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AN ANALYSIS OF CONSUMPTION PATTERN
IN POST-WAR JAPAN

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I. *Introduction*

It is well known that the economic development has been remarkable since the end of the Second World War. This is also true for the rise of real per-capita consumption level. Since the Meiji Restoration this level has steadily increased in Japan if we exclude the period from 1940 to 1945. However, the growth rate of this level is very high in both the 1950's and the 1960's. For instance, the annual growth rate was about 7% from 1953 to 1967.[1]

This rapid rise of real consumption level has had a marked effect upon the composition of consumption expenditure in Post-war Japan. As can be seen in Fig. 2, there is a definite decreasing trend in the percentage of total consumption expenditure occupied by that for food and beverages. A reverse trend can be found for accomodation and miscellaneous item. It is only natural to say that this change is very large in the post-war period when we consider that the variations in the last 20 years have been as large as those which took place in the whole 80 years of the pre-war period. It is often said that the consumption pattern remarkably changed after the Second World War. Since the real consumption level is much higher in the recent Japan than that of the highest in the pre-war period, the composition of consumption expenditure is of course much different with each other. But it is the another problem to examine whether or not the basic behavior of consumption itself has changed after the war. One of the objectives of this paper is to study this problem by comparing our data with those in the pre-war period.

The high growth of consumption level has also raised the relative rank of Japan in the international comparison of consumption level. If we could use the official exchange rate for foreign trades, the per-capita consumption expenditure in Japan was only 10% of the level of the United States in 1953. However, in 1965 this percentage increased up to about 20%. This difference of the consumption level would be smaller if we consider the consumer price levels in these two countries.[2] Further, we can safely anticipate, by extrapolating the past trend, that the per-capita consumption expenditure of Japan would be equal to or larger than
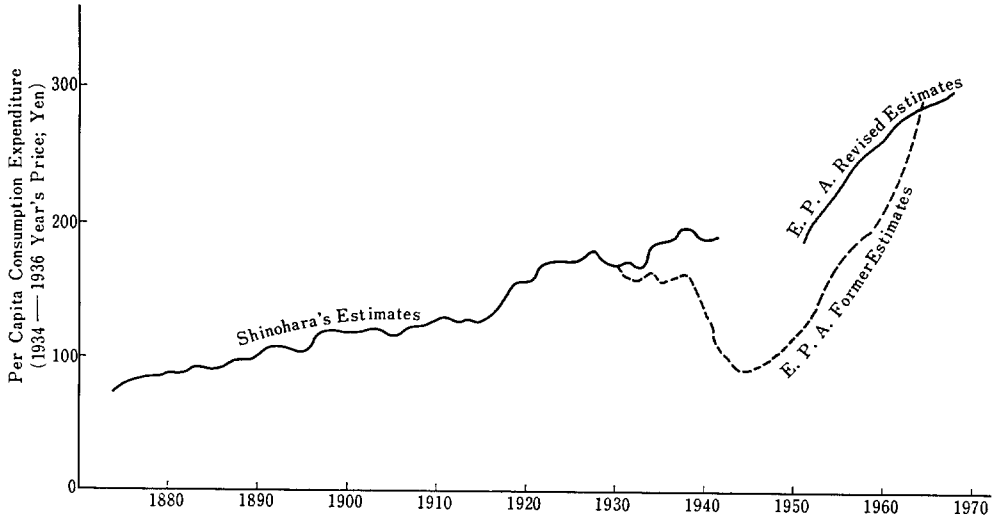
FIG. 1. TIME-SERIES CHANGE OF REAL PER-CAPITA CONSUMPTION
EXPENDITURE IN JAPAN (1875-1967)

Source. Shinohara's estimates: Miyohei Shinohara, *Personal Consumption Expenditure* (Kojin Shōhi Shishutsu), Tōyōkeizai Simpōsha, 1967. E. P. A. Former Estimates, Economic Planning Agency, *White Paper on National Income*, (Kokumin Shotoku Hakusho), The Agency, 1963. E.P.A. Revised estimates: Economic Planning Agency, *Annual Report on National Income Statistics*, The Agency 1969, *op. cit.*

FIG. 2. TIME-SERIES CHANGES IN THE COMPOSITION OF
CONSUMPTION EXPENDITURE (1875-1967)
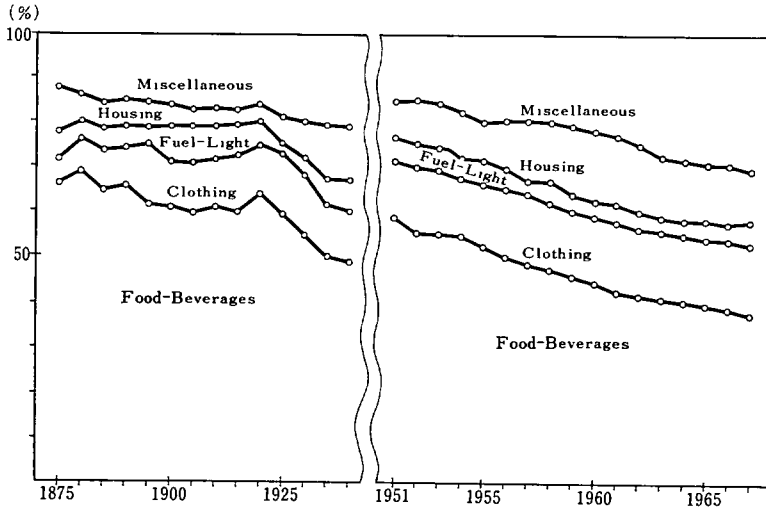
Source : See the source in Fig. 1.

TABLE 1.   THE PER-CAPITA CONSUMPTION OF JAPAN AS COMPARED
WITH THE LEVEL OF ITALY AND THE UNITED STATES

index base	1953	1958	1961	1965	1968
Italy	37.3	46.5	55.7	70.2	86.0
United States	10.2	12.8	16.3	19.7	25.0

Note : 1. The index is calculated by dividing Japanese per-capita consumption expenditure evaluated in the U.S.'s dollar (using the official exchange rate in each year) by the corresponding figures in Italy and the United States. 2. Figures for 1968 were calculated by the preliminary data supplied by the Economic Planning Agency.

Source : United Nations, *Yearbook of National Accounts Statistics, 1966, U. N.*, 1966. United Nations, *Demographic Yearbook, 1967, U. N.*, 1967. International Monetary Fund, *International Financial Statistics, 1960-1969*, I.M.F. 1960-1969.

that found in most of Western Europian countries.

In such a circumstance, it is interesting to compare the consumption pattern of Japan with one in the other countries. It has been suggested that there exist some unique characteristics of consumption behavior in Japanese households. When we want to know the future pattern of consumption in Japan, it is important to examine whether or not there are some unique characteristics of consumption behavior in present Japan. We will treat this problem by using various kinds of data.

II.   *International Engel Functions and Composition of*
Consumption Expenditure in Japan

First, let us examine the composition of consumption expenditures in Japan by referring the international cross-section data. When we calculate the per-capita consumption expenditure and its components (evaluated in the U.S. dollars using the official exchange rate) we can draw a functional relationship between these two variables. An example for food expenditure is shown in Fig. 3. Let us call this kind of function as the International Engel Function.

In our calculation of the international Engel functions, we should pay much attention to the form of this function. This is because the range of dispersion in the explanatory variables of this function (the per-capita consumption expenditure) is very large in the international cross-section data as compared with other kinds of data (for example, income classed data in a certain country). We then tried to apply the n-th order algebraic function for these data where n ran from one to five and attempted to decide the amount of n by statistical tests. According to the results obtained from the international cross-section data of 1963 (as is shown in the United Nations' *Yearbook of National Accounts Statistics, 1966*), the second order algebraic function is most appropriate for our purpose. We also tried to test whether or not we should adopt for our formula the dummy variables attempting to represent the custom differences of consumption behavior according to regions, (the definition of these variables is shown in Table 2). Neverthelsss, our tests proved that the parameters of these variables were statistically insignificant for most of expenditure groups. Thus, our formula for the international Engel functions become very simple as is shown

FIG. 3. AN EXAMPLE OF THE INTERNATIONAL ENGEL FUNCTION (FOOD)

Per-Capita Consumption Expenditure (U. S. $)
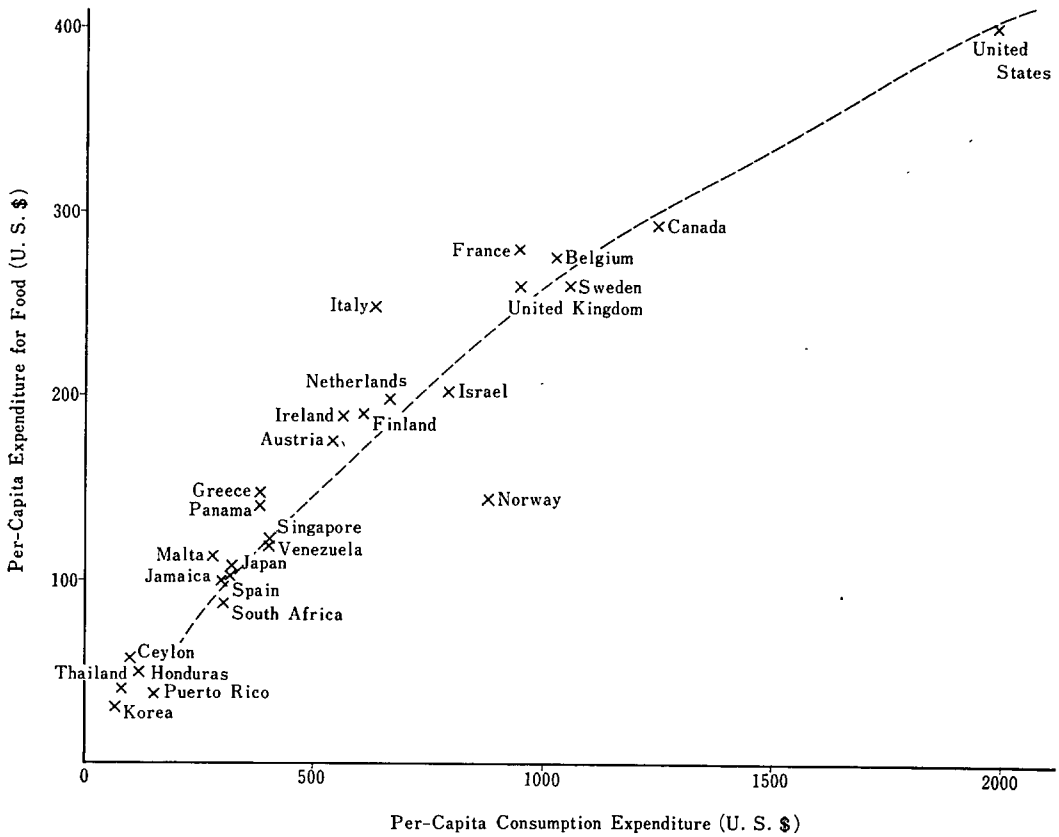
Source : United Nations, *Yearbook of National Accounts Statistics, 1966*, U.N., 1966.

TABLE 2. DUMMY VARIABLES REPRESENTING THE DIFFERENCES IN
CONSUMPTION PATTERNS ACCORDING TO REGIONS

d_1	d_2	d_3	d_4	Variables takes following values in such countries as
1	0	0	0	African countries.
0	1	0	0	Asian countries excluding Japan and Israel.
0	0	1	0	Middle and South America, Portugal, Spain and Israel.
0	0	0	1	Canada, the U.S. and Western Europian countries excluding Portugal and Spain.
0	0	0	0	Japan.

$$e_i/N = a + b(E/N) + c(E/N)^2 \tag{1}$$

where E and e_i indicate total consumption expenditure and expenditure for i-th group (evalu-ated in the U.S. dollars) and N is either the population of nations when we use the national accounts statistics or the family size when we use the family budget data.

We calculate two variations of international Engel function according to the kinds of data. The first is estimated by figures of national accounts statistics as is shown in the

U.N.'s *Yearbook*. Because our calculation is restricted for nations which adopt the U.N.'s system of classification for consumption expenditure (which define 12 major groups of expenditure), our number of samples becomes only 27.[3] This function will be called the international Engel function of the version *A*. We can also estimate this function by using the family budget data in various countries. Because the family budget data have been published in many countries including the under-developing countries where the consumption expenditure has not been estimated in their national accounts statistics, the uses of these surveys are very important. However, because the system of classification varies among various family budget surveys, some adjustments should be done before our calculations. We tried to adopt the same system as used in the analysis of national accounts statistics. One exception concerns the definition of rent expenditures. Because most of family budget data do not have figures on the imputed rent which is included in the rent expenditure of the national accounts statistics, our definition for family budget data restricted for money rent. After these reclassifications, we re-evaluated each figure in 1963 year's U.S. dollars.[4] This function will be called as the

TABLE 3. ESTIMATES OF THE INTERNATIONAL ENGEL FUNCTIONS

	Function A				Function B			
	a	b	$c \times 10^4$	R^2	a	b	$c \times 10^4$	R^2
Food	18.787	0.2999 (0.0329)	−0.5430 (0.1795)	0.9256	21.266	0.3626 (0.0329)	−0.8460 (0.2317)	0.8821
Beverages	−5.697	0.0757 (0.0138)	−0.1943 (0.0754)	0.7550	−3.104	0.0619 (0.0128)	−0.2076 (0.0897)	0.4934
Tobacco	−1.890	0.0419 (0.0110)	−0.0981 (0.0598)	0.6219	0.151	0.0238 (0.0081)	−0.0134 (0.0571)	0.4706
Clothing & other personal effects	7.337	0.0911 (0.0390)	−0.0753 (0.0213)	0.5382	−6.659	0.1438 (0.0120)	−0.2057 (0.0841)	0.9233
Rent and water supply	2.270	0.0456 (0.0314)	0.0560 (0.0172)	0.8675	——	——	——	——
Fuel and light	−5 182	0.0541 (0.0112)	−0.0524 (0.0611)	0.8317	1.417	0.0387 (0.0076)	0.0330 (0.0533)	0.8011
Furniture, furnishings & household equipments	−3.950	0.0778 (0.0140)	−0.0378 (0.0765)	0.8876	−4.614	0.0641 (0.0108)	−0.0192 (0.0761)	0.8013
Household operation	4.748	0.0155 (0.0111)	0.1017 (0.0609)	0.7301	−2.398	0.0388 (0.0110)	−0.0027 (0.0771)	0.6015
Personal care & health expenses	1.726	0.0253 (0.0177)	0.2916 (0.0968)	0.8531	5.603	0.0060 (0.0110)	0.4378 (0.0777)	0.8245
Transport and communication	3.005	0 0553 (0.0257)	0.5087 (0.1406)	0.9077	4.810	−0.0112 (0.0131)	0.9747 (0.0921)	0.9230
Recreation and entertainment	−0.769	0.0739 (0.0134)	−0.0942 (0.0733)	0.8504	−13.707	0.1072 (0.0169)	−0.4134 (0.1192)	0.5804
Miscellaneous services	5.602	0.0203 (0.0234)	0.1936 (0.1275)	0.6183	1.743	0.0690 (0.0234)	−0.0306 (0.1647)	0.4825

Source : See text.

[3] In the U.N.'s *Yearbook*, the consumption expenditure of Japan is classified depending on the system of classification which is unique to Japan. Luckily, a supplementary table was published to inform the figures depending on the U.N.'s system in the *Annual Report on National Income Statistics*, 1969 by the Economic Planning Agency, we used this table as the figures for Japan.

[4] This calculation was done as follows. After each figures converted into 1963 year's price of each country by using the consumer price index, the official exchange rate in 1963 was used to calculate the U.S. dollar's evaluation.

TABLE 4.   INCOME ELASTICITIES OF INTERNATIONAL ENGEL FUNCTIONS
(in 500 U.S. Dollars)

	International Engel Function	
	A	B
Food	0. 7914	0. 7662
Beverages	1. 0307	0. 9078
Tobacco	0. 9662	0. 9584
Clothing & other personal effects	0. 8193	1. 0255
Rent and water supply	1. 3001	——
Fuel and light	1. 1884	0. 9726
Furniture, furnishings & household equipments	1. 0884	1. 1534
Household operation	0. 8412	1. 1376
Personal care & health expenses	1. 2566	1. 2731
Transport & communication	1. 2239	1. 8295
Recreation and entertainment	0. 9532	1. 1141
Miscellaneous services	0. 9830	0. 6721

Source :   See text.

international Engel functions of the version B.

The international Engel functions are estimated by using the ordinary least squares estimation method and the results are shown in Table 3.   In order to know the broad characteristics of these functions, it is convenient to calculate the income elasticity for each expenditure group.[5]   Because the income elasticity differs depending upon the level of income when we adopt the formula (1), only one example is shown in Table 4.   It is interesting to find out that relative ranks of income elasticities are similar to those calculated by the income classified table in the family budget data in Japan.[6]

Now let us examine the characteristics of the composition of consumption expenditure of Japan on the standard of the international Engel functions.   To do this, we calculated the the per-capita consumption expenditure and its components for the various periods in both pre-war and post-war Japan and then re-evaluated them by the 1963 years's U.S. dollars.   By inserting the per-capita consumption expenditure into the explanatory variables in formula (1), we can derive the theoretical amounts of consumption expenditures according to their components depending on the international Engel function.   Because of the lack of detailed information in the original publication, it is very difficult to reclassify the pre-war figures depending on the U N.'s classification system.   However, an approximate estimate was used in this paper.   The ratio shown in Table 5 is calculated by dividing the realized expenditure in Japan by the 'theoretical values'.

Regarding the food expenditure of time-series data, the ratio is a little higher than unity

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[5] In this paper, let us use the term of income elastictiy instead of the elasticity to total consumption expenditure in order to save our space.

[6] Regarding the relationship between the time-series income elasticity and the elasticity found in the international Engel function, see Simon Kuznets, "Quantitative Aspect of Economic Growth of Nations, IV", *Economic Development and Cultural Changes*, 1962. This paper pointed out that the elasticity of the international Engel function does not necessarily coincide with the time-series income elasticity calculated by the long-term time-series data.

both for the pre-war and the post-war period. Concerning the pre-war period a comment should be made here for Shinohara's estimates. Some data had been published for the personal consumption expenditure of the pre-war period before the publication of Shinohara's estimates.[7] When we compare these data we find that the expenditure for food is larger in Shinohara's estimate than the figure in the previous estimates. If we compare these estimates with the theoretical value, the ratio is lower than unity and this is consistent with the findings by using the international Engel function B. We can also find, for the post-war period, a reverse conclusion for the food expenditure between the international Engel function of version A and B. It is said that the food consumption outside home is relatively large in Japan but it is very difficult to cover it in the family budget survey. A part of the above differences may be explained by this.

It is obvious that the level of consumption expenditure for beverages and tobacco is very low in Japan on the international standards. This may be explained by the decreasing trend of relative prices for these items. For instance, the general index of the consumer prices raised 47.7% from 1955 to 1965, but the corresponding ratio was 10.6% for beverages and −2.4% for tobacco.

The ratio for the rent expenditure is systematically higher than unity, but we should not derive some conclusive explanation here. This is because the method of the estimates of the imputed rent varies considerably from a country to a country a great deal of causion must be used for the international comparison of these expenditures. Further, the result is very singular from our common sense. It has been widely admitted that the housing condition is very bad in post-war Japan as compared her income level.[8] This is especially because, given the growth rate of real income, it is very difficult to rise the level of real assets as much as the rise in the real flow income. If we need to give here a preliminary for this finding, we should say that the high level of the ratio does not mean that housing condition is good in Japan on the international standards but this only indicates the relatively high level of rent itself.

This table shows us that the expenditure has been relatively small for both the furniture-household equipments and the transport-communication. It is true that these types of expenditures grew remarkably for the post-war period. However, we find that even these increases are smaller when we evaluate them by using the international Engel function. The low level of the expenditure for the furniture and household equipments can be related to the limited space of residencial house. As was explained before, the housing condition is very bad in post-war Japan. Because the improvements of houses require much expenses, the expenditure on this item will not increase too rapidly. The low ratio for the expenditure for transport and communication can be explained mainly because of the late start in the popularization of personal cars. The prices of domestic personal cars were very high and the foreign cars were not imported because of the surprising rate of import duty until the early 1960's. The sharp decline of these prices and the increase of nominal income in the recent years make it possible to popularize to own cars. However, the expenditure for the transportation remains in the low level on the international standards even in the present day of Japan. Further we should mention about the less developed situation of the consumer

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[7] The most reliable estimate before Shinohara's publication may be one published by the Economic Planning Agency. See the Economic Planning Agency, *White Papaer of National Income, 1963, op. cit.*.

[8] Alan, H. Gleason, "Postwar Housing in Japan and the United States", in Richard, K. Beardsley (ed.), *Studies on Economic Life in Japan*, The Uuiversity of Michigan Press, 1964.

TABLE 5. THE UNIQUE CHARACTERISTICS OF CONSUMPTION PATTERN IN JAPAN

	Food	Beverages	Tobacco	Clothing & other personal effects	Rent and water charges	Fuel and light	Furniture, furnishings, household equipments	Household operation	Personal care & health expenses	Transport & communication	Recreation & entertainment	Miscellaneous services
Time-Series Data (Function A)												
1967	1.0200	0.8627	0.4985	0.8973	1.2545	0.8404	0.8504	1.1698	1.9438	0.4438	1.1592	2.4744
1964	1.0347	0.8223	0.5378	0.9395	1.2819	0.9097	0.8757	1.1472	1.8834	0.3956	1.0943	2.2359
1961	1.0666	0.8092	0.6006	1.0232	1.3233	1.0652	0.8668	1.1334	1.6863	0.3669	0.8996	1.7668
1958	1.1799	0.8359	0.7486	0.9458	1.1723	1.2326	0.5903	0.9428	1.6001	0.3176	0.8288	1.3284
1940	1.0537	1.5103	0.8337	0.8893	1.2174	1.4915	0.7519	0.8714	1.4384	0.6229	1.0429	0.3759
1935	1.0246	2.1115	0.7707	1.0408	1.3780	1.4001	0.3395	1.4775	1.6669	0.5239	1.2142	0.3989
1925	1.1816	2.7565	0.6495	0.8164	1.2913	1.2844	0.2936	1.1815	0.9066	0.6717	1.0983	0.3315
1915	1.1370	2.9807	0.7831	0.6673	1.2179	1.9527	0.2922	1.1657	0.9351	0.3504	1.2452	0.2836
1905	1.2077	3.0308	0.7193	0.5510	1.0129	2.1466	0.2101	0.8710	0.8300	0.2361	1.4645	0.2926
1895	1.1425	3.8413	0.3485	0.7147	1.0190	2.5120	0.1950	0.5950	1.0306	0.1399	1.2356	0.2680
1885	1.0848	6.3414	0.3093	0.4297	1.0485	12.8563	0.2560	0.3632	1.1329	0.0335	1.4651	0.1177
1875	1.1298	7.4001	0.2554	0.4880	1.1019	—	0.2990	0.3301	0.7968	0.0247	1.3933	0.1248
Family Budget Data (Function B)												
1964	0.8296	0.5995	0.3520	1.0772		0.9493	1.0160	2.4047	1.3586	0.6069	1.6712	2.4457
1961	0.8652	0.5287	0.3919	1.1331		1.0304	1.0193	2.0877	1.3344	0.5725	1.5821	2.4008
1957	0.9136	0.4812	0.4795	1.1645		1.0233	0.6420	2.4008	1.3200	0.5852	1.6737	2.3801
1953	0.9435	0.4307	0.5822	1.3333		1.1379	0.5400	1.8079	1.2456	0.5339	1.9493	2.3869
1940/41	0.8484	0.4899	0.5058	1.1087		0.9034	0.7049	0.9933	1.7206	0.4753	1.0054	0.4391
1937/38	0.8796	0.4495	0.5983	0.9559		1.1602	0.5401	0.6804	1.8496	0.5660	2.7180	0.5263
1934/35	1.0596	0.4093	0.5891	0.8560		1.2989	0.4504	0.5698	1.9201	0.5064	2.0880	0.5016
1931/32	0.9744	0.5590	0.6926	1.1245		1.0661	0.5807	0.7580	2.0425	0.5570	2.6348	0.4566
1921/22	0.9768	0.7655	0.5812	1.2344		1.0410	0.5310	0.5126	1.1834	0.2313	2.8977	0.6319

Note: 1. The indices are calculated by dividing the consumption expenditures in Japan (evaluated in 1963 year's U.S. $) according to components by the corresponding 'theoretical values' which are derived from either the International Engel function A (for the national accounts statistics) or the function B (for the family budget data).

Source: See text.

financings.   Owing to the high growth of the Japanese economy, the demand for financial capital was very large and this prevented the developments of the system of consumer finance. It is well known that the sales of new houses or the large scaled consumer durables can be promoted by the increases of consumer finance.   It is only recent years that the availability of consumer credits becomes much easier for the usual households and this may increase the expenditures relating the large scaled consumer durables to some extents.[9]

For the ratios before 1900 we can find some singular results.   For instance, a very low ratio is shown for the expenditure of transport-communication in 1875.   Most of them may be explained, not by a singular pattern of consumption behavior of Japanese people but by the situation of social and economic circumstance.   For example, Japanese people in 1875 did not have the opportunity to use the modern transport facility such as people in the present less developed countries can do.   When we exclude these exceptional case, we should mention here only two additional distinguished characteristics regarding the miscellaneous expenditures. The writer feels it difficult to find the reason why the expenditure for personal care and medical expenses is high for the post-war period.   Only one suggestion he can is that the spread of medical insurrance system has increased the demand for medical services.[10]

The high ratio for the miscellaneous services would be caused by the relatively large expenditure for educational services.   The enrollment ratio for the higher education in Japan is very high among the developed countries.   Further it is said that the educational expenditure outside of school is also large.   It also should be noted here that the ratio has been increasing in recent years.   Regarding the other characteristics shown in Table 5 we need not deal with this topic in detail here.

III.   *A Comparison of Income Elasticity*

The income elasticity is the another indicator in the international comparison of consumption behavior, (see again the footnote 5 of this paper).   It is well known that both the income- and the price-elasticity play an important part in the empirical analysis of consumer behavior.   Especially, the former is studied because it indicates the degree of desires for groups of expenditures given the level of income.   In this section, let us compare the time-series and the cross-sectional income elasticity in post-war Japan with those found in data both for pre-war Japan and for present day of other various countries.   To do this we will adopt the figures found in national accounts statistics as well as family budget surveys.

In our examination of income elasticity of Japan between the pre-war and the post-war period, we applied for the most simplified method of the calculation of income elasticity: *i.e.* the growth rate of real per-capita consumption expenditures according to their components

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[9] Regarding these effects, see for example, Toshiyuki Mizoguchi, "Time-Series Analysis of Consumption Function in Japan by Occupational Groups", *Hitotsubashi Journal of Economics*, Vol. 9, No. 2, 1969.

[10] In Japan, nearly all person can use the medical insurances, supported by the government.   Usually, household heads can get medical services with free charge and the other family member is supported 50% of expenditures by this insurance.

were divided by that of total consumption expenditure.[11] The results shown in Table 6 point to some interesting tendency in the time-series changes of income elasticity.[12] To begin with the income elasticity for food and beverages' expenditure had been decreasing and became negative in the 1940's. It is very surprising to find out such a saturation level for the food expenditure in this period because the average income level was nearly 200 U.S. $ (evaluated in 1963 year's prices). This phenomenon is perhaps related to the Asian pattern of food consumptson found during this period. In the pre-war period of Japan the major caloric intake was upon major food as rice or other cereals. With this type of food consumption expenditure a rise in income does not have much effects on the food expenditure. This explanation partially depends on an analysis of the time-series change in the composition of foods.[13] As is shown in Fig. 4, in pre-war Japan there was not a declining trend in the percentage of food expenditure occupied by that of main foods. This is quite different from the results for the post-war period. To be sure, even in the pre-war period there was a tendency, especially in the high income classes, towards a higher quality consumption pattern. This can be verified by pointing out that the cross-sectional income elasticity for food and beverages was nearly equal to 1.0 in the 1940's. Nevertheless, the element of habit persistent effects were remarkably enough to keep the Asian type consumption pattern of food and this prevented an increase of this expenditure.

The situation in post-war Japan was quite different. It is said the distribution of western type of foods by American Occupation Force during 1945–46 affected positively to change the consumption habits on food of Japanese people. Thus as income rises afterwards the composition of food expenditure changed along different lines than had the pre-war one. The income elasticity, according to time-series data, has been decreasing since 1950 but the slope of this decline for real income changes is not so sharp as that for the pre-war period. The time-series income elasticity is about 0.5. This is much higher than the lowest level in the pre-war period in respective of what the real income level at that time was significantly lower than the level in the 1960's. It is true that the percentage of total calories derived from cereals is high in Japan as compared her income level even in the post-war period,[14] but the consumption pattern has been moving towards the less unique composition.

The time-series income elasticity for clothing expenditures was very high in pre-war Japan but decline after the war. This is partially explained by the remarkable decline in the relative

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[11] This method of calculation would be considered too simple because we do not consider the price variables. For instance, we can make up the model of

$$\log (e_i/NP_i)=a+b \log(E/PN)-c \log(P_i/P)$$

where e_i and E indicate the consumption expendituae for the i-th groups and the total group respectively, P_i and P indicate the consumer prices corresponding to e_i and E and N means the number of population. However, according to the writer's experience, the value of c is generally insignificant when we adopt a broad classification as is shown in Table 6. In this sense, we can accept the method shown in the main sentence as an approximation.

[12] Though the data for post-war period are taken from publications before the revision of national accounts statistics, the results are not much different even if we use data after the revision.

[13] The family budget surveys had been published annually since 1926. These survey covered worker's households by using the representative sampling method. Because the principle of selection of samples was same for all survey years, we can compare their figures as time-series.

[14] See for example the United Nations Research Institute for Social Development, *The Level of Living Index*, The Institute, 1966. See also Economic Planning Agency, Government of Japan, *White Paper on People's Livings, 1969* (Kokumin Seikatsu Hakusho), the Agency, 1969.

TABLE 6. TIME-SERIES CHANGES OF INCOME ELASTICITY OF JAPAN BEFORE
AND AFTER THE SECOND WORLD WAR (I)

from to	Food & beverages	Clothing	Rent	Other housing	Fuel & light	Miscellaneous
1878–88	0.937	3.020	0.391	−1.475	0.734	1.634
1888–98	0.615	5.110	0.221	1.699	0.491	1.909
1908–18	1.031	3.479	−1.004	3.535	3.246	0.519
1918–28	0.553	3.649	0.649	2.010	1.896	1.710
1928–38	−0.058	4.878	0.207	11.085	1.356	3.112
1952–55	0.759	1.293	0.637	2.089	0.251	1.701
1955–58	0.717	1.163	0.802	2.529	0.328	2.303
1958–61	0.449	1.180	1.233	2.727	0.997	2.954
1961–64	0.543	0.943	−0.349	1.845	1.221	1.778

Note: 1. In order to exclude the effects of short-term variations of consumer expenditures we used the average figures of five years for the pre-war period and those of three years for post-war period. For example the income elasticity in the period of 1878–88 is calculated by using the growth rate between the avarage of 1886–90 and that of 1876–80. 2. The data for the pre-war period were made by reclassifying the Shinohara's estimates depending on the system of classification of national accounts statistics in Japan. 3. In order to get the income elasticity concerning the early-1950's we used here the national accounts statistics before the recent revisions.

Source: Economic Planning Agency, *White Paper of National Income, 1966, op. cit.*, Miyohei Shinohara, *Personal Consumption Expenditure, op. cit.*

TABLE 7. COMPARISON OF CROSS-SECTIONAL INCOME
ELASTICITY IN JAPAN (1926–1966)

	Food and beverages	Housings	Fuel and light	Clothing	Health and personal care	Transport and communication	Recreation and entertainment	Education and stationaries
1926	0.7896	1.5657	0.9813	1.6400	1.2793	2.1862	2.1879	3.4795
1931	0.7149	1.1154	0.7404	1.4646	1.1123	2.1229	1.7226	2.2562
1936	1.0545	0.9170	0.5300	1.5502	1.0000	2.2138	1.7581	2.3564
1940	1.0671	1.2661	0 7837	1.4696	1.4500	2.3104	1.4579	2.9681
1951	0.5713	1.3069	0.6095	1.7298	0.7724	—	1.5231	1.3362
1955	0.4664	1.1507	0.7024	1.5470	0.9997	0.4768	1.5023	1.4368
1960	0.4478	1.0600	0.7927	1.4374	0.8318	0.4029	1.5241	1.3531
1966	0.4520	0.8404	0.6012	1.2748	0.5810	0.4429	1.5001	1.2656

Note: Though adjustments were done in order to make the concepts as close as we could, there remained minor differences between the pre-war and the post-war period.

Source: Statistical Bureau of Prime Minister's Office, *Annual Report of Family Income and Expenditure, 1951–1966.* Cabinet's Statistical Bureau, *Report of Family Budget Survey, 1926–1940* (Kakei Chōsa Hōkoku), 1933–1940.

FIG. 4.   TIME-SERIES CHANGES IN THE COMPOSITION
OF EXPENDITURES FOR FOODS AND BEVERAGES IN
WORKER'S HOUSEHOLDS IN JAPAN (1932–1965)
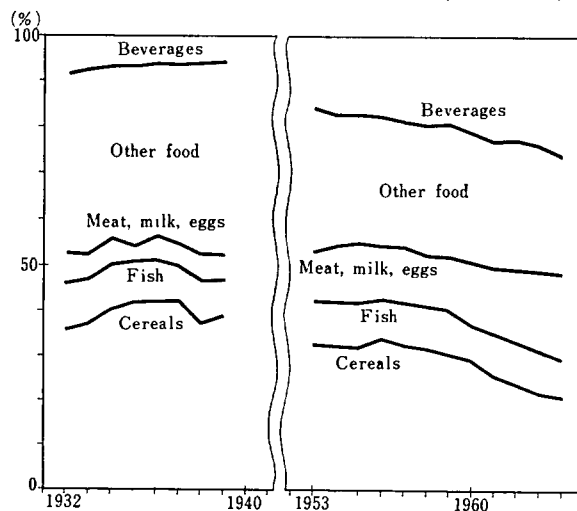
Source :   See the sources of Table 8.

price of clothing materials brought about by the introduction of synthetic fibers.   In the pre-war
period the elasticity of clothing expenditure was relatively large not only because most
Japanese used both western and Japanese style dresses but also because there was a tendency
to purchase high quality Japanese style dresses as a kind of real assets.   But this reason has
been vanishing in recent Japan.   This can be explain why the income elesticity is different
between these two periods.

The changes of income elasticity over times for the fuel and light expenditure is very
interesting because it reflects partially differences how to use materials.   For the period
1900–38, the rise in the income elasticity corresponds to the introduction of electricity, gas
and charcoal into usual households.   Beginning in the mid-1950's consumer durables (such as
Televisions, refrigirators, electric washing machines, etc.) began to appear in the middle
income households.   In the 1960's, the heating equipments (including those of central heatings)
began to be popularized.   The rise of income elasticity in this period can be explained by
the increases of demand for electricity and oil products which are necessary to operate these
consumer durables and equipments.   Generally speaking, the income elasticity for the fuel
and light expenditure is not too high in the usual situation, but this often shows high figures
when the consumption pattern changes.   We can find a remarkable example in Japan because
her growth rate of real income is very high.

The income elasticity for rent and water supply has been unstable in our calculation.   It
is well known that the estimate of this item is very difficult.   Especially because the method
of estimation differs between the pre-war and the post-war period, we had better make
some reservations on these figures.   The income elasticity for the 'other' housing expenditures
is high both for these two periods.   The high income elasticity in the pre-war period was
mainly supported by the purchase of furniture and other household equipments.   In the pre-
war period, the increase of purchase of consumer durables has been significant enough to

explain this level, however, at present there is a tendency for decline in this elasticity.

What comes to time-series elasticity for miscellaneous expenditures shown in Table 6, there are few detective changes. This may be explained by the fact that this expenditure group is composed of various kinds of expenditures. An examination can be done by re-classifying the Shinohara's data according to the system of classification adopted in the United Nations' *Yearbook of National Accounts Statistics*. (Because of the scarcity of information, our work is restricted for the period after 1957 concerning post-war Japan.) The income elasticity by this system is shown in Table 8. According to this calculation, the relatively

TABLE 8. TIME-SERIES CHANGES OF INCOME ELASTICITY OF JAPAN BEFORE
AND AFTER THE SECOND WORLD WAR (II)

from to	Food	Beverages	Tobacco	Clothing and personal effects	Rent and water supply	Fuel and light
1878–88	0. 7459	2. 0810	2. 7755	3. 1580	0. 3219	0. 6406
1888–98	0. 3852	1. 7460	1. 9801	5. 0998	0. 2487	0. 2496
1908–18	0. 8603	1. 5130	3. 1495	3. 2982	−0. 8304	2. 4284
1918–28	0. 6553	0. 1137	1. 6639	0. 4758	3. 6864	2. 0999
1928–38	0. 0646	−4. 0271	0. 1809	5. 7636	0. 1202	1. 5452
1959–61	0. 3708	1. 5138	0. 7608	1. 1916	1. 1574	1. 0678
1961–64	0. 3876	1. 5652	1. 2195	0. 7811	0. 9253	1. 1695

from to	Furniture and other household equipment	Household operation	Personal care & health expenses	Transport and com-munication	Recreation and entertainment	Miscellaneous service
1878–88	−1. 5049	6. 5833	4. 2008	8. 7775	1. 7261	−0. 1448
1888–98	2. 0040	7. 5088	0. 7319	12. 6197	1. 9682	1. 7072
1908–18	4. 2042	1. 2495	2. 1431	4. 3810	−2. 7531	1. 3358
1918–28	−0. 2708	−0. 0173	1. 8929	3 6792	2. 4023	2. 0775
1928–38	11. 9070	−1. 1408	8. 0233	6. 7829	5. 3863	0 1214
1959–61	2. 3465	0. 9670	1. 4222	1. 3985	1. 2200	1. 5843
1961–64	1. 5601	0. 0615	1. 8079	1. 8355	1. 4934	1. 7978

Note : 1. See the note 1 and 2 in Table 6. 2. Since the data used here are different from those in Table 6, we cannot compare these two tables directly.

Source : Economic Planning Agency, *Annual Report on National Income Statistics, 1969,* *op. cit.*, Miyohei Shinohara, *Personal Consumption Expenditure, op. cit.*

high figure can be found for the pre-war period regarding the expenditure for the transport-communication and the recreation-entertainments. The income elasticity of the other miscellaneous service is very high in the post-war period. This can be explained by a rapid increase of educational expenditure in recent Japan.

In the comparison of cross-sectional income elasticity, we can find very high figures for the miscellaneous expenditure groups in the pre-war period. An explanation of this can perhaps be found in the type of income distribution which was much more unequal in that time.

In such a situation only a limited number of households could purchase the 'luxury' goods and services. The elasticity was especially high for the expenditures on the transport-communication, and the other miscellaneous service, etc. The same tendency can also be found in the other housing expenditures. However, with the changes of type of income distribution between the pre-war and the post-war period, the elasticity reduced for these expenditures bringing it up to the level which is a little above 1.0.

Now, let us proceed to the international comparison of income elasticity. The first source of data we will use here is the sequences of the national accounts statistics for various countries. (These can be found in the United Nations' *Yearbook of National Accounts Statistics*). Unfortunately the tables for some countries do not follow completely the system of classification advised by the United Nations, thus our comparison is restricted for relatively small number of countries. In the calculation of time-series income elasticity, in principle, data from 1955 to 1963 are adopted. However, the figures regarding Japan are limited for the period from 1958 to 1967 because of the scarcity of information. The formula used here is

$$\log (e_i/(NP_i)) = a + b \log (E/(NP))$$

where e_i and E are the consumption expenditures for the i-th and the total groups, and P_i and P indicate the corresponding deflators and N is the number of population.[15] The results in Table 9 are in order of pre-capita consumption expenditure in 1963 evaluated in the U.S. dollars using the official exchange rates. We can find that the income elasticity rises or declines as the per-capita consumption expenditure increases in the international cross-section data. For instance, the time-series income elasticity for food expenditure seems to be lower in higher income countries. But this tendency cannot be rigidly proved because most of them is not statistically significant. However the reader can get some idea of these tendency by examining the simple average figures shown at the lower part of this table.

If we keep these in mind when we compare the time-series income elasticity of Japan with that of the other countries, we can detect the following characteristics of Japanese consumer behavior. Generally speaking, the time-series income elasticity in recent Japan is higher than or nearly equal to that derived from the international Engel function. Especially, the high income elasticity can be found for the expenditure of (1) beverages, (2) the furniture, furnishings and other household equipments, (3) transport and communication and (4) personal care and health expense. It is very interesting to point out that the two expenditure groups, (2) and (3), include the large scaled consumer durables (including cars). It has been often said that the amounts of consumer durables in Japan are relatively small as compared with high income level and that this can be explained by the less developed situation of consumer financings. However, the recent change of consumption expenditure seems to fill this gap. In contrast to these findings, the relatively small income elasticity is found for expenditures on food and the household operation. The former is very interesting when we remember the declining tendency of income elasticity in recent Japan as was examined before. The latter is less important because the amount of this expenditure is relatively small.

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[15] We used here the simpler model than that shown in the footnote 9 because the parameter c is not statistically significant for most of countries. When the data were available for all expenditure groups in the form of real vaule in the U.N.'s *Yearbook*, we assumed them as if e_i/P_i and E/P. In such a country as figures were shown only in current prices, we deflated them by the consumer price indices according to expenditure groups for urban or worker's households.

TABLE 9.　AN INTERNATIONAL COMPARISON

	Per capita consumption exp. in 1963 (U.S. $)	Food	Beverages	Tobacco	Clothing & other personal effects	Rent & water supply
1. United States	1,974	0.3217 (0.0344)	0.2992 (0.0327)	0.4332 (0.0657)	0.4432 (0.0627)	0.5230 (0.1629)
2. Australia	1,544	0.4108 (0.0537)	0.4108 (0.0544)	0.4113 (0.0943)	0.4113 (0.1043)	0.6795 (0.1421)
3. Canada	1,240	0.4037 (0.0653)	0.3752 (0.0554)	0.8573 (0.0887)	0.7942 (0.0695)	0.9394 (0.2445)
4. Sweden	1,048	0.2962 (0.0244)	0.2940 (0.0233)	0.3017 (0.2446)	0.2883 (0.2457)	1.1907 (0.0853)
5. Belgium	1,020	0.4897 (0.0330)	0.5441 (0.0373)	0.9824 (0.0651)	1.0927 (0.0718)	0.9245 (0.0775)
6. United Kingdom	942	0.3565 (0.0245)	0.3638 (0.0256)	1.0969 (0.0682)	1.1199 (0.0704)	0.0408 (0.1473)
7. France	937	0.7551 (0.0348)	0.7410 (0.0310)	0.8904 (0.0522)	0.8741 (0.0478)	0.6971 (0.0612)
8. Norway	876	0.4651 (0.0387)	0.4842 (0.0409)	0.8271 (0.1091)	0.8613 (0.1066)	0.5869 (0.1181)
9. Israel	787	0.8293 (0.0233)	0.7896 (0.0169)	1.0240 (0.0438)	0.9721 (0.0450)	0.9038 (0.0333)
10. Netherlands	663	0.5986 (0.0145)	0.6272 (0.0157)	2.0073 (0.0749)	2.1031 (0.0806)	0.3907 (0.0660)
11. Italy	627	0.8393 (0.0234)	0.8821 (0.0249)	0.6165 (0.0204)	0.6479 (0.0219)	0.7473 (0.0416)
12. Finland	603	0.5989 (0.0293)	0.6010 (0.0300)	0.9253 (0.1121)	0.9209 (0.1200)	1.0134 (0.0913)
13. Ireland	562	0.5977 (0.0289)	0.6098 (0.0274)	1.1420 (0.0723)	1.1612 (0.0775)	0.1319 (0.0780)
14. Austria	542	0.4852 (0.0404)	0.4931 (0.0415)	1.0357 (0.0691)	1.0532 (0.0704)	1.0448 (0.0633)
15. Greece	379	0.7273 (0.0188)	0.6524 (0.0119)	1.0305 (0.1560)	0.9464 (0.1208)	1.1460 (0.1061)
16. Panama	377	0.8262 (0.1966)	0.8592 (0.2068)	0.4588 (0.5023)	0.4937 (0.5225)	0.9432 (0.5122)
17. Japan	318	0.3821 (0.0185)	1.9246 (0.1971)	0.9778 (0.0339)	1.0058 (0.2500)	1.0853 (0.0989)
18. Un. of South Africa	304	0.3050 (0.0491)	0.3276 (0.0524)	1.0119 (0.1424)	1.0894 (0.1499)	-0.2259 (0.3905)
19. Spain	300	0.3617 (0.0468)	0.3709 (0.0479)	0.4945 (0.0655)	0.5068 (0.0674)	1.2497 (0.2605)
20. Malta	284	0.5141 (0.0744)	0.5189 (0.0755)	2.3917 (0.2744)	2.4138 (0.2801)	-0.8344 (0.4842)
21. Puerto Rico	153	0.3569 (0.0398)	0.3609 (0.0393)	1.0566 (0.0956)	1.0640 (0.0989)	0.8861 (0.0685)
22. Honduras	123	0.7675 (0.3240)	0.8267 (0.3397)	1.0605 (0.1484)	1.2318 (1.5641)	-3.5019 (2.3605)
23. Ceylon	102	1.3658 (0.2608)	1.4028 (0.2381)	0.6447 (0.8602)	0.6809 (0.8574)	3.0015 (1.2211)
24. Thailand	82	0.7422 (0.0429)	0.7870 (0.0466)	2.7113 (0.3149)	2.8759 (0.3346)	1.0203 (0.1462)
25. Korea (South)	66	0.4254 (0.1364)	0.4864 (0.1516)	0.6182 (0.3288)	0.6795 (0.3745)	1.1703 (0.2365)
Average:　1- 5		0.3831	0.3847	0.5992	0.5984	0.8514
6-10		0.5842	0.5917	1.1380	1.1705	0.5906
11-15		0.6412	0.6443	1.1262	1.1388	0.7457
16-20		0.5480	0.5484	0.9812	0.9917	0.4631
21-25		0.6953	0.7305	1.4143	1.4910	0.2903

Note: 1. The figures in the blackets show the standard of deviations of income elasticities. 2. published data. 3. We do not show here the income elasticity of three countries because the system (Taiwan). We also exclude the results for countries where we can find small number of samples.

Scuces: United Nations, *Yearbcok of Naticnal Acccunts Statistics, 1966, cp. cit.*

OF TIME-SERIES INCOME ELASTICITIES

Fuel and light	Furniture furnishing & household equipments	Household operation	Personal care & health expenses	Transport and communication	Recreation and entertainment	Miscellaneous services
0.5104	1.0332	0.9541	1.4995	1.4226	1.2655	1.2001
(0.1432)	(0.0571)	(0.0688)	(0.1591)	(0.1192)	(0.1335)	(0.1003)
0.6946	0.5414	?	0.5451	0.8288	0.8466	?
(0.1418)	(0.1087)		(0.1129)	(0.0791)	(0.0742)	
0.8929	0.3244	0.2969	1.5810	1.4712	1.4643	1.3657
(0.2086)	(0.0457)	(0.0417)	(0.1560)	(0.1109)	(0.2090)	(0.1693)
1.1815	0.8992	0.8902	1.0993	1.0913	1.6688	1.6497
(0.0812)	(0.0374)	(0.0384)	(0.0548)	(0.0486)	(0.1375)	(0.1405)
1.0274	1.0675	1.1869	0.1491	0.1661	1.0730	1.1945
(0.0869)	(0.0638)	(0.0710)	(0.0123)	(0.0132)	(0.2362)	(0.2619)
0.0381	1.0038	1.0250	0.7749	0.7926	1.4689	1.5041
(0.1506)	(0.0634)	(0.0653)	(0.0362)	(0.0343)	(0.1579)	(0.1574)
0.6848	0.9410	0.9210	1.3970	1.3717	1.2255	1.1980
(0.0576)	(0.0353)	(0.0372)	(0.0821)	(0.0746)	(0.0817)	(0.0844)
0.6135	0.8406	0.8749	0.5150	0.5380	1.3873	1.4499
(0.1220)	(0.0593)	(0.0634)	(0.0404)	(0.0402)	(0.1595)	(0.1620)
0.8587	0.6734	0.6374	1.4006	1.3360	1.0047	0.9540
(0.0333)	(0.0393)	(0.0423)	(0.0665)	(0.0515)	(0.0289)	(0.0316)
0.4104	1.0937	1.1461	0.3136	0.3297	1.1161	1.1686
(0.0686)	(0.0691)	(0.0729)	(0.0392)	(0.0402)	(0.0636)	(0.0687)
0.7855	0.9777	1.0273	0.5114	0.5377	1.4363	1.5106
(0.0437)	(0.0411)	(0.0440)	(0.0168)	(0.0168)	(0.0715)	(0.0730)
1.0186	0.1833	0.1695	0.9494	0.9628	0.7596	0.7683
(0.0900)	(0.2086)	(0.2108)	(0.1259)	(0.1178)	(0.0926)	(0.0875)
0.1320	0.9941	1.0119	0.6573	0.6752	0.7699	0.7797
(0.0799)	(0.0617)	(0.0645)	(0.1048)	(0.1029)	(0.1132)	(0.1187)
1.0627	0.8873	0.9028	0.6000	0.6105	1.0173	1.0349
(0.0639)	(0.0794)	(0.0801)	(0.0303)	(0.0300)	(0.0956)	(0.0969)
1.0417	0.9781	0.8538	2.2356	2.0422	0.7433	0.6518
(0.0743)	(0.1228)	(0.1280)	(0.2538)	(0.1836)	(0.0836)	(0.0875)
0.9542	0.5898	0.6156	0.5899	0.6260	2.0744	2.1812
(0.5414)	(0.3388)	(0.3536)	(0.1090)	(0.1065)	(0.2495)	(0.2432)
0.7084	2.0860	0.5491	2.0303	1.7698	1.4175	1.3130
(0.2500)	(0.0410)	(0.0392)	(0.0447)	(0.0426)	(0.0528)	(0.0549)
−0.2489	1.6121	1.7209	0.1249	0.1366	1.5119	1.6332
(0.4185)	(0.2644)	(0.2896)	(0.0564)	(0.0599)	(0.3296)	(0.3480)
1.2826	0.3443	0.3516	0.3780	0.3883	0.5001	0.5121
(0.2689)	(0.1040)	(0.1072)	(0.0498)	(0.0503)	(0.0738)	(0.0763)
−0.8688	0.7929	0.8028	0.8020	0.8191	2.1097	2.1373
(0.4843)	(0.2758)	(0.2782)	(0.1356)	(0.1322)	(0.2012)	(0.1967)
0.8940	1.1852	1.1955	0.9143	0.9238	1.2089	1.2212
(0.0691)	(0.0758)	(0.0768)	(0.0379)	(0.0346)	(0.0781)	(0.0759)
0.2866	1.6436	1.5302	0.1763	0.3799	0.4016	0.3677
(2.5032)	(0.7662)	(0.8728)	(0.5609)	(0.5820)	(0.7220)	(0.7707)
3.1231	−1.6147	−1.8857	0.9327	1.0612	0.2869	0.1446
(1.1870)	(1.3528)	(1.3134)	(0.5390)	(0.5120)	(0.8424)	(0.8465)
1.0823	0.9579	1.0144	0.1523	0.1619	0.3403	0.3615
(0.1551)	(0.2042)	(0.2179)	(0.0243)	(0.0254)	(0.0400)	(0.0418)
1.3361	1.1094	1.2480	−0.2713	−0.2979	3.4464	3.8372
(0.2577)	(0.1639)	(0.1873)	(0.0805)	(0.0937)	(0.6989)	(0.8147)
0.8614	0.7731	0.8320	0.9748	0.9960	1.2636	1.3502
0.6055	0.9367	0.9652	0.7584	0.7557	1.2126	1.2449
0.7418	0.8524	0.8519	0.8779	0.8597	0.9738	0.9857
0.4435	0.8946	0.9020	0.8215	0.8041	1.3098	1.3414
0.9756	0.6791	0.6509	0.4511	0.5080	1.2990	1.3449

The question marks mean that we cannot get the corresponding figures because of the limitation of of classification adopted there is too specific to be adjusted. They are Denmark, Germany and China (For example, Jamaica, Ecuador, etc.).

TABLE 10. AN INTERNATIONAL COMPARISON OF CROSS-SECTIONAL INCOME ELASTICITY USING FAMILY BUDGET DATA

	Per capita consumption expenditure (in 1963 year's U.S. $)	Food	Beverages	Tobacco	Clothing & other personal effects	Fuel and light	Furniture furnishings & household equipments	Household operation	Personal care & health expenses	Transport and communication	Recreation and entertainment	Miscellaneous services
1. United States, 1960/61	1,742	0.3360 (0.0554)	0.7480 (0.0364)	0.9460 (0.0499)	1.6342 (0.1811)	1.2666 (0.7232)	0.6776 (0.1002)	1.4494 (0.0817)	−0.9361 (0.3374)	−1.1237 (0.3774)	−0.1802 (0.0243)	−0.3152 (0.0528)
2. Canada, 1959	1,273	0.2631 (0.0514)	0.3017 (0.0477)	1.4553 (0.1724)	1.6443 (0.1794)	0.3977 (0.1659)	1.3998 (0.1000)	1.5639 (0.1616)	0.2310 (0.2389)	0.2942 (0.2571)	0.4269 (0.1509)	0.4620 (0.1866)
3. United Kingdom, 1963	1,015	0.4118 (0.0559)	0.4815 (0.0499)	1.7190 (0.1711)	1.9205 (0.2468)	1.0786 (0.3431)	1.5074 (0.2067)	1.6696 (0.2830)	0.0074 (0.2246)	0.0701 (0.2320)	−0.5472 (0.2727)	−0.5471 (0.3313)
4. Luxemburg, 1963/64	939	0.4971 (0.0460)	0.4959 (0.0524)	0.6983 (0.0708)	0.6972 (0.0782)	0.4730 (0.1741)	1.2214 (0.0691)	1.2291 (0.0576)	0.9641 (0.1475)	0.9823 (0.1275)	0.8501 (0.1372)	0.8663 (0.1204)
5. Sweden, 1958	916	0.3650 (0.0556)	0.3703 (0.0556)	1.5352 (0.2373)	1.5398 (0.2513)	1.1790 (0.3369)	0.9782 (0.0461)	0.9874 (0.0495)	0.9081 (0.1335)	0.9299 (0.1197)	−0.3186 (0.3147)	−0.3205 (0.3182)
6. Switzerland, 1964	790	−0.3005 (0.1555)	−0.3575 (0.1290)	0.9206 (0.2895)	0.9206 (0.3070)	−2.7789 (1.5215)	1.3327 (0.1098)	1.3452 (0.1468)	0.7506 (0.6170)	0.9827 (0.5482)	0.3913 (0.3092)	0.5058 (0.2742)
7. Denmark, 1955	765	0.6042 (0.0517)	0.6133 (0.0568)	0.5798 (0.0544)	0.5883 (0.0596)	0.8444 (0.0828)	1.0746 (0.0641)	1.0964 (0.0577)	0.8097 (0.0768)	0.8276 (0.0713)	0.3871 (0.0380)	0.3951 (0.0367)
8. Belgium, 1961	686	0.4389 (0.0823)	0.4272 (0.0781)	1.2234 (0.0932)	1.1902 (0.0782)	0.7247 (0.1160)	1.0142 (0.1362)	0.9700 (0.1417)	1.2502 (0.0918)	1.2171 (0.0746)	0.7645 (0.1521)	0.7517 (0.1391)
9. Un. of South Africa, 1955	661	1.0954 (0.0501)	1.1192 (0.0507)	1.6061 (0.0597)	1.6474 (0.0572)	1.9200 (0.0757)	2.1352 (0.0813)	2.1704 (0.0871)	−0.7938 (0.2411)	−0.7418 (0.2477)	−0.0403 (0.0447)	−0.0357 (0.0453)
10. Israel, 1963	645	0.4643 (0.0142)	0.4584 (0.0135)	0.2591 (0.0750)	0.2547 (0.0746)	0.4041 (0.0994)	0.9783 (0.0968)	0.9684 (0.0921)	1.5628 (0.3198)	1.5646 (0.3019)	0.7570 (0.0336)	0.7465 (0.0354)
11. France, 1956/57	630	0.3656 (0.0337)	0.3617 (0.0328)	0.3656 (0.0337)	0.3617 (0.0328)	0.8790 (0.2093)	0.4524 (0.1243)	1.4320 (0.1238)	1.2086 (0.1537)	1.2211 (0.1402)	0.8549 (0.3008)	0.8380 (0.2992)
12. Ireland, 1951/52	489	0.5906 (0.0303)	0.5873 (0.0343)	1.2355 (0.0443)	1.2297 (0.0404)	0.8811 (0.0960)	1.3840 (0.1181)	1.3754 (0.1278)	1.0675 (0.1111)	1.0639 (0.1027)	0.7085 (0.0511)	0.7052 (0.0493)
13. Austria, 1954/55	442	0.4327 (0.0147)	0.4492 (0.0184)	0.7156 (0.0349)	0.7419 (0.0418)	0.9174 (0.2304)	1.9256 (0.1384)	1.9940 (0.1579)	0.1901 (0.1416)	0.2117 (0.1454)	0.5559 (0.1181)	0.5888 (0.1181)
14. Netherlands, 1959/60	418	0.3883 (0.0581)	0.3983 (0.0674)	0.5093 (0.0617)	0.5332 (0.0603)	0.5499 (0.1756)	1.2593 (0.1356)	1.2946 (0.1654)	0.5791 (0.1835)	0.6258 (0.1786)	0.2655 (0.1296)	0.2898 (0.1303)
15. Hong Kong, 1963	410	1.7367 (0.0889)	1.9006 (0.1341)	1.2146 (0.2173)	1.2939 (0.2607)	3.1939 (0.2939)	−0.5492 (0.1529)	−0.5974 (0.1738)	0.2866 (0.1399)	0.3849 (0.1477)	1.1791 (0.0767)	1.3009 (0.0977)
16. Greece, 1957/58	379	0.7900 (0.0168)	0.7820 (0.0203)	0.5563 (0.1620)	0.5468 (0.1633)	0.6505 (0.1026)	1.0576 (0.1660)	1.0476 (0.1642)	1.2602 (0.2327)	1.2565 (0.2213)	0.8459 (0.0441)	0.8373 (0.0456)
17. Brazil, 1961/62	369	0.6265 (0.0170)	0.6365 (0.0176)	0.6264 (0.0170)	0.6365 (0.0176)	0.5376 (0.0695)	1.2877 (0.0544)	1.3087 (0.0552)	0.8135 (0.1187)	0.8424 (0.1137)	1.2562 (0.0751)	1.2716 (0.0815)
18. Japan, 1964	365	0.5722 (0.0146)	0.5873 (0.0140)	0.4565 (0.0695)	0.4695 (0.0689)	0.5100 (0.1139)	1.2210 (0.0321)	1.2460 (0.0290)	0.5836 (0.1505)	0.6102 (0.1491)	0.6900 (0.0371)	0.7041 (0.0368)

No. Country	n	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
19. Nigeria, 1959/60	356	0.6199 (0.0844)	0.6533 (0.0845)	1.1916 (0.1495)	1.2939 (0.2607)	0.8382 (0.2056)	1.5022 (0.1863)	1.5403 (0.2256)	0.5796 (0.2678)	0.6934 (0.2541)	1.0472 (0.0610)	1.0888 (0.0778)
20. Puerto Rico, 1953	266	0.7542 (0.0295)	0.7306 (0.0321)	1.7816 (0.0315)	1.7269 (0.0358)	0.3597 (0.0532)	0.2148 (0.0485)	1.1770 (0.0514)	1.7236 (0.2361)	1.6786 (0.2146)	0.8016 (0.0539)	0.7784 (0.0475)
21. Morocco, 1959/60	219	0.9347 (0.0206)	0.9422 (0.0207)	0.9941 (0.0974)	0.9789 (0.0978)	0.9994 (0.1127)	1.0507 (0.0515)	1.0571 (0.0540)	0.8433 (0.1101)	0.8624 (0.1061)	0.9866 (0.0568)	0.9974 (0.0547)
22. Chile, 1956/57	204	0.6342 (0.0579)	0.6244 (0.0583)	0.9900 (0.0974)	0.9941 (0.0970)	1.3396 (0.1374)	1.0055 (0.0670)	0.9900 (0.0687)	1.2505 (0.1061)	1.2389 (0.0969)	0.7020 (0.0633)	0.6904 (0.0644)
23. Guyana, 1955/56	188	0.7313 (0.0565)	0.7036 (0.0552)	1.1550 (0.1554)	1.1197 (0.1432)	0.8028 (0.1808)	1.4770 (0.3057)	1.4058 (0.3030)	3.0020 (0.6289)	2.9567 (0.5691)	0.9872 (0.1975)	0.9591 (0.1853)
24. British Honduras, 1958	173	0.8721 (0.0346)	0.8805 (0.0375)	0.6663 (3.1728)	4.5174 (6.1368)	1.1434 (0.1915)	1.3590 (0.0652)	1.3721 (0.0694)	0.8742 (0.0903)	0.8894 (0.0849)	0.8664 (0.0386)	0.8774 (0.0346)
25. Ivory Coast, 1956	159	0.6353 (0.0459)	0.6636 (0.0448)	1.1194 (0.1434)	1.1636 (0.1555)	0.7929 (0.0979)	2.1419 (0.2009)	2.2271 (0.2233)	0.5904 (0.1025)	0.6205 (0.1011)	0.2111 (0.0798)	0.2643 (0.0793)
26. Sudan, 1962	141	0.8302 (0.0324)	0.8189 (0.0335)	0.7803 (0.1964)	0.7822 (0.1928)	0.4935 (0.2256)	1.0204 (0.0626)	1.0087 (0.0619)	0.3124 (0.1119)	0.3084 (0.1067)	0.2165 (0.0494)	0.2054 (0.0467)
27. Malaya, 1958	131	0.4713 (0.1185)	0.4692 (0.1093)	0.4543 (0.2213)	0.4658 (0.2064)	0.5728 (0.1374)	0.2340 (0.7694)	0.1692 (0.7711)	1.9979 (0.8296)	2.0385 (0.7645)	0.8905 (0.3545)	0.8986 (0.3348)
28. Niger, 1961/62	123	0.5382 (0.0927)	0.5323 (0.0886)	0.5252 (0.0962)	0.4943 (0.1115)	0.4022 (0.1347)	0.7576 (0.2379)	0.7240 (0.2414)	0.2593 (0.2228)	0.2653 (0.1932)	0.7583 (0.0698)	0.7478 (0.0660)
29. India, 1958	111	0.8815 (0.0286)	0.8730 (0.0270)	0.6667 (0.4082)	1.2500 (0.5303)	0.5196 (0.3772)	0.8354 (0.1034)	0.8114 (0.1052)	0.0583 (0.1405)	0.1160 (0.1246)	0.6982 (0.0715)	0.6707 (0.0752)
30. China (Taiwan), 1963	100	0.5983 (0.0220)	0.6146 (0.0239)	2.2172 (0.2582)	2.2699 (0.2739)	2.2828 (0.1958)	1.9967 (0.1261)	2.0526 (0.1292)	0.5449 (0.1107)	0.5675 (0.1096)	0.4626 (0.5366)	0.4750 (0.0304)
31. Uganda, 1961	95	0.4630 (0.0592)	0.5404 (0.1062)	1.8925 (0.9112)	2.1561 (1.2222)	2.0152 (0.5093)	1.3330 (0.1942)	1.5847 (0.1233)	-1.9370 (0.5556)	-1.9370 (0.5556)	-0.4583 (0.5366)	-0.4972 (0.6680)
32. Turkey, 1964	92	0.1775 (0.3459)	0.1708 (0.3488)	-0.1543 (0.3223)	-0.1383 (0.3263)	-0.1352 (0.3271)	1.3444 (0.2498)	1.3310 (0.2837)	0.8961 (0.5290)	0.8961 (0.5290)	0.0625 (0.4589)	0.0869 (0.4597)
33. Thailand, 1962/63	92	0.7575 (0.0621)	0.9961 (0.0463)	0.2935 (0.3223)	0.3263 (0.3271)	0.7123 (0.0942)	0.8918 (0.2498)	0.9547 (0.1389)	0.7611 (0.2006)	0.8657 (0.2006)	-0.1259 (0.4589)	-0.0884 (0.4597)
34. Korea (South), 1964	92	0.7397 (0.0243)	0.7624 (0.0251)	1.5709 (0.2916)	1.5730 (0.2960)	1.1358 (0.1054)	1.5648 (0.0780)	1.5697 (0.0811)	0.8657 (0.1468)	0.8657 (0.1468)	0.7758 (0.0467)	0.7792 (0.0454)
35. Ceylon, 1952/53	87	0.7371 (0.0696)	0.7321 (0.0758)	1.6141 (0.0809)	1.6060 (0.0922)	0.8346 (0.0703)	1.2702 (0.1003)	1.2701 (0.0850)	1.0887 (0.1468)	1.0887 (0.0887)	1.2853 (0.0749)	1.2780 (0.0861)
36. Philippines, 1961	80	0.7737 (0.0109)	0.7339 (0.0115)	0.7740 (0.0809)	0.7342 (0.0115)	0.9553 (0.0703)	1.2166 (0.1003)	1.1525 (0.0850)	1.6504 (0.0349)	1.6504 (0.0349)	0.7643 (0.0749)	0.7263 (0.0861)
Average 1–10		0.4175	0.4658	1.0943	1.2040	0.5509	1.2319	1.3450	0.4759	0.5003	0.2491	0.2509
6–15		0.5816	0.5958	0.8630	0.8764	0.7536	1.2007	1.2049	0.6911	0.7358	0.5824	0.6076
11–20		0.6877	0.7083	0.8653	0.8766	0.6621	1.1755	1.1818	0.8292	0.8589	0.8205	0.8393
16–25		0.7170	0.7200	0.9482	1.3328	0.5278	1.3317	1.3372	1.1521	1.1649	0.9394	0.9469
21–30		0.7123	0.7122	1.0508	1.4984	1.0349	1.3878	1.3818	1.2733	1.2864	0.8779	0.8786
26–36		0.6353	0.6583	1.1486	1.2579	1.0717	1.3150	1.3299	0.7151	0.7176	0.5754	0.5711

Note: The figures in the brackets show the standard of deviations.

Source: See the final reference of this paper.

Now let us begin the international comparison by the family budget data.[16]   Because we find such data in various countries, we can compare the cross-sectional income elasticity. This is calculated by the formula

$$\log (e_i/n) = a + b \log (E/n)$$

where e_i and E are the expenditure per household for the i-th and total expenditure respec-tively and n indicates the family size.   The unique characteristics of cross-sectional income elasticity in Japan are less remarkable in this table as compared with the results in Table 9. However, it is also true that the figures for Japan are a little low on the international standard. This may be partially explained by the equal type of income distribution found in recent Japan, but we need to proceed a more detailed examination concerning this fact.

By the way, we can compare the time-series and the cross-sectional income elasticities by using Table 9 and 10.   It has been one of the interesting topics in the econometrics to study the differences found in these two kinds of income elasticities.   For instance, Wold-Juréen proposed to use the cross-sectional income elasticity for the time-series analysis of demand functions through the conditional regression method.[17]   The conditional regression method itself has been refined by the other scholors.[18]   Though this technique is interesting as a statistical method there remains an empirical problem whether or not the elasticity could be considered to be same between these two different kinds of data.   Because the time-sequences of cross-sectional tables are available in Japan, (for instance, by referring the *Family Income and Expenditure Survey*) some tentative studies have been published aiming to explain simultaneously both the time-series and the cross-sectional Engel function.[19]   If these studies will be developed in the future, we shall be able to get some idea regarding this problem.

However, it is the another approach to examine empirically whether or not we can find the relationship between the time-series and the cross-sectional income elasticity by using the international cross-section data.   In this comparison, we used only family budget data covering the large part of households in each country because the cross-sectional income elasticity varies according to the relative income position of samples.   For developed countries, we adopted the surveys belonging the following three categories: the data covering (1) all households, (2) all urban or non-farm households and (3) all worker's households.   For the less developed countries, only surveys belonging to category (1) is adopted.   Further we should notice that there are differences of definitions between these kinds of data.   The most important one is that the imputed rent is included in the consumption expenditure in the national
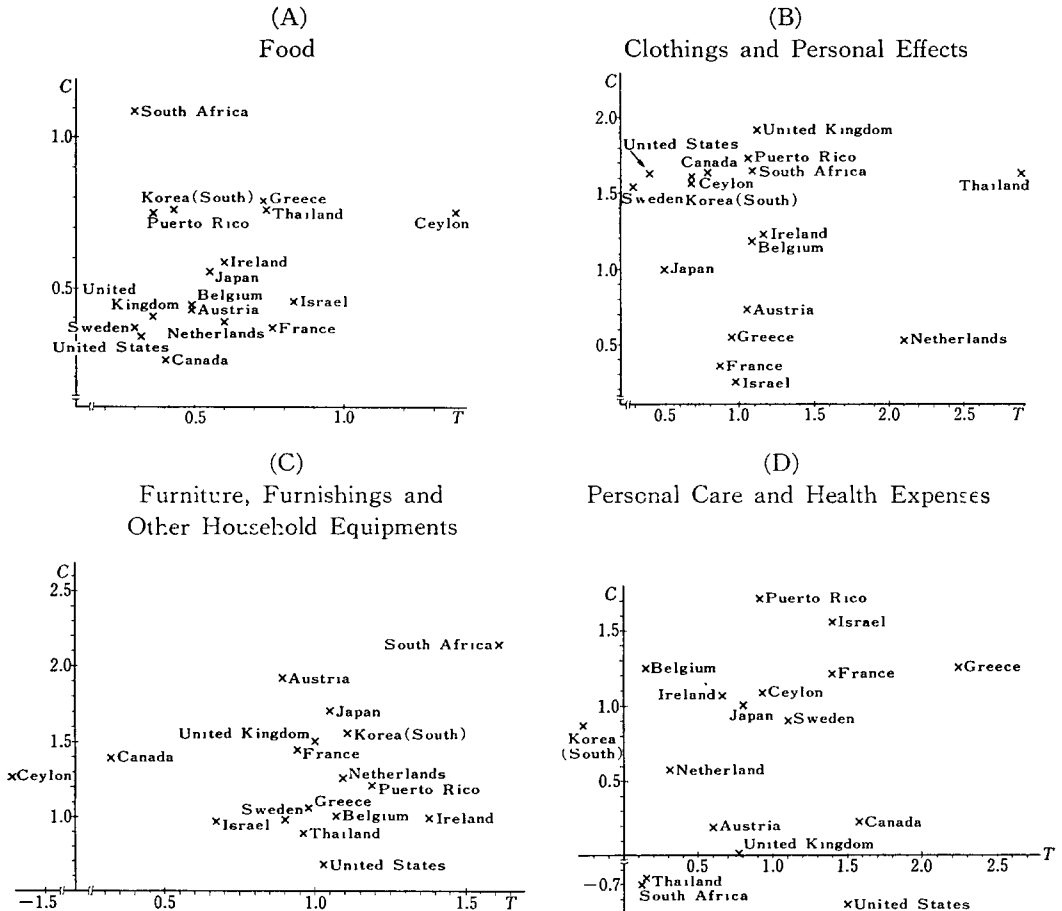
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[16] The pioneer work in this field is H.S. Houthakker's "An International Comparison of Household Expenditure Patterns.   Commemorating the Centenary of Engel's Law", *Econometrica*, Vol. 25, No. 4, 1957.

[17] Herman Wold and Lars Juréen, *Demand Analysis. A Study in Econometrics*, John Wiley & Sons, 1953.

[18] See for example, J. Durbin, "Estimation of Parameters in Time-Series Regression Model," *Journal of Royal Statistical Society*, Series B, Vol. 22, 1960 and H. Theil and A.S. Goldberger, "On Pure and Mixed Statistical Estimation in Economics," *International Economic Review*, Vol. 2, No. 1, 1961.

[19] There have been published two papers attempting to apply the covariance analysis for these data. See T. Mizoguchi, "Covariance Analysis of Family Expenditure" (Kyōbunsan Bunseki niyoru Shōhi shi-shitsu no Bunseki), *Keizai Kenkyū*, Vol. 12, No. 1, 1961 and Hirofumi Kaneda, "Urban/Rural Contrast of Consumption Patterns and Consumer Preference in Post-War Japan" *The Economic Studies Quarterly*, Vol. XIX, No. 2, 1967.   A more fundamental approach can be found in Kōtarō Tsujimura's *Consumption Structures and Prices* (Shōhi Kōzō to Bukka), Keisō Shobō, he made up a very complicated model as-suming a numerical preference field and tried to solve this problem.

FIG. 5.   EXAMPLES OF COMPARISON OF THE TIME-SERIES AND
THE CROSS-SECTIONAL INCOME ELASTICITIES

(A)
Food

×South Africa

Korea(South) ×Greece
× ×   ×Thailand
Puerto Rico   Ceylon

×Ireland
×Japan
United   Belgium
Kingdom ×Austria   ×Israel
Sweden×   ×
United States Netherlands ×France
×Canada

(B)
Clothings and Personal Effects

×United Kingdom
United States
Canada ×Puerto Rico
×   × ×South Africa   ×
×Ceylon   Thailand
Sweden Korea(South)

×Ireland
×Belgium

×Japan

×Austria

×Greece   ×Netherlands

×France
×Israel

(C)
Furniture, Furnishings and
Other Household Equipments

South Africa×

×Austria

×Japan

United Kingdom× ×Korea(South)
×France
×Canada   ×Netherlands
×Ceylon   ×Puerto Rico
Sweden×Greece
×Israel × ×Belgium ×Ireland
×Thailand

×United States

(D)
Personal Care and Health Expenses

×Puerto Rico
×Israel

×Belgium   ×France   ×Greece
Ireland× ×Ceylon
Japan ×Sweden
×
Korea
(South)
×Netherland

×Austria   ×Canada
United Kingdom
×Thailand
South Africa   ×United States

Note :   T and C mean Time-Series and Cross-Sectional Income Elasticity Respectively.
Source :   See the text.

accounts statistics but not in cross-sectional data.   In order to avoid this difficulties, let us calculate the 'income elasticity' for the consumption expenditure minus the expenditure for rent and charges of water supply.   Though this concept of 'income elasticity' is rather singular regarding the theory of consumption behavior, we can be used this as a first approximation.

A comparison is made between these two kinds of income elasticity in Figure 5.   (Because of the limitation of space only the results for major expenditure groups are shown there). Further a characteristic of this comparison is summarized in Table 11.   According to this table and figure, there are some variations in the correlational relationship between these two kinds of income elasticities.   For instance, the correlational coefficient R between these two kind of elasticities is relatively high for the five expenditure groups but is low or negative for the other groups.   However, generally speaking we can find less significant relations between them than we expected before.   However, when we investigate the values of d and $|d|$ which

TABLE 11. COMPARISON OF THE TIME-SERIES AND
THE CROSS-SECTIONAL INCOME ELASTICITIES

	d	$\|d\|$	R
Food	0.0056	0.2114	0.1513
Beverages	−0.0378	0.2523	0.0816
Tobacco	0.0260	0.7074	−0.1523
Clothing & personal effects	−0.0266	0.7398	−0.0653
Rent & water supply	0.0073	0.6030	−0.1496
Fuel & light	−0.0184	0.6496	−0.1322
Furniture, furnishings & household equipments	−0.4743	0.5394	0.1558
Household operation	−0.2939	0.4389	0.2146
Personal care and health expenses	0.2293	0.7290	0.2280
Transport & communication	0.2070	0.6933	0.2216
Recreation & entertainment	0.7709	0.9004	−0.1399
Miscellaneous services	0.7939	0.9491	−0.1317

Source : See text.

$$d=(1/n) \sum_j ((A_j - B_j)/B_j)$$
$$|d| =(1/n) \sum_j (|A_j - B_j|/B_j)$$

is defined as where A_j and B_j are the time-series and the cross-sectional income elasticities for the j-th country, n is the number of country and $|Z|$ means the absolute values of Z, we can find some systematic differences between these elaslicities. Especially, important is how to explain the sign of d according to groups of expenditures. If we examine this in details, some suggestions would be obtained. Such an attempt will be done in the near future.

IV. *The Characteristics of Consumption Behavior in Future Japan*

In place of a final remark, let us examine whether unique composition of consumption expenditures found in recent Japan will be vanishing in the near future or will be still present. To do this, we need to relate the international comparison of consumption expenditure according to expenditure groups with that of income elasticity. If, in these comparisons the consumption level of a certain expenditure group is judged to be low but the time-series income elasticity is relatively large, this unique characteristics will vanish in the near future. Such an attempt is carried out in Table 12. In this table the plus sign is shown in the value for Japan is *remarkably* high on the international standards and *vice versa*, (by referring the figures after 1958). When the cross-products of signs between the level of consumption and the income elasticity are negative the unique characteristics concerning the consumption composition can be considered to be vanishing. As a supplementary examination, we also examined the cross-products of signs between the consumption level and the cross-sectional income elasticity. This study is based on the hypothesis that the cross-sectional income elasticity suggests the consumption behavior in the long term basis.

When we investigate the cross-products in Table 12, we can find that most of them is

TABLE 12. CHARACTERISTICS OF CONSUMPTION COMPOSITION AND
INCOME ELASTICITY IN JAPAN IN COMPARISON WITH
THE INTERNATIONAL STANDARDS

	(1) consumption level	(2) time-series income elasticity	(3) cross-sectional income elasticity
Food	+	—	—
Beverages	—	+	—
Tobacco	—	0	—
Clothing & personal effects	0	0	—
Rent & water supply	+	+	
Fuel and light	0	0	0
Furniture, furnishings and other household equipments	—	+	0
Household operation	+	—	0
Personal care and health expenses	+	+	—
Transport & communication	—	+	—
Recreation & entertainment	0	0	—
Miscellaneous services	+	0	0

Source : See text.

negative or zero. Interesting is that we can find negative sign for the expenditure for trans-
portation and communication which is very low in recent Japan on the international standards.
Though the high level of the expenditure for miscellaneous services is one of the unique
characteristics of Japanese consumption behavior, the characteristics will be still present because
the income elasticity is not too low on the international standards. The plus signs can be
found for two expenditure groups: (1) rent and charges for water supply and (2) personal care
and health expenses. We will not discuss about the former because the international com-
parison in this item is less reliable as compared with the other items. It is very difficult to
explain the causes for the latter. But we should point out that the price levels for these
expenditure groups have been rapidly increasing in recent Japan. Further it is also interesting
that the cross-sectional income elasticity for these group is not high on the international
standard.

The analysis written here is the only the first step to know the characteristics of con-
sumption pattern in Japan. It is necessary to re-examine the origin of the so-called unique
characteristics mentioned here by using the more refined model or techniques. Further, we
need to examine the relation between the high personal saving ratio and the unique char-
acteristic of consumption behaviors in Japan. These problems are left here as the future
works.

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