

PROGRESS IN THE EMPIRICAL ANALYSIS OF CONSUMPTION FUNCTION IN JAPAN*

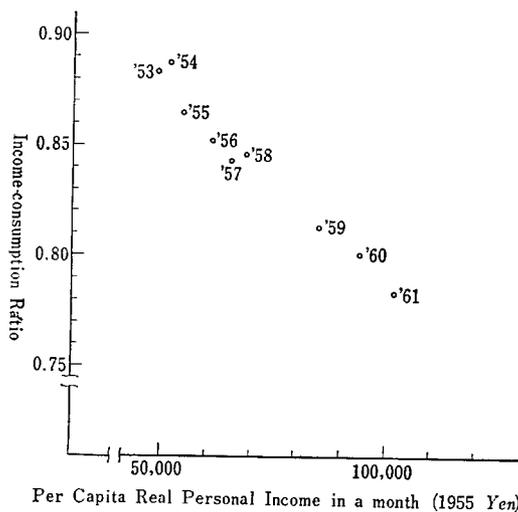
By TOSHIYUKI MIZOGUCHI

Assistant, Institute of Economic Research

I. Introduction

Since World War II, a substantial amount of literatures has been published by Japanese economists on the subject of the consumption function (these have been primarily written in the Japanese language). Interest in this subject was aroused in the first place by the difference between the consumption patterns of the Japanese people and those of the developed Western countries. As is well known, the income-consumption ratio, or the propensity to consume,

FIG. 1. REAL PER-CAPITA PERSONAL INCOME AND INCOME-CONSUMPTION RATIO IN POST-WAR JAPAN



Data: Economic Planning Agency, *White Paper on National Income Statistics, 1961*.

Note: 1 Deflator is the *synthetized consumer price index in urban and rural*.

2 Numbers in the chart refer to years.

* This paper was originally written as a report for the *Symposium on Econometric Analysis* held at Nagoya in August, 1963. The writer expresses his grateful appreciation to the members of this meeting for their useful comments.

decreases as income increases in cross-section data. However, the ratio is relatively stable in the long-term, with fluctuations occurring in accordance with cyclical changes in time-series data of the developed countries. Many hypotheses have been proposed to explain this *curious* phenomenon; for example, the relative income, the liquid assets, or the permanent income hypothesis. However, the income-consumption ratio estimated from her national income statistics has been decreasing since 1953¹ in Japan. This is very interesting, if not surprising. Hence, in an attempt to understand this consumption pattern better, we need to examine consumption theories with the backing of empirical analysis in Japan. The second reason for interests in this subject arises from the fact that the income-consumption ratio in Japan is on a lower level than in other countries. This probably is related to the extremely rapid economic recovery in post-war Japan. Therefore, it is important to clarify why so low a level has been maintained in post-war Japan.

Some economists have tried to solve these problems by using the time-series of the national income statistics and as results have noteworthy suggestions

TABLE 1. INTERNATIONAL COMPARISON OF
INCOME-CONSUMPTION RATIOS
(Consumption/Personal Income)

Burma	0.917	Japan (1953)	0.884
China (Nationalist)	0.903	(1956)	0.852
France	0.922	(1960)	0.798
Germany (West)	0.809	(1961)	0.777
U.K.	0.933	(1962)	0.700
U.S. (1960 Year Values)	0.932		

Data: United Nations, *Yearbook of National Account Statistics, 1960*.

Note International Comparisons are very difficult, because their concepts are different by countries. Thus Table 1 does not offer a precise comparison, but the lower of level income-consumption ratio in Japan can be seen by this table

(see Ref. 19, 20 or 27). However, the amount of informations in their data is too limited to support their assertions completely. On the other hand, the abundant data on family budgets have encouraged investigations of this area. As is shown in the appendix of this paper, family budget surveys of workers and farmers have been published year by year, while those of *other* family group have been published occasionally. The intent of this paper is to briefly trace the previous analyses using these surveys and set in order the point of their arguments.

II. Worker's Consumption Function

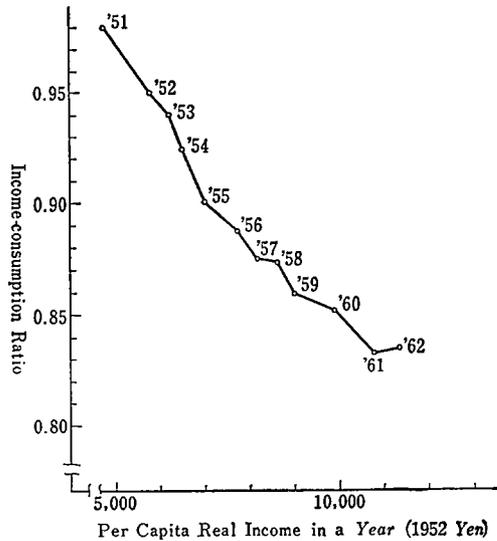
The empirical analyses of the worker's consumption function have mostly used the *Annual Report of Family Income and Expenditure Survey (F.I.E.S.)*. From these, yearly average values since 1951 can be obtained as time-series data as well as some cross-section tables, for example, the table classified by income amounts. Firstly, the comparison by time-series is noteworthy because the average income-consumption ratio has been decreasing since 1951 as in national income statistics. Therefore, the *linear Keynesian type* consumption function,

$$c = a + by \quad (1)$$

where c is consumption, y is income and a and b are positive constants, seems best suited

¹ Before 1953, fluctuations in the income-consumption ratio were rather irregular. This may have been caused by the violent inflation since the war end.

FIG. 2. INCOME-CONSUMPTION RELATION IN JAPANESE WORKER SINCE 1951



Data: *Annual Report of F.I.E.S. 1962.*

Note: Deflater is the *consumer price index* in urban area.

to the income-consumption relations for Japanese workers. Shinohara (Ref. 20) embarked upon an explanation of this tendency using information on the pre-war standard of living of urban workers. At the time of his analysis, the consumption standard was lower than the highest pre-war one. Thus, he anticipated that the average income-consumption ratio would stop decreasing after the real income level surpassed the pre-war peak. Namely, the *Duesenberry type* consumption function,

$$c/y = a + b(y/y_0) \quad (2)$$

where y_0 is the highest income before previous year, is assumed to be the fundamental behavior of workers, and y_0 is identified as the peak pre-war income. However, despite the recent significant rise in real income, surpassing the highest pre-war level, the income-consumption ratio continued to decrease. Thus some improvements in the explanation are necessary.

One approach lays stress on the change in income distribution. The marginal propensity to consume estimated from income-classed data shows a downward trend with some fluctuations year by year. This may be explained by supposing that the income-consumption relation differs according to the consumers' position in income distribution. If the lower level of income-consumption ratio in Japan originates from the inequality of income distribution, as was considered by Lockwood (Ref. 10), the decreasing trend in income-consumption ratio may be caused by the inequalization in the worker's income distribution. In fact, a significant negative correlation coefficient was calculated between the income-consumption ratio and the

coefficient of variation in income distribution in the yearly sequences of *F.I.E.S.* (Ref. 25). However, in order to complete these explanations, we must explain why consumption behaviors are different by the position in income distribution. An approach may be the interpretation from the relative income hypothesis (Ref. 11), but it remains on a preliminary stage.

The approaches using the liquid assets hypothesis should be examined, but regrettably *F.I.E.S.* does not contain the items for stocks of liquid assets. Shinohara (Ref. 22), calculating the ratio of each deposits in national income as an approximation for the worker's came up with an interesting results—the ratio was still lower than the highest pre-war one, even in 1960.² As a result of this finding, he speculated that the income-consumption ratio would stop decreasing after the ratio reached the pre-war level. This may correspond with *Tobin's hypothesis*. But the cross-section analysis, using the recently announced *Survey of Saving Behavior*, does not necessarily coincide with the hypothesis, i.e. Watanabe (Ref. 25), in estimating the function

$$s = a + by + cm \quad (3)$$

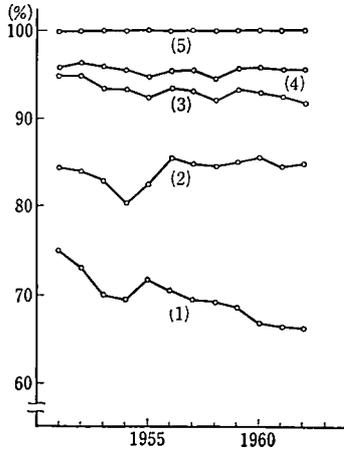
where s is saving and m is the stock of liquid assets, found b and c to be significantly positive. As the survey is scheduled to be continued in the future, their time-series analyses will provide suggestions to explain these complicated results.

Some papers call attention to income compositions. Worker's incomes in the *F.I.E.S.* is classified according to originating source: i.e. 1. regular income of the household head (y_1), 2. other income of household head (y_2), 3. income of other household member (y_3), 4. income from business and supplementary employment (y_4), 5. other income (y_5). Since our study is restricted to workers on this section, the major portion of income is derived from y_1 . The *bonus* payments³ make up the largest portion of y_2 , and these payments fluctuate according to the company's profits although workers can expect some amounts even in periods of recession. The third category y_3 is not so important in the consumption planning. In fact, many Japanese wives and daughters engage in employment, but the lengths of their service are usually so short that their incomes occupy a supplementary position in family budgets, except in the lowest income classes. y_5 is composed of income from assets, social securities, benefits and gifts. Of course, the effects of each category on the consumption planning might be different because the degree of stability in each is dissimilar. Shinohara (Ref. 22), defining y_2 and y_4 as the "incomes of transitory nature," pointed out the increase of their percentages in disposable income since 1951, which he considered as a cause of the decreasing income-consumption ratio. However, despite the increase of these percentages from 1961 to '62, the income-consumption ratio stopped decreasing during this time. The main reason for this can be found in the rapid increase of income in the lowest income classes as is suggested by Yasunaga (Ref. 28). My earlier paper (Ref. 12) could fill this gap. In this paper, y_1 is considered as the main index on the consumption planning, because this portion is the most stable and easiest to forecast from among the various types of income. Thus, pooling the time

² Shinohara did not stress this hypothesis only, because he considered that the decreasing trend is originated from the combined effects of various phenomenon.

³ Japanese workers receive some "bonus payments" as a sort of salary more than twice a year. The amounts are decided nearly in proportion to the basic wage or salary among workers in the same period, however, the ratio of the amounts of bonus to wage or salary varies with the firm's profits or general economic conditions year by year.

sequences of the "quintile group data,"⁴ a sort of income classed data, the ratio of consumption expenditure to y_1 is calculated. An interesting fact is that the ratio not only remains



Data: *F.I.E.S.* 1951-'63.

Note: 1. Regular income of household head, 2. Temporary income of household head, 3. other families' income, 4. income from other business, 5. other income.

case of national income statistics. However, according to Friedman's comparison (see Ref. 2 page 41), the income-consumption ratios in Western workers are much higher than in Japanese workers. From this, we can safely assure that amount of saving in Japanese workers is large comparing with their income levels, though some additional works would be necessary for a rigid numerical comparison.

In addition to the topics mentioned above, there are some works related to the 1959 *National Survey of Family Income and Expenditure*. The survey is on so large a scale that factorial analyses are possible. For example, there are analyses of regional differentials (Ref. 7, 8, 9 and 24) or of differences in age groups (Ref. 7 or 24). However, there is not enough space in this paper to review them on the whole

III. Farmer's Consumption Function

To begin with, the income-consumption ratio on farming families should be examined

⁴ The data are tabulated as follows: each month, all samples are divided into five groups of equal numbers classified in order of income magnitude, and the arithmetic means of receipts and expenditures are calculated within each group. It should be mentioned that the classification is determined by a sort of relative income position not of absolute income.

nearly constant in a time-series in each group but their levels are very similar between income groups. The only exception is in the lowest income class, where the ratio has a downward trend and its level is higher than those in other income classes. If this exception is due to the characteristics unique to a deficit family group, both Shinohara's hypothesis and Yasunaga's criticism can be explained without a contradiction. Cross-section analyses on the similar principle are found in works by Obi-Sano (Ref. 17) and Ozaki (Ref. 18). They considered the marginal propensities to consume of income different by originating sources and by family type. After the original cards of *F.I.E.S.* were controlled by family types, they supported their thesis by multiple-regression analyses, i.e. the marginal propensities to consume by a head of the household is larger than other's. But unfortunately their analyses are confined to only one year.

A rigid international comparison of income-consumption ratios is scarcely possible because the concepts of items or the coverages of subjects in each survey are more dissimilar than in the

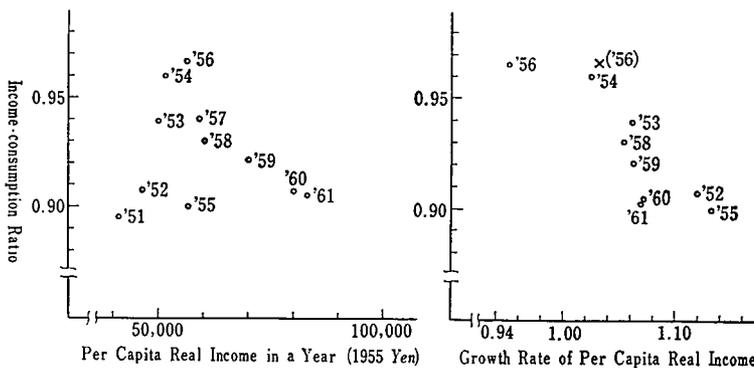
with the *Farm Household Economic Survey (F.H.E.S.)*. In contrast to the situation with workers, the ratio is stable over a long-term trend and its fluctuation can be explained by the *semi-Duesenberry's type* consumption function.

$$c/y = a - b(y/y_{-1})$$

where y_{-1} is the income in previous year, as was pointed out by Shinohara (Ref. 20). An explanation of this contrast is difficult, because the characteristics of farming family in Japan are rather complicated. Among these, three problems have been argued in order to compare with worker's results, i. e. a) the size of the farms on the average is too small to apply an accounting systems to farm activities, b) farmers receive some amounts of the wage-type in come as well as farm income, c) a portion of their consumption expenditures is covered by self-supply products.

A difficulty with the characteristic a) concerns the evaluation of cost in the estimation of net-income. Although the direct costs for agriculture and other businesses are estimated in

FIG. 4. INCOME-CONSUMPTION RATIO IN FORMING FAMILY



Date: *Annual Report of F.H.E.S. 1951-'61.*

- Note:
1. Numbers are the budget years.
 2. Since the survey method was changed in 1957, there exists gap between two periods.
 3. × in Fig. B shows a square root of growth rate between 1954 and '56. Farmers had an extraordinary harvest in 1955, so the income in that year was not a good standard for next year income.

the *F. H. E. S.*, some portion of the "saving for farm activities" (for example saving for the future purchase of agricultural machines) may be included in the "family savings" in this statistics. Thus, the *pure* consumption function can be found only by the exclusion of the "savings" from income. Two papers (Ref. 3 and 16) suggested a relatively higher income-consumption ratios than the usual estimates by evaluating such saving through certain assumptions. According to these calculations, the income-consumption ratios are higher than worker's in nearly all years. However, these valuable suggestions are restricted by their own methods, because the more rigid the analysis being tried the broader must be the assumptions

in the evaluations.

A rather different suggestion concerning income evaluation is how to treat the account for depreciations. For instance, it is doubtful whether farm activities in Japan are controlled by depreciation concepts, although the *F.H.E.S.* calculated them by defining depreciation rates for the survey. Kawaguchi (Ref. 6), adopting the gross-concepts on income and saving, obtained his saving function. This suggestion should be more fully examined in the future.

The decreasing importance of farm income in farmer's activities is one of the noteworthy changes in post-war rural in Japan. The rapid recovery of the Japanese economy has enlarged the differentials of income between urban and rural regions. Thus, farmers have tended to engage in subsidiary works in urban area,⁵ cutting down their hours of labor on farms by mechanizing their agriculturing methods. The table of income composition in the *F.H.E.S.* indirectly indicates this tendencies, i. e. the percentage of farm income in farming familie's income has decreased year by year. As the stability of income may be different according to their originating sources, the income-composition analysis is more important than in the case of worker's. The simplest classification is that of dividing the farmer's income into farm's and other income. Using this classification, Kubo-Murakami (Ref. 8) applied the function

$$c = a + bF + cO + dy_{-1} \quad (5)$$

where F is farm income O is other income, to the cross-section data of the *F.H.E.S.* by using a multiple regression analysis⁶, and found most of b smaller than c . This may be consistent with the permanent income hypothesis, because the fluctuations around trend in F is larger than O . Stability of farm income depends on his main products because the degree of price fluctuations is very different according to the individual farm product. Yuize (Ref. 28), reclassifying the original cards of the *F.H.E.S.* by main products, obtained the noticeable result that the income elasticities of consumption were lower than one in those farming families whose main farm products are subject to large price fluctuations. Recent publication of the official data noted in no. 7 in the appendix will promote such an approach.

The time-series analyses considering changes in income compositions are few. However, a consumption function per farm size classifications may give a hint to this problem, because the decreasing trend of the percentage of farm income in farmer's income is much sharper in family group engaging in small scale farming than in large scale farming. The statistical analysis by Kawaguchi (Ref. 6) proved that the *linear Keynesian type* was the best form in a time-series analysis for small scall farming groups, despite the *Duesenberry's type* being good for large farming groups. The result is consistent with my earlier work (Ref. 13). As the effects of income on consumption may be supposed to be different by income's originating sources, the explanatory variable in the function (4) should be divided. From these considerations, the function

$$c/y = a - b(F/F_{-1}) - c(W/W_{-1}) - d(A/A_{-1}) \quad (7)$$

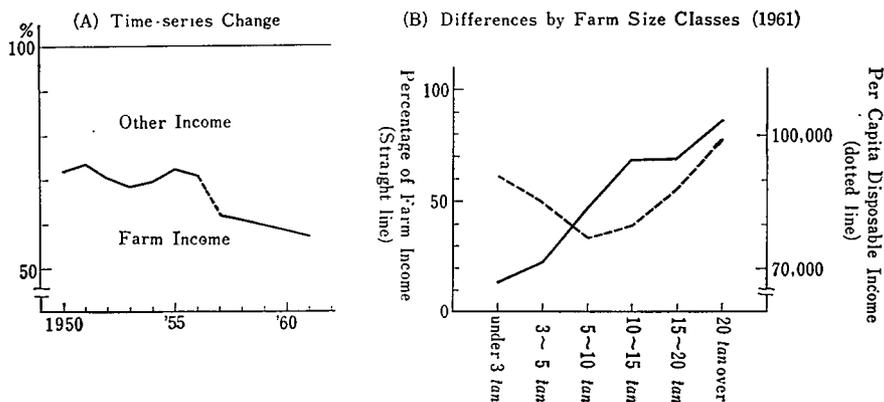
where F , W , and A are farm, regular wage and other incomes,⁷ is estimated for each farm scale classes by pooling the time-sequence of cross-section data in *F.H.E.S.* by the covariance

⁵ Of course, labourers have been supplied from rural area since the Meiji period. However, it is a recent phenomenon that heads of farm households engage in urban factories.

⁶ y_{-1} is introduced into this model out of consideration of the effects on the consumption before the new harvest.

⁷ Other income is composed of forest income, property income, transfers and gifts.

FIG. 5. CHANGES OF THE PERCENTAGE OF FARM INCOME



Data: *F.H.E.S. 1950-'61.*

- Note: 1. The gap between 1956 and '57 originates from the change of the survey method.
 2. One *Tan* is nearly 0.2 acre.
 3. Fig. B's values are averages over the countries excluding Hokkaido area.

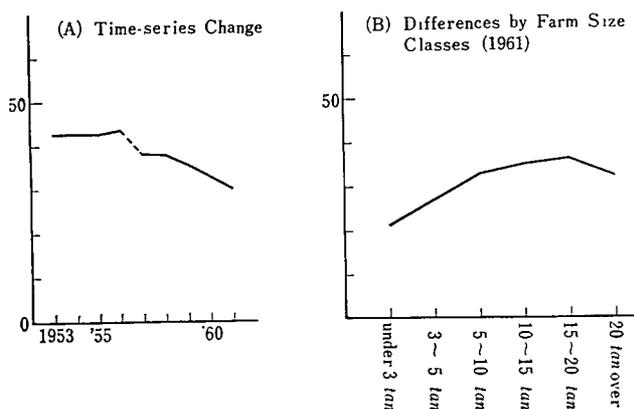
analysis.⁸ The result indicated that c/y was explained mainly by F/F_{-1} in large scale farming groups, but effects of W/W_{-1} on c/y must also be considered in small scale farming groups. Thus, recent steady increases in the growth rates of W in small scale farming explains the decreasing trend in the income-consumption ratio, which is better fitted by the *linear Keynesian type* consumption function. In contrast, the growth rates of F show an insignificant trend with fluctuation, so that the income-consumption ratio in the large scale farming groups changes in such a manner as explained by the *semi-Duesenberry's type* consumption function.

Next, the consumption of self-support products should be examined. Farmers in Japan have been used to support their standard of living by self-support products, mainly rice and vegetables. Especially, farmers in small scale farms engage in agriculture only for the consumption of self-support products. Thus, consumption behaviors by money would be different from those by self-support products. In addition, as the percentage of consumption by self-support products has been decreasing on average, analysis of the consumption patterns for the self-support products is necessary for forecasting the total income-consumption ratios. Considering these, two sorts of special consumption functions are proposed, i.e. the analysis of the relationship between total income and money expenditure (see Ref. 27) and one between the money income and money expenditure (see Ref. 19). These computations resulted in rather higher correlation coefficients than one of total income to total expenditure. But the problem has been solved only in a preliminary sense, and theoretical and empirical analyses should be progressed in the future.

Of course the above discussions have not completely solved the problem of how to treat

⁸ For each farm class, some regional sub-classifications are found. In this analysis, regional differentials are introduced as dummy variables in the covariance analysis.

FIG. 6. PERCENTAGE OF CONSUMPTION BY SELF-SUPPORT PRODUCTS IN TOTAL CONSUMPTION EXPENDITURE



Data: *Annual Report of F.H.E.S. 1950-'61*

Note: See Note on Fig. 5

three characteristics unique to Japanese farmers. However, synthese of them will make it possible to obtain a better consumption function for the farming families and to explain the differences of consumption patterns between in workers and farmers. The most promising approach for this objective, I believe, is to study the effects of incomes on consumption by their originating sources. But more detailed analyses, including those from original cards, will be necessary for this purpose.

Finally the international comparison of the income-consumption ratio in this group is problematic because of the under-developed characteristics in Japanese farming. However, the income-consumption ratios found in *F.H.E.S.* are not considered so low values comparing with the pre-war U.S. or Sweden's cases (Ref. 2 page 41). In addition, the time-series variations of the ratios in Japanese farming family are similar to those of Western developed countries, so we cannot find the unique consumption patterns in the senses of international comparison.

IV. *Consumption Function for Other Families*

Family budget surveys for *other* families have only undertaken recently, so their levels of analyses are behind those for workers or farmers. The "*other* family" group is composed of various kinds of occupational groups; a) proprietor and artisan, b) manager in unincorporated firm, c) manager in incorporated firm, d) professional service, e) without profession. The families belonging to categories a) to d) have a higher income and their income-consumption ratio should be lower.

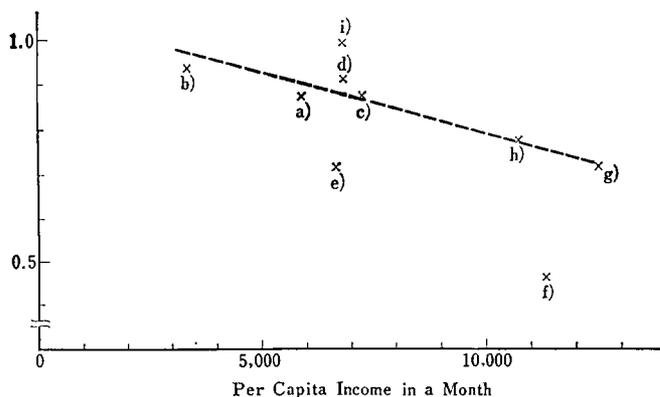
In a pioneer work, Shinohara (Ref. 19) tried to estimate the income-saving ratio from the national income statistics. Although national income in Japan can be divided statistically into the components by its receivers, savings or consumptions are estimated only in total amounts. Shinohara, assuming that the income-saving ratio in the *F.I.E.S.* and the *F.H.E.S.* corresponds with wage type income and farm income, calculated the amount of saving come-

from property and non-farm proprietary income, their income-saving ratio is too high to be explained even by their fairly high income level. Further, the estimated ratio fluctuates violently in accordance with trade cycle. Some improvements in this estimate were tried by Kawaguchi (Ref. 6), however, the results were not so different from Shinohara's.

An analysis of the *Survey of Consumer Behavior* provides a useful comment on the above conclusion as was discussed by Yasunaga (Ref. 26). Comparing the income saving-ratios in the other family group by each income class with those in worker's families, there is not so great a difference between them. But the "saving" in this survey is *liquid type savings* which is a rather limited concept in comparison to the usual definitions (see appendix no. 3). Thus, the low income-consumption ratio in *other* families arises from large amounts of *non-liquid type* savings, such as investment in housing, purchase of land, inventories, etc.

Earnest researches on the consumption function of *other* family have been undertaken since the publication of two new surveys, the *1959 National Survey of Family Income and Expenditure* and the *Survey of Saving Behavior*. The first attempts were checks of the income-consumption ratios estimated from the national income statistics. It is feared that the amount of consumption in the national income statistics in Japan has been under-estimated. Three papers (Ref. 1, 15, 28) calculated the average income-saving ratio by weighting same values of income and saving in the surveys by the number of families per occupations. As the surveys were not designed to estimate the total individual income or saving, it is necessary for the estimation to use some statistical devices, from which the resulted values in the three papers are rather different. However, all of them support the above fear to some extent.

FIG. 7. COMPARISON OF INCOME-CONSUMPTION RATIO BY OCCUPATIONAL GROUPS



Data: 1959 National Survey of Family Income and Expenditure.

Note: Numbers indicate occupational groups as follows. a. Regular laborer, b. Temporary and day laborer, c. Non-government employee, d. Governmental employee, e. Merchant and artisan, f. Manager in un-incorporated firm, g. Manager in incorporated firm, h. Professional service, i. without profession.

The analyses of occupational differentials of the consumption patterns are confined to the cross-section analyses because of the limitation of the date, (the *Survey of Saving Behavior* is scheduled to be continued in the future, so that the time-series analyses will be possible in soon). The most significant finding was the very lower level in the income-consumption ratio for proprietor and artisan, and manager in non-incorporated firm (see Fig. 7). This can be more rigidly proved by standardizing income distribution for each occupational group as was tried by Kinoshita (Ref. 7).⁹ Rather different approach to this was analysed by Kurabayashi-Eguchi's work (Ref. 9), i.e. the marginal propensities to saving estimated from income class data by occupation are much higher in these two groups than in other occupational groups. Although causes of this fact are not completely known, instabilities of income in these groups and some financial reasons are said to explain this. These hypotheses will be checked by using the time-sequences of the informations in the *Survey of Saving Behavior*.

More detailed analyses concerning with *other* families have appeared rather rapidly, but these still remain in rather preliminary stages. However, it is believed that some interesting results should appear using the new surveys in near future.

V. Final Remark

From such a brief review as this paper, it is not possible to know the whole contributions on the consumption function in Japan. However, the main problems about analysis can be understood. Works on a synthesis of the three functions have not begun yet, mainly because researches is lagging on the *other* familie's category. However, recent developments in reseach in this area will remove this obstruction. Combining this with consumption functions for workers and farmers, we shall be able to establish an efficient model for the aggregate consumption function, which will be useful for macro-analyses as well as for consumption analyses themselves.

APPENDIX

Survey Data for Analysis of Consumption Function in Japan¹⁰

1. *Family Income and Expenditure Survey; F. I. E. S. (Kakei Chosa)* Statistical Bureau of Prime Minister Office, (1950, September—) The object of this survey is to estimate average amounts of consumption expenditures and their components of urban family. The subjects of this survey were selected from all urban area by a stratified random sampling. As for families of urban workers, income and receipts other than income¹¹ are also included. The *Annual Report* of this survey (Kakei Chosa Nenpo) contains cross-section tables, for example, "Table of Yearly Average of Income and Expenditure by Income classes" (average from January to November and

⁹ Method of standardization is originately found in W. Eizenga, *Demographic Factors of Savings*, North Holland Pub. Co. 1961.

¹⁰ Reader will find more detailed introduction of data 1) and 4) in appendix of Ref. 20.

¹¹ Receipts other than income are consisted of deposits withdrawn, debts incurred, insurance proceeds and credit purchases. As corresponding outflows are included in the *F.I.E.S.* as well as the *1959 National Survey*, an analysis of saving by its component is possible if the receipts other than income are incurred in the survey

December)¹² or "One by Quintile Groups."

2. *1959 National Survey of Family Income and Expenditure*, (*Showa 34 nen Shohisha Jittai Chosa*); Statistical Bureau (1959). This is an enlarged survey of the *F.I.E.S.* carried out from September to November in 1959. The subjects are selected by a stratified sampling to represent all non-farm families in urban and rural area. As the sample size in this survey is much larger than in the *F.I.E.S.* relatively good values can be found in some detailed cross-tables such as income-region, income-age of household heads, etc. In addition, the survey contains income informations for *other* families as well as for workers, which can be used for the occupational comparisons. However, for the lack of data on receipts other than income, a saving analysis by its components is not possible. Further, users must take care of the fact that the survey is executed only from September to November, and cannot be identified with yearly average even as an approximation, because the consumption behavior in workers and *other* families is much active in December.
3. *Survey of Saving Behavior (Chochiku Doko Chosa)*: Statistical Bureau (1959—). The survey is directed at the saving and investment behavior of individual families. The subjects are selected by a method similar to the *F.I.E.S.* This survey contains questions about income and current amounts of savings by their types; i.e. deposits, stocks and shares, debts and their repayment, investment for housing and consumer durables. Hence, savings except for net increases in cash, can be estimated by type. The survey also covers amounts of liquid assets, though statistical errors may be involved to some extents. The main tables are classified by income classes or by occupations.
4. *Survey of Consumer Behavior (Shohisha Doko Chosa)*: Economic Planning Agency (1957—). The unique characteristic of this survey is the questions about consumer plannings as well as actual behaviors. The subjects are also selected by the same principles as in the *F.I.E.S.*, and they are asked about their plans and actual values of "savings" and expenditures for consumer durables. However, the "savings" cover only liquid type savings without net decreases for debts or investments for housings. Another merit of this survey is that it contains data on the consumer's expectations about their incomes or consumer prices, etc. which may be useful for a motivational analysis of savings. An interesting report is an income classed table sub-classed by growth rates of their income from the previous year.
5. *Farm Household Economic Survey F.H.E.S. (Noka Keizai Chosa)*; Ministry of Agriculture and Forestry (1950—). This survey is aimed at farmer's activities as a whole. The subjects are selected by a stratified random sample to represent farmers from all over the countries (there were survey in the same titles before 1949, however, the subjects are selected a sort of "representative method" and so their values are considered to have some biases). Items useful for consumption analysis are amounts of incomes, expenditures for farm activities and other businesses, family expenditures and liquid assets. Tables are classified by regions and farm sizes. It should be noted with care that there is a gap between 1956 and '57 caused by the change in survey methods.¹³

¹² As pointed out in footnote 3, Japanese workers receive bonus payments especially in December. Thus, classification by the same methods used in other months has no meaning in December. An object of the quintile group data is to get an yearly average value by income classes by avoiding the above difficulties.

¹³ The change of the survey method consists mainly of the enlargement of subjects, i.e. the inclusion of farmers whose farm income takes a small percentage in their total income

6. *Cost of Living Survey of Farming Families (Noka Seikeihi Chosa)*; Ministry of Agriculture and Forestry (1956—). This consists of the reclassified tables of the *F.H.E.S.* The latter being classified by sizes of farms, it is not necessarily appropriate for the consumption analysis. This survey reclassifies the latter's samples by income classes, but regrettably omits information about production activities or stock statistics. It is worth mentioning that the *Survey of Taxes and Public Charges on Farm Households (Noka no Sozei-koka-shofutan ni kansuru Chosa)*, Ministry of Agriculture and Forestry, can be used in place of this survey before 1956.
7. *Farm Household Economic Survey Classified by Main Farm Products, (Nogyo-keitaibetsu Noka Keizai Chosa)*; Ministry of Agriculture and Forestry (1961—). Farmer's activities are supposed to be different by their main products and the analysis of this differences is important. For this purpose, a special classification of *F.H.E.S.*'s samples is published in this survey. In addition to classification by main products, income classes and region are used as subsidiary classification. Containing nearly all items of original *F.H.E.S.*, this may be more appropriate for usual cross-section analysis of consumption patterns.

REFERENCES

- 1 Ando, Yo, "Estimates of Personal Savings by Group of Occupations." *Keizaibunseki*, Inst. of Economic Research, Economic planning Agency. No. 6, 1960.
- 2 Friedman, Milton, *A Theory of Consumption Function*, Princeton, 1957.
- 3 Hasebe, Ryoichi, "On Estimate of Farmers' Consumption Function." *Keizaigakukenkkyu*, Risho Univ. Vol. X, No. 6, 1960.
- 4 Ichioka, Ryoichi, "On Saving Behavior of Farming Families." *Nogyo Sogokenkyu*. Inst. of Agricultural Research, Vol. 16, No. 3, 1960.
- 5 Kanamori, Hisao, "Why Saving Ratio in Japan is so high?" *Keizaigeppo*, Economic planning Agency 1961.
- 6 Kawaguchi, Hiroshi, *Analysis of Saving Structure*. Zenkoku Chihoginko Kyokai, 1961.
- 7 Kinoshita, Soshichi, "Factorial Analysis of Family Saving." *Keizaikagaku* Nagoya Univ., Vol. 10, No. 4, 1963.
- 8 Kubo, Machiko and Murakami, Yoshiteru, "On Consumption Patterns in Farm Economy." *Febian-Kenkkyu*. Febian Association 1961.
- 9 Kurabayashi, Yoshimasa and Eguchi, Eiichi, "Saving Function and Currency Demand Function Estimated from 1959 National Survey of Family Income and Expenditure." (mimeographed). 1962.
- 10 Lockwood, W. W. *The Economic Development of Japan*. London, 1955.
- 11 Mizoguchi, Toshiyuki, "Covariance Analysis of Family Expenditure." *Keizaikenkyu*, Inst. of Eco. Res. Hitotsubashi Univ., Vol. 12, No. 1, 1961.
- 12 ———, "Re-examination of Workers' Consumption Function." *Keizaikenkyu*, Inst. Eco. Res. Hitotsubashi Univ., Vol. 14, No. 2, 1963. (See also *Jour. of Economic Abstract.*)
- 13 ———, "An Analysis of Farmers' Consumption Function in Japan." *Hitotsubashi Review*, Hitotsubashi Univ., Vol. 49, No. 7, 1963.
- 14 ——— and Kanda, Yuichi, "Statistical Analysis of saving Behavior by Groups of Occupation." *Kikanronkeizaigaku*. Toyo Keizai Shinpo, Vol. 12, No. 3.
- 15 Nakamura, Ryuei, "Income Distribution and Consumption Behavior." *Chochikujihou*, Bank of Japan No. 52, 1962.
- 16 Noda, Maki, "On Saving Behavior of Farmers." *Keizaikenkyu*, Inst. Eco. Res. Hitotsubashi Univ., Vol. 7, No. 2, 1959.
- 17 Obi, Keiichiro and Sano, Yoko, "Income Compositions and Marginal Propensity to Consume." (mimeographed) 1962.
- 18 Ozaki, Iwao, "Change of Income Composition and Their Effects on Consumption Behavior." (mimeographed) 1962.

- 19 Shiido, Hisao, *Applied Economics*, Shiseido 1962.
- 20 Shinohara, Miyohai, *Consumption Function*. Keisoshobo 1958.
- 21 _____, "The Structure of Saving and Consumption in Postwar Japan." *Jour. of Pol. Eco.* Vol. 67, No. 6, 1959
- 22 _____, *Secrets of Speed Growth*. Nihon-Keizai-Shinbunsha, 1961.
- 23 _____, *Growth and Cycles in Japanese Economy*. Kinokuniya, 1962.
- 24 _____, "High Saving Ratios and their Future." *Chochikujihō* Bank of Japan. No. 52, 1962.
- 25 Watanabe, Toshiro, "Some Analyses on Family Savings" *Chosa to Kenkyu*, Mitsubishi Eco. Res. Inst. Vol. 2, No. 2, 1963.
- 26 Yamazawa, Ippei, "Econometric Analysis of Farmers' Consumption Behavior." *Ikyo-kenkyu*. Hitotsubashi Univ., 1962.
- 27 Yasunaga, Takemi, *Consumption Economics*. Shiseido, 1960.
- 28 _____, "On Propensities to Save in Japan." *Kokuminseikatsukenkyu*. Research Institute of Peoples' Livelihood Vol. 2, No. 1, 1963.
- 29 Yuize, Yasuhiko, "Farmers' Consumption Functions and their main Farm Products." *Nogyosogokenkyu*. Inst. of Agr. Res., Vol. 15, No. 2, 1961.

Note: 10, 20, 21 and 22 are written in English, others in Japanese.