National Savings Rates of India and Pakistan: A Macroeconometric Analysis

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Savings provide the most important economic link between the past, present and future of a country. An adequate rate of national saving is regarded as an essential condition for achieving targets in the investment and growth rates. For these reasons, the literature relating to savings and consumption with particular emphasis on their determinants–demographic, monetary, fiscal etc., has shown a phenomenal growth during the last half century.

An up-to-date and comprehensive review of theoretical and empirical literature on savings made in Kazmi (1991) led to the conclusion that while literature on the determinants of savings (private, corporate and public) had proliferated over time, there was little work on the 'quantification of factors' causing a differential in the savings rates of two particular countries. This paper makes an attempt to fill this gap by adopting a simple but innovative methodology which has been used for analysing the national savings rates of India and Pakistan and constitutes the following steps:

(a) A regression model incorporating the major macroeconomic variables relevant for explaining the national saving behaviour was specified.

(b) The estimation of the model was instrumental in identification of the signs and magnitudes of coefficients of the variables of the model. Thus the variables could be classified in terms of their negative or positive correlation with the national saving rates.

(c) The difference in the average values of the relevant macro variables of the two countries was estimated. This information as given in Table 1 for India and Pakistan for 1960–88 indicates that on an average basis Pakistan performed better than India in real growth rate, export ratio,

Table 1

India and Pakistan Comparative Data
(The Average Values for 1960–88)

Economic Variable		India	Pakistan	Difference
(1)		(2)	(3)	(4) = (2) −(3)
(i)	National Saving Rate (%)	18.8	10.9	7.9
(ii)	Growth Rate in Real GNP (%)	3.9	6.3	−2.4
(iii)	Population Growth Annual Rate (%)	2.3	3.0	−0.7
(iv)	Government Expenditure on Education/GNP Ratio (%)	2.8	1.6	1.2
(v)	Government Expenditure on Defence/GNP Ratio (%)	2.8	5.8	−3.0
(vi)	Exports/GNP Ratio (%)	4.0	6.4	−2.4
(vii)	Import/GNP Ratio (%)	6.3	13.2	−6.9
(viii)	Gross External Aid/ GNP Ratio (%)	1.3	4.4	−3.1
(ix)	Tax/GNP Ratio (%)	12.6	11.3	1.3
(x)	Inflation Rate (%)	7.4	7.6	−0.2
(xi)	Real Interest Rates (%)	−0.696	−0.013	−0.683

gross aid inflows and real interest rates. The Indian economy, on the other hand, showed better performance in terms of lower population growth rate, higher public expenditure on education, lower ratio of ublic spending on defence and lower import ratio.

(d) The estimates made in (b) and (c) above served as the basis for identifying both the unfavourable variables (factors) viz-a-viz favourable variables (factors) which taken together could explain the significant portion of the 7.9 percentage points difference in the national saving rates of India (18.8 percent) and Pakistan (10.9 percent). A variable was classified as unfavourable from the perspective of Pakistan's relative saving performance if it had a negative but significant coefficient in the estimated regression equation but Pakistan had a higher average value of that variable as compared to India. By multiplying the value of the coefficient with the difference in the average values of the variable for India and Pakistan, one could get the specific value (a percentage) which was attributable to the variable as

an explanatory factor for the saving differential between the two countries. Alternatively if a variable had a positive coefficient, but Pakistan had a lower average value for that variable as compared to India, the variable would be classified as unfavourable.

(e) The classification of variables as favourable would follow the logic opposite to the one elaborated in (d) above.

(f) The cumulative magnitude of favourable variables is netted from total magnitude of the unfavourable variables (factors) to get the relative weight of the 'residual' which represents the effect of variables of cultural, religious and political dispensation.

THE SAVING MODEL: AN EXTENDED ABMVW MODEL[1]

By extending the ABMVW Model of national savings, a "comprehensive" saving model was specified which includes explanatory variables representing demographic, fiscal, monetary, trade-related factors which play a predominant role in determining the aggregate saving behaviour of a country. Since the theoretical basis of each variable included in the model is adequately provided in the literature on savings, we directly reproduce our chosen model:

$$
\begin{aligned}
S_n = a_0 \; &+ \; a_1 \; POPG + a_2 \; Log\,(Y) \quad + \; a_3 \; g \\
&+ \; a_4 \; X \quad + \; a_5 \cdot M \quad + \; a_6 \; EXAID \\
&+ \; a_7 \; GEE + a_8 \quad P \quad + \; a_9 \quad R \quad + \; a_{10} \; DFE \\
&+ \; a_{11} \; TOT + a_{12} \; (DP) \quad + \; a_{13} \; (DS)
\end{aligned}
$$

Where S_n is national saving rate, $POPG$ represents the population growth rate, Y is real per capita income, g is growth rate of real GNP, X is exports, M is imports, $EXAID$ is external aid inflows, GEE is government expenditure on education, P is the inflation rate, R is the real interest rate, DFE is defence expenditure, TOT is index of barter terms of trade and DP and DS are country dummies for Pakistan and Sri Lanka respectively with India taken as the "Control" dummy[2]. The variables such as X, M, $EXAID$, GEE, DFE are measured as ratio of GNP of respective countries.

The hypothesised signs of coefficients are as following:

$$a_1 \; < \; 0; \, a_2 \; > \; 0; \, a_3 \; > \; 0; \, a_4 \; > \; 0; \, a_5 < 0$$
$$a_6 \; > \; 0; \, a_7 \; > \; 0; \, a_8 \; < \; 0;$$
$$a_9 \; > \; 0; \, a_{10} \; < \; 0; \, a_{11} \; > \; 0$$
$$a_{12} < \; 0; \, a_{13} \; < \; 0$$

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[1]For details of the model see Aghevli *et al.* (1990).

[2]The main objective was to evolve a 'representative' saving function which could adequately explain national saving behaviour of countries belonging to South Asian region such as Pakistan, India, Bangladesh and Sri Lanka. This also allowed larger degrees of freedom. Subsequently, however, Bangladesh was excluded because of non-availability of data pertaining to some of the vital macroeconomic variables like government expenditure on education (*GEE*) and real interest rates (*R*) etc.

The above regression model has been estimated by OLS based on time-series data for Pakistan, India and Sri Lanka, for the period 1960–88 which gave the following result:

$$S_n = -0.236 \quad -0.991 \, POPG + 0.057 \, log \, (Y) + 0.108 \, g$$
$$\quad\quad (-2.204) \quad (-1.670) \quad\quad (3.361) \quad\quad (1.190)$$
$$+0.193 \, x - 0.228 \, M + 0.368 \, EXAID + 2.051 \, GEE$$
$$(1.610) \quad (-3.030) \quad (1.807) \quad\quad\quad (2.764)$$
$$+0.337 \, P + 0.437 \, R - 0.735 \, DFE + 0.0004 \, TOT$$
$$(2.369) \quad\quad (2.890) \quad (1.779) \quad\quad\quad (2.112)$$
$$-0.036 \, DP - 0.123 \, DS$$
$$(-2.101) \quad (-5.505)$$

$$\overline{R}^2 = \quad 0.774 \quad\quad D.W. = 1.338 \quad\quad F = 22.804 \quad\quad SSR = 0.033$$

(No. of observations = 87; Degrees of Freedom = 73).

Quantification of Factors Causing Differential in Saving Rates of India and Pakistan

Table 1 has been constructed to highlight the absolute and the relative weight of both unfavourable and favourable factors in explaining the difference of 7.9 percent in the national saving rates of Pakistan and India for the period 1960–88. The table indicates that the absolute difference of 7.9 percent is explained by higher population growth rate to the extent of 9 percent by lower expenditure on education by 32 percent and so on.

The explanation of each estimate is provided in the following:

(i) Population Growth Rate (POPG)

The absolute value of the coefficient of this variable in the pooled regression is −0.991 while the difference in the average population growth rates of Pakistan and India is 0.7 percent (= 3.0 percent–2.3 percent). This difference multiplied with the coefficient of population growth rate gives us the absolute difference of 0.7 percent and this explains 8.9 percent of the difference of 7.9 percent of the saving rates of Pakistan and India.

(ii) Government Expenditure on Education (GEE)

India on an average basis has been spending about 2.8 percent of its GNP on education against Pakistan's 1.6 percent and this difference of 1.2 percent when multiplied with the regression coefficient of 2.051 of GEE gives the absolute difference of 2.5 percent which explains about 32.0 percent of difference in the saving rates of the two countries.

(iii) Government Expenditure on Defence (DFE)

The pooled regression has shown that an increase of 1.0 percent point in defence spending decreases national saving rate by about 0.735 percent point on an average basis. Since Pakistan spends around 5.8 percent of its GNP on defence compared to 2.8 percent of India, this large difference of 3.0 percent in defence spending gives the absolute weight of 2.2 percent (= 0.735 * 3.0) in explaining the average difference of 7.9 percent in the saving rates of India and Pakistan. In other words this differential in defence spending explains about 27.8 percent of the saving difference between the two countries.

(iv) Imports (M)

In the pooled regression, the value of the negative and highly significant coefficient of imports is 0.228, while Pakistan's imports at 13.15 percent of GNP are higher by 6.86 percent as compared to India's imports at 6.29 percent. This difference of 6.29 percent when multiplied with 0.228 gives the absolute weight of 1.6 percent in the total saving difference of 7.9 percent i.e. its relative weight is 20.3 percent.

(v) The Total Effect of Unfavourable Factors

The total effect of unfavourable factors (i) to (iv) in explaining the saving difference between India and Pakistan comes around 7.0 percent which explains 88.6 percent of the average saving difference between India and Pakistan equivalent to 7.9 percent.

(vi) Total Effect of Favourable Factors

The effect of favourable factors such as higher real per capita income, better export performance of Pakistan, higher external aid inflows and higher real interest rates has been to narrow the saving gap between Pakistan and India. The aggregate contribution of these factors in raising the saving ratio of Pakistan viz-a-viz India has been calculated at 2.2 percent in absolute terms and at 27.8 percent in relative terms. The details are provided in items (vii) to (ix) below.

(vii) Real per Capita Income

The value of the cofficient of the logarithm of the real per capita income i.e. $\log(Y)$ is 0.057 which multiplied by 5.371 gives the absolute weight of 0.3 percent i.e. (3.8 percent of total difference of 7.9 percent in the saving ratio of India and Pakistan). The question is how do we get the income multiplicand of 5.371. This is based on the calculations made in Table 3. In this table, Ei, Ep, (YI), (YI)p, (YP)p represent respectively the nominal exchang rate of India, nominal exchange rate of Pakistan, real per capita income of India at 1959-60 prices, real per capita income of India expressed in Pakistani rupees and real per capita income of Pakistan expressed in Pakistani rupees.

Now, for the period 1960–88 the average per capita income of India in Pakistani rupees is Rs 422 against per capita income of Pakistan of Rs 637, such that log (637–422) = log (215) = 5.371. This value multiplied with 0.057 gives us the coefficient of 0.3, which is reflected in Table 2 item (vi).

Table 2

Quantification of Causal Factors Explaining Difference of Average Saving Rates between Pakistan and India

	Unfavourable		Favourable	
	Absolute Difference (%)	Relative Weight (%)	Absolute Difference (%)	Relative Weight (%)
(i) Population Growth Rate	0.7	8.9	–	–
(ii) Government Expenditure on Education	2.5	31.6	–	–
(iii) Government Expenditure on Defence	2.2	27.8	–	–
(iv) Imports	1.6	20.3	–	–
(v) Real per Capital Income	–	–	0.3	3.8
(vi) Growth Rate	–	–	–	–
(vii) Exports	–	–	0.5	6.3
(viii) Inflation Rate	–	–	–	–
(ix) External Aid	–	–	1.1	13.9
(x) Real Interest Rate	–	–	0.3	3.8
(xi) Total Effect of Unfavourable Factors	7.0	88.6	–	–
(xii) Total Effect of Favourable Factors	–	–	2.2	27.8
(xiii) Net Effect of Unfavourable and Favourable Factors	4.8	60.8	–	–
(xiv) Residual	3.1	39.2	–	–
Total Difference	7.9	100.0	–	–

Table 3

Real per Capita Income of Pakistan and India
(in Pakistani Rupees)

	Ei	Ep	Ep/Ei	YI	(YI) p	(YP) p
	(1)	(2)	(3)	(4)	(5) = (4) * (3)	(6)
1960–65	4.76	4.76	1.00	305	305	435
1966–70	7.50	4.76	0.63	377	238	540
1971–75	7.70	8.13	1.06	400	424	598
1976–80	8.50	9.90	1.16	459	532	688
1981–85	10.70	12.70	1.19	426	507	843
1986–88	13.00	16.99	1.31	564	739	944
Avg. Real per Capita Income					422	637

Notes: Ei = Indian rupees/US $.
Ep = Pakistan rupees/US $.
Ep/Ei = Ratio of exchange rates of Pakistan and India.
YI = Real per capita income of India in Indian rupee.
(YI)p = Real per capita income of India in Pakistani rupee.
(YP)p = Real per capita income of Pakistan in Pakistani rupee.

(viii) Growth Rate of GNP

In the pooled regression, the value of the coefficient of the growth rate of real national income is positive but non-significant and as such this variable does not have any leverage on the saving rate differential between India and Pakistan.

(ix) Exports

On the same pattern, the positive coefficient of exports (X) assumes a value of 0.193 which multiplied with the difference in the export ratio of 2.42 percent (i.e. 6.4 percent for Pakistan against 4.05 percent for India) gives us the absolute weight of 0.5 which is 6.3 percent of the saving difference of 7.9 percent between Pakistan and India.

(x) The Residual

The unfavourable factors have explained 88.6 percent of the saving difference between Pakistan and India. The favourable factors i.e. the factors which raised the saving ratio of Pakistan compared to India had the combined effect of 27.8 percent. The net effect of the unfavourable factors is therefore equal to 60.8 percent. This implies that the residuals of 39.2 percent is accounted for by the political, cultural and miscellaneous other monetary and fiscal factors which could not be determined through the regression model.

The role of cultural factors in saving-consumption decisions of a community was highlighted by Friend (1980). His observations quoted here are as much relevant for national savings as for private or household savings:

> "The apparent paucity of non-coercive economic measures which could be taken by the Government to increase household or private saving may seem strange in view of the extremely large observed differences in the underlying saving-income ratios for different countries. Although these differences have not been satisfactorily explained in the literature, it is my judgement that to a major extent they represent cultural differences or difference in tastes (perhaps like those reflected in the Puritan ethic). As a consequence, it may be possible to increase private saving more effectively through non-economic means than through economic policies".

CONCLUSIONS AND LIMITATIONS

The critical finding of this exercise is that demographic factors and the factors associated with human resource development explain more than 50 percent of the difference between the savings rate of India and Pakistan. This finding corroborates the implicit conclusions reached by Wheeler (1984) through the solution of his simultaneous equation model, which assigns paramount importance to these factors in explaining the process of economic growth, changes in productivity and rates of capital formation in India and Pakistan. The role of public spending on defence and the import ratios also explain a significant portion of the saving differential between the two countries. The adverse effects of these unfavourable factors outweigh the effect of favourable factors like higher real per capita income, higher export ratio, higher external capital inflows and higher real interest rates.

It must be reiterated that these conclusions are subject to numerous methodological and estimation caveats, and as such must be taken with a measure of caution and scepticism. The basic deficiency of these calculation stems from the changing values of coefficients of the explanatory variables in the regression analysis because these values are quite sensitive to model specification, time period of analysis and choice of estimation techniques.

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Comments on
"National Savings Rates of India and Pakistan: A Macroeconometric Analysis"

This is an important study in that it undertakes a comparative analysis of the savings behaviour in two countries and thus adds a new dimension to savings analysis.

My comments on the paper very briefly are:

(a) The model includes too many variables but no correlation matrix is reported to judge the collinearity problem. Collinearity affects the outcome among the variables.

(b) The signs of some variables are debatable. For example, while some studies have confirmed a positive relationship between savings and growth of real GNP (a_3), it may be noted that the sign of a_3 will be positive only to the extent the households on the average accumulate wealth when they are young to spend in their old age. In countries like Pakistan and India where the households spend before they earn by borrowing, a_3 may not always bear a positive sign. Furthermore, the positive effect of economic growth on savings may also be negated by a higher dependency ratio.

Similarly, the sign of a_6 in this equation is controversial. Studies by Rsenstien-Rodan (1961); Chenery and Strout (1966) and Chenery and Eckstein (1970) have shown foreign capital inflows as an important variable in relaxing the resource constraint of developing countries. However, following Griffen and Enos (1970), a number of studies have confirmed a negative sign for foreign capital inflows. These include Wasow (1979); Mosley (1980); Gupta and Islam (1983); Morisset (1989) and Ahmed (1990). Talking specifically of foreign aid, Papanek (1973) and Park (1987) have disaggregated foreign capital inflows into different components and they show that the impact of foreign aid on savings has always been negative but that of foreign private investment has always been positive but insignificant. For Pakistan I would refer to the most recent papers by Khan (1992); Mahmood (1992); Shabbir (1992); Chisti and Hasan (1992) presented in the last PSDE conference and that of Khan and Rahim (1993) presented in the present conference. All these studies have shown a negative coefficient of external aid, in particular, and capital inflows in general, for Pakistan. The last study by Khan and Rahim (1993) covers the same time period as in this study. therefore, the positive coefficient of external aid in this paper becomes somewhat doubtful.

(c) On the variables included in the Equation 1 would also like to point out that the estimated model excludes an important variable affecting domestic savings, i.e., external indebtedness. It is shown by Khan (1992) and Khan and Rahim (1993) that the adverse effect of foreign capital inflows on savings has in fact resulted in an higher external debt and external debt exerts a strong influence on national savings. Fry (1991) has also highlighted the negative relationship between foreign debt and national savings for Asian countries.

(d) In the model specification only one variable Y (per capita income) is used in log form. The reason for this is not justified. I think it needs to be clarified why it is so.

(e) Looking at the data set we find that it is pooled data for Pakistan, India and Sri Lanka while the analysis pertains to India and Pakistan only. This raises two important questions: One, what is the justification for pooling three countries data. Was any covariance analysis performed to determine whether the economy of Sri Lanka behaved the same way as that of India or Pakistan? In this respect I would like to draw the attention of the author to the study by Punchamukhi, Mehta and Tadas (1987) which gives detailed data on major macroeconomic parameters for third world countries. It shows that these three economies diverge significantly in imortant macroeconomic variables. Secondly, we know that the parameters of an equation can change if we change the data set. The parameters of the equation estimated in this model reflect the average behaviour of the variables in the three countries. But the contribution of factors in explaining the differences in savings rates are calculated for India and Pakistan only. This casts serious doubts on the reliability of the estimates reported in the paper.

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