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Sensitivity Analysis of Equivalence Scale in Income Inequality Studies*

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Abstract Coulter *et al.* (1992) argues that the use of different equivalence scales produces the estimations of the inequality indexes with U-shaped pattern where $\theta \approx 0.5$ marks the lowest estimate, and that the McClements Scale used in UK would produce lowest estimates of inequality indexes similar to the case where $\theta \approx 0.6$. Banks and Johnson (1994) counter-argues that such property of McClements Scale depends upon the data at hand and equivalence scale specification in terms of the way children are counted against the number of adults within a single household, rather than on the underlying property of the McClements Scale. This study will, first of all, illustrate that the main source of such dispute about the McClements Scale may come from the proportion of large-size family as well as the single parent households with two young children in the sample data. Secondly, it is argued that such differences in inequality measures from using any values of equivalence scale may not matter, contrary to the common belief, once we employ statistical inferences where the differences in estimated values are not statistically significant.

Keywords Income Inequality, Equivalence Scale, McClements Scale

JEL Classification D33, E25, H55, I32, J30, N35

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1. INTRODUCTION

The use of equivalence scale measures has become a standard procedure in many of the income inequality literature, based on the concept of reflecting economies of scale in consumption that would exist within a consumption unit. And there are a number of different ways of constructing equivalence scales, ranging from the simplest form of discounting the consumption unit size such as Family Size Equivalency (FSE) to giving differential weight to each member of the consumption unit such as the McClements or one used in OECD studies. Naturally, the relationship between the equivalency scale values and its effect on income inequality or poverty measures has gained attention by the academia since the choice of the equivalence scale values and its functional representation may affect the estimated values of income inequality.

Coulter *et al.* (1992) demonstrates that the relationship between the equivalence scale value θ ($0 \leq \theta \leq 1$) and inequality or poverty measures shows U-shaped or reverse J-shaped pattern where the lowest measure would be around $\theta = 0.5$. They further state that the McClements Scale systematically produce lowest estimates of inequality indexes compared to the FSE method, where the UKs McClements Scale to be approximately equal to FSE of 0.6 whose value would produce lower estimates of most income inequality and poverty indexes.

On the other hand, Banks and Johnson (1994) dispute the claim of Coulter, et al., that the resulting lower estimates are data specific, rather than the inherent characteristics of the McClements Scale, and also arise from equivalence scale specification of the way it treats children different from adults, which would be data specific as well rather than the inherent characteristics of the McClements Scale.

They first illustrate this point by stating that "[The U-shaped result] would occur if the *per capita* income of large households were larger than the per capita income of small households. In this case inequality indices would tend to fall at all points as θ (the elasticity of income unit need with respect to unit size) increased from zero to one (Banks and Johnson, 1994)." They continues with an illustration that "... reducing the weight given to children relative to that given to adults will reduce inequality (Banks and Johnson, 1994)."

Jenkins and Cowell (1994) further rebuffs the claims of Banks and Johnson (1994), that McClements scale does provide lower estimates of poverty and inequality than other equivalence scale due to its underlying property of reranking effects on inequality measures, producing non-monotonic relationships between equivalence scale and inequality indices. They further argue on the non-comparability that the McClements scale is based on a married couple as the reference household type whereas Buhmann et al. scale is on a single adult, and based on re-adjusting of such that the McClements scale does produce lower estimates of inequality indices.

The current understanding by the academia on this particular issue is that the differences in income inequality estimates arising from using different equivalence scale values could be ignored as long as the equivalence scale values are consistently used for cross sectional/country studies and trend analysis. However, there could be two factors that may systematically produce biased estimates of income inequality when using any type of equivalence scale to account for consumption economies: 1) if there is an underlying demographic changes over time rather quickly or there are disproportionately large number of big households; and 2) economies of scale may not even exist for certain members of a household depending upon their age.

Furthermore, the underlying dispute at hand may not be of utmost importance as much as the Banks and Johnson (1994) and Jenkins and Cowell (1994) argue once one employs the statistical inference framework, where the seemingly large differences in estimated values of income inequality indexes based on different equivalence scales may not be statistically significant at all. This study will first investigate the underlying property of the equivalence scale in terms of the way they give weights to counting children, especially that of McClements Scale, and secondly examine whether the differences in the highest and lowest estimates of inequality indexes arising from using different equivalence scale are indeed statistically different from each other, using the methods proposed by Giles (2002) and Kang (2006) for estimating the standard errors of income inequality measures.

2. DOES THE DIFFERENCES IN THE RELATIVE WEIGHTS GIVEN TO CHILDREN MATTER?

If we do not give differential weights to children within a household, it would be the same as counting each child as equal to an adult, resulting in a simple functional relationship as the equivalent scale $M = S^{\theta}$, where S is the number of a household members and θ is the Family Size Elasticity (FSE) correcting for household economies of scale.[1] Usually, the smaller FSE value θ would represent higher economies of scale within a household where $\theta = 0$ would be the same as using unadjusted household income and $\theta = 1$ would be the same as

[1] Coutier *et al.* (1992) uses the same representation of Buhmann *et al.*s as $M_s = S^{\theta}$ where S is the size of a household.

using per capita household income.

Coulter *et al.* (1992) shows that, however, values close to 0 or 1 produce higher level of income inequality, resulting in a U-shaped or reverse J-shaped estimation of the income inequality indexes where 0.5 usually produces the lowest estimates. They point out that the changes in the covariance term between equivalent income and log household size arising from a change in equivalence scale relativities (Coulter *et al.*, 1992). Lanjouw and Ravallion (1995) also find the size elasticity value between 0.5 and 0.6 to be critical for a distribution-sensitive poverty measure, using the Pakistan Integrated Household Survey of 1991.

However, for a case where S is large, the M term will become smaller at a disproportionately decreasing rate for any given level of θ. For instance, for a household with family size of 9 the resulting M under the FSE of 0.5 would be 3 whereas for a household with family size of 4 the resulting M under the same FSE value would be 2. For a given level of income, such would place the larger household not far below from the smaller households, making the distribution of equivalence income less dispersed than in the case of using the per capita income.

Such an underlying property may become problematic in case there are substantial proportions of large households in the sample data in the first period followed by a rapid change in underlying demographics where the average size of households declines quickly in the second period. For instance, applying the FSE value of 0.5, compared to 1.0, despite the consistent application of FSE values over the two periods, the two may produce different trends over time: that it may become possible to underestimate or overestimate the level and changes in income inequality indexes.

On the other hand, as Jenkins and Cowell (1994) points out, there could be two ways to broadly give differential weights to children in equivalence scales as follows: 1) $M = 1 + \alpha(S_A 1) + \beta S_K$, where S_A and S_K are the number of adults and children in the household, and α and β are the weight given to additional number of adults and children in the household;[2] or 2) $M = (S_A + \eta S_K)\theta$, where η is the weight given to children and θ is the equivalence scale value (Jenkins and Cowell, 1994). The McClements Scale follows the second functional representation for getting the equivalence adjusted income. (See Harris, 2000, pp. 46–48, and Lakin, 2001.)

Table 1 shows the McClements scale values for each type of household member, where the equivalence value is pegged against the married head of household as being 1. More interesting feature of the McClements Scale is in its equiva-

[2]OECD uses this representation where $\alpha = 0.7$ and $\beta = 0.5$ (Jenkins and Cowell, 1994).

Table 1: The McClements equivalence scale value used in the UK

Type of Household Member	UK
Married head of household (ie a married or cohabiting couple)	1.00
1st additional adult	0.42
2nd (or more) additional adult	0.36 (per adult)
Single head of household Adult	0.61
1st additional adult	0.46
2nd additional adult	0.42
3rd (or more) additional adult	0.36 (per adult)
Child aged	
16-18	0.36
13-15	0.27
11-12	0.25
8-10	0.23
5-7	0.21
2-4	0.18
Under 2	0.09

Source: Harris (2000)

lence scale value for single head of household being 0.61 rather than 1. Such may be based on the need of single head being smaller than the need of the married head of household. For additional household members, a different equivalence value is estimated depending on the household member being adult or children of a certain age group. Per households equivalence number is then calculated by simply summing the equivalence values of each household member.

The most noticeable feature of the McClements Scale is that it assumes the increasing economies of scale in consumption as the age of a child goes down. Such a feature is quite reasonable since younger children may consume less of food and clothing, representing smaller needs. However, the McClements Scale values may misrepresent the true economies of scale in consumption for a child under age 2, considering the types of goods needed for this particular age group of children. In other words, the type of food and clothing needed for infants and toddlers may not allow for much economies of scale in consumption, although such would not apply to consumption of housing units or durable goods.

To see whether such a factor may indeed be the focal point of the debate

Table 2: Comparison of the McClements and a FSE of 0.5 & 0.6

(Unit: Equivalence adjusted number of household members)

Household Member Composition	McClements	FSE=0.6	FSE=0.5
2 married adults	1.42	1.52	1.41
2 married adults with a child of age 10	1.74	1.93	1.73
2 married adults with two children of age 2 and 6	1.72	2.30	2.00
Single mother with two children of age 2 and 6	1.00	1.93	1.73
2 married adults with 3 children of age 5, 8, and 13	2.13	2.63	2.24
2 married adults with 2 parents and 2 children of age 14 and 17	2.83	2.93	2.45
5 adults living together	2.15	2.63	2.24

between Banks and Johnson (1994) and Jenkins and Cowell (1994), it may give us some insight by simply comparing the M (equivalence size) of various types of household member composition resulting from McClements Scale and/or FSE. Table 2 below shows a comparison of the McClements equivalence value and the FSE equivalence value of 0.5 and 0.6 on a set of different types of household member compositions.

As it is evident in the table above, the result suggests that the equivalence size of households are not much different between the McClements Scale and FSE = 0.5, especially for a married couple without a child or a one child. More interesting case arises where the household is composed of a single parent with two or more children or a household with infants and toddlers, which shows drastically different equivalence size of household where McClements Scale produces $M = 1$ and FSE of 0.5 produces $M = 1.73$. Accordingly, it is reasonable to argue that the McClements scale may have a tendency to understate the equivalence adjusted income of the households depending upon the proportion of household types of single parents with infants and toddlers in the sample data.

The implication of such finding is that the claim of Banks and Johnson (1994) may bear some truth in saying that the property of McClements Scale producing lowest estimates of income inequality may depend upon the data at hand. Another implication of such finding is that, despite such data-dependent tendency, McClements Scale does seem to produce the equivalence size of households that are similar to that of FSE = 0.5. Accordingly, it is plausible to conclude that the interplay of the two factors, data-specific and lowest equivalence size, have contributed to the tendency of McClements Scale producing the lowest estimates of inequality indexes. Such may also explain why FSE = 0.6 produces inequality indexes similar to McClements Scale, rather than FSE = 0.5 as shown by the simple comparison of equivalence size of households.

3. ARE THE DIFFERENCES IN THE INEQUALITY MEASURES DERIVED FROM DIFFERENT EQUIVALENCE SCALES STATISTICALLY SIGNIFICANT?

As discussed in the previous section, the potential source of the property that McClements Scale produces lowest estimates of inequality measures, similar to the FSE value $\theta = 0.6$, might arise from the proportion of large-size family as well as single-parent with infants and toddlers in the sample data. Such finding may have somewhat serious implications against the general belief that the consistent use of FSE value grants enough logical ground to allow for cross-sectional and trend analysis of income inequality studies. For instance, if there are rapidly changing demographic characteristics towards smaller-size families and single parent households, the use of equivalence scale may mislead the underlying changes in income inequality.

Of course, decomposition methods by population subgroups would allow us to examine the size of contribution arising from changes in underlying demographic characteristics (see Kang, 2007), but the more fundamental question to ask is whether the differences in the estimated income inequality measures arising from using different FSE values or McClements Scales are large enough to draw our concerns on investigating further into the matter. In other words, asking whether such differences arising from the use of different values of FSE are statistically significant at all. The simple methods of statistical inference may answer such, given that we can estimate the standard errors of inequality measures to a reasonable degree.

Estimating standard errors of inequality measures has been quite controversial since the more robust methods would produce the estimates of standard errors too large to have any practical use for such. However, Giles (2002) suggests an alternative way of calculating more efficient estimates of the variance of the Gini coefficients and Kang (2006) suggests alternative ways of estimating the standard errors of the Mean Log Deviation (MLD), Theils Index, and the half of Squared Coefficient of Variation (SCV) that are computationally easier than other more complicated methods such as bootstrap and Jackknife methods.

Giles (2002) shows that the Gini coefficient can be written as:

$$I_{Gini} = (2\theta/n) - 1 - (1/n), \tag{1}$$

where

$$\theta = \left|\sum i \times y_i / \sum y_i\right|, \tag{2}$$

and $i = 1, \ldots, n$ in increasing order. Then, from (1), the standard error of Gini can be written as:

$$s.e.(I_{Gini}) = 2[s.e.(\theta)]/n \tag{3}$$

and θ in both (1) and (2) can be estimated by simple OLS regression by running the following:

$$i\sqrt{y}_i = \theta\sqrt{y}_i + u_i \tag{4}$$

where $u_i = \sqrt{y}_i \times v_i$ and v_i are heteroskedastic errors with variances of the form (σ^2/y_i). Then, by simply running equation (4) with the OLS estimation, and by plugging the standard error of estimated coefficient θ into (3) will provide standard errors of Gini, and into (1) will provide the point estimates of the Gini coefficient itself.[3]

On the other hand, Kang (2006) suggests computationally easier alternatives for estimating the variance of the MLD, Theil, and SCV by rearranging the original formula into separating out the $1/n$ term as follows:

$$MLD_i = \log(\mu/y_i) \tag{5}$$

$$Theil_t = i(y_i/\mu)\log(y_i/\mu) \tag{6}$$

$$SCV_i = 1/2\mu^2(y_i - \mu)^2, \tag{7}$$

where *i* reperesents each observation. By simply estimating the standard error of the mean of these rewritten data entries, one can construct a confidence interval test of inequality measures.[4]

Based on above methods of estimating standard errors of inequality measures, Table 3 shows the estimates of income inequality and the standard errors

[3]Comparison of the estimated Gini from Giles method to that of traditional estimation method confirms that indeed the calculated Gini from Giles method is the same as those from traditional estimation.

[4]Since the $\log(\mu/y_i)$, $(y_i/\mu)\log(\mu/y_i)$, and $(1/2\mu^2)(y_i\mu)^2$ involves estimating the mean of the y_i, further adjustment to the standard errors are necessary. Given the large sample size, however, such may not make much difference in the estimates of the standard errors.

Table 3: Various inequality indexes based on the equivalency-adjusted household total income of the wage earners in the HIES

	Gini		MLD		Theil		SCV	
	FSE=0.5	FSE=1.0	FSE=0.5	FSE=1.0	FSE=0.5	FSE=1.0	FSE=0.5	FSE=1.0
1993	0.343	0.357	0.204	0.22	0.232	0.249	0.414	0.436
	(0.007)	(0.007)	(0.008)	(0.008)	(0.027)	(0.027)	(0.062)	(0.058)
1994	0.339	0.354	0.202	0.219	0.209	0.229	0.306	0.338
	(0.009)	(0.009)	(0.010)	(0.011)	(0.024)	(0.026)	(0.045)	(0.042)
1995	0.342	0.358	0.213	0.232	0.218	0.241	0.351	0.400
	(0.009)	(0.009)	(0.011)	(0.011)	(0.030)	(0.032)	(0.075)	(0.085)
1996	0.347	0.363	0.216	0.235	0.223	0.247	0.345	0.396
	(0.009)	(0.009)	(0.011)	(0.011)	(0.028)	(0.031)	(0.058)	(0.065)
1997	0.355	0.369	0.226	0.242	0.241	0.257	0.402	0.416
	(0.009)	(0.009)	(0.012)	(0.012)	(0.034)	(0.033)	(0.080)	(0.069)
1998	0.350	0.363	0.223	0.237	0.220	0.236	0.306	0.334
	(0.009)	(0.009)	(0.012)	(0.013)	(0.025)	(0.027)	(0.037)	(0.039)
1999	0.346	0.358	0.216	0.229	0.209	0.224	0.277	0.299
	(0.010)	(0.010)	(0.012)	(0.013)	(0.023)	(0.024)	(0.034)	(0.036)
2000	0.343	0.353	0.197	0.208	0.212	0.225	0.307	0.326
	(0.010)	(0.010)	(0.011)	(0.011)	(0.026)	(0.026)	(0.038)	(0.036)
2001	0.355	0.366	0.212	0.224	0.235	0.251	0.388	0.424
	(0.009)	(0.009)	(0.011)	(0.011)	(0.033)	(0.035)	(0.070)	(0.082)
2002	0.354	0.364	0.211	0.222	0.236	0.251	0.391	0.429
	(0.010)	(0.010)	(0.011)	(0.011)	(0.034)	(0.036)	(0.065)	(0.082)

(Standard errors)

of various inequality measures, using Household Income and Expenditure Survey (HIES) data between 1993 and 2002 assembled by the National Statistical Office of Korea (NSO). The HIES sample is consisted of about 5,000-5,500 urban residing households each year, and it has household income data as well as very detailed accounts of consumptions using a book-entry forms. However, the HIES data does not release household income data for a self-owned businesses and single-member households before 2005, only reporting incomes of salary workers. For this reason, the HIES data would provide a better way of comparing the effects of different values of FSE on income inequality indexes considering the Banks and Johnsons counter-arguments of McClements Scales systematic underestimation coming from the data-specificity.

Despite the debate between Jenkins and Cowell (1994) and Banks and Johnson (1994) about the underlying property McClements Scales producing lowest estimates of inequality indexes, it seems they both agree on the U-shaped or reverse J-shaped pattern of inequality measures along with changes in FSE values. In addition, since Jenkins and Cowell (1994) suggests FSE value 1 would produce the highest estimates, and 0.5 the lowest estimates, we can compare the inequality measures using FSE=1 and FSE=0.5 to examine whether the differences are statistically significant, assuming that the estimates using McClements Scales would lie close to FSE value of 0.5.

Table 4 summarizes tests of statistical significance by constructing confidence intervals of selected years 1994, 1997, and 2001 where the differences in the estimates of inequality measures are relatively larger than other years, testing both at both 95% level and 90% level:

As it is evident from the Table 4 above, it is difficult to reject the hypothesis that the inequality measure using FSE=1.0 is statistically significantly different from the one using FSE=0.5, both at 95% and 90% level of confidence. In other words, the highest estimates of the income measures from using FSE=1 is not statistically significantly different from the lowest one from using FSE=0.5. Such finding is true for Gini, MLD, Theils, and SCV altogether, suggesting the debate on the differences in the estimates of inequality measures may not grant much of our attention, contrary to the current belief by the academia.

The McClements equivalency scale as shown in Table 1, on the other hand, is used widely at the UK Office for National Statistics (ONS). Although there is no actual estimated equivalency value for Korean households, it may provide some interesting empirical aspects in relation to the FSE scale. The author has constructed the adjusted equivalency values for Korean households based on an assumption that consumption patterns are similar between UK and Korea, and it

Table 4: Test of statistical significance using the estimated confidence interval

Index	Year	At 95% Level (Z=1.960)		At 90% Level (Z=1.645)	
		FSE=0.5	FSE=1.0	FSE=0.5	FSE=1.0
Gini	1994	(0.321, 0.357)	(0.336, 0.372)	(0.324, 0.354)	(0.339, 0.369)
	1997	(0.337, 0.373)	(0.351, 0.387)	(0.340, 0.370)	(0.354, 0.384)
	2001	(0.337, 0.373)	(0.348, 0.384)	(0.340, 0.370)	(0.351, 0.381)
MLD	1994	(0.182, 0.222)	(0.197, 0.241)	(0.186, 0.218)	(0.201, 0.237)
	1997	(0.202, 0.250)	(0.218, 0.266)	(0.206, 0.246)	(0.222, 0.262)
	2001	(0.190, 0.234)	(0.200, 0.244)	(0.194, 0.230)	(0.204, 0.240)
Theil	1994	(0.162, 0.256)	(0.178, 0.280)	(0.170, 0.248)	(0.186, 0.272)
	1997	(0.174, 0.308)	(0.192, 0.322)	(0.185, 0.297)	(0.203, 0.311)
	2001	(0.170, 0.300)	(0.182, 0.320)	(0.181, 0.289)	(0.193, 0.309)
SCV	1994	(0.218, 0.394)	(0.256, 0.420)	(0.232, 0.380)	(0.269, 0.407)
	1997	(0.245, 0.559)	(0.281, 0.551)	(0.270, 0.534)	(0.302, 0.530)
	2001	(0.251, 0.525)	(0.263, 0.585)	(0.273, 0.503)	(0.289, 0.559)

(Lower bound, Upper bound)

is shown in the right column of the Table 5. Notice also that the adjusted equivalency value of the children is subjectively estimated with a crude interpolating method.

The HIES of Korea maintains the age categories for children in the household that are different from those used in the UK. However, the HIES does not provide income data for non-salary workers before 2007. To make matters worse, there is no one-person household in the HIES data and there is not enough information in the data to tell if the head of a household consists of a single parent or of a couple (Kang, 2006). Henceforth, analysis on consumption is also provided and every household would have to be assumed as a married or cohabiting couple.

Table 6 reports the estimated Gini coefficient and its standard errors from using adjusted McClements equivalency values accordingly. The results from the McClements method are quite close to that of using a FSE value of 0.5, the difference being the range between 0.002 and 0.002. Such findings are consistent with the preliminary analysis result in Table 2 and are expected considering the fact that the HIES does not contain single parents. The remaining question would be whether the estimated inequality indexes are statistically significantly different in case where there is considerably large proportion of single-parent households in data.

Table 5: The McClements Scale assumed for Korea

Type of Household Member	UK	Type of Household Member	Korea (adjusted)
Married head of household (ie a married or cohabiting couple)	1.00	Married head of household (ie a married or cohabiting couple)	1.00
1st additional adult	0.42	1st additional adult	0.42
2nd (or more) additional adult*	0.36	2nd (or more) additional adult*	0.36
Single head of household Adult	0.61	(Not Applicable in HIES)	
1st additional adult	0.46		
2nd additional adult	0.42		
3rd (or more) additional adult*	0.36		
Child aged:		Child aged:	
16-18	0.36	14-19	0.33
13-15	0.27	6-13	0.24
11-12	0.25	3-5	0.18
8-10	0.23	Under 2	0.09
5-7	0.18		
2-4	0.09		
Under 2			

∗ per adult

Table 6: Test of statistical significance using the estimated confidence interval

Year	Total income (Wage Earners Only)		Total Consumption (All Households)	
	FSE=0.5	McClements Scale	FSE=0.5	McClements Scale
1993	0.343	0.342	0.291	0.291
	(0.007)	(0.007)	(0.006)	(0.006)
1994	0.339	0.340	0.274	0.274
	(0.009)	(0.009)	(0.007)	(0.007)
1995	0.342	0.343	0.276	0.276
	(0.009)	(0.009)	(0.007)	(0.007)
1996	0.347	0.346	0.284	0.284
	(0.009)	(0.009)	(0.007)	(0.007)
1997	0.355	0.355	0.273	0.273
	(0.009)	(0.009)	(0.008)	(0.008)
1998	0.350	0.351	0.280	0.280
	(0.009)	(0.009)	(0.007)	(0.007)
1999	0.346	0.347	0.288	0.288
	(0.010)	(0.010)	(0.007)	(0.007)
2000	0.343	0.344	0.278	0.278
	(0.010)	(0.010)	(0.008)	(0.008)
2001	0.355	0.355	0.274	0.274
	(0.009)	(0.009)	(0.008)	(0.008)
2002	0.354	0.354	0.281	0.281
	(0.010)	(0.010)	(0.008)	(0.008)

(Standard errors)

4. CONCLUSION

The arguments between Jenkins and Cowell (1994) and Banks and Johnson (1994) on the topic of McClements Scale systematically producing lowest estimates of inequality measures identifies seemingly important properties of equivalence scale on the one hand that different equivalence scales produces the estimations of the inequality indexes with U-shaped or reverse J-shaped pattern where $\theta \approx 0.5$ marks the lowest estimate. On the other hand, Banks and Johnson (1994)'s counter-argument claiming the property of McClements Scale arising from data-specific and different weight given to children within a single household seems to bear truth as well.

However, the relative weight given to infants and toddlers in McClements Scale may be too small, that the diseconomies of scale that may exist for these particular age groups might have been discarded completely. Also, the lowest estimates arising from using FSE=0.5 may reduce the level of income inequality since it discounts heavily towards large-size households. As it is argued in this paper, the main source of such disputes may come from the proportion of large-size family as well as the single parent households with two young children in the sample data. Then, simply assuming that the consistent use of equivalence scale value would allow for cross-sectional comparison and trend analysis without much worry becomes quite problematic.

Even so, such arguments may not bear much of importance, contrary to the point that I make in this paper, since the statistical inferences on the significance of the differences in estimated values from the highest estimates using FSE=1.0 and lowest estimates using FSE=0.5 are not statistically significant at both 95 and 90% level. The implication here would be on the importance of using the statistical inference techniques as a standard component of income studies in the future.

REFERENCES

Banks, J., and P. Johnson (1994). Equivalence scale relativities revisited, Economic Journal 104, 883–890.

Buhmann, B., L. Rainwater, G. Schmaus, and T. M. Smeeding (1988). Equivalence scales, well-being across ten countries using the Luxemburg Income Study (LIS) database, Review of Income and Wealth 34, 115–142.

Choo, H., and J. Yu (1986). Equivalent scale of expenditure of urban household in Korea, Academic Conference 86, The Korean Economic Association, 931–954.

Coulter, F., F. Cowell, and S. Jenkins (1992). Equivalence scale relativities and the extent of inequality and poverty, Economic Journal 102, 1067–1082.

Fisher, G. (1997). The development and history of the U. S. poverty thresholds, Social Security Bulletin 55(4), 3–14.

Giles, D. (2002). Calculating a standard error for the Gini Coefficient: Some further results, Working Paper EWP0202, Department of Economics, University of Victoria.

Harris, T. (2000). The effects of taxes and benefits on household income, 1998-99, Economic Trends 557, 45–83.

Jenkins, S., and F. Cowell (1994). Parametric equivalence scales and scale relativities, Economic Journal 104, 891–900.

Jorgenson, D., and D. Slesnick (1984). Aggregate consumer behavior and the measurement of inequality, Review of Economic Studies 51, 369–392.

Kang, Y. (2006). How much do we know about income inequality in Korea? International Review of Public Administration 10, 85–101.

Kang, Y. (2007). Identifying the potential influences on income inequality changes in Korea – population subgroup analysis, International Review of Public Administration 11, 71–87.

Lakin, C. (2001). The effects of taxes and benefits on household income, 1999–2000, Economic Trends 569, 35–79.

Lanjouw, P., and M. Ravallion (1995). Poverty and household size, Economic Journal 105, 1415–1434.

Oxley, H., J.-M. Burniaux, T. Dang, and M. M. d'Ercole (1997). Income distribution and poverty in 13 OECD countries, OECD Economic Review 29, 55–94.

Schwarze, J. (2003). Using panel data on income satisfaction to estimate equivalence scale elasticity, Review of Income and Wealth 49, 359–371.