Consumption Function in a Developing Economy and the Korean Experience

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The study by F. Modigliani and E. Tarantelli of the consumption function in a developing country has shown that the major models proposed to explain consumption and saving in advanced countries also provide a good approximation to consumption and saving behavior in developing economies. However, the findings of the authors are based solely on the Italian economy which most resembles that of the more developed western countries (hereafter MDC's) and there may be some objection to the classification of Italy as a less developed country (LDC).[1] In addition, the study is a straightforward application of major existing models, with some improvements, to the Italian economy and may not be applicable to many LDC's whose economic structure and consumption and saving patterns may be vastly different from either the Italian economy or economies of the western-type MDC's. Hence, further investigation would appear to be justified.

(1) For instance, even the subsistence income level in Italy of $ 800 in the Modigliani and Tarantelli study is much higher than per capita income in Korea of $ 530 in 1975. Also, Italian agriculture's shares of GNP and total labor force were 8.8% and 17.4% respectively in 1973 and much lower than the respective shares of 26% and 50% in Korea in the same year. Source: Bank of Korea [1, pp. 254, 268] and OECD, *Economic Survey of Italy*, 1976, p. 66.

This study attempts first to examine the applicability of major existing models to a developing economy such as Korea, which is undergoing rapid changes in economic structure and the behavior, tastes and habits of consumers. Second, it suggests a new model that may explain the dualistic behavior of consumption and saving in the traditional-rural and the modern-urban sectors of an LDC like Korea.

Although consumption and saving are extremely important in the development of a dual economy, there have not been many studies which satisfactorily explain the dualistic behavior of consumption and saving in LDC's within a dualistic framework. The absence of such studies may largely be the result of a lack of reliable data in LDC's. However, Korea's consumption and income data have been compiled and refined for many years and are of good quality for our purposes. In addition to national income data, Korea's Urban Household Survey and Farm Household Survey have been compiled since 1963. [2]

This study first examines the applicability of the existing models to LDC's by fitting them to Korean data for the post-Korean War period, largely following the Modigliani-Tarantelli (MT) approach. In doing so, it compares the results of estimation of consumption functions for Korea with those for Italy. The second part of this study is devoted to the development of a new model for LDC's.

I. Examination of the Existing Models

The principal existing models may be classified, as shown in the MT study, into the standard Keynes model, the Duesenberry-Modigliani (DM) model (of the 1949 original form), the Brown-Davis-Friedman (BDF) model, [3] the Kaldor Model (KM), and the Modigliani Brumberg life cycle hypothesis (LCH) model.

Consumption, income, and other variables have grown substantially during the post-Korean War period, consumption and income roughly by a factor of four and population by more than one and a half times. [4] Therefore, all

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(2) National income data in Korea are compiled by the Bank of Korea. See Bank of Korea [1], [2]. Korea's Urban Household Survey and Farm Household Survey are compiled by the Economic Planning Board [7] and Ministry of Agriculture and Fisheries [8] respectively.

(3) Friedman's permanent income hypothesis can be written, by means of the Koyck transformation, in an autoregressive equation of the form of $C_t = f(Y_t, C_{t-1})$. See Modigliani and Tarantelli [6, p. 827].

(4) Average annual growth rate of population in Korea between 1963~1973 was 1.95%, much

variables have been deflated doubly by price (the implicit price index of private domestic consumption) and population. The Korean data used for the estimation are thus *per capita* real data in contrast to the aggregate data used by Modigliani and Tarantelli. All models have been estimated in both linear and ratio forms (the error term may be more heteroscedastic in the linear form than in the ratio form). The highest previous income and consumption in Korea coincide, as shown in Table 1, with lagged income and consumption respectively.

In Table 1 results of fitting the four major models to Korean data are compared with the results for the Italian economy. As in the case of Italy, each of the major models including the standard Keynes model seems to fit the Korean data reasonably well in terms of the standard errors of both individual coefficients and the full models, and Durbin-Watson statistics.

The standard Keynes model in both linear and ratio form is shown to fit the Korean data extremely well. The Keynes model gives better results for Korea than for Italy. However, the marginal propensity to consume in Korea, as can be expected in LDC's, is in the interval $0.82 \sim 0.84$ and is higher than the $0.76 \sim 0.78$ estimated for Italy.

The BDF model also provides a reasonably good fit to Korean data. As in the case of Italy the coefficient of lagged consumption is larger than that of current income, implying strong consumer habit persistence. However, the difference between the two coefficients is smaller in Korea than in Italy, implying less habit persistence in Korea than in Italy. This may be due to rapid economic development and changes in consumers' tastes and habits in Korea. That is to say, as the economy develops and per capita income rises, consumers' expenditure may become more systematic and organized and consequently more habit-persistent. In addition, as the economy develops so also may the capital markets, consumer credits, unemployment compensation schemes, and various insurance and social welfare provisions.[5] As a result, consumers' planning time horizon is likely to become longer and habit persistence greater as development progresses. This may also be seen from the DM model

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greater than the Italy's respective rate of 0.7%. See Bank of Korea [1, p. 6] and OECD, *op.cit.*, p. 65.

(5) For a recent study on the effect of the institutions and policies of the financial system on household saving, see Henry C. Wallich and Mable I. Wallich, "Banking and Finance," in H. Patrick and H. Rosovsky, eds., *Asia's New Giant:How the Japanese Economy Works*, The Brookings Institution, 1976, pp. 249-315.

Table 1. Comparison of Estimates of Parameters of Consumption Functions: Korea (1956~1972) and Italy (1952~1970)

Types of consumption functions	Constant	Coefficients of				S.E.	D.W.	R^2
		Y	C_{-1}	Y_{-1}	$P(Y/YN)$			
(1) Standard Keynes								
Korea: L	5.03 (0.99)	0.839(0.020)				0.992	2.119	0.992
Korea: R	5.78 (1.12)	0.823(0.025)				0.021	2.16	0.639
Italy: L	1355.4 (246.8)	0.78 (0.011)				322.3	1.41	
Italy: R	1687.7 (244.9)	0.76 (0.012)				0.015	0.98	
(2) Brown-Davis-Friedman								
Korea: L	1.953 (1.789)	0.434(0.126)	0.513(0.175)			1.002	1.194	0.995
Korea: R	1.463 (1.848)	0.473(0.119)	0.481(0.169)			0.02	1.765	0.832
Italy: L	499.1 (337.1)	0.40 (0.12)	0.52 (0.17)			260.9	1.66	
Italy: R	648.5 (356.9)	0.37 (0.12)	0.55 (0.16)			0.012	1.32	
(3) Duesenberry-Modigliani								
Korea: L	2.43 (0.73)	0.457(0.079)		0.455(0.091)		0.57	2.47	0.997
Korea: R	2.55 (0.85)	0.462(0.080)		0.447(0.094)		0.01	2.30	0.858
Italy: L	1254.3 (193.8)	0.23 (0.16)		0.58 (0.17)		250.3	1.23	
Italy: R	1571.5 (200.5)	0.33 (0.17)		0.46 (0.18)		0.013	0.95	
(4) Kaldor								
Korea: L	6.03 (1.50)	0.935(0.109)			−0.181(0.202)	0.999	2.01	0.99
Korea: R	6.72 (1.46)	0.919(0.098)			−0.178(0.176)	0.021	2.04	0.663
Italy: L	2927.2 (468.5)	1.02 (0.068)			−0.70 (0.19)	245.1	1.17	
Italy: R	3448.9 (421.5)	1.06 (0.067)			−0.83 (0.19)	0.011	1.07	

Note: The figure in parentheses beside each coefficient is the standard error of the coefficient. S.E. denotes the standard error of the regression and D. W. the Durbin-Watson statistic respectively. C and Y denote consumption and disposable income. L and R indicate linear and ratio forms respectively. Y includes as in the MT study undistributed corporate profits. $P(Y/YN)$ is property income and independent labor income (P) deflated by the ratio of disposable income (Y) to national income (YN).

As the Kaldor hypothesis emphasizes different propensities to consume of workers' (labor) and capitalists' (property) income, the distribution of income between workers and capitalists becomes an important determinant of consumption and saving. Thus, it is written, as in the MT study, for our purpose as $C/Y = a_w + (a_p - a_w)\,Y_p/Y$, where a_w and a_p denote workers' and capitalists' propensity to consume respectively. Y_p denotes capitalists' income. The saving ratio depends on not the level but the distribution of income between workers and capitalists.

For estimation of the equation, Kaldorian labor income variable is approximated by "compensation of employees" in the Korean national income account adjusted by taxes, subsidies, and transfers. The remaining total disposable income then becomes the Kaldorian property income.

All variables were measured in 1 thousand won at 1970 prices. 1 thousand won is equivalent to about 3 dollars (official exchange rate: one U.S. dollar=310.6 Korean won in 1970).

results, which show greater influence for the current income variable than the lagged income variable. Both the BDF and DM models indicate a relatively greater influence on consumption by the current income variable in Korea than in Italy. This may imply that in a low income country like Korea current income exerts greater influence on consumption than previous income or consumption, and that habit persistence in LDC's is less than in MDC's. Other interesting results are the better fit of the BDF model than the DM model in Korea and the smaller constant term in the BDF than in the DM model as in the case of Italy. The latter may imply a long-run weak interdependence between saving and income in Korea as was argued for Italy.

The Kaldor model also fits the Korean data quite well. The marginal propensity to consume out of salary and wage income (0.92∼0.94) is significantly higher than propensity to consume out of property income (0.74∼0.75) in Korea. But the former seems to coincide closely with the average propensity to consume by urban workers during the 1970∼1974 period (0.91) as computed from the Urban Household Survey data. The results of the Kaldor model indicate a plausible level of propensity to consume out of salary and wage income classes but the difference between the propensity to consume of the two income classes is much smaller in Korea than in Italy, implying a lower level of capitalist income in Korea and thereby a higher propensity to consume out of the latter.

The application of the Kaldor model to LDC's may cause some problems. Approximation of the Kaldorian property income residually, as is commonly done, may result in relatively higher estimates of the propensity to consume property income, which may be shared by not only Kaldor's "capitalists" but also by a large number of the unemployed (disguised or structural) or the marginally employed in both the rural and urban sectors.[6]

Thus, the marginal propensity to consume out of property income in Korea

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(6) During the early period, the proportion in these employment categories was quite high. Even in 1963, of total employment of 7.66 million, 26.9% (2.06 million) were marginally employed, and 37.3% were self-employed. The unemployed numbered 681,000, about 8.2% of the total labor force.

　　In 1974 the proportion of the self-employed was 34.6%, the proportion marginally employed 13.1%, and the unemployment rate 3.8%. If, following the MT study, one-third of the marginally employed (those working less than 35 hours per week in our case) are included in the unemployed, the unemployment rate increases to 26.8% in 1963, 17.5% in 1970, and 13.0% in 1974.

may be at a very low level as Kaldor originally hypothesized, but increases to 0.74~0.75 as estimated in the model due to the inclusion of income received by the marginally employed and the unemployed.

As the unemployed share not only property income (as residually calculated) but also wage income through occassional wage labor and petty self-employment, this will increase, as indicated by the Ricardian-Marxian hypothesis of a unitary propensity to consume among this group, the marginal propensity to consume out of both property income and wage income.

If the effect on the propensity to consume of the unemployed is removed, the marginal propensity to consume of both classes may be much lower than is indicated in Table 1. This can be investigated by estimating the PC of total labor income YL, defined as the sum of the actual labor income of workers and an imputed labor income for capitalists, and the PC of property income YP when the effect of marginal employment is removed. Imputed labor income for capitalists is assumed to equal the average labor income of workers and thus measures capitalists' opportunity costs.[7] The revised estimate of property income is remaining total disposable income. Both variables are again deflated by the price index and population. The estimates for Korea are compared with those for Italy below:

(5) *Modified Kaldor Model*

Korea: L $C=7.81+0.92YL+0.57YP$
         (1.58)(0.07)   (0.13)

         $R^2=0.992$,   D.W.$=2.09$,   S.E.$=1.29$

   R $C=7.27+0.88YL+0.65YP$
         (1.61)   (0.13)

         $R^2=0.72$,   D.W.$=2.13$,   S.E.$=0.02$

Italy: L $C=1043.3+0.85YL+0.40YP$
         (260.9)(0.84)   (0.17)

         S.E.$=290.5$,   D.W.$=1.07$

     R $C=1350.7+0.85YL+0.35YP$
         (264.8)   (0.20)

         S.E.$=0.01$,   D.W.$=0.80$

The modified Kaldor model shows that if property income is not shared by

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(7) Total imputed labor income was estimated as average wage income per wage worker (excluding one-third of marginally employed) multiplied by the entire labor force *minus* the unemployed workers and one-third of the marginally employed.

the unemployed, the propensity to consume of total labor income and of property income in Korea may be as low as 0. 92 and 0. 57 respectively. Note the relatively small influence of unemployment on the propensity to consume of labor income and its relatively large influence on the propensity to consume of property income.

An examination of the applicability of the generalized LCH model may yield very useful results as indicated in the MT study.[8] It has great advantages over the Kaldorian hypothesis in that it assumes that the typical household even in LDC's earns both labor and property income and in that it considers the effect on consumption of both current income and long-run expectations. In this sense the generalized LCH model may be considered as a generalization of not only the original LCH model but also the KM itself.

The generalized LCH model may be useful for LDC's, and especially for Korea which has been characterized by extremely high rates of interest (about 16% per annum in the official financial market and over 35% per annum in the "curb" or informal financial market)[9] and probably a similarly high rate of return on assets. However, due largely to lack of reliable data it has not been systematically examined in this study. Instead this study reports the result of fitting the LCH model of the original form suggested by Modigliani and Brumberg:[10]

(6) *Modigliani-Brumberg Model*

Korea: $C = 0.92 YL + 0.47 A + 0.19 U$
　　　　(0.09)　　(0.22)　(0.04)

　　　　S.E. $= 54.4,$ D.W. $= 1.50,$ $R^2 = 0.99$

Italy: $C = 0.74 YL + 0.09 A + 1.04 U$
　　　　(0.05)　　(0.02)　(0.17)

　　　　S.E. $= 21.0,$ D.W. $= 1.19$

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(8) A recent study by Jefrey G. Williamson on Korean savings indicated that "the LCH seems to account for the impressive rise in Korean domestic savings rates quite adequately." See Jefrey G. Williamson, "Private Domestic Savings in Korea," in the Korean Economic Planning Board, ed., *Discussion Papers on the Draft of the Fourth Five-Year Plan 1977~ 1981*, March 1976, p. 66.

(9) Rate of interests for time deposits (for one year) was 16. 2 percent in 1976. See Bank of Korea [1, p. 21], and the rate of interest in the "curb" market was 37. 6 percent in 1974. See Park, Young Chul, *Unorganized Money Market in Korea*, 1976(unpublished), p. 48.

(10) F. Modigliani and R. Brumberg, "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data," in K. Kurihara, ed., *Post Keynesian Economics*, New Brunswick, 1954.

where A and U denote wealth and number of unemployed respectively.

The result shows that the coefficient of A[11] is 0.47, much greater than that estimated for Italy (0.08~0.09) or the U.S. (0.04~0.08).[12] However, such a high coefficient for A in Korea, with low per capita income, high interest rates, and with few accumulated household assets, may indicate a greater influence on consumption of such household assets. Inclusion of unemployment in equation (6), as suggested in the MT study, may be argued to be an improvement on the original LCH model. However, the coefficient of the unemployment variable U is extremely small for Korea, implying a negligible effect on consumption of the unemployed. This is contrary to what has been assumed by the Ricardian-Marxian hypothesis and seems to be nonsensical.

An interesting observation may be made concerning the relative applicability of the LCH in rural and urban sectors of many LDC's. In rural areas life expectancy of farmers may be assumed to be somewhat shorter than for urban residents. Also, most farmers in LDC's do not retire[13] because of the necessity of continued physical work to maintain a subsistence income level or because of early death. For a typical large traditional farm family surviving at or near the subsistence level, the life cycle hypothesis of a single person in the household may be meaningless. Decisions concerning consumption and saving are made on the basis of the traditional family as a decision unit. Thus the usual assumption of the LCH or the assumption of fixed retirement period, as stated by Feldstein, may have only weak applicability to rural people in LDC's.

The weak applicability of the LCH may also hold for many poor urbanites living at or near the subsistence level. That is, at such low income levels, the LCH assumption of optimizing "preretirement consumption and saving plus his retirement labor supply," as stated by Feldstein,[14] may not be applicable in many LDC's where retirement as a social institution may be important only

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(11) A, a measure of average household assets, is approximated by the average aggregate value of financial wealth held by consumers as there is no available estimate of consumers' total net worth at market prices. YL is the same measure used in the modified Kaldor model. In the LCH, YL measures conceptually income from "human capital" and thus includes not only actual labor income of workers but also imputed labor income of capitalists as in the modified Kaldor model.

(12) See Modigliani and Tarantelli [6, p.835].

(13) Farmers may actually "retire partially" in the sense that as they grow old they become physically weak and thereby less productive. But implications of "partial retirement" in this sense may be much different from those of "retirement" in the LCH.

(14) M. Feldstein [4, p.78].

among modern sector workers while for the majority the the cessation of work
is a function of the capacity or opportunity for productive labor.

II. Characteristics of the Behavior of Consumption and Saving in LDC's

Factors influencing the behavior of consumption and saving in LDC's may be
inferred from the characteristics of LDC's. One of the well-documented charac-
teristics of many LDC's is, according to the development theories of D. Jor-
genson, J. C. Fei and G. Ranis, and others,[15] a dualistic economic structure
consisting of rural-traditional and urban-modern sectors of an economy. The
classification of an economy into rural and urban sectors focuses attention on
the dualistic behavior of consumption and saving in the two sectors.

For instance, Korean agriculture is largely a single-crop-a-year type and thus
the income and consumption (or spending) time horizon for many farmers may
be as long as a year whereas, in the case of urban wage and salary earners, it
may be as short as a month. In addition, the spending unit in the rural sector
is the traditional extended family unit (averaging 5.72 persons in 1973) which
is significantly different from the smaller nuclear family unit (averaging 5.26
persons in 1973) which is the typical spending unit in the urban sector.
Moreover, decisions concerning consumption and saving among many farmers are
influenced by the decisions concerning farm production.

The farm household usually includes both independent (the head of farm family)
and dependent workers (averaging 1.93 family workers in 1973), which may
affect consumption and saving. The mixture of dependent and independent
workers in the same household is far less common in the urban sector.

The purpose of saving may also be different in the two sectors. For instance,
housing is a major goal of saving for many middle and lower income urban
households and expenditure on housing constitutes a substantial proportion of
household income (averaging 21.1 percent for urban households in Seoul in
1974) while housing expenditure constitutes only a small proportion of income
for farm households (averaging 4.9 percent in 1974). Tastes and habits of

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(15) See, for instance, Dale W. Jorgenson, "The Development of a Dual Economy," *Economic
　　 Journal*, 71 (June 1961), J. C. Fei and G. Ranis, "A Theory of Economic Development,"
　　 American Economic Review, 51 (Sep. 1961) and A.C. Kelley, J.G. Williamson and R.J.
　　 Cheetham [5].

consumers in the rural sector may also be more tradition-oriented and less tied to the monetized economy than in the case of urban residents.

This difference in the behavior of consumption and saving[16] necessitates the development of a consumption function for a dual economy.

III. Dualistic Consumption Model[17]

Denoting by a_r the propensity to consume of rural income YR and by a_u the corresponding propensity to consume of urban income YU, the dualistic consumption hypothesis may be stated as:

$$C = a_r YR + a_u YU, \quad where \ Y = YR + YU. \tag{7}$$

In the "naive" dualistic economy model the only source of rural income is agriculture and thus, YR coincides with agricultural income in the national income account. However, a substantial proportion of rural income in Korea is nonagricultural (19.7% of the farm household income in 1974)[18] and thus rural income is greater than agricultural income. For Korea YR is computed from the Farm Household Survey to include non-agricultural income.

The "naive" model is inadequate for analysis of the effect on consumption of the size of rural and urban population and the response of consumption and saving to urbanization. Thus, equation (7) needs to be modified.

As a first step we rewrite equation (7) as $C = a_r(y^r \cdot N^r) + a_u(y^u \cdot N^u)$, y^r and y^u denoting per capita rural and urban income, and N^r and N^u rural and urban population. $y^r \cdot N^r$ and $y^u \cdot N^u$ indicate total rural and urban income. Equation (7) can be written on a per capita basis as:

$$C/N = a_r(y^r \cdot N^r)/N + a_u(y^u \cdot N^u)/N, \quad where \ N = N^r + N^u.$$

N^r/N indicates the share of rural population, and N^u/N the share of urban population respectively. The latter then indicates the level of urbanization u.[19]

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(16) There may be other factors causing dualistic consumer expenditure in LDC's. The so-called Keynesian "objective" factors (6) and "subjective" factors (8) may influence consumption and saving in the two sectors differently. See D. B. Suits [9, pp. 10-12].

(17) I am especially grateful to Dwight H. Perkins and Edwin S. Mills for valuable discussions and helpful suggestions concerning the dualistic consumption models.

(18) Computed from the Farm Household Survey data in 1974. The 19.7% includes also income from agriculture-related activities. See Ministry of Agriculture and Fisheries [8, p. 53].

(19) Urbanization is measured by the proportion of population in urban areas. For definition of urbanization and urban areas, see Edwin S. Mills, *Urban Economics*, Glenview, Ill., 1972, pp. 23-24.

Then a dualistic model may be written:

$$C = a^r(1-u)y^r + a(u)y^u.\tag{8}$$

Equation (8) shows that consumption depends not only on the level of income in rural and urban areas but also on the level of urbanization or the distribution of population between traditional-rural and modern-urban sectors of the economy.

The results obtained by fitting the dualistic models to the Korean data are shown in Table 2. They have been estimated in both the linear and ratio forms. Both models fit the Korean data reasonably well in terms of standard errors and the Dubin-Watson statistics. However, the naive model (equation (7)) doesn't give a clearcut indication of the relative magnitude of the coefficients on rural and urban income. This may be due to the fact that the model excludes, as indicated above, nonagricultural income in the rural sector. Nevertheless, even the naive dualistic model provides a reasonably good approximation to the behavior of consumption and saving in rural and urban areas.

Table 2. Estimates of Parameters of Dualistic Consumption Functions: Korea 1963-1974

Consumption function		Constant	YR	YU	$\widehat{YR}$	$\widehat{YU}$	$(1-u)y^r$	$(u)y^u$	YLU	YPU	S.E.	D.W.	R^2
(7)	L	130.51 (64.00)	0.89 (0.20)	0.81 (0.05)							41.84	1.88	0.96
	R	137.32 (40.14)	0.81 (0.13)	0.85 (0.04)							0.022	1.92	0.73
(8)	L	4.66 (5.37)					0.93 (0.30)	0.78 (0.05)			1.47	1.78	0.99
	R	4.82 (4.35)					0.89 (0.23)	0.80 (0.03)			0.021	1.96	0.68
(9)	L	5.49 (2.53)			0.87 (0.10)	0.74 (0.08)					1.44	1.84	0.99
	R	5.10 (2.24)			0.86	0.78 (0.06)					0.021	2.04	0.69
(10)	L	5.66 (4.47)	0.85 (0.25)						0.91 (0.07)	0.64 (0.07)	1.20	2.43	0.99
	R	5.62 (3.85)	0.85 (0.20)						0.89 (0.05)	0.67 (0.08)	0.02	2.37	0.78

Equation (8) in Table 2 does indicate a clear difference in the propensity to consume out of rural and urban income. The average propensity to consume out of farm household income computed from the Farm Household Survey data between 1970 and 1974 was 89.3 percent. The propensity to consume urban income is shown to be 0.78~0.80 and is much lower than the propensity to consume rural income. This may be because, as corporate income is included in

urban income, per capita income in the urban sector is higher than in the rural sector. The average propensity to consume out of urban workers' income between 1970 and 1974 was 91.1 percent and would appear to be much larger than the propensity to consume out of average urban income. This may imply that the lower propensity to consume out of urban income is mainly due to the inclusion of property and corporate income.[20]

It may be worth checking whether the relative propensity to consume of urban income is appropriate. One way of checking this is to estimate the propensity to consume out of the total imputed "rural income," which is the sum of the actual rural income and the imputed rural income of urban people $(\widehat{YR} = y^r \cdot N^r + y^r \cdot N^u)$. The latter is computed as urban population multiplied by the average rural income. This assumes that the imputed rural income of urban people is equal to the average rural income. It measures the opportunity cost of urban people. Urban income then becomes the remaining total disposable income.

$$C = a_r \widehat{YR} + a_u \widehat{YU}. \tag{9}$$

The propensity to consume of urban income estimated in this way is shown by equation (9) in Table 2 as in the $0.74 \sim 0.78$ range and is found to be even lower than that estimated by equation (8). This suggests that equation (8) indicates the proper relative magnitudes of the propensity to consume out of rural and urban income.

Equation (8) shows interesting results. It indicates that as a dual economy develops and as urbanization continues the level of saving continues to increase. It also indicates that the level of saving depends on per capita income and the population share of each sector. It supports Modigliani's findings concerning intercountry differences in private saving rates that countries with higher rates of economic growth and higher proportions of the population of working age have higher saving rates.[21]

The level of urbanization in Korea was 50.9% in 1975 and is expected to

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(20) Note that income in this study includes, as in the MT study, undistributed corporate profits. This is necessary not only for the study of saving itself but also because in Korea, as in many LDC's, the majority of firms are unincorporated and thus the distinction between household and business savings is exceedingly artificial.

(21) A recent study on Korean savings also indicated that "most of the rise in domestic savings rates up to 1971 or 1972 can be attributed to successful growth." See, Williamson, *op. cit.*, p. 67. Wallich and Wallich also indicate that rapid economic growth induces high consumer saving in Japan. See Wallich and Wallich, *op. cit.*

increase to about 75%, toward the level of the present day MDC's. As urbanization increases, the rates of saving will increase.

Finally, the dualistic model suggested in this study may be modified in order to explain separately the consumption and saving behavior of farmers, urban workers, and urban capitalists. If a distinction is made between consumption and saving behavior of farmers from that of either urban workers or urban capitalists the consumption function for LDC's can be written as:

$$C = a_o + a_r YR + a_{uw} YLU + a_{up} YPU \qquad (10)$$

where a_{uw} and a_{up} denote the propensity to consume of urban labor (or wage) income YLU and urban property income YPU respectively. YLU measures not only actual urban workers income, but also imputed income of urban capitalists. YPU then becomes the remaining total disposable urban income.

The result obtained by fitting equation (10) to the Korean data indicates, as shown in Table 2, that the dualistic model fits the Korean data extremely well in terms of standard error and the Durbin-Watson statistic. Coefficients of rural income, urban labor income and urban property income variables all have the expected relative magnitudes. The propensity to consume out of urban property income is significantly lower than out of either urban labor income or rural income. The result also indicates that the propensity to consume out of rural income is lower than out of urban labor income, confirming, in the case of Korea also, the hypothesis of a higher savings rate among farmers than among urban workers.

IV. Concluding Remarks

We have found that all the existing models and refined models tested in this study provide a surprisingly good approximation to the behavior of consumption and saving even in such an LDC as Korea which is characterized by low per capita income, a relatively large rural sector, high population growth, and rapid industrialization and urbanization. However, existing models may have to be modified in order to better approximate consumption behavior in a dualistic economy undergoing rapid changes in economic structure and the behavior, tastes and habits of consumers.

The models suggested in this study emphasize the importance on consumption and saving behavior of the relative distribution of income and population be-

tween the rural-agricultural and urban-modern sectors. Hence, they may provide a useful framework for understanding the behavior of consumption and saving in response to industrialization and urbanization that take place in the process of development of a dual economy. Differentiation between the behavior of consumption and saving in the rural and urban sectors appears to be important in analyzing consumption and saving in a dual economy.

The consumption and saving behavior of rural farmers appears to be quite different from that of either urban workers or urban capitalists. This is indicated by the coefficients on the rural income, urban labor income and urban property income variables in equation (10) as shown in Table 2. The propensity to consume out of agricultural income (0.85) is much higher than out of urban property income (0.64~0.67). Thus, treatment of agricultural income and urban property income into the same category as in the Kaldor model appears to be inappropriate and may lead to a substantial overestimation of the propensity to consume property income as in equation (4) in Table 1. The propensity to consume out of property income inclusive of both agricultural and property income as estimated by equation (4) in Table 1 is 0.74~0.75, much greater than that estimated by equation (10) in Table 2. Separation of farmers income from the Kaldorian property income leads to surprisingly reasonable estimations of the propensity to consume out of all three separate income types. The trichotomy of consumers into rural farmers, urban workers, and urban capitalists appears to be a great improvement indeed over the simple Kaldorian worker-capitalist dichotomy.

Inclusion of analysis of the influence of urbanization on consumption in the model may be useful in analyzing consumption and saving in a dual economy undergoing rapid urbanization due to rapid economic growth. The level of industrialization and urbanization in Korea is 0.54 and 0.51 in 1975 respectively, and is expected to increase, due to economic growth, to a stable level of over 0.90 and about 0.75 respectively as seen in MDC's such as Japan and the U.S.[22] As urbanization continues due to economic development and rural people continue to migrate to urban areas, the propensity to consume out of total disposable income is found to decrease as shown in equation (8) in Table 2.[23] Consumption and saving in LDC's may be determined by the level of

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(22) See Mills, *op.cit.*

(23) According to dualistic development theories, dualistic production, consumption and demogra-

income and population share in the two sectors; the overall saving rate will increase, however, only if urbanization is accompanied by a rise in property income which offsets the greater marginal propensity to consume out of urban labor income than out of rural income.

The study also shows that the principal existing models appear to explain urban consumer behavior better than rural consumer behavior. This may be due to the fact that the existing models have been developed with reference to highly urbanized MDC's. Thus, they may have limited applicability to many LDC's only partially urbanized and having a large rural-agricultural sector.

The result of fitting the existing models to the Korean data shows also some interesting results. The propensity to consume out of income of all types in Korea is shown to be generally much higher than in Italy. This supports the widely accepted hypothesis that the saving rate is higher in a country with a higher level of per capita income.

The degree of habit persistence is found to be lower in Korea than in Italy but may be expected to increase as the economy develops. With development consumers become better organized, do more conscious planning and have greater access to stable credit markets, unemployment compensation schemes, pension systems, various insurance and social welfare provisions which make it easier to maintain a stable level of consumption expenditures.

The influence of unemployment of consumption is also quite significant in the case of Korea. But the influence of the unemployed on the propensity to consume out of property income is found to be much greater than its effect on the propensity to consume out of labor income.

The LCH model may be of limited applicability to many rural farmers and even urban workers surviving at or near the subsistence level. Due to the necessity of continued physical work to maintain a subsistence income or because of early death, farmers may not be able to retire. In addition, decisions concerning consumption and saving are made not on an individual basis but with the whole traditional family as a decision unit. Thus, the LCH model may have only weak applicability to rural people in LDC's.

It must be pointed out, however, that many of these conclusions are still to

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phic conditions in the rural and urban sectors cause industrialization and movement of population and labor force from rural to urban areas. See, for instance, Kelley, Williamson, and Cheetham [5].

be regarded as tentative, as they are based on studies covering only certain periods for Korea and Italy, and need to be validated through additional studies covering more LDC's at different stages of economic development and having different consumption and saving behavior.

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