

Impact of Globalization on Inflation in Selected South Asian Countries: Using Panel Data Techniques

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Abstract

The present study is about to elucidate the relationship between globalization and inflation in the South Asian Region. This study is carried out for period of 1981-2016 for four south Asian countries. Panel data techniques were put into investigation. Panel unit root tests reported that the variables are of $I(0)$ and $I(1)$. Hausman test revealed that Pooled Mean Group is suitable for estimation i.e. ARDL. Results showed that the globalization forces considerably and significantly determine inflation. In case of individual country it affected inflation a little different; it is highly significant in case of Bangladesh and Sri-Lanka and less effective for India and Pakistan. Bangladesh and Sri-Lanka may get benefit from protectionist policy to control inflation. We can conclude that large countries are less affected i.e. India and Pakistan. Due to large size of the country external forces are inefficient to affect domestic structure considerably. A small country is expected to be affected more, therefore, it is recommended that small countries should adopt the policies of globalization more carefully.

Key Words

Globalization, Inflation,
South Asian Countries,
Panel Ardl

Introduction

The advancement of science and technology, eliminations of trade barriers as well as financial and exchange rate limitations has greatly reduced the cost of transportation and communication. These activities made globalization possible. It can be referred to the process by which the economies become closely integrated. It was introduced in the 1960s and became the most rapidly growing concept in the last decade of twentieth century (Ali, 2019; Ali, 2013; Afzal, 2007). It has been described in a variety of ways because of its dynamic virtues like cultural, economic, political and social. The main theme of this phenomenon is to share the world products and resources among economies as to increase welfare of the world inhabitants'. Political, cultural and Social globalization, involve is the generalization of democratization's policies, planning, cultures virtues and Status of media, can also affect the decisions of many peoples sentiments regarding the fictional advantages of foreign diets and foreign lifestyles. Social globalization may overweight the effect urbanization, intensify the use of technology associated with the fall in energy use over time (Monda et al., 2007; Swinburn et al., 2011), or can get higher calories by consuming high energy foods with abundant supply (Drewnowski & Popkin, 1999; Popkin & Gordon, 2004). World of the second half got to know that distance between the nation leads to worsening the situation more and more. They came to know that World's welfare can be increased with the sharing of the world resources. Therefore, most of the developed countries got closer since the early 1950s. But most of the developing countries did not show interest in it. With the passage they also came to participate in the beneficial process of globalization (Afzal, 2007). Most of the developing countries limitedly participated in the mid of the 1970s, and more aggressively in the late 1980s (Ali, 2013). South Asia also falls into the process of liberalization in the 1980s. Aggressive liberalization has been taken in the early 1990s.

South Asia countries have common features in general. These features affect both closed and open macroeconomic policy adoptions, upshots, and stability. It is consists of high population growth rates, low-income growth rates, a large share of population devoted to agriculture, massive

trade deficits. The largest part of consumption basket is Food and dependency on oil imports. The process of liberalization started in most of the countries in 1990s. It was shocked by itself, over time, more diversity and deeper markets reduce volatility. Small economies are more affected by external shocks with the process of liberalization due to more open with having less control of current and low market development and having both domestic and foreign debt. Such like similar situation leads to convergence in policies. Frequent changes in food and oil products prices prior to the global crisis led to high inflation rates in most of the Asian and the Pacific countries. South Asia's major economies like India and Pakistan faced double-digit inflation. It was observed that food inflation was more severe. Inflation rates affect different sector of the economy disproportionately. Moreover, a sustained rise in food inflation leads to increase wages rates and general inflation in lag periods. To identify, the main cause of high inflation in open economies of South Asia.

Inflation is caused by the disparity between demand and supply of the economy. It may also affect by demand and supply-side factors as well. It may be created by the supply-side shocks of. These shocks are very much sharp and considered responsible volatile price level. Demand-side changes also caused inflation.

Both the demand side and supply side inflation are closely connected with international transaction both in real and in nominal terms. Trade transactions, foreign investment, and remittances affect both, directly and indirectly, general price levels. Remittances may affect demand of consumer goods by increasing purchasing power of the domestic consumer. In case of South Asian countries, remittances are the main source of foreign capital inflows (Khan et al., 2007).

Trade in the form of imports and in a rise in its prices put pressure on inflation and excessive outflow of capital putting depreciating pressure on exchange rate which can further cause increase in price level of the domestic economy. Liberalization in trade means loss in government revenue which will be recovered by imposing taxes domestically. In this way liberalization will leads to the possible increase in general price level (Ali, et al., 2019).

Globalization contributes significantly in the determination of economic development by incorporating previously unemployed resources into the production environment and makes possible transfer the benefits of technological developments through diffusion between developing and developed countries (Ali *et al.*, 2013) and growth theories by Lucas (1988) and Romer (1986). Moreover, more open economies have the opportunities to get benefits from access to external cheap resources, market extension and can get from the advanced technology (Barro & Sala-i-Martin, 1995). Free trade transactions reduced international price differences by clearing fall in supply (Price Equalization Theorem). Moreover, it is one of the sources of technological diffusion and sharing expertise between developing and developed countries. Domestic growth ensures smooth supply which further reduction in prices (Ali, 2015).

Materials and Methods

The Model

Based on stated literature in introduction, the model of this study for inflation is as following:

$$INF_{it} = \beta_1 TOP_{it} + \beta_2 FDI_{it} + \beta_3 REM_{it} + \beta_4 GDI_{it} + \beta_5 MS_{it} + \varepsilon_{it} \quad (1)$$

INF= Inflation Rate (CPI)

FDI=Foreign Direct Investment

GDI=Domestic Investment (GFCF)

ε = Normally Distributed Error Term

TOP=Trade Openness (X+M)/GDP

REM= Workers' Remittances

MS= Money Supply

Data Nature and Sources

The data is of panel nature. It has N=4 (Bangladesh, India, Pakistan, and Sri-Lanka) and T=36 (1981 -2016). For the estimation purpose to assess the required objectives data are collected from World Bank (WDI).

Econometric Techniques

In the present panel, the span of data is high; therefore, unit root testing is necessary prior to estimation.

Stationerity Test (Panel)

Levin, Lin and Chu Test

Levin Lin and Chu (LLC) presented one of the most important tests of stationarity for panel data in 2002. For stationarity of the data it takes homogeneity into account. It is assumed that the explained parameters p_i 's are to be cross interdependent. It is defined as:

ADF test for every separate sub section can be written as:

$$\Delta X_{i,t} = \Omega_i + \Upsilon_i X_{i,t-1} + \sum_{p=1}^{\Upsilon_i} \Upsilon_{ip} \Delta X_{i,t-p} + \epsilon_{i,t} \quad (2)$$

Hypotheses are formulated as:

H₀: Data is non-stationery.

$$H_0: \Upsilon_1 = \Upsilon_2 = \dots \Upsilon_n = \Upsilon = 0$$

H₁: Data is stationery.

$$H_1: \Upsilon_1 = \Upsilon_2 = \dots \Upsilon_n \neq \Upsilon \neq 0, \quad \Upsilon < 0$$

Im, Pesaran and Shin Test

According to Pesaran et al. (1997) assumption, the cross-sections are independent, but in case of large data span it is not true. But Banerjee et al. (2001) are of the view that if the assumption is not valid, it will reject the null hypothesis. To look for the solution of the problem existed; Pesaran (2003) introduced a new panel unit root test. The equation of the test is as:

$$\Delta Y_{i,t} = \delta_i Y_{i,t-1} + \sum_{j=1}^{p_i} \delta_{ij} \Delta Y_{i,t-1} + \gamma_{it} \quad (3)$$

The IPS test may be defined as:

$$t_{NT} = \frac{1}{N} \sum_{i=1}^N t_{it} (P_i)$$

In the previous equation, t-value showed ADF for each individual economy. Test statistic may be designed for ADF as:

$$B_t = \frac{\sqrt{N(T)} [t_T - E(t_T)]}{\sqrt{\text{var}(t_T)}}$$

Hypotheses of *IPS*

H₀: data is non-stationary.

H₁: data is stationary

Hausman Test

The impact of diverseness on the ways of the coefficients can be driven with the help of the Hausman test. Hausman test deals with the heterogeneity element of the variables. The decision is based on the following criterion:

If we found the variables homogenous, PMG will be preferred over MG. Efficient estimates can get through PMG technique.

If H_0 is rejected, we can accomplish that efficient estimator is MG, and MG is preferred over PMG.

Then the estimates of the pooled mean group believe more efficient than mean group.

H_0 of the Hausman Test is that the PMG is an efficient estimator.

In case of the rejection of the null hypothesis, it supposed that MG is efficient and it preferred over PMG and vice versa. The decision making is based on the value of concerned probability: if the estimated value is less than the critical value at 5 %, thus it will lead to the rejection of H_0 (Chu and Sek, 2014).

PANEL ARDL (PMG/MG)

The ARDL model is famous approaches as compare to other co-integration approaches because of their number of advantages in a single approach. This approach is based on single co-integration and first time the technique is introduced by Pesaran and Shin (1999) and revised after some time by Pesaran et al. (2001). The key advantage of this procedure is that if all variable are of $I(0)$ or as well as stationary at first difference $I(1)$ or also there is mixture of first difference or level we only apply this approach, we do not use any other approach, in simple words this approach does not force that there is compulsory for all variable that it must be co-integrated on the equal order. Another advantage of this approach is that it deals in long run in conjunction with short-run relationship (Dritsakis, 2011). Strong results and consistent estimates are provided by autoregressive distributed lag approach when the

sample size is small of long-run coefficients (Shin and Pesaran, 1999). It is suitable for short span data and also provides efficient results in the presence of endogeneity.

Inflation's Model

$$\Delta INF_{it} = \alpha_{it} + \lambda_{1it} INF_{i(t-1)} + \lambda_{2it} TO_{i(t-1)} + \lambda_{3it} FDI_{i(t-1)} + \lambda_{4it} REM_{i(t-1)} + \lambda_{5it} MS_{i(t-1)} + \lambda_{6it} GDI_{i(t-1)} + \sum_{j=0}^p \delta_1 INF_{i(t-j)} + \sum_{j=0}^p \delta_2 TO_{i(t-j)} + \sum_{j=0}^p \delta_3 FDI_{i(t-j)} + \sum_{j=0}^p \delta_4 REM_{i(t-j)} + \sum_{j=0}^p \delta_5 GDI_{i(t-j)} + \sum_{j=0}^p \delta_6 MS_{i(t-j)} + \varepsilon_{1it} \dots \dots \dots (4)$$

Results and Discussions

To carry out the required impact, different statistical and econometric tools are used. The results of these tools are presented below in turn.

Descriptive Statistics

Results regarding general aspects of the data available for the research model of the present study are given in the following table.

Table 1. Descriptive Statistics Presentation

	INF	TO	FI	REM	DI	MS
Mn	3.209	17.285	1.907	2.011	13.382	11.285
M	6.23	18.521	2.807	6.050	8.942	12.521
Max	13.638	41.492	10.015	9.053	19.820	23.492
Min	3.228	15.244	1.614	1.852	8.241	10.244
S.D	2.308	10.042	5.047	5.805	7.328	13.042
Skew	0.871	2.525	4.013	3.002	4.241	9.525
Kurt	2.807	6.429	11.657	17.704	15.130	13.201
J-B	9.051	4.882	35.414	13.654	15.730	25.603
Prob	0.005	0.0209	0.000	0.000	0.000	0.000

In the first stage, descriptive statistics are carried out for 36 years and for four countries having 144 observations. The results in Table-1 show that INF's mean value is almost 6, and its standard deviation is 2.308 and their maximum and minimum values are 13.6 and 3.228 respectively. The minimum values INF shows that a country or some countries in the panel have low level of inflation. On the other side the panel countries have a country or set of countries which have a high level of Inflation in the current globalized period. Therefore, there is a need for conducting a comprehensive study to check whether which country affected more and which one less affected. The skewness of the data shows that the distribution is moderately skewed; on the other hand the kurtosis indicates that the INF is leptokurtic, in simple words it means that it having a higher peak. In the end Jarque-Bera test indicated that the surplus variable INF is not normally distributed, whenever the value of probability is below the 5%, this will leads to the rejection of the null hypothesis and acceptance of the alternate hypothesis of non-normal distribution of the variable: Means the variable is under observation is not normally distributed (Enders, 2004).

Similarly, variables representing globalization i.e. TO, FI and REM and their means are 17, 1.09 and 2.01 respectively. It clear from the means values that countries are more integrated in term of trade as compared to other aspects of globalization. The corresponding standard deviations are 10, 5 and 5.8 respectively. The maximum values of globalization's variables are 41, 10 and 9 respectively. The minimum values of globalization's variables are 15, 1.6 and 1.8 respectively. Showing that there are nations included in this panel which contributed differently to the process globalization. The result of skewness and kurtosis statistics are clear which is mentioned in the table of TO, FI, and REM. The Jarque-Bera statistics indicated that the variables under consideration are not normally distributed,

the probability values are also less than 0.05, and therefore, null hypothesis could be rejected that the variable is not normally distributed.

Descriptive statistics are mentioned in Table-5.1 about GDI with a mean value of 13.2. The standard deviation of the said variable is 7.2. The maximum and minimum values are 19.8 and 8.4 respectively. The minimum values of gross domestic investment for the nation or nations included in the panel having a minimum gross domestic of 8.4 percent of GDP, while the maximum values of gross domestic investment at the panel represent the high level of Gross domestic investment in the panel countries. The result of Jarque-Bera statistics and probability values showed that GDI is no more a normally distributed variable, with a high value of Jarque-Bera statistic 15.7 and the probability value is 0.000. We conclude that GDI is not normally distributed.

We are dealing with panel data having long data span; therefore, panel unit root tests are used. After stationarity testing suitable estimation is also desirable. We have used Levin, Lin and Chu (2003) and Im, Pesaran, and Shin (2002) for the purpose of unit root testing and for the estimation of the parameters Panel ARDL is employed. The results of the mentioned techniques are given in detail in turn.

Results of the Panel Unit Root Tests

The data of the present research study consist of four cross-sections and 36-year time span. The time span is enough long; therefore unit root tests are employed. The results of the two selected penal unit root tests are presented in the table given below.

Table 2. Results of the Panel Unit Root Tests

Variable	LLC Test				IPS Test				Outcome
	I(0)		I(1)		I(0)		I(1)		
	T-Value	Prob.	T-Value	Prob.	T-stat	Prob.	T-Value	Prob.	
INF	0.627	0.778	-3.760	0.000	-0.968	0.678	-5.895	0.000	I(1)
TO	0.154	0.129	-6.686	0.000	-0.190	0.139	-7.875	0.000	I(1)
FDI	-0.945	0.607	-4.808	0.003	-0.931	0.599	-4.789	0.000	I(1)
REM	1-.358	0.519	-5.317	0.000	-1.410	0.497	-5.305	0.000	I(1)
GDI	-3.706	0.000	----	----	-3.673	0.000	----	----	I(0)
MS	-0.891	0.498	-3.418	0.001	-0.906	0.409	-4.031	0.000	I(1)

LLC=Levin, Lin and Chu Test, IPS=Im, Pesaran and Shin Test

The bird eye view of the results presented in Table- 5.1 enables us to decide about the stationarity level of the variables selected regressed in the model. According to the above table all of the above variables are stationary at 1st difference expects GDI. We found different order of the stationarity (I(0) and I(1)). In such like situation literature suggested that Panel ARDL is suitable technique for parameters estimation.

Hausman Test

For the selection of the suitable technique, whether Mean Group or Pooled Mean Group should be used. For the said purpose the Hausman test is used.

H₀: Pooled Mean Group is preferred over Mean Group

If the null hypothesis is accepted then it believed that pooled mean group is more efficient and it preferred over mean group (Chu & Sek, 2014).

Table 3. Hausman Test's Results

	(b)MG	(B)PMG	(b-B)Difference
INF	-10.62	-3.17	-7.05
TO	-4.39	1.38	-5.77
FI	1.244	1.209	0.035
REM	-12.23	-7.03	-5.20
GDI	2.891	2.018	0.773
MS	-8.175	-5.235	-2.940
Probability Value	= 0.660		

In above table the results shows that the probability value is greater 0.05 i.e. **0.66**, so we accept null hypothesis and apply PMG estimator.

Globalization and Inflation Model Results

Panel ARDL provides estimates of the model for long run as well as for the short run. It also provides results for the region as whole and sub-regions as well. This technique is more suitable for the comparison between each country in panel. It will help to get the results and differentiate between the impacts of globalization on different countries of the region.

Estimated results for globalization and inflation model in South Asian Economies

Table 4. Dependent Variable: Inflation

Variables		Coef.	Std. Err.	T value	Prob
Long Run	TO	0.17	0.05	3.40	0.009
	FI	0.03	0.051	0.29	0.588
	REM	0.29	0.13	2.23	0.013
	MS	0.79	0.158	5.00	0.000
	GDI	0.51	0.34	1.50	0.21
Short Run	ECT	0.49	0.11	4.45	0.000
	ΔTO	0.21	0.091	2.307	0.023
	ΔFI	0.19	3.15	0.060	0.879
	ΔREM	0.03	0.13	0.23	0.708
	ΔMS	0.25	0.76	0.32	0.603
	ΔGDI	0.20	0.35	0.571	0.592
	Cons	1.87	0.585	3.20	0.001
		R2=0.814		DW= 2.14	

The estimates of both the short and long runs for the region as a whole are presented in table-4; I the upper part of the table long run results are presented while in the lower part short-run results are given. The variable ‘TO’ is found positively and significantly related to the inflation rate in the region. The estimated value of the coefficient of ‘TO’ is 0.17 with a probability of 0.009, that there is positive association between trade liberalization and inflation. Trade openness leads to increase price level of the region. The finding of the study is opposite of the theoretical framework of the trade theories and supported some of the past studies investigated by Munir and Kiani (2011). Financial openness affects statistically significantly Inflation in South Asian countries in both the long and short run. Similarly, REM is statistically significant with positive sign; which revealed a positive association between remittances and inflation. The result of the current study is parallel with the findings of Tung et al. (2015). The overall impact of globalization factors are positive to inflation rate in the selected countries which means that globalization forces leads to increase inflation rate in developing countries of South Asia.

The coefficient estimate of ECT is -0.49, which is negative and statistically significant. It is also less than one which is desirable. The negative and significance appearance of ECT confirm the long run convergence. The coefficient of ‘R²’ is 0.84. The estimated value of R² reported that the regression model regressed is good fitted. It is clear from the value of Durban Watson that the model has no serious issue of serial correlation.

ARDL Results (Specific Country Case)

The results of the short run for each of the individual countries for which data are regressed are given in the following table.

Table 5. Globalization and inflation (Individual Countries)

Variables	PK	BNG	IND	SRI
ETC	-0.549 (0.009)	-0.822 (0.000)	-0.951 (0.000)	-0.810 (0.000)
ΔTO	0.064 (0.014)	0.28 (0.017)	0.17 (0.012)	0.47 (0.047)
ΔFI	0.18 (0.05)	0.22 (0.016)	0.14 (0.000)	0.06 (0.000)

ΔREM	0.17 (0.005)	0.427 (0.012)	0.20 (0.000)	0.39 (0.028)
ΔGDI	0.39 (0.29)	0.39 (0.14)	0.39 (0.25)	0.95 (0.19)
ΔMS	0.76 (0.007)	0.81 (0.019)	0.69 (0.037)	0.66 (0.029)
CONS	2.839 (0.004)	2.84 (0.000)	10.30 (0.000)	15.23 (0.000)

Values in parentheses () are probability estimates. Where Pk= Pakistan, BNG= Bangladesh, IND= India, and SRI= Sri-Lanka

The results in Table-6 are the short-run estimates for the individual countries of the region. The estimate of the coefficient of ETC term is negative and significant which confirm the existence of stable long-run equilibrium. The speed of convergence towards equilibrium is high in case of India followed by Bangladesh and Sri-Lanka and with lowest speed in Pakistan. The coefficient estimate of 'TO' is positive and significant for all of the panel countries, the same association is also reported by Munir and Kiani (2011). The variable is highly significant in case of India and highly contributed in case of Bangladesh (highest coefficient value). While the coefficient of 'TO' is least for the countries India and Pakistan. It is concluded from the results that 'TO' leads to increase in inflation. The variable FI is found positive and significant in association with inflation. FI is more effective to affect inflation in case of Bangladesh and Pakistan while less effective to affect inflation in India and Sri-Lanka. Similarly, the third important component of Globalization i.e. REM affects inflation positively. Remittances strongly affect inflation rates in Bangladesh and Sri-Lanka. The impact of remittances on inflation is lowest in case of Pakistan and moderate in case of India. GDI is insignificant to affect inflation rates in the panel of countries. The short-run impact of MS is positive but insignificant with a probability value of 0.79. Money Supply is added to the model to test the quantity theory aspect of inflation. The variable MS is found positive and significant. The results are an indication of the existence of the quantity theory of money in the study area. The results are more supportive in case of Bangladesh and Pakistan, while comparatively less supportive India and Sri-Lanka. Because the Quantity Theory of Money had described that there is perfect (one to one) relationship between monetary growth and inflation rate.

Conclusion and Policy Recommendations

Globalization's measures are tested against inflation in South Asian Countries. Different measures are taken for the representation of globalization in literature, but globalization is defined and measured by Trade openness, Financial Integration and Workers Remittances for the sake of simplicity and based on data available regarding the selected panel of countries. We are dealing with panel data having four cross-sectional and thirty-six data span. Data span is enough long, therefore, unit root testing is necessary for the testing of stationarity of the data. Levin, Lin & Chu and Im, Pesaran & Shin unit root tests are employed to the data. Tests reported that variables have different unit-roots: order zero and order one. To decide whether MG or PMG the technique will be suitable for estimation of the parameters, Hausman Test is used. PMG is preferred over MG. Thus Panel ARDL technique is used for estimation of the required impact. Results revealed positive relationship between globalization forces and inflation. The impact of globalization on individual countries is different. Different components of Globalization affect inflation differently. Therefore, this study suggests that more research should be done to clearly identify the impact of each component of globalization inflation on different countries in the panel. And, to investigate the reasons that the difference in impacts of the components of globalization on inflation in each of the countries.

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