

Impact of Saving, Foreign Aid on Growth in India (1981-2011) A perspective on dual-gap model

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Abstract

The study employed co-integration technique as well as Toda and Yamamoto (1996) causality test to-uncover the direction of causal relationship between savings and economic growth in India for the period of 1981 and 2011. The empirical results suggest that savings, foreign aid and economic growth are positively co-integrated indicating a stable long run equilibrium relationship. Further, the findings revealed a unidirectional causality running from savings and foreign aid to economic growth. Based on findings the study recommends that aid should be used to support short term budget and productive sectors; also the use of aid should focuses on growth enhancing as well as poverty reduction policies this will raise the peoples' propensity to save.

Keywords: *Co-integration, foreign Aids, Savings, Foreign exchange earnings and Economic Growth*

1. Introduction

The Economy of India is the tenth-largest in the world by nominal GDP and the third-largest by purchasing power parity (PPP). The country is one of the G-20 major economies, a member of BRICS and a developing economy that is among the top 20 global traders according to the WTO. India was the 19th-largest merchandise and the 6th largest services exporter in the world in 2013. India's economic growth slowed to 4.7% for the 2013–14 fiscal years, in contrast to higher economic growth rates in 2000s. The Indian Finance Ministry projects the GDP growth for fiscal 2014 will be 5.5%. IMF projects India's GDP to grow at 5.6% over 2014-15. Agriculture sector is the largest employer in India's economy but contributes a declining share of its GDP (13.7% in 2012-13). Its manufacturing industry has held a constant share of its economic contribution, while the fastest-growing part of the economy has been its services sector - which includes construction, telecom, software and information technologies, infrastructure, tourism, education, health care, travel, trade, banking and other components of its economy.

Since liberalization, the value of India's international trade has increased sharply, with the contribution of total trade in goods and services to the GDP rising from 16% in 1990–91 to 47% in 2008–10. India accounts for 1.44% of exports and 2.12% of imports for merchandise trade and 3.34% of exports and 3.31% of imports for commercial services trade worldwide. In November 2010, exports increased 22.3% year-on-year to INR850.63 billion (US\$13 billion), while imports were up 7.5% at INR1251.33 billion (US\$20 billion). Trade deficit for the same month dropped from INR468.65 billion (US\$7.4 billion) in 2009 to INR400.7 billion (US\$6.3 billion) in 2010.

India's reliance on external assistance and concessional debt has decreased since liberalization of the economy, and the debt service ratio decreased from 35.3% in 1990–91 to 4.4% in 2008–09. In India, External Commercial Borrowings (ECBs), or commercial loans from non-resident lenders, are being permitted by the Government for providing an additional source of funds to Indian corporates.

With 1.2 billion people and the world's fourth-largest economy, India's recent growth and development has been one of the most significant achievements of our times. Life expectancy has more than doubled, literacy rates have quadrupled, and health conditions have improved. India will soon have the largest and youngest workforce the world has ever seen. At the same time, the country is in the midst of a massive wave of urbanization as some 10 million people move to towns and cities each year in search of jobs and opportunity. It is the largest rural-urban migration of this century. Massive investments will be needed to create the jobs, housing, and infrastructure to meet soaring aspirations and make towns and cities more livable and green. World Bank: (2013) "India Country Overview ".

It has been observed that domestic savings, if properly mobilized, can encourage an improvement in the economic activities through investment. However, recent empirical findings have been mixed as a result the debate on savings and growth remains at best inconclusive. E.g. Studies by Olajide S. and Oladipo (2006), found unidirectional causality from savings to economic growth. Maurota and Kelly (2001), Vaibhau et'al (2008), found bi-directional causality. Pinchawee and Rasmidatta (2001), R.Verna (2007), found unidirectional causality from economic growth to savings. Bhaharumshah et'al (2003), Maurota and Kelly (2001), found no causality at all.

One of the major economic problems of any developing and underdeveloped countries is inadequate savings i.e. inadequate domestic savings or inappropriate mobilization of savings for investment purposes is what is termed in the literature as savings constraint (SAVING GAP). This gap can be corrected through foreign aids (grant and loans) according to two-gap model of economic growth. The effect of foreign aid on growth, however, is ambiguous in the literature. Empirical evidence about the relationship of foreign aid and growth differs with some studies finding a negative effect of foreign aid on growth (e.g Lohani, 2004; marrra, 2002; Peter Beaver, 1972; Mosley, 1980; Mosley et'al, 1987; Boone, 1994) and some studies providing an evidence of positive effect (e.g Lensink and White, 2001; Berthaut Moreira, 2005; Tasew Tadese,2010).

Most of the studies reviewed have focused on the role of savings on growth without looking at role play by other variables that supplement savings, other studies concentrated on the role play by FDI without looking at the foreign aid, this study sees to identify the specific role play by foreign aid on economic growth. Therefore, the paper aims at establishing whether or not the theoretical prescription of the two-gap model of economic growth holds in India; specifically, to evaluate how well Indian economy is using its own savings and to examine whether the resource inflow in the form of foreign aid can have significance impact on economic growth for India. The rest of the paper is structured as follows. Section 2 explicates the theoretical background of the two-gap model, while Section 3 discusses the methodology. Empirical results are presented in Section 4, while the conclusion and policy recommendations are contained in the last section.

2. Literature Review

2.1. Theoretical literature

2.1.1. Dual Gap Model of Aid

The Harrods (1939) and Domar (1946) growth model was the well-known formulation of the gap theory. The model assumed that there is an excess supply of labor and that the growth is constrained only by the availability and productivity of capital. Since savings in the

developing countries is too low to achieve a target growth rate, foreign capital was needed to supplement savings so as to increase the investment and growth.

In their article 'Foreign Assistance and Economic Development', Hollis B. Chenery and Alan Strout (1966), developed a well-known two-gap model of foreign aid. Their idea is that saving gap and foreign exchange gap are two separate and independent constraints on attainment of target rate of growth in developing countries and they see a foreign aid as way of filling this gap in order to achieve a target growth rate in the economy. Savings gap is when domestic savings rises less than investment, while foreign exchange gap set in when export earning falls short of foreign exchange required to import capital good for investment. Bacha and Taylor (1990), Suggested that when revenue raising capacity is not sufficient to cover the desired level of investment appropriate use of foreign aid will helps to fill the gap.

2.2. Empirical Literature

2.2.1. Saving and economics growth

Pinchawee and Rasmidatta (2011), studied the relationship between domestic savings and economic growth using time series annual data for Thailand, the study cover the period of 1960 to 2010, the empirical result demonstrated the unidirectional causality running from economic growth to savings. R.Verna (2007), studied saving, investment and growth in India between 1950/51 to 2004/2005, using ARDL-bound test approach, the study found that saving is not significantly affect economic growth, the study further suggest unidirectional causality running from growth to saving.

Using two-stage least square method, Vaibhau et al (2008), studied the savings and economic growth in Asian countries, the empirical result found the bi-directional causality between savings and economic growth in south-east and south-south Asia. Olajide et al (2006), study the saving and economic growth in developing countries, using granger non causality test proposed by Yoda and Yamamoto (1996), they suggested that saving and economics growth are positively co-integrated and the study further suggested that there is unidirectional causality running from saving to economic growth in Nigeria during the study period.

Bhaharumshah et al (2003), studied the relationship between saving and economic growth in South Korea, Singapore, Malaysia, Philippines and Thailand, using panel data, the study found no significant relation-ship exist. Using Toda and Yamamoto (1995), procedure Mourota and Kelly (2001), suggested that there is no causality between private saving and economic growth in India while bi-directional causality exist for Srilanka.

2.2.2. Foreign Aid and Economic Growth

Tasew and tadesee (2010), examined the impact of foreign aid on investment and growth in Ethiopia using the multi-variete co-integration analysis, over the period of 1970 to 2009, the result suggested that foreign aid positively affect growth. Ann Veiderpass et al (2007), using panel data of sixty countries, found no clear pattern to explain the relationship between foreign aid and GDP. S.Lohani (2004), studied relationship between foreign aid and development, using ordinary least square, the empirical result found that foreign aid have negative and significant impact on GDP.

2.2.3. Export and Economic Growth

Olabanji et al (2010), examined the application of export in Nigeria during 1970 to 2010. The study employs co-integration and causality test, the study found unidirectional causality from growth to export. Chen (2007), used granger causality test, vector error correction and ARDL-Bound test to study the relationship between export and economic growth in Taiwan and did not find export have any significant impact on growth. Panos et al (2000), studied the output growth and variability of export and import growth using panel data of non-oil producing Asian countries. The empirical result found no significant relationship between export and economic growth during the study period.

3. Methodology

3.1. Source of data and Model specification

The present study is purely based on secondary data which covered 31 years (1981- to-2012) which was collected from World Bank development Indicators web site and Hand Book of Statistics of India. The data related to the following variables: Real GDP (PPP) adjusted, gross domestic saving as percentage of total GDP (GDS), Foreign aid (loan and grant), total export receive (foreign exchange earnings). The relationship would be specified as follows:

$$GDPC = F(GDS, AID, EXP) \dots\dots\dots 1$$

In order to maintain the linearity in the relationship the above equation is expressed in log form as follows:

$$LNGDPC_t = a_1 + a_2LNGDS_t + a_3LNAID_t + a_4LNEXP_t + U_t \dots\dots\dots 2$$

Where: $(a_1, a_2, a_3, a_4) > 0$, LNGDPC is the log of Real GDP (PPP) adjusted, LNGDS is log of gross domestic saving as percentage of total GDP (GDS), LNAID is log of Foreign aid (loan and grant), LNEXP is log of total export receive (foreign exchange earnings) and U_t is error term.

3.2. Analytical Tools

3.2.1. Unit root test:

The first step involves carrying out unit root tests on all the variables of interest using both Augmented Dickey-Fuller (ADF) and Phillips-Perron tests at 1% and 5% levels of significance. This is to ensure that the series enter the model in a non-explosive form.

3.2.2. Co-integration test:

To determine whether there exists a long run relationship among domestic saving, foreign resource inflow (export) and economic growth (GDP), the study employed multivariate co-integration approach, the Johansen (1992), and Johansen and Juselius (1990) to test for co-integration. The maximum eigenvalue and trace statistics are used to determine the co-integration rank r (the number of independent co-integrating vector):

The general form of the vector correction model is given by:

$$\Delta y_t = a_{0y} + a_{1y}t - \pi_y z_{t-1} + \sum_{i=1}^{p-1} T_{iy} \Delta z_{t-1} + \Psi_y w_t + \varepsilon_t, t = 1, 2, 3 \dots \dots \dots n. \dots \dots (3)$$

Where $z_t = (y_t, x_t)$, y_t is an $m \times 1$ vector of endogenous variables $I(1)$ and w_t is $q \times 1$ vector of exogenous variable $I(0)$ variables.

3.2.3. Causality test

Many tests of Granger-type causality have been derived and implemented to test the direction of causality –Granger (1969) and Sims (1972). These tests are based on null hypotheses formulated as zero restrictions on the coefficients of the lags of a subset of the variables. Thus, the tests are grounded in asymptotic theory. The shortcomings of these tests have been discussed in Toda and Phillips (1994). Using a Wald test to test linear restrictions on the parameters of a VAR model, and (some of) the data are non-stationary; the Wald test statistic does not follow its usual asymptotic chi-square distribution, Dave Gile (2011).

In dealing with these problems, Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996) –TYDL- methodology were employed. They proposed a technique that is applicable irrespective of the integration and co-integration properties of the system. The method involves using a Modified Wald statistic for testing the significance of the parameters of a VAR(s) model (where s is the lag length in the system). Thus, the estimation of a var ($s + d_{\max}$) guarantees the asymptotic χ^2 distribution of the Wald statistic, where d_{\max} is the maximal order of integration in the model. The lag length of the variables in the causal models is set according to Schwartz criterion (SBC). Since lagged dependent variables appear in each equation of the aforementioned causal models, their presence is expected to purge serial

correlation among the error terms. The lag length, using the Schwartz criterion (SBC), is determined to be 2, so the model is augmented with extra lag.

We can test for the absence of Granger causality by estimating the following VAR model: Lutkepohl (2007, Ch. 7).

$$Y_t = a_0 + a_1 Y_{t-1} + \dots + a_p Y_{t-p} + b_1 X_{t-1} + \dots + b_p X_{t-p} + u_t \quad \dots\dots\dots(4a)$$

$$X_t = c_0 + c_1 X_{t-1} + \dots + c_p X_{t-p} + d_1 Y_{t-1} + \dots + d_p Y_{t-p} + v_t \quad \dots\dots\dots(4b)$$

Then, testing $H_0: b_1 = b_2 = \dots = b_p = 0$, against $H_A: \text{'Not } H_0\text{'}$, is a test that X does not Granger-cause Y.

Similarly, testing $H_0: d_1 = d_2 = \dots = d_p = 0$, against $H_A: \text{'Not } H_0\text{'}$, is a test that Y does not Granger-cause X.

In each case, a rejection of the null implies there is Granger causality. Increasing the number of lags in the WALD model up to the maximum integration level of variables entered in the model is crucially fundamental in opting for the Toda and Yamamoto causality testing procedure. The Toda and Yamamoto approach is an alternative causality testing approach based on the Granger non-causality equation but augmented with extra lags determined by the potential order of integration of the series in causality tests.

4. Discussion of Empirical result:

This section covers the presentation of the empirical findings of the study. The first step involved the establishment of order of integration of the annual time series data collected. tables 1 and 2 presented the unit root test of variables such as log of real GDP per capita (LNGDPC), log of gross domestic savings (LNGDS), log of foreign aid (LNAID) and log of export (LNEXP). All the variables except LNEXP, are I(1), as presented table 1 and 2 below.

Table 1: Augmented Dickey-fuller test:

Augmented Dickeyfuller test			
variables	ADF statistics	Critical values at 5%	Order of intergration
LNGDPC	-3.250229	-2.981038	I(1)
LNGDS	-5.818075	-2.981038	I(1)
LNAID	-8.125112	-2.981038	I(1)
LNEXP	-3.742238	-2.976263	I(2)

Source: Author's computation

From ADF result LNGDPC, LNGDS, and LNAID are I(1), while LNEXP is I(2), and the same result was also found from the pp-statistic as presented table 2.

Table 2: Phillips-Perron test:

Phillips-Perron test			
variables	pp statistics	Critical values at 5%	Order of intergration
LNGDPC	-3.250229	-2.981038	I(1)
LNGDS	-5.818075	-2.981038	I(1)
LNAID	-8.125112	-2.981038	I(1)
LNEXP	-3.742238	-2.976263	I(2)

Source: Author's computation

Table 3 shows the result from Johansen-Juselius Test for Multiple Co-integration as presented in equation 3 above. According to both maximal eigenvalue and trace statistic tests, our results indicate the existence of two co-integrating vectors as maximum eigenvalue and trace statistics reject the null hypothesis when $r = 0$ in each equation. The hypothesis $r = 0$ is re-jected as the computed value of the test statistics (103.4498) is greater than the critical value (63.87610). The null hypothesis for $r = 1$ is also rejected.

Furthermore, the next step identified that the null hypothesis of at most two co-integrating vectors ($r=2$) is accepted at the 5 % level of significance. Hence, there is adequate information to ascertain that there are two co-integrating vectors. Thus, the Johansen co-integration test suggested that there is a long run relationship between gross domestic savings, foreign aid export and economic growth. Hence, the long run relationship between economic growth and all the explanatory variables is found to be positive in each co-integrating vector. This suggested the existence of at least one directional casualty.

Johansen-Juselius Test for Multiple Co-integration: Equation									
Result of λtrace Test					Result of λmax Test				
H ₀	H _A	Eigenvalue	Trace Statistics	Critical Value (5%)	H ₀	H _A	Eigenvalue	Max-Eigen Statistics	Critical Value (5%)
$r=0^*$	$r>0$	0.825247	103.4498	63.87610	$r=0^*$	$r>0$	0.825247	43.60947	32.11832
$r \leq 1^*$	$r>1$	0.773455	59.84028	42.91525	$r \leq 1^*$	$r>1$	0.773455	37.12024	25.82321
$r \leq 2$	$r>2$	0.487347	22.72004	25.87211	$r \leq 2$	$r>2$	0.487347	16.70389	19.38704
$r \leq 3$	$R<3$	0.213880	6.616144	12.51798	$r \leq 3$	$r>2$	0.213880	6.616144	12.51798

Trace test indicates 2 cointegrating equations at 5% level. The * denotes a rejection of the null hypothesis at the 5 % level

Source: Author's computation

As discussed in methodology section the study employed the modified wald-test method using level variable as proposed by Toda and Yamamoto (1995) as presented in equation 4a and 4b above section. The result is presented in table 4.

Table 4: Test for granger non-causality Toda and Yamamoto approach:

Test for granger non-causality Toda and Yamamoto approach			
Dep.	LNGDPC	LNGDPC	LNGDPC
Ind.	LNGDS	LNAID	LNEXP
X ²	23.11926	6.78283	7.656648
P-value	0.0001	0.0215	0.0217
Dep.	LNGDS	LNGDS	LNGDS
Ind.	LNGDPC	LNAID	LNEXP
X ²	0.573914	0.516095	0.186046
p-value	0.7505	0.7726	0.9117
	→	→	→

Source: Author's computation

Table 4 above reported the X²-test statistic, together with the corresponding p-values and the results for the bivariate causality test. The results suggested that there is uni-directional causality running from gross domestic saving, foreign aid and export to economic growth. This empirical result signifies the importance of Dual-gap model to Indian economy and also confirms the robustness of the studies carried out by Olajide S. and Oladipo (2006), Lensink and White, 2001; Berthaut Moreira, 2005; Tasew Tadesee, 2010).

By examining the long run relationship among the variables the study found that the variables converged and the gross domestic savings and foreign aid met their expected positive sign, indicating their positive and significant impact on Economic growth, as a unit increase in gross domestic savings is associated with 7.69% increase in growth, and a unit increase in foreign aid is associated with 0.64% increase in growth, while export found to be in negative relationship with the Economic growth as a unit increase in export is associated with the 0.32% decrease in growth and this result is in agreement with study carried out by Olabanji et al (2010), and this is resulted from the fact that sometimes export lead to transfer of valuable resources outside the country which damages the domestic future growth.

4.1. Conclusion and Recommendations:

Based on the findings of this study, positive relationship exists among economic growth (GDPC), gross domestic savings (GDS), and foreign aid (AID), but negative relationship

where found between export (EXP) and economic growth (GDPC) in India during the study period. The study also reveals the existence of positive long run relationship between economic growth and all the explanatory variables, except export which the relationship found to be negative in each co-integrating vector. Finally, the study identified the uni-directional causality running from gross domestic saving, foreign aid and export to economic growth. This empirical result signifies the importance of Dual-gap model to Indian economy. Base on the finding from the study, foreign aid in the form of loans and grants contribute immensely economic growth. The only problems arise as a result of bad policies, therefore the study recommends the use of aid should focuses on growth enhancing as well as poverty reduction policy this will raise the people propensity to save. The study also recommends that the aid should use to support short term budget and productive sector.

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