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A REVIEW ON PRIMARY INSTRUMENTS OF ECONOMIC GROWTH AND INCREASE IN NATIONAL INCOME

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ABSTRACT

Since the inception of economic planning in India, the emphasis has been on saving and investment as the primary instruments of economic growth and increase in national income. One of the objectives of economic plan (for e.g., Eleventh five year plan) is to increase the production in the economy and thus economic growth. To increase the production, capital formation is considered as the crucial determinant; and capital formation has to be backed by the appropriate volume of saving. Increased saving is used for increased capital formation, use of the increased capital formation for increasing saving, and use of the increased saving for a further increase in capital formation constituted the strategy behind economic growth.

KEYWORDS: A Review on Primary Instruments

INTRODUCTION

In view of the crucial role played by savings and investment in the economic growth of India, we intend to investigate the major interdependencies between these three variables by analyzing the time series data for India from 1950-2008. Our aim here is to identify and study the pattern between savings, investment and economic growth and the policies which led to such changes so that this analysis can henceforth be used for developing economic models for India and estimating and forecasting the policy implications which would affect these variables.

OVERVIEW OF LITERATURE

Literature on the role of savings and investment in promoting economic growth was studied as a part of my course (Theory of Macroeconomic Development). The central idea of Lewis's (1955) traditional theory was that an increase in saving would accelerate economic growth, while the early Harrod-Domar models specified investment as the key to promoting economic growth. On the other hand, the neoclassical Solow (1956) model argues that the increase in the saving rate boosts steady-state output by more than its direct impact on investment, because the induced rise in income raises saving, leading to a further rise in investment. However, the new growth theories since the mid-1980s, Romer (1986, 1990), Lucas (1988) and Barro (1990), reconfirm the view that the accumulation of physical and human capital are the drivers of long run economic growth and that high savings and investment rates are important in view of their strong and positive association with the GDP growth rate as suggested by endogenous growth theories.

Since the economic crises in 1980s and financial reforms in 1990s in India, many studies were conducted but these studies provide little empirical evidence which supports the crucial role that savings and investment play in promoting economic growth. These studies commonly test for Granger causality between Indian savings and growth, or

between Indian investment and growth. The findings tend to support the hypothesis that savings do not cause growth, but economic growth causes savings. For example, Sinha (1996) found that the growth of gross domestic saving and/or the growth of private domestic saving and the growth of GDP indicate that the causality does not run in any direction. Mühleisen (1997) conducts Granger causality tests by running bivariate VARs on the growth in real GDP and the levels of total, public and private savings rates. Whilst these tests indicate there is significant causality from growth to savings, they consistently reject causality from savings to growth for all forms of savings. Mühleisen also states that this outcome is robust with respect to variations in the VAR lags, the choice of growth variable and other forms of savings. Saggar (2003) extends Mühleisen's (1997) period to 2000-01 in order to analyze the consequences of India's financial reforms in the 1990s. He estimates bivariate VARs between the log of real GDP and total, public, private and foreign savings rates. The results support Mühleisen's conclusions in that causality runs from output to savings and not in the opposite direction.

Mahambare and Balasubramanyam (2000) conclude 'the Granger causality test suggests that causality runs from growth to savings' for India. Agrawal (2000) examines the savings rate and the growth rate of real GNP using VAR specifications. His analysis finds causality from growth to the savings rate, not only for India but also for Sri Lanka. Sahoo, Nataraj and Kamaiah (2001) use annual data for the period 1950-51 to 1998-99 to examine the link between savings and growth in India. They find one-way causality from gross domestic product to gross domestic savings in real terms, both in the long run and short run.

Verma (2007) employed the ARDL co-integration approach to determine the long run relationship of GDS, GDI and GDP for the period 1950-51 to 2003-04 and supported the hypothesis that saving does not cause growth, but growth causes saving, the study also finds that saving unambiguously determines investment in both the short and long runs. No evidence is found to support the commonly accepted growth models in India, that investment is the engine of economic growth. Sinha and Sinha (2008) examined the relationships among growth rates of the GDP, household saving, public saving and corporate saving for the period 1950 to 2001 and found that economic growth produced higher saving in various forms and never the other way around.

Aghion et.al. (2006) argues that saving affects growth positively in those countries that are not too close to the technological frontier, but does not affect it at all in countries that are close to the frontier. Literature in terms of Investment viz. Sandilands and Chandra (2003) conclude that 'Indian capital accumulation is the result rather than the cause of growth'. However Saggar (2003) shows that total and private investment rates cause real GDP growth. Despite this, he finds no evidence of causality from public investment to real GDP and from the growth in real GDP to the different measures of investment.

Seshaiah and Sriyval (2005) demonstrate that savings and investment are closely related. Verma and Wilson (2004) estimate that per worker household savings have an elastic 1.87 effect on household per worker investment in the long run. The reverse long run elasticity from household sector per worker investment to savings is 0.54 and both estimates are significant at the one per cent level. However, Verma and Wilson (2004) show there is only weak and imprecise evidence of the links between these variables and real per worker output in the short run. We will therefore focus on the difficult task of identifying and quantifying links between sectoral savings and GDP and sectoral investment and GDP in the long run and the short run.

Venkata (2005) found that savings are influencing investment but investment is not influencing the savings in India. The savings are influencing the investment by 95 per cent whereas investment is influencing savings by 5 per cent.

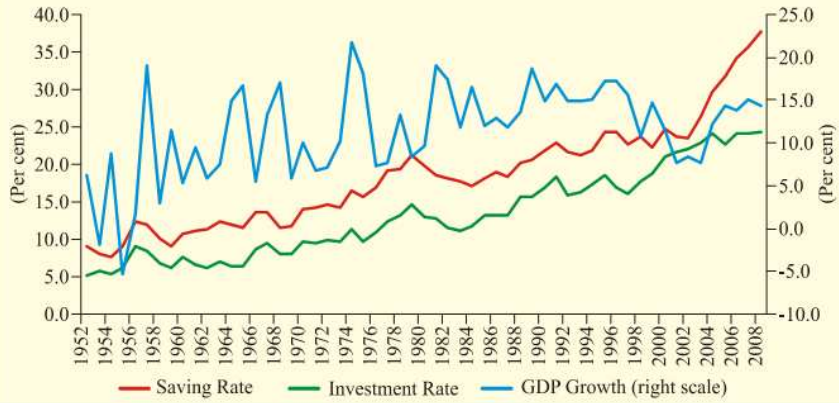
The growth in savings could not finance most of India's investment especially in mid-1980s because they were already at a quite high level. As a result, during the late 1980s India depended heavily on foreign sources that led to a balance of payment crisis in 1990s. Khundrakpam and Ranjan (2010) found long-run co-integration relationship between savings and investment. However, inclusion of post reform period weakened the relationship characterized by a more liberalized period. On the other hand, Shahbazet. al. (2008) found that there exists low positive correlation between domestic savings and investment in Bangladesh, Pakistan, India, Nepal and Sri Lanka.

Data

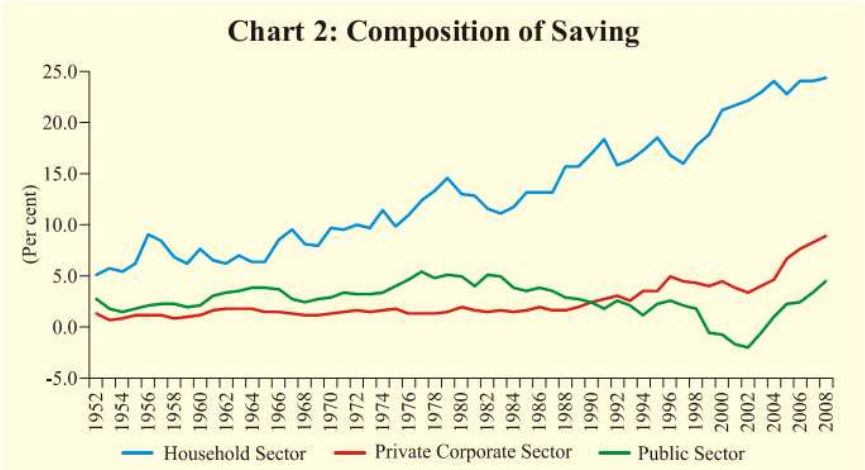
The study uses the annual data to examine the causal relationships between domestic saving, investment and income for India. Annual time series data for gross domestic product (GDP), gross domestic saving (GDS), gross domestic investment (GDI), saving and investment of household sector, private corporate sector and public sector for the period 1950-51 to 2010-11 are collected from Reserve Bank of India publication Handbook of Statistics on Indian Economy 2010-11 and Central Statistics Office (CSO).

Savings and Investment rates have been steadily increasing since 1950-51. A significant positive and robust relationship between growth rate and saving rate was observed during this period, as growth rate was also rising during 1950-51 to 2007-08. Not only prior to economic reforms in 1990-91 domestic savings and domestic investment were highly correlated but even after the BOP crises in 1991 the correlation remain unchanged (correlation coefficient of 0.99 for the period) and only the gap between them was narrowed (as can be observed from Chart 1).

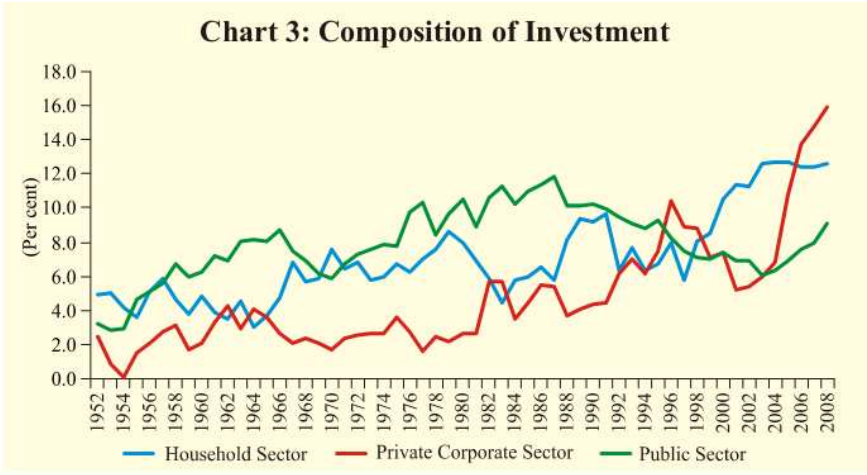
Chart 1: Saving, Investment rates and nominal growth



We can observe (from Chart 2) that while India's saving and investment rates have steadily increased overtime, their composition has undergone a considerable change, most noticeable being the growing divergence between the public and private saving. The share of household saving in the total saving has increased in the early 1990s to a maximum in 2001-02, after which it steadily declined till 2007-08. The savings rate private corporate sector was stagnant till the late 1980s but it has recently emerged as the sector with the fastest rising saving rate. The share of private corporate saving in total saving also increased considerably in the last 25 years.



Until prior economic reforms in 1990-91, public investment rate was dominating and reached its peak value after which the role of public sector has gradually reduced in number of sectors, and its place has been taken over by the private sector (as evident from Chart 3).The share of public sector investment in total investment was stagnant till 1980s, and has since then shown a downward trend. On the other hand, the share of private corporate investment has steadily increased. Household sector investment rate also increased gradually till 2004-05 and it moderated thereafter. However, its share in total investment broadly remained the same.



Methodology

In order to determine the order of integration of the time series variables we first conduct the unit root test, we employ the augmented Dickey-Fuller test to test for the stationary of data. After that we proceed to test the co-integration among the different variables with the help of Johansen co-integration test. Based on the results of co-integration test we perform Granger-Causality test under the vector error correction methodology (VECM) or under vector auto regression (VAR) framework to find out the causal relationship (If the variables are not co-integrated and hence the VAR method would be used to investigate causality. On the other hand, if the variables are co-integrated, the VEC method is used to test for causality).

Unit Root Test

We first perform unit root tests in levels and first differences in order to determine the order of integration of the series. To test the order of integration, we employ the conventional augmented Dickey-Fuller (ADF) test. ADF test examines the null hypothesis of a unit root against a stationary alternative.

The results are present in the table below:

GDP has a Unit Root, I(1)			**t-Statistic**
Augmented Dickey-Fuller test statistic			0.090682
Test critical values:	1% level		-3.568308
	5% level		-2.921175
	10% level		-2.598551

Household savings has Unit Root, I(1)			**t-Statistic**
Augmented Dickey-Fuller test statistic			21.76796
Test critical values:	1% level		-3.550396
	5% level		-2.913549
	10% level		-2.594521

Private Corporate Sector Savings has Unit Root, I(1)			**t-Statistic**
Augmented Dickey-Fuller test statistic			3.115251
Test critical values:	1% level		-3.574446
	5% level		-2.923780
	10% level		-2.599925

Public Sector Savings has a Unit Root, I(1)			**t-Statistic**
Augmented Dickey-Fuller test statistic			1.196449
Test critical values:	1% level		-3.577723
	5% level		-2.925169
	10% level		-2.600658

Gross Domestic Savings has a Unit Root, I(1)			**t-Statistic**
Augmented Dickey-Fuller test statistic			7.857156
Test critical values:	1% level		-3.571310
	5% level		-2.922449
	10% level		-2.599224

Household Sector Investment has a Unit Root, I(1)			**t-Statistic**
Augmented Dickey-Fuller test statistic			10.66586
Test critical values:	1% level		-3.577723
	5% level		-2.925169
	10% level		-2.600658

Private Corporate Investment has a Unit Root, I(1)			**t-Statistic**
Augmented Dickey-Fuller test statistic			1.401049
Test critical values:	1% level		-3.577723
	5% level		-2.925169
	10% level		-2.600658

			t-Statistic

Public Sector Investment has Unit Root, I(1)			
Augmented Dickey-Fuller test statistic			4.441845
Test critical values:	1% level		-3.574446
	5% level		-2.923780
	10% level		-2.599925

Gross Investment has a Unit Root, I(1)			t-Statistic
Augmented Dickey-Fuller test statistic			13.58930
Test critical values:	1% level		-3.574446
	5% level		-2.923780
	10% level		-2.599925

We can observe from the statistics of Augmented Dickey-Fuller test that the variables are not level stationary. So we need to do co-integration test for these variables in order to not get spurious results.

Co-integration Test

After the unit root test for stationary we go for Johansen's test for co-integration among variables in the same way, so that we can eliminate spurious results. We intend to check for the presence of co-integrating relationship among the variables. Starting with the null hypothesis that co-integration (r=0) does not exist among the variables, the trace statistic is well above the 95 per cent critical value for all the series.

The example of one of the series (GDP and GDS) is shown below:

Unrestricted Co-integration Rank Test (Trace), GDP and GDS			
Hypothesized		Trace	0.05
No. of CE(s)	**Eigen Value**	**Statistic**	**Critical Value**
None *	0.434673	47.16719	15.49471
At most 1 *	0.238085	15.22757	3.841466
Trace test indicates 2 co-integrating eqn.(s) at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			

We find that all the series are co-integrated with GDP series except private corporate sector saving (PCS). Hence, it rejects the null hypothesis of no co-integration in favor of existence of co-integration for all the series except PCS as shown below:

Unrestricted Co-integration Rank Test (Trace), GDP and PCS			
Hypothesized		Trace	0.05
No. of CE(s)	**Eigen Value**	**Statistic**	**Critical Value**
None *	0.540464	44.40727	15.49471
At most 1	0.015331	0.865167	3.841466
Trace test indicates 1 co-integrating eqn.(s) at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			

Hence, we use Vector Error Correction (VEC) Model for all other series and Vector Auto Regression(VAR) Model for PCS to test for causality.

Granger Causality Test

After finding out the results of co-integration tests and we now intend to find out the vector error correction methodology and vector auto regression to determine the direction of causality between income, saving and investment. As we already know that Granger causality test is performed under VECM if co-integration exist and under VAR framework otherwise. So here we employ Granger causality test under VAR methodology for savings of private corporate sector (PCS) and GDP whereas for all other series it is employed under the VECM framework.

The results of the Granger Causality test have been summarized below in tabular form:

Gross Domestic Savings causes Gross Domestic Product
Gross Domestic Product does not cause Gross Domestic Savings
Gross Domestic Investment causes Gross Domestic Product
Gross Domestic Product does not cause Gross Domestic Investment
Gross Domestic Savings and Gross Domestic Investment cause Gross Domestic Product
Gross Domestic Product does not cause Gross Domestic Savings and Gross Domestic Investment

CONCLUSIONS

We here analyzed the data for 1950-51 to 2010-2011 and empirically find that the direction of causality is from saving and investment to economic growth collectively as well as individually and there is no causality from economic growth to saving and/or investment.

Also, we have already studied and known from the various long-run growth theories, an economy will have higher growth rate if it has a higher growth rate of investment. Many may believe that a really big open economy like India will not need the backing up of domestic savings for its investments as it can finance its investments from foreign sources. However from the empirical analysis above we can observe that high domestic savings will definitely increase the growth rate.

These results may not please many economists as they view India as a very big open economy with domestic and foreign investors and domestic saving need not be endogenous to growth. But it is required to have technological progress in a country for investment led growth, the case here in actual can be of low technological progress in India and difficulties in adapting technologies from foreign investors due to India traditional and inherent nature.

As already pointed out in literature review above, Aghion et.al. (2006)argues that saving affects growth positively in those countries that are not too close to the technological frontier, but does not affect it at all in countries that are close to the frontier. So as is empirically found for the case of India there exists a savings led growth due to its distance from the technological frontier, now the question that arises is that how far is India from the frontier?

From the above discussion it is clear that the economy is not catching up with the technology frontier as the growth is led by savings and is not driven by the innovations that are taking place worldwide. This indicates that although the economy is opened to foreign investments, the growth is still driven by the domestic savings. Further, domestic firms may not be absorbing the technology which comes through the foreign investment in order to undertake more profitable innovation projects due to certain reasons which seem to be a very important topic of discussion at this hour. Also it may be possible that some of the sectors are lying far below the technological frontier and need a boost to catch up the quick moving frontier, other sectors may be lagging behind the frontier and their distance from the frontier may actually be

increasing. We need to identify such sectors of the economy and take quick policy measures to reduce the distance from the frontier in all possible sectors so as to be independent of this savings led growth.

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