

## Impact of Public Debt and Debt Servicing on Income Inequality: Empirical Investigation from South Asia

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### **Abstract**

*This study examines the relationship between debt and inequality in a panel of seven South Asian economies over the period from 1996 to 2014. The study incorporated domestic debt, external debt and debt servicing as debt measures in a single panel model. The control variables are government effectiveness, GDP and trade openness. The study used Least Square Dummy Variable (LSDV) Fixed Effect model, Pooled OLS and Random Effect model with standard diagnostics of Hausman test, Lagrangian Multiplier test and F-test for model efficiency. The econometric analysis is also supported by standard diagnostic test for serial autocorrelation, heteroskedasticity and multicollinearity. The study determines that public debt and debt servicing are significant determinants of inequality, increase in domestic debt, external debt and debt servicing leads to decrease inequality. The study concludes that the policy authorities should concede the importance of redistribution channel and the public debt to reduce inequality in South Asia.*

**Keywords:** Debt Servicing; income inequality; South Asia; LSDV

### **Introduction**

Economic inequalities are most obviously shown by people's different positions within the economic distribution - income, pay, wealth. However, people's economic positions are also related to other characteristics. Income inequality is often presented as the percentage of income to a percentage of population. It is often associated with the idea of income "fairness" and is generally considered "unfair" if the rich have a disproportionately larger portion of a country's income compared to their population. At the beginning of 21st century, the developing world has faced two major interrelated problems: that is, their heavy indebtedness and incidence of poverty and inequality. Together they have important implications for the growth possibilities of these countries. Due to pressure from NGOs and anti-globalization movement, IMF, World Bank, UNDP and other IFIs have somewhat belatedly linked debt relief with poverty reduction programs. Unless growth is widely shared, South Asia is still having large pockets of persistent poverty. Worse, rising social and ethnic tensions from increasing inequality could exacerbate existing conflicts and trigger new ones. Government can finance its budget expenditure through borrowing or taxing the output and this taxing the output may have many distortions and create the intergenerational equity and can cause a transfer of resources that tend to undermine growth and increase poverty and inequality.

Over the year most of developing world has failed to collect enough resources to finance their budgets. As a result, they have to face the problem of twin deficit and must rely on public external and domestic debt to finance their development activities. In case of resource starved developing world, debt-financed growth has been replaced by a more balanced view of how it affects economic growth, employment, income inequality, poverty and wealth. In developed countries' case the higher inequality is closely linked with higher external and internal indebtedness. But, in less developed countries' governments use public debt as an imperative tool to finance its expenditures. Economic growth can be increased by effective and

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proficient utilization of resources to achieve macroeconomic goals. However, if the public debt is not properly utilized, it would restrict economic growth and become the biggest curse for the economy.

South Asia has emerged one of the poorest and illiterate regions of the world, having more than 1.65 billion population in which 500 million poor living below poverty line and about 46 percent of the world's illiterate live in the South Asia. This is the region, which has more than 22 percent of the world's population, while having only 1.3 percent of the world's income. It also appears one of the most indebted regions of the world with rising inequalities (World Bank, 2013).

The widening income gap between the rich and the poor has stimulated the need to understand the roots of inequality and poverty, and to construct apposite policies that trim down poverty levels and narrow the income gaps. Fiscal policy can help to tackle the region's rising inequality (ADB, 2014)<sup>4</sup>.

In developing world, many countries use foreign assistance and public debt to fuel economic growth and to alleviate poverty and inequality. Public debt consists of inside or outside borrowing of a nation over a period wrapping its intact history. It is a stock variable and is a fundamental source to cover the financing gaps of government. Public debt is a doubled-edged blade; on the one hand heavy indebtedness leads to macroeconomic threats and also can slow down economic growth and development. Public debt is one of the major economic issues facing the governments of South countries. There is an inadequate literature on the effects of public debt on the social sector and pro poor and inclusive growth. In addition, the available studies on public debt and economic growth have typically focused on external debt. This study aims at filling this gap by using the most recent data from the period 1990 to 2014 to investigate the impact of domestic, external debt and debt servicing on income inequality in South Asian region.

Therefore, this study is focused to analyze the role and implications of international and domestic debt in South Asia. Besides, South Asia's tendency of resources outflow from South Asia to other countries, in terms of debt services, is also identified in terms that how it affects income distribution and inequality situation. The debt cycle theory provides a rationale for international aid in terms of its contributions to enable recipient countries to enhance economic growth. A country borrows in the first stage, generates additional resources and is able to stand on its own feet in the second stage. However, it continues to borrow in the second stage. In the third stage, the country may emerge as surplus of resources and it can repay the loans (debt cycle theory).<sup>5</sup>

The increases in budget deficits and debt positions in developing countries in response to the Great Recession have sparked an interesting debate on the effects of large changes in fiscal positions and balances on economic activity. The financial crisis of 2007-08 has hit countries and shaken financial systems all over the world. This has led to the implementation of large scale fiscal expansionary interventions and, as a result, to massively increased public debt issuances in the countries. The massive bailouts of the banking system have further burdened fiscal balances and rise considerable concern about fiscal solvency of some countries. Many governments want to keep deficits under control, but rolling back the expansionary measures by cutting spending and raising taxes implies an enormous wealth transfer from tax payers to the financial system. The conduct of expansionary fiscal policies also implies a huge shift in resources among groups which causes worries about growing inequality within countries. South Asian per capita annual income is the lowest of any region. Within low income is its mal-distribution within countries. Recent trends show that income distribution in South Asia

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<sup>4</sup> Asian Development Bank. (2014). Asian development outlook 2014: Fiscal policy for inclusive growth.

<sup>5</sup> See Avramovic (1964); Miksell (1968). They define the stages slightly different. See Chaudhary and Ali (1993).

has worsened with growth. The South Asian economy must continue to grow at 10% per annum for reducing poverty; secondly policy interventions are needed to ensure better income distribution which can come from employment growth<sup>6</sup>.

### Econometric Model

Public debt has positive and negative effects on income distribution and inequality along with different macroeconomic variables. Economies face high and persistent budget deficit when the ratio of deficit with respect to GDP increases over the time period especially in long run. To overcome this situation government has three options to reduce the deficit: printing money, borrowing and curtailing expenditure. Each tool has its own consequences e.g. when government use printing money then it adversely affects the economy through inflation, high interest rate and low investment level. On the other hand, when government utilizes borrowing, this option is beneficial for short run but it has many worse consequences. Government agrees to borrow on the terms repayments which generally contain strict rules regulations. Hence in the next fiscal year government used its revenue on debt servicing which creates more expenditures and revenue gap as percentage of GDP this will reduce the further borrowing to finance deficit.

Consequently, government should concern about their public spending plan and they have only one option to reduce deficit by reducing the expenditures (current expenditure), it does not mean that government should reduce their spending by all means. Government should focus on unproductive spending but mostly governments curtailed development expenditure especially expenditure on education and health instead of slashing current unproductive expenditure (Sabir, 2001 & Akram et al., 2011).

In the light of above discussion, we will examine the effect of public debt on inequality with the help of other control variables. For analyzing the relationship between dependent and independent variables the functional form of models is written as follows.

Inequality = f (External debt, domestic debt, GDP, tax revenue, government expenditures, exports)

**Inequality = f (DD, ED, DS, GCE, PR, GDP, EX, TO, NFA, GEF, INF, TXR)**

**Model A: External public debt and income inequality**

$$(Y)_{it} = \alpha + \beta_1(ED)_{it} + \beta_2(X)_{it} + \mu \dots \dots \dots (1)$$

Where.

Y=Gini index is income inequality measure

ED= External debt

X= vector for control variables

**Model B: Domestic public debt and income inequality**

$$(Y)_{it} = \alpha + \beta_1(DD)_{it} + \beta_2(X)_{it} + \mu \dots \dots \dots (2)$$

Where.

Y=Gini index is income inequality measure

DD= External debt

X= vector for control variables

**Model C: Debt servicing and income inequality**

$$(Y)_{it} = \alpha + \beta_1(DS)_{it} + \beta_3(X)_{it} + \mu \dots \dots \dots (3)$$

Where,

Y=Gini index is income inequality measure

DS= Debt servicing

X= vector for control variables

<sup>6</sup> Based on World Bank Report on inequality, "Confronting rising inequality in Asia", which is available at [www.worldbank.org](http://www.worldbank.org).

$$\text{GINI} = \alpha + \beta_1(\text{EXTD}_{t,i}) + \beta_2(\text{DD}_{t,i}) + \beta_3(\text{DSRV}_{t,i}) + \beta_4(\text{TO}_{t,i}) + \beta_5(\text{GDP}_{t,i}) + \beta_6(\text{GEF}) + \mu_{t,i}$$

### 3.4 The Data

For the empirical relationship between public debt and inequality this study will use a panel of South Asian countries and data for the period of 1990-2014. Data will be collected from World Development Indicators (WDI), International Financial Statistics (IFS) and World Income Inequality Database (WIID). The variables description is as follows:

#### 3.4.1 Dependent Variables

The study will have employed inequality as dependent variable. Gini index can be utilized for measuring the income inequality in percentage form, its value ranges from 0 to 1, 0 for perfect equality and 1 for perfect inequality.

#### 3.4.2 Independent Variables

Public debt variables will be used as independent variables, which includes domestic share of public debt as % of GDP, external public debt as % of GDP and debt servicing as % of GDP. This study will also control for tax revenues, government size (govt. consumption expenditures), total public debt as % of GDP, Exports and GDP per capita. Government effectiveness, inflation CPI index, tax rate % of GDP and net foreign assets.

#### Variables Description

To find the data on domestic debt for developing countries is much difficult task. Abass (2007) comprehensively worked on this issue and proposed a new database for domestic debt. Domestic debt is closely equal to the banks' claims on government plus securities held by central bank. The studies on domestic debt (Akram, 2010 & Salti, 2010), use the dollar value of public debt held internally and domestic debt % of GDP and this study will use the domestic debt as % of GDP. For the domestic debt servicing the domestic savings % of GDP will be used.

Existing studies on the external debt suggest different indicators to measure the debt. In this regard debt/GDP, debt/exports, external debt/foreign reserves, external debt/revenue and external debt servicing/ exports ratios are most widely used. Akram (2013) examines the impact of external debt on income inequality. The present study uses the external debt as percentage of GDP and external debt servicing as percentage of exports.

To measure income inequality, share of bottom 20% to 40%, GINI Coefficient, Watt Index have been used in different studies. In the present study GINI coefficient will be used in percentage form. It ranges from 0 equal distributions to 100: unequal distribution.

Different studies use many determinants of income distribution and inequality, GDP, inflation government expenditures, fiscal deficit, fiscal consolidation, trade openness, exports, imports, taxes, urbanization, population growth, investment, democracy, political conflict and institutional variables (Salotti & Trecroci, 2013; Salti, 2010; Akram, 2010 & Acemoglu et al., 2013).

## Results and Discussions

In order to determine which model is more appropriate for our study (FEM or REM), the HST is carried out. To back up our result, i.e. REM is to be used, the BP-LM test is also performed and the results are shown in tables given below. After having the thorough discussion regarding the methods used in the current study we have reached on the following results. This chapter is about the results with incorporating methodology discuss in the 4<sup>th</sup> chapter which are Ordinary Least Square Model (OLS), Least Square Dummy Variable Model (LSDV), Random and Fixed Effect Models, we followed Akbar et al. (2011) and Rajasekar & Deo (2014) to estimate the comprehensive results of the current panel study. The analysis started with the simple Descriptive Analysis.

**Table 1**  
**Descriptive statistics**

	INEQ	EXDT	DSRV	DD	GDP	GEF	TO
Mean	36.845	40.071	2.7181	1896.88	5.900	-0.249	67.766
Median	34.090	37.713	2.403	150.570	5.896	-0.2801	48.235
Maximum	62.690	87.565	7.541	28577.2	19.58	0.9101	204.759
Minimum	28.65	2.896	0.823	0.1930	-3.635	-0.986	21.551
Std. Dev.	6.646	17.172	1.480	5020.98	3.022	0.4596	44.705
Obs...	133	133	133	133	133	133	133

Table 5.1 presents the descriptive statistics of variables used in the empirical analysis, maximum value of inequality index (INEQ) is 62.69 and minimum is 28.65 in the period of analysis. This means there is diversity in inequality among South Asian countries. Domestic debt (DD) is measured in kind of million dollars, where maximum value of DD is 28577.2 in India and minimum is 0.1930 in Maldives. Maximum external debt (EXTD) is recorded at 87.56% of GDP and minimum was recorded at 2.869% of GDP. Mean value of debt servicing (DSRV) is 2.71 and maximum is 7.54 with minimum value of 0.823% of GDP.

**Table 2: Correlation matrix**

	INEQ	EXDT	DSRV	DD	GDP	GEF	TO
INEQ	1.0000						
EXDT	-0.0261	1.000					
DSRV	-0.0051	0.0177	1.0000				
DD	0.0140	-0.1166	0.0532	1.0000			
GDP	-0.1603	0.0258	0.0025	-0.0160	1.0000		
GEF	0.1326	0.2271	-0.0210	0.1114	0.2001	1.0000	
TO	0.0216	0.0353	0.0700	-0.0062	0.3176	0.0407	1.0000

Table 5.2 presents the correlation matrix which determines that correlation between inequality and EXDT, DD and DSRV is weak and negative so it is clear that there is negative relationship between the debt indicators and inequality in South Asia but relationship is not very strong one.

### Econometric Model Selection

To check which model is appropriate for our study, we use F-test (efficiency test) for models between OLS and Fixed Effect Model (FEM) / Random Effect Model (REM).

$$F_{Groups\ effect} = \frac{(R_{fix}^2 - R_{pooled}^2)/(N - 1)}{(1 - R_{LSDV}^2)/(NT - N - K)}$$

**Table 3: Redundant Fixed Effects Tests**

Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	11.471328	(6,120)	0.0000
Cross-section Chi-square	60.294836	6	0.0000

F-test value is more than 5, which shows that it is highly significant. So we can say that OLS results are not appropriate so we incorporate REM or FEM for appropriate results. However OLS Model is not appropriate for our study.

**Table 4: Model Selection Tests**

Specification Test	P-Value	Tested	Selected Model
F-test	0.000	OLS/FEM	Fixed
Breusch and Pagan	0.000	OLS/REM	Random
Huasman test	0.4761	REM/FEM	Random

Different model selection criteria are pointing out that random effect is present in our model so the study discusses the results of random effect to provide empirical evidence to support hypothesis tested. So the results of only random effect model is considered appropriate to present the findings of the study.

### Random effect model

The result of random effect model confirms the significance of domestic debt, external debt and debt servicing to affect inequality level in south Asian countries. The results are presented in table 5.5

**Table 5:  
Random effect model (Selected model)**

Dependent Variable: INEQ				
Method: Panel EGLS (Cross-section random effects)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXDT	-0.0093*	0.0214	-0.4331	0.0656
DSRV	-1.5125***	0.2319	-6.5219	0.0000
DD	-0.039***	6.48E-05	-5.9629	0.0000
GEF	10.448***	0.8385	12.460	0.0000
GDP	-0.3460***	0.1076	-3.2128	0.0017
TO	0.0513***	0.0084	6.1071	0.0000
C	43.235***	1.4394	30.035	0.0000
Diagnostics				
Effects Specification				
			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			3.244934	1.0000
Weighted Statistics				
R-squared	0.674935	F-statistic		43.60239
Adjusted R-squared	0.659455	Prob(F-statistic)		0.0000

Random effect model determines that all the debt indicators e.g. EXTD, DD and DSRV are negatively and significantly affecting INEQ in South Asia. The coefficients of EXTD and DD are very small but the diagnostics are suggesting that the effect is significant so we can consider the results to reject null hypothesis in favor of alternative hypothesis that there is significant impact of debt on inequality. The negative signs of debt indicators suggest that with increase in debt will leads to increase in redistribution and that will further reduce the income inequality in the economies with higher debt ratios.

**Table 6: Cross section effects**

Country Code	Country Name	Effect
1	Bangladesh	1.6807
2	Bhutan	-4.9961
3	India	-5.4270
4	Maldives	-0.5540
5	Nepal	6.6351
6	Pakistan	0.9105
7	Sri Lanka	1.7507

## Diagnostic tests

In order to ensure more reliable results and to remain in line with econometric norms, we have performed tests for Autocorrelation and Heteroscedasticity. We have shifted to heteroscedasticity using the following assumptions:

$H_0$ : Have heteroscedasticity;  $H_1$ : Do not have heteroscedasticity (Homoscedasticity)

**Table 7: Test for Autocorrelation**

F(1,19)	Prob> F	Implication
9.735	0.198	no autocorrelation

Serial correlation test indicates that probability value is 0.198 which indicates there is no autocorrelation present in the penal data set.

**Table 8: Heteroscedasticity Test**

Chi <sup>2</sup>	Prob> Chi <sup>2</sup>	Implication
24.95	0.0001	there is no Heteroscedasticity

According to the p-value, which is less than 0.05, we reject the null hypothesis and find that there is no presence of Heteroscedasticity in our panel for South Asia.

**Table 9: Multicollinearity test**

Variable	VIF	1/VIF
<b>EXTD</b>	4.81	0.208
<b>DSRV</b>	3.51	0.285
<b>DD</b>	2.45	0.408
<b>TO</b>	1.75	0.572
<b>GDP</b>	1.74	0.574
<b>GEF</b>	1.73	0.578

The value of VIF of all variables greater than 1 and less than 5 except IM, which shows that variables are moderately correlated, In other words moderated multicollinearity exists between the variables. All the variables have less than 10 value of VIF, due to this there is no need for further investigation.

The study's findings about the hypothesis which is empirically examined in penal of 7 South Asian countries shown very similar results with the previously conducted studies. We cannot neglect the importance of debt in affecting the inequality in South Asian countries.

## Conclusion

The determinants of the levels and dynamics of inequality constitute an important topic in open economy macroeconomics. Different theoretical models have different predictions about the factors underlying inequality dynamics and about the signs and magnitudes of the relationships between unequal distribution of income and debt indicators. Different approaches to testing the empirical implications of multiple theories, either directly or indirectly, are therefore of considerable interest. Recently many studies have developed the link between debt and inequality argued that with other traditional determinants of inequality the debt indicators are also very significant drivers of income inequality.

This study examines the relationship between debt and inequality in a panel of seven South Asian economies over the period from 1996 to 2014. The study incorporated domestic debt, external debt and debt servicing as debt measures in a single panel model. The control variables are government effectiveness, GDP and trade openness. The study used Least Square Dummy Variable (LSDV) Fixed Effect model, Pooled OLS and Random Effect model with standard diagnostics of Hausman test, Lagrangian Multiplier test and F-test for model efficiency. The econometric analysis is also supported by standard diagnostic test for serial autocorrelation, heteroskedasticity and multicollinearity.

The results of the study are consistent with previous literature and for similar results suggested that targeted policy reforms could help reduce the inequality over the medium term. So accordingly this includes policies to improve regulatory frameworks and financial markets in South Asian economies. Appropriate policies to redistribute can help the countries of South Asia to reduce the level of inequality in the developing economies. Previous literature has also identified effective policy reforms in the way of efficient debt servicing and debt return policies that can also be helpful to increase the redistribution and to further reduce the income inequality.

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