

Impact of Foreign Debt on Savings and Investment in Pakistan

Imran Sharif Chaudhry, Shahnawaz Malik & Muhammad Ramzan
Department of Economics, Bahauddin Zakariya University, Multan, Pakistan

Abstract

This paper investigates the impact of foreign debt on savings and investment in Pakistan using time series econometric tools for the period 1973-2006. Annual data for the real savings, real interest rate on bank deposits, real gross domestic product, real foreign debt, real debt servicing on foreign debt, real investment and growth rate of real gross domestic product. We first examine the stationarity of the variables using augmented Dickey-Fuller test. Real gross domestic product and its growth rate were found stationer at level 5 percent. All other variables were found stationer at first difference. A co-integration analysis of the models can not be carried out because residuals of the models are not stationary at level and have not the same order. To avoid the results of spurious regressions, multivariable regression analysis is carried out by considering their respective orders of the differences of the series. According to the empirical results, there is partial evidence that foreign debt contributed favorably to investment expenditures and savings in Pakistan. Finally, it can be concluded that governance mechanism for the use and monitoring of funds generated through external borrowing needs much ardent improvement because of its strong and significant impact on savings and investment.

Key Words: *Debt; Savings and Investment; Real Gross Domestic Product; Time Series Econometrics; Pakistan*

Introduction

Pakistan is facing serious economic problems both at micro and macro levels since the day of independence. Now debt problem has occupied central stage in economic planning and fiscal management exercises in Pakistan. Growing burden of debt is one of the root causes of slowing down the growth of Pakistan's economy. The analysis of debt situation is considered important in the literature of economics and it would provide guideline to policy makers for taking broad decisions about the important national plans and to development strategies in the country. Debt is an obligation that a debtor owes to a creditor. In economics, debt is usually denominated in the units of money, but it can also involve payments in the form of goods or services. A debt to be paid in money may arise from direct borrowing of money or from acceptance of goods and services with the understanding that payment will be made later.

In this study, we analyze the effects of foreign debt and foreign debt servicing on saving and investment efforts in the country. Since national savings are defined as domestic savings plus net factor income from abroad, the increase in debt servicing is likely to reduce saving through its adverse effects on net factor

income from abroad. The same linkage can be used to derive a negative relationship between the size of foreign debt and national savings. In particular, a larger volume of foreign debt not only increases the charges of debt servicing but also decreases the national savings.

On the other hand, foreign debt is likely to have a favorable effect on total investment in a country because most of the foreign borrowing is done on the plea that domestic savings are not sufficient to finance the planned investment expenditures. However, one can also argue that all foreign borrowings are not used for investment purposes. Furthermore, the investment expenditure financed by foreign borrowing is likely to crowd out the investment that could be financed from domestic resources. This suggests that the effect of foreign debt on investment expenditure is not certain. Similarly, the changes in foreign debt servicing can affect the level of investment in either direction. While studying the effects of foreign debt or debt servicing on saving and investment, it is important to consider some other variables that are also expected to affect saving and investment.

For the saving behavior, we consider two important theories namely the Keynesian theory of consumption and Classical theory of saving as suggested in the Loanable-funds model. According to Keynesian theory, an increase in income is partially consumed and partially saved. Therefore, savings are expected to be positively correlated to income. According to Classical theory of saving, an increase in the real interest rate is expected to result in increase saving. More scientific approach to this relationship is given in the form of Life cycle or inter-temporal theories of consumption and savings.

According to these theories, the increase in interest rate has two effects on savings, the substitution effect and income effect. By substitution effect, we mean that an increase in interest rate will induce individuals to substitute the current consumption by future consumption and hence result in increase saving. By income effect, we mean that an increase in interest rate increases the expected income of those people whose net assets are positive and it reduces the expected income of those people whose net assets are negative. Since on average net assets in an economy are positive, the increase in interest rate is likely to result in increase in expected income. This in turn will reduce the need for savings for the sake of future consumption.

Thus combining the income and substitution effects, one can argue that increase in interest rate could affect savings in either direction. Hence, for a country like Pakistan where net assets are relatively small, it is expected that the substitution effect will overweight the income effect and hence saving will be positively

correlated with interest rate. For the behavior of investment we include, besides foreign debt or foreign debt servicing, two variables in the investment function. The first variable is real rate of interest and this is included in the light of Keynesian theory of investment. According to this theory, an increase in interest rate results in increase in the cost of borrowing, or more specifically the rental price of capital. Therefore, the level of investment expenditure is adversely affected. The second variable that we include in the investment function is the growth rate of real GDP. This is included in the light of accelerator model of investment, whereby investment expenditure is positively affected by the expected increase in aggregate demand. Thus, if the growth rate of real GDP is taken as proxy for the expected increase in aggregate demand then investment expenditure would be positively correlated with real GDP.

Besides above theories, we also assume that investment expenditure has inertia in its time path. This is because investment expenditure is done in the light of expansionary plans of firms which are usually completed in periods larger than one year. Thus, if a firm undertakes a new investment expenditure in the current year, it is likely to carry on investment activity in the following few years as well. In order to capture the inertia, we include one-year lagged investment expenditure in our investment function.

The major objective of this paper is to analyze the impact of debt and its servicing on savings and investment in Pakistan using time series econometric tools.

Foreign Debt, Savings and Investment: A Review

There are various studies that measure the effects of foreign aid inflows on economic growth, savings and investment, but their results are not consistent. Weisskopf (1972) estimates the impact of foreign capital inflows on domestic savings for 44 underdeveloped countries using a model, which consisting of seven equations in nine variables and the inequalities (similar to the two-gap model). The study stresses that foreign capital inflow presents an addition to the total supply of resources available to a country and thereby increases the possible magnitude of domestic expenditures. The numerical results of study illustrate the hypothesis that the impact of foreign capital inflow on ex-ante domestic savings in underdeveloped countries are significantly negative, so foreign savings appear to substitute for domestic savings.¹ The author argues that if trade constraint is active then the impact of foreign debt on ex post savings is more likely to be positive because in such a situation, external resources help to relieve the

¹ Using Neo-classical growth framework, Crouch (1973) has shown that the benefits of foreign investment can also be temporary unless it increases national savings rate and/or productivity.

independent limitation on investment imposed by a shortage of specific required imports. If there is a binding saving constraint, then ex ante and ex post saving functions are equal.

Papanek (1973) applies a cross-country regression analysis to thirty-four countries using data for the 1950s and to fifty-one countries using data for the 1960s. The author tests the impact of foreign aid and foreign private investment on economic growth and savings. The empirical findings indicate that foreign aid, foreign investment, and domestic savings are treated as separate independent variables. The savings and foreign inflows are as a one third of GDP growth rate and foreign aid has a greater effect on economic growth than the other variables. Correlation between aid and foreign private investment is not significant and GDP growth is not correlated with exports, education, per capita income or country size. On the other hand, savings are highly correlated with exports and per capita income, not with country size.

Stoneman (1975) strongly criticizes Weisskopf (1972) and Papanek (1973) for inadequate formulation of models. In this study, biased or incomplete country samples have been used, inappropriate selection of statistics has been made, and deficiencies exist in the statistics themselves. The study develops a simple regression model for testing the impact of foreign capital particularly foreign direct investment on economic growth rates of twenty-two poor countries. The author estimates the model using the five-year periods (1948, 1953, 1958, 1963, and 1968) data for all countries and sets a hypothesis that the foreign capital inflow may raise the incremental capital-output ratio. The results of study support its hypothesis but suggest that foreign direct investment is associated with structural effects such as export promotion, changes in capital-output ratio, changes in income distribution, differential stimulus to various sectors, etc, that retard growth. Therefore, the author incorporates net direct investment, net foreign inflows, and stock of foreign direct investment separately in the growth equation.

Mosely (1980) criticizes the previous work on aid, savings, and growth on the ground that none of the estimated equations offer any kind of lag structure, relating the independent and dependent variables. Even then, the existence of lags between the commitment of aid, and OLS is inappropriate if the independent variable contains variables, which are endogenous to the process under examination, instead of being extraneously determined. Therefore, the Two Stage Least Squares method is appropriate to this model. The writer estimates his model for the thirty poorest countries in the years 1969-77 and discovers that the relationship between aid and growth for these countries is still positive; it is

significant and positive for UK-aided countries and negative but insignificant for French and Scandinavian-aided countries.

The study by Zaidi (1985) is an attempt to examine the debt-servicing capacity issue of developing countries from the empirical side. Some of the country specific factors like political stability, the rate of return on capital, the exchange rate and financial and trade policies are considered to be the most important factors along others while addressing the problem of LDCs external indebtedness. The study considers these internal as well as the external factors the basic reason for rising debt servicing burden of LDCs. By focusing attention on the role of domestic saving and investment, as well as the budget deficit of the public sector, the author makes use of two growth-cum-debt models.

Snyder (1990) establishes his model on the ground that a negative association between savings and aid is the spurious result of omitted variables such as war, political disturbances, sudden terms-of-trade changes, and natural disasters. Any of these variables can lower domestic savings and raise foreign aid receipts at the same time, and it may or may not be correlated with per capita income. The study uses international panel data set covering fifty mostly low and middle income countries and three decades (the 1960s, 1970s, and early 1980) and estimate the model by OLS. The study concludes that previous findings of combination of factors, including failure to control the omitted variables (especially per capita income), use of an unsuitable aid proxy, problems with sample size and composition, and consistent negative and insignificant aid coefficients suggest that some aid-switching may be going on.

Khan (1992) examines the impact of real per capita income, GDP growth rate, trade, dependency ratio, foreign capital inflows, and foreign aid to GNP ratio on the national saving rate of Pakistan, using time-series data for the period 1959-60 to 1987-88. The author estimates the model with OLS techniques and finds that one of the reasons for the low rate of savings in Pakistan is foreign capital inflow. The study confirms foreign capital inflow's depressing effect on national savings in Pakistan. According to the results, a one percent increase in the inflow of foreign capital reduces savings by 0.21 percent.

Shabbir and Mahmood (1992) study the impact of foreign financial inflows such as foreign private investment and aid on economic growth and domestic savings of Pakistan over the period of 1959-60 to 1987-88. The authors use the Two Stage least square method for estimation of simultaneous equations. The main conclusion of their study is that net foreign private investment and disbursement of grants and external loans have a positive impact on the rate of growth of real

GNP in Pakistan and that foreign financial inflows may discourage domestic public and/or private saving behavior and resource mobilization efforts.

White (1992) presents rich reviews of the long and as yet unresolved debates. For applied economists the message is that most attempts at assessing the impact of aid on saving, investment and growth suffer from various flaws. These include unresolved theoretical issues, faulty data, particularly for cross-country analysis, specification errors that call into question the scientific rigor of the findings and the difficulty in modeling the mechanisms through which aid actually impacts various macroeconomic variables including growth. These reviews and the conclusions would give pause to applied economists seeking to empirically test the aid-growth association.

Khan and Rahim (1993) examine the impact of annual changes in net economic assistance receipts on changes in two indicators of economic development; domestic savings and economic growth of Pakistan. The analysis incorporates regression of OLS using the sample years 1960 to 1988. The estimated regression equations for domestic savings provide negative coefficients of correlation between foreign aid and domestic efforts for resource mobilization. Aid in grant also exhibits a positive effect on economic growth after one year of actual disbursement, but its estimated coefficient is insignificant.

Kemal (1997) estimates the saving rates against foreign capital inflows along with various other variables that affect the saving behavior. The study finds that foreign capital inflows have entirely been used to finance consumption in Pakistan. So, the increase in foreign capital has resulted in lowering the saving rate by the same magnitude and as such foreign aid may have contributed almost nothing to growth.

Kemal (2001) explains the debt accumulation and its implications for growth and poverty in Pakistan. The author shows that debt accumulation and debt servicing adversely affect the poor. The study illustrates that even though debt burden as a percentage of GDP of Pakistan exceeds that of all the South Asian countries yet it still is not so high as to qualify for a debt write-off. This implies that Pakistan has the capacity to service the debt.

Were (2001) examines the impact of external debt on economic growth and private investment in Kenya. The author observes the structure, magnitude, composition and determinants of Kenya's external debt. The study finds that debt accumulation and current debt flows discourage growth. But, current debt flows stimulate investment and debt accumulation deters investment. The study also reports that the causes of external debt in Kenya can be attributed to both

internal and external factors. Internal factors are expansionary fiscal policies and highly distorted trade policies, while external factors include deterioration of terms-of-trade leading to BOP deficits, high world interest rates and increased protectionism by developed countries, which tends to discriminate against exports from less developed countries.

Siddiqui and Malik (2002) estimate directly the impact of debt on GDP growth rate and argue that debt accumulation and growth have a non-linear relationship: up to a certain level the impact is positive and beyond the threshold level the relationship turns negative. The study reports mixed evidence regarding the impact of debt burden on economic growth. While debt accumulation in other countries of south Asia so far has not had a negative impact on the growth rate, debt accumulation in the case of Pakistan is resulting in low growth.

Mohey-ud-din (2006) analyzes the impact of the foreign capital inflow on GDP Growth in Pakistan during 1975-2004. He concludes that the foreign capital may be helpful in boosting economic growth only under the presence of appropriate monetary, fiscal and the trade policies. Major concern of the policies should be on the inflow of FDI and other form of foreign private capital, while the inflow official aid, loans, grants and debts should be minimized.

Data and Methodology

In this study, annual time series data from 1973 to 2006 is taken from Pakistan Economic Survey (various issues) of the Ministry of Finance and from various Annual Reports of the State Bank of Pakistan. The series of price levels (CPI and GDP deflator) are available with different bases for different periods. The same is the case for the variables that are measured at constant prices. For regression analysis, all such data are converted to a common base of 1990-91. Some information has also been taken from 50 years of Pakistan Statistics, published by the Federal Bureau of Statistics (FBS). Besides this, International Financial Statistics (*IFS*) of International Monetary Fund has also been used to supplement the information.

A number of econometric equations are specified in order to study the effects of foreign debt or foreign debt servicing on national saving and investment. In both the saving and investment functions, we include foreign debt and foreign debt servicing alternatively as the independent variables. Furthermore both the functions are specified alternatively in linear and log linear forms.² Thus, we

² In the log linear specification, we take logs of all the variables except the real rate of interest for two reasons. First, the real rate of interest can turn out to be negative and therefore, its log can not be calculated.

specify the following four econometric equations for saving behavior and four econometric equations for investment behavior:

$$S/CPI = \alpha_1 + \alpha_2 (RD-INF) + \alpha_3 Y + \alpha_4 (FD/GDPD) + \mu \quad (1)$$

$$S/CPI = \beta_1 + \beta_2 (RD-INF) + \beta_3 Y + \beta_4 (FDS/GDPD) + \mu \quad (2)$$

$$\text{Log} (S/CPI) = \gamma_1 + \gamma_2 (RD-INF) + \gamma_3 \log Y + \gamma_4 \log (FD/GDPD) + \mu \quad (3)$$

$$\text{Log} (S/CPI) = \delta_1 + \delta_2 (RD-INF) + \delta_3 \log Y + \delta_4 \log (FDS/GDPD) + \mu \quad (4)$$

Where:

- S/CPI = Real savings
- RD-INF = Real interest rate on bank deposits
- Y = Real Gross Domestic Product
- FD/GDPD = Real foreign debt
- FDS/GDPD = Real debt servicing on foreign debt

$$I = \beta_1 + \beta_2 (RA-INF) + \beta_3 \text{GROWTH} + \beta_4 (FD/GDPD) + \beta_5 I (-1) + \mu \quad (5)$$

$$I = \alpha_1 + \alpha_2 (RA-INF) + \alpha_3 \text{GROWTH} + \alpha_4 (FDS/GDPD) + \alpha_5 I [(-1)] + \mu \quad (6)$$

$$\text{Log} (I) = \gamma_1 + \gamma_2 (RA-INF) + \gamma_3 \text{GROWTH} + \gamma_4 \log (FD/GDPD) + \gamma_5 \log [I (-1)] + \mu \quad (7)$$

$$\text{Log} (I) = \delta_1 + \delta_2 (RA-INF) + \delta_3 \text{GROWTH} + \delta_4 \log (FDS/GDPD) + \delta_5 \log [I (-1)] + \mu \quad (8)$$

Where:

- I = Real Investment
- RA-INF = Real interest rate on bank Advances
- GROWTH = Growth rate of real GDP
- FDS/GDPD = Real debt servicing on foreign debt
- I (-1) = One Year lagged real Investment
- FD/GDPD = Real foreign debt

Second, the changes in the real rate of interest indicate the relative changes, while for the other variables, relative changes can be indicated by changes in the log.

Results and Discussions

First of all, variables are tested for unit root, using Augmented Dickey-Fuller test. In this regard, results are reported in table 1 and 2. This test has been performed with trend and without trend. Y and GROWTH are found stationary time series at level when tested without trend. All other time series are found stationary at 1st difference. The results are different when ADF test is performed with trend. Y time series is stationary at 2nd difference while FDS/GDP and GROWTH are found stationary at level. All other time series are stationary at 1st difference. Finally, it is concluded that the co-integration analysis could not be made as all series have not the same order of integration. So we estimated the stated models with their respective differences of the variables.

Table 1: Augmented Dickey-Fuller Test without Trend

Variables	Level	1st Difference	Conclusion
S/CPI	-0.71	-8.40	I(1)
Log (S/CPI)	-0.63	-6.08	I(1)
RD-INF	-2.59	-5.08	I(1)
Y	10.88	--	I(0)
Log (Y)	-2.02	-3.27	I(1)
FD/GDPD	1.54	-4.05	I(1)
Log (FD/GDPD)	-0.85	-5.26	I(1)
FDS/GDPD	-0.60	-10.60	I(1)
Log (FDS/GDPD)	-1.51	-9.70	I(1)
RA-INF	-2.26	-5.16	I(1)
GROWTH	-3.96	--	I(0)
I	0.98	-5.12	I(1)
Log (I)	-2.26	-3.26	I(1)
I(-1)	0.98	-5.12	I(1)
Log I(-1)	-2.26	-3.26	I(1)

Source: Authors' calculations based on Eviews software

Table 2: Augmented Dickey-Fuller Test with Trend

Variables	Level	1st Difference	2nd Difference	Conclusion
S/CPI	-2.86	-8.30	--	I(1)
Log (S/CPI)	-2.71	-5.99	--	I(1)
RD-INF	-2.84	-5.00	--	I(1)
Y	2.60	-2.91	-7.99	I(2)
Log (Y)	-0.57	-4.00	--	I(1)
FD/GDPD	-1.09	-4.51	--	I(1)
Log (FD/GDPD)	-2.43	-5.16	--	I(1)
FDS/GDPD	-3.76	--	--	I(0)
Log (FDS/GDPD)	-3.24	-10.19	--	I(1)
RA-INF	-3.20	-5.16	--	I(1)
GROWTH	-3.99	--	--	I(0)
I	-1.75	-5.44	--	I(1)
Log (I)	-1.06	-3.74	--	I(1)
I(-1)	-1.75	-5.44	--	I(1)
Log I(-1)	-1.07	-3.73	--	I(1)

Source: Authors' calculations based on Eviews software.

The results of estimation are arranged in Tables 3, 4, 5 and 6. In all the four tables, we observe that our specified models perform quite well in terms of overall explanatory powers of the models. In all the eight equations estimated, the DW-statistic does not fall in the rejection range. In most cases, it lies within the acceptance range, only in few cases, it falls in the inclusive range but the value remains close to the acceptance, rather than the rejection range. Thus, by and large, we can accept the null hypothesis that autocorrelation is absent from the regression errors. Coming to the behavior of individual regression coefficients, the regression coefficients of real interest rate and real GDP have miscellaneous nature of results in all the four estimated saving functions. But it can be concluded that real GDP and real interest rate are adversely related to savings. Likewise, the regression coefficients of real interest rate, growth rate real GDP and lagged investment in the estimated investment equations are according to the theory, though the regression coefficient of interest rate in the linear specification are statistically insignificant.

**Table 3: Parameters Estimates of Saving Equation
(Dependent variable is real savings)**

Independent Variables	Equation 1	Equation 2
Intercept	4667.64 (1.795)	-3818.61 (-5.520*)
Real interest rate on bank deposits	-2096.682 (-2.482*)	-138.918 (-0.240)
Real GDP	-0.002 (-1.721**)	-0.014 (-2.911*)
Real foreign debt	0.126 (2.127*)	-----
Real debt servicing on foreign debt	-----	0.766 (3.625*)
R ²	0.76	0.84
DW Statistic	2.04	1.96
Sample Size	33	33

*Note: The t-statistics (in parenthesis) significant at 5% and 10% levels are indicated by * and ** respectively.*

**Table 4: Parameters Estimates of Saving Equation
(Dependent variable is log of real savings)**

Independent Variables	Equation 3	Equation 4
Intercept	-0.382 (-3.131*)	-0.205 (-1.488)
Real interest rate on bank deposits	-0.153 (-3.110*)	0.031 (4.213*)
Log of Real GDP	2.436 (3.256*)	2.546 (2.299*)
Log of Real foreign debt	1.925 (6.395*)	-----
Log of Real debt servicing on foreign debt	-----	-1.29 (-2.61*)
R ²	0.75	0.65
DW Statistic	2.09	2.13
Sample Size	33	33

*Note: The t-statistics (in parenthesis) significant at 5% and 10% levels are indicated by * and ** respectively.*

**Table 5: Parameters Estimates of Investment Equation
(Dependent variable is real Investment)**

Independent Variables	Equation 5	Equation 6
Intercept	4329.604 (0.753)	3014.604 (7.004)
Real interest rate on bank Advances	-470.378 (-1.636**)	-368.633 (-0.945)
Growth rate of Real GDP	-647.668 (-0.688*)	-349.251 (-1.626*)
Real foreign debt	0.099 (2.798*)	-----
Real debt servicing on foreign debt	-----	1.277 (5.701*)
One year lagged Real investment	0.402 (1.560*)	0.481 (4.517*)
R ²	0.85	0.74
DW Statistic	1.90	2.00
Sample Size	33	33

Note: The t-statistics (in parenthesis) significant at 5% & 10% levels are indicated by and **respectively.*

**Table 6: Parameters Estimates Investment Equation
(Dependent variable is log of real Investment)**

Independent Variables	Equation 7	Equation 8
Intercept	0.021 (0.628)	-0.048 (-0.664)
Real interest rate on bank Advances	-0.012 (-2.011*)	-0.006 (-1.410)
Growth rate of Real GDP	0.003 (0.372)	0.020 (1.635**)
Log of real foreign debt	-0.192 (-0.628)	-----
Log of real debt servicing on foreign debt	-----	0.155 (1.408)
Log of one year lagged Real investment	0.799 (5.253*)	0.516 (2.528*)
R ²	0.54	0.39
DW Statistic	1.87	1.69
Sample Size	33	33

*Note: The t-statistics (in parenthesis) significant at 5% and 10% levels are indicated by * and ** respectively.*

We now come to the main focus of our analysis that is the effects of foreign debt or foreign debt servicing on saving and investment. In the saving function, the volume of foreign debt has positive and significant effect on savings. The effect of foreign debt servicing on saving is negative and it is statistically significant when dependent variable is log of real savings but it is positive when dependent variable is real savings. Based on these results, we conclude that foreign debt itself does not have any significant adverse effect on national saving efforts. However, servicing of the foreign debt creates burden on the current resources, thereby adversely affecting national saving efforts.

In the investment equations, we find that foreign debt or foreign debt servicing have positive impact on the level of investment. But the relationship is marginally significant (at 10 percent level) in two of the four equations and insignificant in the other two equations. Thus, we can conclude that foreign debt does have the favorable effects on level of investment expenditure. But this favorable effect is not strong enough to justify the policy of reliance on foreign borrowing unless one finds some other favorable contribution to the economy.

Conclusion

The basic purpose of this paper was to analyze the impact of foreign debt and foreign debt servicing on the savings and investment expenditures in Pakistan. Time series econometric techniques have been carried out to fulfill this purpose, using annual data for the period 1973-2006. There is partial evidence that foreign debt contributed favorably towards investment expenditures and savings in Pakistan. This obviously implies that the funds generated through foreign borrowing have been used partially to finance investment expenditure and partially to finance consumption expenditures. The negative effect of foreign debt on saving indicate that the resource generated through foreign borrowings have been used partially for consumption purposes. Similarly, the result that foreign debt has contributed favorably to investment activity but not to economic growth suggests that the resources generated through external borrowing have been allocated inefficiently. There is strong evidence that governance mechanism for the use and monitoring of funds generated through external borrowing needs much improvement.

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