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Theoretical and Empirical Issues in National Income and Consumption Planning in LDCs*

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This paper gives a theoretical and empirical formulation of economic planning objectives in LDCs, and uses the available data to test for: (1) the relative importance of micro parameters on the one hand, and macro variables on the other, in long term perspectives of national output growth, and (2) the "Random Walk" hypothesis as it applies to national consumption in developing countries. It finds that while micro policy parameters are more effective than macro-based demand management strategies in planning for long-term growth of national output and consumption, the relative effectiveness of micro policy instruments would differ according to the level of development of the country concerned.

I. Introduction

Economic planning in LDCs is widely believed to offer the essential and perhaps only institutional and organizational mechanism for overcoming the major constraining bottlenecks in economic development. Its main aim is to overcome the constraints that limited resources could place on the growth potential of an economy. Through careful planning, investment projects are chosen and coordinated in order to channel scarce factors into most efficient uses.

Failure of economic planning in LDCs is normally judged in terms of the plans' inability to attain their major objectives. These objectives

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are wide and varied, but the major ones include: to raise national income and the consumption horizon of an economy over time, to reduce the level of unemployment, and to achieve greater equity in national income distribution (Dasgupta, 1974). Economic policy planners in LDCs are usually not able to completely evaluate the actual economic objectives of any given plan program. Even though the objectives may well be spelt out ahead of the plan formulation and implementation, the planning authorities are usually not able to ascertain the exact economic variables to act on for a given plan program.

This study focuses on the two planning objectives of national income growth and the expansion of national consumption over time.[1] We set out a basic theoretical model of national income determination, and of consumption, from which we derive some theoretical basis for the empirical study of these important indicators of economic development. Then we offer some specification of their empirical models and some description of the data with which these models are tested. Finally, we provide the estimation and discussion of the empirical results, along with some policy conclusions of the study.

II. Planning for National Income Growth

We posit national output as determined by the interplay of the three sectors of the economy: the market demand sector, the production (supply) sector, and the exchange (distribution) sector. These are given respectively as:

Aggregate demand:

$$(1) \qquad Y = C(Y,r,T) + I(r) + G + X(x) - M(Y,x)$$
$$C_1 > 0,\ C_2 < 0,\ C_3 < 0,\ I' < 0,\ X' < 0,\ M_1 > 0,\ M_2 > 0.$$

Aggregate supply:

A linear production function giving output as a function of resources employed:[2]

[1] Unemployment and income distribution are not explicityly treated in the present work. This is because reduction of unemployment is positively correlated with growth in national output which is the focus of the present study, while the subject of income distribution is a broader topic that deserves wider treatment in a more general equilibrium framework.

[2] We use a specific form of the aggregate supply equation because using a general form such as $Y = R(\psi, \alpha, \omega, P)$ misses a crucial character of the supply of output, namely, that

(2) $Y = \psi f(R_D)$, where $f'(R_D) > 0$, $R_D = R + \alpha(\omega/P)$

ψ = shift parameter of the production function, $\psi > 0$

$\alpha < 0$.

Exchange (Distribution) sector equilibrium:

(3) $m = P\{\Phi(Y) + \phi(r)\}$

$\Phi' > 0$, $\phi' < 0$,

where

Y = national output level
C = Consumption
r = interest rate
T = taxes
I = Investment level
G = Government spending
X = volume of exports
x = foreign exchange rate of the domestic currency
M = volume of imports
R = resource endowment
R_D = aggregate resource demand
ω = average resource price
P = general price level
m = money supply
Φ, ϕ, are demand for money functions,
and α, ψ, are parametric constants.

Solving the above multi-sectoral equilibria gives the long run equilibrium national output Y*, which represents the economy's potential output. Any instantaneous growth in it, dY*, can be found in terms of all the relevant multi-sectoral parameters on which it depends. Thus, a total differential of each of the sectoral equations and rearrangement, yields the matrix relation:

$$(4) \quad \begin{bmatrix} 1 - C_1 + M_1 & 0 & -(X' - M_2) \\ 1 & \alpha\psi\omega/P^2 & 0 \\ P\Phi' & \Phi + \phi & 0 \end{bmatrix} \begin{bmatrix} dY \\ dp \\ dx \end{bmatrix} = \begin{bmatrix} F \\ G \\ H \end{bmatrix}$$

it depends on the economy's ability to actually utilize the resources as against the mere accumulation of it. This is particularly important for planning in poor countries where the ability to put available resources to use has been a hinderance to growth (see Ezeala-Harrison and Baffoe-Bonnie, 1994).

where

$$F = dG + C_3dT + (C_2 + I')dr$$
$$G = R^D d\psi + \psi[dR + (\omega d\alpha + \alpha d\omega)/P]$$
$$H = dm - P\phi' dr$$

The coefficient determinant of (4) is

$$\Delta = -(X' - M_2)\{(\psi + \phi) - \alpha\Phi'\psi\omega/P\} > 0. \tag{4a}$$

Solving for the required instantaneous increase in national output we obtain:

$$dY^* = -(X' - M_2)[(\Phi + \phi)\{R_D d\psi + \psi(dR + (\omega d\alpha + \alpha d\omega)/P)\} - (\alpha\psi\omega/P^2)]dm - P\phi' dr. \tag{5}$$

In solving this model, we have treated the exchange rate (x) as endogenous, and the interest rate (r) as exogenous. We justify these assumptions on grounds that x rests on the domestic inflation (rate) policy, and moreover, that there be a flexible exchange rate policy that would be consistent with the economic planning program. As for the interest rate, it is a discretionary policy instrument of the monetary authorities, and is thus exogenously (pre)determined.

We have therefore, in equation (5), obtained the economy's output growth potential in terms of its parametric determinant factors.[3] This expression reveals key factors that influence output growth, which have important implications for the formulation of national income planning objectives.

The determinants of national output increase are a combination of both parametric constants and "demand-side" factors of the system. These are changes in money supply (dm) and interest rate (dr), as well as the long-run structural parameters, such as X' and M_2 (measures of the terms of trade, or the country's export and import sensitivities to foreign exchange movements), Φ (transactions demand for money), and ϕ (speculative demand for money). However, other demand-side factors that are prone to short-term manipulations, such as taxes, and government spending, are absent. The most influential factors in long term national output planning are the parameters ψ, R, α, and the variables ω and P.

[3] Using a general form of the aggregate supply model: $Y = R(\psi, \alpha, \omega, P)$, $R_1 > 0$, $R_2 < 0$, $R_3 < 0$, $R_4 > 0$, a total differential of which would yield $dY = R_1 d\psi + R_2 d\alpha + R_3 d\omega + R_4 dP$ would still not change the elements of Row 3 of (4) and H.

$\psi = \partial Y/\partial f$ is technological progress, which captures the roles of education and technical training, manpower development programs, and general techniques of production, on national output growth. The parameter R, as the level of resource endowment, indicates the dependence of national output level and its growth potential on the size of resource acquisition and exploitation. This includes the full utilization of the labour force, and minimization of the unemployment of resources. The parameter $\alpha = \partial R_D/\partial \omega$ is an index of resource market balance in the economy, and measures the role of resource pricing in mobilization of resources.[4]

The foregoing results suggest that while demand management policies would be less appropriate for realizing the long-term planning objective of raising national output, manipulation of long term structural parameters appears to have more potential. The preliminary policy implication from this is that long-term output growth policies should be supply-side micro policies. But this finding will only be emphasized for purposes of policy implementation after it has been underscored with empirical support.

III. Planning for Expansion of Consumption Horizon

An economy's welfare is predicted on its level of consumption. A balance between consumption in the present and consumption in the future, with a view to maintaining a uniformly distributed *desired* consumption profile, is envisaged. The present and future are spread uniformly over the plan period, with the present (period 1) representing the beginning of the plan program and the future (period k) being the plan horizon and thereafter. The economy's *endowment position* is the size of income (wealth) available to it in the year.[5]

The economy's national output over the successive yearly periods in the plan are $Y_1, Y_2 \ldots Y_k$, $k = 1, 2, 3\ldots$ is the plan horizon. For simplicity we assume that the national endowment position would be constant over time, and also assume a two-period inter-temporal consumption

4 ψ and R_D could possibly (and most probably) be functions of labour supply, which may, in turn, be dependent on income tax rates. In such a setting, a change in tax rates (a demand-side change) may well influence aggregate supply. However, we chose not to model such effects because of the relatively minor effects of these factors on ψ and R_D.

5 In formulating its consumption projections, the economy needs not be constrained by the size of its endowment. This is because the economy can borrow or lend. By borrowing or lending the economy can vary its endowment position and thus move its *budget constraint.*

problem. We also assume that the economy's goal is to achieve a commensurate level of national consumption subject to its endowment constraint. We define

$C_1(Y_1, Y_k)$ = consumption in year 1 of plan period,

$C_k(Y_1, Y_k)$ = consumption at the planning horizon,

and the problem is to maximize $U(C_1, C_k)$ subject to endowment constraint, where

Y = endowment position

U = utility from consumption.

At the beginning of the plan period the economy can consume as much as

$$Y_1 + Y_k/(1+r),$$

where $Y_k/(1+r)$ = present value of the economy's future endowment,
r = prevailing interest rate.

At the end of the plan, the economy can consume

$$Y_k + (1+r)Y_1.$$

Assuming $Y = Y_1 = Y_k$, then over the this two time periods in which the economy could consume a maximum of C_1 in period 1 and C_k in period k, the budget constraint is

(6a) $$C_1(1+r) + C_k = Y(2+r)$$

or

(6b) $$[C_1(1+r) + C_k]/(2+r) = Y.$$

The objective function is

$$\text{Max}_{C_1, C_k}\ U(C_1, C_k) + \lambda\{Y - [C_1(1+r) - C_k]/(2+r)\}$$

giving the first-order conditions

$$U_1 - \lambda(1+r)/(2+r) = 0,$$

$$U_2 - \lambda/(2+r) = 0,$$
$$Y - [C_1(1+r) - C_k]/(2+r) = 0.$$

These are solved for

$$Y - [C_1(U_1/U_2) - C_k]/(2+r) = 0$$

or

$$C_k = C_1(U_1/U_2) - Y(2+r). \tag{7}$$

This expresses future consumption as not only dependent on endowment but also on the current level of consumption and the interest rate. The dependence of future consumption on interest rate makes intuitive sense.

To verify relationship between future consumption and income:

$$\begin{aligned} dC_k = dY - [&(C_{11}dY_1 + C_{1k}dY_k)\cdot U_1/U_2 + C_1\{U_2U_{11}\cdot \\ &C_{11}(dY_1 + C_{1k}dY_k)\} - U_1U_{22}\cdot\{C_k(C_{11}dY_1 \\ &+ C_{1k}dY_k)\}/U_2^2] - [Ydr + dY(2+r)], \end{aligned} \tag{7a}$$

where $C_{11} = \partial C_1/\partial Y_1$ and $C_{1k} = \partial C_1/\partial Y_k$ are respectively the marginal propensities to consume in periods 1 and k.

Thus:

(a) $\partial C_k/\partial Y_1 = -[C_{11}U_1/U_2 + C_1C_{11}\cdot U_2U_{11}\cdot C_kC_{11}/U_2^2] > 0,$

(b) $\partial C_k/\partial Y_k = -[C_{1k}U_1/U_2 + C_1U_2U_{11}C_{11}C_{1k} - U_1U_{22}C_{1k}/U_2^2] > 0,$

(c) $\partial C_k/\partial Y = -1 - (2+r) = -(1+r) < 0.$

These results imply that future consumption is positively dependent on current and future incomes, and negatively dependent on endowment level. The negative dependence is presumably because of the role of interest rate in endowment level, as shown in result (c).

Since $Y - C_k = C_1(U_1/U_2) > 0$, it implies that the economy would be a lender at period k, indicating that the interest rate would be an important variable whose control would be necessary in consumption planning.[6] For by reducing consumption in the immediate period the

6 It is easy to verify from the budget constraint that whereas the relationship between

economy can increase its assets in the future period, which together with the interest earned (as a net lender) would raise the level of endowment which would raise future consumption. Thus, the economy can choose its desired future consumption level by setting a target for the appropriate levels of present consumption and endowment. We now turn to the empirical analysis of these results.

IV. The Empirical Model

We utilize data on selected developing countries covering the period 1960-1989.[7] The preceding theoretical analysis suggests that national output growth (Y′) over a given time horizon depends on technological progress (ψ), the level of resource endowment (R) and its mobility (α), resource prices (ω), and the general price level (P). Current and planned consumption depend on endowment (income) level (Y), marginal utilities of current and planned consumption (U_1, U_2), and the interest rate (r). Planned and current consumption levels depend on each other.

To verify the implication of our theoretical model regarding the relative unimportance of macro policy variables as against micro policy parameters in long-term national output growth, we carried a separate empirical study on the effects of the former. Our empirical study of consumption will test for some of the major findings that already exist on the subject. Two of such findings are the Random Walk Hypotheses (RWH) advanced by Hall (1978) and the Error Correction Model (ECM) introduced by Davidson *et al* (1978); and while our study will verify the RWH and its relevance as a guide for consumption planning in developing countries, the ECM is not studied in this work.[8] Our em-

current consumption and interest rate is clearly negative as expected, that between future consumption and interest rate is not unequivocal; viz: $\partial C_1/\partial r = -Y/(1+r)^2 - C_k[(2+r) - (1+r)/(2+r)^2] = -Y/(1+r)^2 - C_k\{1/(2+r)^2\} < 0$; and $\partial C_k/\partial r = Y - C_1(3+2r)$. This shows that the response of future consumption to interest rate would depend on endowment (Y) and current consumption.

7 The sample countries are selected from all three developing continents of the Southern Hemisphere: Singapore, Korea, Thailand (Oceanic/Asia) Ghana, Zambia, Nigeria (Africa), and Mexico and Argentina (Latin America). These are countries that show evidence of past economic planning programs with some relative though varying degree of successes.

8 Different versions of both the RWH and the ECM have been developed by researchers on the topic of consumption, some of who included other variables to the basic consumption equation. Molana (1991), Zuehlke and Payne (1989) and Davis (1984) are a few of such studies. Bean (1986) and Wickens and Molana (1984) carry versions of the ECM. See also Muellbauer (1983).

pirical results would determine whether Hall's RWH, that is, the assertion that consumption is a 'random walk' because the change in consumption should not be predictable, as current consumption is only affected by lagged consumption levels, is supported by the evidence in the selected countries we have used.[9]

A. Model Specification

The output equation is specified as

$$(8a) \quad Y' = F(\psi, R, \alpha, \omega, P, (X' - M_2), \Phi, \phi)$$

to be tested against the control equation

$$(8b) \quad Y^1 = F^1(m, G, r, t)$$

with the linear models respectively

$$(9a) \quad Y' = \beta_0 + \beta_1\psi + \beta_2 R + \beta_3\alpha + \beta_4\omega + \beta_5 P + \beta_6(X' - M_2) + \beta_7\Phi + \beta_8\phi + \epsilon_1$$

$$(9b) \quad Y^1 = \mu_0 + \mu_1 + \mu_2 G + \mu_3 r + \mu_4 t_i + \mu_5 t_c + \epsilon_2$$

where t_i = income tax rate, t_c = corporate tax rate.

The consumption schedules are also specified respectively for current consumption:

$$(10a) \quad C_1 = g(Y, C_k, U_1, U_2, r)$$

with the linear model

$$(10b) \quad C_1 = \gamma_0 + \gamma_1 Y + \gamma_2 C_k + \gamma_3 U_1 + \gamma_4 U_2 + \gamma_5 r + \gamma_6 C_{1(t-1)} + \epsilon_3$$

and planned (future) consumption:

$$(10c) \quad C_k = h(Y, C_1, U_2, U_1, r)$$

9 The simple RWH would be: $\log C_t = a_0 + a_1 \log C_{t-1} + e_t$, where a_0 is a constant consumption level, and e_t is an unpredictable random disturbance. The implication of this is that any variables (including income) other than lagged consumption used as regressors, should have zero coefficients.

with the linear model

$$(10d) \quad C_k = \pi_0 + \pi_1 Y + \pi_2 C_1 + \pi_3 U_2 + \pi_4 U_1 + \pi_5 r + \pi_6 C_{k(k-1)} + \epsilon_4$$

where

$\beta_0, \mu_0, \gamma_0, \pi_0$ = intercept terms,
β_j's, μ_j's, γ_j's, π_j's = parameter estimates, (j = 1,2..8);
ϵ_j's = error terms, (j = 1,..4).

B. The Data

The empirical data covers the period 1960-1989. The nature of the variables of the models compelled us to employ several proxies for the data used in the estimations. For the output equation, data on the growth rate of national output (Y′) are available directly, but the level of technological progress (ψ) is proxied by the size of national expenditures on education and technical training, while the level of average resource cost (ω) is proxied by the average level of wages in the country.

Resource endowment level (R) is assumed to be highly correlated with its rate of exploitation, which is proxied by the level of investment expenditures in the extractive industrial sector (mining, agriculture, forestry, fishing). A dummy variable for labour union strength in the country is used as a proxy for resource mobility (α), while the consumer price index stands for the general price level (P).

The term $(X' - M_2)$ is the difference between the export sensitivity foreign exchange rate and the import sensitivity to foreign exchange rate, and is interpreted here as the country's terms of trade index (TOT). This index is the proxied by the ratio P_X/P_M, where P_X = exports price index, and P_M = imports price index. The transactions demand for money (Φ) is measured by the annual percentage growth of commercial banks' lending, while the speculative demand for money (ϕ) is proxied by the commercial banks' outstanding cash deposits at the end of each calendar year.

The variables of the control equation of output are from the IFS Yearbook, Yearbook of Labor Statistics, and UNESCO Statistical Yearbook, over the relevant periods. m is growth rate of money supply, G is growth rate of government expenditure, t_i is the yearly average income tax rate, and t_c is the yearly average corporate tax rate.

In the consumption estimation, current period consumption levels (C_1) are obtained for the relevant years involved, but future consumption (C_k) is interpreted as the level of *planned* (desired) consumption

projections at the end of the given planning period. The marginal utility of current consumption is measured as an index of current welfare of the representative citizen, and is proxied by the current level of per capita income of the country. The marginal utility of future consumption is likewise the future or planned level of per capita income projections at the end of a given planning period.

V. The Empirical Results

Equations (9a), (9b), (10b) and (10d) are estimated using 2SLS, and the primary regression results show a pattern of parameter estimates that are consistent with the theoretical findings. Generally, high R^2 (for both national income and consumption) and F-ratios (for national income) indicate a uniformly high degree of explanatory power of the variables. Diagnostic tests we performed on the results did not indicate any serial correlation, as may be shown by the D-W scores reported.

A. National Output

Tables 1a and 1b present the estimates for national output. Technology features as a determining factor in the national output growth of all the countries, but highly significant only for Argentina and the newly-industrializing Oceanic countries, but not of a very important influence for Mexico, Ghana, Zambia, and Nigeria — all relatively unindustrialized and agro-based economies: an evidence that seems to be suggesting that the role of technology tends to be correlated with the level of industrialization. The result for Mexico is rather surprising.

The level of resource endowment, on the other hand, featured strongly for Ghana, Mexico, and Nigeria with high levels of significance, and weakly for Korea, Argentina, and Thailand. The positive estimated coefficients for resource price in the cases of Nigeria and Mexico (both significant at 1% level), and Ghana (significant at the 5% level), complements the important influence which resource endowment has in these cases.

The coefficients of resource price are weak (for Korea and Argentina) and only significant at the 10% level (for Singapore and Thailand). These seem to suggest the differences in emphasis placed in different sectors during the various plan programs in the various countries. For whereas the poorer economies of Ghana, Nigeria, and Mexico most likely carried a resource-based plan with emphasis in agriculture and mining, Singapore and Korea would most likely base their output growth

plans on manufacturing industry and high-technology sectors.

Whereas the role of inflation in output growth is positive as could be expected, the influence of resource mobility is conflicting between Korea, Zambia, Nigeria, and Thailand (where its coefficients are negative as can be expected) and the others. The cases of Ghana, Mexico and Singapore are easily attributed to the general weakness of organized labour in these countries; the results for Korea (significant at 5% level) and Thailand (significant at 10%) indicate the importance of resource mobility in output growth.

The control results are favourable to the theoretical assertions which are being tested. The effects of money supply on long term growth of output in all the cases are relatively small — having a weak coefficient

Table 1a

REGRESSION ESTIMATES OF LONG-TERM NATIONAL OUTPUT GROWTH

Variable	Ghana	Korea	Singapore	Thailand
β_0	−0.3355	−0.9757	−0.8999	−0.2509
	(−1.3632)	(−1.6378)	(−1.1577)	(−0.9414)
ψ	0.0459*	2.1011***	3.1074***	2.0787***
	(1.9875)	(4.4856)	(5.9804)	(2.9041)
ω	2.3037**	0.0849	1.9273*	1.8010*
	(2.6949)	(1.8175)	(1.8295)	(1.7607)
R	1.9608**	0.1111*	0.4835	0.1074*
	(2.0814)	(1.7027)	(1.2341)	(1.7615)
P	0.3273	0.2154**	0.4476*	0.1893**
	(1.4789)	(1.9709)	(1.6556)	(2.0144)
α	0.6810*	−2.1011**	3.1074	−2.0787*
	(1.6621)	(−1.9843)	(1.2514)	(−1.7223)
$X' - M_2$	2.0931***	1.7892**	2.2110***	2.0231***
	(4.2991)	(2.0041)	(4.0280)	(3.4412)
Φ	4.2334***	2.9908**	3.1211***	2.7989***
	(3.1044)	(2.1209)	(3.0544)	(2.9967)
ϕ	0.0671*	0.9032	0.8995	0.9088
	(1.7960)	(0.5431)	(0.5113)	(0.6907)
R^2	0.79	0.88	0.78	0.88
F	14.08	72.40	52.19	38.23
DW	2.17	1.92	1.95	1.87

Variable	Mexico	Nigeria	Argentina	Zambia
β_0	−0.1819	−1.1357	−1.2699	−1.2710
	(−0.3221)	(−1.1373)	(−0.4170)	(−0.5311)
ψ	0.0512**	0.0188**	2.7121***	0.0112*
	(2.3273)	(2.1904)	(4.1022)	(1.8901)
R	0.4231***	0.1290***	0.0687	0.3215*
	(2.5412)	(3.0987)	(0.2576)	(1.6543)
ω	2.1608***	2.1111***	0.3998	0.1074*
	(4.0814)	(4.1032)	(1.1256)	(1.9321)
P	0.1213	1.0957**	1.9453*	1.9013**
	(0.2319)	(2.2119)	(1.7161)	(2.0223)
α	0.2818	−1.0341**	0.9042	−0.9061*
	(0.5441)	(−2.6908)	(1.0093)	(−1.7501)
$X' - M_2$	2.1731***	3.1221***	2.0117**	2.1121***
	(2.8310)	(3.1098)	(2.1006)	(5.0998)
Φ	4.1884***	3.8701**	2.5228***	3.5521***
	(3.2213)	(2.2109)	(4.0721)	(4.9210)
ϕ	0.3422	0.8041	0.5022	0.4531*
	(0.2621)	(0.4552)	(0.9021)	(1.6870)
R^2	0.80	0.90	0.87	0.91
F	22.54	42.21	48.90	34.44
DW	2.52	2.89	2.04	1.89

Notes: t-ratios in parentheses directly under each estimate;
Sample sizes varied for various countries;
* Significant at 10% level;
** Significant at 5% level;
*** Significant at 1% level.

estimate for Zambia, Ghana, Singapore, and Mexico, all with high levels of significance — while showing some effects for Korea, Nigeria, and Thailand. A similar result applies to the effects of government spending (weak for Korea, Argentina, Nigeria, and Thailand, and moderate for Singapore and Ghana, but all statistically significant at the 5% level at least), interest rate (generally negligible for all), and income taxation (statistically insignificant for Thailand, Singapore, and Nigeria, weak for Korea and Zambia). The mild effect of income taxation in Ghana and Mexico could be attributable to the general low income character of the population (which meant that demand would be very sensitive to any little changes in disposable income). Corporate taxation however appears to highly influence output in all cases. The cases of

Table 1b

ALTERNATE REGRESSION ESTIMATES OF
LONG-TERM NATIONAL OUTPUT GROWTH

Variable	Ghana	Korea	Singapore	Thailand
μ_0	0.1231	0.2154	0.6419	0.1599
	(1.2342)	(1.0685)	(2.0981)	(1.1510)
m	0.0071**	0.1119***	0.0599**	0.3808**
	(2.2109)	(2.5629)	(1.9708)	(2.1240)
G	0.4127**	0.0849**	0.1163**	0.0890**
	(2.1649)	(1.9921)	(1.9895)	(1.9907)
r	−0.0801***	−0.1099**	−0.1248*	−0.1055
	(−2.5814)	(−2.1012)	(−1.8900)	(−0.9271)
t_i	−0.5370	0.1215*	−0.0844	−0.0267**
	(−2.1781)	(−1.9749)	(−2.0226)	(−2.1144)
t_c	−2.3872***	−2.0987**	−1.9007***	−1.9877***
	(3.1294)	(2.1310)	(4.0871)	(3.6442)
R^2	0.81	0.86	0.79	0.84
F	42.14	28.40	30.12	33.90
DW	1.94	1.70	1.62	1.22

Variable	Mexico	Nigeria	Argentina	Zambia
μ_0	0.2231	0.1042	0.3329	0.2139
	(1.2342)	(1.0685)	(2.0981)	(1.1510)
m	0.0071**	0.1119***	0.1599**	0.0818*
	(2.2109)	(2.5629)	(1.9978)	(1.8440)
G	0.4879**	0.0849	0.0186**	1.5890**
	(2.0989)	(0.1162)	(2.0103)	(1.9711)
r	−0.0911**	−0.0679**	−2.0191**	−0.1055
	(−2.1814)	(−2.2012)	(−1.9821)	(−0.9271)
t_i	−0.6321*	−0.1320*	−0.8913	−0.1027
	(−1.6781)	(−1.8544)	(−0.4433)	(−0.1144)
t_c	−2.1872***	−1.3889**	−1.9872**	−1.6678***
	(−3.0544)	(−2.1828)	(−2.2434)	(−3.1204)
R^2	0.81	0.92	0.79	0.90
F	42.14	36.20	42.92	39.80
DW	1.94	1.89	1.92	1.69

Notes: t-ratios in parentheses directly under each estimate;
Sample sizes varied for various countries;
* Significant at 10% level;
** Significant at 5% level;
*** Significant at 1% level.

Ghana, Zambia, and Mexico indicate the dependence of these economies on foreign capital sources, under the circumstances of which profit taxation policies would affect investment to a larger extent.

B. Consumption

Tables 2a and 2b present the consumption results. The basic consumption function is vindicted by the results we have on current and planned consumption levels for all the four developing countries. The expected negative relationship between current and planned consumption and the interest rate is weakly supported by these results. The interest rate coefficients were highly significant only for current consumption in Mexico, Ghana and Singapore, while planned consumption showed no statistically significant dependence at all on interest rate. This again goes to support the preceding results on national output concerning the relative weakness of macro variables in long term influences on economic indicators.

The current level of consumption showed strong positive dependence on desired (future) levels of consumption with high statistical signi-

Table 2a

2SLS ESTIMATES OF CURRENT CONSUMPTION

Variable	Ghana	Singapore	Korea	Thailand
γ_0	0.2462	0.1898	1.7867	1.3477*
	(0.2176)	(0.1428)	(0.1227)	(1.6631)
Y	0.8969**	0.8891**	0.8207***	0.9012**
	(2.1793)	(2.2481)	(4.1284)	(2.1303)
C_2	0.1687*	0.0877*	1.9071***	0.0433
	(1.8210)	(1.7442)	(2.5602)	(0.8002)
U_1	4.6805	2.4413*	0.4125	0.7612*
	(1.3100)	(1.1762)	(1.0911)	(1.6903)
U_2	0.2608	1.0957**	1.4321**	1.3210
	(0.8120)	(2.2349)	(1.9816)	(0.2302)
r	−0.2689***	−1.0238*	−1.9214**	−0.0906*
	(2.5341)	(−1.6908)	(2.0093)	(−1.7501)
$C_{1(t-1)}$	0.1185*	0.2134*	0.5642***	0.5421
	(1.7311)	(1.9131)	(2.8088)	(0.8722)
R^2	0.989	0.976	0.965	0.982
DW	1.833	1.513	1.298	1.188

Variable	Mexico	Nigeria	Argentina	Zambia
γ_0	0.3212	0.1898	1.8820	1.3477
	(0.2176)	(0.1428)	(0.1227)	(0.0311)
Y	0.7986**	0.8891**	0.8007***	0.9012**
	(2.1793)	(2.2481)	(5.1284)	(2.1303)
C_2	0.1484*	0.0877*	1.8106***	0.0433
	(1.7210)	(1.9012)	(3.1602)	(0.8002)
U_1	4.2865	2.4413*	0.4125	0.7612*
	(1.3100)	(1.8167)	(1.0911)	(1.8903)
U_2	0.2195	1.0957**	1.7612**	1.3210
	(0.8120)	(2.2349)	(2.1816)	(0.2302)
r	−0.3180***	−1.0238*	1.8924**	−0.0906*
	(4.5441)	(−1.6908)	(2.0093)	(−1.6501)
$C_{1(t-1)}$	0.1218*	0.2134*	0.6242***	0.5421
	(1.7311)	(1.7792)	(3.9088)	(0.8722)
R^2	0.989	0.976	0.965	0.982
DW	1.833	1.513	1.298	1.188

Notes: t-ratios in parentheses directly under each estimate;
Sample sizes varied for various countries;
* Significant at 10% level;
** Significant at 5% level;
*** Significant at 1% level.

ficance only for the newly industrializing (relatively high-income) countries such as Thailand and Singapore, but not for (low-income) Ghana or Zambia. Again only in three relatively high-income countries (Korea, Argentina, and Singapore) did current consumption show strong negative and statistically significant dependence on future (planned/desired) welfare. These results seem to suggest that different consumption policy approaches are needed for different countries according to their current levels of development.

Planned (future) consumption level did not appear to be affected by current consumption. But there were strong and highly statistically significant dependence of planned consumption on planned welfare in all cases.

Lagged consumption levels featured generally as a determining factor infuencing both current and planned consumption. But whereas it has a statistically significant coefficient for both current and planned consumption in the case of the high-income countries, in the case of

Table 2b

2SLS Estimates of Future Consumptional

Variable	Ghana	Singapore	Korea	Thailand
π_0	−0.1759	−1.1357	−1.2959	−1.2710
	(−0.2612)	(−1.1373)	(−0.1274)	(−0.5311)
Y	0.1566**	1.2109**	1.5621***	2.0992*
	(2.2908)	(2.2318)	(4.5864)	(1.8142)
C_1	0.0100	0.1290*	−0.1290	0.0982
	(1.4855)	(1.6713)	(0.8710)	(0.3219)
U_1	0.0266**	−2.0951**	−2.3341*	0.1124*
	(1.9821)	(−2.1021)	(−2.1321)	(1.6827)
U_2	0.6384***	1.1106**	1.7621**	0.9982***
	(4.8620)	(2.2432)	(2.1760)	(5.4302)
r	2.6569	−1.3471*	1.9083	−0.8770*
	(0.2190)	(−1.7698)	(0.6570)	(−1.8755)
$C_{2(t-1)}$	0.6305***	−1.4233**	1.8721***	1.0782**
	(5.2890)	(−1.9726)	(4.3766)	(2.0121)
R^2	0.980	0.924	0.908	0.918
DW	1.956	1.960	1.890	1.951

Variable	Mexico	Nigeria	Argentina	Zambia
π_0	−0.1759	−1.1357	−1.2959	−1.2710
	(−0.2612)	(−1.1373)	(−0.1274)	(−0.5311)
Y	0.1566**	1.2109**	1.5621***	2.0992*
	(2.1908)	(2.2318)	(4.5864)	(1.7452)
C_1	0.0100	0.1290*	−0.1290	0.982
	(1.4855)	(1.8233)	(0.8710)	(0.3219)
U_1	0.0266**	−2.0951**	−2.3341*	0.1124*
	(2.0913)	(2.1021)	(1.7139)	(1.6827)
U_2	0.6384***	1.1106**	1.7621**	0.9982***
	(3.8620)	(2.0432)	(1.9760)	(4.4302)
r	1.3218	−1.3471*	2.1172	−0.8770*
	(0.2190)	(−1.7698)	(0.6570)	(−1.8755)
$C_{2(t-1)}$	0.8255***	−1.4233**	1.2219***	1.0782**
	(3.2890)	(−1.9762)	(4.8766)	(2.0921)
R^2	0.980	0.924	0.908	0.918
DW	1.956	1.960	1.890	1.951

Notes: t-ratios in parentheses directly under each estimate;
Sample sizes varied for various countries;
* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level.

(low-income) Ghana its estimated coefficients are significant only for planned consumption and not for current consumption. However, despite lagged consumption, the other included regressors did have non-zero coefficients. This indicates that the evidence did not support the RWH in these developing countires. In fact, the evidence suggests a rejection of the RWH in developing countries.

At best, we can only infer that the RWH appears to be evident only for the relatively high-income countries and not for low-income countries.

VI. Summary and Policy Conclusions

A theoretical and empirical formulation of national output and consumption planning is presented here as a guide for long term planning for these two important economic objectives. It is found that manipulation of micro policy parameters would be more effective in planning for long term national output growth in developing countries, while demand management policies would be less than effective. However, the relative effects of the micro policy parameters would differ according to the level of development of the country concerned. For instance, a low-income agrarian economy would need more resource management than infusion of high technology, while a relatively high-income economy would need a more technologically biased planning.

These are important lessons for guidance of planning programs of many developing countries which have tended to place emphasis on inappropriate policy parameters in the past. The high priorities that had been given to acquisition of sophisticated technologies in the planning programs of may low-income developing countries, appear to have been a flawed policy action. Planning in these countries require the effective mobilization of resources and the adoption of an appropriate mix of resource prices in allocating resources. Equally, planning programs based on the instruments of macro policy, appear to have been misguided as well.

The planning objective of augmenting national consumption is seen to lie heavily on raising national output. There is a consistent showing that future consumption is influenced by planned welfare aspiration. This introduces a socio-political dimension aspect of resource mobility, namely, that the society needs to raise its aspirations. This has been a neglected aspect of planning variables, and low-income countries need to recognize the importance of such human factors in long term plan-

ning strategy.

This study has not found sufficient evidence to support Hall's Random Walk Hypothesis on the whole, but there is indication that the hypothesis may have some merit in high-income countries. Developing countries therefore have to view consumption as mainly dependent on national income, and until sufficiently high levels of national income have been achieved, LDCs must generally constrain their consumption levels. In particular, LDCs must strongly resist the temptation on financing higher consumption levels with borrowed resources.

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