

# 3

## Income Distribution in Rural and Urban Areas

In the previous chapter we examined income distribution for Thailand as a whole. In this chapter the whole kingdom is divided into two areas: rural and urban.

The most serious problem of income distribution in Thailand is the income gap between rural and urban areas, which reflects the productivity gap between the agricultural sector and the non-agricultural one. Since the non-agricultural sector grows faster than the agricultural one does, it is widely believed that the income disparity between the agriculture and non-agriculture sectors has increased since the 1960s. In real terms this is true. But in nominal terms this is not necessarily the case as will be shown in this chapter. Actually, the agricultural share in GDP increased from 28.2 per cent to 31.5 per cent between 1971 and 1975, which resulted in a decrease in income inequality in 1975. The terms of trade between the agriculture and non-agriculture sectors is an important factor in the analysis of income distribution. The rapid inequalization in the early 1980s was also aggravated by the deteriorating terms of trade in the agricultural sector.

An explanation of the organization of this chapter may be helpful. In the next section the definition of rural and urban areas is given. In the study of income distribution in Thailand, this definition changed in 1969, which makes this matter more difficult and complex. Following these definitions the income distribution in the rural areas, where income inequality increased gradually, will be examined first. Next the urban areas will be analyzed to show that income inequality decreased in 1975, as was the case for the whole kingdom as noted in the previous chapter, but that income inequality increased thereafter. After the examination of income distribution within the rural and urban sectors, income disparity between rural and urban areas is analyzed. The decomposition analysis of in-

equality indices shows that the income disparity between the areas decreased in 1975 but increased thereafter.

In the latter part of this chapter we will examine theoretically Kuznets inverted U-shaped curve hypothesis in terms of the enlarging urban sector. It will be shown that in the earlier phase of urbanization, income inequalization would have occurred even if the income gap between the rural and urban areas and the income inequality within these areas had remained unchanged. Some scholars argue that conventional inequality indices, such as the Gini coefficient, are not appropriate because such indices evaluate the change mentioned above as inequalization. We will examine this assertion at the end of this chapter.

### Definition of Rural and Urban Areas

A definition of the rural areas and the urban areas in Thailand is rather complicated. The definition used is based on three types of local administration: those for the municipal areas, sanitary districts, and villages. These are defined below.<sup>1</sup>

*A. Municipal Areas.* A municipal area is a legal unit established by the Royal Decree of the 1953 Municipal Act. There are three categories of municipal area; *nakhon* (city), *muang* (town) and *tambon* (commune). A tambon municipality is established wherever it is deemed appropriate. A muang municipality is established in each area where the administrative seat of the provincial government is located or where the population is at least 10,000 people, with an average density of not less than 3,000 people per square kilometer. The source of tax revenue must also be sufficient for the execution of municipal affairs as stipulated in the 1953 Municipality Act. A nakhon municipality is established in areas where the population is at least 50,000 people, with an average density of not less than 3,000 people per square kilometer. Tax revenue must also be sufficient for the execution of municipal affairs as stipulated in the 1953 Municipality Act.

*B. Sanitary Districts.* A sanitary district is established by the Ministry of Interior under the provisions of the Sanitary District Act of 1952. Under the provisions of the Municipality Act, any sanitary district may be established as a municipal area.

*C. Villages.* Villages are those areas not covered by the definitions of municipal areas or sanitary districts mentioned above.

In the *Household Expenditure Survey of 1962/63* (HES 1962/63) the rural area was defined as villages, and the urban area was defined as both sanitary districts and municipal areas. But in the *Socio-Economic Survey of 1968/69* (SES 1968/69) the rural area was defined as both villages and sanitary dis-

Table 3-1  
Definition of Rural and Urban Areas

Area	HES 1962/63	SES 1968/69
Municipal Area	Urban	Urban
Sanitary District	Urban	Rural
Village	Rural	Rural

tricts, and the urban area was defined as municipal areas. In other words, the sanitary districts were included in the urban areas in HES 1962/63 but they were included in the rural areas in SES 1968/69. This change in the definition is shown in Table 3-1. Unfortunately, there is no way to consolidate these differences in the definition to derive comparable data of rural and urban areas because the data for HES 1962/63 and SES 1968/69 were not given for sanitary districts separately. Therefore, no comparison between HES 1962/63 and SES 1968/69 at the rural and urban level is made in this study.

Since 1975, data for sanitary districts are given separately, and it is possible to derive data for rural and urban areas whose definitions are consistent to both the definitions of HES 1962/63 and SES 1968/69. Therefore, we applied both definitions of HES 1962/63 and SES 1968/69 to the data after 1975, which enabled us to utilize both HES 1962/63 and SES 1968/69 for the analysis of income distribution at the rural and urban levels.<sup>2</sup>

In the following sections, "villages and sanitary districts" are called "the rural area in the broad sense" and "villages" are called "the rural area in the narrow sense" where possible without confusion. For the urban areas, municipal areas is called "the urban area in the narrow sense" and "municipal areas and sanitary districts" are called "the urban area in the broad sense," again where possible.

### Changes in Income Distribution in the Rural Area

We start with income distribution in the rural area. Table 3-2 shows the inequality indices of the rural area. The result is shown for both definitions of the rural area. The figures in Table 3-2 show that the data for the rural area which is defined as "villages and sanitary districts" is available for the period after 1969 and that the data for the rural areas defined as "villages" is available for 1962 and after 1975.

The difference in definition caused some difference in the level of income inequality. For every year and for every inequality index the income inequality for the rural area defined as "villages and sanitary districts" is

Table 3-2  
Income Inequality for the Rural Areas

	1962	1969	1975	1981	1986
A. Sanitary Districts and Villages					
Gini coefficient					
1. Decile method	—	0.3840	0.3915	0.4133	0.4392
2. Kakwani's method	—	0.3873	0.4030	0.4194	0.4534
Theil index	—	0.2528	0.2585	0.2899	0.3370
Varlog	—	0.5494	0.5928	0.6608	0.7139
B. Villages					
Gini coefficient					
1. Decile method	0.361	—	0.3783	0.4078	0.3968
2. Kakwani's method	—	—	0.3874	0.4160	0.4057
Theil index	—	—	0.2401	0.2823	0.2669
Varlog	0.353	—	0.5584	0.6440	0.6046

Source: Ikemoto and Limskul [21] and the author's estimate.

always higher than for the rural area defined as "villages." This is because there is a difference in the income level between villages and sanitary districts and because the rural areas defined as "villages and sanitary districts" contain a wider variety of households within it than those defined as "villages." This relation is generally applicable to the comparison between rural areas and the whole kingdom. Income inequality for the whole kingdom is always higher than that for the rural areas (compare Table 2-2 and Table 3-2). This is due to the fact that the rural area is rather more homogeneous than the whole kingdom in terms of income distribution.

The changes in income inequality between 1962 and 1969 cannot be deduced from Table 3-2 because of the difference in the definition of rural area. But it may be conjectured that for 1969 the Gini coefficient of the decile method for "villages" might be lower than 0.384 for "villages and sanitary districts." But it might also be lower than 0.361 in 1962, or higher than 0.378 in 1975, or between them as well. Therefore, the direction of the change in income inequality cannot be deduced.

Between 1962 and 1975 income inequality increased as the Gini coefficient increased from 0.361 in 1962 to 0.378 in 1975 for the rural areas in the narrow sense. Income distribution also worsened between 1969 and 1975, during which the Gini coefficient increased from 0.384 to 0.391 for the rural areas in the broad sense. This change is contrary to the equalization that occurred in Thailand as a whole. This indicates that the decrease in income inequality for the whole kingdom is explained by the de-

creasing income inequality in the urban areas and the decreasing income gap between the rural and urban areas, as will be shown later.

Between 1975 and 1981 income inequality increased for both definitions of rural areas, but between 1981 and 1986 the results are different according to the definition. In the rural areas in the narrow sense, income inequality decreased slightly while in the rural area in the broad sense it increased. This difference is caused by the increasing income gap between villages and sanitary districts.

Income share by household group is shown in Table 3-3 and in Figure 3-1. The direction of change in the income share by household groups is nearly the same as that for the whole kingdom since 1969 (see Figure 2-3). But the magnitude of the change is different, especially between 1969 and 1975. In this period the income share of the top decile decreased

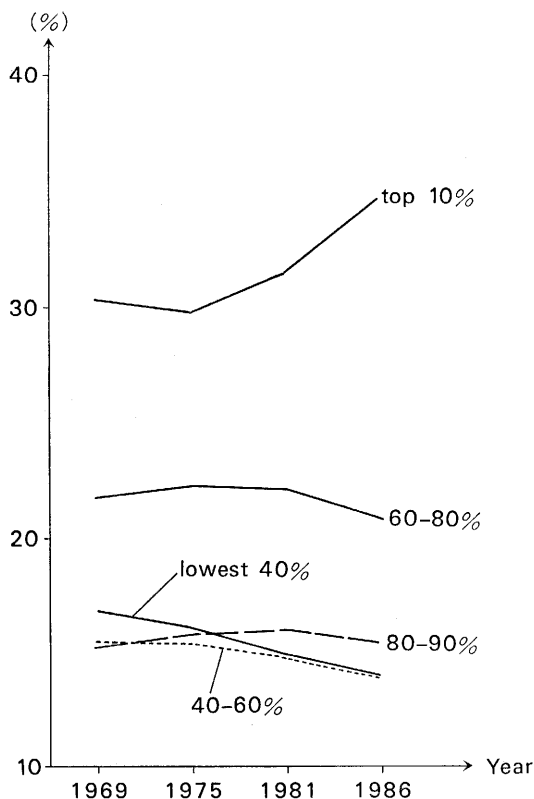


Figure 3-1  
Income Share in Rural Areas by Household Group  
Source: Table 3-3.

Table 3-3

## Income Share by Household Group for the Rural Areas

(%)

Household Group	1962	1969	1975	1981	1986
Lowest 40 per cent	—	16.9	16.2	15.1	14.2
40-60 per cent	—	15.5	15.5	15.0	14.1
60-80 per cent	—	21.8	22.4	22.2	21.0
80-90 per cent	—	15.4	16.0	16.2	15.7
Top 10 per cent	—	30.4	29.9	31.6	34.9

Source: Ikemoto and Limskul [21] and the author's estimate.

Note: The rural areas are defined as "villages and sanitary districts."

by 2.6 percentage points for the whole kingdom while it only decreased by 0.5 percentage points for the rural area. This is the reason income inequality did not decrease in the rural area between 1969 and 1975. And this indicates that the decrease in the income share of the top decile of the whole kingdom was attributable to the urban areas.

### Changes in Income Distribution in the Urban Areas

Changes in income distribution in the urban areas are much more drastic than those of the rural areas (see Table 3-4). Between 1962 and 1975 the Gini coefficient in the urban areas in the broad sense increased slightly from 0.405 to 0.418. But between 1969 and 1975 the Gini coefficient for the urban areas in the narrow sense sharply decreased from 0.439 to 0.402 in contrast with the rural area. As is the case for the rural areas, income

Table 3-4

## Income Inequality for the Urban Areas

	1962	1969	1975	1981	1986
A. Municipalities					
Gini coefficient					
1. Decile method	—	0.4393	0.4027	0.4275	0.4662
2. Kakwani's method	—	0.4433	0.4078	0.4267	0.4560
Theil index	—	0.3383	0.2717	0.3079	0.3808
Varlog	—	0.7178	0.6564	0.7385	0.8336
B. Municipalities and sanitary districts					
Gini coefficient					
1. Decile method	0.405	—	0.4187	0.4369	0.4826
2. Kakwani's method	—	—	0.4232	0.4424	0.4813
Theil index	—	—	0.2942	0.3235	0.4114
Varlog	0.628	—	0.7092	0.7623	0.8886

Source: Ikemoto and Limskul [21] and the author's estimate.

inequality for the urban areas defined in the narrow sense is always smaller than that for the urban areas defined in the broad sense. This implies that the Gini coefficient of the decile method in 1969 for the rural areas in the

Table 3-5  
Distribution of Income for the Urban Areas

Household Group	1962	1969	1975	1981	1986
Lowest 40 per cent	—	14.2	15.2	14.0	12.7
40-60 per cent	—	14.2	15.4	14.7	13.6
60-80 per cent	—	21.2	23.3	22.8	21.3
80-90 per cent	—	15.3	16.0	16.5	15.6
Top 10 per cent	—	35.1	30.1	31.9	36.9

Source: Ikemoto and Limskul [21] and the author's estimate.  
Note: The definition of urban areas is "municipal areas."

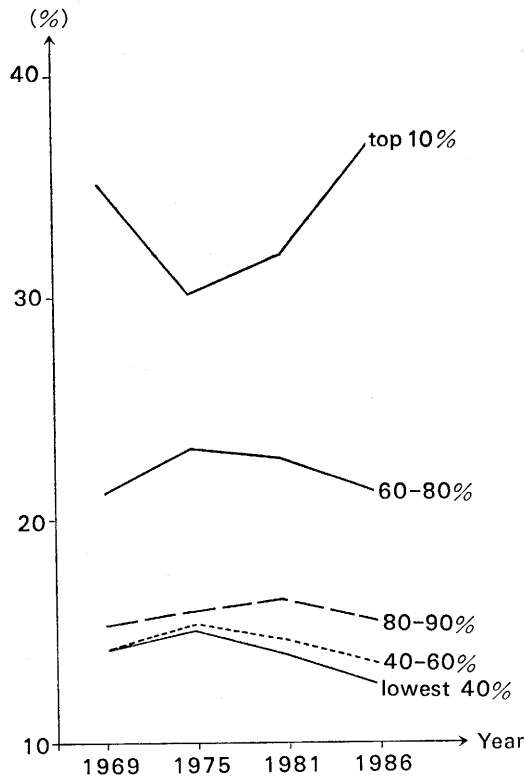


Figure 3-2  
Income Share in Urban Areas by Household Group  
Source: Table 3-5.

broad sense would be more than the 0.439 of the rural areas in the narrow sense. Therefore, it might be concluded that income inequality in the urban areas increased from 1962 to 1969 but decreased from 1969 to 1975.

The decrease in income inequality between 1969 and 1975 was more rapid than that for the whole kingdom. As a result, the income inequality of the urban areas became lower than that for the whole kingdom in 1975. This shows that the decrease in income inequality in the urban areas played an important role in decreasing income inequality for the whole kingdom.<sup>3</sup>

This decrease in income inequality in the urban areas is largely due to the large drop of income share of the top decile group. Their share decreased by five percentage points from 35.1 per cent in 1969 to 30.1 per cent in 1975 (see Table 3-5 and Figure 3-2). These changes of the urban top decile effected the top decile of the whole kingdom directly because the urban household predominates the top decile of the whole kingdom.<sup>4</sup> This

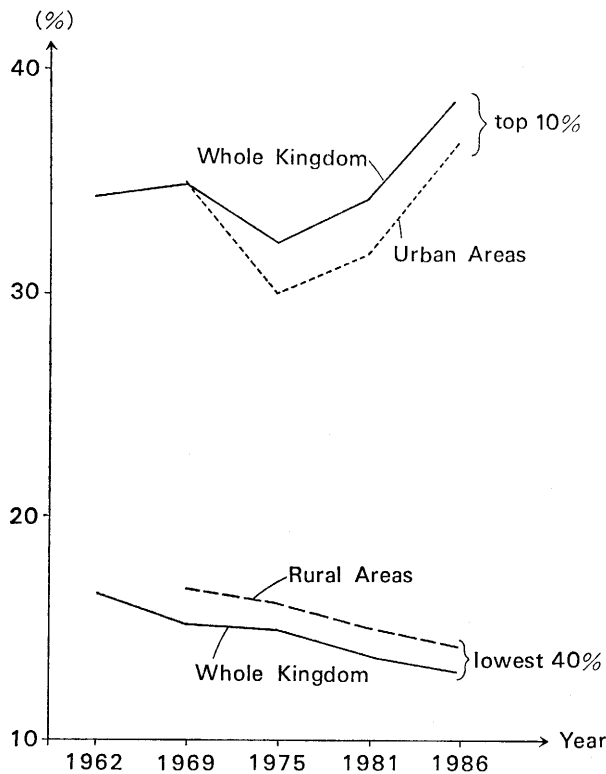


Figure 3-3

Comparison of Income Share by Area

Source: Table 2-3, 3-3, and 3-5.



Table 3-6

## Distribution of Personal Income

(%)

	1970	1975	1981	1986
Compensation of employees	23.5	26.0	33.5	38.3
Income from farms, professions, and other unincorporated enterprises	64.8	63.1	54.5	47.2
Income from property	11.7	10.8	12.1	14.5
Total	100.0	100.0	100.0	100.0

Source: Calculated from NESDB [62].

relationship also exists between the whole kingdom and the rural area in regard to the income share of the lowest 40 per cent. Figure 3-3 compares the income share of the top decile of the whole kingdom to that of the urban areas and also compares the income share of the lowest 40 per cent of the whole kingdom to that of the rural areas to show that close relationship exists between them. Thus it might be concluded that the decreasing income share of the top decile of the whole kingdom in 1975 was largely due to the decreasing income share of the urban top decile.

The decreasing income share of the urban top decile in 1975 may be attributable to the economic and political situation in the early 1970s when the first oil crisis and the October Revolution occurred. The effects of these events on the income share of the urban top decile can be seen from the national income statistics. Table 3-6 is calculated by selecting those items of the national income statistics which correspond to the concept of household income of the socio-economic survey reports. Though the total of these items are not exactly the same as the household income, we can use these as an approximation.<sup>5</sup> One of the main sources of the urban high income class is "property income." Its share in personal income is only about 10 per cent and far below the income share of the top decile, which is about 40 per cent. But its change seems to be reflected in the income share of the urban top decile as shown in Table 3-5. The share of property income decreased from 11.7 per cent in 1970 to 10.8 per cent in 1975 but increased slightly to 12.1 per cent in 1981 and then rapidly to 14.5 per cent in 1986. This change is very similar to that of the income share of the top decile and, therefore, to income inequality in the whole kingdom and urban areas. This implies that changes in the share of property income are one of the most important factors of income inequality in the urban areas.

### Disparity between Rural and Urban Areas

We have looked at income inequality within rural and urban areas separately. Another source of income inequality is the income gap between rural and urban areas. In Thailand the share of urban households is very small. Table 3-7 shows the distribution of households by area. Since 1962 the share of urban households has been increasing, but even in 1986 the urban share is still only 20.9 per cent in the narrow definition (B-1 in Table 3-7) and 29.7 per cent in the broad definition (B-2 in Table 3-7).<sup>6</sup> Though international comparison is difficult because definition of the urban area can be very different between countries, these figures are still very small compared with those of other middle income countries. Even though the population of Bangkok, the largest city in Thailand, exceeds five million, the second largest city has a very small population of less than one-tenth of Bangkok.

Figure 3-4 shows how small the share of urban households is. This figure is drawn on the assumption that the distribution of income follows the log-normal distribution. The horizontal axis indicates the income level and the vertical axis shows the density of households or the percentage of households at a certain income level. For example, those households that are situated in villages and receive an income of between 2,000 and 2,001 bahts consist of about 0.021 per cent of all households in the whole kingdom. The area under the curve indicates the percentage share of households for each area because the density curve is adjusted by the household share of the area. Therefore, it shows very clearly that the household share of municipal areas is very small while that of villages is very large.

The curve for villages shows that the highest density (or mode) is at about 1,200 bahts and that households in villages concentrate within a narrow range of income of around 1,200 bahts. The mode of sanitary districts is somewhat higher, at about 1,500 bahts and that for municipal areas is the highest, at about 2,400 bahts. As the mode increases, the concentration

Table 3-7  
Distribution of Households by Area

Area	1962	1969	1975	1981	1986
(%)					
A. Rural					
1. Sanitary districts and villages	—	89.1	86.8	82.6	79.1
2. Villages	81.0	—	73.5	72.6	70.3
B. Urban					
1. Municipal areas	—	10.0	13.2	17.4	20.9
2. Municipal areas and sanitary districts	19.0	—	26.5	27.4	29.7

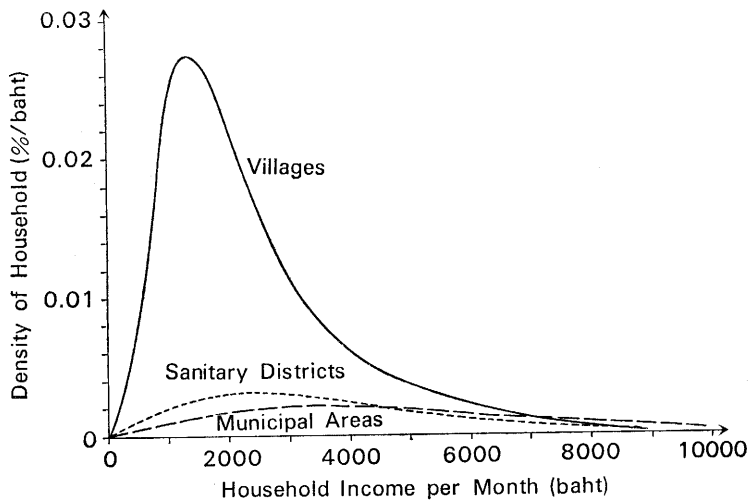


Figure 3-4

Distribution of Household by Area, 1981

Source: Estimated from data tape of SES 1981.

Table 3-8

Mean Household Income by Area

(baht)

	1962	1969	1975	1981	1986
Whole kingdom	595	1,099	1,857	3,445	3,800
A. Rural areas					
1. Sanitary districts and villages	—	930	1,601	2,864	3,240
2. Villages	449	—	1,479	2,720	2,651
B. Urban areas					
3. Municipal areas	—	2,539	3,629	5,981	7,303
4. Municipal area and sanitary districts	1,218	—	2,970	5,005	6,358
C. Ratio					
5. 3/1	—	2.73	2.27	2.09	2.25
6. 4/2	2.72	—	2.01	1.84	2.40

Source: Ikemoto and Limskul [21] and the author's estimates from NSO [65].

of households to a certain range of income becomes blurred. Households in the municipal areas have a wide range of income. This difference implies that in the rural areas income distribution is rather homogeneous and more equitable while in the urban areas it is rather heterogeneous and less equitable.<sup>7</sup>

Table 3-8 shows the mean household income by area at current prices and the ratio between them. The ratio indicates that the income gap be-

tween rural and urban areas has been decreasing from 1962 to 1981. This was already pointed out in Meesook [37] and our results confirm her conclusion. But between 1981 and 1986 it increased (from 2.09 in 1981 to 2.25 in 1986) when the rural areas were defined in the broad sense (C-5 in Table 3-8). The increase is much bigger if the rural areas are defined in the narrow sense, that is, from 1.84 in 1981 to 2.40 in 1986 (C-6 in Table 3-8). The difference between the two definitions results from the decrease in the mean household income at current prices in villages in 1986 (A-2 in Table 3-8) in contrast to the increase in the municipal area and sanitary districts. This is the sole case of decreasing mean income at current prices.

The change in the rural-urban gap reflects the relative position of the agricultural sector. As shown previously in Table 3-6 the share of farm income remained stable until 1975 but decreased rapidly from 63 per cent in 1975 to 47 per cent in 1986.<sup>8</sup> This change is consistent with production data. The agricultural share in GDP increased from 28.2 per cent in 1971 to 31.5 per cent in 1975 but thereafter decreased 6.1 per cent to 25.4 per cent in 1981 and still further by 8.7 per cent to 16.7 per cent in 1986 (see Table 3-9). We should pay attention to the fact that these figures are expressed at current prices. The improvement in agricultural relatively to non-agricultural sectors in the early 1970s was largely due to the improvement in terms of trade in favor of the agricultural sector. And this condition, favorable to the rural sector, benefited the lower income class

Table 3-9  
GDP and Employment by Sector

	1971	1975	1980	1986
GDP (millions of baht)	144,607	298,816	684,930	1,098,362
Agriculture	40,786 (28.2)	94,063 (31.5)	173,806 (25.4)	183,037 (16.7)
Non-agriculture	103,821 (71.8)	204,753 (68.5)	511,124 (74.6)	915,325 (83.3)
Employment (thousands)	16,619	18,182	22,681	26,672
Agriculture	13,112 (78.9)	13,270 (73.0)	16,092 (71.0)	17,803 (66.8)
Non-agriculture	3,507 (21.1)	4,912 (27.0)	6,589 (29.1)	8,870 (33.3)
Per capita GDP (baht/month)	725	1,370	2,517	3,432
1. Agriculture	259	591	900	857
2. Non-agriculture	2,467	3,474	6,465	8,600
3. Ratio (2/1)	9.52	5.88	7.18	10.04

Source: Hutaserani and Jitsuchon [15], p. 22.

Note: At current prices. Figures in parentheses are the percentage share.

and accordingly decreased income inequality. The improvement in labor productivity of the agricultural sector between 1971 and 1975 is very impressive. This is a nominal phenomenon which occurred largely due to the relatively higher commodity prices after the commodity boom in the early 1970s. But it had a real impact in reducing income inequality in Thailand. On the other hand, the non-agricultural sector could not keep pace with the agricultural one. As a result the productivity gap decreased sharply from 9.52 in 1971 to 5.88 in 1975.

The productivity gap, however, increased thereafter to reach 10.04 in 1986, which is higher than 9.52 in 1971. Contrary to the commodity boom in the early 1970s, the terms of trade became unfavorable to the agricultural sector in the 1980s, especially after 1983. This is a factor that widened the rural-urban gap and income inequality in the whole kingdom.

Lastly, we will break down income inequality into two components. One is income inequality *within* rural and urban areas and the other is income inequality *between* the rural and urban areas. For this purpose both the Theil index and the variance of income logarithm (varlog) are used.<sup>9</sup> The results are shown in Table 3-10.

The between-component of the Theil index decreased from 0.080 in 1969 to 0.052 in 1975, indicating that the rural-urban gap is narrowing. Although it increased slightly to 0.053 in 1981, this increase is so small that it may be said that in the latter half of the 1970s the rural-urban gap re-

Table 3-10  
Decomposition of Inequality between Areas<sup>a</sup>

	1969	1975	1981	1986
Theil Index				
Total <sup>b</sup>	0.3674	0.3241	0.3495	0.4237
Within-component	0.2868	0.2720	0.2958	0.3533
	(78.1)	(83.9)	(84.7)	(83.4)
Between-component	0.0806	0.0522	0.0536	0.0704
	(21.9)	(16.1)	(15.3)	(16.6)
Variance of Income Logarithm				
Total <sup>b</sup>	0.6563	0.6854	0.7478	0.8833
Within-component	0.5721	0.6149	0.6720	0.7389
	(87.2)	(89.7)	(89.9)	(83.7)
Between-component	0.0842	0.0706	0.0758	0.1444
	(12.8)	(10.3)	(10.1)	(16.4)

Source: Ikemoto and Limskul [21] and the author's estimate.

Note: Figures in parentheses indicate percentage contribution.

<sup>a</sup> The sanitary districts are included in the rural areas.

<sup>b</sup> Total is calculated by aggregating the between- and within-components. Therefore, these value are not necessarily the same as the values of Table 2-2.

mained unchanged. In terms of the percentage contribution it decreased from 21.9 per cent in 1969 to 16.1 per cent in 1975 and then to 15.3 per cent in 1981. The decrease between 1975 and 1981 is due to the increase in the inequality as a whole (see Total in Table 3-10). Between 1969 and 1981 the varlog shows the same pattern as the Theil index.

Between 1981 and 1986 both indices indicate that the between-component increased rapidly in terms of the absolute level as well as the percentage contribution. The difference is that in 1986 the varlog shows a higher value of between-component than ever before, and the Theil index shows a still lower value than that of 1969. Even though this difference does exist, it may be concluded that in the early 1980s income inequality between the rural and urban areas increased rapidly. In terms of percentage contribution the between-component of the Theil index increased only slightly between 1981 and 1986, that is, from 15.3 per cent to 16.6 per cent. This is because the within-component increased at a similar rate. Quite coincidentally the value 16.6 per cent in 1986 is almost the same for the Theil index as well as for the varlog. In the analysis of income distribution a level of 16 per cent for the between-component is evaluated as fairly large.

### **Kuznets Hypothesis and the Expanding Urban Sector**

Now we will reconsider the Kuznets hypothesis on the relationship between income inequality and economic development in relation to rural and urban areas.

Kuznets [32] gave some explanations for his hypothesis. One of them is the increasing share of the urban sector. In his paper based on a simple model, he showed that income inequality increases as the share of the urban sector increases until a certain level is reached; thereafter, income inequality decreases, even though income inequality within urban and rural sectors and the income gap between rural and urban sectors does not change. On his assumption, the highest income inequality is brought about when the population share in the agricultural sector is between 50 and 70 per cent.

Now we will present his result by decomposable inequality measures. First of all two assumptions are made as follows:

Assumption 1: Income inequality within the rural and urban areas does not change;

Assumption 2: The ratio of rural mean income to urban mean income is constant over time.

At a glance each of these two assumptions does not seem to indicate any inequalization of income when considered separately. But when these assumptions are combined, the expanding urban sector results in income

inequalization until the urban sector expands to a certain level as the Kuznets hypothesis indicates.

To show this relationship we use the Theil index. The Theil index can be decomposed into two components: one is inequality between sectors, and the other is inequality within a sector.<sup>10</sup> In our case this sector means rural and urban sectors. Now the Theil index is expressed as follows:

$$T = T_w + T_b,$$

where  $T_w = Y_r \cdot T_r + Y_u \cdot T_u$ ,

$$T_b = Y_r \cdot \ln(M_r/M) + Y_u \cdot \ln(M_u/M),$$

where  $T$ ,  $Y$ , and  $M$  stands for the Theil index, income share and mean income, respectively, and suffix  $r$  and  $u$  indicate the rural and urban areas.

$T_w$  is called the "within-sector component" and is a weighted average of the Theil indices of rural and urban sectors ( $T_r$  and  $T_u$ ), weight being the income share of the sector ( $Y_r$  and  $Y_u$ ).  $T_b$  is called the "between-sector component" and is equal to the Theil index on the assumption that every household has the same level of income as the average of the sector. Assumption 1 means that  $T_r$  and  $T_u$  are constant, and Assumption 2 means that the mean income ratio ( $M_r/M_u$ ) is constant over time.

We further make two more realistic assumptions:

Assumption 3: Income inequality in the urban sector is higher than in the rural sector ( $T_u > T_r$ );

Assumption 4: The mean income in the urban sector is higher than in the rural sector ( $M_u > M_r$ ).

These assumptions are consistent with many empirical results.

Now we will examine what will happen if the household share of the urban sector ( $W_u$ ) increases (or that of the rural sector [ $W_r$ ] decreases). The effect of this on the within-sector component  $T_w$  is derived by differentiating  $T_w$  with respect to the household share of urban sector ( $W_u$ ), which is included in  $Y_r$ ,  $Y_u$ , and  $M$  as

$$Y_i = M_i \cdot W_i / M, \quad i = r, u,$$

$$M = M_r \cdot W_r + M_u \cdot W_u,$$

$$W_r = 1 - W_u.$$

Thus we obtain

$$\frac{\partial T_w}{\partial W_u} = M_u \cdot M_r \cdot (T_u - T_r) / M^2 > 0.$$

By the assumption ( $T_r < T_u$ ) inequality always holds. This means that as

the share of the urban household increases, the within-component of Theil index ( $T_w$ ) increases. This is intuitively evident. Further differentiating this equation with respect to  $W_u$  we obtain

$$\begin{aligned} \frac{\partial^2 T_w}{\partial W_u^2} &= -M_u \cdot M_r \cdot (M_u - M_r)(T_u - T_r) / M^3 \\ &= -\frac{2A(1-A)(T_u - T_r)}{(W_u + W_r \cdot A)^3} < 0, \end{aligned}$$

where  $A = M_r/M_u$ ,  $0 < A < 1$ .

This equation shows that the shape of this curve depends on the mean income ratio ( $M_r/M_u$ ). In Figure 3-5 four curves are drawn for four different values of ( $M_r/M_u$ ), that is, 0.1, 0.3, 0.5, 0.7, assuming  $T_u=0.5$  and  $T_r=0.1$ . Since  $T_w=T_r$  at  $W_u=0$  and  $T_w=T_u$  at  $W_u=1$ , all curves start from  $T_w=0.1$  and reach to  $T_w=0.5$  as  $W_u$  increases from 0 to 1. Figure 3-5 shows that as the mean income ratio ( $M_r/M_u$ ) decreases, income inequality increases more rapidly at a lower level of urbanization (or smaller value of  $W_u$ ). For example, at  $W_u=0.4$ ,  $T_w$  is nearly 0.45 for the curve of 0.1 while it is much lower for other curves. It is noteworthy that within-sector inequality can be higher in the process of urbanization when the income gap between the sectors is higher if it is measured by the Theil

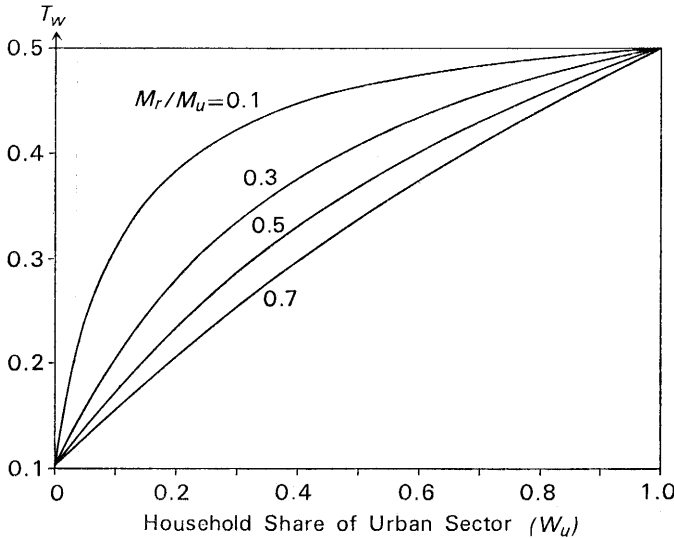


Figure 3-5  
Within-Components of Theil Index ( $T_w$ )

Source: The author's estimate.

Note:  $T_u=0.5$ ,  $T_r=0.1$ .



index. This is because the weight of the equation  $T_w = Y_r \cdot T_r + Y_u \cdot T_u$  is the income share ( $Y_r$  and  $Y_u$ ), not the household share ( $W_r$  and  $W_u$ ).<sup>11</sup> Thus the mean income ratio between sectors can affect the within-sector component ( $T_w$ ) even though it seems to be independent of the income gap between sectors.

The between-sector component of the Theil index shows an inverted U-shape, as we can easily imagine. At the two extreme points where no household exists in either of the sectors—that is,  $W_u = 0$  or  $W_r = 0$  (or  $W_u = 1$ )—there is no inequality between the sectors because there is only one sector at these points. Between these extreme cases there exists inequality between sectors unless the sectoral mean income is the same. Thus there exists an inverted U-shaped curve of between-sector component ( $T_b$ ).

Now we derive the value of  $W_u$  which brings about the highest between-sector inequality ( $T_b^*$ ), which will be denoted  $W_u^*$ .  $W_u^*$  may be seen as the turning point beyond which between-sector inequality ( $T_b$ ) decreases. By differentiating  $T_b$  with respect to  $W_u$  and setting the derivative function equal to zero, we obtain:

$$W_u^* = -A(\ln(A) - A + 1)/(1 - A)^2,$$

where  $A = M_r/M_u$ ,  $0 < A < 1$ .

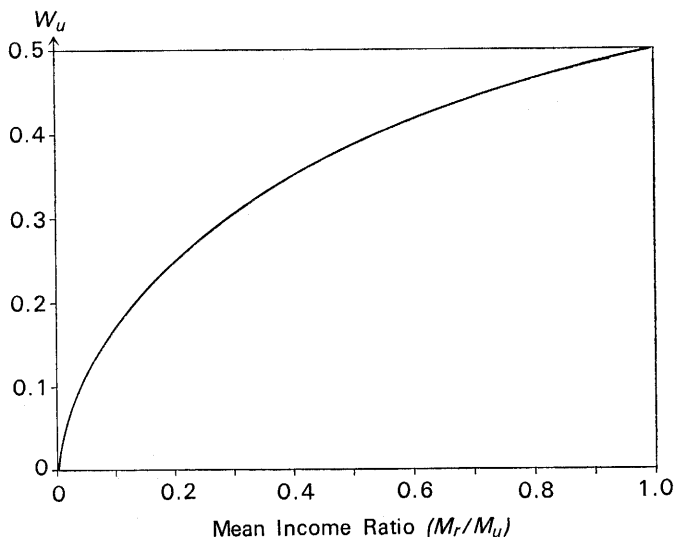


Figure 3-6  
Household Share of Urban Sector ( $W_u$ ) and  $M_r/M_u$  for the Maximum Between-Component of Theil Index ( $T_b^*$ )

Source: The author's estimate.

Therefore the value of  $W_u^*$  is determined only by the mean income ratio ( $M_r/M_u$ ) between sectors. Figure 3-6 shows the above equation. This figure shows that when the mean income ratio ( $M_r/M_u$ ) is very large the turning point will come at an earlier stage of urbanization. As the income gap narrows (or as  $M_r/M_u$  approaches 1), the value of  $W_u$  which brings about the highest between-inequality approaches 0.5. Thus when the income gap between sectors is negligible, the maximum  $T_b$  is brought about at the point where the household share of the rural and urban sectors are nearly the same to each other, though in this case  $T_b$  is also negligible as can be seen from Figure 3-7. Figure 3-7 shows how the between-sector component,  $T_b$ , changes as the urban share ( $W_u$ ) increases for four different levels of mean income ratio ( $M_r/M_u$ ) between sectors. All four curves are inverted U-shaped. When the income gap between sectors is very big, the maximum  $T_b$  corresponds to a small urban household share. For example, when the mean income gap is 0.1, maximum between-sector inequality is brought about when the urban household share is only 17 per cent. Not only is the urban share small, but between-sector inequality is also very high. Figure 3-7 shows that in this case between-sector inequality ( $T_b$ ) reaches higher than 0.6.

In summary it can be said that the larger the income gap between the

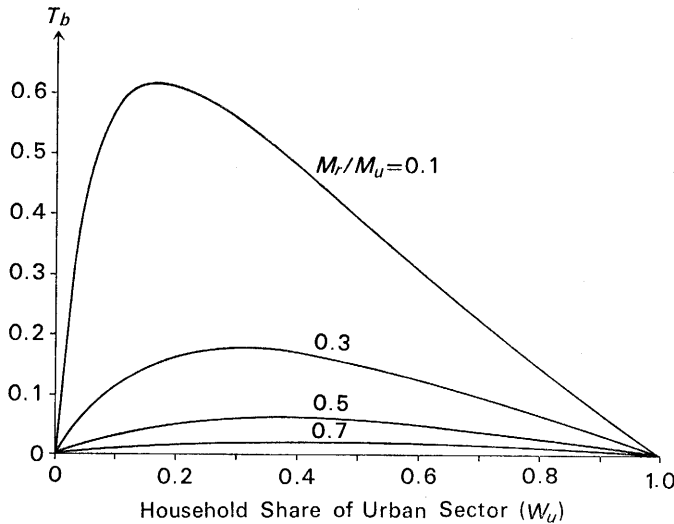


Figure 3-7  
Between-Components of Theil Index ( $T_b$ )

Source: The author's estimate.

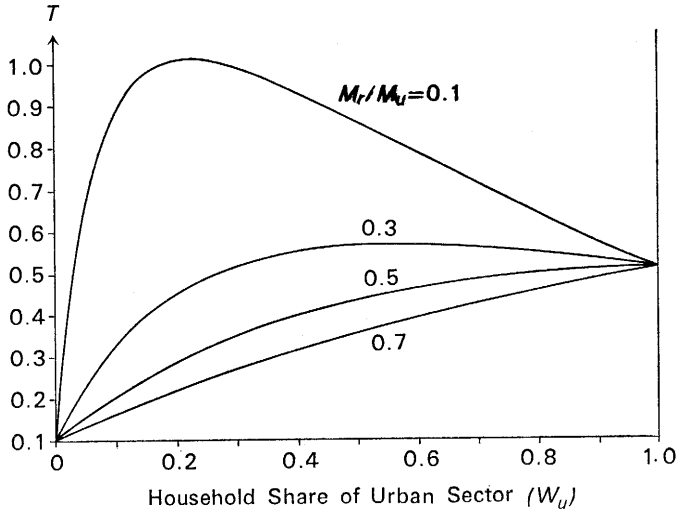


Figure 3-8  
Theil Index ( $T$ )

Source: The author's estimate.

Note:  $T_u=0.5$ ,  $T_r=0.1$ .

sectors is, the between-sector component of the Theil index also becomes bigger and the urban household share which brings about the highest between-component of the Theil index becomes smaller.

Figure 3-8 shows the sum of the between- and within-components of the Theil index shown in Figures 3-5 and 3-7. This figure indicates that when the relative income ratio ( $M_r/M_u$ ) is equal to 0.1 and 0.3, the curve of the Theil index shows an inverted U-shape. But when the relative income ratio is equal to 0.5 and 0.7, the Theil index increases slowly. This is because the inverted U-shaped curve of the between-component (Figure 3-7) is dominated by the slow increase of the within-component (Figure 3-5). The bigger the difference between sectoral inequality ( $T_u - T_r$ ) relative to the mean income gap is, the effect to offset the inverted U-shape of the between-component is also bigger.

Now we use more realistic values. Figure 3-9 is drawn based on the actual data of Thailand in 1981 ( $M_r/M_u=0.5$ ,  $T_u=0.31$ , and  $T_r=0.29$ ). There are two curves in the figure. The higher one shows the total inequality ( $T$ ), and lower one shows the within-sector component ( $T_w$ ). The difference between these two curves shows the between-sector component ( $T_b$ ). In 1981 the share of the urban sector was 13.3 per cent and the Theil index for the whole kingdom was 0.334, which is indicated by the

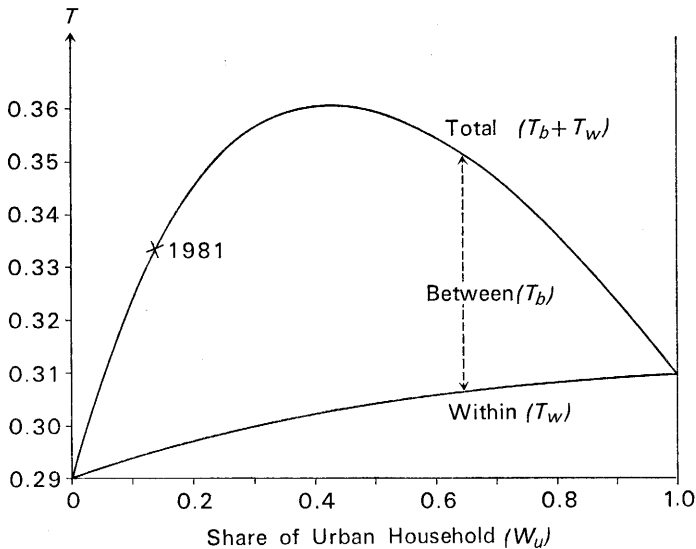


Figure 3-9

## Theil Index for Thailand

Source: The author's estimate.

Note:  $M_r/M_u=0.5$ ,  $T_u=0.31$ ,  $T_r=0.29$ .

1981 intersect in Figure 3-9. On the assumption that  $T_u$ ,  $T_r$ , and  $M_r/M_u$  are constant, though these assumptions are rather unrealistic, income inequality in Thailand will increase until the urban share reaches about 40 per cent of the total. Needless to say, we must be very careful in interpreting this result because of the rather unrealistic assumptions.

### An Implication of the Expanding Urban Sector

In the previous section we have seen that an increase in the share of the urban household causes the inverted U-shaped curve of income inequality on the assumptions that:

- (1) There is no change in income inequality within each sector, and
- (2) The income gap between sectors does not change.

Neither of these assumptions seems to be unfavorable to income distribution. Both Assumptions 1 and 2 do not mean income inequalization by themselves. But some measures of income inequality, such as the Theil index, evaluate the changes on these assumptions as an increase in income inequality as seen in the first phase of the Kuznets curve. Income inequalization is usually considered to be an unfavorable phenomenon. Since the assumptions are not unfavorable, what then brings about this unfavorable

result? This was already asked by Fields [14]. His Proposition 5 states as follows: "For modern sector enlargement growth, the conventional relative inequality measures do not 'correctly' measure relative inequality, if the 'correct' definition of relative inequality in dualistic development is the intersectoral income difference or ratio (or a monotonic transformation thereof)" (Fields [14], p. 55). He then continues: "In the early stages of modern sector enlargement growth, we may be misled into thinking that relative inequality is worsening when in fact the intersectoral income differential is not changing" (Fields [14], p. 55). Fields regards income inequalization on the assumptions mentioned above as "statistical artifacts without social welfare content" (Fields [14], p. 56).

We can further extend this way of thinking. For example, we can divide the rural sector into two groups, that is, into a modern rural sector and a traditional rural sector. Assuming that the income gap between the modern rural sector and the traditional rural sector and income inequality within them remain constant, and that the share of the modern rural sector increases, then the income inequality of the rural sector—both modern and traditional, measured by conventional indices, such as the Theil index—will increase during the period in which the modern rural sector remains small relative to the traditional rural sector. We can continue this way of thinking by dividing further the modern rural sector into a highly developed sector and a less developed one. This way of thinking implies that income inequalization in any sub-sector measured by the conventional indices may include those changes that occur on the Assumptions 1 and 2 mentioned above which are not directly related to income inequalization. This way of thinking seems to make us refrain from using the conventional inequality indices and will lead us finally to a criterion in terms of development.

Contrary to this growth-oriented interpretation, an equity-oriented interpretation of income inequalization on the Assumptions may be that inequalization is caused by the dissatisfaction of the rural people who do not receive the benefits of any urban-enlarging development.

Our model cannot be applied to Thailand directly because the assumptions are too simple, but still we can derive some implications from it for Thailand. These assumptions are not actually true for the Thai case. The first assumption that income inequality within each sector remains constant is not true. Our analysis shows that it is increasing. The second assumption that the income gap between rural and urban sectors does not change is also not true. Actually it is decreasing, though this tendency reversed in the 1980s. Contrary to the general impression that regional income disparity is increasing, which is based on the GRP per capita, house-

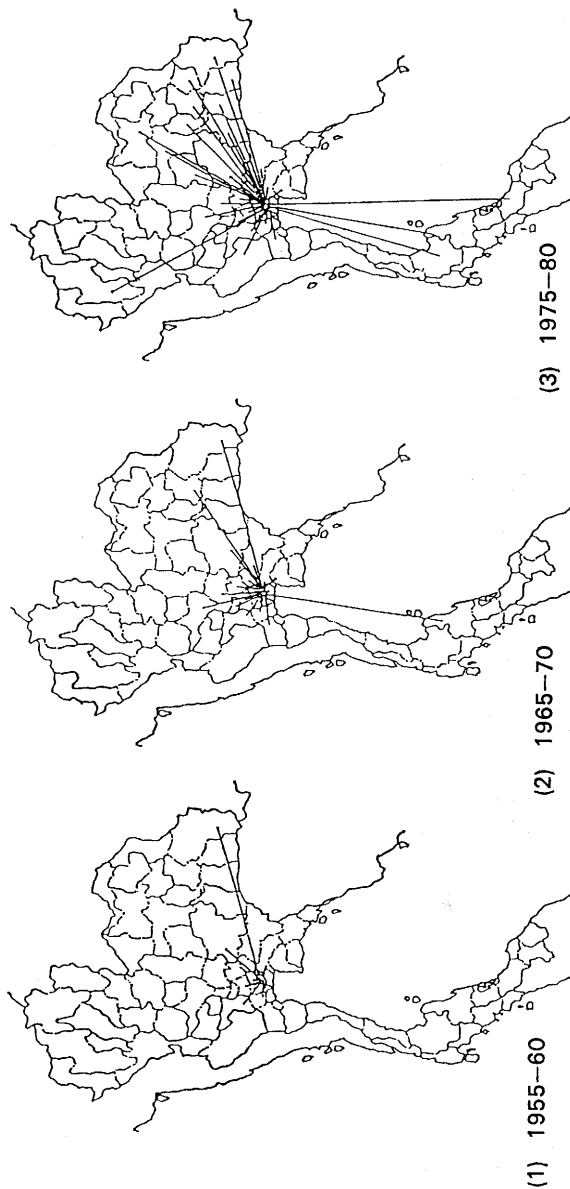


Figure 3-10  
Migration between Bangkok and Other Regions  
Source: Watanabe [67], p. 33.  
Note: ← indicates migration of more than 4,000 persons.

hold income disparity between the rural and urban sectors decreased until 1981. This tendency to decrease was partly due to favorable conditions for the rural sector in the 1970s and partly due to the movement of population between regions. Figure 3-10 shows that this kind of movement increased between 1955 and 1980. If migration into urban areas had been prohibited, the income gap between rural and urban sectors would have been bigger, and income inequality for the whole country would also have been larger as indicated in Figure 3-7.

Even though migration into urban areas may reduce the income gap between sectors, it may increase income inequality within the urban sector if the migrants fail to find jobs and move into the informal sector. When we divide the urban sector into formal and informal sectors, we can apply the same argument as that for rural and urban sectors mentioned above; thus, in the process of increasing the share of formal sector, income inequality within the urban sector changes like the Kuznets inverted U-shaped curve, and this inequalization at the first stage will increase if the income gap between formal and informal sectors becomes larger. One way to mitigate income inequalization in the process of increasing the formal sector would be to reduce the income gap between the formal and informal sectors. Industrialization policy to promote labor-intensive industry is desirable in this sense too. And this is the reason capital-intensive technology leads to rapid income inequalization.

### Comparison with Other Decomposable Inequality Indices

In this section we will briefly compare three inequality indices that are decomposable according to population groups. One of them is the Theil entropy measure  $T$ , which we have used in the chapter to explain the relationship between structural change and income inequality. The other two are another Theil measure, which is called Theil's second measure  $L^{12}$  and varlog. The Theil's second measure is sometimes called the Shorrocks index.<sup>13</sup> This is expressed as:

$$L = \sum_j W_j \cdot \ln(M/M_j),$$

where  $W_j$ ,  $M_j$ , and  $M$  stand for household share and mean income of income class  $j$  and mean income of the all households, respectively.

This measure "reverses the roles of income share and population share" (Anand [5], p. 309). Theil's second measure ( $L$ ) can be decomposed into sectors that we will call rural and urban sectors as follows:

$$L = L_w + L_b,$$

where  $L_w = W_r \cdot L_r + W_u \cdot L_u$  and  $L_b = W_r \cdot \ln(M/M_r) + W_u \cdot \ln(M/M_u)$ .

Here  $L_r$  and  $L_u$  are Theil's second measure of rural and urban sectors, respectively.  $L_w$  is called the within-component and  $L_b$  is called the between-sector component.

The variance of income logarithm ( $V$ ) is written as:

$$V = \sum_j W_j \cdot (\ln M_j - \bar{M})^2,$$

where  $\bar{M}$  is the average of the logarithms of mean income.

Decomposition is as follows:

$$V = V_w + V_b,$$

where  $V_w = W_r \cdot V_r + W_u \cdot V_u$  and  $V_b = W_r \cdot (\ln M_r - \bar{M})^2 + W_u \cdot (\ln M_u - \bar{M})^2$ .

$V_w$  is called the within-sector component and is a weighted average of the varlog of each sector ( $V_r$  and  $V_u$ ) with the household share ( $W_r$  and  $W_u$ ) being the weight.  $V_b$  is called the between-sector component. When we divide the total population into two groups, we can examine the movement of the between-sector component as we did in this chapter. By differentiating  $L_b$  with respect to  $W_u$  and setting the derivative equal to zero, we

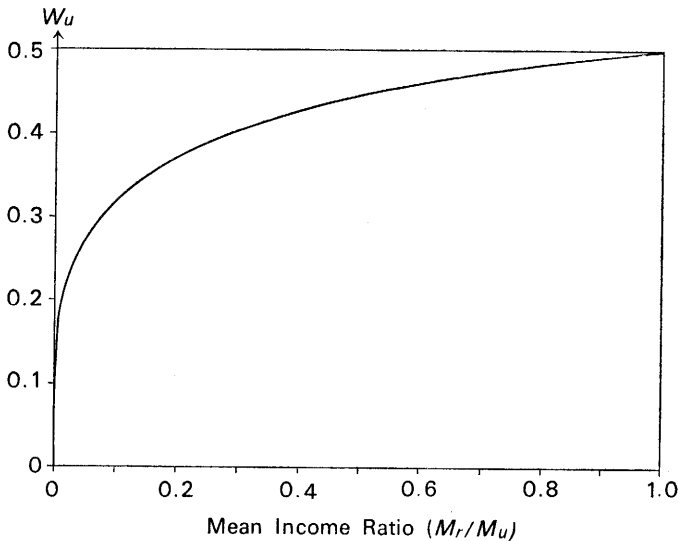


Figure 3-11  
 $W_u$  and  $M_r/M_u$  for Maximum  $L_b$

Source: The author's estimate.



obtain the population share of urban sector  $W_u$  which brings about the maximum between-sector component (the turning point):

$$W_u = -1/\ln(A) + A/(A-1),$$

where  $A = M_r/M_u$ ,  $0 < A < 1$ .

This equation is shown in Figure 3-11. The difference between this figure and Figure 3-6 is that the curve in Figure 3-11 is higher than that in Figure 3-6. This means that the Theil index ( $T$ ) reaches its maximum at a smaller share of urban household than Theil's second measure ( $L$ ), especially when the income gap between sectors is big. In other words, the turning point comes earlier if measured by the Theil index ( $T$ ) than if measured by Theil's second measure ( $L$ ).

In Figure 3-12 the change in the between-sector component of Theil's second measure ( $L$ ) is shown for four cases ( $M_r/M_u = 0.1, 0.3, 0.5, 0.7$ ). Compared with Figure 3-7 the peak of the curves appear at a higher value of  $W_u$ . Figure 3-13 is drawn based on the actual value and on those assumptions made in this chapter, that is, that within-sector inequalities do not change and only the population share of the urban area increases. From this figure we can see that the highest inequality is brought about when the population share of the urban sector is around 50 per cent. This is higher than the case of Figure 3-9 where the highest inequality is brought about when the population share is around 40 per cent.

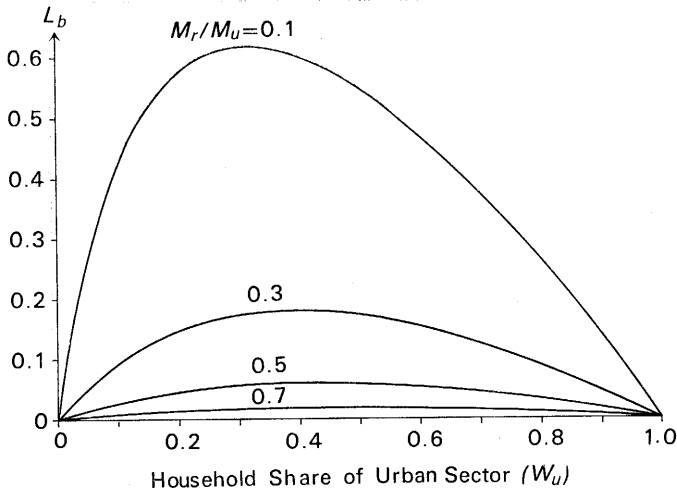


Figure 3-12

Between-Components of Theil's Second Measure ( $L_b$ )

Source: The author's estimate.

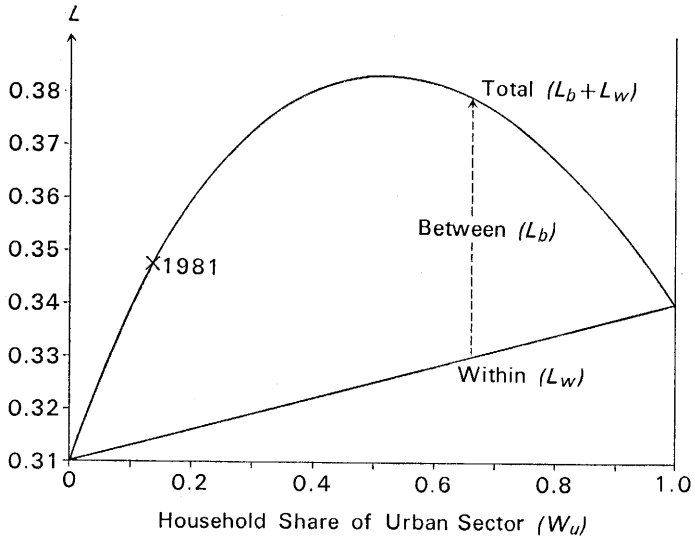


Figure 3-13  
Theil's Second Measure for Thailand  
Source: The author's estimate.  
Note:  $M_r/M_u=0.5$ ,  $L_u=0.34$ ,  $L_r=0.31$ .

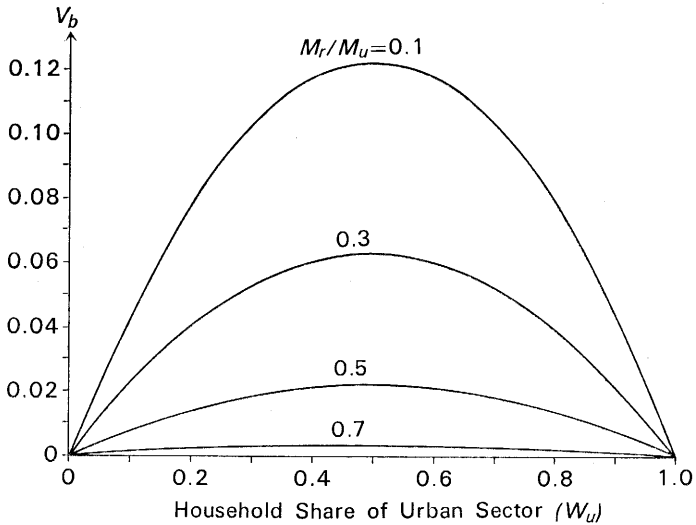


Figure 3-14  
Between-Components of Varlog ( $V_b$ )  
Source: The author's estimate.

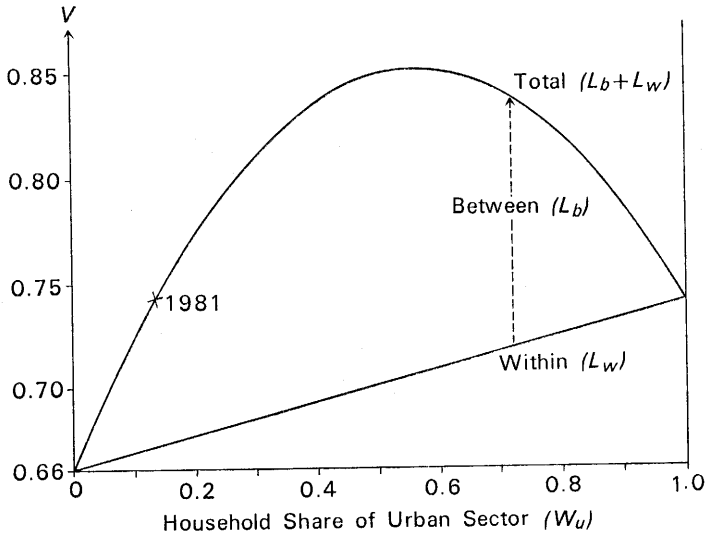


Figure 3-15  
Varlog for Thailand

Source: The author's estimate.

Note:  $M_u=9.35$ ,  $M_r=7.65$ ,  $V_u=0.74$ ,  $V_r=0.66$ .

For the case of varlog by differentiating the between-component ( $V_b$ ) with respect to  $W_u$  we obtain:

$$W_u = 0.5 \quad (\text{or } W_r = 0.5).$$

This means that the highest inequality is brought about whenever the population share of the urban sector is 50 per cent independently of the mean income gap ( $M_r/M_u$ ). The four cases where the gap of the mean of log-income is 0.1, 0.3, 0.5, and 0.7 (not the ratio of mean income) are shown in Figure 3-14. And the curve based on the actual value is shown in Figure 3-15. In this case the highest inequality is brought about when the population share is around 66 per cent.

The difference of the values of  $W_u$  which correspond to the maximum inequality is attributable to the social welfare function on which these inequality measures are based. The varlog is insensitive to the relative income gap ( $M_r/M_u$ ) while the Theil index ( $T$ ) is the most sensitive among the three measure. Since the decomposition of the inequality index gives a different impression according to which inequality measure is used, we should keep this fact in mind whenever we use this method.