SAVINGS- INVESTMENT RELATIONSHIP IN INDIA

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ABSTRACT

The study of relationship between saving and investment has wide implications for fiscal policy. Both national income accounting approach and the macroeconomic theories leaves a room for ambiguity regarding the causality of these variables. So the paper examines the causality and the long run relationship between savings and investment using time series data (1950-2009) for India by applying VAR model. The main findings of the paper are that there exists a two-way causality between these variables for the time period analyzed and that they also have a long run relationship

INTRODUCTION

Savings and investments are two key variables which play a significant role in economic growth and expansion. However, the relationship between savings and investments remain one of the great contested areas among the economists because at the heart of the debate lies the question of 'Causation' that is whether it is the savings that causes investments or it is the investment which causes savings. The question of causation becomes even more important because it has very important implications for the fiscal policy making of the country.

For instance, the economic Significance of government deficits is commonly constructed in terms of their negative effects on net national saving and capital formation. Behind this interpretation of government deficits lies an implicit view that it is saving that causes investment: government deficits represent negative government saving, and this reduces the pool of national saving available for investment thereby reducing the level of investment. Not only does the saving - investment causation debate raise questions about the level of deficits, it also has implications regarding how such deficits are to be closed. Thus, if saving causes investment and investment is desired for purposes of raising growth, then the government deficit should be closed by cutting spending rather than raising taxes.

This is because raising taxes would tend to lower disposable income and household saving, thereby reducing the benefit of lower deficits on national saving. Indeed, taxes should actually be cut so as to increase saving. So, if the view that saving causes investment is true, and then increasing the rate of capital formation requires increased national saving, and this calls for policies of "abstinence" on the part of both households and government. On the other hand, if investment causes saving, then the policy implications are substantially different. In this case there is no necessary need for abstinence: rather, the problem is one of getting enterprises to increase their investment spending. In such fashion, the claim that saving causes investment and investment causes savings has profound implications for the design of fiscal policy. Though there is a lot of literature focusing on the relationship between these two variables but it transpires that neither the national income accounts nor the macro economic theories (Classical and Keynesians) can help disentangle this issue.

The national income accounting identity only tells about the magnitude of the savings and the fact that savings equals investment holds as an identity but which may the causality goes is not concluded from the identity. Similarly if we look at macro economic theories in classical theory, an increase in savings will lead to a reduction in the interest rates which makes investors demand more from the available funds and therefore to an increase in investments. Contrarily, Keynes argues that an increase in the investment leads to an increase in the output and income which, in turn, will increase savings. Therefore they have conflicting views regarding the causality and this leaves room for ambiguity regarding the direction of causality. Since neither national income accounting nor the theories could provide a clear stand on the direction of causality therefore it becomes an empirical matter. Surprisingly, for the Indian context there is a little empirical literature on this matter. This paper, therefore, seeks to fill in this gap by providing a time series analysis of relationship between savings and investments for India using VAR model and also after identifying the causality it attempts to examine the long run relationship using co-integration analysis.

REVIEW OF LITERATURE

The relationship between savings and investment has been widely explored following the seminal work by Feldstein and Horoika (1980).The test regresses the ratio of investment/gdp on savings/gdp. Their study used the data on savings and investment for 21 OECD countries to find out whether there was perfect capital mobility or not i.e. weather incremental savings were retained in the domestic country or they entered the global pool of capital. Their findings show that there was high correlation between domestic savings and investment and hence low degree of capital mobility. Studies following this have examined this relationship for both cross sectional and time series data sets for different country samples.

From analyzing the correlation the focus of the literature has also extended to studying the causality and the co-integration to assess the long run relationship

between these variables. Pollin and justice (1994) conducted their study on quarterly data on U.S. economy and found that savings and investment are not Co-integrated indicating the fact that may be greater capital mobility for the period observed. However Miller (1988) using the data for the U.S. between 1946-87 found that both savings and investment were integrated of order one and that they were co-integrated prior to second world war but no long run relationship existed after that. Levy (1998) extended this work further in this direction and examined this relationship for the same economy in both short run and long run and found out the evidence in favors of long run relationship.

Most of these studies have focused on developed countries and attempt to study this relationship for developing countries has been limited in literature. Especially for India, not much empirical work has been done to find out the causality and the long run relationship between these variables. Sinha(2002) conducted a cross sectional analysis for developing countries and found out that Savings and investment rate are co-integrated for Myanmar and Thailand indicating that growth of savings rate are causing growth of Investment rate. But however the result of causality for his study suggested reverse causality between Savings and Investment rate for Hong Kong, Singapore, Malaysia and Myanmar. Suggesting that Co integration and causality are not necessarily dependent phenomenon. Singh (2008) has examined the long-run relationship between domestic savings and investment in India. He found co integration between these two variables. The long run slope parameter on saving is significantly different from zero but not from one. This result supports the FH hypothesis and suggests the imperfect mobility of capital and home-bias in the asset portfolio of domestic investors. Verma (2007) studied the relationship of savings, investment and economic growth in India using the autoregressive distributed lag (ARDL) approach to co integration using data from 1950-51 to 2003-04. The F-static indicated that the null of no co integration cannot be rejected only when GDP is the dependent variable. Therefore the empirical work for the relation of these variables presents no uniform results.

INDIAN EXPERIENCE RELATING SAVINGS AND INVESTMENT

The data for both the periods, 1950-2009 and 1970-2009 exhibits a gap between savings (Gross domestic savings) and investment (Gross domestic capital formation) as a proportion of gross domestic product in India. The gap remained persistent during this period.

For the period 1950-2009, average growth rate of gross domestic savings (at constant prices) was 7.59% which was slightly less than that of Goss domestic capital formation (at constant prices),7.99%. Highest savings ratio (savings as a proportion of GDP) was 37.7% in year 2007 and minimum was 8.29% in year 1953. For investment, values were 37.8% and 8.17% respectively for same years. Resource gap on an average, in this time period, was negative which implies that domestic investments on an average were greater than the domestic savings. Figure (1) plots savings and investment ratio to time (1950-2009) and reveals that for the entire period, saving ratio has been more or less remained lower than the investment ratio in our economy.

SAVINGS AND INVESTMENT RATIO IN INDIA, 1950-2009
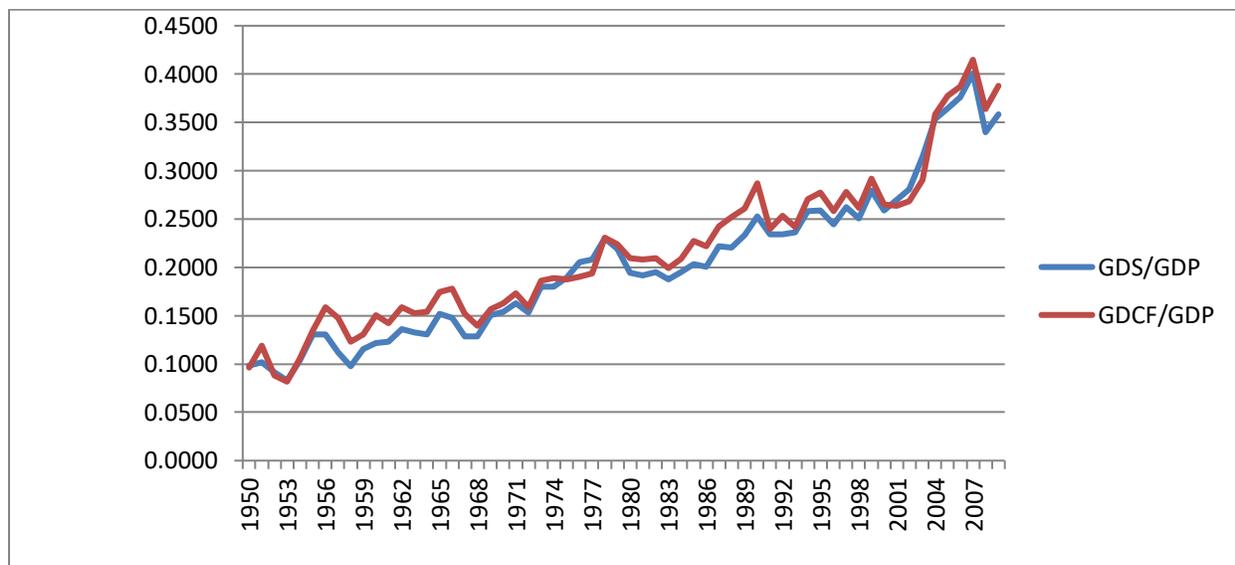
However, in the later period from 1970-2009, similar pattern persists. For this period, average growth rate of savings ratio was 7.993%. Whereas, it was 8.175% for investments. Similar to the period 1950-2009, this sub period also experienced negative resource gap that is on an average, investments were again greater than the savings.

SAVINGS AND INVESTMENT RATIO IN INDIA,1970-2009
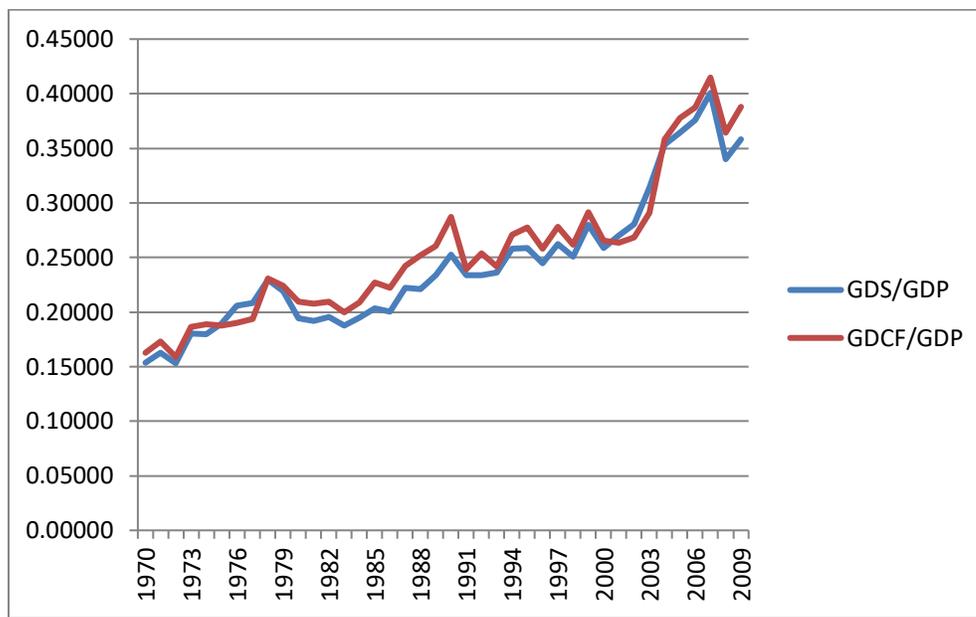
The table as follows summarizes the above mentioned results.

GROSS DOMESTIC SAVINGS, GROSS DOMESTIC CAPITAL FORMATION (as% GDP) IN INDIA

PERIOD	VARIABLES	AVERAGE	MINIMUM	MAXIMUM
1950-2009	**Gross Domestic Savings**	20.282	8.288	37.7
	Gross Domestic Capital Formation	21.524	8.174	37.8
	Resource Gap	-1.242	0.114	-0.1
1970-2009	**Gross Domestic Savings**	24.380	15.309	37.7
	Gross Domestic Capital Formation	25.429	15.881	37.8
	Resource Gap	-1.049	-0.572	-0.1

NOTE: GDP is Gross domestic Product

Resource Gap is difference between gross domestic savings and gross domestic capital formation.

DATA SOURCE AND METHODOLOGY

In order to analyze the causal relationship between the variables (Savings and Investments), steps are as follows:

1) The first step in causality investigation is to verify for the existence of a unit root in the variables namely gross domestic savings and gross domestic capital formation. This is done with the help of AUGMENTED DICKEY FULLER TEST (ADF TEST) which helps to identify whether the time series of a particular variable is stationary or not.

   Null hypothesis: $H_o: \theta = 0.$ (It refers to the existence of unit root.)
   Alternative Hypothesis: $H_A: \theta < 0$ (It implies that unit root does not exist.)

   DECISION RULE: We reject the null when t statistics is less than the critical value at 10% level of significance which implies the existence of unit root in the variable.

2) VECTOR AUTOREGREESION AND GRANGER CAUSALITY METHOD was then used in order to analyze or identify the short run causal relationship between the variables.

   Null hypothesis: $H_o: X$ **does not granger cause Y**
   Alternative hypothesis: $H_A: X$ **granger cause Y.**

   DECISION RULE: If P value is less than 0.1 i.e. at 10% level of significance then we reject the null hypothesis.

3) Once, the short run causal connection between the variables has been identified, coming up next is the need for identification of long run relationship

between the variables using <u>ENGLE GRANGER TEST FOR COINTEGRATION.</u>

Null Hypothesis: H_o: **No cointegration exist**
Alternative Hypothesis: H_A: **Cointegration exist.**

DECISION RULE: We reject the Null hypothesis when t statistic is less than 0.1, i.e. at 10% level of significance.

<u>DISCUSSION OF THE RESUTS</u>

These tests are conducted for both the time periods 1950 to 2009 and 1970 to 2009. The results are as follows:

<u>UNIT ROOT TEST OF STATIONARITY ON VARIABLES (Table(1))</u>

TEST IN LEVELS			
VARIABLES	**TIME PERIOD**	**VALUES**	**RESULT**
Gross Domestic Savings	1950-2009	4.983	I(1)
Gross Domestic Capital formation	1950-2009	5.448	I(1)
Gross Domestic Savings	1970-2009	3.417	I(1)
Gross Domestic Capital Formation	1970-2009	3.838	I(1)

GRANGER CAUSALITY TEST (Table (2))

VARIABLES: SAVINGS RATIO AND INVESTMENT RATIO					
FULL PERIOD : 1950-2009 (lags = 4)					
Null Hypothesis	**Chi2**	**Probability**	**Observations**	**Degree of freedom**	**AIC**
Investment Ratio does not causes Savings ratio	16.9713	0.0020	59	4	-11.639*
Savings ratio does not causes Investment ratio	19.6440	0.0006	59	4	
TIME PERIOD:1970-2009(lags= 5)					
Null Hypothesis	**Chi2**	**Probability**	**Observations**	**Degree of freedom**	**AIC**
Investment ratio does not granger causes savings ratio	12.9532	0.0238	59	5	-10.965854
Savings ratio does not causes Investment ratio	9.7665	0.0821	59	5	

COINTEGRATION TEST (Table (3))

COINTEGRATION TEST		
Values ,Time Period	1950-2009	1970-2009
Observations	54	35
R square	0.4925	0.5198
Adjusted R square	0.4827	0.5052
t-statistics	-7.10	-5.98
P> $|t|$	0.0000	0.0000
Slope Coefficient	-0.9607	-1.04
Constant	-0.000	0.0000554

The ADF test results [refer Table(1)] for variables **GDS** and **GDCF** for the period **1950 to 2009** showed that they are both I(1) process and unit root exists therefore they are not stationary. Hence in order to have some degree of stationarity, we used the variables GDS and GDCF as a ratio of GDP i.e. GDS/GDP and GDCF/GDP

PERIOD 1950-2009

Under granger causality test we reject the null hypothesis [refer Table 2]

a)   Investment Ratio does not granger causes Savings ratio because the p value 0.0020 < 0.1.

b)   Savings ratio does not granger causes Investment ratio because the p value 0.0006 < 0.1.

Hence, the result reveals that there is a two way causality between savings and investment

Under co integration we reject the null hypothesis because t statistic is -7.10 < 0.1 implying that there exist co integration. Therefore, savings and investment are related in the long run. [refer Table (3)]

PERIOD 1970-2009

For this sub period, we used the variables savings and investment as ratio of GDP because the series for GDS and GDCF were not stationary at their levels.

Under granger causality test we reject the null hypothesis [refer Table (2)]

a) Investment Ratio does not granger causes Savings ratio because the p value 0.0238 < 0.1.

b) Savings ratio does not granger causes Investment ratio because the probability 0.0200 < 0.1.

Hence, the result reveals that there is again a two-way causality between savings and investment.

Under co integration, we reject the null hypothesis that there exist no co integration between savings-GDP ratio and investment-GDP ratio because t statistic is -5.98 < 0.1 implying that there exist co integration. Therefore for this period also there exists a long run relationship between savings and investment. [refer Table (3)]

CONCLUSION

Our results suggest that for the Indian data set there is an evidence of two way causality between savings and investment. The robustness of this result is confirmed by the fact that the results show similar pattern of causality whether we evaluate the longer period (1950-2009) or a sub period (1970-2009). Using macroeconomic foundations we can show that results are consistent with the two schools of thoughts that is the two way causality can be shown to be a case in both classical and Keynesian framework.

In the classical macro model the level of investment is determined in the loanable funds market by the demand and supply for loanable funds. The demand for loanable funds is a negative function of the real interest rate, and represents investment demand: the supply of loanable funds is a positive function of the real interest rate, and represents the saving. In principle a rightward shift of the investment demand schedule can cause an increase in investment, with the extent of the increase depending on the interest sensitivity of saving. However, a rightward shift of the saving supply schedule can also produce an increase in investment due to fall of interest rate

As with classical macroeconomics, the short run Keynesian model also allows for bi-directional causality. An increase in investment spending shifts the IS right, and raises investment, output, and the real interest rate. An increase in marginal propensity to save shifts the IS left, and income and interest rates fall. If investment spending is a negative function of the interest rate, then investment spending rises owing to the decline in interest rates. This reveals how saving can cause investment.

Finally the results on co-integration suggest that they are related in long run as well. Hence savings and investment causes each other and are also related in the long run as per our findings.

REFERENCES

1) Wooldridge.J,1976, "introductory econometrics a modern approach" fourth edition, cengage learning,ch-18.

2) Schncider.B, 1998, "Saving-Investment correlation and capital mobility in developing countries with special reference to India", Indian Council for Research on International economics relations, working paper no.48

3) levy D,1988,"investment-saving co-movement and capital mobility:Evidence from US time series".

4) Mishra.P , J.das and mishra.S, 2010, "the dynamics of savings and investment relationship in India", European journal

5) Mishra.A and Mohit.J,2012, "investigating the causal relationship between savings and investment and economic growth for India", International journal of financial management, vol 1, issue 2, page no. 15-23.

6) Verma R, 2007, "savings, investment and growth in India: an application of the ARDL bounds testing approach", south Asia economic journal, 8(1), 87-98

7) Pollin R and justice C, 1994, "saving, finance and interest rates: an empirical consideration of some basic Keynesian proposition".

8) Singh T, 2008, "testing the saving-investment correlation in India; an evidence from single equation and system estimator.

9) Feldstein, M and Heroic C. (1980), "Domestic Saving and International Capital Flows", Economic Journal, 90:314-329.

10) Miller SM, 1988, "saving-investment co integrated.

11) Sinha D, 2002, "saving –investment relationship for japan and other Asian countries.