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Income Inequality and Kuznets' Hypothesis in Thailand

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During the rapid economic growth of Thailand that started in the latter half of the 1980s, income inequality increased very rapidly. At the same time, the industrial sector absorbed underemployed labour force in rural areas in the early 1990s. It was expected, therefore, that income inequality would decrease soon in Thailand. However, statistical indicators do not show clear and consistent downward trends in the mid-1990s. We examine whether Thailand has passed the turning point of the Kuznets' curve. We generalize the Kuznets' hypothesis by redefining the agricultural sector as low-productivity sector and the industrial sector as high-productivity sector. Consequently, the Kuznets' curve does not necessarily appear only once but can appear several times when new high-productivity industries appear. With this idea we will argue two points. One is that income inequality increased rapidly in the latter half of the 1980s because of the emergence of export-oriented manufacturing industries established by foreign direct investment (FDI). The second contention is that income inequality did not decrease clearly in the 1990s, even though the labour market might have passed the turning point, because the Thai economy shifted to domestic-orientation, which led to the currency crisis in 1997.

I.   Introduction

Income inequality in Thailand has been increasing gradually since the 1960s. Though in the 1960s income inequality in Thailand was relatively lower than other Southeast Asian countries, after 30 years, the level of income inequality became as high as in the most unequal countries in the world. During the rapid economic growth of Thailand, which started in the latter half of the 1980s, income inequality increased very rapidly. At the same time, the industrial sector absorbed the underemployed labour force in rural areas in the early 1990s. The experience of East Asian countries suggests that the turning point in the labour market corresponds to the turning point of the Kuznets' curve. Consequently it

was expected that income inequality would also decrease soon in Thailand. However, as this paper will show, there is no clear evidence of consistent downward trends in the mid-1990s. Some statistical indicators indicate a downward trend while others indicate an upward trend. Therefore it is not yet known whether income inequality decreased or not.

In this paper we reconsider Kuznets' inverted-U shape hypothesis. Kuznets' hypothesis states that at the early stage of economic development income inequality increases while at the later stage it decreases. Originally it was supposed that this change corresponded to the structural change from agricultural to industrial economy. When a modern industrial sector is introduced into an agricultural economy, the income gap between these two sectors will rise. However, when the modern sector absorbs the labour from rural areas, the income gap will narrow. This explanation applies only once in the course of economic development. However, inequalization does not necessarily occur only once. For example, in developing countries income inequality is increasing. We can generalize Kuznets' hypothesis to include this phenomenon. More generally, Kuznets' hypothesis can be expressed as follows: When a new and more productive industry is introduced into a matured (or stagnant) economy (which may be an agricultural economy or an industrial one), the income gap will widen because of the gap between the new and old industries. However, when the economy moves towards a new equilibrium through a shift of resource allocation, the income gap will narrow.

In this paper we will argue two points. One is that income inequality increased rapidly in the latter half of the 1980s because of the emergence of export-oriented manufacturing industries established by foreign direct investment (FDI). The other is that income inequality showed no clear decrease in the 1990s, even though the labour market might have passed the turning point, because Thai economy shifted to domestic orientation, which led to the currency crisis in 1997.

In this paper we examine the changes in income inequality and the regional income gap in the 1990s in Sections II and III, respectively. In Section IV we discuss the factors involved in the change in income inequality during this period in Thailand. First we present a theoretical explanation, which is a generalization of the Kuznets' hypothesis (IV.1), and then discuss factors of increasing inequality in the 1980s (IV.2), the turning point in the early 1990s (IV.3) and the bubble economy and economic crisis (IV.4). Section V is the conclusion. The Appendix sets out the method used by the National Statistical Office (NSO) to estimate the Gini coefficient.

II.   Overall Trend of Income Inequality: 1962–98

II.1   1962–1992

In the 1960s income inequality in Thailand was generally lower than in other Southeast Asian countries where the Gini coefficient was about 0.5 but higher than in East Asian countries whose Gini coefficient was about 0.3. Thailand

started import-substituting industrialization based on the private sector in the early 1960s. However, the Thai economy was dominated by the agricultural sector until the early 1980s when the share of manufacturing sector passed that of the agricultural sector. As the share of the industrial sector increased, income inequality gradually increased. Thailand entered a period of rapid economic growth in the latter half of the 1980s, which was ended by the currency crisis in July 1997. Engines of growth in this period were exports of manufactured goods to developed countries and foreign direct investment (FDI) from Japan and other developed countries and Asian NIES. In this short period the structure of trade changed dramatically from agricultural products to manufactured products, including high-tech products such as computer parts. These changes mark Thailand's shift from an agricultural to a manufacturing economy. However, this is rather exaggerated in two respects. One is that such exports depend on imported parts and materials. And another reason is that Thailand took only the part of labour-intensive process. The purpose of FDI was to make use of cheap labour in Thailand. These two factors severely limit value-added in Thailand.

Labour-intensive industrialization is considered to have promoted equal income distribution during high economic growth in Taiwan. Such industrialization makes it possible to absorb abundant labour not only in the manufacturing sector but also in the construction and service sectors. In Thailand too, it succeeded in absorbing underemployed labour in the rural areas in the early 1990s. As a result, Thailand changed from a labour-abundant to a labour-shortage economy and the wage rate began to increase not only in urban areas but also in rural areas.

Taiwanese experience suggested that labour-intensive industrialization could avoid worsening income inequality. However, Thailand failed to avoid it and income inequality worsened very rapidly in the latter half of the 1980s and early 1990s. Tables 1 and Figure 1 show Gini coefficients for the whole kingdom from 1962 to 1998. The Gini coefficient in terms of household income ((1) in Table 1) increased from 0.417 in 1975 to 0.507 in 1992. The Gini coefficient in terms of per capita household income ((4) in Table 1) also increased 0.475 in 1981 to 0.535 in 1992.[1] In terms of per capita welfare, which is defined as household income divided by its poverty line, it also increased from 0.481 in 1988 to 0.499 in 1992. All these indices indicate that income inequality worsened very rapidly from 1981 until 1992. Thus the question concerning to this period is why income inequality increased so rapidly in spite of the labour-intensive industrialization.

Changes in Gini coefficient are reflected in the changes in the income share of the top decile, or the richest 10% of all households or people in terms of income. The population of Thailand is about 60 million and each decile in terms of population, not households, contains about 6 million people, which is roughly the same as the population of Bangkok. Bangkok is the principal city of Thailand and its income level is much higher than other cities. Therefore nearly

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1. In fact it decreased from 1986 to 1988. However, The year 1986 is said to be abnormal and therefore we exclude the year 1986 from our analysis.

Table 1 Gini Coefficient and Poverty in Thailand

	1962	1969	1975	1981	1986	1988	1990	1992	1994	1996	1998
Hosehold income											
(1) Method 1	0.413	0.426	0.417	0.441	0.458	0.465	0.500	0.507	0.495	0.512	0.522
(2) Method 2				0.431							
(3) Method 3							0.475	0.497	0.483	0.484	0.478
Per capita household income											
(4)				0.475	0.504	0.488	0.496	0.535	0.524	0.512	0.519
(5) NSO								0.445	0.431	0.429	0.426
Per capita welfare											
(6) NESDB						0.481	0.481	0.499	0.486	0.477	0.481
Poverty incidence (%)											
(7)	57.0		33.0	23.0	29.5						
(8)				17.5	22.4	16.1	15.0	10.9			
(9)						32.6	27.2	23.2	16.3	11.4	12.9
Household Expenditure											
(10) Household							0.425	0.441	0.426	0.426	0.418
(11) Per Capita							0.452	0.457	0.439	0.446	0.424

Note: Method 1 used Pareto distribution.
 Method 2 used SES data tape.
 Method 3 used average income.
Source: (1) 1962–81: Ikemoto (1991). 1986–98: Estimated from NSO, Report of Household, Socio-Economic Survey, various years, and NSO (1999).
 (2) 1981: Ikemoto (1991).
 (3–4) Estimated from NSO, Report of Household, Socio-Economic Survey, various years, and NSO (1999).
 (5) NSO, Report of Household Socioeconomic Survey, various years, and NSO (1999).
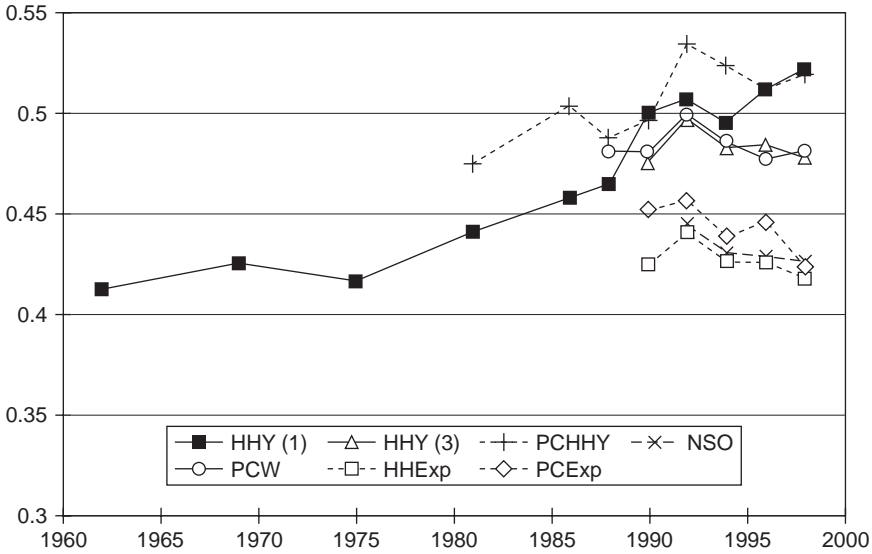 (6) NESDB [ ].
 (7) Hutaserani and Jitsuchon (1988).
 (8) Ikemoto (1993).
 (9) NESDB (1999).

Figure 1   Gini Coefficients in Thailand

Source: Table 1.

30% of Bangkok population, about 2 million, is included in the top decile of the whole kingdom (Ikemoto, 1992). We may say the 2 million people of the Bangkok people includes not only the 'rich' but also the 'middle class' which emerged during the rapid economic growth and who took an active role in democratic movement in the early 1990s.

The top decile's share of household income increased gradually from 34.1% in 1981 to 42.4% in 1992 (Table 2) while its share of per capita household income increased from 37.7% in 1981 to 43.7% in 1992 though the value in 1986 is exceptionally high due to the reason mentioned above (Table 3). The changes in the Gini coefficient are well reflected in the changes in the income share of the top decile.

During this period the income share of all other deciles generally decreased both in terms household income and per capita household income. Therefore it can be said that income inequality increased from the gain of the top decile and the loss of the other deciles. These changes are especially marked after 1988 when Thai economy achieved two-digit economic growth. This result may give an impression that the high economic growth in this period benefited only the 'rich' class in Bangkok. This is true only in relative terms. If we look at the result in absolute terms (or in Baht), all deciles gained. Even if the income is deflated by the consumer price index, there was an increase in real income. This is reflected in the decrease in the incidence of poverty (Table 1). The incidence of poverty in 1986 is exceptionally high and we omit this year. Neglecting the

Table 2 Income Distribution (Household Income) Whole Kingdom

	1981	1986	1988	1990	1992	1994	1996	1998
Average income (Baht)								
Decile 1	686	664	744	869	1,117	1,379	1,796	2,186
Decile 2	1,115	1,088	1,247	1,508	1,863	2,279	2,943	3,573
Decile 3	1,440	1,412	1,640	2,027	2,442	2,971	3,819	4,628
Decile 4	1,780	1,738	2,038	2,564	3,030	3,669	4,697	5,686
Decile 5	2,149	2,110	2,478	3,166	3,675	4,433	5,780	6,904
Decile 6	2,615	2,622	2,995	3,882	4,472	5,460	7,248	8,663
Decile 7	3,232	3,293	3,741	4,795	5,744	7,001	9,167	11,009
Decile 8	4,090	4,252	4,857	6,158	7,653	9,250	11,925	14,399
Decile 9	5,507	5,883	6,770	8,745	11,026	13,183	16,855	20,257
Decile 10	11,676	13,270	15,972	24,464	30,258	34,395	49,437	63,453
Total	3,429	3,633	4,248	5,818	7,128	8,402	11,367	14,076
Share (%)								
Decile 1	2.0	1.8	1.8	1.5	1.6	1.6	1.6	1.6
Decile 2	3.3	3.0	2.9	2.6	2.6	2.7	2.6	2.5
Decile 3	4.2	3.9	3.9	3.5	3.4	3.5	3.4	3.3
Decile 4	5.2	4.8	4.8	4.4	4.3	4.4	4.1	4.0
Decile 5	6.3	5.8	5.8	5.4	5.2	5.3	5.1	4.9
Decile 6	7.6	7.2	7.1	6.7	6.3	6.5	6.4	6.2
Decile 7	9.4	9.1	8.8	8.2	8.1	8.3	8.1	7.8
Decile 8	11.9	11.7	11.4	10.6	10.7	11.0	10.5	10.2
Decile 9	16.1	16.2	15.9	15.0	15.5	15.7	14.8	14.4
Decile 10	34.1	36.5	37.6	42.0	42.4	40.9	43.5	45.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Gini Coefficient	0.431	0.458	0.465	0.500	0.507	0.495	0.512	0.522
Annual growth rate(%)		1.2	8.1	17.0	10.7	8.6	16.3	11.3
of income(period.)		(1981–86)	(1986–88)	(1988–90)	(1990–92)	(1992–94)	(1994–96)	(1996–98)

Note: Average income refers to average monthly household income.
    Annual growth rate refers to average annual growth rate of household income.
Source: Estimated by the authors from NSO, Report of the Household Socio-Economic Survey, National Statistical Office, various years and NSO (1999).

Table 3   Income Distribution (Per Capital Household Income) Whole Kingdom

	1981	1986	1988	1990	1992	1994	1996	1998
Average income (Baht)								
Decile 1	111	103	137	248	270	350	506	617
Decile 2	266	252	327	404	479	612	854	1,030
Decile 3	349	343	432	523	652	827	1,128	1,352
Decile 4	433	437	537	642	834	1,049	1,407	1,678
Decile 5	525	543	654	785	1,039	1,300	1,733	2,037
Decile 6	632	678	825	1,012	1,289	1,654	2,220	2,557
Decile 7	780	875	1,076	1,322	1,698	2,160	2,889	3,341
Decile 8	1,028	1,181	1,438	1,784	2,359	2,914	3,880	4,509
Decile 9	1,522	1,885	2,209	2,612	3,586	4,264	5,644	6,599
Decile 10	3,412	3,935	4,480	6,046	9,488	11,369	14,475	17,954
Total	906	1,023	1,212	1,538	2,169	2,650	3,473	4,167
Share (%)								
Decile 1	1.2	1.0	1.1	1.6	1.2	1.3	1.5	1.5
Decile 2	2.9	2.5	2.7	2.6	2.2	2.3	2.5	2.5
Decile 3	3.9	3.4	3.6	3.4	3.0	3.1	3.2	3.2
Decile 4	4.8	4.3	4.4	4.2	3.8	4.0	4.1	4.0
Decile 5	5.8	5.3	5.4	5.1	4.8	4.9	5.0	4.9
Decile 6	7.0	6.6	6.8	6.6	5.9	6.2	6.4	6.1
Decile 7	8.6	8.6	8.9	8.6	7.8	8.2	8.3	8.0
Decile 8	11.3	11.5	11.9	11.6	10.9	11.0	11.2	10.8
Decile 9	16.8	18.4	18.2	17.0	16.5	16.1	16.2	15.8
Decile 10	37.7	38.5	37.0	39.3	43.7	42.9	41.7	43.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Gini Coefficient	0.475	0.504	0.488	0.496	0.535	0.524	0.512	0.519
Annual growth rate(%)		2.5	8.8	12.7	18.8	10.5	14.5	9.5
of income(period).		(1981–86)	(1986–88)	(1988–90)	(1990–92)	(1992–94)	(1994–96)	(1996–98)

Note: Average income refers to average monthly per capita household income.
        Annual growth rate refers to average annual growth rate of per capita household income.
Source: Estimated by the authors from NSO, Report of the Household Socio-Economic Survey, National Statistical Office, various years and NSO (1999).

value in 1986, the incidence of poverty decreased slightly from 17.5% in 1981 to 15.0% in 1990 (Table 1 (8)). However, the change in the 1990s is very impressive. It decreased from 15.0% in 1990 to 10.9% in 1992 (Table 1 (8)), or 32.6% in the 1988 to 23.2% in 1992 (Table 1 (9)).[2]

There are some channels of the trickle-down effects through which prosperity in Bangkok spread to other regions in Thailand.[3] For example, workers migrating to Bangkok from other regions or rural areas send back or bring back their income earned in Bangkok or other urban areas to rural areas. More of the government budget is allocated to other regions or rural areas through local government. Congestion and higher prices and wages in Bangkok tended to move investment to other regions, and so on. Through these and other channels rural income increased and poverty incidence was decreased. However, the fact that the increase in rural income lagged behind that in Bangkok and other urban areas caused the Gini coefficient to increase rapidly.

II.2   1992–1998

The changes in income inequality in the 1990s are not clear. The Gini coefficient decreased from 0.507 in 1992 to 0.495 in 1994 but began to increase again to 0.522 in 1998, which is incredibly high. This seems to contradict Kuznets' inverted-U shape hypothesis (Kuznets, 1955). The high economic growth since the latter half of the 1980s was led by labour-intensive export-oriented manufacturing industries. They may be characterized as high-tech industries, which produce high-tech products such as hard disk and other computer parts, the process conducted in Thailand was very labour-intensive. Most of the capital-intensive parts are imported from developed countries and assembled by unskilled labour in Thailand. The main purpose of FDI in this period was to make use of the cheap, abundant unskilled labour in Thailand. These and other urban industries succeeded in absorbing the abundant labour and in the early 1990s the wage rate of agricultural labour began to increase. This indicates that the labour market turned from labour-abundance to labour-shortage. This kind of turning point in the labour market corresponded to the turning point of Kuznets' inverted U shape hypothesis in such countries as Japan, Taiwan, Korea, and Malaysia. Therefore, it was expected that income inequality would also begin to decrease in Thailand[4]. However, if my estimate (Table 1 (1)) reflects the reality, this expectation was not realised.

However, it is not clear whether my estimate reflects the reality or not. Table 1 shows various series of the Gini coefficient and they do not always show the

2.   Differences in (8) and (9) in Table 1 are due to different poverty lines. (8) applies the rural poverty line to the whole kingdom. Since the rural poverty line is lower than the urban one, it underestimates poverty incidence in urban areas. (9) uses the revised poverty line which is higher than the old one. Therefore (9) is higher than (8). See Meesook (1979), Kakwani and Krongkaew (1996) and Krongkaew et al. (1992).

3.   This effect spread even to neighbouring countries through migrant workers to Thailand.

4.   Sussangkarn et al. (1988) predicted that income inequality would begin to decrease at the mid-1990s. See also Bhongmakapat (1990).

same trend and some are decreasing. A problem of (1) in Table 1 is that it tends to overestimate the income level of the top decile, which overestimates the Gini coefficient, too. The mean income of the top decile is estimated by applying the Pareto distribution to the higher income class. However, the data given in the reports of SES by NSO become fewer and fewer because the income intervals of the table of income distribution is fixed while income level is generally increasing.

To correct for this overestimation, the mean income of the top decile is estimated by subtracting the sum of mean incomes from the bottom to the ninth decile from the overall income. The result is shown in (3) in Table 1, which shows that the Gini coefficient has been steadily decreasing since 1992. (2) in Table 1 is derived from the sample data of the SES and is considered to be close to the estimates (3). If we connect these two series, it can be said that income inequality increased from 1981 to 1992 and then decreased until 1998. These changes support Kuznets' hypothesis.

This contradiction should be checked by other series. Per capita household income ((4) in Table 1) shows a trend similar to (3), which increased from 0.475 in 1981 to 0.535 in 1992 and decreased to 0.512 in 1996. Though it increased slightly in 1998, it was still lower than that in 1992. Therefore (4) shows the U-shape. The Gini coefficient estimated by the National Statistical Office (NSO) also decreased from 0.445 in 1992 to 0.426 in 1998. The Gini coefficient estimated by NSO is much lower than other estimates, which gives an impression that Thailand is a rather equal country. A serious problem of the estimates by NSO is that it uses conceptually wrong formula (see Appendix for details).

The Gini coefficient of per capita welfare shows a similar trend to that of per capita household income. In terms of household expenditure, for both total household expenditure (10) and per capita household expenditure (11), the Gini coefficient also reached its peak in 1992 and decreased until 1998. Thus (3), (4), (5), (6), (10) and (11) all indicate a decreasing trend after 1992 while only (1) shows an increasing trend after 1994. Therefore it could be that income inequality has been decreasing since 1992.

III. Regional Income Gap

One of the most important aspects of income inequality in Thailand is the regional income gap, which accounts for about 20% of income inequality of the whole kingdom (Ikemoto, 1991, p. 67 and Ikemoto and Limskul, 1987). It is mainly due to the large income gap between Bangkok and other regions. Thailand is usually divided into five regions, that is, Bangkok,[5] Centre, North, Northeast and South. Table 4 shows the regional income gap in terms of per capita household income. In 1992 when the income gap was the widest, the income gap between Bangkok and the Northeast, the poorest region, was 100:22 in terms of per capita household income. Such an income gap is very large, relative to other Asian countries, and if it is measured by per capita gross regional product

5. Bangkok includes three surrounding provinces (Nonthaburi, Phatun Thani, and Samut Prakarn).

Table 4   Per Capita Household Income by Region and Area

	1981	*1986*	*1988*	*1990*	*1992*	*1994*	*1996*	*1998*
Per Capita Household Income (Baht)								
Whole Kingdom	751	844	1,027	1,372	1,811	2,174	2,890	3,378
Region								
Greater Bangkok	1,422	1,829	2,251	3,257	4,691	4,975	6,879	7,806
Centre	852	954	1,082	1,457	1,817	2,358	2,954	3,500
North	700	796	919	1,242	1,420	1,789	2,362	2,736
Northeast	493	521	682	784	1,052	1,366	1,807	2,089
South	740	871	966	1,171	1,557	1,955	2,500	2,911
Areas								
Municipal Areas	1,451	1,751	1,801	2,307	3,337	3,656	4,944	
Sanitary Districts	787	980	1,129	1,451	2,011	2,370	3,502	
Villages	583	595	736	929	1,144	1,501	1,933	
Bangkok = 100								
Whole Kingdom	52.8	46.2	45.6	42.1	38.6	43.7	42.0	43.3
Region								
Greater Bangkok	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Centre	59.9	52.2	48.1	44.7	38.7	47.4	42.9	44.8
North	49.2	43.6	40.8	38.1	30.3	36.0	34.3	35.0
Northeast	34.6	28.5	30.3	24.1	22.4	27.4	26.3	26.8
South	52.0	47.6	42.9	36.0	33.2	39.3	36.3	37.3
Areas								
Municipal Areas	102.1	95.8	80.0	70.8	71.1	73.5	71.9	
Sanitary Districts	55.4	53.6	50.2	44.6	42.9	47.6	50.9	
Villages	41.0	32.6	32.7	28.5	24.4	30.2	28.1	

Growth Rate (%)	1981–86	1986–88	1988–90	1990–92	1992–94	1994–96	1996–98
Whole Kingdom	2.4	10.3	15.6	14.9	9.6	15.3	8.1
Region							
Greater Bangkok	5.2	10.9	20.3	20.0	3.0	17.6	6.5
Centre	2.3	6.5	16.0	11.7	13.9	11.9	8.9
North	2.6	7.4	16.3	6.9	12.2	14.9	7.6
Northeast	1.1	14.3	7.3	15.8	13.9	15.0	7.5
South	3.3	5.3	10.1	15.3	12.1	13.1	7.9
Areas							
Municipal Areas	3.8	1.4	13.2	20.3	4.7	16.3	
Sanitary Districts	4.5	7.3	13.4	17.7	8.6	21.6	
Villages	0.4	11.2	12.3	11.0	14.5	13.5	

Source: Calculated from NSO, The Report of Socio-Economic Survey, various years and NSO (1999).

(GRP), it is considerably larger, as much as 9:1. This is the figure usually cited to emphasize the large regional income gap.

The regional gap seems to indicate the U-shape pattern. Regional income inequality increased from 1981 to 1992 both in terms of household income and per capita household income. In this period the income gap between Bangkok and the Northeast increased from 100:35 to 100:22.

However, the regional gap seems narrow after 1994. The income gap between Bangkok and the Northeast decreased to 100:27 in 1998. This change is consistent with the changes in overall income inequality mentioned in the previous section.

Changes in per capita GRP are similar to those in household income and per capita household income (see Table 5). The gap in terms of per capita GRP between Bangkok and the Northeast increased from 8.71:1.00 in 1989 to 9.62 in 1993 and then decreased to 8.55 in 1995.

We can see a similar trend in the income gap between urban and rural areas. In Thailand urban and rural areas roughly correspond to Bangkok and other regions because urban sectors are concentrated in and around Bangkok. In Thailand three categories are used, that is, municipal areas, districts, and villages, which correspond to urban, semi-urban, and rural areas, respectively. In Table 4 the 'Areas' exclude Bangkok.[6] Thus we have four categories by area; Bangkok (the most urbanized areas), municipal areas other than Bangkok, sanitary districts, and villages.[7]

The income gap between Bangkok and the other three areas both in terms of household income and per capita household income shows a U-shape pattern. The income gap widened from 1981 to 1992 and then narrowed thereafter. For example, the income gap between Bangkok and municipal areas, which exclude Bangkok, was negligible in 1981 but during the 1980s, especially in the latter half of the 1980s, it widened to 10:7 in the early 1990s. The income gap between Bangkok and rural areas also widened in this period. However, after 1992 it narrowed considerably for sanitary districts and rural areas. Thus these changes are consistent with the changes in the Gini coefficient mentioned in the previous section.

From the results of this and previous sections we may assume that Thailand reached the turning point of the Kuznets' inverted U-shape hypothesis in the early or mid-1990s. In the next section we will discuss the factors which brought about equalization of income distribution in Thailand.

IV. Kuznets' Hypothesis Reconsidered

IV.1 Theoretical explanation

As mentioned in previous sections, Thailand could have reached the turning point of Kuznets' hypothesis in the early 1990s. Kuznets' hypothesis is not generally supported by cross-sectional analysis, which pools income distribution

6.   For example, in 1981, the household share of municipal areas, sanitary districts, and villages is 6.7, 9.0, and 71.2%, respectively. The sum of these is 86.9%. If the share of Bangkok (13.1%) is added, the total is 100%.

7.   NSO classifies areas into three categories according to the local administration, that is, municipal areas, sanitary districts and villages. Sanitary districts are between municipal areas and villages in terms of urbanization. 20% of all households in Bangkok are classified as living in sanitary districts and villages.

Table 5   Gross Regional Products

		1989	1990	1991	1992	1993	1994	1995
Distribution of GDP by Region								
	WK	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Bangkok	50.1	52.6	52.2	51.9	53.1	52.5	51.5
	Centre	17.7	16.6	17.5	17.6	17.8	18.0	18.4
	North	10.7	10.0	9.9	10.0	9.4	9.3	9.1
	Northeast	12.5	12.0	11.7	11.9	11.3	11.5	12.0
	South	9.0	8.7	8.7	8.6	8.4	8.7	9.0
Distribution of Population								
	WK	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Bangkok	35.4	31.5	33.6	33.9	33.5	34.3	35.7
	Centre	21.3	19.1	18.9	19.2	17.7	17.7	17.8
	North	25.0	22.8	22.5	22.9	21.2	22.0	23.2
	Northeast	17.9	16.6	16.6	16.7	15.8	16.6	17.4
	South	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Per Capita GRP (Northeat = 1.00)								
	WK	2.76	2.87	2.93	2.89	3.04	2.96	2.85
	Bangkok	8.71	9.32	9.31	9.02	9.62	9.15	8.55
	Centre	2.89	2.80	3.03	3.00	3.21	3.17	3.12
	North	1.53	1.49	1.50	1.51	1.51	1.46	1.39
	Northeast	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	South	1.86	1.92	1.94	1.90	1.95	1.96	1.93
Share by Sector								
Agriculture	WK	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Bangkok	9.2	9.0	9.8	9.9	11.0	10.9	9.9
	Centre	23.7	21.5	22.0	21.6	21.8	20.9	21.4
	North	20.7	19.1	18.7	18.1	17.2	16.3	15.7
	Northeast	25.0	26.2	24.9	24.6	21.7	21.1	21.5
	South	21.4	24.2	24.6	25.8	28.4	30.9	31.5
Manufacturing	WK	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Bangkok	73.7	74.4	71.7	69.3	67.8	65.4	64.2
	Centre	16.5	16.2	19.2	20.4	21.9	23.8	24.6
	North	3.3	3.0	3.1	3.9	3.8	4.1	4.0
	Northeast	4.2	4.1	3.8	4.3	4.5	4.9	5.2
	South	2.4	2.3	2.2	2.1	2.0	1.9	2.0
Construction	WK	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Bangkok	46.6	46.1	46.9	48.4	52.7	48.4	45.8
	Centre	16.5	16.3	16.6	16.0	15.6	15.1	15.1
	North	12.2	12.6	12.1	12.3	11.4	12.5	12.8
	Northeast	16.0	15.4	15.2	14.4	12.8	15.3	17.8
	South	8.8	9.7	9.2	8.9	7.5	8.6	8.5
Banking etc.	WK	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Bangkok	67.0	70.9	69.2	72.6	71.4	72.7	71.3
	Centre	11.6	10.8	11.3	9.8	10.2	9.0	9.6
	North	8.0	7.3	7.4	6.6	6.6	6.3	6.4
	Northeast	7.1	5.7	6.3	6.0	6.6	6.7	7.2
	South	6.2	5.4	5.8	5.1	5.2	5.3	5.6

Source: NESDB (1996).

data from all over the world. It is also denied even at a country level for the reason that in a country that has passed Kuznets' curve income inequality increased again. In this case the U-shape becomes an N-shape. However, Kuznets' hypothesis can more usefully be applied to a certain period in economic development.

One factor of the U-shape change cited by Kuznets is the structural change from an agricultural economy to an industrial one (Kuznets, 1955). When an economy is transformed from an agricultural one with a fairly equal income distribution to an industrial economy with a more unequal income distribution, income inequality reaches a peak at the middle of this process.[8] This may be explained in economic terms as follows: When an agricultural economy begins to industrialize, higher income in the industrial sector, or an income gap between the two sectors, is necessary to give incentives to industrialize. Thus higher income inequality is inevitable at the early stage of economic development. However, the income gap between the two sectors may be variable. Labour-intensive industrialization as in Taiwan may not increase income inequality so much as a capital-intensive one. When the industrial sector succeeds in absorbing a large part of labour force and the inequality accompanying industrialization is adjusted, the income gap will be narrowed. This is an explanation of Kuznets' hypothesis. This factor is not limited to the case of industrialization but can be applicable to other cases when a new industry emerges. Recent inequalization which observed in developed countries may be due to the emergence of the IT economy.

Therefore we can characterize the two phases of Kuznets' curve as follows:

(1) An inequalization phase caused by the emergence of a new industry whose productivity is much higher than the old one.
(2) An equalization phase brought about by economic adjustment to equilibrium.

In fact these two forces may be combined to explain the change in income inequality in the actual world. When another industry emerges before entering the second phase, income inequality will be increasing. This idea will be applied to the Thai case in the next section.

IV.2 Increasing Income Inequality in the 1980s

In the Thai case there are two questions that should be answered:

(1) Why has income inequality in Thailand increased so rapidly while its economic growth is led by labour-intensive industrialization.
(2) Why income inequality is not clearly decreasing after the turning point both in the sense of Kuznets' hypothesis and the labour market is reached at the early 1990s.

These two questions will be discussed in this order.

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8. For a graphical presentation, see Ikemoto (1991).

The rapid economic growth in the latter half of the 1980s was led by exports and FDI. Exports and FDI made use of cheap labour in Thailand. Therefore industrialization in this period can be characterized as labour-intensive. Taiwanese experience in the 1960s suggested that labour-intensive industrialization does not worsen income distribution to the same extent as capital-intensive one. However, in Thailand income inequality worsened very rapidly in spite of its labour-intensive characteristics.

The differences between Taiwan and Thailand may be due to differences in the income gap between rural and urban areas and to differences in unskilled and skilled labour. In Taiwan cheap labour was supplied from not only the agricultural sector but also from the urban informal sector, which absorbed migrants from Mainland China. In Thailand cheap labour came from the countryside, especially from the Northeast, the poorest region. As mentioned above, the income gap between Bangkok and the Northeast is so large that the expansion of urban economy worsens the income inequality more than in Taiwan.

Another difference relates to the supply of skilled labour, engineers and managerial workers. Many manufacturing factories were established in Thailand in the latter half of the 1980s by FDI. These firms employed unskilled workers but also skilled labour, engineers and managerial workers. In Thailand unskilled labour was abundant but there was a shortage of unskilled labour. One of the most serious bottlenecks for FDI was the scarcity of engineers in the late 1980s and early 1990s. As a result, their salaries increased much higher than for other occupations. Households, headed by 'professional, technical and administrative workers' in Bangkok, received incomes about 3.5 times higher than the national average in 1986, increasing to 4.7 times in 1992 (see Table 6). Even though this group accounts for only 1.4 to 1.6% of all households, they led the economic change in this period. Their income first began to increase in 1986–88, with a growth rate of nearly 15%. In the following period, 1988–90, the income of those households such as 'entrepreneurs', 'clerical, sales and services workers' also began to increase not only in Bangkok but also in other regions. 'Production workers' also benefited, though to a less extent. Double-digit growth of non-agricultural household income in nominal terms continued until 1992 but the rapid growth decelerates suddenly in 1994. Particularly for Bangkok where the growth rate decreased to less than 5%.

This corresponds to the slow-down of the economic growth of Bangkok and a narrowing of the income gap between Bangkok and other regions. These changes of household income by socio-economic class indicate that the rapid growth brought about a bottleneck in the supply of engineers and other skilled workers, which led to a rapid increase in their salaries. And led to increases in the wages and salaries of similar socio-economic classes. Wages of production workers could not increase as much as those of skilled labour because of the abundant supply. Thus the income gap between skilled and unskilled workers widened during the period of rapid growth.

Table 6   Household Income by Socio-Economic Class

	1986	1988	1990	1992	1994	1996
Total Monthly Income (Baht)						
All households	3,631	4,106	5,625	7,062	8,262	10,779
Farm operators: mainly owning land	2,449	2,825	3,684	4,028	4,836	6,684
: mainly renting land	2,226	3,056	3,602	4,835	6,290	7,365
Entrepreneurs, trade and industry	5,367	5,773	8,453	10,536	12,175	16,496
(Bangkok only)	8,212	8,715	13,228	19,225	16,919	29,135
Employees: professional, tech. adm. workers	8,500	9,649	15,132	19,063	21,368	27,593
(Bangkok only)	12,584	16,590	23,584	33,342	34,926	44,925
Clerical . sales & services workers	5,521	5,830	8,048	10,366	11,608	14,245
(Bangkok only)	6,939	7,337	10,996	14,254	15,707	18,185
Production workers	3,989	4,202	5,375	6,675	6,890	8,528
(Bangkok only)	4,949	5,566	6,762	9,034	9,636	12,241

Annual Growth Rate of Monthly Income (%)	1986–88	1988–90	1990–92	1992–94	1994–96
All households	6.3	17.0	12.0	8.2	14.2
Farm operators: mainly owning land	7.4	14.2	4.6	9.6	17.6
: mainly renting land	17.2	8.6	15.9	14.1	8.2
Entrepreneurs, trade and industry	3.7	21.0	11.6	7.5	16.4
(Bangkok only)	3.0	23.2	20.6	−6.2	31.2
Employees: professional, tech. adm. workers	6.5	25.2	12.2	5.9	13.6
(Bangkok only)	14.8	19.2	18.9	2.3	13.4
Clerical . sales & services workers	2.8	17.5	13.5	5.8	10.8
(Bangkok only)	2.8	22.4	13.9	5.0	7.6
Production workers	2.6	13.1	11.4	1.6	11.3
(Bangkok only)	6.1	10.2	15.6	3.3	12.7

Whole Kingdom = 100	1986	1988	1990	1992	1994	1996
All households	100.0	100.0	100.0	100.0	100.0	100.0
Farm operators: mainly owning land	67.4	68.8	65.5	57.0	58.5	62.0
: mainly renting land	61.3	74.4	64.0	68.5	76.1	68.3
Entrepreneurs, trade and industry	147.8	140.6	150.3	149.2	147.4	153.0
(Bangkok only)	226.2	212.3	235.2	272.2	204.8	270.3
Employees: professional, tech. adm. workers	234.1	235.0	269.0	269.9	258.6	256.0
(Bangkok only)	346.6	404.0	419.3	472.1	422.7	416.8
Clerical . sales & services workers	152.1	142.0	143.1	146.8	140.5	132.2
(Bangkok only)	191.1	178.7	195.5	201.8	190.1	168.7
Production workers	109.9	102.3	95.6	94.5	83.4	79.1
(Bangkok only)	136.3	135.6	120.2	127.9	116.6	113.6

Percentage Distribution of Households (%)	1986	1988	1990	1992	1994	1996
All households	100.0	100.0	100.0	100.0	100.0	100.0
Farm operators: mainly owning land	35.8	34.2	33.8	31.7	24.6	23.7
: mainly renting land	7.7	6.7	5.5	4.6	3.8	3.9
Entrepreneurs, trade and industry	13.9	13.1	13.1	13.8	14.6	15.3
(Bangkok only)	3.0	3.1	3.0	2.7	3.1	3.7
Employees: professional, tech. adm. workers	5.6	5.8	5.1	5.6	5.8	6.1
(Bangkok only)	1.2	1.4	1.5	1.6	1.4	2.0
Clerical . sales & services workers	8.8	10.2	11.3	11.7	12.7	12.8
(Bangkok only)	3.8	5.3	4.6	4.5	4.9	5.7
Production workers	9.2	9.7	11.5	12.1	14.9	15.8
(Bangkok only)	3.6	3.8	4.2	3.9	3.6	4.1

Note: Those occupations such as 'farm workers', 'general workers' and 'economically inactive' are not included in this table.

Source: NSO, Report of the Household Socio-Economic Survey various years, Table 3.2, 3.3.

Thus we have to distinguish these two segments of the labour market. Taiwanese success may be due to its having a sufficient supply of educated workers while the failure in Thailand may be partly due to the limited supply of educated workers in the late 1980s and early 1990s.

IV.3   Turning point in the early 1990s

Now we turn to the second question, that is, why income inequality is not decreasing considerably even after the labour market reached the turning point. This will be explained by a rapidly changing economic structure led by different sectors, that is, first by export-oriented manufacturing industries and then by domestic-oriented bubble economy.

As already mentioned, rapid economic growth was begun in the latter half of the 1980s by the export-oriented industries. They could succeed in absorbing abundant unskilled labour and in the early 1990s the labour shortage in rural areas became apparent. At the same time income inequality seemed to reach the peak of the Kuznets' inverted U-shape curve. It was then that people joined the democratic movement. This might indicate popular dissatisfaction with the increasing inequality. After the democratic movement took off, income inequality began to decrease. This was partly caused by a slow-down of economic growth in Bangkok as well as by acceleration of economic growth in other regions. The annual growth rate of household income between 1992 and 1994 in Bangkok fell to only 3.0% in terms of per capita household income (see Table 4). This figure is considerably lower than those in previous years. However, this did not affect the overall growth rate because it was compensated for by the high growth rate in other regions. This year was exceptional because the growth rate in Bangkok recovered to 17.6% in the next period.

However, at this time, the leading industry shifted from export-oriented labour-intensive manufacturing to the financial sector. Financial liberalization, started in the early 1990s, stimulated domestic-oriented industries which enticed engineers and skilled staff from the manufacturing sector by offering higher salaries. After the financial liberalization, the bubble economy emerged in Thailand, which stimulated income of those who invested in stock market and real estate. Because the supply of engineers lagged far behind the demand, their wages increased rapidly. This greatly increased income inequality rather than reduced it. Thus the second phase of the Kuznets' curve was delayed by the emerging new wave of another Kuznets' curve.

South Korea experienced a similar phenomenon. In the 1960s rapid economic growth was led by a labour-intensive export-oriented manufacturing sector. When the country had nearly reached the turning point of the Kuznets' U-shape hypothesis in the early 1970s, it began to promote capital-intensive heavy and chemical industries. This shift increased the demand for engineers and skilled labour and, as a result, income inequality temporarily increased. However, after a while, income inequality began to decrease in the mid-1970s.

Table 7   Income Ratio between Bangkok and outside by Occupation

	1986	*1988*	*1990*	*1992*	*1994*	*1996*
Entrepreneurs, trade and industry	1.79	1.80	1.88	2.28	1.55	2.33
Employees: professional, tech. adm. workers	1.69	2.22	2.03	2.46	2.04	2.35
Clerical . sales & services workers	1.57	1.75	1.82	1.80	1.74	1.64
Production workers	1.42	1.58	1.43	1.68	1.85	1.79

Source: Calculated from NSO, Report of the Household Socio-Economic Survey, various years.

IV.4   The economic crisis in 1997

When the Thai economy fell into crisis in 1997, the rural sector was also hit indirectly by losing the opportunity to work in urban areas and by reduced local government spending. However, at the same time, the devaluation of the baht stimulated agricultural exports and therefore the rural economy was not so severely affected as the urban one. Rural areas took the role of safety net to absorb those who became unemployed in urban areas after the crisis. Thus the rural sector gained new value from this role.

Thailand is characterized by high mobility between the rural and urban areas. Migrants from rural areas to the urban sector return to their homes in rural areas after working in urban areas for a certain period. This means that the labour market is efficient and effective. This may be borne out by the fact that agricultural wage was increased after underemployed people were absorbed in the urban sector in the early 1990s. In other words, the labour shortage in the urban sector spread to rural areas and brought about labour shortage in rural areas, too.

The mobility between rural and urban areas is illustrated by the narrow gap between them by occupation. Table 7 shows the ratio household income between Bangkok and outside Bangkok by occupation group. For example, the income ratio of households headed by production workers was 1.42 in 1986 increased to 1.85 in 1994. The ratio is not so big as the regional income gap. The large regional income gap reflects not only the income gap by occupation but also the difference in occupational structure. The income ratio of the entrepreneurs and professional workers was not so high in 1986 but increased rapidly and reached 2.28 and 2.46 in 1992, respectively. This reflects the severe shortage in these occupations and abundant opportunity in Bangkok. The gap narrowed in 1992 but widened again in 1996. These groups were those who were directly benefited from the bubble economy.

Table 8 shows the sources of household income for the whole kingdom and Bangkok. Considerable change was observed in the increasing share of 'wages and salaries' and non-farm profits and the decreasing share of farming profit and non-money income. These changes reflect the transformation from an agricultural to an industrial economy.

The impact of the bubble may appear in the share of non-farm profits and property income that consists of rent and 'interest and dividends'. However,

Table 8   Sources of Household Income, Whole Kingdom and Bangkok

Source of Income	1986	1988	1990	1992	1994	1996	1986	1988	1990	1992	1994	1996
Whole Kingdom				(Baht)						(%)		
Total monthly income	3,631	4,106	5,625	7,062	8,262	10,779	100.0	100.0	100.0	100.0	100.0	100.0
Earnings	2,420	2,711	3,898	4,947	5,904	7,732	66.6	66.0	69.3	70.1	71.5	71.7
Wages and salaries	1,223	1,411	2,040	2,752	3,407	4,297	33.7	34.4	36.3	39.0	41.2	39.9
Profits, non-farm	619	632	960	1,279	1,547	2,108	17.0	15.4	17.1	18.1	18.7	19.6
Profits, farming	560	653	885	889	921	1,288	15.4	15.9	15.7	12.6	11.1	11.9
Property income	34	38	62	110	88	170	0.9	0.9	1.1	1.6	1.1	1.6
Rent	13	18	12	28	19	59	0.4	0.4	0.2	0.4	0.2	0.5
Interst and dividends	21	20	50	82	69	111	0.6	0.5	0.9	1.2	0.8	1.0
Current transfer	205	286	318	412	584	776	5.6	7.0	5.7	5.8	7.1	7.2
Non-money income	938	1,016	1,192	1,488	1,593	1,944	25.8	24.7	21.2	21.1	19.3	18.0
Other money receipts	34	55	155	105	93	157	0.9	1.3	2.8	1.5	1.1	1.5
Greater Bangkok				(Baht)						(%)		
Total monthly income	6,949	7,877	11,724	15,951	16,418	21,947	100.0	100.0	100.0	100.0	100.0	100.0
Earnings	5,083	5,661	8,681	11,932	12,904	17,064	73.1	71.9	74.0	74.8	78.6	77.8
Wages and salaries	3,502	4,080	6,151	8,470	9,244	11,639	50.4	51.8	52.5	53.1	56.3	53.0
Profits, non-farm	1,388	1,361	2,312	3,132	3,357	5,074	20.0	17.3	19.7	19.6	20.4	23.1
Profits, farming	110	159	160	217	189	205	1.6	2.0	1.4	1.4	1.2	0.9
Property income	106	57	156	297	192	537	1.5	0.7	1.3	1.9	1.2	2.4
Rent	39	12	16	102	25	280	0.6	0.2	0.1	0.6	0.2	1.3
Interst and dividends	67	45	140	195	167	257	1.0	0.6	1.2	1.2	1.0	1.2
Current transfer	491	565	561	745	700	874	7.1	7.2	4.8	4.7	4.3	4.0
Non-money income	1,242	1,509	1,911	2,755	2,552	3,418	17.9	19.2	16.3	17.3	15.5	15.6
Other money receipts	27	85	415	222	70	54	0.4	1.1	3.5	1.4	0.4	0.2

Source: NSO, Reports of the Household Socio-Economic Survey various years.

the share of the latter is very small, accounting for only 2.4% in 1996, the highest value for Bangkok. The value remained much lower, between 0.7% in 1988 and 1.9% in 1992. The increase in its share from 1.2% in 1994 to 2.4% in 1996 may reflect the bubble economy. A larger increase is found in the share of non-farm profit, which increased from 20.4% in 1994 to 23.1% in 1996. These increases were attained at the cost of the wages and salaries, whose share decreased from 56.3% in 1994 to 53.0% in 1996. Such changes can be found at the national level, too. Thus the bubble economy worsened the labour share. However, it should be noticed that this is true in relative terms only and that in absolute terms, wages and salaries also increased rapidly both in Bangkok and the whole kingdom. Thus most of the population benefited from the bubble economy.

V.   Conclusions

In this paper we have seen that income inequality in Thailand increased very rapidly from the latter half of the 1980s to 1992 but the direction of change after 1992 is still not clear. Some measures indicate that income inequality decreased while others do not. We may consider that in the early 1990s Thailand had already reached the turning point in the sense of Kuznets' hypothesis.

We generalize Kuznets' hypothesis so that we can use it to explain the changes in income inequality in Thailand. Originally Kuznets' hypothesis is derived from the transformation from an agricultural to an industrial economy. Therefore it was supposed to happen only once in the course of economic development. However, it is suggested that the transformation need not be limited to this change but can apply also to a similar change where a new high-productivity industry is introduced into a matured economy. Thus when an economic structure is rapidly changing, income inequality tends to be higher. If this idea is applied to Thailand, two phases can be identified: One is the export-oriented phase in the latter half of the 1980s and another is the bubble economy in the mid-1990s. The export-oriented economic growth could absorb the under-employed labour force in rural areas but it failed to decrease income inequality. This may be due to that fact that the Thai economy was changing to a domestic-oriented economy, which led eventually to the bubble economy. Thus before entering into the second phase of a Kuznets' curve caused by the export-oriented economic growth, a new wave Kuznets' curve caused by domestic-oriented growth emerged. Overlapping of the two Kuznets' curves might delay the phase of the equalization.

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Appendix. On The Method of NSO to Estimate Gini Coefficient

The Gini coefficients by NSO (National Statistical Office) published in the Reports of the Socio-Economic Survey are much lower than is generally thought likely. For example, the Gini coefficient in 1998 is 0.426 while it is estimated about 0.5 by scholars. In this appendix the method used by NSO will be examined and some associated problems will be pointed out.

A.1   The method of NSO

The methodology adopted by NSO is as follows.

(1) Households are ordered by per capita household income and divided into ten groups with the same number of households in order to obtain decile groups.

(2) The total population belonging to each decile is calculated. (This step is necessary because the average household size differs between deciles. Usually the household size for the lower decile is larger than that for the

higher decile. In other words, 'poor' households in terms of per capita household income are larger and 'rich' households are smaller.)

(3) Total household income is aggregated for each decile. Percentage share of the aggregated total household income is calculated.

(4) Cumulative distribution is calculated from (3).

(5) The Gini coefficient is calculated with percentage share of (3).

An example is given below in Table A1. In this table, households are ordered by per capita household income (1). Then the population is aggregated for each decile and its percentage share is calculated (2). Since the average household size is larger for the lower (or 'poor') decile (4.8 persons for the bottom decile and 2.7 persons for the top decile)(2b), population share of the lower decile is larger (12.9% for the bottom decile and 7.3% for the top decile)(2). Then the total income of each decile is obtained by aggregating the total household income of all households belonging to the decile and its share is calculated (3). The column (4) is the cumulative form of (3). The Gini coefficient is calculated from column (4) and the result is 0.426.

A problem with this methodology can be easily understood by a simple example as shown in Table A2. In this example, there are only 10 households which makes the distribution of household identical to the decile data. The 'poorer' household has a larger household size as is the case shown in Table 1. In this case the bottom decile (or bottom household) has the largest size (15 persons) while the top decile (or top household) is a single-person household. The per

Table A1   Percentage of Household Income by Decile Groups of
Households ordered by Per Capita Current Income, 1998

(1) Percent of Households	(2) Percent of Population	(2a)	(2b) Average Household Size	(3) Percentage Share of Current Income	(4)	Per Capita Current Income
	Decile	Cumulative		Decile	Cumulative	
10	12.9	12.9	4.8	2.4	2.4	616
20	11.8	24.7	4.4	3.4	5.8	984
30	11.3	36.0	4.2	4.4	10.2	1,301
40	10.6	46.6	4.0	5.1	15.3	1,644
50	10.0	56.6	3.7	6.1	21.4	2,048
60	9.9	66.5	3.7	7.4	28.8	2,549
70	9.4	75.9	3.5	9.2	38.0	3,299
80	8.6	84.5	3.2	11.6	49.6	4,531
90	8.2	92.7	3.1	16.0	65.6	6,588
100	7.3	100.0	2.7	34.4	100.0	15,996
Total	100.0		3.73	100.0		3,378
(5)Gini Ratio				0.426		

Note: The average household size of all households is estimated by the author.
Source: NSO (1999), Table 8, p. 31.

Table A2   First Example

Percent of Households	No. of Households	Average Household Size	Per Capita Current Income	Total Income
10	1	15	1,000	15,000
20	1	10	2,000	20,000
30	1	8	3,000	24,000
40	1	7	4,000	28,000
50	1	6	5,000	30,000
60	1	5	6,000	30,000
70	1	4	7,000	28,000
80	1	3	8,000	24,000
90	1	2	9,000	18,000
100	1	1	10,000	10,000
Total	10	6.1		22,700

Table A3   Second Example

(1) Percent of Households	(2) Percent of Population Decile	(2a) Percent of Population Cumulative	(2b) Average Household Size	(3) Percentage Share of Current Income Decile	(4) Percentage Share of Current Income Cumulative	Per Capita Current Income
10	24.6	24.6	15	6.6	6.6	1,000
20	16.4	41.0	10	8.8	15.4	2,000
30	13.1	54.1	8	10.6	26.9	3,000
40	11.5	65.6	7	12.3	38.3	4,000
50	9.8	75.4	6	13.2	51.5	5,000
60	8.2	83.6	5	13.2	64.8	6,000
70	6.6	90.2	4	12.3	77.1	7,000
80	4.9	95.1	3	10.6	87.7	8,000
90	3.3	98.4	2	7.9	95.6	9,000
100	1.6	100.0	1	4.4	100.0	10,000
Total	100.0		6.1	100.0		3,721
(5)Gini Ratio				−0.026		

capita household income is assumed to increase by 1,000 intervals from 1,000 of the bottom to 10,000 of the top. Total income is calculated by multiplying per capita income by household size. The result is shown in the last column. It should be noticed that the total income does not necessarily increase as the per capita current income increase. The total income reaches the maximum at the 5th and 6th deciles. This means that the Lorenz curve appears to be a strange shape.

Table A3 shows the example in the same form as Table 1. The resultant Gini coefficient is −0.026. This strange result arises from the unusual shape of the Lorenz curve.

A problem with the method used by the NSO is that household is evaluated by total household income while it is ordered by per capita household income. If

Table A4   Comparison

	Unit	Evaluated by	Ordered by	Gini coefficient
NSO	Household	Household income	Per capita household income	0.426
Case 1	Household	Household income	Household income	0.478
Case 2	Population	Per capita household income	Per capita household income	0.503
Case 3	Household	Per capita household income	Per capita household income	0.504

household is ordered by total household income, it should be evaluated by total household income. If population is ordered by per capita household income, it should be evaluated by per capita household income. These two methods are widely used and their meaning is easy to understand. However, if household is ordered by per capita household income, by what should it be evaluated? If it is evaluated by total household income as in the NSO's report, a strange result may occur as the above example shows. It should be evaluated by per capita household income. In this case, the decile share is not the income share any more. These results are summarized in Table A4. Cases 1 and 2, which are widely adopted, show higher Gini coefficients than the NSO's. Thus the NSO's estimates gives a very different impression of income inequality in Thailand. Case 3, which orders household by per capita household income and evaluates it by per capita household income, shows a Gini coefficient very close to Case 2. Case 3 is more meaningful than the NSO's estimates.