultural productivity increased over time. The coefficient on land is estimated positive, as expected, and significant at the 1% level. While the estimated coefficient on labor is positive, it is insignificant. This result may reflect the fact that workers were inefficiently used. The coefficient on capital has a wrong sign, but it is insignificant. Although farming capital increased after the colonial period, its effect on rice production is not significant. A further investigation of labor and capital is necessary, which is beyond the scope of this study.

The estimated coefficient on WD has the expected sign and is significant, which suggests that rice production in Korea critically depended on weather conditions. The dummy variable, $SEPD$, is significantly negative, implying that the political separation of the Korean peninsula and the Korean War produced a harmful effect on the rice production of South Korea.[28] Finally, the estimated coefficient on DU is of the expected sign and different from zero at the 1% significance level. In sum, the regression results show that a decrease in tenancy rate increased rice production, which may be interpreted as supporting the Marshallian productive inefficiency theory.

VI. Concluding Remarks

The effect of agricultural land reform on the Korean economy was tremendous. While most of the previous studies have focused on the changes in land ownership, they ignored the economic cause of land re-

form and its effects on income redistribution and rice production. This article addresses those issues as well as the political and economic causes of land reform.

We emphasize that high transaction costs between landlords and tenants eventually broke down the tenancy system. Also, land reform redistributed income mainly from landlords to tenants and, on a smaller scale, to the government and the general public. This is consistent with the intuition of the median voter theorem. In addition, the abolition of the tenancy system increased agricultural production, which supports the notion of the Marshallian productive inefficiency theory of sharecropping. It also made a contribution to stabilizing the political environment, thus positively affecting future economic growth.

Appendix

TABLE A1

DATA APPENDIX

Year	Rice Output (1,000 *Suk*)	Labor (1,000 Men Equivalent)	Land (1,000 Hectare)	Capital (Million *Won*)	Tenancy Rate
1937	26,796	1,782	1,626	22,392	.579
1938	24,139	1,806	1,647	23,085	.580
1939	14,356	1,684	1,225	20,827	.584
1940	22,527	1,874	1,629	21,920	.586
1941	24,886	1,842	1,633	22,140	.585
1942	15,688	1,687	1,203	20,821	.588
1943	18,719	1,814	1,505	19,530	.546
1944	16,052	1,753	1,319	17,402	.524
1955	20,549	1,629	1,080	25,125	.052
1956	16,928	1,719	1,088	26,240	.055
1957	20,846	1,831	1,096	26,684	.058
1958	21,951	1,928	1,099	24,161	.061
1959	21,872	2,154	1,104	22,465	.065
1960	21,157	2,234	1,112	21,862	.068
1961	24,046	2,349	1,119	23,469	.064
1962	20,937	2,095	1,130	26,847	.060
1963	26,098	2,239	1,146	35,661	.056
1964	27,462	2,315	1,186	37,056	.052
1965	24,313	2,335	1,218	39,317	.070
1966	27,217	2,341	1,221	39,171	.075
1967	25,022	2,328	1,225	40,353	.081
1968	22,190	2,168	1,224	37,974	.086
1969	28,406	2,096	1,218	40,772	.092
1970	27,357	2,010	1,219	42,252	.097
1971	27,762	2,031	1,201	43,276	.089
1972	27,481	1,934	1,192	43,001	.081
1973	29,248	1,916	1,183	48,224	.073
1974	30,868	1,324	1,204	54,188	.077

SOURCE.—Ministry of Agriculture, Forest, and Fishery (MAFF), *Hankukyangchongsa* (Rice policy history) (Seoul: MAFF, 1978).

Notes

* An earlier version of this article was presented at the annual conference of the Southern Economic Association, 1996. Financial support from the Korea Center for Free Enterprise is gratefully acknowledged. We also thank Chip Filer, Seungjun Lee, and an anonymous referee for their helpful comments and suggestions.

1. See M. A. Taslim, "Redistributive Land and Tenancy Reform in Bangladesh Agriculture," *Journal of Developing Areas* 27 (April 1993): 341–75.

2. In the prereform period, a 50:50 division of output in sharecropping contracts was prevalent.

3. The U.S. Army occupied South Korea from October 1945 to August 1948, and during that period it acted as the government in Korea. From August to October 1945, there was no formal government, which resulted in social disorder.

4. On the median voter theorem, see Duncan Black, "On the Rationale of Group Decision-Making," *Journal of Political Economy* 56 (February 1948): 23–34, and *The Theory of Committees and Elections* (Cambridge: Cambridge University Press, 1958).

5. The Agricultural Land Reform Act was passed in June 1949, but it became ineffective, since President Rhee did not sign the act into law.

6. *Jungbo* is a measurement unit of area, and one *jungbo* is approximately equal to 0.992 hectare.

7. Korea Agricultural Economic Research Institute (KAERI), *Nongchikaehyoksa Yonku* (A study on the history of agricultural land reform) (Seoul: KAERI, 1989).

8. Landlords were classified into two groups, depending on the amount of land they owned. The first group owned more than 5 *jungbo* and earned income only from crop-share tenancy, while the second group owned less than 5 *jungbo*, and their income came from crop-share tenancy and self-cultivating. The ALRAA affected the two groups differently. Those in the first group sold most of their land to tenants before the ALRAA became effective, whereas those in the second group did not sell, expecting that their land would not be reverted. However, all the land over three *jungbo* owned by the two groups was reverted. Thus, the ALRAA had a greater effect on the second group.

9. See S. H. Chang, "Nongchikaehyok Kwachonge Kwanhan Shilchungjok Yonku" (An empirical examination of the process of land reform), in *Haebangchunhusaui Inshik* (The perspective of the history about the time of liberalization), M. K. Kang et al. (Seoul: Hankilsa, 1985), esp. 2:317.

10. As mentioned in n. 8, there were two groups of landlords. Sixty percent of the first group sold their land to tenants before ALRAA, whereas most of the second group, owning small amounts of land, did not sell their land to tenants, expecting that theirs would not be reverted. However, theirs was also reverted. We were not able to determine why the second group did not resist the reform.

11. Some tenant farmer households could not pay for the purchase of land at the time of ALRAA. They borrowed money to make the payment for the redistributed land but soon sold it to self-cultivating households, and subsequently they either became tenants again or migrated to urban areas.

12. Douglass C. North, *Institutions, Institutional Change, and Economic Performance* (New York: Cambridge University Press, 1990).

13. One *suk* is approximately equal to 180.4 liters (4.9629 bushels).

14. Y. B. Park, *Hankuksa 100 Changmyon* (One hundred scenes of Korean history) (Seoul: Karaum, 1993).

15. Y. I. Chung, "Mikunchongui Nongopchongchaek" (Agricultural policy of the U.S. military administration), *Mikunchongshidaeui Kyongchechong-*

chaek (Economic policy of the U.S. military administration) (Seoul: Korea Research Institute of Spirit and Culture, 1992).

16. The market interest rate was about 48% per annum in the mid-1950s. The official discount rate of a bill was 14.24% per annum before April 5, 1951; after that, 17.52% to October 9, 1951, 17.25% to June 2, 1953, and 17.52% to March 31, 1962. For computational convenience, 17% was applied as the discount rate of the bill.

17. As mentioned in Sec. II, the government purchased the land from landlords with land securities. However, actual compensation was made in cash.

18. D. Gale Johnson did not seem to accept the productive inefficiency argument, although his theoretical model lends support to the argument. See his "Resource Allocation under Share Contracts," *Journal of Political Economy* 58 (April 1950): 111–23.

19. See Steven N. S. Cheung, "Private Property Rights and Sharecropping," *Journal of Political Economy* 76 (November–December 1968): 1107–22; R. H. Coase, "The Problem of Social Costs," *Journal of Law and Economics* 3 (October 1960): 1–44.

20. Radwan A. Shaban, "Testing between Competing Models of Sharecropping," *Journal of Political Economy* 95 (October 1987): 893–920.

21. Mookherjee developed a model of the complete contract. He argued that a transfer of land ownership from a landlord to an owner cultivator enhances the bargaining power of the latter, which results in a higher level of effort incentives. See D. Mookherjee, "Informational Rents and Property Rights in Land," in *Property Rights, Incentives, and Welfare,* ed. J. Roemer (New York: Macmillan, 1997).

22. See I. H. Yoo, *Hankuknongchichedoui Yonku* (A study on farm land system in Korea) (Seoul: Baekmundang, 1975).

23. The observations for 1961–74 were included because the number of observations for 1937–44 and 1955–60 were not sufficient for a meaningful statistical inference.

24. Ministry of Agriculture, Forest, and Fishery (MAFF), *Hankukyangchongsa* (Rice policy history) (Seoul: MAFF, 1978).

25. As the referee recommended, it would be desirable to include the variables of crop prices and wage rates in the regression to separate out the effect of the reform. However, those variables were excluded because of the lack of consistent time series data for the period investigated.

26. This argument was first made by Hoch. See Irving Hoch, "Estimation of Production Function Parameters Combining Time-Series and Cross-Section Data," *Econometrica* 30 (January 1962): 34–53.

27. In assessing the contribution to China's agricultural growth of market-oriented institutional reform along with the adjustments in state procurement prices, Lin found that both factors are mainly responsible for the output growth during the period 1978–84. See, for details, Justin Yifu Lin, "Rural Reforms and Agricultural Growth in China," *American Economic Review* 82 (March 1992): 34–51.

28. We conducted the Chow test to further investigate the effect of the separation of the peninsula and the Korean War on rice production. The whole sample is grouped into the two subsamples, 1937–44 and 1955–74. The null hypothesis of there being no structural break is rejected at the 1% level. The F-statistic is calculated to be 4.94, whereas the critical value is 4.28 with (7, 14) degrees of freedom. In the test, we exclude the dummy variable (DU), capturing the effect of an abrupt change in tenancy rate, since the second subsample contains zeros only.

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