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EFFECTS OF CHANGES IN FOREIGN EXCHANGE RESERVES AND REAL EFFECTIVE EXCHANGE RATE ON INDUSTRIAL OUTPUT GROWTHS IN BANGLADESH

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ABSTRACT

This paper studies the effects of foreign exchange reserves and real effective exchange rate on industrial output in Bangladesh. Quarterly data are used from 1981-1982 to 2013-2014. The standard ARDL procedure and VECM are applied. Both DF-GLS and Ng-Perron efficient tests exhibit non-stationarity of each variable in log-level with I (1) behavior. The ARDL estimates provide evidence of co-integration among the variables. The VECM estimates confirm convergence with moderate pace of adjustment toward long-run equilibrium. Short-run net interactive effect of foreign reserves on industrial output is weakly positive while the net effect of real effective exchange rate is negative.

Contribution/ Originality: This study contributes to the existing literature on the topic in terms of i) implementation of relatively new ARDL procedure in lieu of the classical co-integration methodology in view of its certain shortcomings, ii) the findings are applicable to developing countries like Bangladesh experiencing increasing foreign exchange reserves due to rising inflows of remittances and export earnings from low-end products, and iii) policy implications, applicable to such countries.

1. INTRODUCTION

Foreign exchange reserves of a country are national funds to be prudently managed by its central bank or the monetary authority. They are maintained as cash reserve in globally traded key currencies (i.e. US dollar, euro, Japanese yen, British pound and recent addition of China's yuan) for precaution as short-term investment in highly liquid and safe foreign financial assets for interest income and in gold for profit to deal with unforeseen financial exigency and crisis. The composite basket of the above reserve currencies is known as SDR (Special Drawing Right) of the IMF. They are readily available for direct financing of payments imbalances, and occasional interventions in foreign exchange markets to stabilize exchange rate within a prescribed target zone. In addition,

adequate foreign exchange reserves act as a self-insurer to provide support in times of foreign liquidity crisis, improve external creditors' confidence and rating of the sovereign debt, increase foreign investors' confidence to entice FDI, imports financing, etc. The benefits are immense despite considerable holding cost in addition to opportunity cost when foreign currency assets could have been used for long-term productive domestic investment, particularly in much needed infrastructure. In this case, the marginal productivity of domestic capital turns out to be the opportunity cost.

Typically, the purpose of holding reserves is to allow the central bank an additional means to stabilize the exchange rate from external shocks. In addition to meeting the transaction needs of countries, reserves are used for a precautionary purpose to provide a cushion to absorb unexpected shocks or a sharp deterioration in their terms of trade or to meet unexpected capital outflows. Reserves are also used to manage the exchange rate through intervention in the foreign exchange market. Sound external reserves management practices are important because they can increase a country's overall resilience to shocks as the central bank will have the ability to respond effectively to financial crisis. Sound external reserves management can equally support but not substitute for sound macroeconomic management. Similarly, inappropriate economic policies can pose serious risks to the ability to manage external reserves.

The general need to hold reserves simply arises from the fact that investors (especially, foreign investors) believe that a country should have reserves to make such a country a viable place to invest with regards to credit rating, without much regard to whether or not such reserves would contribute meaningfully to economic growth of the country. Credit rating agencies do place considerable weight on the volume of a country's official foreign currency reserves. Their sheer accumulation may not be a key determinant of a nation's ability to meet its financial obligations and development efforts. Other factors such as the country's productivity, domestic efficiency and political stability, among many others, could play a significant role in this respect.

As a rule of thumb, a county should have foreign exchange reserves adequate to meet at least its 3 months' import bills, if the country needs to support its currency by interventions. Any amount exceeding this level is excess foreign exchange reserves buildup that should be utilized productively to promote domestic industrial expansion by encouraging imports of capital goods, raw materials and intermediate goods. As of December, 2016, Bangladesh built foreign exchange reserves of $32 billion that can pay import bills for more than nine months.The value of foreign exchange reserves fluctuates due to changes in exchange rates. So, frequent close monitoring of the changes in value and appropriate timely actions are imperative.

High growth in foreign exchange reserves strengthens real effective exchange rate of home currency unleashing domino effects on the economy. Appreciation of real effective exchange rate dampens export-growth momentum due to erosion in global competitiveness of export products and fuels import growth. Current account surplus contributes to accretion of foreign exchange reserves. In contrast, its reversal depletes foreign exchange reserves that, in turn, causes depreciation of home currency vis-à-vis some key currencies (included in the basket) with expansionary and contractionary effects on exports and imports, respectively. To add, export growth is vital to industrial output growth depending on input-mix (domestic and foreign). Furthermore, larger imports of capital goods, raw materials and intermediate goods add to the industrial productive capacity. In essence, foreign exchange reserves growth entails both costs and benefits, but the net gain ought to be positive. The causal relationships among foreign exchange reserves, real effective exchange rate and industrial growth reinforce one another.

A brief pictorial view of the historical trends from 1975 through 2014 in foreign exchange reserves, industrial production index and real effective exchange rate in log-levels for Bangladesh is provided below in Figure 1:

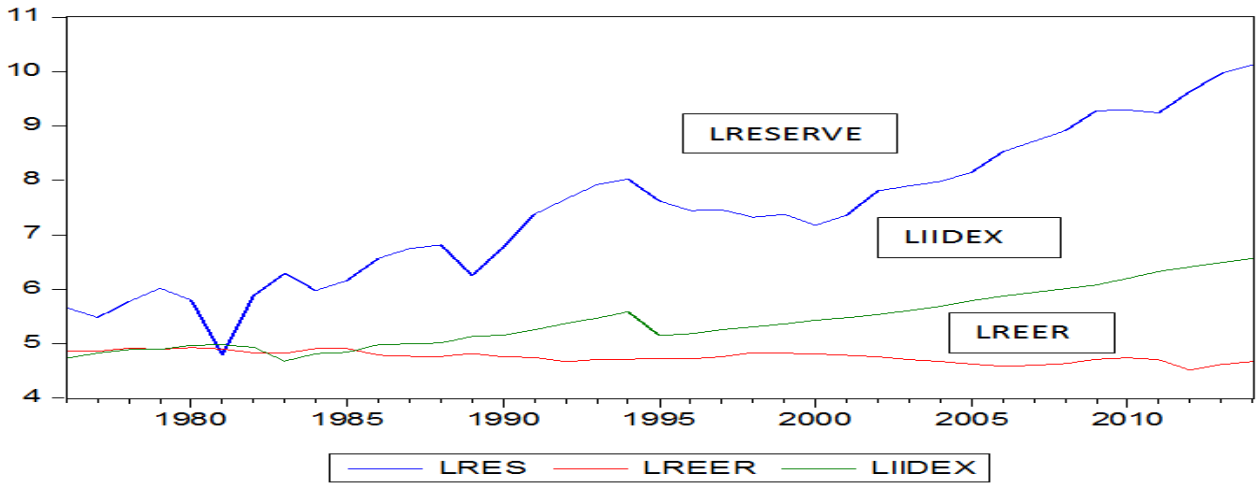

Figure-1. Data Plots in Log-Level

Source: Bangladesh Bank and Bangladesh Bureau of statistics

Since 1980, the foreign exchange reserves record significant uptrend. At the same time, the industrial index shows some improvement and the real effective exchange rate in log-level displays some stability. Each of the above variables is in log-level. Foreign exchange reserves have more fluctuations than others. To note, expatriates' remittances is a major source of foreign exchange reserves, next to the export earnings of the readymade garments (RMG) sector.

In light of the aforementioned, the objective of this paper is to investigate the effects of growth in foreign exchange reserves, and changes in real effective exchange rate on industrial output growth in Bangladesh using quarterly data from 1981-1982 to 2013-2014. The remainder of the paper proceeds as follows. Section II briefly reviews relatively recent related literature. Section III outlines the empirical design. Section IV reports results. Section V offers conclusions, policy implications and contributions.

1.1. Brief Review of Relatively Recent Related Literature

One of the most spectacular recent trends in the international monetary system is the considerable building up of foreign reserves by emerging economies. The average foreign exchange reserves-to-GDP ratio in developing countries more than doubled between 1980 and 2010, increasing from 9.5 to 23.3 percent. The increase has been particularly remarkable in East Asia, where the average ratio steeply rose from 15.5 percent in 1980 to 55.3 percent in 2010.

The large accumulation of foreign exchange reserves is not just interesting in itself, but it also represents a key element for understanding the direction and allocation of international capital flows among developing economies. As observed by Gourinchas and Jeanne (2011) the neoclassical growth model would suggest that capital should be directed towards those economies that experience faster productivity growth. The data depict that faster growing economies are associated with lower net capital inflows. International reserves play a fundamental role in explaining this puzzling pattern of the data. In fact, Gourinchas and Jeanne (2011) show that fast growing countries are net exporters of capital because of their policy of international reserves accumulation.

A puzzling negative correlation between productivity growth and capital inflows in developing countries is observed by Prasad *et al.* (2007) and by Gourinchas and Jeanne (2011). Gourinchas and Jeanne (2011) find that the allocation of capital among developing economies is determined by the pattern of foreign exchange reserves accumulation. The central role of government intervention in shaping capital flows to developing countries relates to the so-called "Bretton Woods 2" perspective on the international monetary reserves in emerging economies. In part, this is due to export-led growth strategy. Rodrik (2008) provides empirical evidence in favor of a causal link from real exchange rate undervaluation to spurring economic growth.

From a theoretical perspective, the growing literature providing formal models reveal that negative correlation between economic growth and capital inflows characterize developing countries [e.g., Aghion *et al.* (2006); Angeletos and Panousi (2011); Buera and Shin (2009); Broner and Ventura (2010) and Sandri (2010)]. All these papers focus on private capital flows, showing that the negative correlation between economic growth and capital inflows is driven by foreign currency reserves accumulation by the public sector. This is consistent with the empirical finding of Gourinchas and Jeanne (2011). Aguiar and Amador (2011) provide a model in which public capital flows may generate a negative correlation between economic growth and capital inflows. In their model, the government decreases its stock of foreign debt in order to credibly restrain from expropriating the return from private investment, thus stimulating investment and growth. In contrast, foreign exchange reserves accumulation by the public sector shifts productive resources towards the tradable sector in order to exploit the knowledge spillovers springing from the imports of foreign capital goods. Aizenman and Lee (2007) and Korinek and Serven (2010) emphasize the link between foreign exchange reserves accumulation and growth externalities, while Durdu *et al.* (2009); Jeanne and Ranciere (2011) and Bacchetta *et al.* (2011) focus on the precautionary motive of holding international reserves.

Countries, in general, maintain foreign exchange reserves to effectively manage their exchange rates and reduce adjustments costs associated with fluctuations in the international payments. The 'rule of thumb' of maintaining optimal reserves is equivalent to at least 3 months of imports (Mendoza, 2010). High foreign exchange reserves are maintained to tide over global economic and financial instability. The 1997 SE-Asian crisis is a good testimony to this effect (Stiglitz, 2006). It is a tool for maintaining undervalued exchange rate to promote trade and international competitiveness as mercantilist motive (Aizenman and Lee, 2007). High level of foreign exchange reserves boost investor's confidence and augments foreign investment to spur economic growth. According to Dooley *et al.* (2003) foreign exchange reserves accumulation helped interventions by Asian Central Banks to prevent currency from appreciation against US dollar in order to boost export-led growth.

1.2. Empirical Design

The estimating base model is specified as follows:

$$LIIDEX_t = \alpha_0 + \Pi_1 LRESERVE_t + \Pi_2 LREER_t + Le_t \ldots\ldots (1)$$

Where, LREER = log of foreign exchange reserves holding, $LREER$ = log of real effective exchange rate, $LIIDEX$ = log of industrial index, e = log of residual error term and t = time subscript.

There are several methods available to test for the existence of long-run equilibrium relationship among time-series variables. The most widely used methods include Engle and Granger (1987) test, maximum likelihood test following Johansen (1988; 1992; 1995); Hansen (1982) and Johansen and Juselius (1990) tests. These methods require that the variables in the system are integrated of order one i.e. I(1). In addition, these methods suffer from low power and do not have good small sample properties. Due to these problems, a relatively more advanced autoregressive distributive lag (ARDL) testing approach to co-integration has become popular.

As empirical design, this study employs ARDL testing approach to co-integration following the methodology proposed by Pesaran *et al.* (2001) and Pesaran and Shin (1995, 1998). This methodology is preferred to classical co-integration procedures as it has certain advantages over them. For example, it can be applied regardless of the stationarity properties of the variables in the sample. Secondly, it allows for inferences on long-run estimates which are not possible under classical co-integration procedures. Furthermore, ARDL model can accommodate greater number of variables in comparison to Vector Autoregressive (VAR) models.

To begin with, data have to be tested for unit root. This testing is necessary to avoid the possibility of spurious regression as test is based on the assumption that the variables are I(0) or I(1). If data are found I(0) or I(1), the ARDL testing approach to co-integration is applied which consists of three steps. The existence of a long-run relationship between or among the variables is established by testing for the significance of lagged variables in an error-correction mechanism regression. Then, the first lags of all variables in level are added to the equation to create the error-correction mechanism equation for performing additional test by computing the joint F-test on the significance of all the lagged variables. Subsequently, the ARDL forms of equations are estimated where the optimal lag-lengths are selected by Akaike (1969) Information criterion (AIC), and the restricted versions of the equations are solved for the long-run solutions.

An ARDL representation of equations (1), is specified as follows:

$$\Delta LIIDEX_t = = \beta_0 + \sum_{i=1}^{p} \beta_i \Delta LRESERVE_{t-i} + \sum_{i=1}^{p} \lambda_i \Delta LREER_{t-i} + \sum_{i=1}^{p} \alpha_i \Delta LIIDEX_{t-i}$$

$$+ \psi LRESERVE_{t-1} + \gamma LREER_{t-1} + \theta LIIDEX_{t-1} + \mu_t \quad \ldots\ldots(2)$$

For null hypothesis (H_o) of no co-integration, $\psi = \gamma = \theta = 0$

For alternative hypothesis (H_A) of co-integration, $\psi \neq \gamma \neq \theta \neq 0$

On the evidence of co-integrating relationship among the variables, there exists a vector error-correction representation (Engle and Granger, 1987). The corresponding vector error-correction model (VECM) takes the following form:

$$\Delta LIIDEX_t = \vartheta_3 e_{t-1} + \sum_{i=1}^{k} \alpha_{2i} \Delta LIIDEX_{t-i} + \sum_{j=1}^{k} \alpha_{3j} \Delta LRESERVE_{t-j} + \sum_{j=1}^{k} \alpha_{4j} \Delta LREER_{t-j} + v_t' \text{ --- (3)}$$

Equation (3) corresponds to original equation (1). Here, e_{t-1} is the error-correction term. If the coefficient of e_{t-1} is negative and statistically significant in term of the associated pseudo t-value, there is evidence of a long-run causal flow to the dependent variable from the relevant explanatory variables. If α_{2i}'s, α_{3i}'s, and α_{4i}'s do not add up to zero, there are short-run interactive feedback relationships in equation (3).

To clarify, if α_{3i}'s, and α_{4i}'s are non-zeros, lagged changes in real effective exchange rate and foreign exchange reserves lead the current change in industrial output in the short run. Their relative numerical magnitudes indicate relative influence of the relevant explanatory variable on the dependent variable. The sum of the coefficients of each lagged independent variable shows its net interactive feedback effect with other variables.

Quarterly data from 1981-1982 to 2013-2014 are employed. Foreign exchange reserves data are obtained from Bangladesh Economic Review (2013-2014), industrial output index data are gathered from the Bangladesh Bureau of Statistics, and real effective exchange rate data are collected from Annual Reports of the Bangladesh Bank (the Central Bank).

2. RESULTS

To have a glimpse of the nature of the data distribution of each time series variable, the standard descriptors are reported as follows:

Table-1. Descriptive Statistics

	LRESERVE	LREER	LIIDEX
Mean	7.420462	4.761752	5.418531
Median	7.382746	4.761883	5.313452
Maximum	10.12763	4.931158	6.571275
Minimum	4.795791	4.515245	4.682131
Std. Dev.	1.336717	0.101930	0.527573
Skewness	0.214820	-0.226682	0.657759
Kurtosis	2.298704	2.501772	2.394878
Jarque-Bera	1.099162	0.737379	3.407234
Probability	0.577192	0.691640	0.182024
Sum	289.3980	185.7083	211.3227
Sum Sq. Dev.	67.89883	0.394807	10.57667
Observations	39	39	39

The mean-to-median ratio of each variable is near unity indicating its near-normal distribution. The standard deviation of each variable is very modest. As well, both skewness and Kurtosis of each variable are reasonably low. Perhaps, these are partly attributed to the logarithmic transformation of variables.

To examine the time series property of each variable, the efficient DF-GLS and Ng-Perron unit root tests are performed. They are reported as follows:

Table-2. Efficient Unit Root Tests*

Variables	**DFGLS**	**First Diff**	**Ng-Perron (MZ_t)**	**First Diff**
LRESERVES	-0.527936	-5.795757	-1.83108	-13.80000
LREER	-1.607340	-5.802445	-1.03430	-8.10000
LIIDEX	-1.411717	-5.932095	-0.73707	-5.70000

*(DF-GLS) critical values are -2.653 and -1.954 at 1 and 5 percent levels of significance, respectively. Ng-Perron ((MZ_t) critical values are -2.580 and -1.980 at the aforementioned significance levels, respectively.

The null hypothesis of unit root (non-stationarity) for each variable cannot be rejected at both 1 and 5 percent levels of significance by both DF-GLS and Ng-Perron tests. In other words, all three variables are non-stationary in log-levels. On first-differencing, the variables become stationary depicting I (1) behavior.

Next, the standard ARDL estimates of equation (2) for cointegration are reported as follows:

Table-3. Autoregressive Distributed Lag Model: ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.710951	6.941031	1.254994	0.2206
LRES(-1)	0.531627	0.205002	2.593277	0.0154
LREER(-1)	-2.085429	1.306721	-1.595926	0.1226
LIIDEX(-1)	0.894181	0.441895	2.023512	0.0534
Δ(LRES(-1))	0.003737	0.211776	0.017648	0.9861
Δ (LRES(-2))	-0.262885	0.174572	-1.505881	0.1442
Δ (LRES(-3))	-0.004128	0.185233	-0.022284	0.9824
Δ (LREER(-1))	0.187188	1.307086	0.143210	0.8872
Δ (LIIDEX(-1))	0.049689	0.639593	0.077688	0.9387
R-squared	0.948437	Mean dependent var		7.613010
Adjusted R-squared	0.932571	S.D. dependent var		1.272962
S.E. of regression	0.330552	Akaike info criterion		0.840926
Sum squared resid	2.840873	Schwarz criterion		1.240873
Log likelihood	-5.716206	Hannan-Quinn criter.		0.978988
F-statistic	59.77912	Durbin-Watson stat		1.983702
Prob(F-statistic)	0.000000			

Source: Authors' Own Estimation using EVIEWS (9).

The numerical coefficients of all one-period lagged variables in log- levels are non-zeros with significant associated t-variables with some exception for real effective exchange rate. This implies cointegrating relationship among the variables of interest regardless of their orders of integration.On the evidence of cointegration among the variables, the final step is to estimate the VECM (3). The results are reported as follows:

Table-4. Estimates of VECM

VER

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.089703	0.067900	1.321113	0.1980
RES_2(-1)(e_{t-1})	-0.557643	0.191539	-2.911375	0.0073
Δ (LRESERVE(-1))	0.149168	0.189127	0.788717	0.4374
Δ (LRESERVE(-2))	0.236746	0.161368	1.467118	0.1543
Δ (LRESERVE(-3))	0.030042	0.166679	0.180237	0.8584
D(LREER)	-1.273981	0.946680	-1.345736	0.1900
Δ (LREER(-1))	0.272852	1.121507	0.243291	0.8097
D(LIIDEX)	0.876369	0.512255	1.710805	0.0990
Δ (LIIDEX(-1))	-0.107827	0.554198	-0.194564	0.8472
R-squared	0.465770	Mean dependent var		0.117262
Adjusted R-squared	0.301392	S.D. dependent var		0.365945
S.E. of regression	0.305867	Akaike info criterion		0.685700
Sum squared resid	2.432416	Schwarz criterion		1.085646
Log likelihood	-2.999742	F-statistic		2.833527
Durbin-Watson stat	1.970586	Prob(F-statistic)		0.021010

Source: Authors' Own Estimation using EVIEWS (9).

The estimated coefficient of the error-correction term (e_{t-1}) has expected negative sign confirming convergence of the variables toward long-run equilibrium. The numerical magnitude of the coefficient is moderate with significant associated pseudo t-value showing moderate pace of adjustment toward the equilibrium. The effects of current and preceding two years' foreign exchange reserves accumulation on industrial production are positive but statistically insignificant. Conjecturally, this is due to stagnation or slow growth of private investment in the industrial sector emanating from uncertain business and political environments. The net effect of real exchange rate appreciation is negative for shorter duration with statistical insignificance. The industrial output growth momentum is also low-to-moderate. The estimated VECM explains only 30 percent of industrial growth in terms of $\bar{R}^2$. In Figures 2 and 3, CUSUM and CUSUM-Squares respectively, reveal parameter instability over 1990-1996.

3. CONCLUSIONS, POLICY IMPLICATIONS AND CONTRIBUTIONS

All the variables are non-stationary in log-levels with I(1) behavior. They are co-integrated. Long-run convergence of the variables with moderate pace toward long-run equilibrium is evidenced. Foreign exchange reserves accumulation exerts short-run positive effects on industrial output. However, the effects are statistically weak. The net negative effect of real effective exchange rate changes is of shorter duration and weak for industrial output growth unless it is productively and efficiently utilized for importing raw materials, technologies and equipment. Furthermore, there is a lack of parameter stability of the model over 1990-1996 (Appendix). External reserves management in Bangladesh is a topical issue of great importance. The Bangladesh government should use the country's foreign exchange reserves to promote economic growth by investing for infrastructural development. Channeling external reserves to other investment outlets will help rapidly drive the economy. This study suggests that in order to reduce the opportunity cost of holding foreign reserves, part of the reserves should be invested for

economic development in the areas of health, education, and infrastructures. They, in turn, would help further alleviate poverty and enhance the sustainable growth. This study contributes to the existing literature on the topic in terms of i) implementation of relatively new ARDL procedure in lieu of the classical co-integration methodology in view of its certain shortcomings, ii) the findings are applicable to developing countries like Bangladesh experiencing increasing foreign exchange reserves due to rising inflows of remittances and export earnings from low-end products, and iii) policy implications, applicable to such countries.

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REFERENCES

Aghion, P., D. Comin and P. Howitt, 2006. When does domestic saving matter for economic growth? NBER Working Paper No. 12275.

Aguiar, M. and M. Amador, 2011. Growth in the shadow of expropriation. Quarterly Journal of Economics, 126(2): 651-697. *View at Google Scholar | View at Publisher*

Aizenman, J. and J. Lee, 2007. International reserves: Precautionary versus mercantilist views, theory and evidence. Open Economics Review, 18(2): 191-214. *View at Google Scholar | View at Publisher*

Akaike, H., 1969. Fitting autoregression for prediction. Annals of the Institute of Statistical Mathematics, 21(1): 243-247. *View at Google Scholar*

Angeletos, G.M. and V. Panousi, 2011. Financial integration, entrepreneurial risk and global dynamics. Journal of Economic Theory, 146(3): 863-896. *View at Google Scholar | View at Publisher*

Bacchetta, P., K. Benhima and Y. Kalantzis, 2011. Capital controls with international reserve accumulation: Can this be optimal? Unpublished Manuscript.

Broner, F.A. and J. Ventura, 2010. Rethinking the effects of financial liberalization. NBER Working Paper No. 16640.

Buera, F.J. and Y. Shin, 2009. Productivity growth and capital flows: The dynamics of reforms. NBER Working Paper No. 15268.

Dooley, M.P., D. Folkerts-Landau and P. Garber, 2003. An essay on the revived Bretton Woods system. NBER Working Paper No. 9971.

Durdu, C.B., E.G. Mendoza and M.E. Terrones, 2009. Precautionary demand for foreign assets in sudden stop economies: An assessment of the new mercantilism. Journal of Development Economies, 89(2): 194-209. *View at Google Scholar | View at Publisher*

Engle, R. and C.W.J. Granger, 1987. Co-integration and error-correction: Representation, estimation, and testing. Econometrica, 55(2): 251-276. *View at Google Scholar | View at Publisher*

Gourinchas, P.O. and O. Jeanne, 2011. Capital flows to developing countries: The allocation puzzle. NBER Working Paper No. 13602.

Hansen, L.P., 1982. Large sample properties of generalized method of moments estimators. Econometrica, 50(4): 1029-1054. *View at Google Scholar | View at Publisher*

Jeanne, O. and R. Ranciere, 2011. The optimal level of international reserves for emerging market countries: A new formula and some applications. Economic Journal, 121(555): 905-930. *View at Google Scholar | View at Publisher*

Johansen, S., 1988. Statistical analysis of cointegration vectors. Journal of Economic Dynamics and Control, 12(2-3): 231-254. *View at Google Scholar | View at Publisher*

Johansen, S., 1992. Testing structural hypothesis in multivariate cointegration analysis of the PPP and the VIP for U.K. Journal of Econometrics, 53(1-3): 211-244. *View at Publisher*

Johansen, S. and K. Juselius, 1990. Maximum likelihood estimation and inference on cointegration with applications to the demand for money. Oxford Bulletin of Economics and Statistics, 52(2): 169-210. *View at Google Scholar | View at Publisher*

Johansen, S., 1995. Likelihood-based inference in cointegrated vector autoregressive models. Oxford: Oxford University Press.

Korinek, A. and L. Serven, 2010. Real exchange rate undervaluation: Static losses, dynamic gains. World Bank Policy Research Working Paper No. 5250.

Mendoza, E.G., 2010. Sudden stops, financial crises, and leverage. American Economic Review, 100(5): 1941-1966. *View at Google Scholar | View at Publisher*

Pesaran, H.M. and Y. Shin, 1995, 1998. An autoregressive distributed lag modeling approach to cointegration analysis. DAE Working Papers, No. 9514.

Pesaran, H.M., Y. Shin and R.J. Smith, 2001. Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3): 289-326. *View at Google Scholar | View at Publisher*

Prasad, E.S., R.G. Rajan and A. Subramanian, 2007. Foreign capital and economic growth. NBER Working Paper No 13619.

Rodrik, D., 2008. The real exchange rate and economic growth. Brooking Papers on Economic Activity: 365-412.

Sandri, D., 2010. Growth and capital flows with risky entrepreneurship. IMF Working Paper; No. WP/10/37.

Stiglitz, J., 2006. Making globalization work. New York: W.W. Norton and Company.

Appendix: Tests for Parameter Stability

CUSUM

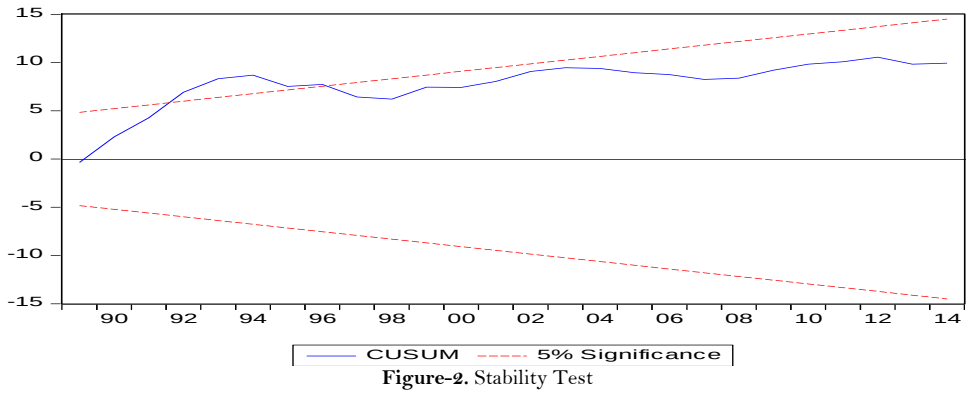

Figure-2. Stability Test

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Source: Application of EVIEWS (9).

ARDL: CUSUM Square

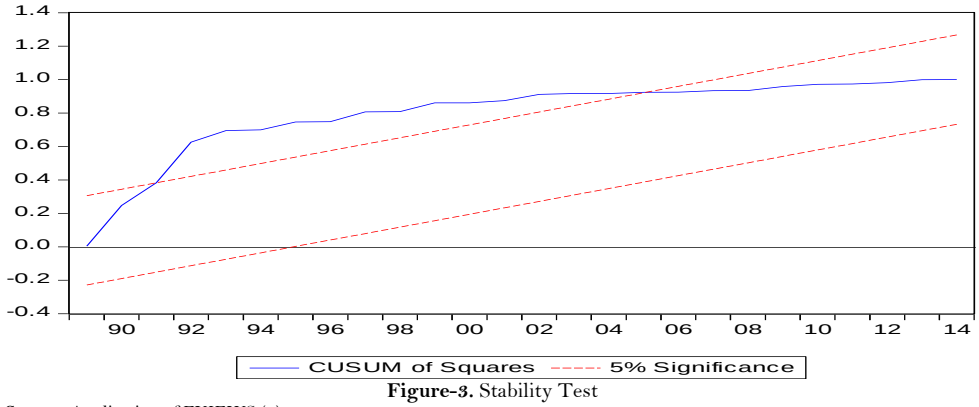

Figure-3. Stability Test

Source: Application of EVIEWS (9).