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The Impact of Remittances on Monetary Variables in Lower Middle Income Countries*

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Abstract

Remittances area stable source of financial volatility for remittance-receiving countries, although capital flows have fallen sharply for lower middle income countries during recent years. This study examines the relationships between remittances andthe monetary transmission channel, aside from the exogenously imposed assumption of price rigidity. The model is built up from microeconomic foundations and is analyzed using the autoregressive distributed lag (ARDL) co-integration framework for the lower middle income countries with the highest remittances as a percentage share of GDP in 2013. The results, based on the bounds testing procedure, confirm that a stable, long-run relationship exists between remittance growth and monetary variables. The empirical results show that there is a unique co-integrated and stable long-run relationship among broad money growth, GDP growth, inflation rate, official exchange rate, and real interest rate for all eight countries. We find that the remittance elasticity coefficients are mixed and inconsistent for each individual country among the lower middle income countries. Our results also reveal that, after incorporating the CUSUM and the Cumulative Sum of Recursive Residuals (CUSUMSQ) tests, the remittance function was stable between 1980 and 2014. This finding therefore explain the monetary nature of the transfersin the presence of remittances and financial developments in the financial sector.

Keyword : Remittance, Monetary Variables, ARDL, CUSUM test

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This paper complies with the ethical codes set by NRA and AJBC.

1. Introduction

Migrant remittances are a steadily-growing external source of capital for developing countries. Remittance flows have continually increased from 1970 until the present. However, from 1997 they increased dramatically even though the world economy faced two big financial crises, in 1997 (the Asian financial crisis) and 2007–2008 (the global financial crisis). The relative importance of remittances as a source of external resources is also expected to increase further, as growth in private capital flows to developing countries may moderate when interest rates begin to rise in advanced economies, or when growth in developing economies remains weak.

However, remittances are associated with significant development impacts, such as the accelerated alleviation of poverty, improved access to education and health services, and enhanced financial development, as well as multiplier effects throughhigher household expenditures the World Bank (2015) found that remittances are not only the single largest source of foreign exchange but also constitute 80 percent of reserves for developing economies. Another important aspect identified by Forbes et al. (2012) and followed here is that sudden coincide with the global financial crisis that began in 2008. By contrast, remittances showed a slight above-trend growth during the period 1990–2012. The same pattern was observed during previous, less severe and less synchronized crisis episodes, with remittances generally displaying resilience while capital flows gyrate. Capital flows, on average, decline as foreign direct investment and net official development assistance to lower middle income countries decline. Such results supportthe role of remittances during periods of financial crisis. So, this research aims to investigate the effect on the financial markets in remittance-receiving countries. However, the nexus between remittances and development remains complex, especially with regards to the movement of people, which contributes to the spread of global interdependence at all levels – social, economic, and political. A small set of studies has investigated the behavior of remittances in relation to the financial markets, but so far there is limited knowledge on the issue.

2. Reviews of Literature

Remittances have been proved to be a more sustainable source of foreign currency for developing countries than other capital flows such as foreign direct investment, public debt or official development assistance the World Bank (2015). The World Bank Group (2015) also found that remittance is a stable source of financial volatility for remittance-receiving countries, although capital flows have fallen sharply in the lower middle income countries.

Studies have been carried out for countries like South Korea Hyun(1984); Kim(1983), Pakistan Burney(1989), Bangladesh Habib(1985); Shah and Amir(2011), and Sri Lanka Rodrigo and Jayatissa(1988). Mahmud(1989), Stahl and Habib(1991), and Kim(1983) found that between 3 percent and 7 percent of GNP growth during the period from 1976 to 1981 was attributable, directly or indirectly, to migrant remittances, and Ro and Seo(1988) set the figure at a remarkable 33 percent in 1982. A Rand Corporation study Asch(1994) on the effects of emigration on the Philippines, Ireland, the Dominican Republic, and Mexico concluded that " migration has a positive effect on the sending country". The study found that immigrationrelieves unemployment and may raise the wages of workers who remain behind. Remittances are spent primarily on current consumption, but the multiplier effects of such spending expand demand and create jobs. Finally, returning migrants become productive after about six months of unemployment. Most research on remittances is related to growth, development, and social structure.

Some studies concentrate more on the effects of remittances on the financial markets. Ahlburg(1996), Taylor(1999), and Straubhaar, Vădean(2005) found that the income distribution effects of remittances are positive.Moreover, Caceres and Saca (2006) found that remittances led to decreases in economic activity, international reserves, and money supply, and increases in interest rates, imports, and consumer prices,in El Salvador between 1995 and 2004, using monthly data.Ahlburg(1996) found that remittances made the distribution of income more equal rather than less equal in the mid-1980s in Tonga.

Cáceres(2004) found the effects of remittances on investment, interest, inflation rates, and the money supply by applying co-integration techniques to the period of 1980–2001. He found that remittances tended to exert upward pressure on interest rates in El Salvador, and that this hadnegative effects on economic growth. In a subsequent paper Cáceres(2006) analyzed the effect of remittances on the monetary variable. He found, by applying the GARCH method to the monthly data, that remittances were an important determinant of the money supply.

It is suspected that there is a relationship between overseas remittances, financial innovations, and economic growth Giuliano and Ruiz-Arranz(2009). In both Lower Development countries (LDCs) and Developing countries (DCs), there have been very few facilities for the development of the financial sector. Hence the growth of remittances has been ineffective in promoting productive activities in these economies through an expansion of credit. However, at the same time, sound financial innovations have been important in increasing the amount of remittances, decreasing transaction costs for the economy in general, and promoting growth.

Threats to remittances and the lack of financial innovations worsen the economic situation. Remittances are not just an unwavering source for the development of infrastructure but are also a stable source of foreign exchange reserves, havingless volatile characteristics than other sources of foreign earnings. Arezki and Brückner(2012) and Coulibaly(2015) found that a high flow of remittances may have a transitory shock on income and may amplify the growth process in the long run. They highlighted the impact of remittances in the presence of a transitory income component. They examined the unique case in which a negative effect of remittances emerges in Sub-Saharan African countries.

Since the emergence of the concept of financial development and the discussion of whether remittances play a role in enhancing the growth process, keen interest has been shown in both macroeconomic indicators as engines of growth. This study is another attempt to throw light on these findings in the presence of remittances and the financial developments that have emerged in the financial sector.

Table 1 Summary of Literature Review

Remittance effect on Economic Growth		
From South Korea Kim(1983), Hyun(1984), from Pakistan Burney(1989) from Bangladesh, Habib(1985), Shah and Amir(2011); and from Sri Lanka Rodrigo and Jayatissa(1988) and so on.		
Remittance Effect on Financial Market		
Study	Methodology	Findings
Ahlburg(1996)	The Lorenz Curve and Gini Coefficient	Remittances are created the distribution of income more equal rather than less equal in the mid-1980s in Tonga
Taylor(1999)		Contribute to broad based income growth in migrant sending areas is a key to promoting development from migration
Straubhaar, Thomas, and Vãdean(2006)	Survey report	The positive growth effects of remittances in developing countries
Saca and Caceres(2006)	Vector Autoregression model	Remittances play an important role in Salvadoran economy.
Cáceres(2004) and Cáceres (2006)	Cointegration and GARCH	Upward pressure on the interest rate in El Salvador and an important determinant of the money supply.

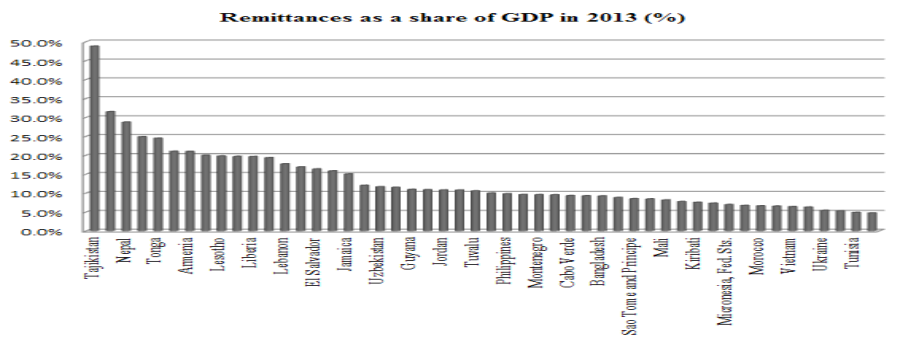
Giuliano and Ruiz-Arranz(2009)	OLS and SGMM for 100 developing countries	A suspicious relationship Overseas remittances and financial innovations with economic growth
Arezki and Brückner(2011)	Panel fixed and random effect.	A transitory shock on income and amplify the growth process in the long-run in Sub-Saharan African countries.
Coulibaly(2015)	the panel Granger causality testing approach that is based on Seemingly Unrelated Regressions (SUR) multivariate systems	Remittances positively influence financial development only in four countries (Niger, Senegal, Sierra Leone and Sudan) and financial development positively impacts remittances only in Gambia.

The following section presents a critical overview of the state-of-art literature on remittances, and is organized as follows: data on migrant remittances, methods of estimating remittance flows, global and regional trends in remittance flows, and the importance of remittances as a source of capital for developing countries, are discussed.

The following section describes the theoretical and econometric models for the determinants of remittances. The fourth section discusses the sampling, data collection, empirical results and interpretation of the results. The final section presents the conclusions.

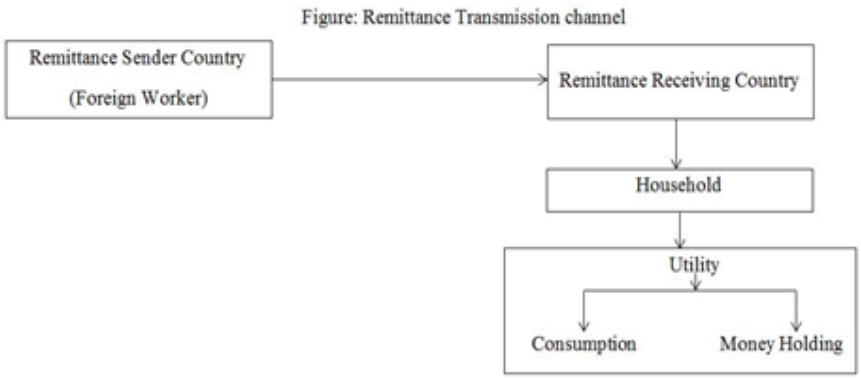
3. Description of Research Dimensions

Figure 1 Remittances as a Share of GDP in 2013 (%)



Data Source: World Bank, Calculation by Authors

Figure 2 Remittance Transmission Channel



3.1. Theoretical Model

Remittances are more relevant than other international capital flows in promoting the domestic financial sector. Not only that, they make the single highest percentage contribution to GDP among fifty remittance-receiving countries (Figure 1).

Now consider the assumption that there is no capital and government in the remittance transmission channel (figure 2). Under this assumption, output is produced using labor as the only input. Aggregate output is therefore given by:

$$Y = F(L)\ F'(\bullet) > 0, F''(\bullet) \le 0 \tag{1}$$

where Y=GDP + Rem (Rem=Remittance send by Migrant Labor) and L= Ld+Lm (Ld=Domestic Labor and Lm= (L-Ld) =Migrant Labor)

This implies that aggregate consumption and aggregate output are equal. There is a fixed number of infinitely lived households that obtain utility from consumption and from holding real money balances, and disutility from working. For simplicity, weignore population growth and normalize the number of households to 1. The representative household's objective function is

$$\mu = \sum_{t=0}^{\infty} \beta^t [U(Ct) + g(\frac{Mt}{Pt}) - V(Lt)] \tag{2}$$

Budget Constraint: $A_{t+1} = M_t + (A_t + W_t L_t - P_t C_t - M_t)(1 + i_t + e_t)$

Where A=Asset Accumulation at t and t+1 time, Mt=Money demand, W= Wage, L=Labor, i= Interest rate and e= Exchange rate

There is diminishing marginal utility of consumption and money holding, and an increasing marginal disutility of working: $U'(\bullet) > 0, U''(\bullet) < 0, g'(\bullet) > 0, g''(\bullet) < 0, V'(\bullet) > 0, V''(\bullet) > 0.$ We assume that U (•) and g(•) take their usual constant-relative-risk-aversion forms:

$$U(Ct) = \frac{Ct^{1-\theta}}{1-\theta}, \theta > 0, \tag{3}$$

$$g(\frac{Mt}{Pt}) = \frac{(\frac{Mt}{Pt})^{1-v}}{1-v}, v > 0. \tag{4}$$

The assumption that money is a direct source of utility is a shortcut. In truth, individuals hold cash not because it provides utility directly, but because it allows them to purchase goods more easily. One can think of the contribution of $\frac{Mt}{Pt}$ to the objective function as reflecting this increased convenience, rather than of direct utility. To find the first-order condition for the household's money holdings, consider a balanced-budget change in $\frac{Mt}{Pt}$ and Ct for optimal money holdings is therefore:

$$g'(\frac{Mt}{Pt}) = \frac{it + et}{1 + it + et} U'(Ct) \tag{5}$$

Since U(•) and g(•) are given and Ct=Yt, this condition implies:

$$\frac{Mt}{Pt} = Yt^{\theta/v} (\frac{1 + it + et}{it + et})^{\frac{1}{v}} \tag{6}$$

So the condition for equilibrium in the money market is written as simply:

$$\frac{M}{P} = L(i, e, gdp, rem) \tag{7}$$

$$So \ \mathrm{Re}m = f(i, e, gdp, p, M) \tag{8}$$

3.2. Econometric Model

To explore the transmission mechanism of remittances, we employ an autoregressive distributed lag model (ARDL) Pesaran et al.(1999) that was extended by Pesaran et al.(2001) for the long-run relationships and dynamic interactions among the variables of interest. The ARDL approach has the advantage that it does not require all variables to be I(1) (as required by the Johansen framework), and it is still applicable if wehave I(0) and I(1) variables in our set.

The bounds test co-integration method has certain econometric advantages over other methods of co-integration; these advantages are the following:

- All variables of the model are assumed to be endogenous.
- The bounds test method for co-integration is applied irrespective of the order of integration of the variable. The variable might be first order, I(1), or I(0).
- The short-run and long-run coefficients of the model are estimated simultaneously. An ARDL representation of equation (8) is formulated as follows:

$$\Delta \mathrm{Rem}_t = \theta_0 + \sum_{i=1}^{n} \theta_{1i} \Delta \mathrm{Re}m_{t-i} + \sum_{i=1}^{n} \theta_{2i} \Delta i_{t-i} + \sum_{i=1}^{n} \theta_{3i} \Delta e_{t-i} + \sum_{i=1}^{n} \theta_{4i} \Delta gdp_{t-i} + \sum_{i=1}^{n} \theta_{5i} \Delta p_{t-i} + \sum_{i=1}^{n} \theta_{6i} \Delta M_{t-i} + \beta_1 \mathrm{Re}m_{t-1} + \beta_2 i_{t-1} + \beta_3 e_{t-1} + \beta_4 gdp_{t-1} + \beta_5 p_{t-1} + \beta_6 M_{t-1} + \varepsilon_t \tag{9}$$

where Δ*denotes the first difference operator*

θ_0 is the drift component, and

ε_t is the usual white noise residuals.

The first to sixth expressions $(\beta_1 - \beta_6)$ on the right-hand side correspond to the long-run relationship. The remaining expressions, those with the summation sign and $(\theta_1 - \theta_6)$, represent the short-run dynamics ofthe model. Some of variables have a break point in the data. We consider all the structural break data as dummy variables. Also we include the BREAK dummy variable, as well as an intercept and linear trend as (fixed) regressors. So, an ARDL representation of equation (9) becomes the following:

$$\Delta \mathrm{Rem}_t = \theta_0 + \sum_{i=1}^{n} \theta_{1i} \Delta \mathrm{Re}\, m_{t-i} + \sum_{i=1}^{n} \theta_{2i} \Delta i_{t-i} + \sum_{i=1}^{n} \theta_{3i} \Delta e_{t-i} + \sum_{i=1}^{n} \theta_{4i} \Delta gdp_{t-i} +$$
$$\sum_{i=1}^{n} \theta_{5i} \Delta p_{t-i} + \sum_{i=1}^{n} \theta_{6i} \Delta M_{t-i} + \beta_1 \mathrm{Re}\, m_{t-1} + \beta_2 i_{t-1} + \beta_3 e_{t-1} + \beta_4 gdp_{t-1} + \beta_5 p_{t-1} + \beta_6 M_{t-1} +$$
$$\tau_1 i_{BREAKt} + \tau_2 e_{BREAKt} + \tau_3 gdp_{BREAKt} + \tau_4 p_{BREAKt} + \tau_5 M_{BREAKt} + \tau_6 \mathrm{Re}\, m_{BREAKt} + \tau_7 Trend_t + \varepsilon_t \quad (10)$$

To investigate the long-run relationships among Rem, I, e, gdp, p, M, bound testing under the procedure proposed by Pesaran et al.(2001) is used. The bound testing procedure is based on the F-test with the hypothesis of no co-integration among the variables, against the existence or presence of co-integration among the variables, denoted as:

H0: β1 = β2 = β3 = β4 = β5= β6= 0

i.e., there is no co-integration among the variables.

Ha: β1 ≠ β2 ≠ β3 ≠ β4≠ β5≠ β6 ≠ 0

i.e., there is co-integration among the variables.

The ARDL bound test is based on the Wald-test (F-statistic)under the null hypothesis of no co-integration among the variables. Two critical values are given by Pesaran et al. (2001) for the co-integration test. The upper critical bound assumes all the variables are I(1), meaning that there is a co-integration relationship between the variables being examined. When the computed F-statistic is greater than the upper bound critical value, H0 is rejected (the variables are co-integrated). The lower bound assumes that all the variables are I(0), meaning that there is no co-integration among the variables. If the F-statistic is below the lower bound critical value, then H0 cannotbe rejected (there is no co-integration among the variables). When the computed F-statistic falls between the lower and the upper bound, then the results are inconclusive.

We also develop the unrestricted error correction model (UECM) based on the assumption made by Pesaran et al.(2001). From the UECM, the long-run elasticities are the coefficient of the one-lagged explanatory variable (multiplied with a negative sign) divided by the coefficient of the one-lagged dependent variable.

The ARDL has been chosen since it can be applied to a small sample size such as the one in this study. Also, it can estimate the short- and long-run dynamic relationships in the money demand simultaneously. The ARDL methodology relieves usof the burden of establishing the order of integration amongst the variables.

Furthermore, this method can distinguish between dependent and explanatory variables, and allows one to test for the existence of a relationship between the variables.

Finally, with the ARDL it is possible that different variables have a different optimal number of lags.

Thus, equation (9) in the ARDL version of the error correction model can be expressed as equation (10) :

$$\Delta \mathrm{Rem}_t = \theta_0 + \sum_{i=1}^{n} \theta_{1i} \Delta \mathrm{Re}\, m_{t-i} + \sum_{i=1}^{n} \theta_{2i} \Delta i_{t-i} + \sum_{i=1}^{n} \theta_{3i} \Delta e_{t-i} + \sum_{i=1}^{n} \theta_{4i} \Delta gdp_{t-i} + \sum_{i=1}^{n} \theta_{5i} \Delta p_{t-i} + \sum_{i=1}^{n} \theta_{6i} \Delta M_{t-i} + \gamma EC_{t-1} + \tau_1 i_{BREAKt} + \tau_2 e_{BREAKt} + \tau_3 gdp_{BREAKt} + \tau_4 p_{BREAKt} + \tau_5 M_{BREAKt} + \tau_6 \mathrm{Re}\, m_{BREAKt} + \tau_7 Trend_t + u_t \quad (11)$$

where ã is the speed of adjustment parameter and EC is the residuals that are obtained from the estimated co-integration model of equation (10).

4.1 Data and Empirical Results

This section describes the data on remittances, exchange rates, and interest rates. Our goal in this research is to inspect the contributions made by remittances to exchange rate (e), interest rate (i), inflation (p), gross domestic product (gdp), and so on, for the lower middle income countries (World bank define that lower middle-incomeeconomies are those with a Gross National Income (GNI) per capita between $1,026 and $4,035) among the fifty remittance-receiving countries with the top values for remittances as a share of GDP (2013). Thirteen upper middle income countries appear in the top fifty countries, so we exclude these. The total number in our sample is therefore 37 countries. Eventually, we obtain data for eight countries, namely Bangladesh, Cabo Verde, the Arab Republic of Egypt, Guatemala, Honduras, Sri Lanka, Lesotho, and the Philippines. The data used in the research cover the time span from 1981 to 2014, and are yearly data. The data are obtained from the world development indicators of the World Bank.

At the beginning of the impact analysis, it becomes crucial to check for the stationarity of the variables of our model (equation 8), as regression with non-stationary time series data may lead to a spurious result.This is to ensure that the variables are not I(2) stationary, so as to avoid spurious results according to the F-statistics proposed by Pesaran et al. (2001). Thus, the analysis proceeds with unit root test using Augmented Dickey Fuller (ADF) and the Phillips and Perron test for non-break variables. The Minimize DF t-statistic and the Minimize Intercept break t-stat, as proposed by Vogelsang and Perron (1998) and Zivot and Andrews (2002), are used for endogenously determining the break dates from the data. Table 1 presents the results of the unit root test. The ADF, PP, Minimize DF t-statistic and Minimize Intercept break t-stat test results confirm that some of the time series data of the variables in the model are non-stationary in their level form. However, these variables are found to be stationary in their first difference.

According to the definition of the ARDL model specification, we deploy the ARDL

procedure for analyzing the long-run relationships and dynamic interactions among the variables empirically. In the methodology set out above, remittances depend on the real interest rate, the official exchange rate, the gross domestic product, inflation and money demand. In the first step of the ARDL analysis, we estimate an OLS regression for the first difference part of equation (11),and then test for the joint significance of the parameters of the lagged level variables when added to the first regression. According to Pesaran et al. (2001), "this OLS regression in first differences is of no direct interest" to the bounds co-integration test. The F-statistic tests the joint null hypothesis that the coefficients of the lagged level variables are zero (i.e. no long-run relationship exists between them). Compared with the (normalized) in the ARDL-OLS regressions.

The calculated F-statistic is higher than the upper bound critical value at the 5% significance level for all countries (Table 4). Thus, the null hypothesis of no co-integration is rejected, implying long-run co-integration relationships amongst the variables when the regressions are normalized.

Once we have established from the unit root tests regression results that there is long-run co-integration, we estimate equation (11) using the following ARDL specification. The bounds tests for co-integration: in the first step of the results obtained by normalizing on remittances, we test for the presence of long-run and short-run relations. The bounds test for co-integration is reported in Table 4. The findings suggest the existence of co-integration with remittances asthe dependent variable, as the calculated R-statistics are greater than the upper bound critical value at the 5% level for Bangladesh, Cabo Verde, Guatemala, the Arab Republic of Egypt, Honduras, Sri Lanka, the Philippines, and Lesotho. These results mean that the null hypothesis of no co-integration can be rejected when remittances is the dependent variable. In other words, the results suggest a long-run relationship between the variables. The long-run and short-run estimates are reported in Tables 2 and 3.

According to Table 3, elasticity of broad money growth and gross domestic product for Cabo Verde, the inflation rate for Guatemala and the Philippines, and the official exchange rate for the Arab Republic of Egypt and the Philippines are not significant,but It is elasticities for the other countries are highly significant. It appears that remittances responds very well for a first group consisting of Bangladesh, Honduras, and Lesotho, a second group of Guatemala, the Arab Republic of Egypt, and Sri Lanka, and a third group of Cabo Verde and the Philippines.

However, the GDP growth of Cabo Verde, the broad money growth of Guatemala and Honduras, the official exchange rate of the Arab Republic of Egypt, and the inflation rate of Sri Lanka and the Philippines are not significant in the long run. The rest of the variables are significant in the long run.

In contrast to these significant results, for the short-run the co-integration equations for all counters capture the short-run dynamics. In the short run, deviations from the long-run equilibrium can occur as the result ofshocks in any of the variables of the model. In addition, the dynamics governing the short-run behavior of remittances are different from those governing the long-run behavior. The study applies several diagnostic tests to the ARDL estimates. The model passes the Jarque-Bera normality tests, signifying that the errors are normally distributed. Moreover, heteroscedasticity tests show that the errors are homoscedasticand independent of the regressors. Given that the Cumulative Sum of Recursive Residuals test (CUSUMSQ) statistic does not exceed the bounds of the 5% level of significance in Figure 3, the ARDL estimates appear stable.

Just as noteworthy, from Table 4, the CointEq(-1) carries an expected negative sign for Bangladesh, Cabo Verde, Guatemala, Sri Lanka, and the Philippines, and a positive sign for the Arab Republic of Egypt, Honduras, and Lesotho. The existence of a stable and predictable relationship between remittance growth and monetary variables is considered a necessary condition for the formulation of monetary policy strategies. The stability of the long-run coefficients is used to form the error-correction term in conjunction with the short-run dynamics. Some of the problems of instability could stem from an inadequate modeling of the short-run dynamics that characterize departures from the long-run relationship. Hence, it is expedient to incorporate the short-run dynamics for the constancy of the long-run parameters. In view of this we apply the CUSUM and CUSUMSQ tests, which were developed by Brown et al. (1975).

The CUSUM test is based on the cumulative sum of recursive residuals and the first set of n observations. It is updated recursively and is plotted against the break points. If the plot of the CUSUM statistic stays within the 5% significance level, the estimated coefficients are said to be stable. A similar procedure is used to carry out the CUSUMSQ test, which is based on the square recursive residuals. A graphical presentation of these two tests is provided in Figure 2.

Since the plots of the CUSUM and CUSUMSQ statistic for remittances marginally cross the critical value lines, we are safe to conclude that the remittances variable is stable. However, the plot of the CUSUMSQ statistic for remittances crosses the critical value line, indicating some instability in remittances andmoney demand. However, this finding could be an indication of the fact that remittances arethe monetary aggregate that central banks should control.

4.2 Interpreting the Result

The relationship between remittances and exchange rate suggests that households convert a fraction of the remittances received into local currency. If households are not con-

verting remittances into local currency, then the immigrant should not be concerned about the exchange rate. If the household is converting remittances into local currency then immigrants should adjust the amount of the transfer in response to changes in the exchange rate. For instance, after a real depreciation of the local currency, each US dollar of remittances will be worth more to the household. This means that the household needs fewer US dollars to consume a certain bundle of goods. If the purpose of the transfer is to make a certain bundle of goods available to the household, then the immigrant should decrease the amount of US dollars that he or she is sending back home. Furthermore, if the immigrant is making a long-term investment with remittances or remitting to build a retirement nest egg, then fewer US dollars will be required to reach certain target levels of investment. Conversely, in this case, each US dollar of remittances is now worth more in the home country. If the immigrant has investments in both countries, but plans to return eventually to home country, then it may be better to take advantage of the depreciation by investing more in home country. Also, it is possible that the immigrant wants to send more because each US dollar will benefit his or her family more. For instance, it is possible that after the depreciation the household will be able to send their children to a better school by receiving more US dollars than before.

In summary, remittances may increase or decrease after a depreciation of the local currency. Hence, whether they increase or decrease boils down to which of these two effects dominates. The results in table 3 suggest that the long-run relationship between remittances and the exchange rate is significant for Bangladesh, Cabo Verde, Guatemala and Honduras.

There are various potential explanations for this finding. It could be the case that households demand more local currency after receiving remittances. The increase in demand for local currency. It is also possible that households simply demand more goods after receiving remittances. Given the limited supply of non-tradable goods in local market, this may increase the price of non-tradable goods. The price of tradable goods is determined by the world price. In the traditional the real exchange rate is taken as the ratio of the price of tradable goods over the price of non-tradable goods. The local currency appreciates because the price of non-tradable goods rises, while the price of tradable goods stays constant.

If The remittances are affecting domestic money demand positively. This is consistent with the evidence that remittances are being converted into domestic currency in Guatemala, Honduras, Sri Lanka, Lesotho, and Philippine. An increase in the volume of remittances increases household income. As such, the household may want to increase domestic money holdings for transaction purposes. Remittances are another useful variable to use when estimating domestic money demand. Alternatively, if the

household is using US dollars to consume, the increase in remittances should have a positive impact on the holdings of US dollars. These two possibilities are not mutually exclusive; that is, the household may hold more of both currencies. The result table 3 suggest, to the contrary, that remittances affect the holdings of US dollars negatively for Bangladesh, Cabo Verde, Arab Rep. Egypt, but positively for Guatemala, Honduras, Sri Lanka, Lesotho and Philippine.

5. Conclusions

Remittance flows to emerging markets have been increasing in recent years. For lower middle income countries, they exceed official flows of capital, including foreign direct investment. The literature on remittances has focused on the real effects and on trade-theoretic models, while putting little emphasis on the monetary nature of the transfers. In this study, we explore the relationships between remittances, broad money growth, inflation, real interest rates, GDP growth, and official exchange rates in the long-run and short-run dynamics by using the ARDL approach to co-integration proposed by Pesaran et al.(2001). The empirical results show that most of the variables in the model are statistically significant both in the long-run and in the short-run dynamics. However, The long-run relationship between Remittance and GDP for Bangladesh, Arab Rep. Egypt and Honduras are significance (Table 3) that means If Remittance increase then GDP will be decreased. That's findings to be slightly inconsistent with the expectation. Thus, we can conclude that remittances are a part of the monetary variable for the long run and the short run. The monetary policy implication for those remittance-receiver countries with the highest percentage of remittances should be to create impasses to the remittances.

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Appendix

Table 2 Unit Root Test

		ADF Test/Minimize DF t-statistic			PP Test/Minimize Intercept break t-stat		
Country	Variable	Level (trend & intercept)	First difference	Break	Level (trend & intercept)	First difference	Break
Bangladesh	M	-5.5404*	-9.4015*	2001/2001	-4.4606***	-4.379*	1992/2006
	Gdp	-6.8607*	-4.7605**	No	-7.0475*	-19.5799*	No
	p	-4.1708	-7.4414*	No	-4.1106**	-15.5051*	No
	E	-3.2950	-5.8273*	No	-2.6336	-7.2346*	No
	Rem	-1.3129	-4.4123**	No	-1.3196	-4.1788**	No
	I	-5.3567*	-8.3361*	2004/1995	-4.5535***	-8.1123*	2005/1993
Cabo Verde	M	-13.3167*	-8.1106*	1993/1992	0.4134	-9.2141*	1993/1993
	Gdp	-3.1803	-15.6070*	No	-3.1469**	-15.6070*	No
	p	4.9034*	-5.5211*	No	-4.8724*	-20.4597*	No
	E	-3.4249	-4.418***	1992/2000	-2.0035	-4.0828	2002/2002
	Rem	-2.3213	-3.9929**	No	-2.7283	-3.8961**	No
	I	-9.3477*	14.0527*	1993/1996	-8.8106*	-4.385***	
Guatemala	M	-6.2430*	-4.4237**	1991/2003	-5.1966*	-.5987	2011/1993
	Gdp	-3.2622	-7.5806*	No	-3.2330***	-8.0566*	No
	p	-4.8407**	-7.1294*	1994/1994	-3.4595	-6.1882*	1993/1993
	E	-3.6408	-4.9612**	2002/1993	-0.8106	-3.7498	2001/2001

	Rem	-2.7862	-6.2085*	No	-2.7862	-6.2044*	No
	I	-4.8058**	-7.9112*	1992/1992	-3.2191	-5.8446*	2004/2002
Arab Rep. Egypt	M	-5.0179*	-4.9565*	No	-5.653*	-8.4914*	No
	Gdp	-4.6579*	-10.5054*	No	-4.6707*	-11.8270*	No
	p	-4.2810	10.5306*	1991/2008	-4.5390***	-8.6405*	1993/2009
	E	-3.5263	-3.7347*	No	-2.2159	-3.6066**	No
	Rem	0.7035	-5.5779*	No	-0.6471	-5.5813*	No
	I	-4.674**	-10.7060*	2006/1993	-4.8317**	-4.2544	2006/2002
Honduras	M	-5.5104*	-7.4217*	1997/1997	-0.9770	-9.6208*	1998/1997
	Gdp	-5.3534*	-6.4165*	No	-5.3500*	-21.5571*	No
	p	-3.3227	-6.3157*	1995/1995	-3.5645	-53298*	2000/1997
	E	-3.4003	-4.349***	2005/1995	-1.9118	-3.0730	No
	Rem	-5.089*	-5.2638*	No	-1.7248	-5.9861*	No
	I	-4.4962**	-7.8389*	1994/1998	-3.8737	-3.9666	1993/2004
Sri Lanka	M	-6.6573*	-10.8016*	1996/1996	-3.5624	-7.4634*	1996/1995
	Gdp	-6.2620*	-6.6069*	2001/2009	-4.2161	-6.1932*	2000/2007
	p	-6.6406*	-8.2099*	2008/2009	-4.0945	-6.0207*	2009/2008
	E	-3.1748	-1.401036	No	-2.2413	-6.3217*	No
	Rem	-2.2026	-5.5653*	No	-1.6356	-5.7834*	No
	I	-5.0577*	-7.7891*	1992/1992	-5.7485*	-7.1833	2001/1997
Lesotho	M	-4.3828*	-6.6796*	No	4.2571*	-21.5650*	No

	Gdp	-6.5161*	-5.7585*	No	-6.3782*	-16.5348*	No
	p	-8.1126*	-11.8004*	1994/2004	-8.0631*	-4.9545**	1994/1993
	E	-2.4571	-5.2188*	1997/2002	-0.8437	-5.3535*	2002/2002
	Rem	-2.9877	-6.0095*	No	-2.9962	-6.9973*	No
	E	-3.6288	-9.4310*	1998/2002	-4.3546	-5.5016*	2000/1993
	I	-6.2708*	-10.3510*	No	-6.1887*	-12.5443*	No
Philippines	M	-5.4017*	-8.1535*	1997/1998	-4.9449*	-7.9049*	1999/1995
	Gdp	-5.8392*	-6.7561*	2007/2009	-5.6634*	-6.1469*	2008/1993
	p	-4.7843**	-8.7988*	1991/2003	-3.1309	-7.9715	1998/2009
	E	-0.8115	-4.7195*	No	-1.1601	-4.7082*	No
	Rem	-2.0324	-6.8265*	No	-2.2968	-6.8299*	No
	I	-6.0838*	-7.0354*	1997/1998	-6.4569*	-6.9594*	1997/1993

Table 3 Co-integration Form

	Bangladesh	Cabo Verde	Guatemala	Arab Rep. Egypt	Honduras	Sri Lanka	Lesotho	Philippines
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Rem_LOG(-1)	0.0920	0.7695*	-0.5294*	-1.8139*		0.2256*	-0.1813	-8.059*
Rem_LOG(-2)	-0.7644*	0.4458*	-0.5066*	-1.2318*		0.5571*	-0.4958*	-0.9063*
Rem_LOG(-3)								
M	-0.0045**	0.0091*	0.0692*	0.0354*	-0.0309*	-0.0053*		0.0085*
M(-1)	0.0228*	0.0085*	-0.0368*	-0.0464*	0.1271*	-0.0106*		-0.0069*
M(-2)	0.0028		-0.0152	-0.0183*	-0.0120	-0.0049*		
M(-3)								
GDP	-0.1598*	-0.0040**	0.5192*	0.0576*	0.6318*	0.0045**	0.0220**	0.0185*
GDP(-1)	0.0768*	0.0066*	-0.4113*	-0.0574*	-0.4126*	-0.0354*	0.0751*	
GDP(-2)		-0.0202*		0.0128	-0.1656*	-0.0082*	0.0205***	
GDP(-3)								
P	-0.0470*	0.0305*	0.0419	-0.0781*	0.2703*	-0.0007	-0.0046	0.0006
P(-1)	0.0962*	0.0126*		0.0166*	-0.2757*			
P(-2)	0.0320*	-0.0110*			-0.0411**			
P(-3)								
E	0.0443*	-0.0218*	1.6409*	-0.0006	-0.3974	-0.0037*	-0.1818*	-0.0062
E(-1)	-0.1054*		0.3915	0.0220	-2.6852*	-0.0005	0.0874*	
E(-2)			2.5720*	0.2457*	-4.4659*	0.0097*		

E(-3)								
I	-0.0365*	0.0332*	0.0817***	-0.0555*	0.4744*	-0.0010	-0.0035	0.0142*
I(-1)	0.0443*	0.0194*		0.0411*	-0.1577*	-0.0042	0.0170	-0.0227*
I(-2)	0.0128*	0.0079*		-0.0186**			0.0103*	
I(-3)								
M_BREAK	-0.0056	0.0104*	-0.1010*		0.1919*	-0.0049*		-0.0066*
GDP_BREAK								0.0038
P_BREAK			0.0841	0.0137	-0.1161*	0.0575*	0.0183*	0.0266*
LIR_BREAK								0.0523*
E_BREAK		0.0135*	0.6381*		0.9617*		-0.0085	
I_BREAK	0.0113**	-0.0257*		-0.4220*	-0.1428**			
C		16.0340*		-12.9557*		23.1574*		
Rem_BREAK			0.0645					
Trend								
CointEq(-1)	-0.8674*	-0.8839*	-0.1576*	0.5918*	0.3181*	-1.2257*	0.0431*	-0.0125*

Table 4 Long-run Form

	Bangladesh	Cabo Verde	Guatemala	Arab Rep. Egypt	Honduras	Sri Lanka	Lesotho	Philippines
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
M	-0.040553*	-0.002702	0.575655**	-0.18792*	0.595786*	0.002802**	0.457629*	0.807866*
GDP	-0.420446*	0.00321	5.09369*	-0.278393*	-3.743411*	0.041286*	1.249968	0.982351*
P	-0.24671*	0.062185*	0.244283	0.272054*	-3.629586*	-0.007885*	0.194763	0.026494
E	0.103902*	-0.020688*	-5.94718**	0.13963	4.277061*	-0.000058	0.627016	-0.064917
I	-0.147281*	0.014515**	1.66355*	0.274889*	-2.920842*	-0.004666***	0.688676*	2.502726*
M_BREAK	-0.00837	0.013329***	-0.591296*		-0.680435*	-0.003737*		-0.383391*
GDP_BREAK								0.415943*
P_BREAK			0.454101	-0.022771	0.32227*	0.047753*	-0.161881	1.445108*
I_BREAK	0.011984	-0.028889*		0.657718*	0.629378*			2.725717*
E_BREAK		0.014909*	3.328016*		-3.036068*		-0.132871	
Rem_LOG_BREAK			0.414633					
C	22.222411*				57.842848*			
@TREND		0.032927*		-0.016524		0.094754*		

Table 5 ARDL

	Bangladesh	Cabo Verde	Guatemala	Arab Rep. Egypt	Honduras	Sri Lanka	Lesotho	Philippines
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Rem_LOG(-1)	0.204367	0.894983*	0.343493*	-0.1889	1.331327*	0.013278	0.841235*	0.188721***
Rem_LOG(-2)	-0.88297**	-0.31535***	0.004885	0.531399*		0.322386*	-0.28209	-0.11896
Rem_LOG(-3)	0.789212**	-0.44197**	0.496988*	1.24829*		-0.55104*	0.486241*	0.909262*
M	-0.0048	0.008876*	0.066424*	0.035651*	-0.03518**	-0.00521*	-0.00625	0.009137*
M(-1)	-0.00762**	-0.0027	-0.01543	0.029881*	-0.02652*	-0.00193**	-0.01453*	0.001084
M(-2)	-0.02068*	-0.0085*	0.022599**	0.027408*	-0.14777*	0.005622*		0.006723*
M(-3)	-0.00297		0.015426	0.018081*	0.012066	0.00492*		
GDP	-0.16437*	-0.00418	0.49691*	0.056906*	0.346056*	0.00463	0.01867	0.020603*
GDP(-1)	-0.13089*	0.013881*	-0.09298	0.048152*	0.459269*	0.010604*	0.000414	
GDP(-2)	-0.07869***	-0.02726*		0.071142*	0.278721*	0.027087*	-0.05389*	
GDP(-3)		0.02032*	0.383735*	-0.01173	0.156247*	0.007857**	-0.02193	
P	-0.04815**	0.028756**		-0.07784*	0.282751*	-0.00054	0.00494	0.000556
P(-1)	-0.07261**	0.037698*	0.037775	-0.06618*	0.624261*	-00.00905**	-0.01378	
P(-2)	-0.06559*	-0.02384*		-0.01671**	0.254178*			
P(-3)	-0.03308***	0.011005***		-0.01153	0.041391*			
E	0.0045234*	-0.02127*	1.618409*	-0.0432	-0.23716	-0.00371**	-0.19444**	-0.00136
E(-1)	-0.06115**	0.003428	-2.08103*	0.21502*	-4.00941*	0.003335*	0.251723**	
E(-2)	0108327*		2.008698*	-0.24278*	-2.00328*	0.009918*	-0.08574	

E(-3)			-2.46571*	-0.05531*	4.832747*	-0.00961*		
I	-0.03729**	0.032*	0.072054	-0.0646*	0.53742*	-0.00085	-0.00443	0.012773*
I(-1)	-0.0479*	-0.0005	0.185195*	-0.05998*	0.263754*	-0.00894*	-0.01083***	0.016496*
I(-2)	-0.03241*	-0.01122*		0.017492*	0.16658*	0.004123*	-0.00591	0.02322*
I(-3)	-0.0134***	-0.00776*		0.013453***			-0.01009**	
M_BREAK	-0.00744	0.011494*	-0.09144*		0.225447*	-0.00454*		-0.00804
GDP_BREAK								0.008723
P_BREAK			0.07022		-0.10678*	0.058038*	0.007347	0.030308*
LIR_BREAK								
E_BREAK		0.012856*	0.514626*		1.005932*		0.006031	
I_BREAK	0.010658	-0.02491*		-0.38857*	-0.20853*			0.057166*
Rem_BREAK			0.064117***					
C	19.76452*	15.61538*		-12.9403**	-19.1649*	22.84768*		
Trend		0.028394**		0.009762		0.115161*		
R-squared	0.99903	0.999209	0.971894	0.993363	0.993725	0.99985	0.936551	0.998105
Adjusted R-squared	0.995843	0.995412	0.920794	0.951885	0.968623	0.999358	0.826957	0.99621
BG test for Serial Correlation LM Test								
F-statistic	0.280094	8.756685**	0.11571	71.03278*	7.992771**		0.017489	

Obs*R-squared	3.123242	25.61262*	0.790703	29.58352*	24.79551*		0.119975	
Jarque-Bera	4.39(0.11)	0.09(0.95)	0.20(0.90)	1.23(0.54)	0.09(0.95)	2.52(0.28)	1.01(0.60)	0.48(0.78)
ARDL Bound Test	4.295769*	4.4795**	3.795248**	8.029059*	3.385865**	11.23984*	3.529494**	11.1997*

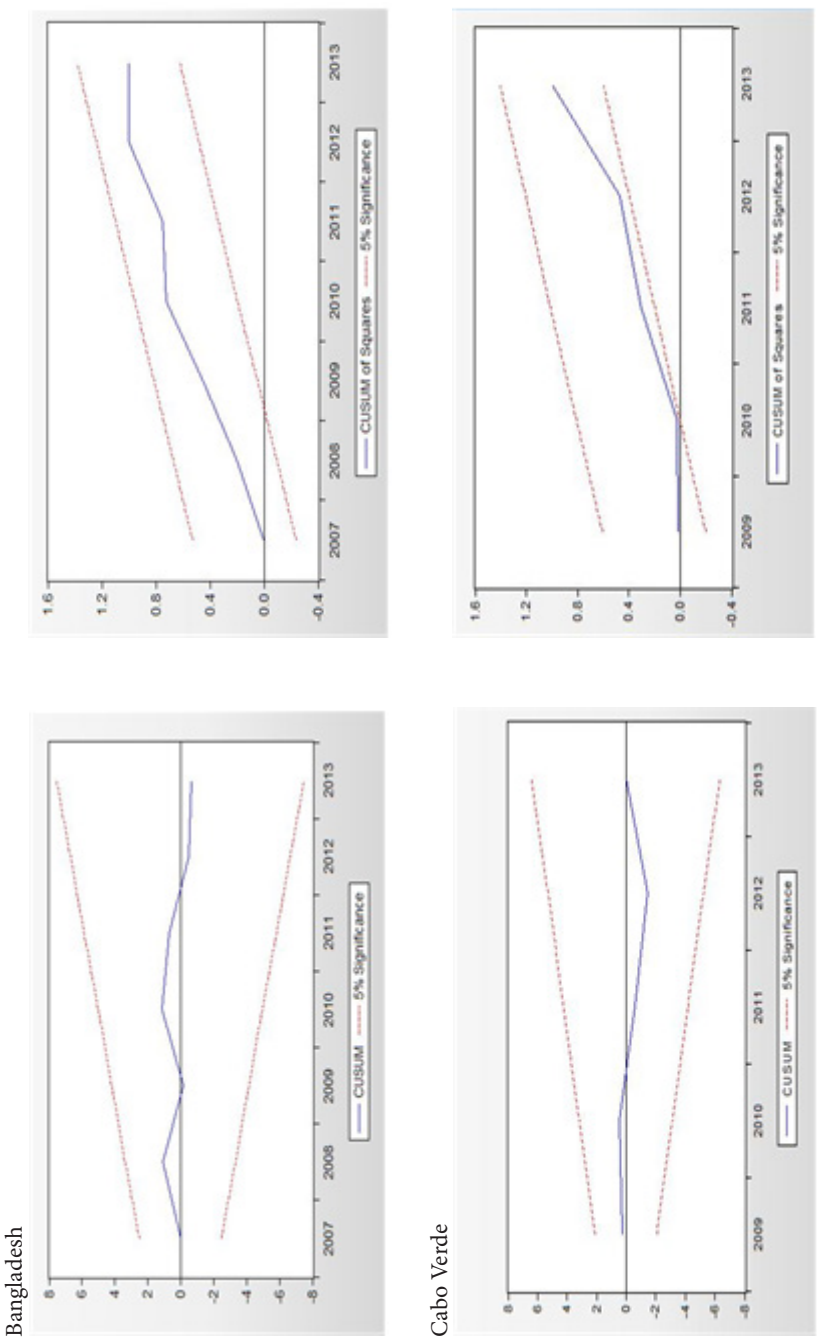
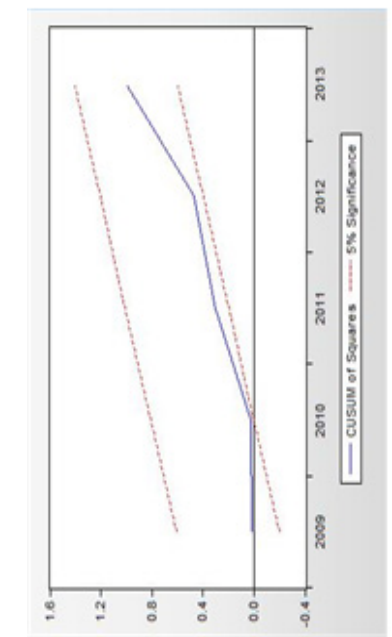
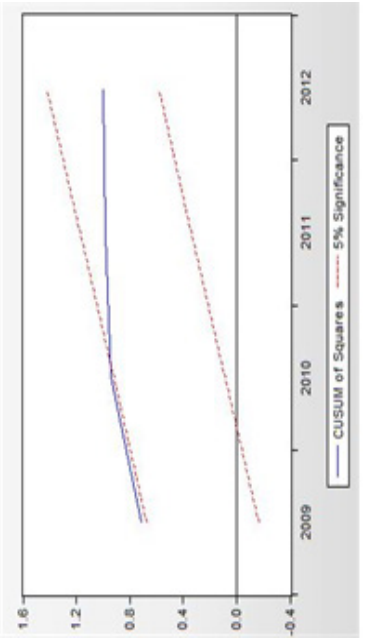
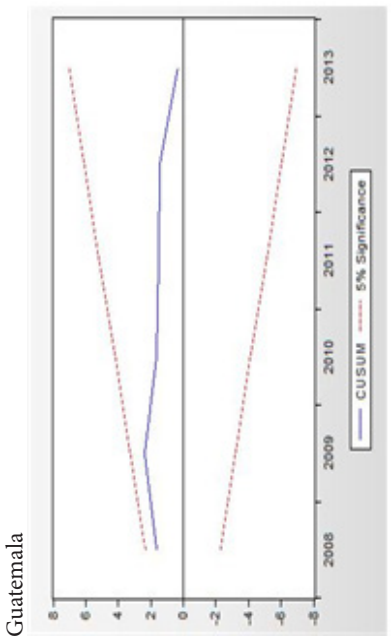


Figure3 USUM and CUSUM of Squares tests

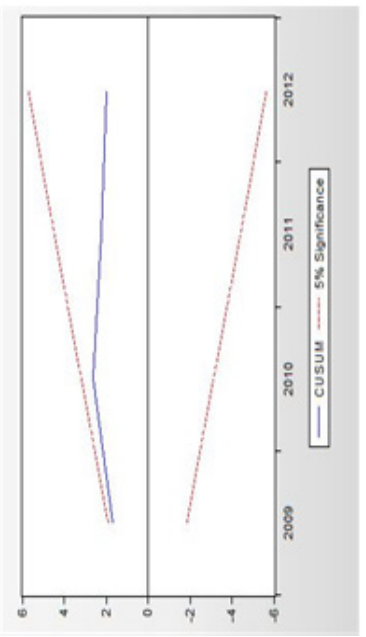


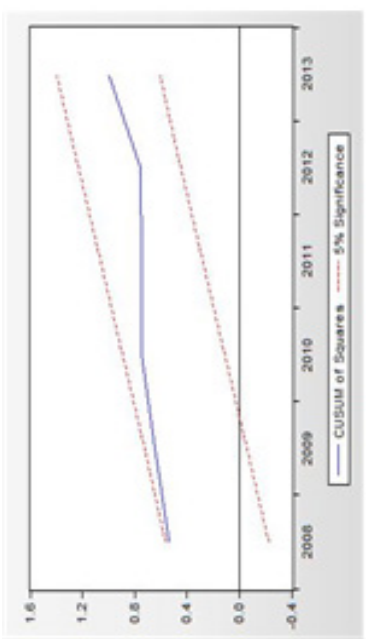


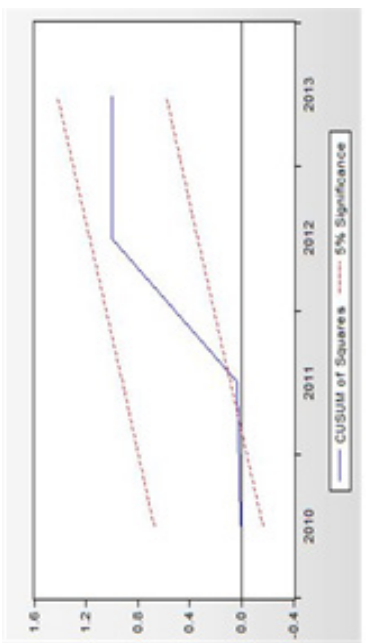
Guatemala



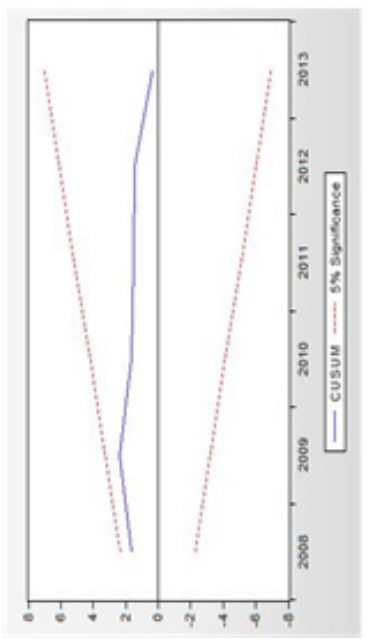
Arab Republic Egypt



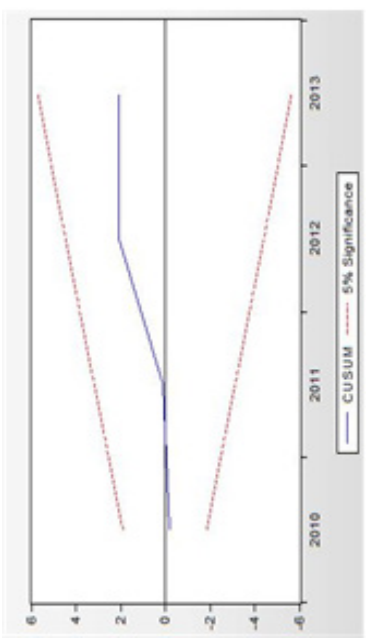


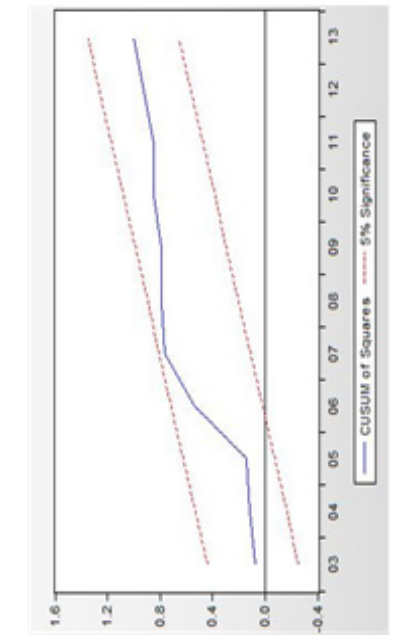


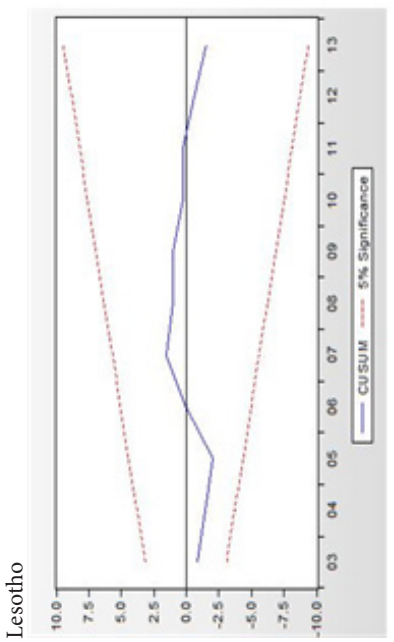
Honduras



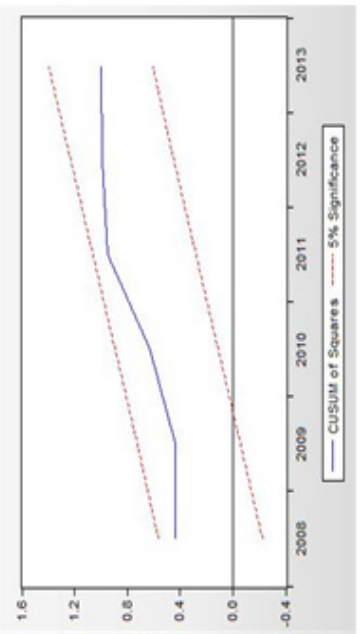
Sri Lanka

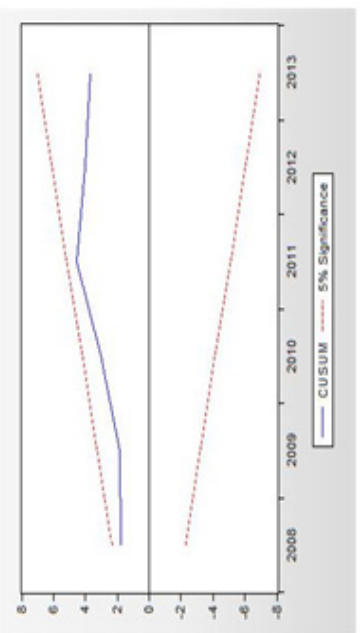






Lesotho





Philippines