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INCOME INSTABILITY AND CONSUMPTION-SAVINGS IN SOUTH KOREAN FARM HOUSEHOLDS 1965-1970

by

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ABSTRACT

Paper describes the sources and extent of income instability among a representative sample of South Korean farm households during 1965-70. An index of income instability is included in a consumption function to estimate its effects on savings-consumption behavior. Authors conclude that households studied saved larged amounts and that part of this savings was due to unstable income.

Income Instability and Consumption-Savings in South Korean Farm Households 1965-1970

by

Y. K. Ro, D. W Adams and L. J. Hushak*

A major tenet in capitalist as well as socialist economics is that concentration of economic surpluses or income is necessary if savings propensities are to be high and capital formation rapid. Profit makers in capitalist societies are thought to inherit high savings propensities, while socialists feel that the state is the most proficient saver. It has been a virtual article of faith among economists that little or no voluntary savings can be mobilized under any economic system until per capita incomes are quite large. As a result, most savings mobilization programs emphasize involuntary techniques, or aim voluntary mobilization efforts mainly at relatively high income groups.

Recent results from research in Taiwan and South Korea, along with additional evidence from several other low income countries, appear to be inconsistent with this widely held tenet [Ong and others, Hyun and others, Adams]. These results show surprisingly large savings propensities among rural households with average per capita incomes well below $200 U.S. This evidence leads one to suspect that factors, in addition to absolute levels of income, may strongly influence savings behavior. At least three of these additional factors have

surfaced in the literature. The first relates to the quality of the household's income flow. Friedman has argued that disturbances in income flows may cause households to interpret part of their income as being transitory, and that households tend to save a large part of this transitory income. Two additional factors have been stressed by Wai. He has argued that the incentives to save as well as opportunities to save are important factors influencing consumption-savings decisions. Unfortunately, it is very difficult, without a controlled experiment, to test the importance of these two latter factors in household decisions. This is especially true in rural areas of low income countries where many incentives to save are weak and very limited opportunities exist for holding savings. As will be shown later, it does appear possible to measure empirically the importance of income stability in savings decisions.

In the discussion which follows we use South Korean farm household data to access the importance of income instability in savings behavior. We pursue three objectives in the discussion. The first is to describe the extent and sources of income instability among South Korean farm households from 1965 to 1973. The second objective is to access how income instability has affected consumption-savings decisions. The final objective is to draw some policy implications from the South Korean experience which may be helpful to other low income countries which want to increase savings propensities.

Some background on recent changes in the South Korean economy and farm households is useful in setting the stage for the analysis which follows.

Background

South Korea often has been cited by economists as a case of successful development [Brown]. During the past 15 years, the South Korean economy has experienced rapid growth, with an average annual growth rate of almost 10 percent [EPB]. With this growth, the economic make-up of the country has undergone significant change. The share of mining and manufacturing in the overall economy has increased steadily from about 15 percent in 1962 to about 31 percent in 1976, while the share of agriculture, forestry and fisheries decreased from about 40 percent to about 25 percent [EPB]. Despite the decline in relative importance, Korea's agricultural sector has performed satisfactorily in many respects. Over the period 1962-1976, agricultural land and labor productivities expanded by 7 to 10 percent a year. As a result, agricultural production increased at an average growth rate of more than 4 percent annually [EPB].

As a result of these changes, incomes in rural areas significantly increased over the past 15 years. As can be seen in Table 1, both the average net and disposable incomes of farm households increased by more than two-and-a-half times in real

TABLE 1: Income Composition, and Consumption-Savings Patterns of Farm Households in South Korea, Average Per Household, 1962-1976

	Income				Consumption						Ratio of Consumption to Disposable Income
	Household Net Income	Net Farm Income	Net Off-Farm Income	Household Disposable Income	Total Household Consumption	Food	Clothing	Housing and Utilities	Education and Misc.		
	(1,000 Won)a/	(Percent)		(1,000 Won)a/		-------(Percent)---------					
1962	177	80	20	172	148	56	8	14	23		.86
1963	201	81	19	195	171	60	7	14	21		.88
1964	204	83	17	197	166	59	7	11	23		.84
1965	166	79	21	159	150	53	8	12	27		.94
1966	177	78	22	169	150	50	9	12	29		.88
1967	190	78	22	184	164	49	9	12	30		.89
1968	212	77	23	205	170	47	9	13	31		.83
1969	241	77	23	233	189	46	9	12	32		.81
1970	259	76	24	253	211	46	8	12	34		.84
1971	332	82	18	326	229	47	8	12	33		.70
1972	352	82	18	346	257	48	7	12	32		.74
1973	369	81	19	361	262	47	7	13	32		.73
1974	366	80	20	358	234	48	7	15	30		.65
1975	373	82	18	365	263	47	7	13	33		.72
1976	444	80	20	433	287	46	7	14	33		.66

Source: Ministry of Agriculture and Fisheries (MAF), Report on the Results of the Farm Household Economy Survey, yearly reports from 1962 to 1976 (Seoul, Korea; MAF, various years' 1963 through 1977).

a/ Adjusted to 1970 prices using Wholesale Price Indexes for South Korea. Average official rate of exchange for Won to one U.S. dollar was 304 in 1970.

terms from 1962 to 1976. During this period, about 20 percent of the average farm household income came from off-farm sources. The low income figures for 1965 through 1968 were due to severe droughts and floods, and the high income figure in 1971 was due to increased prices for food grains [KDI].

It can also be noted in Table 1 that consumption increased significantly, but less than did incomes. As a result, the share of consumption to disposable income decreased steadily from 85 percent in 1962 to 66 percent in 1976. This has resulted in significant improvements in farm households savings capacities during this period. Changes in overall consumption patterns also occurred. During the past 15 years, average farm household food consumption decreased from 56 percent of total consumption to 46 percent. Expenditures for education and miscellaneous items increased. The food consumption patterns also changed. During 1962-1970, consumption of the staples, rice and barley, decreased absolutely, while expenditures on foods other than staples increased substantially [MAF, EPB]. Farm households apparently have improved their diets and cultural activities with their expanded incomes.

The Korean farm households are large and have relatively educated family members. As a result, most of the labor force used in the farm is supplied by family labor. Small farm size and intensive production are the main characteristics of farm units in South Korea [Ro].

Income Instability

These substantial changes in household economic conditions have been associated with significant amounts of income instability. Individual farm household data are not available to document the extent of this instability prior to 1965. Representative household information collected by the Farm Household Economy Surveys are available, however, for 1965, 1968, 1969 and 1970.[1/] Data for 131 households included in the Surveys during all four years give substantial insights into the extent and nature of rural income flows.

Several indicators might be used to measure income instability. In this study an instability index is used which measures the average variation of each household's income around average household income over a given time period. The general form of this index was developed by Lundberg and later applied to Taiwanese farm household data by Canh. The index is defined as:

$$I = 1/3\ (|X_1 - \overline{X}| + |X_2 - \overline{X}| + |X_3 - \overline{X}|) \qquad (1)$$

where

$X_1 = [(Y_{68} - Y_{65})/Y_{65}]\ 100/3,$

$X_2 = [(Y_{69} - Y_{68})/Y_{68}]\ 100,$

$X_3 = [(Y_{70} - Y_{69})/Y_{69}]\ 100,$ and

$\overline{X} = 1/3\ (X_1 + X_2 + X_3)$

The Y terms represent household incomes for the respective years. The average annual growth of household income for 1965-70 is represented by $\bar{X}$. Four different measures of household income are used: household net income, household disposable income, household net farm income, and household net off-farm income. Income instability indexes are constructed for each of these measures of income.

Information on characteristics of the 131 households is presented in Table 2. The information is also broken down into three income instability groups: those households with relatively low indexes of 0-15, those with medium indexes of 15-30, and those with relatively large indexes of more than 30. The groups were defined so that roughly one-third of the 131 households fell into each of the instability groups. There was little difference among the three groups with respect to family size, farm size, disposable income, and total consumption. There were, however, substantial differences in average annual growth rates of income among the three income instability groups. Households with the most unstable incomes also experienced the highest average annual growth rates in all types of income.

In Table 3 several statistics on the instability indexes for the four different types of income are presented. As can be noted, there are large differences in instabilities of various income types among households. The ranges of household net and disposable income instabilities are from about 4 and 6

TABLE 2: Average Family Characteristics and Average Annual Income Growth (1965-1970) of 131 Panel Farm Households in South Korea by Disposable Income Instability Groups, 1970

	Total	Disposable Income Instability Index (1965-1970)		
		0-15	15-30	30+
Number of Households	131	39	48	44
Family Size (Persons)	5.96	6.33	5.88	5.73
Farm Size (Hectares)	.92	.98	.87	.91
Disposable Income (Won)	236,152	238,687	222,781	248,491
Total Consumption (Won)	192,750	203,013	187,014	189,705
Average Annual Growth of:				
Total Net Income	18.7	10.7	13.9	31.1
Disposable Income	19.9	10.9	14.4	33.9
Farm Income	20.2	15.3	18.6	26.3
Off-Farm Income	57.6	31.8	57.1	81.1

Source: Computed from the data for 131 panel farm households in South Korea, 1965-1970.

TABLE 3: Selected Descriptive Statistics of Instability Indexes from Various Income Types of 131 Panel Farm Households in South Korea, 1965-1970

	Income Types			
	Total Net Income	Dispos-able Income[a/]	Net Farm Income	Net Off-Farm Income
Median[b/]	22	23	25	54
Mean	30	32	31	105
Range	198	217	159	803
Minimum	4	6	3	3
Maximum	203	223	163	806
S.D.	28	32	25	130

Source: Computed from the data for 131 panel farm households in South Korea, 1965-1970.

a/ Household total net income less taxes and interest payments.

b/ This is the average value of instability indexes of the ten households closest to the actual median value.

to about 203 and 223, respectively. These ranges are slightly wider than the range for farm income instability, but much narrower than the range of off-farm income instability. Referring to the median and mean values of each instability index, off-farm income flows appears to be the most unstable among the four income types. The median and mean values of the index of off-farm income instability are much larger than those of other income measures.

Another interesting aspect which can be noted in Table 3 is that total income flows are more stable than the various components. As can be seen, the median income instability indexes for household net and disposable income among all 131 farm households were 22 and 23, respectively, while the same indexes for farm and off-farm incomes were 25 and 14, respectively.[2/] It appears that households were able to blend relatively unstable farm and off-farm income flows into a more stable total household income stream.

Estimating Models

In recent years increased attention has been paid to the permanent income notion in the analysis of consumption-savings behavior. Various consumption functions based on the permanent income model have been developed. One of the most recent elaborations is an interaction consumption function.[3/] This function stands on the assumption that additional variables other than income affect the marginal propensity to consume (MPC) out of

permanent income. In this study, five additional variables, in addition to an income instability variable, are tested in the interaction consumption function given by:

$$C = b_1Y + b_{20}Yp + b_{21}Yp + b_{22}INYp + b_{23}CRYp + b_{24}LQYp + b_{25}RTYp + b_{26}FAYp + e \quad (2)$$

where b is the parameter and e is the error term. Other variables in this and following expressions are defined in Table 4. As can be noted in the above formula, the interaction consumption function allows the slope of the permanent income variable to be changed by the levels of additional variables. This characteristic enables examination of the possible affects of additional variables on consumption-savings behavior by looking at how the levels of those additional variables affect the MPC out of permanent income.

Income instability measures the variability of income over time. It is expected that households with relatively unstable income streams have lower MPCs than those with relatively stable income streams. The coefficient b_{21}, therefore, is expected to be negative. The income source ratio measures the relative importance of farm income in total household income. Under the assumption that farm households have attractive on-farm investment opportunities, the relationship between MPC (b_{22}) and the income source ratio is hypothesized to be negative [Adams and others].

TABLE 4: Definitions of Variables Used[a/]

C = total household consumption (all expenditures not directly related to production activities in a given year).

Y = household disposable income (total household receipts minus tax and interest payments).

Y_p = permanent income (the general level of income or normal income).

I = the index of household disposable income instability.

FI = the index of household farm income instability.

OI = the index of household off-farm income instability.

IN = the income source ratio defined as the ratio of gross farm income to gross household income.

CR = the value of household credit used during the year.

LQ = the value of liquid asset holdings at the beginning of the year.

RT = the rate-of-return on capital defined as the ratio of gross household income to total asset holdings in the previous year.

FA = the number of family members.

LA = total cultivated land in hectares.

PA = the ratio of paddy land to total cultivated land.

AW = average number of work days per farm worker (total family work days divided by the number of farm workers).

DP = the ratio of dependents to total family members.

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a/ All variables are expressed in per household terms. Those variables with monetary value are expressed in units of 100 Korean Won.

Credit may be used by farm households to finance consumption expenditures.[4/] The relationship between MPC (b_{23}) and household credit use is expected, therefore, to be positive. It also has been suggested that liquid asset holdings are one of the important factors affecting consumption-savings behavior [Crockett and Friend]. It is expected that liquid asset holdings are positively related to the MPC (b_{24}).

The rate-of-return on capital reflects the profitability of on-farm investment or the opportunity costs of current consumption versus future consumption. Households with high expected rates-of-return on capital tend to increase their investments in farm capital and to switch more of their consumption to savings [Adams and others]. The coefficient b_{25} is expected, as a result, to be negative. Many empirical studies have found that the number of family members does not have a significant effect on total consumption, but does have a strong influence on some important components of total consumption [Canh]. The coefficient b_{26} is expected to be positive.

It has been suggested that farm and off-farm income instability might have different effects on consumption-savings behavior. To examine this, equation 3 is reformulated by adding farm and off-farm income instability variables (FI and OI) instead of overall income instability (I) as explanatory variables.

The coefficients of both FI and OI are expected to be negative. It is also expected that the coefficient of FI is

greater than that of OI in absolute terms. Expected signs of other coefficients are the same as discussed earlier.

Estimated Permanent Income

Several measures of permanent income have been proposed. In a recent study on consumption-savings behavior, estimates from an income regression function and 3-years weighted average incomes were used alternatively as proxies for permanent income [Hyun and others]. This study suggested that the former adequately represents permanent income when time series income information is not available. The income regression function is a modification of Bhalla's "earnings function" which is based on the idea that the general level of income (permanent or normal income) is a function of several major inputs such as labor, land and capital.[5/] Using this income regression function, the permanent income was estimated as follows:

$$Y = \underset{(336.25)}{956.24} + \underset{(178.28)}{1120.23}LA + \underset{(.036)}{.1396}LQ + \underset{(40.45)}{202.51}FA - \underset{(382.46)}{1748.49}IN$$

$$+ \underset{(228.03)}{763.56}PA + \underset{(.123)}{.2092}CR + \underset{(2.145)}{4.62}AW - \underset{(360.15)}{981.27}DP$$

$$R^2 = .679, \quad S.E. = 686.05, \quad F\text{-ratio} = 32.33$$

where Y, the predicted value of current observed disposable income in 1970, represents permanent income. The figures shown in parentheses below each estimated coefficient are the standard errors of each estimated coefficient. An estimated coefficient indicates that a single unit change in a variable, when other variables are constant increases (or decreases) permanent

income by the value of the coefficient times a 100 Korean Won per household. Due to the nature of the ordinary least-square method used, the mean value of permanent income was the same as that of current observed income and the mean value of transitory income (residuals) was zero.

Empirical Results

A cross-sectional analysis was done on the 131 panel farm households for the year 1970. In the first step of the analysis, the most basic permanent income consumption function, including only income variables, was estimated.

$$C = \underset{(.0778)}{.3321Y} + \underset{(.0804)}{.4616Yp}$$

$$R^2 = .924, \quad S.E. = 589.55, \quad F\text{-ratio} = 781.56$$

The standard error of each estimated coefficient is shown in the parentheses below each coefficient. All variables are expressed in per household terms and in 100 Korean Won.

The F-statistic shows that two income variables explain rather well the variation in current consumption. Both coefficients of the income variables were significantly different from zero. The MPC out of permanent income, the sum of coefficients of the two income variables, was about .79 and the MPC out of transitory income was about .33. This evidence supports the hypothesis that the MPC out of transitory income is greater than zero, but less than the MPC out of permanent income.

The estimates of the interaction consumption function are provided in Table 5. Model I is an estimate of equation 2.

TABLE 5: Estimation Results of the Consumption Functions and the Mean Values of Variables Used for 131 Panel Farm Households, Per Household in 1970

	Estimates of the Consumption Function I	Estimates of the Consumption Function II	Mean Values
Y	.3719*** (.0760)	.3433*** (.0757)	2,362
Y_p	.8299*** (.1366)	.8913*** (.1419)	2,362
	(Interaction Terms)[b/]		
I	-.0015*** (.0008)	--	31.9
FI	--	-.0016** (.0009)	31.2
OI	--	.0002** (.0001)	104.9
IN	-.2309** (.1161)	-.2636** (.1192)	.81
CR	.00006** (.00003)	.00005** (.00003)	319
LQ	-.000005 (.000007)	-.00001* (.000007)	1,443
RT	-.1650** (.0788)	-.1532** (.0790)	.46
FA	-.0172* (.0110)	-.0198** (.0110)	5.96
R^2	.9349	.9360	--
S.E.	557.88	555.52	--
F-ratio	220.83***	198.20***	--
MPC at the Mean Levels[c/]	.802	.823	--

(See footnotes on page 17.)

a/ Except I, FI, OI, IN, RT and FA, values are in 100 Korean Won.

b/ All additional variables in the first and second colums were interacted with permanent income variables (Y_p).

c/ Figures are the MPC out of permanent income at the mean levels of all additional variables.

*Significant at the .10 probability level (one tail t-test).

**Significant at the .05 probability level (one tail t-test).

***Significant at the .01 probability level (one tail t-test).

The model is highly significant. The estimated coefficients of the income variables (Y and Yp) are statistically significant. As the interaction consumption function implies, the sum of the coefficients of income variables represents the MPC out of permanent income when all other variables have zero values. At the mean level of each additional variable, the MPC out of permanent income is about .80, which is very similar to that estimated from the simple model.

The effect of income instability was significant and negative. This result suggests that household with higher income instability, other things being equal, consume less of the increments in their incomes. This also suggests that the unstable income flows make farm households save more at the margin.

The ratio of gross farm income to gross household income also has a negative effect on the MPC out of permanent income. This result implies that the closer to fulltime farming a farm household is, the smaller its consumption propensities, and thus, the larger its savings propensities. A positive and significant relationship was found between the MPC out of permanent income and the amount of credit used. The coefficient associated with the interacted credit variable was positive and significant in the model used. These results indicate that a substantial portion of the credit used by farm households is associated with consumption.

It also was found that farm households are sensitive to economic incentives in determining their consumption. The negative coefficient of the interacted rate-of-return on capital was significant at the .05 probability level in the model used. Households with attractive rates-of-return on capital tend to reduce their consumption.

The effect of liquid asset holdings on household consumption-savings decisions was found to be negative, but not statistically significant. Moreover, in an alternative consumption model based on a Keynesian formulation the coefficient was positive and significant.[5/] The coefficient of the interacted family size variable was negative but it was only marginally significant.

Model II in Table 5 is the estimate of the interaction consumption function in which farm and off-farm income instability variables are substituted for the total income instability variable. The introduction of farm and off-farm income instabilities into the consumption function did not change substantially the coefficient of multiple determination nor the coefficients of other explanatory variables. At the mean level of each additional variable, the MPC out of permanent income was about .82.

The analysis showed that, as expected, farm and off-farm income instabilities (FI and OI) had different effects on the MPC out of permanent income. The coefficient of the interacted FI was negative and significant at the .05 probability level.

The interacted OI had a positive coefficient which was statistically significant. Households with larger farm income instability and smaller off-farm income instability, other things being equal, have lower MPCs. The magnitude of the coefficient was also different between the two instability indexes. The hypothesis that farm income instability has a larger coefficient than off-farm income instability in absolute terms is accepted in this study.

CONCLUSIONS

Several conclusions useful for policy makers can be drawn from this analysis. The first is that very substantial voluntary savings emerged among the households studied. While it is not entirely clear what caused these high savings propensities, it does appear that a substantial amount of income instability was closely associated with this favorable savings performance. This income instability led households to interpret a significant part of their incomes as transitory, and caused savings propensities which were very high out of this income component. While we could not shed much light on why savings propensities were also high on the permanent income component, we feel this might be at least partially explained by attractive incentives and opportunities to save.

A second conclusion is that policy makers may be able to design more satisfactory programs to mobilize and encourage saving. These programs ought to pay careful attention to

incentives and opportunities to save in addition to the income instability issue. Policy makers ought to be particularly aggressive in designing savings mobilization programs which focus on regions and households experiencing a good deal of income instability. The instability may be due to rapid increases in off-farm employment, highly variable weather, or rapid technological change.

The final general conclusion which we draw is that economists have overemphasized the importance of absolute income levels in determining savings behavior. On the basis of the South Korean experience, we feel that rural poor will save and that factors in addition to absolute income levels are important in determining saving propensities. A more enlightened and positive approach to mobilizing voluntary savings will result in accelerated capital formation, better performing financial markets, and a more equitable participation in the economic system by the rural poor.

FOOTNOTES

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1/ For more details on these surveys see [Ro].

2/ In an earlier study of income instability among Taiwanese farmers, Canh reported very similar results; the median values of total net income, net farm income, and net off-farm income were about 22, 23 and 71, respectively, and the mean values were about 28, 42 and 227, respectively.

3/ A modification of this function was used by Hyun and others in a recent study of consumption-savings behavior among South Korean farm households. For more detailed consideration on this function, see [Hyun and others] and also [Ro].

4/ In the case of South Korea, the portion of credit used by an average farm household for living expenses to total household credit use has been around 15 percent for a number of years [MAF].

5/ For more details on the income regression function, see [Hyun and others] and also [Ro].

6/ For the purpose of comparison, an interaction consumption function based on a Keynesian formulation was also estimated. Except for the liquid asset variable, all coefficients had the same sign as found in the model based on the permanent income hypothesis. This inconsistency may result because a part of the liquid asset holdings were absorbed into the permanent income component from the income regression function.

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