The Role Of Saving In Pakistan's Economic Growth

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Abstract

We study the relationship between saving and economic growth using time series data for Pakistan for 1960-95. We find that both total saving and private saving have a long run positive relationship with GDP. The augmented Granger causality indicate that the growth of GDP Granger causes the growth rates of both private saving and total saving. However, the growth rate of private saving is found not to be Granger causing growth of GDP while the growth of total saving is found to be causing the growth of GDP.

Introduction

Pakistan was created in 1947 when India gained independence and was divided. Pakistan's economic performance during the decade of the 1950s was dismal. Real per capita income declined at first and then caught up to the pre-independence level. During the next decade, the economy went through a number of shocks. The real GDP grew at an average rate of about 3% per year. Pakistan was involved in two wars with India in 1965 and in 1971. The 1971 resulted in the creation of eastern Pakistan as a separate country (Bangladesh). The economy grew at an average rate of 4.6% per year during the 1970s. The 1980s was a good decade for the Pakistani economy when real GDP grew at an average rate of 6% per year. The growth of the economy slowed down considerably during the first half of the 1990s.

In such typical models of economic growth as the Solow (1956) model, a clear connection is made between saving and economic growth. The conventional wisdom says: higher saving leads to higher investment which in turn leads to higher economic growth. The presumption is that higher saving precedes economic growth and higher saving causes economic growth. The belief in these types of models leads to strong macroeconomic policy recommendations for development. As a result, for many years, the World Bank has recommended that developing countries should pay close attention to policies that lead to higher saving rate in order to boost economic growth. In this paper, we study the saving and growth nexus for Pakistan using annual data for Pakistan for 1960-95. All data come from the *International Financial Statistics* (September 1997).

Following previous studies, we define total saving as GDP minus consumption (private and government). Baxter and Crucini (1993) have called this "basic saving". Private saving is defined as total saving minus government saving. Government saving is defined as government revenue minus government expenditure. All data are deflated by the GDP deflator so that we deal only with real variables. We use logarithmic transformations of all data so that first

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differences give us the growth rates.

Figure 1 shows total saving as a percentage of GDP in Pakistan. Total saving as a percentage of GDP has been around 16% in recent years. However, during the 1970s, the low saving rate was of much concern. Social ethos placed pressure for consumption among that class of society, which could afford to save (Noman, 1988, p. 166). Another factor for the low saving rate was the Islamization of the economy. A tax on saving deposits (called *Zakat*) of 2.5% discouraged people from holding bank accounts and encouraged them to use resources for speculative purposes. One of the aims of the Fifth Five-Year Plan (1978-83) was to raise the saving rate substantially. However, in practice, the results were rather disappointing. The total saving rate hit an abysmal low at less than 6% in 1985. The target rate of growth of the ambitious Sixth Five Year Plan had to be revised downwards due to the government's inability to raise domestic resources for the plan. Pakistan's total saving rate compared unfavorably with other South Asian countries such as India and Sri Lanka during the 1970s and 1980s. Both India and Sri Lanka had much higher saving rate than Pakistan during the period. Figure 2 shows private saving as a percentage of GDP. What is striking about private saving as a percentage of GDP is that there was a steep rise in it from 1985 to 1993. Private saving as a percentage of GDP has hovered around 20% in recent years. According to Husain (1996), this rise in the private saving rate can be attributed mostly to financial deepening. The demographic structure of population of Pakistan has remained more or less the same as a result of a high rate of population growth. This is in contrast with many countries in Southeast Asia where a decline in the growth rate of population has been a significant factor in increasing the saving rate. It should also be noted that the private saving rate is much higher in many Southeast Asian countries than in Pakistan.

Methodology and Results

We use the most recent techniques in time series econometrics to study the relationship between saving and GDP in Pakistan. First, it is necessary to study the unit root properties of the variables. We use the augmented Dickey-Fuller (ADF) (see Dickey and Fuller (1979 and 1981) test. The test involves estimates the following equation:

$$\Delta y_t = c_1 + \omega y_{t-1} + c_2\, t + \sum_{i=1}^{p} d_i \Delta y_{t-i} + \nu_t \qquad (1)$$

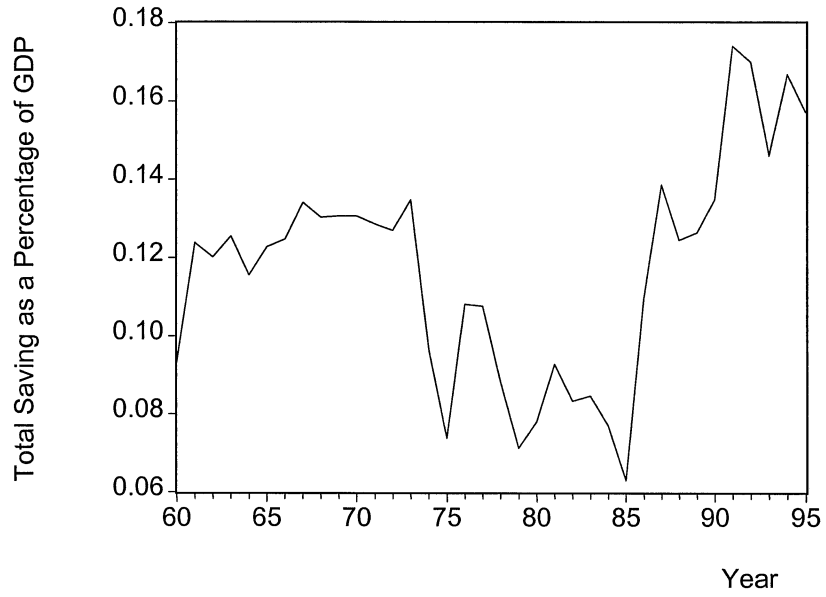
In (1), $\{y_t\}$ is the relevant time series, Δ is a first-difference operator, t is a linear trend and ν_t is the error term. The above equation can also be estimated without including a trend term (by deleting the term c_2 t in the above equation). The null hypothesis of the existence of a unit root is H_0: $\omega = 0$.

The results of the augmented Dickey-Fuller tests are in Table 1. The results show that all three variables have unit roots but the first differences are stationary, i.e., all three variables are I(1). Now that we have established the order of integration of the variables, we use the multivariate cointegration tests. We use a Johansen (1991) framework of cointegration tests. The general form of the vector error correction model is given by:

$$\Delta y_t = a_{oy} + a_{1y} t - \Pi_y z_{t-1} + \Sigma \Gamma_{iy} \Delta z_{t-i} + \Psi_y w_t + e_t,\ t = 1,2,.n \qquad (2)$$

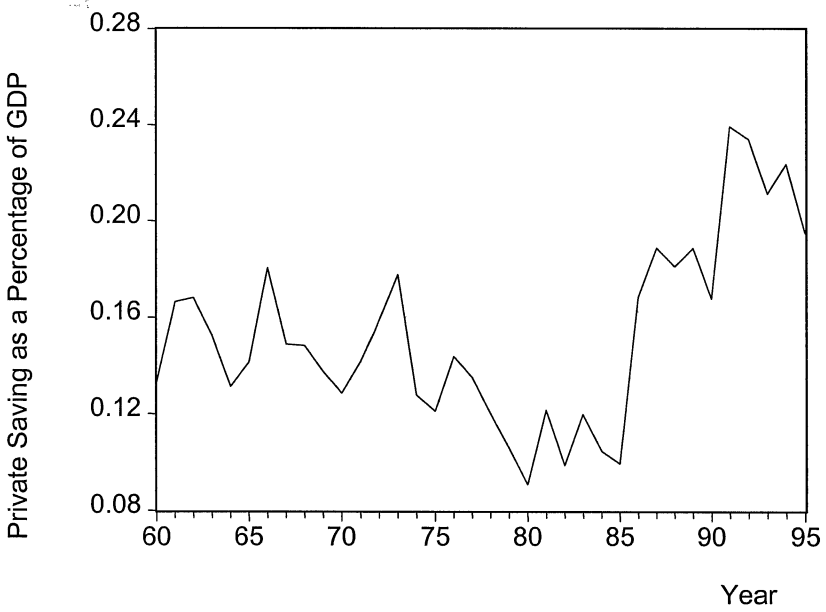
where $z_t = (y'_t, x'_t)'$, y_t is an m_y x 1 vector of endogenous variables I(1) variables and w_t is a q x 1 vector of exogenous/deterministic variables I(0) variables. This framework of cointegration tests is more robust than the residual based cointegration tests proposed by Engle and Granger (1987). The results of the cointegration tests for GDP and total saving (TS hereinafter) are in table 2. Since we have a relatively low sample size, we use the finite sample correction proposed by Reinsel and Ahn (1992). The trace statistic is multiplied by (T - pk)/T where T is the number of observations, p is the number of

Figure 1. Total Saving as a Percentage of GDP in Pakistan, 1960-95.



Source: Calculated from International Monetary Fund (1997).

Figure 2. Private Saving as a Percentage of GDP in Pakistan, 1960-95.



Source: Calculated from International Monetary Fund (1997)

variables and k is the lag order in the VAR system. We use the Schwarz Bayesian Criterion (SBC) to determine the lag which turns out to be one. The trace test results indicate that the two variables are cointegrated and that the number of cointegrating vectors is equal to one. Next, we conduct similar cointegration tests between GDP and private saving (PVS hereinafter). Again, we use the finite sample correction to correct the statistics. In this case also, the SBC selects a lag of one. The results of the cointegration tests for GDP and PVS are in table 3. Again, the results for both eigenvalue and trace tests indicate that there is one cointegrating vector. These two cointegrating vectors for GDP and TS and GDP and PVS are in table 4. The results indicate that there is positive long run relationship be-

Table 1
Augmented Dickey-Fuller Tests

Variable	Test Statistic	Variable	Test Statistic
PVS	-1.9237(0)	ΔPVS	-6.5690*(0)
TS	-1.6084(0)	ΔTS	-5.7602*(1)
GDP	-2.0838(0)	ΔGDP	-4.8895*(0)

Note: PVS, TS and GDP stand for private saving, total saving and gross domestic product respectively. All variables are expressed in logarithmic terms. Δ stands for first difference. Lags in parentheses are determined using the Schwarz Bayesian Criterion (SBC). The number of observations is kept constant at various lags. The critical value at the 5% level for variables (with trends) in their levels is -3.5615. The critical value for variables without trends in their first differences is -2.9627. *Indicates no trend.

Table 2
Cointegration Tests for Total Saving and GDP

Trace Tests			
Null	Alternative	Test Statistic	Critical Value
R=0	r>=1	53.77**	20.18
R <=1	r=2	2.83	9.16

Note: All variables are expressed in logarithmic terms. The lag order is one and was determined by using the Schwarz Bayesian Criterion. Test statistics are corrected for finite sample bias. Critical values are for the 95% quantile.
**Significant at the 5% level.

Table 3
Cointegration Tests for Private Saving and GDP

Trace Tests			
Null	Alternative	Test Statistic	Critical Value
R=0	r>=1	52.23**	20.18
R <=1	r=2	4.96	9.16

Note: All variables are expressed in logarithmic terms. The lag order is one and was determined by using the Schwarz Bayesian Criterion. Test statistics are corrected for finite sample bias. Critical values are for the 95% quantile.
**Significant at the 5% level.

Table 4
Long Run Cointegrating Vectors

GDP	TS
-1.000	0.7059
GDP	PVS
-1.000	0.6427

Note: PVS, TS and GDP stand for private saving, total saving and gross domestic product respectively. All variables are expressed in logarithmic terms. The coefficients are normalized on GDP.

tween GDP and TS as well as between GDP and PVS.

Next, we consider the issue of causality. Even if we find that the variables are cointegrated, it does not imply causality. We conduct the Granger (1969) causality tests. When the variables are stationary or they are cointegrated, then causality tests can be conducted. However, Granger (1988) argues that when the variables are cointegrated, the standard Granger causality tests are not valid. We need to use the error correction model of the following form: (See page 83.)

$$\Delta x_t = a_0 + a_1 z_{t-1} + \sum_{i=1}^{g} c_i \Delta x_{t-i} + \sum_{j=1}^{h} d_j \Delta y_{t-j} + \varepsilon_t \quad (3)$$

$$\Delta y_t = b_0 + b_1 z'_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta x_{t-i} + \sum_{j=1}^{n} \beta_j \Delta y_{t-j} + v_t \quad (4)$$

In (3) and (4), z_{t-1} and z'_{t-1} are lagged error terms of the following cointegrating equations respectively.

$$y_t = g_0 + g_1 x_t + z_t \quad (5)$$

$$x_t = h_0 + h_1 y_t + z'_t \quad (6)$$

Granger suggests that causality tests can be performed on the levels or on the first differences if the variables are cointegrated. If the variables are not cointegrated but stationary, then the lagged error terms (z_{t-1} and z'_{t-1}) are to be dropped from equations (3) and (4). Regressions (3) and (4) are the unrestricted regressions. The restricted regressions can be run by dropping $\sum_{j=1}^{h} d_j \Delta y_{t-j}$ terms from (3) and $\sum_{i=1}^{m} \alpha_i \Delta x_{t-i}$ from (4). In addition, z_{t-1} and z'_{t-1} do not enter the restricted regressions. The F statistic is calculated as follows:

$$F = (n\text{-}k\text{-}1)\,[(ESSR - ESSU) / q(ESSU)] \quad (7)$$

where ESSR is the error sum of squares in the restricted regression, ESSU is the error sum of squares in the unrestricted regression, n-k-1 is the number of degrees of freedom in the unrestricted regression and q is the number of parameter restrictions. The statistic is distributed as F(q, n-k-1).

Since our results show that both sets of variables have a long run relationship, we use the augmented Granger causality tests. We are more interested in studying the growth rates of the variables. As indicated earlier, we use logarithms of the variables so that first differences give us growth rates. The results for lags of one, two and three lags are given in tables 5-7. The lags were also determined by the Schwarz Bayesian Criterion (SBC) but in no case did the optimal lag turn to be more than two. The results for lags of one and two indicate that there is a strong evidence that the growth of TS leads to the growth of GDP and vice versa. Also, there is strong evidence that the growth of GDP Granger causes the growth of PVS but not vice versa. That the growth rate of GDP Granger causes the growth rates of both TS and PVS is expected. However, the reverse causality is of more interest from a policy point of view.

The implication is that policies which aim at increasing the growth of total saving are likely to lead to a rise in the growth rate of the economy. However, not all types of saving are equally conducive to economic growth. Policies targeted to increase the growth rate of private saving are not very effective in increasing economic growth. In other words, it is quite possible that private saving was used for purposes that did not promote economic growth very much. Pakistan has a very huge parallel (black market) economy. Much of the private saving is held by people who are part of this parallel economy. It is quite likely that a large part of saving by these people are not held by the banks. Much of this saving goes to speculative activities and conspicuous consumption (with a lag). These types of activities may not effectively contribute to economic growth. Thus, unless the structure of private saving changes, it may not contribute much to economic growth. Since total saving is found to be contributing to economic growth, it means that government saving rather than private saving contributes to economic growth. Without a study of the detailed breakdown of government saving, it is not possible to delve deeper into the reasons why government saving contributes to economic growth. Disaggregated time series data on government saving are not readily available.

Table 5
Granger Causality Tests for Lag One

Cause	Effect	Test Stat.
ΔPVS	ΔGDP	2.47
ΔGDP	ΔPVS	7.90
ΔTS	ΔGDP	5.60
ΔGDP	ΔTS	6.61

Note: PVS, TS and GDP stand for private saving, total saving and gross domestic product respectively. All variables are expressed in logarithmic terms. Δ stands for first difference. All variables are expressed in logarithmic terms. The table value is 4.14 at the 5% level of significance.

Table 6
Granger Causality Tests for Lag Two

Cause	Effect	Test Stat.
ΔPVS	ΔGDP	1.63
ΔGDP	ΔPVS	4.64
ΔTS	ΔGDP	4.00
ΔGDP	ΔTS	5.53

Note: PVS, TS and GDP stand for private saving, total saving and gross domestic product respectively. All variables are expressed in logarithmic terms. Δ stands for first difference. All variables are expressed in logarithmic terms. The table value is 3.31 at the 5% level of significance

Table 7
Granger Causality Tests for Lag Three

Cause	Effect	Test Stat.
ΔPVS	ΔGDP	1.86
ΔGDP	ΔPVS	2.60
ΔTS	ΔGDP	2.55
ΔGDP	ΔTS	2.17

Note: PVS, TS and GDP stand for private saving, total saving and gross domestic product respectively. All variables are expressed in logarithmic terms. Δ stands for first difference. All variables are expressed in logarithmic terms. The table value is 2.93 at the 5% level of significance.

Conclusion

In this paper, we use modern time series econometric techniques to study the relationship between saving and economic growth in Pakistan. We distinguish between private saving and total saving. We find that both private saving and total saving have a long run relationship with GDP. Next, we use augmented Granger causality tests between the growth rate of GDP and growth rates of total saving and private saving. The results show that the growth rate of total saving Granger causes the growth rate of GDP. However, the growth rate of private saving does not Granger cause the growth rate of GDP which means that the growth rate of government saving Granger causes the growth rate of GDP. Thus, policies aimed at increasing government saving are likely to promote economic growth.

Suggestions for Future Research

This paper shows that government saving rather than private saving promotes economic growth. However, we have used aggregate data for both types of saving. Further research can use disaggregated data on saving. It is likely that some types of saving (and investment) promote economic growth more than other types. Future studies using disaggregated data for both private and government saving can throw more light on the relationship between saving and economic growth in Pakistan.

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