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External debts, current account balance and exchange rates in emerging countries

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Abstract

This article aims to study the relationship between exchange rates, current account balance, and external debts in a sample of 13 emerging countries. We use quarterly data over the period 2000Q1–2016Q4. Based on VECM approach and ARDL model, the main common finding for the selected countries is that for most countries the fluctuation of exchange rates is driven by the accumulation of external debts and/or large current account imbalance, especially in the long-run. While in some countries, only unidirectional causality is pointed out, in other countries, we find bidirectional causality between variables, implying that external debts and current account balance are also influenced by the trend of exchange rates.

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1. Introduction

Exchange rates are considered as one of the key variables that affect the economic performance of countries. In emerging countries, local currencies appear very attractive to arbitragers and speculators since they often exhibit high fluctuation in their values against major world currencies. While this increased fluctuation may result in huge profits for traders, the instability in emerging market currencies is often persistent, and may lead to an economic slowdown. This persistent instability in such currencies pushes us to wonder about its causes.

Fluctuation of exchange rates is due to a wide range of factors including interest rates (Chueng and Chinn, 2001), inflation rates (Morana, 2009; Yin and Li, 2014), terms of trade (Chowdhury, 2012) and political instability (Bouraoui and Hammami, 2017). Other macroeconomic fundamentals, such as external debts (Bunescu, 2014; Saheed *et al.*,2015) and current account balance (Lee and Chinn, 2006; Muller-Plantenberg, 2010) have been also examined as determinants of exchange rates movement. However, these two fundamentals were studied in the framework of either developed countries (Lee and Chinn, 2006; Muller-Plantenberg, 2010) or single country (Fida *et al.*, 2012; Tfi and Richard, 2015).

The aim of this paper is to investigate whether fluctuation of domestic currencies in a panel of 13 emerging countries is driven by current account balance and/or external public debts through the use of Vector Error Correction Model (VECM) and Auto-Regressive Distributed Lag (ARDL) model.

Our study contributes to the existing literature in two important ways. First, most previous papers emphasized the causality between variables in one direction from exchange rates to current account balance and/or external public debts or inversely. However, in this paper, while the variable of interest is exchange rate movements, and, we focus mainly on the factors that may explain this variable, we consider, as well, the causality in the opposite direction. Second, we select an exhaustive panel of emerging countries and check whether they have common features in the relationship between variables. These countries have been chosen because they have undergone large current account imbalances and accumulated high levels of external debts. Can these indicators be behind the weakening of currencies? In the present paper, we attempt to answer this question.

The rest of the paper is organized as follows. Section 2 proposes an overview of the literature on this topic. Section 3 describes the data and the methodology used for our empirical analysis. Section 4 discusses the empirical results. Finally, section 5 concludes the paper.

2. Literature review

Current account balance seems to have crucial implications for the movement of exchange rates. In this context, Lee and Chinn (2006) analyzed the relationship between current account and real exchange rate in G7 countries by decomposing them into temporary and permanent shocks. By using SVAR model, they show that in the long-run, permanent shocks to current account have larger effects on the real exchange rate than temporary shocks.

Muller-Plantenberg (2010) also studied the role of balance of payments in the dynamic of exchange rates in 11 developed countries. They tested different economic assumptions and argued that, in addition to the exchange rate regime, balance of payments affects significantly nominal and real exchange rates through international payments flows. In particular, exchange rates are found to react differently to whether capital flows are restricted or not and whether they are accommodating or autonomous.

Other studies examined the causality from exchange rates to current account balance. For instance, Fratzscher et *al.*(2010) compare between the contribution of each of asset prices and exchange rates to explain US current account imbalances over the period 1974-2008. The variance decomposition analysis show that 30% of the trade balance movement is determined by shocks to equity market and housing prices; whereas shocks to real exchange rates account for only 9%. Kappler et *al.*(2011) used a sample of 128 developed and developing countries to study the effect of 14 episodes of exchange rate appreciation happened between 1960 and 2008 on current account balances. Based on dummy augmented panel autoregressive model, their results reveal that current account balance deteriorates strongly as a result to exchange rate appreciation periods. The authors explain this finding by the shrinkage of savings. In emerging economies, Gervais et *al.*(2016) explored whether real exchange rates facilitate the rebalancing of current account. Based on event study methodology and VECM, they find that real exchange rate movements are associated with a significant shortening in current account imbalances. The authors added that the type of exchange rate regime accounts significantly in improving current account deficits. In line with these findings, Gnimassoun (2015) focused on the exchange rate regime in 44 sub-Saharan African countries and attempted to determine whether the type of regime may affect current account balance.

Their results show that flexible exchange rate regime is more effective than fixed and intermediate regime in reducing imbalances in current account.

With regards to external debts, Couharde et *al.*(2016) investigate the role of this variable in explaining real exchange rates movement in the euro area. Using NATREX approach, they point out that real exchange rates are influenced by external debt positions of countries in the sense that they become more sensible to interest rate differential with the increase in the level of indebtedness. More recently, Zhu (2019) studied the effect of external financial liabilities on real exchange rates in a panel of 31 developed countries during the period 2001-2013. The author finds evidence that both external debts and equity liabilities decrease real exchange rate jumps. Saheed et *al.*(2015) explored the relationship between external debts, debt service payment, foreign reserve and the exchange rate in Nigeria. Based on multiple regression model, they show that all variables have a significant explanatory power for changes in the exchange rate. In particular, debt service payment is found to have the largest effect on exchange rate movements. Similarly, Tfi and Richard (2015) addressed the causality between external debts and the Nigerian currency between 1981 and 2013. They distinguish between external public debt receipts and servicing, and conclude that both components of external debts affect significantly the exchange rate in the short and the long-run. However, Bunescu (2014) failed to highlight a significant relationship between exchange rates and external debts in Romania. The rationale for the author is that the nature of exchange rate movements is, in most cases, unpredictable.

On the other hand, Udoka and Anyingang (2010) examined whether exchange rates, GDP, fiscal deficit, LIBOR, and terms of trade may affect external debts in Nigeria. The estimation output of OLS regression model shows that all variables have obvious effect on external debts, with an emphasis on GDP which has the strongest effect. Similarly, Rehman et *al.*(2011) analyzed the cointegration between nominal exchange rate, external debts, fiscal deficits and terms of trades in Pakistan over the period 1972-2008. Based on vector error correction model, they report a positive and significant casualty running from exchange rate to external debts in the long-run; whereas in the short-run, none of variables have exhibited a significant relationship with external debts.

3. Data and methodology

In this paper, we select a panel of 13 emerging countries including Brazil, Turkey, South Africa, India, Indonesia, Mexico, Russia, Chile, Thailand, Poland, Philippines, China and Malaysia. The common characteristics of these countries are that they incurred imbalances in their current accounts (deficit) and rely heavily on foreign funding.

For each country, 3 macroeconomic measurements are employed: nominal exchange rate against the US dollar, current account balance and external public debts. All exchange rates are U.S dollar (USD) priced, i.e., the price of one unit of foreign currency in terms of USD. The current account balance and external public debts are expressed as percentage of GDP. Our data set is drawn from *Thomson Reuters Eikon* database and consists of quarterly observations from 2000Q1 to 2016Q4.

To test the relationship between exchange rates, current account balance and external public debts, we carry out 2 dynamic regression models: vector error correction model (VECM) and auto-regressive distributed lag (ARDL) model.

3.1 Vector Error Correction Model (VECM)

VECM are widely used in the economic and financial literature to estimate multivariate cointegrated time series. The main interest of these models is that they provide a convenient way to deal with both short-term and long-term relationships between variables. VEC specification requires that variables are integrated of the same order.

For each emerging country, a VECM is specified as follows:

$$\Delta rate_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta rate_{t-i} + \sum_{j=1}^{p} \alpha_{2j} \Delta cab_{t-j} + \sum_{k=1}^{p} \alpha_{3k} \Delta ed_{t-k} + \delta_1 ect_{t-1} + \varepsilon_{1t} \quad (1)$$

$$\Delta cab_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta cab_{t-i} + \sum_{j=1}^{p} \beta_{2j} \Delta rate_{t-j} + \sum_{k=1}^{p} \beta_{3k} \Delta ed_{t-k} + \delta_2 ect_{t-1} + \varepsilon_{2t} \quad (2)$$

$$\Delta ed_t = \lambda_0 + \sum_{i=1}^{p} \lambda_{1i} \Delta ed_{t-i} + \sum_{j=1}^{p} \lambda_{2j} \Delta rate_{t-j} + \sum_{k=1}^{p} \lambda_{3k} \Delta cab_{t-k} + \delta_3 ect_{t-1} + \varepsilon_{3t} \quad (3)$$

Where $rate_t$ refers to exchange rate, cab_t represents current account balance, ed_t is external debts, Δ denotes the first difference operator and ect_{t-1} stands for the error correction term which is the estimated residual from the cointegration equation. It measures the speed at which prior deviations from equilibrium are corrected.

3.2 Auto-Regressive Distributed Lag (ARDL)

When variables do not exhibit the same order of integration, the suitable model for analyzing the relationship between them is ARDL. This model can be applied with a mixture of I(0) and I(1) variables. ARDL model is given by the following equations:

$$\Delta rate_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta rate_{t-i} + \sum_{j=0}^{p} \alpha_{2j} \Delta cab_{t-j} + \sum_{k=0}^{p} \alpha_{3k} \Delta ed_{t-k} + \theta_1 rate_{t-1} + \theta_2 cab_{t-1} + \theta_3 ed_{t-1} + \varepsilon_{1t} \quad (4)$$

$$\Delta cab_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} cab_{t-i} + \sum_{j=0}^{p} \beta_{2j} \Delta rate_{t-j} + \sum_{k=0}^{p} \beta_{3k} \Delta ed_{t-k} + \theta_4 rate_{t-1} + \theta_5 cab_{t-1} + \theta_6 ed_{t-1} + \varepsilon_{2t} \quad (5)$$

$$\Delta ed_t = \lambda_0 + \sum_{i=1}^{p} \lambda_{1i} ed_{t-i} + \sum_{j=0}^{p} \lambda_{2j} \Delta rate_{t-j} + \sum_{k=0}^{p} \lambda_{3k} \Delta ed_{t-k} + \theta_7 rate_{t-1} + \theta_8 cab_{t-1} + \theta_9 ed_{t-1} + \varepsilon_{3t} \quad (6)$$

4. Empirical results

4.1 Unit root test

To check stationarity, we conduct Augmented Dickey-Fuller (ADF) unit root test. The results are presented in Table 1.

Table 1: Results of ADF unit root test

Country	Variable	Model	ADF *t-stat.* Level	ADF *t-stat.* First difference	Integration order
Brazil	*rate*	N	-1.00	-5.74*	I(1)
	cab	N	-1.38	-8.80*	I(1)
	ed	N	-0.42	-2.42*	I(1)
Turkey	*rate*	C	-4.95*	-	I(0)
	cab	N	-1.32	-9.92*	I(1)
	ed	C	-3.40*	-	I(0)
South Africa	*rate*	N	-1.45	-6.09*	I(1)
	cab	N	-0.78	-12.11*	I(1)
	ed	N	0.22	-2.32*	I(1)
India	*rate*	N	-1.12	-5.92*	I(1)
	cab	N	-2.33*	-	I(0)
	ed	N	-0.27	-2.89*	I(1)
Indonesia	*rate*	N	-1.06	-5.62*	I(1)
	cab	N	-2.40*	-	I(0)
	ed	N	-2.35*	-	I(0)
Mexico	*rate*	N	-1.85	-7.02*	I(1)
	cab	N	-1.28	-10.63*	I(1)
	ed	N	-0.49	-2.29*	I(1)
Russia	*rate*	N	-1.21	-6.57*	I(1)
	cab	N	-2.53*	-	I(0)
	ed	C	-2.95*	-	I(0)
Chile	*rate*	N	-0.60	-6.28*	I(1)
	cab	N	-2.75*	-	I(0)
	ed	N	-0.43	-2.42*	I(1)
Thailand	*rate*	N	0.06	-5.08*	I(1)
	cab	N	-2.63*	-	I(0)
	ed	N	-2.94*	-	I(0)
Poland	*rate*	N	-0.19	-7.05*	I(1)
	cab	N	-1.80	-7.87*	I(1)
	ed	TC	-3.82*	-	I(0)

Philippines	*rate*	N	-0.37	-6.24*	I(1)
	cab	N	-2.31*	-	I(0)
	ed	N	-1.67	-2.96*	I(1)
China	*rate*	N	0.64	-2.29*	I(1)
	cab	N	-1.00	-8.97*	I(1)
	ed	N	-0.76	-2.24*	I(1)
Malaysia	*rate*	N	-0.52	-5.76*	I(1)
	cab	N	-0.73	-8.94*	I(1)
	ed	N	0.42	-2.86*	I(1)

Note: * indicates significance at 5% level; N= model with neither trend nor constant; C= model with constant; TC= model with trend and constant.

The results indicate that for Brazil, South Africa, Mexico, China and Malaysia all variables appear to be stationary at first difference since the null hypothesis of a unit root is rejected at 5% significance level under the column first difference. However, for Turkey, India, Indonesia, Russia, Chile, Thailand, Poland and Philippines we find a mix of I(0) and I(1) variables.

Variables with the same integration order can be tested for cointegration using Johansen (1988) test. However, for I(0) and I(1) variables, cointegration is checked with bounds test under ARDL approach.

4.2 Cointegration analysis

Testing for cointegration allows us to check whether a long-run relationship exists among variables. For variables with the same integration order, cointegration is tested through Johansen (1988) approach which is based on two test statistics, namely, Trace statistics and Maximum eigenvalue statistics:

$$\lambda_{Trace}(r) = -T \sum_{i=r+1}^{g} \ln(1-\hat{\lambda}_i) \qquad (7)$$

$$\lambda_{Max}(r, r+1) = -T.\ln(1-\hat{\lambda}_{r+1}) \qquad (8)$$

Where r is the number of cointegrating vectors, T is the number of observations, and $\hat{\lambda}_i$ is the estimated eigenvalues.

In conducting Trace and Max-eigenvalue tests, we retain the model assuming intercept in cointegrating equation(s) and no intercept in VECM. This choice is based on the fact that variables in level do not exhibit trend whereas variables in first difference appear to oscillate around zero. Results of Johansen (1988) cointegration test are presented in Table 2.

Table 2: Results of Johansen's cointegration test[1]

Country	H_0	Trace statistic	Max-Eigen statistic
Brazil	None	36,32(35,19)*	14,87(22,29)
	At most 1	21,45(20,26)*	12,36(15,89)
	At most 2	9,08(9,16)	9,08(9,16)
South Africa	None	40.90(35.19)*	28.16(22.29)*
	At most 1	12.73(20.26)	8.41(15.89)
	At most 2	4.32(9.16)	4.32(9.16)
Mexico	None	38.00(35.19)*	28.55(22.29)*
	At most 1	11.44(20.26)	9.28(15.89)
	At most 2	2.15(9.16)	2.15(9.16)
China	None	39.95(35.19)*	25.54(22.29)*
	At most 1	12.40(20.26)	8.92(15.89)
	At most 2	3.48(9.16)	3.48(9.16)
Malaysia	None	46.78(35.19)*	29.55(22.29)*
	At most 1	17.23(20.26)	12.44(15.89)
	At most 2	4.79(9.16)	4.79(9.16)

Note: Numbers in parentheses are the 5% critical values; * denotes rejection of the hypothesis at the 5% level

[1] These results are based on the optimal lag length p=1 for Brazil, South Africa, Mexico, China and p=2 for Malaysia.

For South Africa, Mexico, China and Malaysia, the null hypothesis is rejected only for rank $r=0$, indicating the existence of 1 long-run relationship between variables. However, for Brazil, we find that Max-eigenvalue and Trace statistics produce conflicting results. Lutkepohl *et al.* (2001) made a comparison between these two tests. Based on a Monte Carlo simulation, they found that Trace test tends to have a higher performance than Maximum eigenvalue test. Hence, we consider only the results of Trace test and we conclude the presence of 2 cointegrating relationships.

For the remaining countries whose variables are mixture of I(0) and I(1), we set up bounds test to check for cointegration. Initially developed by Pesaran and Pesaran (1997), this test uses F-statistic to examine whether long-run coefficients given in each equation from (4) to (6) are jointly significant. Basically, in equation (4), we test the following hypothesis:

H_0: $\theta_1 = \theta_2 = \theta_3 = 0$

H_1: $\theta_1 \neq \theta_2 \neq \theta_3 \neq 0$

Similarly, the null and alternative hypotheses for equations (5) and (6) are defined as H_0: $\theta_4 = \theta_5 = \theta_6 = 0$ versus H_1: $\theta_4 \neq \theta_5 \neq \theta_6 \neq 0$ and H_0: $\theta_7 = \theta_8 = \theta_9 = 0$ versus H_1: $\theta_7 \neq \theta_8 \neq \theta_9 \neq 0$, respectively. The computed F-statistics are presented in Table 3.

Table 3: Bounds test results

		Dependent variable		
		Δrate	***Δcab***	***Δed***
F-statistic	Turkey	9.573*	3.430	4.815
	India	2.956	5.102*	1.959
	Indonesia	3.131	3.383	13.105*
	Russia	2.635	3.621	3.137
	Chile	1.963	2.261	3.166
	Thailand	5.169*	2.375	2.991
	Poland	3.297	5.004*	0.773
	Philippines	3.754	3.103	2.318
Critical value bounds consisting with Case II: Intercept and no trend, and K (number of regressors) = 2 at 5% significance level are: I(0)= 3.793 and I(1)= 4.855				

Notes: * indicates the existence of cointegration between variables.

We find evidence of cointegration for Turkey and Thailand when *Δrate* is specified as the dependent variable, for India and Poland with *Δcab* as dependent variable and for Indonesia when *Δed* is the dependent variable. In other cases, we fail to reject the null hypothesis of no cointegration since the F-statistic is below the lower bound I(0) critical value.

4.3 VECM estimates

In estimating VECM, we select the optimal lag length based on Akaike Information Criterion (AIC) and Schwarz Criterion (SC). These criteria suggest the inclusion of one lag (p=1) for Brazil, South Africa, Mexico, China and two lags (p=2) for Malaysia. The results of these estimates are reported in Table 4.

Table 4: Results of VECM estimation

Short-run estimates				**Long-run estimates**		
Brazil						
Error Correction	***Δrate***	***Δcab***	***Δed***		***CE1***	***CE2***
ECT1(-1)	-0.13(-2.40)*	-1.02(-0.69)	-2.31(-2.13)*	*rate(-1)*	1.00	0.00
ECT2(-1)	0.14(0.41)	0.47(0.06)	-0.21(-3.82)*			
Δcab(-1)	-2.07(-2.31)*	-0.18(-1.39)	-0.076(-0.78)	*cab(-1)*	0.00	1.00
Δed(-1)	-0.04(-2.77)*	0.05(0.40)	0.52(5.14)*	*ed(-1)*	0.56(2.51)*	0.22(0.54)
Δrate(-1)	0.29(2.39)*	-8.51(-3.22)*	-1.57(-0.80)	*constant*	-0.83(-4.82)*	1.00(0.87)
South Africa						

Error Correction	*Δrate*	*Δcab*	*Δed*		*CE*
ECT(-1)	-0.27(-2.20)*	4.26(0.48)	-0.48(-5.58)*	*rate(-1)*	1.00
Δcab(-1)	0.09(1.17)	-0.46(-3.69)*	-0.52(-0.04)	*cab(-1)*	6.64(4.12)*
Δed(-1)	-0.04(-1.03)	-0.10(-1.44)	0.76(10.68)*	*ed(-1)*	4.77(10.16)*
Δrate(-1)	0.33(2.68)*	-17.30(-0.92)	-5.39(-0.29)	*constant*	-0.21(-22.15)*
Mexico					
Error Correction	*Δrate*	*Δcab*	*Δed*		*CE*
ECT(-1)	-0.29(-2.13)*	0.93(0.56)	6.30(3.56)	*rate(-1)*	1.00
Δcab(-1)	0.83(1.15)	-0.35(-2.76)*	0.82(0.60)	*cab(-1)*	1.71(3.21)*
Δed(-1)	0.41(0.98)	-0.24(-0.33)	0.78(10.11)*	*ed(-1)*	0.19(4.61)*
Δrate(-1)	0.48(0.39)	-3.39(-1.57)	-5.89(-2.56)*	*constant*	0.32(3.50)*
China					
Error Correction	*Δrate*	*Δcab*	*Δed*		*CE*
ECT(-1)	-0.15(-4.47)*	0.19(1.13)	0.16(0.83)	*rate(-1)*	1.00
Δcab(-1)	0.58(0.32)	-0.17(-1.35)	2.28(1.08)	*cab(-1)*	0.11(1.54)
Δed(-1)	-0.19(-2.37)*	0.58(1.34)	0.63(7.42)*	*ed(-1)*	0.12(10.51)*
Δrate(-1)	0.55(4.66)*	-4.48(-0.44)	4.43(0.22)	*constant*	-0.26(-22.28)*
Malaysia					
Error Correction	*Δrate*	*Δcab*	*Δed*		*CE*
ECT(-1)	-0.24(-5.04)*	16.61(0.53)	-2.13(-1.61)	*rate(-1)*	1.00
Δcab(-1)	0.69(1.90)	-0.28(-2.17)*	0.10(1.78)		
Δcab(-2)	0.43(1.26)	-0.36(-2.95)*	0.91(1.73)	*cab(-1)*	0.24(1.51)
Δed(-1)	-0.49(-2.18)*	1.40(0.05)	0.93(7.80)*		
Δed(-2)	0.14(1.55)	-0.33(-0.95)	0.16(0.01)	*ed(-1)*	0.34(16.27)*
Δrate(-1)	0.26(2.32)*	-0.97(-0.02)	-4.02(-2.30)*		
Δrate(-2)	0.07(0.64)	2.77(0.06)	-3.81(-2.14)*	*constant*	-0.44(-39.37)*

Notes: CE: cointegrating equation. ECT: error correction term. Numbers in parentheses are t-statistics; * indicates significance at 5% level.

As shown in Table 4, external debts are found to be the main driver of exchange rate fluctuations in the selected countries. While in the short-run, estimates of this variable do not exhibit always a significant link with exchange rates; in the long-run, all coefficients are negative[2] and significant, indicating that 1% increase in external debts is associated with a depreciation in exchange rates ranging from 0.12% for China to 4.77% for South Africa. The estimates of ECT are in line with these findings since all coefficients have the expected sign (negative) and significant, implying that a deviation from the long-run equilibrium in one period is corrected in the next period by relatively slow adjustment rate ranging from 13% in Brazil to 29% in Mexico. Indeed, these countries rely heavily on external funding. For instance, the average external public debts to GDP ratio in Malaysia and South Africa has increased between 2000 and 2016 by 29% and 108% respectively. In general, a high level of external debts implies uncertainty about the country's solvency, and may generate inflation as a way for financing the increasing burden of debts. Consequently, the rise in inflation leads to the depreciation of the currency. These findings are consistent with those of Ajayi and Oke (2012) who demonstrate that large external debts in Nigeria were the cause of depreciation in local currency.

In addition to external debts, current account imbalances show also a significant power in explaining the movement of exchange rates in South Africa, Brazil and Mexico. 1% increase in current account deficit results in 6.64% and 1.71% depreciation in the South African rand and the Mexican peso, respectively in the long-run and 2.07% depreciation in the Brazilian real in the short-run. Besides the strong dependence on foreign debts, emerging countries, in particular, Mexico, Brazil and South Africa have witnessed, from 2008 to 2016, persistent current account deficits, which average -1.78%, -2.72% and -3,98% of GDP, respectively. This deficit is usually associated with negative net sales, implying less export relative to imports. This trade deficit generates a fall in the demand of home currency, and thereby, a depreciation.

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[2] The signs of the estimated long-run coefficients reported in Table 4 are consistent with the estimates of error correction term. Therefore, to get the estimates of long-run equations, the signs should be converted to the opposite.

In Mexico and Malaysia, the causality between exchange rates and external debts does not run only in one direction, but occurs also in the opposite direction since the short-run estimates of exchange rates depicts a negative and significant impact on external debts. Obviously, a depreciation in the domestic currency makes the cost of external debts more expensive since this depreciation increases the amount of domestic currency needed to buy foreign currency for paying interest and maturity obligations.

Similarly, current account imbalances show bidirectional causality with exchange rates in Brazil. In the short-run, 1% appreciation in the Brazilian real reinforces the imbalances in current account by -8.51% of GDP (deficit). Indeed, an appreciation in the exchange rate makes exports less competitive and, therefore, leads to decrease in the demand for exports. As the balance trade is the largest component of current account balance, this decline in exports will result in current account deficit.

4.4 ARDL estimates

When variables are found to be cointegrated with bounds test, ARDL modelling consists in estimating a long-run equation (variables in levels), as well as a separate short-run equation or restricted ECM (variables in 1st difference). However, in case of no cointegration, we estimate the equations given in (4), (5) and (6) which include both the short-run and the long-run estimates. To determine the optimal lag length, we use Akaike Information Criterion (AIC), Schwarz Criterion (SC) and Hannan-Quinn Criterion (HQC).The results of ARDL estimates are summarized in Table 5 and Table 6.

Table 5: ARDL estimates for cointegrated variables

Long-run estimates					
	Dependent variable: ***rate***		Dependent variable: ***cab***		Dependent variable: ***ed***
	Turkey	**Thailand**	**India**	**Poland**	**Indonesia**
constant	0.51(1.62)	0.34(31.92)*	-15.17(-2.64)*	-1.23(-0.93)	4.48(2.89)*
rate	-	-	-3.46(-2.30)*	-8.18(-4.40)*	-5.29(-0.34)
cab	-2.59(-3.37)*	0.28(0.34)	-	-	-6.45(-8.65)*
ed	0.44(0.71)	-0.17(-6.11)*	-0.36(-2.31)*	-0.62(-4.13)*	-
Short-run estimates					
	Dependent variable: ***Δrate***		Dependent variable: ***Δcab***		Dependent variable: ***Δed***
	Turkey: ARDL(1,3,3)	**Thailand: ARDL(1,2,3)**	**India: ARDL(1,1,1)**	**Poland: ARDL(1,1,1)**	**Indonesia: ARDL(4,0,3)**
constant	-0.19(-2.57)*	0.10(1.09)	-0.02(-0.16)	0.08(0.59)	-0.27(-1.77)
Δrate	-	-	3.12(0.11)	-7.99(-1.15)	-3.04(-1.04)
Δrate(-1)	0.18(1.40)	0.38(3.30)*	-2.22(-0.07)	0.31(0.04)	-
Δcab	-0.22(-4.80)*	-3.19(-1.15)	-	-	-0.10(-1.03)
Δcab(-1)	-0.05(-0.94)	-6.21(-1.06)	-0.25(-2.20)*	-0.58(-0.44)	0.11(1.05)
Δcab(-2)	0.08(1.90)	5.31(1.90)	-	-	0.91(0.08)
Δcab(-3)	0.05(1.28)	-	-	-	0.58(0.65)
Δed	-0.08(-1.62)	5.15(0.43)	-0.22(-0.36)	0.73(0.82)	-
Δed(-1)	-0.05(-0.78)	-0.12(-2.50)*	1.23(1.85)	-0.57(-0.62)	0.83(6.24)*
Δed(-2)	0.10(1.71)	7.40(0.49)	-	-	0.45(0.25)
Δed(-3)	0.17(1.46)	-0.22(-1.47)	-	-	-0.54(-0.32)
Δed(-4)	-	-	-	-	-0.89(-0.73)
ECT(-1)	-0.08(-1.77)	-0.04(-1.17)	0.39(3.87)	0.17(1.99)	-0.09(-0.85)

Notes: ECT: error correction term. Numbers in parentheses are t-statistics; * indicates significance at 5% level.

Table 6: ARDL estimates for non-cointegrated variables

		Dependent variable		
		Δrate	***Δcab***	***Δed***
	constant	-0.02(-1.16)	-0.24(-0.59)	2.49(2.47)*
	Δrate	-	17.02(0.54)	-8.88(-0.35)
	Δrate(-1)	0.88(0.67)	0.86(0.02)	-5.11(-1.92)
	Δcab	0.30(0.54)	-	-0.44(-2.30)*

Russia: ARDL(1,1,1)	*Δcab(-1)*	-0.026(-0.50)	0.69(8.00)*	0.09(0.28)
	Δed	-0.07(-0.35)	-0.06(-1.30)	-
	Δed(-1)	-0.40(-2.29)*	0.02(0.60)	0.61(6.44)*
	rate(-1)	-0.02(-0.54)	11.81(1.29)	-15.53(-0.64)
	cab(-1)	-0.11(-0.92)	-0.07(-2.72)*	0.13(1.84)
	ed(-1)	-0.58(-1.99)*	0.06(0.64)	-0.08(-3.46)*
Chile: ARDL(1,1,1)	*constant*	0.03(1.32)	4.53(0.91)	6.49(2.17)*
	Δrate	-	-7.34(-2.70)*	9.47(0.52)
	Δrate(-1)	0.22(1.71)	-2.64(-0.92)	-3.57(-0.19)
	Δcab	-0.15(-2.70)*	-	-0.10(-1.32)
	Δcab(-1)	0.05(1.04)	-0.15(-1.26)	0.11(0.15)
	Δed	0.51(0.52)	-0.27(-1.32)	-
	Δed(-1)	-1.84(-1.93)	0.30(1.43)	0.64(6.30)*
	rate(-1)	-0.10(-1.48)	-2.05(-1.30)	-16.61(-1.70)
	cab(-1)	-7.58(-2.78)*	-0.20(-2.29)*	-0.08(-1.44)
	ed(-1)	-2.43(-0.97)	-0.02(-0.38)	-0.07(-2.43)*
Philippines: ARDL(1,1,1)	*constant*	0.02(1.19)	9.84(1.60)	5.75(1.55)
	Δrate	-	2.74(0.63)	-2.03(-0.78)
	Δrate(-1)	0.13(0.98)	2.13(0.46)	-5.45(-1.03)
	Δcab	2.56(0.63)	-	-0.09(-1.24)
	Δcab(-1)	2.62(0.59)	-0.09(-0.64)	0.11(1.33)
	Δed	-5.27(-0.78)	-0.27(-1.24)	-
	Δed(-1)	3.09(0.47)	0.05(0.26)	0.65(6.98)*
	rate(-1)	-0.10(-1.56)	-3.27(-1.43)	-1.74(-1.26)
	cab(-1)	-9.24(-2.09)*	-0.37(-2.69)*	-0.19(-2.32)*
	ed(-1)	-4.04(-0.43)	-0.04(-1.56)	-0.03(-2.24)*

Note: Numbers in parentheses are t-statistics; * indicates significance at 5% level.

In terms of the relationship between exchange rates and current account balance, we find, for Turkey, Chile and Philippines similar results to those obtained with South Africa, Brazil and Mexico in Table 4. In the long-run, the increase in current account imbalance (deficit) by 1% depreciates the Turkish lira, the Chilean peso and the Philippine peso by 2.59%, 7.58% and 9.24%, respectively. There is also a significant impact in the short-run for Turkey (-0.22%), but it is less pronounced than the long-run impact. In fact, current account deficit may generate a lack of confidence by foreign investors, which lead them to withdraw their investments. The investment flight from these nations causes a drop in the value of their domestic currencies. Table 6 reports also bidirectional causality between exchange rates and current account imbalance in Chile since 1% depreciation in the Chilean peso is found to strengthen the imbalance by -7.34% of GDP (deficit).

In Thailand and Russia, the fluctuation of exchange rates is rather due to external debts in both the long-run and the short-run, which seems reasonable given that for both countries, the average external debt (% of GDP) over the study period remains high and does not fall below 37.16%.

With regards to India and Poland, exchange rates appear to have a significant impact in explaining the imbalance in current account in the long-run. However, the ECT (Table 5), regardless of the dependent variable, is always non-significant, indicating that there is no adjustment towards long-run equilibrium.

Surprisingly, in Russia, Indonesia and Philippines, we find that current account imbalance affects significantly external debts. Indeed, current account deficits are often financed by foreign debts. In the long-run, continuous borrowing is not sustainable and leads countries to burden high interest payments. Specifically, Russia has experienced these difficulties in the last 10 years when it was unable to pay back their external debts. This finding is consistent with Mehta and Kayumi (2016) who showed that running current account deficits in India are highly associated with the incentive to borrow from abroad.

In contrast, for India and Poland, we highlight a negative and significant relationship running from external debts to current account imbalance. Indeed, these countries, in particular Poland, have heavy dependence on external borrowings (73% of GDP over the last quarter of 2016). This outstanding ratio makes them exposed to a rise in the cost of external borrowing. Therefore, to continue benefiting from external financing with a low cost, the accumulation of external debts forces them to improve their current account imbalances. These results are in accordance with those of Bulut (2011) who illustrates the adjustment process of current account imbalances to net external debt holdings.

5. Conclusion and policy implications

Emerging nations are particularly sensitive to global debt markets and monetary policy conducted in some developed countries, which may alter the value of their domestic currency. In this paper, we selected a panel of 13 emerging countries and tried to determine the factors that may affect their exchange rates against USD. The common characteristic of these countries is that they have fragile macroeconomic fundamentals, such as large current account deficit and high levels of external debt. Based on VECM and ARDL approach, our results reveal that the accumulations of external debts and/or large current account imbalance are found to affect significantly the fluctuation of exchange rates in all countries where exchange rates variable is modeled as dependent variable. Moreover, the dynamic structure of VECM and ARDL allowed us to point out bivariate relationships between exchange rates and current account imbalance in Brazil and Chile and between exchange rates and external debts in Mexico and Malaysia.

Given the large current account deficits and the heavy dependence on external debts, policymakers in these emerging markets should adopt new policies to stabilize their exchange rates. In this way, it would be useful to reduce their current account deficits by, for instance, expanding exports and restricting imports. Moreover, external debts should be decreased through constituting larger foreign reserves and having better capital controls. These findings may be generalized to other emerging countries which are not included in our sample but incurring as well large external debts and/or current account imbalances.

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