

Title	INCOME DISTRIBUTION IN JAPAN: AN EXAMINATION OF THE FIES DATA, 1963-1971
Sub Title	
Author	MOUER, ROSS
Publisher	Keio Economic Society, Keio University
Publication year	1974
Jtitle	Keio economic studies Vol.11, No.1 (1974.) ,p.9- 28
JaLC DOI	
Abstract	
Notes	
Genre	Journal Article
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AA00260492-19740001-0009

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INCOME DISTRIBUTION IN JAPAN: AN EXAMINATION OF THE FIES DATA, 1963-1971*

ROSS MOUER**

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V. THE RELIABILITY AND USEABILITY OF THE FIES INCOME ESTIMATES

When using statistical materials, it is important that one be familiar with the the data he is using. Data being used for the study of income income distribution should be checked primarily in three ways. First, to what extent are the income earning units uniform either through time or at a given point in time.

* Sections I, II, III and IV appeared last year in Vol. X, No. 1 of this journal, pp. 87-109. The discussion on household size and household income in Section IV has since been further developed in a subsequent article, "Kakei Chōsa ni Okeru Shotoku Bunpu to Setai Seiin Sū no Kanren" (The Relation of Household Size to the Distribution of Income as Seen in the FIES Data), *Mita Gakkai Zasshi* (Keio University's Journal of Economics) (Vol. 66, No. 10: October, 1973), pp. 16-34. The discussion on income distribution and some of the dimensions of social stratification in Section VII is pursued in greater detail without reference to the question of representativeness in "Nihon ni Okeru Kaitaikei Betsu no Shotoku Bumpu no Jōtai: Kakei Chōsa Kenkyū o Tsūjite" (A Subsystems Approach to Income Distribution in Japan Using the FIES Data), which will be published shortly in *Kikan Riron Keizaigaku* (The Economics Studies Quarterly published by the Japanese Association of Theoretical and Quantitative Economists) (Vol. 26, No. 1: April, 1975).

** The author has benefited greatly from the assistance and cooperation of many persons. A more elaborate note of appreciation appears on the first page of this article. Readers are kindly referred to that part of the article which was published last year.

In the case of data like that which is available from the Family Income and Expenditure Survey (FIES), where the earning unit is the household, variation in household size may mean that the distribution of income among households differs from that among individuals. The relationship between household size and household income was examined in Section IV of this essay. The other two items which need checking concern the two sets of variables from which Gini concentration coefficients and other similar indices are calculated. The first set consists of the income estimates. The second set of variables reflects the population distribution. While sections VI and VII deal with the representativeness of the sample from which the population distribution is derived, this section focuses upon the reliability and usability of the income estimates, looking in particular at the matter of income secrecy, the spreading of income estimates over time, the discrepancy between annual and monthly income estimates, and the change in the range of the various income classes or groupings. Although the problem of secrecy may tend to weaken slightly our confidence in the reliability of the income estimates, the more significant issues have to do with the ways in which the data are presented. It is hoped that this discussion will alert the reader not only to some of the problems, but also to some of the possibilities of the FIES data.

A. *Income Secrecy and the Propensity to Report Income*

In all industrialized societies there has grown up a rather sophisticated but nonetheless rigid set of customs to maintain an aura of secrecy with regard to personal income.⁷ Framed in terms of the language of individualism, personal freedom or the creative desire for privacy, the general approbation for such secrecy has served the more mundane purpose of reducing tax burdens for both the rich and the criminal, while at the same time lessening the need for ideologies which legitimate conspicuous inequality. From a casual reading of the literature on Japanese national character, which suggests that the Japanese penchant for group orientation, Japan's commonly referred to pride in homogeneity and the widespread acceptance of national goals goes a long way in accounting for a variety of behavioral patterns in Japan, including the high savings rate, one might expect a minimum of secrecy and a low incidence of tax evasion. However, while this is not the place to examine Japanese values, let it suffice to say that tax evasion exists and would appear to exist to the extent that it creates a serious problem in trying to get reliable income estimates for the FIES.⁸ Indeed, a con-

⁷ See, for example, Barbara Wootton's probing discussion in *The Social Foundations of Wage Policy* (London: Unwin University Books, 1962), pp. 28-34.

⁸ James I. Nakamura discusses this problem as it relates to his efforts to obtain accurate quantitative data on agricultural production in the Meiji period. In the first four chapters of *Agricultural Production and the Economic Development of Japan: 1873-1922* (Princeton: Princeton University Press, 1966) he shows how farmers sought to reduce their tax burden by concealing the productive potential of their land through misclassification of their land or outright failure to register it. In contemporary Japan the belief that this bias is present in the income statistics of the national tax administration seems to be widespread. Nevertheless, the author knows of no recent empirical studies along these lines.

stant theme in the FIES literature is its stress on confidence and secrecy. In the small brochure introducing all potential survey participants to the FIES, considerable attention is focused on the protection of secrecy:

Since the FIES has been designed as an official statistical survey as provided by the Survey Statistics Law, Article 56, citizens have a civic duty to respond to the survey. At the same time, the law also provides for the complete protection of all confidential information. Furthermore, Article 14 on THE PROTECTION OF INDIVIDUAL CONFIDENTIAL INFORMATION and Article 15 on THE CRIMINALITY OF USING SURVEY DATA FOR OTHER THAN PURELY STATISTICAL PURPOSES provide for stiff penalties for those who commit any infractions. Thus the survey is structured so as to avoid any possibility of even the slightest repercussion coming to any individual upon completing the survey. Therefore, your entries on the survey forms will be read only once for statistical purposes, after which the forms will be incinerated or otherwise completely destroyed.⁹

In choosing persons both to visit homes (*chōsain*) and to supervise the administration of the survey (*shidōin*), one of the three conditions for employment is the absence of “any direct contact with either police activities or the tax administration.”¹⁰

Nevertheless, despite these efforts to gain the confidence of the public, a good amount of mistrust continues to remain. First, it is still impossible to obtain accurate income estimates for the households of non-employees. Whereas rather detailed information on income has been obtained for the households of employees since the survey's inception in 1952,¹¹ no such data is available for the households of the self-employed, management, professionals and other similar types. Since July 1962 annual income estimates of total family income without any breakdowns have been obtained from both kinds of households. Second, as will be discussed briefly in the following section a sizeable percentage of those approached refuse to respond to the survey. Third, this problem is commonly recognized among those engaged in carrying out the survey. The 1970 annual report of the FIES, like all the other reports, cautions that some bias may have entered the income estimates of those in the top income groups due to “the small size of the sample, the annual fluctuations in income among those groups and certain other biases in reporting income.”¹² One official at the Prime Minister's Bureau of Statistics also confirmed that this problem was a very real one limited not just to the high income groups but one to be found in the reporting of household income

⁹ “*Kakei Chōsa no Shiori*” (The Story of the FIES), a folded, single sheet information handout given to all households which are visited in asking them to participate in the survey (Tokyo: Sōrifu, Tōkei Kyoku, no date—cir. 1972).

¹⁰ Sōrifu, Tōkei Kyoku, *Kakei Chōsa Jittai Yōryō*, p. 8.

¹¹ As for the income of households of employees, the breakdown shows the amount of wages and salaries for both household head and spouse, with the former's income being further broken down into regular income, bonuses and occasional income. The income from other members of the household, property income, social security, gifts and all other sources of income are also given.

¹² The 1970 FIES annual, pp. 449–450.

at all levels since households would report the main income of the household but tend to conceal secondary income.¹³ Personal conversations elsewhere and a considerable amount of tax evasion would suggest that income secrecy is an obstacle to obtaining reliable income estimates. Unfortunately, however, we are unable to obtain information on the extent to which such a bias exists. Thus, one is inclined to be suspicious that some sort of bias exists, but does not have anything tangible with which to estimate the extent to which such concealment affects the data.

B. *Time Lags in the Measurement of Annual Income*

Annual income estimates have been collected since July 1962 when the FIES was totally revised. Before that time annual income estimates for employee households had simply been calculated from each family's monthly income average during the six months of its participation in the survey. Although the month of December was excluded from such calculations due to the fluctuations caused by the payment of the winter bonus as provided for under Japan's system of semi-annual bonuses, the months of June, July and August—a three month period during which the summer bonus is commonly paid—were included. Moreover, given a number of other factors which also help to shape annual patterns of business activity,¹⁴ the average monthly income over the various six month periods during which a given household could conceivably participate in the survey varied considerably. Finally, it had been impossible to get detailed information on monthly income from the households of non-employees. Thus, the annual income estimates were introduced in order to get reliable income data for the entire year including December, avoid monthly fluctuations which might affect the income of households, and obtain reliable income estimates for the households of non-employees. However, the new system of annual income estimates is quite complex and introduces possibilities for its own biases. In order to examine more closely the significance of these new biases, it is first necessary to explain briefly about the new system for compiling annual income estimates.

Each household participates in the FIES for six months. At any given time the survey covers about 8000 households. Every month one sixth of the total

¹³ As for what the major difficulties were in maintaining the family household account books in which both income and expenditures are recorded, I was told that the major problem was the measurement of food products in order to derive unit prices (e.g., price per certain units of measurement), followed by the difficulty of recording the expenditures out of small change which the men always carry with them when they go to work (an amount which is much larger than we are accustomed to carrying in the United States, for example). The third problem mentioned was that of the failure to report secondary income. Interview at the Tōkei Kyoku, January 27, 1973.

¹⁴ For example, Shuntō tends to concentrate wage increases in the spring. The custom of hiring and retiring on April 1, the movement of *dekasegi* laborers in the construction industry, and the January lull right after the New Year's celebrations also tend to occur with annual regularity and would therefore affect the six month income averages.

sample is rotated out of the sample and replaced with a new set of households. Thus, out of the 8000 households surveyed for a given month, one sixth are in their first month of participation, one sixth in their second month, . . . , and one sixth in their sixth and last month of participation. As Diagram VIII suggests, the total number of households participating in the survey during any given year would be $22,667 [8000 + (11/6) (8000)]$, assuming a constant sample of 8000 each month. While all households make entries in their account books each month, an annual income estimate is made only once during the six month period of participation. This income estimate is the total of all household income earned during the immediately preceding one year. Thus, if the estimate was taken in April of year Y_{i+1} , the estimate refers to total household earnings from April of year Y_i through March of year Y_{i+1} . During the first six months of the survey (from July 1962 through December 1962), this estimate was recorded by each family in its third month of participation (shown by the \circ in Diagram VIII). This estimate was then used along with the family's data on monthly expenditures and income (in the case of employee households) for the four month period extending from the third to the sixth month of participation. In other words, it was used for four-sixths of the time each household participated in the survey. Since each month's record of expenditures and income is treated as a separate unit in compilations, the annual income estimate of each actual household was counted four times as the income of four different statistical households, presentations requiring an annual income estimate being made only with data from the last four months of each household's participation in the survey. Thus, the annual data which is classified by the sixteen income groups was based upon the data received during that four month period. Beginning in January 1963, however, the time of entry was moved up to the second month (shown by the \diamond in Diagram VIII), with data then being made available for the last five months during which each family participated in the survey. This meant that the total number of observations for data classified by annual income groups was five-sixths the total number of observations for other purposes. Finally, beginning in January 1971, income estimates taken in the second month of each family's six month participation period were carried back for use in calculating other data recorded during the first month. Thus, the single observation on annual income which is presently recorded in the second month is now used six times. Therefore, the totals or averages appearing for groupings based upon annual income now equal those derived for other purposes. However, each single observation of annual income is counted only for as many months as the household participates in any given year. A household which enters the sample in October of year Y_i presently has its annual income estimate counted three times for three different statistical households for the year Y_i (covering the three month period from October to December of that year) and three times for the year Y_{i+1} (during the first three months of the following year). Unfortunately, the complexity of this system and the subsequent changes render any brief description inadequate. It is hoped,

DIAGRAM VIII
 ROTATION SCHEDULE FOR EACH ONE SIXTH OR THE FIES SAMPLES AND THE
 TIME PERIOD CORRESPONDING TO THEIR RESPECTIVE
 ESTIMATES OF ANNUAL INCOME

	Year 0					Year 1												Year 2					
	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	
<p>◆ ● Running horizontally, the shaded area signifies the six month period during which each one sixth of the sample participates in the survey.</p> <p>Seen vertically, the shaded area identifies the six sixths of the sample which participate and thereby form the total sample during any given month.</p> <p>○ signifies the month in which annual household income was recorded from July 1962 through December 1962.</p> <p>◆ signifies the month in which annual household income was recorded beginning in January 1963</p>																							
Twelve Month Period During Which Recorded Income Was Earned (after survey change of 1/1/63)																							
A. Last Month		7/Y _t	8/Y _t	9/Y _t	10/Y _t	11/Y _t	12/Y _t	1/Y _{t+1}	2/Y _{t+1}	3/Y _{t+1}	4/Y _{t+1}	5/Y _{t+1}	6/Y _{t+1}	7/Y _{t+1}	8/Y _{t+1}	9/Y _{t+1}	10/Y _{t+1}	11/Y _{t+1}	12/Y _{t+1}	1/Y _{t+2}			
B. First Month	8/Y _{t-1}	9/Y _{t-1}	10/Y _{t-1}	11/Y _{t-1}	12/Y _{t-1}	1/Y _t	2/Y _t	3/Y _t	4/Y _t	5/Y _t	6/Y _t	7/Y _t	8/Y _t	9/Y _t	10/Y _t	11/Y _t	12/Y _t	1/Y _{t+1}	2/Y _{t+1}				
Relative Weight (number of months during year Y1 for which each income estimate was used)																							
July 1962—December 1962			1	2	3	4	4	4	4	4	4	4	4	4	3	2	1						
January 1963—December 1963			1	2	3	9	5	5	5	5	5	5	5	4	3	2	1						
January 1964—December 1970	1	2	3	4	5	5	5	5	5	5	5	5	5	4	3	2	1						
January 1971—	1	2	3	4	5	6	6	6	6	6	6	6	6	5	4	3	2	1					

therefore, that the reader's close examination of Diagram VIII might clarify any remaining points of ambiguity.

Continuing with the same diagram, it should be clear that the income estimates calculated for any given year are actually a composite of estimates collected over a fifteen to seventeen month period, each estimate being weighted according to the length of time for which it is used. For example, one sixth of the 8000 participating households in January of any given year Y_{i+1} are in their sixth and last month of participation. Their annual income estimation, which was obtained the previous September (the second month of participation in year Y_i) and includes income earned during the past year (from September of year Y_{i-1} through August of year Y_i), is used only once. At the end of January (e.g., from February of the same year Y_{i+1}), that one-sixth of the sample households is replaced in the survey by a new set of households which soon (in March which is the second month of their participation) submit their own annual income estimate. In the same month of January, one sixth of the sample is in its first month of participation. Households in that sixth submit their annual income estimates in February. The February estimates then are used for the remaining five months in cases of families beginning before 1971, and for the full six months in the case of those beginning from January 1971, the estimates being carried back one month in the latter case. Thus, at the present time, depending upon when a family enters and leaves the survey sample, some estimates are used only once in a given year while others are used a full six times. The estimates are taken over a seventeen month period and include income earned during a twenty-eight month period.

The question therefore arises: How does this spreading of the income over time affect our understanding of the statistics? First, although income earned during a twenty-eight month period is measured over a seventeen month period, the estimates for year Y_{i+1} are concentrated around the one year beginning in May of year Y_i and ending in April of year Y_{i+1} , being offset from the survey year by about nine months. In other words, the FIES annual income data for

TABLE XI. THREE HYPOTHETICAL INCOME DISTRIBUTIONS

Average Income	Sample distribution		
	Case A	Case B	Case C
10	2	5	2
20	7	10	4
30	30	30	21
40	30	30	21
50	30	15	21
60	1	8	15
100		2	13
200			3
Total Sample	100	100	100
Gini Coefficient	.1495	.2060	.2887

TABLE XII. GINI COEFFICIENTS AND ARITHMETIC AVERAGES FOR THE THREE HYPOTHETICAL DISTRIBUTIONS IN TABLE XI AND DIFFERENT COMBINATIONS THEREOF

The Three Hypothetical Distributions in Table XI and Different Combinations Thereof	Gini Coefficients Calculated from the Actual Distribution in Each Hypothetical Case and Combinations Thereof	Simple Arithmetic Average Calculated with the Three Gini Coefficients for the Three Hypothetical Cases
A	.1495	
B	.2060	
C	.2887	
A + (1/6) (A + B)	.1551	.1566
A + (1/6) (B + C)	.1855	.1740
A + (1/6) (A + C)	.1785	.1669
B + (1/6) (A + B)	.1901	.1989
B + (1/6) (B + C)	.2267	.2163
B + (1/6) (A + C)	.2204	.2093
C + (1/6) (A + B)	.2770	.2610
C + (1/6) (B + C)	.2862	.2784
C + (1/6) (A + C)	.2819	.2713

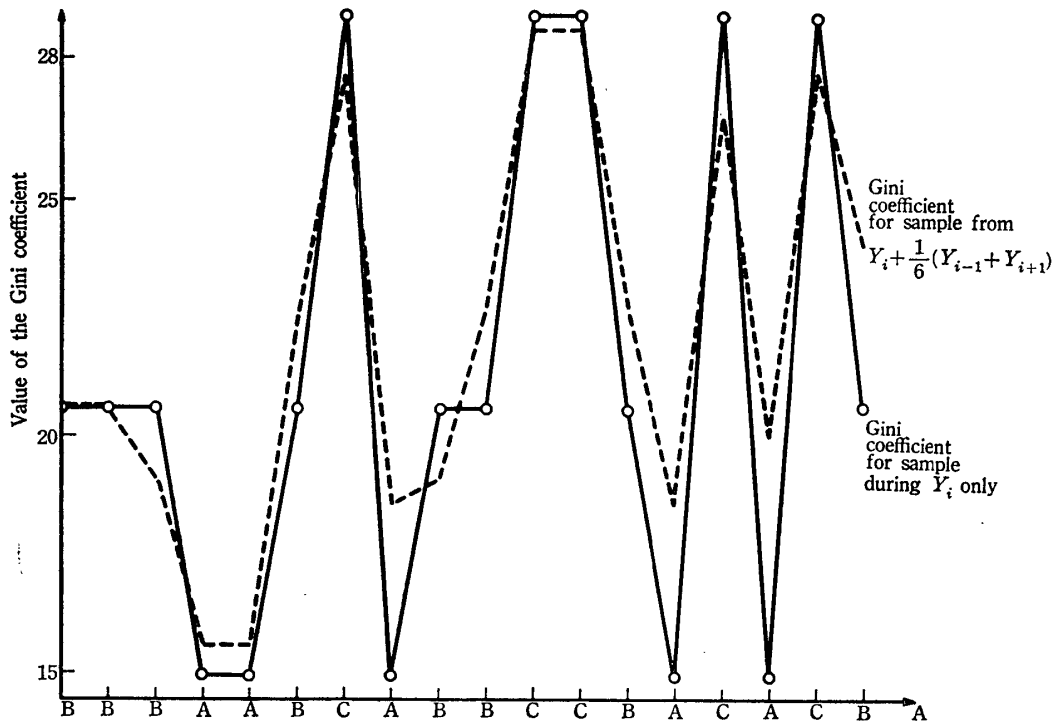
1971 actually centers around the Japanese fiscal year 1970.

A second distortion caused by this spreading of income estimates is the softening of fluctuations. In other words, the averaging of income over a twenty-eight month period would seem to round off peaks and troughs. In order to gain some idea of the dimensions of such distortions, three hypothetical distributions are considered. The hypothetical sample distributions and income estimates are given in Table XI. The Gini coefficient for each case and for different combinations of the three cases are given in Table XII. Most noticeable is the preponderant weight of the three high income units in case C. Although such incomes occur infrequently and perhaps even randomly they lift the Gini coefficient considerably even when only a small portion of their weight is carried over into another period. Clearly shown in Diagram IX is the effect of spreading the time period over which income estimates are collected. The diagram also shows the extent to which this kind of spreading out of the time period serves to narrow the range of fluctuation in the Gini coefficient. Although this smoothing out of the curve would not seem to hide any significant long term trends, it might certainly weaken correlations with other factors and thereby serve to increase the difficulty of identifying other kinds of variables which act upon or are influenced by the distribution of income.

The third and most difficult problem arising from the spreading of FIES annual income estimates through time is related to the affect of rapid economic growth and inflation on the Gini coefficient. With the exception of 1962 (9.1%) and 1965 (10.8%), the growth rate of nominal GNP was over fifteen percent during the 'sixties. Thus, even assuming that the distribution of incomes remained

DIAGRAM IX

THE EXTENT TO WHICH THE GINI COEFFICIENT IS AFFECTED BY SPREADING THE TIME PERIOD FOR WHICH INCOME ESTIMATES ARE GATHERED: AN EXAMINATION OF VARIOUS COMBINATIONS OF THE THREE HYPOTHETICAL CASES IN TABLE XI AND XII



Successive time periods: the capital letters refer to a hypothetical occurrence of the three hypothetical distributions given in Table XI

unchanged (e.g., that the income of each and every household grew at exactly the same rate), the rapid change in the levels of income over the period of seventeen months would cause a considerable shift in the distribution curve. In aggregating the curves for the seventeen month period, a new curve with a much broader base is formed. However, when each monthly curve is weighted by the number of times its composite estimates of income are counted in the computations for any given year, the kurtosis or peakedness of the distribution would seem to be restored. We are interested, then, in any differences between the shape of the income distribution curve for annual income collected during any given month and that for the weighted aggregate which appears on an annual basis.

In order to answer these questions in only a partial fashion, I assumed that the 1963 FIES income distribution for all households for all Japan was similar to the distribution for one sixth of the sample for any given month. I further assumed that the average income for any given income class interval was earned by all households in that interval. The final assumption is that all incomes increase at an annual rate of twenty percent. The income for each household in each income group for each of the seventeen months is given in Table XIII along with the number of individuals in each interval. Using the weights given at the

TABLE XIII. THE GROWTH IN AVERAGE INCOME BY INCOME GROUP OVER SEVENTEEN MONTHS
AT AN ANNUAL GROWTH RATE OF TWENTY PERCENT
(with the figures for the first month being based upon the 1963 FIES sample)

Variously Weighted Sample (S=1963 FIES sample)						Month																	
S	2S	3S	4S	5S	6S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	16	17	
45	90	135	180	225	270	79	80	81	83	84	85	87	89	89	91	92	93	95	96	98	99	101	
454	908	1362	1818	2270	2724	155	157	160	162	165	167	170	172	175	178	180	183	186	189	192	195	198	
886	1772	2658	3544	4430	5316	250	254	258	262	266	270	274	278	282	287	291	296	300	305	309	314	319	
1177	2354	3531	4708	5885	7062	348	353	359	364	370	375	381	387	393	399	405	411	418	424	431	437	444	
1281	2562	3843	5124	6405	7686	448	455	462	469	476	483	491	498	506	514	522	530	538	546	554	562	571	
1079	2158	3237	4316	5395	6474	544	552	561	569	578	587	596	605	614	624	633	643	653	663	673	683	694	
834	1668	2502	3336	4170	5004	641	651	661	671	681	692	702	713	724	735	746	758	769	781	793	805	818	
570	1140	1710	2280	2850	3420	744	755	767	779	791	803	815	828	840	853	866	879	893	907	921	935	949	
416	832	1248	1664	2080	2496	842	855	868	881	895	909	922	937	951	965	980	995	1011	1026	1042	1058	1074	
273	546	819	1092	1365	1638	943	957	972	987	1002	1017	1033	1049	1065	1081	1098	1115	1132	1149	1167	1185	1203	
385	770	1155	1540	1925	2310	1080	1097	1113	1130	1148	1165	1183	1201	1220	1238	1257	1277	1296	1316	1336	1357	1377	
200	400	600	800	1000	1200	1277	1297	1316	1337	1357	1379	1399	1420	1442	1464	1417	1509	1533	1556	1580	1604	1629	
127	253	381	508	635	762	1479	1502	1525	1548	1572	1596	1620	1645	1670	1696	1722	1748	1775	1802	1830	1858	1886	
52	104	156	208	260	312	1683	1709	1735	1762	1789	1816	1844	1872	1901	1930	1959	1989	2020	2051	2082	2114	2147	
41	82	123	164	205	246	1866	1895	1924	1953	1983	2013	2044	2076	2107	2140	2172	2206	2239	2274	2309	2344	2380	
151	302	453	604	755	906	2947	2992	3038	3085	3132	3180	3228	3278	3328	3379	3431	3483	3537	3591	3646	3702	3759	
Weights for Each Month																							
July 1962—December 1962							1	2	3	4	4	4	4	4	4	4	4	4	3	2	1		
January 1964—December 1970						1	2	3	4	5	5	5	5	5	5	5	5	4	3	2	1		
January 1971—						1	2	3	4	5	6	6	6	6	6	6	6	5	4	3	2	1	

bottom of Table XIII, all incomes and their weighted sample populations were aggregated and the Gini coefficient calculated for the sixteen income groups. First, however, it is interesting to look at the percentage distribution curves A, B and C in Diagram X. Whereas the curve A for the first month (the shape of which is similar to that for any other month) is most skewed, curve B, which is the weighted aggregate using the formula applied during the initial six month period in 1962, shows a marked leveling of the curve, suggesting a loss in skewedness. Curve C is based upon the weighted system used since January 1971, and shows an even further leveling of the curve, although the difference between the two curves for the weighted averages is not so great. The other curve for the 1964–1970 period has not been drawn, but obviously lies somewhere between the other two weighted curves.

Looking at curves A, B, and C in Diagram X, one might suspect that there would also be a shift in the Gini coefficient. However, this does not seem to be the case. Looking at the coefficients for these curves, as shown in Table XIV, one can only conclude that the aggregation of the data in any of the several ways used by the FIES does not affect the Gini very much, if at all. Indeed one is inclined to conclude that the small variation in coefficients is due to simple arithmetic errors which remained undetected in the rather complicated computations despite a double checking. In other words, the equalizing effect on the Gini coefficient of a larger percentage of the sample households having relatively more income seems to be offset by the fact that the range of incomes is widened. Nevertheless, the fact that there was a considerable shift in the distribution curves of Diagram

DIAGRAM X
INCOME DISTRIBUTION CURVES FOR TABLE VIII
(in percentages)

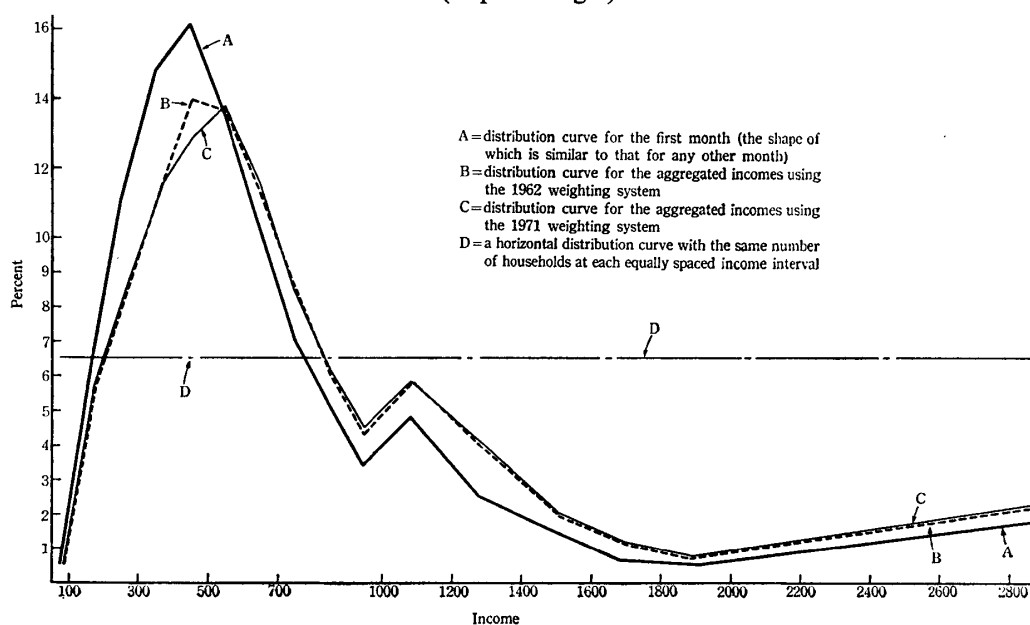


TABLE XIV. GINI COEFFICIENTS FOR THE CASES
PRESENTED IN TABLE XIII

Gini Coefficient for Any Single Month	.3346
Gini Coefficient for Simple Aggregation of Seventeen Months	.3342
Gini Coefficient for Weighted Aggregations	
A. July 1962—December 1962 Weighting Method	.3344
B. January 1963—December 1970 Weighting Method	.3340
C. January 1971—Present Weighting Method	.3343

X suggests that there is still room for skepticism. First, the demonstration that the FIES method of aggregation did not bias the Gini coefficient needs to be more rigorous in view of the considerable effects on the distribution curve. For example, the Gini coefficient in the example used here approximates .3333 (see Table XIV). However, this is precisely the value which would be derived if the Gini coefficient were calculated from a straight horizontal line distribution as shown by line D in Diagram X. Perhaps if another distribution were used in the example, the Gini coefficient would have been affected. Second, some question might be raised about the appropriateness of the Gini coefficient itself to show such changes. However, the fact that movements in the Gini coefficient do not seem to be necessarily related to shifts in the range of income or in the percentage distribution curve clearly leads us to a discussion which is beyond the scope of this paper and might even require a re-examination of the whole concept and measurement of equality as are commonly understood in the frequent use of such curves and coefficients.

C. Income Mobility and the Discrepancy Between Annual and Monthly Income Estimates

The discussion in the preceding sub-section clarified the major differences in the way in which annual income estimates and monthly income estimates are obtained. As one might expect, the monthly income averages for all households are considerably above the annual income averages. This is due to the time lag between the two estimates and the rapid growth rates and accompanying inflation in the Japanese economy during the decade under consideration. However, as shown in Table XV, income expansion does not seem to have occurred at an equal pace in all income groups. Indeed, at first glance there would seem to be a marked discrepancy between high income groups and low income groups. Since the monthly income estimates must check with monthly expenditures and are recorded in some detail, whereas the annual income estimates are recorded only once and even so are entered only in a most general fashion and from memory, it would seem reasonable to assume that the monthly estimates are more reliable. Accepting such an assumption, it would then further seem that those in the lower income groups had been consistently underestimating their annual income in terms of their monthly income, and conversely that those in the higher income

groups had been consistently overestimating their annual income. This phenomena, then, would help to account for the fact that Gini coefficients for annual income have been considerably above those for monthly income.

However this kind of bias in the income estimates is contrary to what one would expect from subjective appraisals of income. From a casual reading of the sociological literature, in mass societies where a special value seems to be attached to belonging to the great middle class, one might expect that the poor would cite higher incomes while the wealthier, possibly also reinforced by the fear of bringing upon themselves the burden of otherwise unnecessary tax investigations, would tend to hand in more conservative estimates. We are left, then, with the possibility that a measure of "income mobility" has occurred. In other words, households very likely may be earning different incomes in two successive time periods. Thus, given the fact that all the income groupings in the

TABLE XV. ANNUAL INCOME ESTIMATES AS A PERCENT OF MONTHLY
INCOME ESTIMATES: 1963-1971
(employee households, all Japan)

Income Group	1963	1964	1965	1966	1967	1968	1969	1970	1971			
Average	94.44	93.52	96.10	95.28	94.52	93.78	93.64	92.56	96.15			
- 99	50.97	47.58	24.98	71.41	43.75	64.57	} 75.12	} 64.07	} 43.31			
- 199	74.13	72.82	66.39	58.22	64.59	57.16						
- 299	81.22	78.87	77.39	75.96	69.93	73.82						
- 399	84.64	81.72	83.25	79.17	82.93	76.48				74.38	76.62	60.24
- 499	88.51	87.53	87.22	84.25	85.26	78.97				79.54	76.25	71.94
- 599	90.06	88.84	88.93	89.78	89.00	85.39	82.80	80.09	86.57			
- 699	93.45	90.60	93.26	89.64	89.64	87.52	83.36	82.69	82.44			
- 799	94.34	94.36	94.48	92.79	90.00	90.21	87.63	85.14	84.37			
- 899	97.05	95.29	95.85	92.72	89.59	88.15	86.68	86.68	86.22			
- 999	97.56	96.25	95.07	94.37	92.26	91.97	90.46	87.08	89.82			
-1199	99.67	97.32	98.20	99.25	94.46	93.39	92.07	88.38	90.80			
-1399	110.00	105.18	105.89	101.00	99.01	95.96	95-67	92.11	92.64			
-1599	108.72	108.49	109.45	105.74	101.31	89.10	98.12	93.03	94.77			
-1799	118.89	111.13	118.74	106.94	101.26	103.25	101.16	98.11	97.36			
-1999	142.80	128.36	122.98	112.25	105.40	101.82	103.67	98.09	98.94			
-2499							103.55	105.72	103.49			
-2999	148.12	129.73	129.69	118.67	107.97	107.73	111.63	102.83	105.48			
3000							138.06	115-03	123.37			
Percentage of the sample with Ratios Below Eighty	3.51	7.12	4.15	9.40	5.65	7.99	4.75	2.53	1.61			
Percentage of the sample with Ratios Over One Hundred	5.39	7.37	10.87	13.93	11.37	9.50	13.44	9.96	15.37			

Note: The upper set of percentages = $\frac{\text{Annual Income Estimates}}{12 (\text{Monthly Income Estimates})}$

Source: Calculated by the author from the annual FIES reports.

FIES data are classified according to annual income, we may also conclude that the poorer households a year ago are on the average now earning relatively more, whereas the wealthier households a year ago are on the average now earning relatively less. In other words, when mobility occurs throughout society, those on the bottom can only go up and those on the top can only come down. Accordingly, some of the middle-income households a year ago are now earning less while others are now earning more; consequently, as a group, their average income has not changed much in relative terms, increasing only in absolute terms due to economic growth and inflation occurring in the economy as a whole.

If we accept this latter interpretation of the data, which would seem quite reasonable, then a comparison of the two Gini coefficients—the Gini coefficient calculated from the estimates of the previous year's annual income with household distribution based upon those annual income estimates and the Gini coefficient calculated from the present year's monthly income but with the household distribution still based upon the annual income estimates—would give us some idea as to how much "income mobility" has occurred. These two Gini coefficients for the years 1963 through 1972 are given in Table XVI. Looking at the percentage comparisons in the third column of that table, one can conclude that, with the possible exception of 1967 and 1968 when slight increases are observable, the amount of income mobility over time has remained rather stable during the decade under consideration. If this type of mobility actually exists, it would mean that the distribution of incomes over a longer period of time would be more egalitarian than that for any given one year period. Moreover, if a value is in fact placed on identification with the mean in society then the comparisons in Table XVI would show an even greater amount of mobility in terms of income.

TABLE XVI. GINI COEFFICIENTS FROM ANNUAL AND MONTHLY
INCOME ESTIMATES: 1963-1971
(employee households, all Japan)

Year	(1) Annual Income Estimates	(2) Monthly Income Estimates	(3) Percentage Change (2)/(1)
1963	.2755	.2261	.8207
1964	.2636	.2157	.8183
1965	.2556	.2077	.8126
1966	.2595	.2136	.8231
1967	.2535	.2193	.8651
1968	.2405	.2028	.8432
1969	.2319	.1887	.8137
1970	.2294	.1879	.8191
1971	.2322	.1874	.8071
1972	.2350	.1886	.8023

Source: Calculated by the author from the annual FIES reports.

TABLE XVII. SAMPLE COMPOSITION IN THE LOWEST AND
HIGHEST INTERVALS: 1963-1970
(percentages) (all households, all Japan)

	The Three Lowest Income Intervals			The Three Highest Income Intervals		
	-99	100-199	200-299	2000-2499	2500-299	3000+
1963	.6	5.7	11.1		1.9	
1964	.5	3.8	8.1		2.0	
1965	.2	2.5	5.5		2.4	
1966	.1	1.7	4.4		3.4	
1967	.1	1.2	3.0		4.4	
1968		.7	1.9		5.3	
1969		1.8		4.0	1.7	1.4
1970		1.1		6.4	2.5	2.2

D. *Changes in the Income Intervals*

In 1969 the income intervals were changed slightly. The lower three intervals (up to ¥99,000, ¥100,000-199,000 and ¥200,000-299,000) were combined, while the top interval was divided into three. As the percentages involved at either end of the scale were less than twenty, there should have been no effect upon Gini coefficients calculated from the quintile data (as in Table III). However, this sudden change may affect comparisons of Gini coefficients calculated from the sixteen income groups (as in Table XVI). As we saw above (Table IV), the division of intervals into smaller intervals tends to smooth out the Lorenze curve, pushing it slightly further out and away from the line of perfect equality. Thus, the realignment of income intervals could conceivably account for a significant shift in the Gini coefficient. However, as Table XVII suggests, the percentage of the sample population at both ends of the income scale is rather small. As the total population of the combined intervals is smaller than that for the newly divided intervals, we can conclude that the total bias is ever so slightly toward a higher Gini coefficient. In other words, the Gini coefficient is increased by a mere two points or so. With a range of 10,000, two points up or down in the Gini coefficient, this would seem to be rather insignificant.

VI. THE UNIVERSE OF THE FIES

The accuracy with which generalizations about income distribution in Japan can be drawn from the FIES data is to some extent limited by the universe of the survey. It is then further limited by the extent to which the sample is representative of that universe. Although small biases may balance out in the long run and thereby do not necessarily affect long term trends, they can account for numerous small fluctuations in given years, thereby making time series analysis

more difficult, if not impossible. In this section the size of the universe will be considered. The degree to which the sample is representative of that universe will be examined in the following section.

The FIES annual is fairly explicit about the kinds of households it excludes. The 1970 FIES annual lists the following ten categories of persons who are excluded from the survey:

1. Farming households which are cultivating 0.1 hectare (.247 acres) (0.3 hectare in Hokkaido) or more. This also includes households which receive agricultural incomes equivalent to those which can be earned from the above sized plots of land.
2. Households engaged in forestry (lumbering, etc.).
3. Households engaged in fishing.
4. Single-person households.
5. Households of foreigners.
6. Households which operate restaurants, hotels, motels, inns, dormitories, etc., when the cooking and/or other facilities are used for both the guests and the household members.
7. Households which operate boarding houses.
8. Households in which four or more employees are living.
9. Households in which the household head is gone for long periods of time.
10. Other households designated by the Prefectural Governor as unsuitable for survey purposes.

Although there is a listing of all households in each FIES bloc which indicates the status of each household in the bloc in terms of the above criteria, those sheets are not made available at the present time. Thus, it is impossible to know accurately just how many households and how many persons are excluded from the survey. We can, however, make some reasonable guesses by examining the national census data.

The most important of the ten categories listed above are the first three which exclude agricultural households, fishing households and those with income from forestry. As the census data in Table XVIII shows, the percentage of households excluded in this fashion (items A.1-A.6) has been of sizeable but nonetheless diminishing proportions. Since the size of the agricultural household is larger than that of the non-agricultural household, 24.27 percent of the population in ordinary households still remains outside of the survey, as compared with only 18.45 percent of the households in 1970. A major problem in comparing FIES data and census estimates, however, is that of definition. The population census defines one as an agricultural worker if the major portion (fifty percent or more) of income comes from agriculture. The FIES uses the standard of actually cultivating 0.1 hectare OR earning from agricultural activity an equivalent income which is equal to only ¥50,000.¹⁵ Thus, given the average household head's annual income of about ¥1,200,000 in 1970, a very small percentage (less than five percent) of agricultural income could eliminate a household from the FIES universe, whereas any household with say less than ¥600,000 of agricultural income may have been counted as a non-agricultural household in the population census. In other words, the actual number of agricultural households according to the

¹⁵ Tōkei Kyoku, *Kakei Chōsa no Tebiki* (January 1973), p. 60.

FIES definition is actually greater than that assumed by a casual glance at the census data in Table XVIII.

The number of individuals excluded in the fourth category, single-person households, increased markedly during the 'sixties. Accounting for only 1.03 percent of the persons in ordinary households in 1960, such independent single person households rose to be 1.85 percent of all households in 1965, and 2.78 percent by 1970. A check of the census data for the FIES blocs shows an even higher percent (3.84 percent) of persons living in single-person ordinary households.¹⁶ The growing number of individuals living alone no doubt reflects the rising standard of living which now allows strong personalities to choose the luxury of arrangements for independent living. At the same time, however, the exclusion of this portion of the population at both ends of the age continuum no doubt introduces an egalitarian bias into calculations of the Gini coefficient based upon the household as the basic unit. Single person households have only a single income and then probably a below average income as earned by young unmarried types or older retired types. Moreover, if we think in terms of disposable income after the costs of living have been met and the economies of scale which operate for the larger household unit, perhaps the bias is even wider. On the other hand, it is difficult to predict how Gini coefficients based upon the individual as a unit (e.g., per capita income) would have been affected by this trend toward single unit households were such information available in the FIES data.¹⁷

The importance of the other categories given above is difficult to estimate. From the national population census, we are able to know the number of individuals not in ordinary households. Such persons include those who have been in hospitals for over three months, single persons living in dormitories, prison inmates, and persons in other kinds of institutions. For statistical purposes they are

¹⁶ This percentage was calculated by the author from the population census survey sheets for all FIES sample blocs (*kakei chōsa hyōhon sekkei shiryō kādo*). Based on this data, the percentage of single person households in 1970 steadily increases from a low of 1.52 percent for small towns and villages to a high of 4.80 percent for Japan's seven largest cities.

¹⁷ For example, there is no information to tell us whether there is a difference between income classes in the propensity of household members to break off and form independent single-person households. In other words, how would the addition of these earning units to their respective "households of origin" affect the various indices of income inequality in terms of family size. Another problem is the increasing number of students in higher education. Although most of these live in boarding houses and are therefore counted as quasi-households, a small but growing number is looking for a new sense of independence and freedom by living in independent apartment units, thereby forming single-person ordinary households. In addition, there is the problem of estimating family size. It is the upper classes which can afford to send their children off to college. On the other hand, among college students, one might speculate that those in the upper income brackets tend to come from the urban areas where the colleges are located. However, these students usually commute from home and thereby their attendance does not affect family size, whereas the students from the rural areas will tend to come from families with a lower average income, thereby reducing the statistical size of those families in the FIES sample.

TABLE XVIII. HOUSEHOLDS BY ECONOMIC TYPE: 1960, 1965 AND 1970

	Households			Household Members		
	1960	1965	1970	1960	1965	1970
A. The Number of Ordinary Households	19,571,300	23,091,880	26,746,900	89,299,400	93,466,120	98,689,100
(percentage composition)						
1. Owner—						
Ag.	16.95	11.86	7.82	19.92	14.57	14.57
2. Employee						
—Agricult.	1.31	1.10	.80	1.23	1.08	.81
3. Mixed A	7.00	6.35	5.75	9.66	9.11	8.46
4. Mixed B	.39	.37	.39	.44	.45	.47
5. Mixed C	1.11	.59	.54	1.45	.81	.76
6. Mixed D	4.16	3.32	3.15	5.06	4.25	4.15
7. Non-Ag. A	12.94	11.46	11.90	12.49	11.28	11.86
8. Non-Ag. B	45.70	53.20	56.66	40.21	47.66	52.05
9. Non-Ag. C	4.15	4.13	4.10	4.99	5.18	5.14
10. Non-Ag. D	2.45	2.90	3.71	2.64	3.22	4.23
11. Households with no one in the work force	3.78	4.60	5.15	1.85	2.28	2.41
12. Others	.06	.11	.05	.07	.12	.05
B. The Total Population of Japan				93,418,501	98,274,261	103,720,060
C. The Number of Single-Person Ordinary Households	918,800	1,815,800	2,882,600	918,800	1,815,800	2,882,060
Percentage Composition						
D. A.7-12 above				62.25	69.74	75.74
E. A/B				95.59	95.11	95.15 (94.09)
F. C/A				1.03	1.85	2.78 (3.84)
G. $D \times E \times (1-F)$				58.89	65.10	70.06 (68.53)
H. $(D-F) \times E$				58.52	64.57	69.42 (67.65)

Notes: "Mixed A" refers to households in which the household head is an owner in agriculture and other members are in non-agricultural industries; "Mixed B," household head is an employee in agriculture and others are in non-agricultural industries; "Mixed C," the household head owns a business in a non-agricultural industry and others are in agriculture; and "Mixed D," the household head is an employee in a non-agricultural industry and others are in agriculture. "Non-Ag. A" refers to households in which the household head owns his own business in a non-agricultural industry and no other

household members are working; "Non-Ag. B," household head is a employee outside of agriculture and no other members are employed; "Non-Ag. C," household head owns his own business in the non-agricultural sector and other members are employed in the non-agricultural sector; "Non-Ag. D," household includes households in which the household head is an employee and other members are also employed in the non-agricultural sector. Others includes households in which the household head is not working but other household members are. Attention should be paid to the fact that the figures in item C (the number of single-person ordinary households) are included within the totals for ordinary households in item A (the number of ordinary households).

Source: Tōkei Kyoku, *Sōrifu, Setai Oyobi Kazoku—Kokusei Chōsa Tokubetsu Shūkei Kekka* (Household and Family Population Census of Japan—Special Tabulation Results), Results), (Tokyo: Ōkura Shō, March, 1970), p. 300; Tōkei Kyoku, *Shōwa 50 Nen Kokusei Chōsa—Zenkoku Todōfuken Betsu Kekka Sokuhō* (1970 Population Census of Japan: Prompt Report of the Findings) (Tokyo: Ōkura Shō, September, 1971), p. 398; and Tōkei Kyoku, *Nihon no Jinkō—Shōwa 35 Nen Kokusei Chōsa no Kaiketsu* (Summary of Results of 1960 Population Census of Japan) (Tokyo: Ōkura Shō, 1963), p. 580.

The figures in parentheses in the last column for 1970 are from the author's own copies of the 1970 National Population Census Data Sheets for the FIES blocs (Kakei Chōsa Hyōhon Sekkei Shiryō Kādo).

grouped together as quasi-households (jun-setai). However, in the cases where employees live-in, only households with six or more such employees are counted as quasi-households in the census whereas a larger number—those with four or more such employees—are considered unsuitable for the FIES. As shown in Table XVIII, the number of persons in such quasi-households has remained at slightly under five percent during the 'sixties. Here again, the census data for the FIES blocs give an even higher percent (5.91).¹⁸ The other categories (six, nine and ten) given above are even more difficult to estimate without the above-mentioned listing for each survey bloc. In particular, however, the number of small restaurants and lodgings where facilities are not clearly separated for business use and family use would seem to be rather large. Considering all the various reasons for exclusion as mentioned above, I think it would be safe to conclude that the FIES universe is about five percentage points below the estimates given in lines G or H of Table XVIII. Thus even in 1970, the FIES universe can be said to include roughly two-thirds of the Japanese population.

Finally, it is important to keep in mind the fact that most studies related to income distribution are calculated for the households of employees. Moreover, in dealing with any of the dimensions of stratification or the various demographic variables, as is done in the following section, no data at all is available for non-employee households. In such instances the households of the self-employed, which are represented by categories A.7 and A.9 in Table XVIII, are also excluded, along with other certain types of corporate managers and professional and technical

¹⁸ Calculated as explained in footnote 14. As in the case of single-person households, the percentage of quasi-households rises steadily from a low of 2.67 percent for small towns and villages to a high of 6.49 percent for Japan's seven largest cities.

personnel which might otherwise have been included as employee households in figures from the national population census (categories A.8 and A.10 in Table XVIII). Therefore, studies which rely on the FIES data for the households of employees are dealing with between forty and fifty percent of the total population.

A second major problem involving the universe and the representativeness of the FIES sample is the low response rate. There is a special survey for those who fail to respond, but here again the results of this kind of survey are seldom if ever made available or even tabulated. The most recent results available from this survey for the first six months of 1955, however, are available.¹⁹ The survey shows that approximately 25 percent of the households surveyed failed to respond, with no noticeable difference between the households of employees and those of non-employees. The non-response rate was twice as high for two person households as for all other households, higher for households whose head's status is unclear, higher for households headed by older persons, and high for temporary and casual day laborers. Thus, on the whole, the non-response household tends to be a low income household. The rate of non-responses seems to have risen, however, and was very roughly estimated as being between thirty and forty percent by one survey administrator.²⁰ One set of figures taken in 1965 on the reasons for not responding found that 26.3 percent were simply too busy, 15.3 percent were households where both the husband and wife were working, 15.1 percent refused to give a reason and 14.6 percent claimed that they could not commit themselves to an interview.²¹

A third problem is the turnover of households which have agreed to participate in the survey. In 1969 about 14 percent of the participating households dropped out sometime during the six month period.²² Again there are no data on these households. A fourth and final problem is the return of unusable household account books or other kinds of forms for the survey which have been incorrectly completed. Thus, a small percent of the returns have been excluded in this fashion although the percent has steadily dropped from a high of 3.5 percent in 1963 to 1.93 percent in 1970. It is impossible to know whether the unusable returns come randomly from all types of respondents or whether they are from among a certain kind of respondent—for example, those with a minimum of education who find the survey's rigor somewhat troublesome.

(To be continued)

¹⁹ Tōkei Kyoku, *Kakei Chōsa Sōgō Hōkoku Sho—1946–1962* (General Report on the Family Income and Expenditure Survey: 1946–1962) (Tokyo: Ōkura Shō, March, 1964), pp. 346–347.

²⁰ Interview at the Shōhi Chōsabu (Consumer Expenditure Section), Tōkei Kyoku, Sorifu on November 30, 1972.

²¹ Same interview as directly above.

²² Interview at the Shōhi Chōsabu, January 27, 1973.