

DETERMINANTS OF EXTERNAL DEBT IN INDIA

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ABSTRACT

This paper uncovers theoretical foundations of the factors influencing external debt and presents empirical model of the macroeconomic determinates of external debt in India for a period from 1990-91 to 2016-17. The OLS model reveal that gross fiscal deficit, net domestic savings, net domestic capital formation, exports, imports, real effective exchange rate, foreign exchange reserves, net terms of trade, consumer price index, debt service ratio, net foreign direct investment, gross domestic product and real interest rates (LIBOR) are the prominent macroeconomic variables and they explain 62 percent of the total systematic variations in India's gross external debt.

Keywords: External Debt, Gross Domestic Product, Economic Growth, Real Effective Exchange Rate, Foreign Exchange Reserves

INTRODUCTION

In the late eighties, Indian economy encountered several internal and external problems associated with political instability, fiscal imbalances and their spilled-over effects on balance of payments (BoP) accounts which resulted into the widening of current account deficit. The Kuwait-Iraq war led high imports and low exports of goods and services to Kuwait, Iraq and other Arab countries during this period further aggravated the problem. The war drove pressure on already weak balance of payment position of the country (Economic Survey, 1990-91). India's economic

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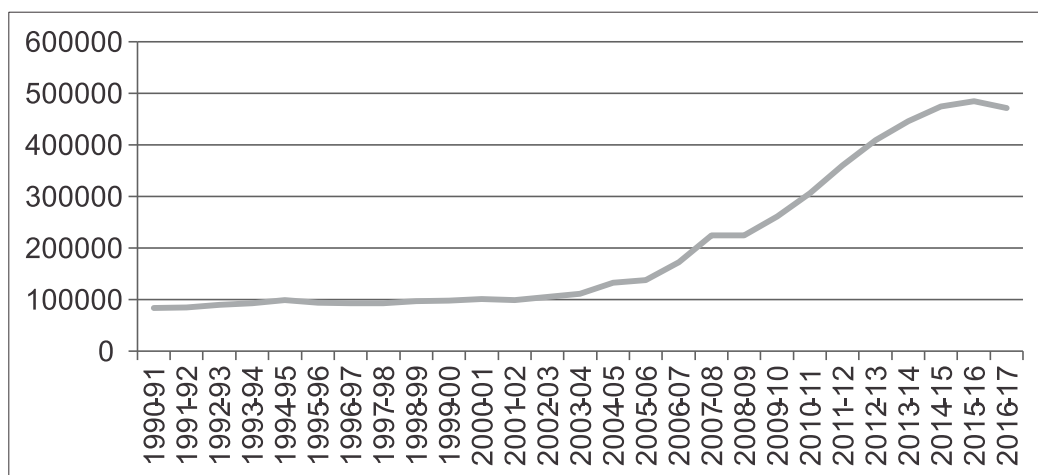
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position during this period was so weak that foreign reserves could finance import bill for three weeks only. As immediate measure, the government had to draw down the foreign reserves from the International Monetary Fund (IMF).

To overcome from this situation, enhance efficiency and competitiveness in global market the government of India introduced process of structural reforms, a paradigm shift in economic, industrial and foreign policy. This process included a series of long term corrective measures, such as, exchange rate adjustment, mobilization of exceptional financing, fiscal correction and consolidation. Since these measures were expected to take time lag to improve the economic situation; the government, as an immediate action opted for restricting imports by reducing the consumption of petrol oil and lubricants (POL) products, generating additional export avenues, mobilizing external assistance, and arranging finance from bilateral sources and financial institutions at concessional rates including IMF under modified compensatory and contingency financing facility.

India's External Debt: An Overview

India considers external debt as a source of capital which supplements both the savings and investment gap, and trade gaps (current account deficit) in the economy. External debt in India is clubbed under multilateral and bilateral debt, loan from IMF, export credit, commercial borrowing (ECB), non-resident (NRI) deposits, rupee debt, and short term debt. The pattern of India's external debt (Figure-1) indicate that the volume of gross external debt US\$ 83801 million in 1990-91 increased to US\$ 99008 million in 1994-95 due to unfavourable balance of payment position (Ministry of Finance, 2001). It further increased from US\$ 93730 million in 1995-96 to US\$ 111645 million in 2003-04 because of surge in NRI deposits and valuation changes against US\$ (Ministry of Finance, 2004). The increase in NRI deposits was attributed to policy shift from higher interest rates and exchange rate guarantee to streamlined and rationalized rates with a view to reduce interest outgoings from repatriable accounts (Ministry of Finance, 2004).

Figure 1: External Debt (US\$ Millions)

Source: External Debt Status Reports (Various Issues), Ministry of Finance, GoI

The period from 2004-05 to 2006-07 recorded increase in gross external debt from US\$ 132973 million to US\$ 172360 million driven by private debt (ECB) and also the valuation changes against US\$ (Ministry of Finance, 2007). The increase in ECB was mainly attributed to a large amount of redemption of bonds (India Millennium Deposit) issued by the government during 1998-2000 with a view to mobilize foreign reserves. During 2007-08 to 2010-11, India's external debt increased from US\$ 224407 million to US\$ 305861 million. This was primarily driven by increased contribution of ECB and NRI deposits in the total gross external debt and also the valuation changes in exchange rates (weakening of dollar against major currencies). The increase in ECB and NRI deposits during this period was caused by interest rate wedge in domestic market and the persistent interest rate differential between domestic and international markets (Ministry of Finance (2010).

During period from 2011-12 to 2016-17, India's external debt increased from US\$ 360766 million to US\$ 471852 million. This escalation was attributed to the existence of current account difficulties and rising private debt flows (which included ECB and NRI deposits). The rise in ECB caused a spike in commercial bank

loans, securitized borrowings and increase in NRI deposits, especially due to launching of SWAP scheme by the Reserve Bank of India. This resulted in increase in deposits in Foreign Currency Non-Resident Bank (FCNR-B) accounts (Ministry of Finance, 2015). In nutshell, India's external debt since 1990-91 accumulated due to widening of current account deficit and unfavourable BoP, policy change regarding interest rates and valuation of US dollar, weakening of US dollar against major currencies and presence of interest rate wedge in the economy.

REVIEW OF LITERATURE

The review of literature covers a detailed survey of relevant studies conducted in various economic environments including Nigeria, Kenya, Pakistan, Sub Saharan Africa, and Caribbean economies. In this line, Krumn (1985), Hasan (1999), Ishfaq and Chaudhary (1999), Kemal (2001), Were (2001), Bilquees (2003) and Perez (2007) through decomposition analysis identified probable determinants of external debt accumulation. These included public and private investment, public expenditure, shrinking government revenue, fiscal deficit, current account deficit, terms of trade, interest rate, exchange rate, inflation rate, debt service, economic misalignment and macroeconomic policy instabilities. Ajayi (1991), Mbelle (2002) and Samson (2003) tried to segregate internal and external determinants of external debt by using decomposition effects. They pointed out fiscal expenditure, domestic savings, inefficient macroeconomic policies, and inefficient debt management as internal factors and variable interest rates, exports, external oil shocks and balance of payment situation as prominent external factors affecting external debt accumulation.

Saibu and Abogan (2005), Greenidge et al. (2010), Awan et al. (2011), Alam and Taib (2013), Mulugeta (2014) and Lau and Lee (2016) used cointegration approach to quantify the factors responsible for external debt accumulation in selected countries, such as, Nigeria, Caribbean economies, Pakistan, Ethiopia, Thailand and Philippines. They observed fiscal deficit, trade deficit, exchange rate, foreign reserve, exports, interest rate, gross domestic product, consumer price index and

quasi money (M_2) as factors having long run cointegrating relationship with external debt. The summary of external debt determinants identified by several researchers is presented in Box – 1.

Box – 1: Determinants of External Debt	
Determinant	Considered By
Fiscal Gap	Krumn (1985), Ajayi (1991), Hasan (1999), Ishfaq and Chaudhary (1999), Kemal (2001), Were (2001), Mbelle (2002), Samson (2003), Bilquees (2003), Saibu and Abogan (2005), Anorou et al. (2006), Perez (2007), Sulley (2010), Lekomola (2010), Greenidge et al. (2010), Awan et al. (2011), Alam and Taib (2013), Awan et al. (2014)
Interest Rate	Ajayi (1991), Hasan (1999), Were (2001), Mbelle (2002), Samson (2003), Saibu and Abogan (2005), Anorou et al. (2006), Sulley (2010), Greenidge et al. (2010), Lekomola (2010), Mulugeta (2014), Lau and Lee (2016)
Trade Gap	Krumn (1985), Ajayi (1991), Hasan (1999), Kemal (2001), Were (2001), Mbelle (2002), Samson (2003), Saibu and Abogan (2005), Anorou et al. (2006), Perez (2007), Sulley (2010), Lekomola (2010), Alam and Taib (2013)
Exchange Rate	Ajayi (1991), Were (2001), Saibu and Abogan (2005), Anorou et al. (2006), Greenidge et al. (2010), Sulley (2010), Awan et al. (2011), Awan et al. (2014), Lau and Lee (2016)
Investment-Savings Gap	Ajayi (1991), Were (2001), Mbelle (2002), Samson (2003), Sulley (2010), Greenidge et al. (2010), Abdullahi et al. (2015), Al-Fawwaz (2016)

Terms of Trade	Ajayi (1991), Lekomola (2010), Awan et al. (2011), Awan et al. (2014), Al-Fawwaz (2016)
Economic Policy	Krumn (1985), Ajayi (1991), Mulugeta (2014)
Gross Domestic Product	Al-Fawwaz (2016), Lau and Lee (2016)
Inflation Rate	Were (2001), Lau and Lee (2016)
Debt Service	Were (2001), Lekomola (2010)
Forex Reserves	Saibu and Abogan (2005) (2005)
Quasi Money (M_2)	Lau and Lee (2016)
Real Effective Exchange Rate (REER)	Sulley (2010), Greenidge et al. (2010)

Samson (2003), Anorou et al. (2006), Lekomola (2010) and Sulley (2010) followed Ordinal Least Square (OLS) technique to identify the factors responsible for external debt accumulation in Africa, Tanzania and Heavily Indebted Poor Countries (HIPC). They observed fiscal deficit, trade deficit, domestic savings, terms of trade, international interest rates, current account deficit, debt service and real effective exchange rate (REER) as significant factors affecting external debt accumulation. Awan et al. (2014), Abdullahi et al. (2015) and Al-Fawwaz (2016) followed the non-linear approach to quantify the factors responsible for external debt accumulation. By using ARDL modelling technique they pointed out gross domestic product per capita, savings, fiscal deficits, trade openness, interest rates and exchange rates as major contributors of external debt accumulation.

DATA AND METHODOLOGY

Based on theory, literature survey and observations on trend, pattern and causes of external debt in India since 1991, the researchers identified certain factors for developing a model on determinants of external debt in India. The annual data of

gross external debt (dependent variable) and the identified independent variables spanning from 1990-91 to 2016-17 is extracted from official websites of Reserve Bank of India (RBI) and World Bank. The detail description of these variables including unit of measurement and source of data is presented in Box – 2 given below.

Box – 2: Description of Selected Variables		
Variable Name & Code	Unit	Data Source
(A) Dependent Variable		
Gross External Debt (EXD)	US \$ Million	http://dbie.rbi.org.in
(B) Independent Variables		
Gross Fiscal Deficit (GFD)	Rupee Billion	http://dbie.rbi.org.in
Net Domestic Savings (NDS)	Rupee Billion	http://dbie.rbi.org.in
Net Dom. Capital Form. (NDCF)	Rupee Billion	http://dbie.rbi.org.in
Exports at FoB (EXPO)	US\$ Million	http://dbie.rbi.org.in
Imports (IMPO)	US\$ Million	http://dbie.rbi.org.in
Real Eff. Exch. Rates (REER)	Index	http://dbie.rbi.org.in
Foreign Exch. Reserves (FXR)	US\$ Million	http://dbie.rbi.org.in
Net Terms of Trade (TOT)	Index	http://dbie.rbi.org.in
Consumer Price Index (CPI)	Index	http://dbie.rbi.org.in
Debt Service Ratio (DSR)	Percentage	http://dbie.rbi.org.in
Net Foreign Direct Invest. (FDI)	Current US \$ Million	http://data.worldbank.org/wdi
Gross Domestic Product (GDP)	Current US \$ Million	http://data.worldbank.org/wdi
Real Int. Rates – LIBOR (RIR)	Percentage	http://data.worldbank.org/wdi

The basic descriptives, mean, median, standard deviation, skewness, kurtosis, Jarque-Bera value and its associated probability of all the variables under

consideration are presented in table – 1. It shows that all the variables, except EXD are normally distributed. For convenience in analysis, all the data sets are converted to their natural logarithm form. The test of stationarity is performed by using Augmented Dickey-Fuller (ADF) Unit Root test on log transformed data of independent and selected dependent variables. The results (table – 2) indicate only CPI stationary at level, and all other independent variables stationary at the first differencing. Only EXD, the dependent variable is found to be stationary at second differencing.

EMPIRICAL MODEL

Ordinal Least Square (OLS) estimation technique, which provides best results in case of non-stochastic time series, is used to model the relationship between explanatory and set of independent variables. The functional relationship between GDP and selected independent variables is expressed as:

$$EXD = f (INV, SAV, EXPO, IMPO, GFD, RIR, REER, FXR, GDP, TOT, CPI, DSR, FDI)$$

The mathematical form of relationship among the variables can be expressed as:

$$EXD = \alpha + \beta_1 INV + \beta_2 SAV + \beta_3 EXPO + \beta_4 IMPO + \beta_5 GFD + \beta_6 RIR + \beta_7 REER + \beta_8 FXR + \beta_9 GDP + \beta_{10} TOT + \beta_{11} CPI + \beta_{12} DSR + \beta_{13} FDI + \mu \dots \dots \dots (1)$$

The functional relationship suggests that changes in the dependent variable (EXD) are explained by independent variables β_1 to β_{13} and μ . μ (μ), the stochastic error term is added to the equation. In order to avoid the problem of outliers and non-normality of explanatory variables in the estimation process, the data is transformed into logarithms. Accordingly, the earlier functional relationship explained in equation – 1 is transformed and expressed in equation – 2 given below.

$$\log EXD = \alpha + \beta_1 \log INV + \beta_2 \log SAV + \beta_3 \log EXPO + \beta_4 \log IMPO + \beta_5 \log GFD +$$

$$\beta_6 \log RIR + \beta_7 \log REER + \beta_8 \log FXR + \beta_9 \log GDP + \beta_{10} \log TOT + \beta_{11} \log CPI + \beta_{12} \log DSR + \beta_{13} \log FDI + \mu \dots\dots\dots(2)$$

The results of OLS estimation presented in table – 3 show that GFD, NDS, EXPO, IMPO, REER, TOT, CPI, DSR and RIR have negative coefficients, meaning that these variables have negative relationship with EXD. The positive coefficients of NDCF, FXR, FDI and GDP indicate that they have positive impact on EXD. The relationship in model form is presented as:

$$EXD = 0.021 - 0.18 GFD - 0.73 NDS + 0.64 NDCF - 0.50 EXPO - 0.09 IMPO - 0.11 REER + 0.35 FXR - 0.26 TOT - 0.11 CPI - 0.30 DSR + 0.14 FDI + 0.33 GDP - 0.17 RIR + \mu \dots\dots\dots(3)$$

The results can be understood as one percent increase in net domestic savings (NDS) will cause 0.73 percent decrease in gross external debt (EXD); similarly, one percent increase in net domestic capital formation (NDCF) will result into increase in gross external debt (EXD) by 0.64 percent. Further, one percent increase in exports (EXPO) will result into fall in EXD by 0.50 percent, and one percent increase in foreign exchange reserves (FXR) will lead to increase in EXD by 0.35 percent.

Other negative coefficient associated with gross external debt indicate that one percent increase in debt service ratio (DSR), terms of trade (TOT), gross fiscal deficit (GFD), real interest rates (RIR), real effective exchange rates (REER), consumer price index (CPI), and imports (IMPO) will result into decrease in EXD by 0.30 percent, 0.26 percent, 0.18 percent, 0.17 percent, 0.11 percent, 0.11 percent and 0.09 percent respectively. Likewise, the positive coefficients of gross domestic product at current prices (GDP) and net foreign direct investment (FDI) indicate that one percent increase in these variables is expected to result in increase in EXD 0.33 percent and 0.14 percent respectively.

The value of coefficient of determination (R^2) of the model is 0.62. It indicates that 62 percent of the total systematic variations in gross external debt (EXD) are explained

by the variations in independent variables considered in the model, and remaining 38 percent variations are attributed to other factors, such as economic policies changes and unknown variables termed as stochastic error term.

MODEL DIAGNOSTICS AND RESIDUAL CHECKING

Econometric theory suggests that residuals of OLS model must be free from heteroscedasticity, multicollinearity, autocorrelation and normality, otherwise the basic assumption of the best linear unbiased estimators (BLUE) associated with OLS estimation will not hold true. Accordingly, residuals of the model are tested on all the parameters using econometrics methodologies. The results obtained from *Breusch-Pagan-Godfrey test* indicate that the residuals in the model do not have heteroscedasticity issues (P-value 0.586 of Chi-square). The results of *Breusch-Godfrey LM test for serial correlation* indicate no serial correlation (P-value 0.274 of Chi-square). Further, the correlations of independent factors are low and Durbin Watson test statistic is close to 2; hence, it can be concluded that the residuals are free from multicollinearity and autocorrelation problem. The Jarque-Bera test of normality shows P-value of 0.366 meaning that the residuals are normally distributed. All this indicate that above model holds correct.

CONCLUSION

In this paper an attempt has been made to identify and model the prominent factors which affect the external debt accumulation in India. The results of the empirical model indicate that sixty two percent of variations in gross external debt are explained by explanatory variables considered in the model and the remaining 38 percent variations are attributed to other factors, e.g., economic policies changes and the unknown variables. The OLS estimates provide an insight about the effects of the selected macroeconomic factors on external debt accumulation, thus, making it convenient to address the key factors to manage the vulnerability of the external debt in India. The model is based only on quantitative variables; qualitative factors, such

as economic policies, macroeconomic misalignment is ignored which is reflected by stochastic error term. The results could however be better if both quantitative and qualitative factors were considered.

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Tables

Table – 1: Basic Descriptive

	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
EXD	201873.40	111645.00	143883.10	0.98	2.36	4.74	0.093
GFD	2206.96	1269.12	1858.82	0.74	1.83	4.04	0.133
NDS	10572.68	5984.55	9950.64	0.73	2.08	3.33	0.190
NDCF	11345.84	5251.39	10867.48	0.70	1.91	3.52	0.172
EXP	125938.80	66285.00	112609.30	0.66	1.80	3.57	0.168
IMP	188013.60	80003.00	175000.10	0.66	1.81	3.53	0.171
REER	104.03	102.20	5.85	0.79	2.38	3.27	0.195
FXR	151967.00	112959.00	133906.50	0.34	1.43	3.27	0.195
TOT	86.19	86.40	15.71	-0.06	2.24	0.66	0.719
CPI	128.91	107.94	70.21	0.77	2.42	3.02	0.221
DSR	14.39	13.70	9.46	0.58	2.07	2.49	0.288
FDI	1.51	5.21	1.61	0.66	1.83	3.53	0.171
GDP	9.35	6.00	6.76	0.71	1.95	3.48	0.176
RIR	5.82	5.86	2.17	-0.42	2.57	1.01	0.604

Source: Own Calculations

Table – 2: Augmented Dickey Fuller Unit Root Test

Variable	Z(t)	Critical Value (5%)	Order of Integration	Remark
EXD	-5.54	-3.60	I(2)	Stationary
GFD	-5.54	-3.60	I(1)	Stationary
NDS	-5.50	-3.60	I(1)	Stationary
NDCF	-5.71	-3.60	I(1)	Stationary
EXPO	-4.54	-3.60	I(1)	Stationary
IMPO	-4.16	-3.60	I(1)	Stationary
REER	-5.18	-3.60	I(1)	Stationary
FXR	-5.32	-3.60	I(1)	Stationary
TOT	-4.33	-3.60	I(1)	Stationary
CPI	-4.87	-3.60	I(0)	Stationary
DSR	-4.83	-3.60	I(1)	Stationary
FDI	-5.96	-3.60	I(1)	Stationary
GDP	-5.25	-3.60	I(1)	Stationary
RIR	-6.35	-3.60	I(1)	Stationary

Table – 3: OLS Estimation Results

Dependent Variable	EXD	Constant (α) = 0.021
Independent Variables		Coefficient ()
1.	GFD	-0.18
2.	NDS	-0.73
3.	NDCF	0.64
4.	EXPO	-0.50
5.	IMPO	-0.09
6.	REER	-0.11
7.	FXR	0.35
8.	TOT	-0.26
9.	CPI	-0.11
10.	DSR	-0.30
11.	FDI	0.14
12.	GDP	0.33
13.	RIR	-0.17
R ² (Goodness of Fit)	0.62	
Adjusted R ²	0.24	
F Statics (Prob.)	0.0067	
Source: Own Calculations		