# Sources of Overtime Changes in the Rural-Urban Gap and the Intrafarm Inequality of Income in Korea

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## I. Introduction

The Korean economy has been experiencing rapid changes both in its size-and structure since the early 1960's. During the 1962-76 period, its real GNP grew at an average annual rate of more than 10%. In 1962, over 40% of the GNP originated from agriculture, forestry, and fishery. The figure fell to about 20% in 1976.

Although the agricultural sector has been declining in its relative importance, about 30% of the economy's total households still engage in agriculture. With the agricultural sector being so large, not only the rural-urban gap in average income but the inequality among farm households must be considered important in the overall context of nationwide distribution of income.

Table 1 shows the ratio of average income of farm households to that of urban employee households. As shown, the relative position of farm households deteriorated abruptly during the 1964-67 period and then improved steadily thereafter. According to Table 2, however, the income gaps between different sizes of farm households narrowed between 1964-67 and then widened again afterwards. Tables 1 and 2 thus suggest the probable possibility of a conflict between the problem of rural-urban gap in income and that of inequality within the agricultural sector. That is, a policy measure intended to narrow the rural-urban gap may turn out to widen the inequality among farm households. And the nationwide distribution of income may also worsen as a result.[1]

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1 According to the author's estimation as a visiting researcher at the Korea Development Institute, intrasectoral inequality is the major source, while intersectoral inequality the minor source, of the nationwide inequality in Korea.

**Table 1**

Indices of Farm Household Income Compared to Urban Employee Household Income (Urban Household Income = 100.0)

| Year | Indices | Year | Indices |
|---|---|---|---|
| 1962 | 70.3 | 1970 | 67.1 |
| 1963 | 116.2 | 1971 | 78.9 |
| 1964 | 129.2 | 1972 | 83.0 |
| 1965 | 99.8 | 1973 | 87.4 |
| 1966 | 80.6 | 1974 | 104.7 |
| 1967 | 60.1 | 1975 | 101.6 |
| 1968 | 62.6 | 1976 | 100.4 |
| 1969 | 65.3 | | |

Sources: *Report on the Results of Farm Household Economy Survey,* Ministry of Agriculture and Fishery; *Annual Reports on the Family Income and Expenditures Survey,* Economic Planning Board.

**Table 2**

Indices of Farm Household Income for Different Sizes of Farm Land (Household Income with Less than 0.5 hectare = 100.0)

| Size of Land | 1964 | 1967 | 1970 | 1975 |
|---|---|---|---|---|
| -0.5 h.a. | 100.0 | 100.0 | 100.0 | 100.0 |
| 0.5-1.0 h.a. | 139.7 | 130.1 | 129.9 | 145.8 |
| 1.0-1.5 h.a. | 191.1 | 172.0 | 177.0 | 183.1 |
| 1.5-2.0 h.a. | 264.6 | 225.5 | 234.9 | 235.5 |
| 2.0- h.a. | 345.8 | 291.8 | 292.7 | 325.8 |

Source: *Report on the Results of Farm Household Economy Survey,* op. cit.

The purpose of this study is to quantitatively trace out what sources contribute to creating such a conflict and what sources to reducing it. Specifically, contributions of the following four sources will be estimated.

(1) Agricultural income
Included in this category are incomes which occur from farm products such as crops, livestock and sericulture, and from processing of own farm products.

(2) Side-business income
This category includes incomes which occur from own non-farm businesses such as general and agriculture-related services, forestry products, fishery products, commerce, industry, mining,

and the like.

(3) Non-business receipts
All non-managemental receipts are included in this category. Examples are wages, rent, interest, gifts, subsidies, etc.

(4) Composition of farm households
This specifically means relative frequencies of farm households in different farm sizes. Obviously, a change in this source alone can affect both average income and income inequality of farm households even without a change in any of the three sources above.

Selected as bench-mark years in this study are 1965, 1970 and 1975. There is no particular reason why these years, and not others, should be selected. But, there is one important aspect that should be noted for these bench-mark years: As shown in Table 1, the average income of farm households was about equal to that of urban employee households both in 1965 and in 1975 while, in 1970, the former was substantially lower than the latter. In other words, the 1965-70 period may be considered as one of relative deterioration of farm households, whereas the 1970-75 period as one of their relative improvemtnt.

The present analysis consists of two steps. In the first step, contributions of the four sources above to the average income of farm households will be estimated. In the second step, contributions of the same to the change in inequality within the agricultural sector will be estimated. The results of these two steps will then be combined to see in what direction and to what extent each of the sources contributes respectively to the rural-urban gap in income and to the inequality among farm households.

## II. Sources of Growth in Average Income of Farm Households

The following notations are used throughout this study.

$y_A^e$ = agricultural income per household in the e-th bracket (in terms of land holdings)

$y_B^e$ = side-business income per household in the e-th bracket

$y_C^e$ = non-business receipts per household in the e-th bracket

$y^e$ = total income per household in the e-th bracket

$= y_A^e + y_B^e + y_C^e$

$f^e$ = relative frequency of households in the e-th bracket

$\bar{y}$ = average income of all households

$= \Sigma y^e \cdot f^e$

where the summation holds over all e.

Subscripts o and t denote respectively the initial and the final years under consideration.

The basic methodology is to decompose the change in aveage income of farm households ($\triangle \bar{y}$) into the respective sources described in the preceding section.[2] That is:

$$(1)\quad \triangle \bar{y} = \bar{y}_t - \bar{y}_o$$

$$= \Sigma y_t^e \cdot f_t^e - \Sigma y_o^e \cdot f_o^e$$

$$= \Sigma (y_o^e + \triangle y^e) \cdot (f_o^e + \triangle f^e) - \Sigma y_o^e \cdot f_o^e$$

$$= \Sigma f_o^e \cdot \triangle y^e + \Sigma y_o^e \cdot \triangle f^e + \Sigma \triangle y^e \cdot \triangle f^e$$

$$= \Sigma f_o^e \cdot \triangle y_A^e + \Sigma f_o^e \cdot \triangle y_B^e + \Sigma f_o^e \cdot \triangle y_C^e + \Sigma y_o^e \cdot \triangle f^e + \Sigma \triangle y^e \cdot \triangle f^e$$

$$= \triangle \bar{y}_A + \triangle \bar{y}_B + \triangle \bar{y}_C + \triangle \bar{y}_F + \triangle \bar{y}_X$$

where summation holds over all e and each of $\triangle \bar{y}_K$ (K=A, B, C, F, X) in the last expression is defined as its corresponding term in the immediately preceding expression.

In equation (1), $\triangle \bar{y}_A$ represents the change in average income of farm households which would have resulted if only agricultural income had changed with no change in any of the remaining sources. That is, $\triangle \bar{y}_A$ measures that part of $\triangle \bar{y}$ which is attributable solely to the change in agricultural income in each bracket. Similarly, $\triangle \bar{y}_B$ and $\triangle \bar{y}_C$ measure parts of $\triangle \bar{y}$ attributable respectively to changes

2 This methodology is a modification of what the author employed elsewhere. See Kim (1977).

in side-business income and in non-business receipts. $\triangle \bar{y}_F$ in turn represents the change in average income which would have resulted if only relative frequencies or composition of farm households had changed. Finally, $\triangle \bar{y}_X$ measures interaction between the change in household income and the change in household composition. Equation (1) thus decomposes $\triangle \bar{y}$ into five sources.[3]

Dividing through equation (1) by $\bar{y}_o$ gives both the growth rate of average farm household income and sources of this growth rate.

The *Report on the Results of Farm Household Economy Survey*, Ministry of Agriculture and Fishery, which is the main source of data for this study, contains detailed information on various components of income for different brackets (in terms of land holdings) of farm households. But, relative frequencies of the sampled households in the *Survey* are significantly different from those reported in the *Korea Statistical Yearbook*, Economic Planning Board, under the heading "Farm Households by Size of Cultivated Land".[4] For this reason, while income statistics are used from the *Survey*, relative requencies are used from the *Yearbook*.

All income statistics are firstly converted into figures in 1970 prices by using agricultural price indices received by farmers. From the resulting income figures and the relative frequencies of farm

3 Each of the three terms in the last expression of equation (1) can be further decomposed into as many components as desired. If, for example, $\triangle \bar{y}_A$ is to be decomposed into two sub-sources such as the change in income from crops $(\triangle y^e_{A1})$ and the change in income from non-crops $(\triangle y^e_{A2})$, then

$$\triangle \bar{y}_A = \Sigma f^e_o \cdot \triangle y^e_A$$

$$= \Sigma f^e_o \cdot \triangle y^e_{A1} + \Sigma f^e_o \cdot \triangle y^e_{A2} \text{ (due to } \triangle y^e_A = \triangle y^e_{A1} + \triangle y^e_{A2}) = \triangle \bar{y}_{A1} + \triangle \bar{y}_{A2}$$

4 In 1970, for instance, the following differences are found.

| Land Holding | Household Frequency | |
|---|---|---|
| | *Survey* | *Yearbook* |
| -0.5 h.a. | 23.05% | 32.63% |
| 0.5-1.0 h.a. | 37.63% | 34.19% |
| 1.0-2.0 h.a. | 30.76% | 26.52% |
| 2.0- h.a. | 8.56% | 6.66% |

households are estimated, for 1965-70 and 1970-75 periods respectively, the sources of growth in average farm household income according to equation (1). The results are presented in Table 3.

In Table 3, column (1) indicates the growth rate of average income during the specified periods. Columns (2) through (6) in turn measure parts of this growth rate ascribed respectively to those sources specified at their corresponding headings. Columns (2) though (6) add up to column (1), as they should due to equation (1).

According to column (1), the average income of farm households grew only by 17% during the five-year period of 1965-70. This low rate of growth reflects the relative deterioration of farm households compared to urban households, as pointed out earlier in relation to Table 1. Between 1970-75, however, the growth rate was some 46% and this reflects the relative improvement of farm households, as also pointed out earlier.

**Table 3.** Sources of Growth in Average Income of Farm Households: 1965—1970, 1970—1975

| | Parts of Growth Rate Attributable to: | | | | |
|---|---|---|---|---|---|
| Five-Year Growth Rate of Income | Change in Agricultural Income | Change in Side-Business Income | Change in Non-Business Receipts | Change in Composition of Farm Households | Interaction |
| $(\Delta\bar{y}/\bar{y}_0)$ | $(\Delta\bar{y}_A/\bar{y}_0)$ | $(\Delta\bar{y}_B/\bar{y}_0)$ | $(\Delta\bar{y}_C/\bar{y}_0)$ | $(\Delta\bar{y}_F/\bar{y}_0)$ | $(\Delta\bar{y}_X/\bar{y}_0)$ |
| (1) | (2) | (3) | (4) | (5) | (6) |
| 1965—1970 | | | | | |
| 17.28% | 7.04% | 1.13% | 7.53% | 1.39% | 0.19% |
| 1970—1975 | | | | | |
| 46.39% | 42.29% | −0.30% | 3.55% | 0.41% | 0.43% |

Sources: See section (2).

Column (2) indicates that contribution of the growth of agricultural income was only of secondary importance to the overall growth of farm household income between 1965-70, whereas it was the dominant source of the growth of farm household income between 1970-75. Closely related to this differing role of the agricultural income was the government's change in emphasis on farm income policies. During the 1960's, the government put the highest priority on industrialization and virtually neglected the agricultural sector. Beginning around 1970, however, it put more emphasis on agriculture, introducing several farm support progams such as the policy of hihgher rice price. In any case, it is rather surprising that the agricultural income was not always the dominant source of the growth of average farm household income.

Column (3) in turn shows that the side-business income contributed positively to the growth of farm household income during the 1965-70 period while, during the 1970-75 period, it contributed negatively. But, the contribution of this source was relatively minor in both periods.

As shown in column (4), contribution of the non-business receipts was another important source of the growth of farm household income. It was the leading source during the 1965-70 period, although its importance declined substantially during the 1970-75 period. This phenomenon may be interpreted as following, wage and salary earnings being the major component of the non-business receipts[5]: As rapid industrialization proceeded, farmers happened to have more and more opportunities of employment (without changing their primary status as farmers). When the scope for agriculture was not good (1965-70), they tended to participate more in these opportunities. When the scope was good (1970-75), they tended to participate less.

Finally, column (5) shows another interesting aspect. Contribution of the change in farm household composition was positive in both periods. This implies that small farmers tended to out-migrate relatively more than large farmers, which in itself tended to increase the average farm household income. This tendency was relatively minor though.

The conclusion of this first step of analysis is now quite obvious. Both agricultural income and non-business receipts were the major sources of the growth of average farm household income. But, crucially responsible for the relative deterioration or improvement of farm households compared to urban households was the growth rate of agricultural income. When the growth was sluggish, farm households were falling behind. When the growth was rapid, farm households were catching up or even taking the lead.

## III. Sources of Change in Inequality among Farm Households

In addition to those of the preceding section, the following notations are also used.

$N^{e,q}$ = number of bracket e households which belong to the $q-th$ quintile

$Y^q$ = gross sum of incomes in the $q-th$ quintile

5 In 1970, for example, about 46% of total non-business receipts came from wage and salary earnings.

$= \Sigma y^e \cdot N^{e,q}$

where summation holds over all e in the $q-th$ quintile.

The methodology here is very close to that of the preceding section. The change in gross sum of incomes in the $q-th$ quintile ($\triangle Y^q$) can be decomposed as following:

(2) $\triangle Y^q = Y_t^q - Y_o^q$

$= \Sigma y_t^e \cdot N_t^{e,q} - \Sigma y_o^e \cdot N_o^{e,q}$

$= \Sigma (y_o^e + \triangle y^e) \cdot (N_o^{e,q} + \triangle N^{e,q}) - \Sigma y_o^e \cdot N_o^{e,q}$

$= \Sigma N_o^{e,q} \cdot \triangle y^e + \Sigma y_o^e \cdot \triangle N^{e,q} + \Sigma \triangle y^e \cdot \triangle N^{e,q}$

$= \Sigma N_o^{e,q} \cdot \triangle y_A^e + \Sigma N_o^{e,q} \cdot \triangle y_B^e + \Sigma N_o^{e,q} \cdot \triangle y_C^e + \Sigma y_o^e \cdot \triangle N^{eq} + \Sigma \triangle y^e \cdot \triangle N^{e,q}$

$= \triangle Y_A^q + \triangle Y_B^q + \triangle Y_C^q + \triangle Y_F^q + \triangle Y_X^q$

where summation holds over all e in the $q-th$ quintile and each of $\triangle Y_K^q$ (K=A, B, C, F, X) in the last expression is defined as its corresponding term in the immediately preceding expression.

In equation (2), $\triangle Y_A^q$, $\triangle Y_B^q$ and $\triangle Y_C^q$ measure parts of $\triangle Y^q$ attributable respectively to changes in agricultural income, side-business income, and non-business receipts. $\triangle Y_F^q$ in turn represents that part of $\triangle Y^q$ ascribed solely to the change in farm household composition. Finally, $\triangle Y_X^q$ measures interaction between the change in household income and the change in household composition. Equation (2) thus decomposes $\triangle Y^q$ into five sources.[6]

Dividing through equation (2) by $Y_o^q$ gives both the growth rate of the gross sum of incomes in the $q-th$ quintile and sources of this growth rate.

6 Each of the first three terms in the last expression of equation (2) can be further decomposed similarly to equation (1). See footnote (3) above.

By using the same data as in the preceding section, sources of the change in inequality among farm households are estimated according to equation (2) for 1965-70 and 1970-75 periods respectivtly. The results are presented in Table 4.

In Table 4, column (1) represents the growth rate of the gross sum of incomes for each quintile, thus showing which quintile improved relatively more (or less) in its living standard during the specified periods. Columns (2) through (6) in turn measure parts of this growth rate attributable respectively to their corresponding sources. For each quintile, columns (2) through (6) add up to column (1).

According to column (1), between 1965-70, the gross sum of incomes grew faster for the lower two quintiles than for the higher three. That is, the inequality among farm households may be safely said to have decreased during the period. Between 1970-75, however, the first quintile showed the lowest growth rate in the gross sum of incomes although, among the remaining quintiles, the growth rate was higher for the lower two quintiles than for the higher two. Therefore, it is not clear whether or not the inequality may be said to have

Table 4. Sources of Change in Inequality among Farm Households: 1965—1970. 1970—1975

| Quintiles | Five-Year Growth Rate of Gross Sum of Incomes $(\Delta Y^q/Y^q_o)$ (1) | Parts of Growth Rate Attributable to: Change in Agricultural Income $(\Delta Y^q_A/Y^q_o)$ (2) | Change in Side-Business Income $(\Delta Y^q_B/Y^q_o)$ (3) | Change in Non-Business Receipts $(\Delta Y^q_C/Y^q_o)$ (4) | Change in Composition of Farm Households $(\Delta Y^q_F/Y^q_o)$ (5) | Interaction $(\Delta Y^q_X/Y^q_o)$ (6) |
|---|---|---|---|---|---|---|
| 1965—1970 | | | | | | |
| 1st quint. | 13.33% | 1.02% | 1.79% | 15.01% | −3.82% | −0.68% |
| 2nd quint. | 18.23% | 2.71% | 1.79% | 12.96% | 0.88% | −0.11% |
| 3rd quint. | 11.93% | 7.74% | 1.77% | 6.87% | −3.82% | −0.63% |
| 4th quint. | 11.76% | 9.49% | 0.41% | 4.95% | −2.64% | −0.47% |
| 5th quint. | 11.38% | 9.37% | 0.69% | 4.18% | −2.56% | −0.29% |
| 1970—1975 | | | | | | |
| 1st quint. | 30.20% | 29.26% | −1.52% | 9.67% | −5.24% | −1.96% |
| 2nd quint. | 43.48% | 37.06% | −0.75% | 8.34% | −2.20% | 1.02% |
| 3rd quint. | 46.13% | 47.36% | 0.28% | 6.58% | −5.21% | −2.84% |
| 4th quint. | 38.36% | 42.63% | 0.47% | 2.39% | −4.79% | −2.35% |
| 5th quint. | 36.27% | 47.16% | −0.41% | −2.06% | −5.75% | −2.67% |

Sources: See section (3).

decreased during the 1970-75 period.

Column (2) clearly shows that the growth in agricultural income tended to widen the inequality among farm households for both 1965-70 and 1970-75 periods.[7] In fact, the growth of this source was the singly most important factor of unequalizing the distribution among farm households. Between 1965-70, this factor created a gap in growth rates of gross incomes between the top and the bottom quintiles by 8.35 (=9.37−1.02) percentage points in favor of the former. The same gap created between 1970-75 was 17.90 (=47.16−29.26), also in favor of the top quintile.

Column (3) in turn indicates that the change in side-business income contributed to narrowing the inequality between 1965-70 while, between 1970-75, it roughly tended to widen the inequality with a minor exception of the top quintile. Overall, therefore, it may be said that contribution of the change in this source to the income distribution of farm households was rather volatile. In any case, the gaps in growth rates of gross incomes created by this factor were relatively small.

According to column (4), the growth in non-business receipts showed a tendency to equalize the distribution among farm households for both 1965-70 and 1970-75 periods. Furthermore, it was the singly most important factor of narrowing the inequality among farm households. Between 1965-70, this factor produced an equalizing gap in growth rates of gross incomes by 10.83 (=15.01−4.18) percentage points between the top and the bottom quintiles. And this equalizing gap more than compensated the unequalizing gap created by the growth of agricultural income (8.35 percentage points). During the 1970-75 period, the same gap was 11.73 percentage points.

Finally, as shown in column (5), it can not be unequivocally said whether the change in the composition of farm households contributed to narrowing or widening the inequality among farm households. But, in view of the fact that this factor contributed to raising the average income of farm households, an inference can be made that the change in this source actually tended to narrow the inequality. At any rate, the gaps in growth rates of gross incomes

7 It should be clearly understood that to say a factor tended to widen the inequality in a particular year is one thing and to say the change in a factor tended to widen the inequality between two different years is another. The former means that the factor, compared to other factors, produced bigger income gaps between different brackets. The latter means that the factor changed over time so that either its inequality-widening tendency became stronger or its inequality-narrowing tendency became weaker. The statement in the text is in this latter context.

generated by this factor were relatively small.[8]

To sum up, the growth of agricultural income, which was crucially responsible for reducing the rural-urban gap in income, was the primary source of widening the inequality of income among farm households. The growth of non-business receipts, which also contributed importantly to reducing the rural-urban gap, in turn was the main source of narrowing the inequality among farm households. Contributions of the remaining sources were relatively minor both to narrowing the rural-urban gap and to affecting the intrafarm inequality.

## IV. Policy Implications

There is an implicit assumption underlying the discussion of this final section. If a policy measure contributes both to reducing the rural-urban gap in income and to narrowing the inequality among farm households, then the measure is considered appropriate for distributive purposes. If a policy measure creates a conflict between the rural-urban gap and the intrafarm inequality, then the measure is considered inappropriate.

(1) The most important finding in this study is that, while the growth of agricultural income was the crucial source of reducing the rural-urban gap in income, it was also the primary source of widening the inequality within the agricultural sector. At least two aspects were responsible for this latter characteristic. First, large-scale farmers derived relatively more of their income from agricultural activities. Therefore, general farm support programs benefited large-scale farmers relatively more. Second, the percentage of agricultural income stemming from rice growing was higher for larger farmers. The policy of higher rice price, which was a typcial form of the farm support programs in the 1970's, benefited larger famers relatively more as a result.[9] It can therefore be said that any farm support program, to be effective for distributive purposes, should be applied differentially rather than generally.

(2) The change in side-business income showed volatile contributions. Its contribution to the growth of average farm household

8 It is true that smaller farmers tended to out-migrate relatively more than larger farmers – a phenomenon of obviously narrowing the inequality among farmers. This phenomenon is one of Renaud's (1976) two reasons for the improvement of inequality within the rural sector in Korea. But, the result of the present analysis suggests that the phenomenon was not strong enough to significantly affect the pattern of income distribution among farm households.

9 This second aspect is also pointed out by Mozoguchi et al. (1976).

income was positive at one time and negative at another. Its contribution to the change in intrafarm distribution was inequality-narrowing at one time and inequality-widening at another. In any case, contribution of this source was relatively small in magnitude. Therefore, any policy measure through this source is not likely to be effective for distributive purposes unless such a policy is applied very extensively and elaborately.

(3) The growth of non-business receipts not only played an important role in reducing the rural-urban gap in income, but it was also the principal source of narrowing the inequality among farm households. The implication of this finding is that any policy measure through this source is likely to be not only consistent with, but also effective for, both objectives of reducing the rural-urban gap and of narrowing the intrafarm inequality. Programs which will help provide farmers with more employment opportunities are expected to be effective. Such programs will be more effective if employment opportunities can be made in harmony with the seasonality which farmers are inherently subject to.

(4) Contribution of the change in farm household composition was unexpectedly small both to raising the average income and to lowering the income inequality of farm households. Therefore, policy measures intended to induce smaller farmers to out-migrate seem to be of secondary choice at best for distributive purposes.

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