Currency Devaluation and Output Growth: An Empirical Analysis for South Asian Economies

Shafiq-ur-Rehman[a], Muhammad Atiq-ur-Rehman[b,c] and Muhammad Shahid Maqbool[c]

[a]*National College of Business Administration and Economics (NCBA&E), Lahore, Pakistan.*
[b]*Department of Economics, University of the Punjab, Lahore, Pakistan.*
[c]*Higher Education Department, Government of the Punjab Lahore, Pakistan.*
E-mail: qazshafiq5@gmail.com; atiq164@gmail.com; shahidmakbool@gmail.com

Abstract: Devaluation is considered to be useful in enhancing economic growth by raising exports of a country. But devaluation may not be growth-promoting incase of developing countries due to deteriorating terms of trade, expensive imports and rising inflation. This study is an attempt to empirically analyze the impact of currency devaluation on real output in the South Asian region for the period of 1990-2017 and modern econometric techniques are applied for analysis. The empirical findings show that devaluation has no significant positive impact on the economic growth of South Asian countries except in Bangladesh. The low-tech primary exports as compared to hi-tech manufactured imports of the region bring no fruitful effects of devaluation (depreciation) in terms of real output growth.

Keywords: Devaluation, Depreciation, Real output, Exchange rate

1. Introduction

It is a common notion that the currency devaluation (depreciation)can boost economic growth in the developed as well as in the developing countries. The traditional view to devalue the currency is to improve the exports and reduce trade deficits. A reduction in the value of domestic currency makes exports cheaper which raises the export volume and promotes economic growth. Conversely, import substitution is encouraged due to higher import prices. China is a major example, where the economy is reaping the benefits of currency devaluation. By devaluating the currency, a country can lower the export prices and gain a competitive advantage in the global markets. The fragile Yuan made China's imports costlier which encouraged the preparation of import substitutes domestically.

The nexus between exchange rate and economic growth has been a widely debated topic among the Economist and policymakers. According to the conventional approach, a competitive exchange rate enhances exports and stimulates economic growth. However, contrary conclusions are often obtained

after proper empirical analysis. Depreciation or devaluation has the potential to increase exports but the cost of imports also rises. Currency depreciation in Mexico has witnessed a consistent drop in output, while currency appreciation has been associated with an economic boom (Kamin and Klau, 1998). Some economists are of the view that devaluation or depreciation may not essentially result in higher output in the developing economies. But devaluation may have contractionary effects on domestic economic activity triggered by trade deterioration, external sector imbalances and domestic inflation. The contractionary effect may come from the demand side or supply-side channels (Kalyoncu, Artan, Terzekia and Ozturk: 2008). About the demand side, nominal devaluation negatively affects aggregate demand. Moreover, the price elasticity of exports and imports also affect trade balances. When the elasticities are low, they will influence trade balance and recessionary effectsare observed in the economy.When demand is inelastic and prices fall then total revenue also falls. In the supply-side channel, devaluation can reduce aggregate supply due to high costs of imports.

The earlier researchers Bahmani-Oskooee, Chomsisengphet&Kandil (2002), Christopoluos (2004), andMemon *et al.* (2015)found the mixed results while analyzing currency devaluation and its impact on growth. The problem of heterogeneity arises in analyzing the time series data on several countries simultaneously because when an individual regression is estimated for each country then there is a strong possibility of different parameters of the model for each country. (Verbeek: 2008). To overcome the empirical issues this study uses panel analysis to observe the relationship between currency devaluation and output level for SAARC countries which includes Bangladesh, Bhutan, India, Pakistan, and Nepal. Engle-Granger co-integration and error correction techniques are appliedfrom 1990 to 2017. The rest of the study is divided into five parts. A literature review is covered in section 2. In section 3, the analytical framework and econometric methodology are discussed. In section 4, results are reported while in the last section conclusion is given.

2.   Literature Review

The relationship between output and devaluation has been studied in several ways but the empirical findings have mixed results.Edward (1986) finds the negative impact of devaluation on the output of the twelve developing economies during 1965-1980. The negative effect was also advocated by Lizondo & Montiel (1989) while analyzing real economic variables: investment, real output and employment of developing countries. Kalyoncu *et.al.* (2008) observe the negative impact of devaluation for 23 OECD countries from 1980 to 2005, applying cointegration technique for data analysis. Ahmad *et al.* (2015) explore the effect of exchange rate depreciation on the economic growth of Pakistan from 1976 to 2010. The results of the analysis illustrate that depreciation hurt economic growth. Kappler *et al.* (2011) find that the negative

influence of currency appreciation on output is statistically insignificant. Prabirjit (1992) confers the effects of currency devaluation on the Indian economy from 1971 to 1990. The empirical results depict that the depreciation of Indian rupee has no significant effect on exports and import volumes.

Chou and Chao (2001) observe the currency devaluation effect on aggregate output in five developing countries from 1997 to 1999. The study concluded that the short-run effect was found. The short-run contractionary impact on output is due to a fall in aggregate demand caused by increased price level. The contractionary effect of devaluation was advocated by Bahmani-Oskooee, Chomsisengphet & Kandil (2002) and Magendzo (2002).

Christopoluos (2004) analyzed the devaluation and output relationship for 11 Asian countries for the period of 1968-1999. The study reveals that in the long-run only three countries growth prospects improved due to depreciation but on the other hand depreciation harmed output growth of the rest of the countries. The positive effect of devaluation was also observed by Upadhyayal (1999). Bahmani-Oskooee and Mohammadian (2016) suggest the possibility of different effects of currency appreciation and depreciation on output. Similarly, Bahmani-Oskooee *et al.* (2018) explain that the effect of currency depreciation is asymmetric.

3. Analytical Framework and Econometric Methodology

In this study real exchange rate is used as a regressor while real GDP as a dependent variable as earlier used by Chou, and Chao, (2001) and Kalyoncu *et.al.* (2008). A simple linear regression model is applied for dataanalysis following the Christopoluos (2004) method

$$\text{Log}(Y_t) = \alpha + \beta \, \text{Log} \, (RER_t) + u_t$$

The variables are in logarithmic form whereas Y represents the real GDP at constant prices and RER depicts real exchange rate. The slope coefficient β estimates the elasticity of Y concerning real exchange rate. When the sign of β becomes positive with statistically significant, then the exchange rate depreciation (devaluation) would lead to economic expansion. On the other hand, the negative and statistically significant coefficient of β explains that the exchange rate depreciation (devaluation) would become contractionary for the economy. The exchange rate would be neutral to real output when â is not statistically significant. The data is collected from International Financial Statistics.

Before analyzing the data, the properties of the time series were checked. Since in time series data, there are certain trends, for this purpose Augmented Dickey-Fuller (ADF) test is used to inspect the stationary properties of data. ADF test equation can be written as

$$\Delta X_t = \alpha + \beta X_{t-1} + \sum_{i=1}^{n} \gamma \Delta X_{t-i} + \varepsilon_t$$

Where X is the variable of interest, the sign Δ is the first difference operator, 't' is time, α is intercept and β, γ are slope coefficients while 'ε' is the random error term.

The test of cointegrationis applicable when all the series are integrated of the same order. Engle and Granger (1987) are of the view that the sum of non-stationary time series can be stationary. If time series are individually stationary after differencing, the linear combination of two series in levels can be stationary. This study applied the Engle-Granger test of cointegration to observe the long-run relationship. Augmented Dickey-Fuller Test is utilized to observe the stationarity. The ADF test shows that the series are co-integrated.If the variables are found to be co-integrated by applying Engle and Granger (1987) test, an error correction model (ECM) is estimated to examine the short-run effect.

$$\Delta LY_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta LY_{t-i} + \sum_{i=0}^{n} \beta \Delta LRER_{t-i} + \lambda EC_{t-1} + v_t$$

Where EC is the error-correction term, the sign Δ is the first difference operator, I stands for lags, v_t is the white noise error term; α_0, α_1, β, and λ are the coefficients to be estimated.

4. Empirical Results

Since annual data is used for analysis from 1990 to 2017. The real exchange rate is calculated by multiplying the ratio of foreign CPI to the domestic CPI with the nominal exchange rate. All series are expressed in the logarithmic form. The first step towards data analysis is to check the stationarity by applying the unit root test. As mentioned earlier, the ADF testing is used to check the unit root. The empirical results are shown in Table 1 below.

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Test

| Country | *Level* | | *First Difference* | |
	LY	LRER	LY	LRER
Bangladesh	3.48 [2]	0.1356 [1]	-1.2270*** [1]	-4.2517* [3]
Bhutan	1.0483 [0]	-1.4131 [1]	-4.7190* [0]	-3.3094** [0]
India	1.9804 [0]	-1.0889 [1]	-5.2367* [0]	-3.8094* [0]
Nepal	-1.1645 [2]	-0.9193 [1]	-5.1857* [1]	-3.5428** [1]
Pakistan	0.9606 [2]	-1.2015 [1]	-3.1355** [0]	-2.6348*** [1]

Note: Square brackets show suitable lag for unit root testing while *,**,and*** indicate stationarity at 1%,5%and 10% level of significance respectively.

The results from Table 1 show that the ADF test statistics are insignificant at a level depicting the existence of unit root in the series while results are significant at the first difference, which reveals the existence of cointegration between real exchange rate and real GDP. Engle-Granger cointegration test is

applied to examine the long-run relationship between the variables. In Table 2, the results of the ADF test are given. The ADF test statistics are not significant for most of the countries which depict no long-run association between real output and real exchange rate.

Table 2: Engle-Granger Co-integration Test Results

Country	Constant	LRER	ADF
Bangladesh	23.4215*	0.7556*	-2.7205*** [1]
	(575.8272)	(71.7188)	
Bhutan	18.4037*	0.9064**	-2.0122 [3]
	(45.4476)	(8.3264)	
India	26.4068*	0.7236*	-2.4996 [0]
	(170.8143)	(16.5208)	
Nepal	22.4389*	0.5021*	-2.4113 [0]
	(228.5275)	(20.5865)	
Pakistan	25.8673*	0.3328*	-2.5545 [1]
	(494.8482)	(23.6796)	

Note: Parenthesis indicate t-statistics while square brackets show lag order for ADF test. The notations *,**,and*** indicate significance at 1%,5% and 10% level of respectively.

The significant 't' statistics of constant terms are due to just one independent variable. The insignificant ADF test shows that the effect of currency devaluation on output growth is neutral in these economies. However, fragile evidence of cointegration is present in case of Bangladesh.

Economic theory suggests that if exports are non-traditional items, with high demand from the importing world, it can improve its terms of trade through devaluation.But, if exports are less advanced or primary products as compared to hi-tech manufactured imports then devaluation will result in deteriorating terms of trade and leads toslow economic growth. Exports are mainly low-tech, agro-based and primary products while imports are hi-tech manufactured products in case of SAARC countries, so the typical textbook theory of advantageous devaluation is not properly applied in the region. The Error-Correction Mechanism results for Bangladesh are presented in Table 3 below.

Table 3: Error-Correction Test Results

Country	$\Delta LRER_t$	$\Delta LRER_{t-1}$	EC_{t-1}
Bangladesh	0.2859**	0.4395**	0.1696
	(2.3300)	(3.3701)	(0.9158)

Note: Parenthesis indicate t-statistics while square brackets show lag order for ADF test. The notations ** indicates significance at 5%.

The positive and significant coefficient of the real exchange rate and its lagged term reflects a positive impact of devaluation on output growth in the

short-run. The insignificant error correction term shows exchange rate volatility and zigzag movements which makes convergence difficult.

5. Conclusion

The purpose of this paperis to examine the impact of currency devaluation on output growth in the SAARC region. The empirical results using Engle-Granger co-integration test reveal that the long-run effect of devaluation on output only exists in case of Bangladesh but there is no significant effect of devaluation on economic growth in case of India, Bhutan, Nepal, and Pakistan. Keeping in view the above results, it was concluded that currency devaluation is not a solid solution to stimulate economic growth by reducing trade deficits or improving the balance of payments in the SAARC region. The potential reason for these findings is the primary nature of exports of the region. Devaluation has an adverse effect which might enhance the imbalances in the foreign sector due to high costs of imports and inelastic exports. Exchange rate devaluation is thought to be a booster for export competitiveness because exports will become cheaper for foreigners. Exports are mainly low-tech, agro-based and primary products while imports are hi-tech manufactured products in case of SAARC countries, so the typical textbook theory of advantageous devaluation is not properly applicable in the region.The economies of the region should not look forward to devaluing their currencies but only a stable exchange rate is desirable to avoid macroeconomic volatility and other pecuniary fluctuations. The export promotion policies and tax rebates can be adopted as a policy measure to incentivize the investors. The region can get a comparative advantage due to cheaper labor. The target-oriented human capital formation policies by enhancing the labor skills may be expedient. There is a dire need to strengthen mutual cooperation in the region to make macroeconomic stability and fight collectively against economic challenges.

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