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Political Risk and Real Exchange Rate: What can we Learn from Recent Developments in Panel Data Econometrics for Emerging and Developing Countries?

Abstract

This paper focuses on the analysis of the long-run response of the Real Exchange Rate (RER) to political risks and tests whether non-economic variables have an impact on RER in 31 emerging and developing countries. We use annual data from the International Country Risk Guide database over the 1984 to 2016 period. Based on the recently developed method of Cross-Sectionally Augmented ARDL approach of Chudik and Pesaran (2015b), and the panel threshold estimation of Chudik *et al.* (2017) our main findings are the following: i) countries experiencing a high degree of corruption, a high risk to investment, or a high degree of political instability tend to experience a real exchange rate depreciation, ii) there exists strong evidence for a threshold effect on the relationship between investment profile-RER, corruption-RER and political instability-RER. Specifically, political instability and corruption adversely affect real exchange rate especially when they exceed the threshold. iii) the effects of bureaucracy, law, and order seem to be statistically insignificant on the RER. Our findings are robust to the inclusion of the Balassa-Samuelson effect in the estimated equations.

JEL-Codes: C210, D730, F310, P480.

Keywords: real exchange rate, political instability, institutional quality, cross-sectionally augmented ARDL, threshold effects, emerging and developing countries.

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I- Introduction

The economic determinants associated with the long run exchange rate dynamics have become a major area of interest in international macroeconomic and finance research. Indeed, the real exchange rate plays an important role in determining the competitiveness, resource allocation, international trade direction, as well as the economic growth and development in a country. Furthermore, the behavior of the real exchange rate is a key component in macroeconomic policy evaluation and design, since Keynes' famous dictum states that *policies affecting the real exchange rate even in the intermediate run may have a significant imprint on growth*. In particular, evidence from emerging and developing countries (Latin America, Asia and Africa) further stresses the strong link between real exchange rate (RER here after) policies and economic performance (Edwards, 1989; Égert, *et al*., 2006; Kent and Naja, 1998, Domaç and Shabsigh, 1999; Hadj Amor and Sarkar., 2009, Caporale *et al.* 2011**,…**etc.). This explains why many have considered the economic crises in developing and emerging world as being directly or indirectly caused by inappropriate exchange rate policies in those countries. Therefore, due to importance of the exchange rate in an economy, identifying its determinants and its behavior has been a key objective not only for academicians and researchers but also for policymakers.

The research associated with the behavior of the real exchange rates have been recently renewed by the acute fall and deterioration of the national currencies in many emerging countries as well as the increased political risks and their impact mainly on the fundamental determinants of the exchange rate. These political risks as defined by the International Country Risk Guide (ICRG), can be explained by the socio-political instability, corruption, bureaucracy, low order, governmental changes, democratic unrest, frequent elections, and intra-party conflicts. In particular, developing and emerging economies are not exempt from corruption and political instability, creating not only uncertainty in political and legal environment but also disrupting markets through various adverse effects on macroeconomics fundamentals. However, despite the plethora of literature on exchange rate determination modeling, i.e., the Purchasing Power Parity (PPP) theory and the Balassa-Samuelson effect, the flexible-price monetary model of Frenkel-Bilson in 1970s, the overshooting model of Dornbusch, or portfolio balance models (Branson, Haltunen et Masson, 1977), previous research has rarely focused on qualitative variables such as political instability, corruption, democracy or other institutional qualities when examining the determinants of real exchange rates in emerging and developing countries. Most political factors have contingent effects on exchange rate policies (Steinberg and Walter, 2013).

It is worth noting that political stability is a qualitative state of public development, defined as public order, which dominates the system of relationships that reflects the community and the succession of goals value as well as the ways to achieve these goals (Sidamor *et al.* (2016). Accordingly, political instability is the inability to resist internal and external shocks that disturb the socio-economic system. As for corruption, it is defined by the World Bank (1997) and UNDP (1999) as the act of individuals or groups who take advantage of public office for private gain and therefore accentuating inflation. Indeed, many researchers have investigated the impact of political instability and corruption on macro-variables. Indeed, several economists such as Easterly and Rebelo (1993); Benhabib and Spiegel (1994) and

Barro (1996) have argued that political instability reduces the volume of investment which consequently hurts employment and productivity, decreases income, and eventually leads to inflation. Edwards *et al. (1992)* examined this idea by arguing that a more corrupt country will have an inefficient tax system that induces its government to resort to an inflationary tax policy. In addition, Alisena et al.(1996), Alesina and Perotti, (1993) and more recently Ali, Hashmi and Hassan (2013) have argued that non-economic factors like corruption and political instability create uncertainty of government policies, which can encourage new potential investors to invest their capital in some safer political environments. Such capital flight will decrease domestic private investment, and reduce economic growth. Barro (2013) has also stressed the importance of a corruption-free government. He underlines that if a country is corruption-free then it will encourage investors to invest and promote the economic growth of an economy. This will increase the living standard of the masses.

This leads us to conclude that most political factors have contingent effects on the exchange rate policy decisions, which are not only tied to economic contingencies, but also to political priorities (Cesar M. Rodriguez, 2016). In this respect, recent research has started to give a greater interest to how various political factors interact to jointly determine the exchange rate policies (Steinberg and Walter, 2013). Modeled for the first time by Bahmani-Oskooee and Nasir (2002), their study argued that an unstable political system could drive away foreign investors, which, eventually, may lead to a significant revenue loss for the government. To make up for the revenue loss, the government may again resort to various forms of inflationary policies. They have also showed that countries experiencing a high degree of corruption or low levels of law and order are likely to have depreciated currencies. Kazi *et al.* (2013) found that political instability has a significant negative effect on the domestic currency value in Bangladesh. More recently, Rodriguez (2016) argued that the quality of political institutions, political strength and credibility have an influence on how the exchange rate regimes are set.

Thus, investigating the impact of the political risk on the real exchange rate in developing and emerging countries and also whether the political and institutional factors can be used as a policy tool for long run real exchange rate determination are worth being further researched both on the theoretical and empirical levels.

In this context and given the limited number of studies examining the relationship between the exchange rate and the political risk in emerging and developing countries, our study re-visits the determinants of the real exchange rate and its equilibrium level by paying close attention to Balassa-Samuelson (BS) effect augmented by some qualitative variables. Therefore, we investigate the response of the real exchange rate to political risk and provide an answer to the following questions: How do non-economic variables contribute to the exchange rate determinants? Do political instability and institutional quality have a significant effect on the long real exchange rate in some selected emerging and developing countries?

More precisely, we consider an alternative modeling of real exchange rate dynamics by accounting for the changes in the political climate and investment risk in addition to more traditional RER determinants. Therefore, our study provides an interesting case for emerging and developing economies, which represent a critical issue to policy makers in the context of unstable political-economic situation. Accordingly, our study substantially contributes to

scientific discussion in terms of the importance of political economy in the exchange rate policy and bridges the gap in the literature of long run RER determinants.

While this paper is based on the analytical framework developed by Balassa and Samuelson effect and the paper by Bahmani-Oskooee and Nasir (2002), we have extended their work in two directions: First, we focus on the political risk factors developed by the ICRG (2016) in addition to the main macroeconomic fundamentals, such as productivity differential, and we model the RER in the long term for a panel of emergent and developing countries. Secondly, our empirical investigation is based on recent developments in panel data methods, and specifically on the cross-sectionally augmented ARDL approach (CS-ARDL) of Chudik and Pesaran (2015b), and refined by the panel Threshold estimation of Chudik *et al.* (2017). This methodology enables us to investigate the possible non-linear effects in the relationship between political instability and institutional quality on the one side, and the real exchange rate on the other, as well as to examine the long-term effects of political instability and institutional quality on the real exchange rate. To the best of our knowledge this is the first attempt in literature to implement these recent developments in panel data econometrics to shed some light on the influence of the political risk on the long run real exchange rate in emerging and developing countries.

The remainder of the paper is organized as follows. Section II outlines the models and methods. Section III describes the data and construction of variables. Section IV presents the estimation results as well as outcome of a robustness analysis and finally, Section V concludes.

II- The Models and Methods

Any model of real exchange rate determination begins with the so called productivity bias hypothesis or Balassa-Samuelson effect. Balassa (1964) and Samuelson (1964) independently argued that the greater the productivity differentials between two countries, the larger the gap between the Purchasing Power Parity based (PPP) exchange rate and the equilibrium rate. The extensive literature of testing the productivity bias hypothesis has been reviewed by Bahmani-Oskooee and Nasir (2005) and as they show most researchers have adopted the following specification:

$$(PPP / R) = a + b(PROD^{d} / PROD^{w}) + \varepsilon \qquad (1)$$

where PPP is the purchasing power parity based exchange rate defined as number of units of domestic currency per unit of a base country's currency, R is the equilibrium exchange rate, $PROD^{d}$ is a measure of productivity in domestic country, and $PROD^{w}$ is a measure of productivity in the base country or rest of the world. Denoting the domestic price level by P^{d} and the price level in the base country by P^{w}, since PPP = P^{d} / P^{w}, the dependent variable in (1) reduces to the real exchange rate as in (2) below which identifies productivity differentials as the main determinant of the real exchange rate:

$$(P^d / P^w R) = a + b(PROD^d / PROD^w) + \varepsilon \qquad (2)$$

As productivity at home or domestic country increases relative to the base country, so does wages and eventually prices. Therefore, a relatively more productive country will experience currency appreciation in real term. This productivity bias hypothesis or Balassa-Samuelson effect is supported if an estimate of b in equation (1) is positive and significant.

Model (1) is cornerstone of testing any other hypothesis. Indeed, it was extended by Bahmani-Oskooee and Nasir (2002) when they added and tested validity of some qualitative variables such as a measure of law and order, a measure of bureaucracy, and a measure of corruption. Theoretically, they argued that there are two channels through which any of these qualitative variables can affect the real exchange rate. First, in more corrupt and more bureaucratic countries, inflation rate is higher, thus, an increase in any of these measures will increase the gap between the PPP-based exchange rate and the equilibrium rate, causing domestic currency to depreciate in real term. Second, since more corrupt countries are relatively less productive, they usually experience a depreciating currency in real terms. Therefore, following Bahmani-Oskooee and Nasir (2002) approach we augment equation (1) by adding different qualitative variables one at a time and consider the following log linear models:[5]

$$Ln(REER) = \alpha_0 + \alpha_1 Ln(Balassa) + \alpha_2 Ln(Investment\ profile) + \varepsilon \qquad (2)$$

$$Ln(REER) = \alpha_0 + \alpha_1 Ln(Balassa) + \alpha_2 Ln(Bureaucracy\ Quality) + \varepsilon \qquad (3)$$

$$Ln(REER) = \alpha_0 + \alpha_1 Ln(Balassa) + \alpha_2 Ln(corruption) + \varepsilon \qquad (4)$$

$$Ln(REER) = \alpha_0 + \alpha_1 Ln(Balassa) + \alpha_2 Ln(Law\ and\ Order) + \varepsilon \qquad (5)$$

$$Ln(REER) = \alpha_0 + \alpha_1 Ln(Balassa) + \alpha_2 Ln(Political\ Instability) + \varepsilon \qquad (6)$$

The above specifications differ from those of Bahmani-Oskooee and Nasir (2002). First, whereas they considered the U.S. to be the base country in their models, we define the real exchange rate as the real effective exchange rate (REER) where its construction is based on using price and exchange rate data from 31 trading partners. Thus, our mesure of the real exchange rate is relatively more comprehensive. Second, the productivity differentials that we denote by "*Balassa*" in the models is defined as the ratio of productivity of each country in the sample relative to average productivity in 31 partners. Again, they considered the U.S. measure of productivity as the base country's productivity. Finally, we consider two more qualitative variables than theirs, i.e., investment profile and political instability that they did not consider.

[5] Note that Bahmani-Oskooee (1992) who subjected equation (1) to time-series analysis did not use logarithmic form. However, Bahmani-Oskooee and Nasir (2001, 2002) specified their models in log-linear forms.

In estimating the above models we consider the long-run effects of political instability and institutional quality on REER using the cross-sectionally augmented ARDL approach (CS-ARDL) developed by Chudik and Pesaran (2015b). One of the main features of this approach is that it permits to estimate the long-run effects in large dynamic heterogeneous panel data models with cross-sectionally dependent errors. The previous literature on the estimation of long-run effects using panel data allowed for the estimation of long-run effects using panel data, but it doesn't allow for cross-sectionally dependent errors (FMOLS approach, Pedroni, 2001), DOLS (Mark and Sul, 2003) and the PMG approach (Pooled Mean Group**)** of Pesaran, Shin, and Smith (1999). "*Ignoring error cross-sectional dependence can have serious consequences*" (Pesaran, 2006). Recent literature has recognized that cross section dependence is an important characteristic of macro data. Pesaran (2006) suggested the CCE (Common Correlated Effects) approach, which consists of estimating the linear combinations of the unobserved factors by cross-section means of the dependent and independent variables, and then running standard panel regressions augmented with these cross-section averages. Kapetanios, Pesaran, and Yagamata (2009) extended the results of Pesaran (2006) by allowing unobserved common factors that are not stationary. More recently, Bai (2009), and Sarafidis (2009) suggested dynamic panel estimators that allow for cross-sectional dependence and are particularly aimed at short panels, but do not allow for dynamic heterogeneity. Chudik *et al.*(2016) developed a new Cross-Sectionally Augmented Distributed Lag (CS-DL) approach to estimate the long-run effects in large dynamic heterogeneous panel data models with cross-sectionally dependent errors. Chudik and Pesaran (2015a) provided a survey of the current literature on estimation and inference in large panel data models with cross-sectional dependence.

Chudik and Pesaran (2015b) extended the CCE approach by allowing for dynamic panels with heterogenous coefficients and weakly exogenous regressors. This approach, based on the estimation of ARDL specifications, augmented with cross-section averages to filter out the effects of the unobserved common factors, from which long-run effects can be indirectly estimated. This approach is known as Cross-Sectionally Augmented ARDL, or CS-ARDL in short. Similarly to the Common Correlated Effects (CCE) estimators, in the CS-ARDL approach, the individual regression is correctly augmented by cross-section average to filter out the effects of common factors. The advantage of this approach (CS-ARDL) is to take into account all the three important aspects of the panel (the dynamics, the heterogeneity and the cross-sectional dependence). Applying this approach enables us to re-write any of the models (2)-(6) to incorporate country-specific intercepts α_i and a number of unobserved common factors that affects all cross-sectional units. For example, the model associated with equation (6) will take the following form:

$$Ln(REER)_{it} = \alpha_{i0} + \alpha_1 Ln(Balassa)_{it} + \alpha_2 ICRG_{it} + \varepsilon_{it} \qquad (7)$$

where *ICRG* is the political instability or institutional quality variable. The common factors can be monetary or macroeconomic (real) factors.

The CS-ARDL model can then be written as:

$$\Delta Ln(REER)_{it} = \alpha_{0i} + \rho_i^{EC} Ln(REER)_{it-1} + \theta_{1i}^{'} X_{it-1} + \theta_{2i}^{'} \Delta X_{it} + \beta_{1i} \overline{Ln(REER)}_{t-1}$$
$$\delta_i \bar{X}_{t-1} + \sum_{l=0}^{p} \pi_{il} \overline{\Delta Ln(REER)}_{t-l} + \sum_{l=0}^{p} \Gamma_{il} \overline{\Delta X}_{t-l} + u_{it} \qquad (8)$$

where $X_{it} = (Ln(Balassa) \quad ICRG)^{'}$. $\bar{X}_t = N^{-1} \sum_{i=1}^{N} X_{it}$ is a vector consisting of the cross-sectional averages of explanatory variables. Augmenting the model with a sufficient number of lagged cross-sectional averages makes the CCE Mean Group estimator performs well, even in a dynamic model with weakly exogenous regressors (Chudik and Pesaran, 2015b).

III. Data and Variables

To measure the political instability and Institutional quality effects on the real exchange rate in developing countries, we have collected data from 31 countries over the 1984-2016 period[6]. The countries in our sample are selected based on their exchange-rate regime. The developing countries are those which have a managed floating and freely floating exchange rate regime. Since qualitative variables come at annual frequency, the data on all variables are on annual base. As mentioned before, the *REER* is the real effective exchange rate and in order to be consistent with models (1)-(6), for each country i with j trading partners, we define it in a manner that a decrease reflects real depreciation of domestic currency. It is constructed as:

$$REER_i = \sum_{j=1}^{31} w_j \left(\frac{E_j P_i}{P_j}\right) \qquad (9)$$

where P_i and P_j are the price level in country i and partner j respectively, measured by the CPI (Consumer Price Index); E_j is the nominal bilateral exchange rate defined as number units of partner j's currency per unit of domestic country i's currency, w_j is the weight of partner j in the bilateral trade with domestic country i. Again to be consistent with each model, the *Balassa* variable is defined as the ratio of domestic country's real per capita GDP over the geometric mean (weighted in a similar way as the *REER*) of the same variable in trading partners. The measures of institutional quality are Investment profile, Bureaucracy Quality, Corruption, Law and Order. These indicators come from the International Country Risk Guide (ICRG 2017). All the quality of institutions measures are in index forms. The *Bureaucracy Quality*, *corruption* and *Law and Order* are expressed on a scale of 6 points. A score between 4 and 6 means a very high level of institutional quality. Conversely, for a score between 0 to 2.5, the level of institutional quality becomes lower. Concerning Investment profile index it is expressed on a scale of 12 points. A score between 10 and 12 means a very high level of institutional quality. Conversely, for a score between 0 to 5.5, the level of institutional quality becomes lower.

[6] Algeria, Argentina, Bangladesh, Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Egypt, Gambia, Ghana, Guatemala, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Paraguay, Peru, The Philippines, Sierra Leone, Sri Lanka, Syria, Thailand, Tunisia, Turkey, and Uganda.

$Instability$ is the political instability index. Political stability plays an important role in the economic development of a country. An unstable political system could seriously impede economic growth. Fredriksson and Svensson (2003) show that the rigor of environmental regulation can decrease along with growing political instability. Awokuse and Gempesaw (2005) define "*political instability as the degree of propensity for a change in the governance of a country, which may include any type of insurrection, revolution, and military-led coups. More specifically, political instability can be defined in terms of the frequency of events that increase the likelihood of social and political unrests. Examples of such indicators of political instability include the number of politically motivated assassinations, number of people killed as a result of domestic mass violence, number of successful coups, number of anti-government demonstrations and general strikes among others* ".

In this study we adopt the approach suggested by Hibbs (1973), Barro (1991), Benhabib and Spiegel (1992), Mauro (1993) and Alesina and Perotti (1996) to measure the political instability index. Under this approach, political instability is measured by formatting an index which summarizes diverse variables catching phenomena of political disturbances. Previous studies used the method of principal component (PCA) to construct this index. In this paper we have employed this technique on a set of 8 political instability indicators. These indicators are government stability, internal conflicts, external conflicts, military politics, religious tensions, ethnic tensions, democratic responsibility and Socio Economic Conditions. All these indicators are available from ICRG (1984-2016). These indicators are listed in Appendix B. The aggregate political instability index ranges from 0 to 100, where 0 denotes maximum instability, and a score of 100 perfect political stability. The higher the score is the less unstable the nation is. Thus, the ICRG political risk measure is constructed in a way that an *increase* in the measure denotes a *reduction* in the political risk.

We include in Appendix A, the mean, the maximum and the minimum of political instability, and institutional indicators for all countries in our sample. Generally, Costa Rica is the most stable country while Pakistan is the most instable. Many countries have made significant progress in curbing corruption. Costa Rica is the best country at fighting corruption whereas Paraguay is the least successful.

To examine whether individuals are interdependent, we have used a test suggested by Pesaran (2004). The test is based on the average of the correlations between the residuals from a regression on each individual separately. Practically, consider the variable y_i pertaining to the individual i. The variable is regressed on its first lag and the residuals are collected to compute ρ_{ij} which is the correlation coefficient between the residuals from individual i and j regressions. The statistic

$$CD = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \qquad (10)$$

is shown to have a N (0,1) distribution under the null hypothesis of independence, where N is the number of individuals**,** and T is the number of years. The results of the test applied to our

sample are given in Appendix C. For all variables, the tests reject the null hypothesis of independence of individuals at the 1% level.

To examine stationarity, we use a test that incorporates the interdependence of individuals. Among the existing tests, the one proposed by Pesaran (2007) is the most adequate. The test builds on the well-known augmented Dickey-Fuller regressions. Practically, consider y_{it} pertaining to the individual i at time t. Run the regression

$$\Delta y_{it} = \alpha_i + \rho_i y_{it-1} + \gamma_i \bar{y}_{t-1} + \delta_i \Delta \bar{y}_t + \vartheta_{it} \tag{11}$$

and take the calculated Student statistics of ρ_i; t_i., where $\hat{y}_t$ is the average of y_{it} over all individuals at time t. The statistic

$$CIPS\,(N,T) = \frac{1}{N}\sum_{i=1}^{N} t_i(N,T) \tag{12}$$

is used to test for stationarity but it does not have a standard distribution. We follow Pesaran (2007) and simulate the critical values using the Monte Carlo approach. If the computed statistics (*CIPS*) is above the critical value, one cannot reject the null hypothesis of non-stationarity. The results of the test applied to our sample are presented in Appendix C. The tests reveal that all variables in level are integrated of order one.

IV –Empirical Results

In this section we empirically examine whether country risk (political instability and institutional quality notably) can be considered as long-run real exchange rate determinants for a panel of 31 emerging and developing countries over the 1984 to 2016 period. To do so, we estimate equations (2)-(6) using the recently developed method of Cross-Section Augmented ARDL approach (CS-ARDL) of Chudik and Pesaran (2015b)[7]. Specifically, we estimate each model by incorporating more lags of the cross-section averages in addition to the cross-section averages of all model variables as outlined by equation (8). This equation represents the Chudik and Pesaran (2015b) dynamic CCE Mean Group approach.

The estimations of the long-run coefficients of *Balassa*, *Political instability* and *Institutional quality indicators* on REER and the mean estimation of the speed of adjustment from the panel ARDL and CS-ARDL model are reported in table 1. In this table we provide MG (Mean Group) estimates for 5 specifications, (a), (b), (c), (d) and (e) through which, we respectively estimate the model including Balassa and *Investment profile*, *Balassa* and *Bureaucracy Quality*, *Balassa* and *Corruption*, *Balassa* and *law and Order*, and *Balassa* and *political instability index*. All these measures of Institutional quality are entered in level rather than in log.

[7]As truly noted by a referee an ARDL approach can suffer from endogeneity issues. However Monte Carlo simulations of Chudik *et al.* (2013), and Chudick *et al.* (2017) provide evidence of the robustness of panel CS-ARDL estimates to endogeneity problem.

Table 1: Mean Group (MG) Estimates of the Long-Run Effects Based on the ARDL and the CS-ARDL Approach
Panel A: Full sample analysis (31 countries)

	CS-ARDL (1 lag)				
	(a)	(b)	(c)	(d)	(e)
Lag Ln(REER)	-0.47***	-0.48***	-0.53***	-0.55***	-0.56***
	(-13.6)	(-11.3)	(-12.5)	(-10.4)	(-9.13)
Investment profile	0.015**	-	-	-	-
	(1.97)				
Bureaucracy	-	0.02	-	-	-
		(1.3)			
Corruption	-	-	0.014**	-	-
			(2.1)		
law	-	-	-	0.12	-
				(1.6)	
Instability index	-	-	-	-	0.08**
					(1.98)
Ln (Balassa)	0.68*	0.73*	0.66	0.63	0.54*
	(1.84)	(1.66)	(1.64)	(1.52)	(1.71)
CD Test Statistics	0.74	0.81	0.68	-0.77	0.9

Note: t-statistics are in parentheses. *** = significant at 1%, **= significant at 5%, *=significant at 10%
CD statistic is associated to the Pesaran (2004) test. This statistic is shown to have a N (0,1) distribution under the null hypothesis of independence.

As can be seen from Table 1, in all specifications, the lagged REER level variable is highly statistically significant, with a negative sign. Besides, the speed of convergence to equilibrium is very fast. The results for *Balassa* variables are generally consistent with the theoretical and empirical literature. This variable reflects a productivity gap and aims at capturing the potential Balassa-Samuelson effect. The positive coefficients obtained for *Balassa* variable supports our theoretical expectation that a relatively more productive country enjoys a real appreciation of its currency.

For specification (a), the coefficient of *Investment profile* is positive and statistically significant. A decrease of one point in the *Investment profile uncertainty* appreciates the real exchange rate by 1.5%. For the case of specification (c), the coefficient on *Corruption* is positive and it is statistically significant. A decrease of one point in the corruption index appreciates the real exchange rate by 1.4%. On the contrary, specifications (b) and (d) indicate that the coefficients of *law and Order* and bureaucracy are positive but not statistically significant. In specification (e), the coefficient on *Political instability* is positive and statistically significant. These results shed light on the relative importance of political risk as a

real exchange rate determinant. The deterioration of the political situation leads to a decrease of 8% in the long run real effective exchange rate. The more developing countries move towards more political stability, the more real exchange rate appreciates. Such results notably confirm the models of contingent investment or "real options" and the one based on self-fulfilling exchange rate crises (see Banerjee, 1992). Indeed, political uncertainty affects real investment decisions and the currency value. Therefore an individual investor will pull his money out of the country if currency depreciation seems likely to occur. Moreover, a peaceful environment and a democratic government are indeed favorable for investors (see Barro, 2013).

Our econometric results show that countries experiencing a high degree of corruption, a high risk to investment, or a high degree of political instability tend to experience a real depreciation in their currency. These findings are in line with Bahmani-Oskooee and Nasir (2002), and Benjamin *et al.* (2013). Certainly, an unstable political system could drive away foreign investors, which may eventually lead to a significant revenue loss for the government. To compensate for that, the government may resort to various forms of inflationary policies. They argued that countries experiencing a high degree of corruption tend to experience a real depreciation in their currencies.

IV-1) Political Instability and Institutional Quality Threshold Effects On REER

The above results suggest that a high risk country through the deterioration of political situation and the institutional quality would probably lead to REER depreciation. In this section, we investigate the possible non-linear effects in the relationship between political instability and institutional quality on the one side, and the real exchange rate on the other. These indicators can depreciate the real exchange rate especially when the level of political instability and institutional quality exceeds certain threshold –*i.e.* the deterioration of political stability and the low level of institutional quality. For the increase of these variables to indicate the degradation of the political situation and the institutional quality, we multiply by (-1) the political instability indicators and institutional quality already defined in the previous section. Thus, when Bureaucracy Quality, corruption and Law and Order have a score between -2.5 and 0 it implies that the level of institutional quality is weak. The closer we get to 0 the more the level of institutional quality decreases. In other words and for the case of corruption for example, countries with the highest scores (between -2.5 and 0) are countries with the highest perceived corruption. While for the Investment profile, a score between -5.5 and 0 implies that the level of institutional quality is low. As for the political instability index, it ranges from -100 and 0, where 0 denotes maximum instability, and a score of -100 denotes perfect political stability. The higher the score is the less stable the nation is. When a variable score increases (decreases in absolute value) it implies the degradation of the political situation and of the institutional quality. These modified variables are identified as follows: $Investment\ profile^{\dagger}$, $Bureaucracy^{\dagger}$, $Corruption^{\dagger}$, $Law\ and\ Order^{\dagger}$, and $Political\ instability^{\dagger}$.

To determine the political instability and institutional quality threshold beyond which RER will decrease, we have performed the dynamic panel threshold approach recently developed by Chudik *et al.* (2017) to investigate the non-linear effect. This approach takes into account

the dynamics, the cross-country heterogeneity, the cross-sectional dependence and the feedback effects between political instability and institutional quality on one side and the real exchange rate on the other. Furthermore, we have examined the long-term effects of political instability and institutional quality on the real exchange rate using the ARDL specifications discussed in Chudik *et al.* (2015), as well as their cross-sectionally augmented versions. We start our econometric analysis with the following "reduced form" panel threshold-ARDL specification for ΔY_{it}:

$$\Delta y_{it} = c_i + \varphi' g(d_{it}, \tau) + \sum_{l=1}^{P} \lambda_i \Delta y_{i,t-l} + \sum_{l=1}^{P} \beta_i \Delta d_{i,t-l} + v_{it} \tag{21}$$

, where y_{it} is the log of the real exchange rate, $g(d_{it}, \tau)$ is the threshold variable and can be: $g_1(ICRG_{it}, \tau) = I[ICRG_{it} > \tau]$. ICRG is the political instability or institutional quality variable. The threshold variable $g_1(ICRG_{it}, \tau)$ takes the value of 1 if the political instability or institutional quality is above the given threshold value of τ and zero otherwise. The threshold coefficient, τ , can then be determined by a covering search method (see Chudik *et al.*, 2017 for more details).

Chudik *et al.* (2017) developed new tests for threshold effects in the case of large dynamic heterogeneous panel data models with cross-sectionally dependent errors. Using vector notations, equation (1) for $t = 1,2, \dots . T$ can be written as:

$$\Delta Y_i = Q_i \Gamma_i + \Phi F_i(\tau) + V_i \qquad \text{for } i = 1,2, \dots N \tag{22}$$

, where ΔY_i is a (Tx1) vector of observations on Δy_{it}, Q_i is an observation matrix of regressors $Q_i = \left(1, \Delta y_{i,t-1}, \Delta ICRG_{it}, \Delta ICRG_{it-1}, ICRG_{it-1}\right)$ and $F_i(\tau)$ is a (T x r) matrix of observations on the threshold variables in $g(ICRG_{it}, \tau)$. r is the number of threshold variables.

The SupF test statistic for testing the null hypothesis $\varphi = 0$ is given by

$$SupF = \sup_{\tau \epsilon H} [F_{NT}(\tau)] \tag{23}$$

, where H represents the admissible set of values for τ and

$$F_{NT}(\tau) = \frac{(RSS_r - RSS_u)/_r}{RSS_u/_{(n-s)}} \tag{24}$$

RSS_u is the residual sum of squares of an unrestricted model, RSS_r is the residual sum of squares of the restricted model under the null $\varphi = 0$, n is the number of observations and s is the total number of estimated coefficients in the unrestricted model. Similarly, we define the AveF test statistics as

$$AveF = \frac{1}{\#H} \sum_{\tau \epsilon H} F_{NT}(\tau) \tag{25}$$

, where #H denotes the number of elements of H. The asymptotic distributions of the SupF and AveF test statistics are non-standard, but they can be easily simulated. In our empirical application $r = 1$, then we use the square root of $F_{NT}(\tau)$ in (23) and (25) to obtain the SupF and AveF test statistics, respectively.

Before applying the threshold regression model, we apply a test for the existence of the threshold effect between political instability and Institutional quality on one side and the real

exchange rate on the other side. Chudik *et al.* (2017) developed new tests for threshold effects in the case of heterogeneous dynamic panel data models. The results of the test of political instability and institutional quality -threshold effects are summarized in Table 2. This table contains the SupF and AveF test statistics for the significance of the simple threshold variable, $g_1(ICRG_{it}, \tau)$. The critical values for the SupF and AveF statistics at 10% are included in Appendix D. In Table 2 we report the results for the ARDL specifications augmented with cross-section averages, denoted by CS-ARDL (see Chudik *et al.*, 2017 for more details).

Table 2: Tests of political instability and institutional quality-threshold effects

	CS-ARDL									
	$Investment\ profile^{\dagger}$		$Bureaucracy^{\dagger}$		$Corruption^{\dagger}$		$Law\ and\ Order^{\dagger}$		$Political\ instability^{\dagger}$	
Regressions with threshold variables:										
Lags	(1,1)	(2,2)	(1,1)	(2,2)	(1,1)	(2,2)	(1,1)	(2,2)	(1,1)	(2,2)
$\hat{\tau}$	-1,89	-2,01	-2.19	-2.19	-2.11	-2.61	-1,31	-1,36	-47	-49
$SupF$	1,99	2,29	1,44	0,79	4,73**	4,20**	1,88	1,61	15,7***	5,48**
$AveF$	1,29*	1,60*	0,22	0,07	0,82	0,82	0,82	0,59	1,86*	1,07
CD	-1,65	-1,16	-0,90	-0,67	-1,14	-1,36	-0,66	-0,28	-0,58	-0,59

Statistical significance of the Sup and Ave test statistics is denoted by * ,**, and ***, at 10%, 5% and 1% level, respectively. CD is the cross-section dependence test statistic of Pesaran (2004) and follows a N (0,1) distribution under the null hypothesis of independence.

The panel threshold tests based on the ARDL specifications provide evidence for a threshold effect in the relationship between Investment Profile-RER, Corruption-RER and Political instability-RER. Indeed, for these variables, the SupF and AveF test results are statistically significant. The threshold effects for $Investment\ profile^{\dagger}$ is at score of -1.9 with 24.4% of observations falling into the higher investment profile regime ($-i.e.\ Investment\ profile^{\dagger}$ score is between -2 and 0). For the $Corruption^{\dagger}$ measures, the corruption threshold is between -2.11 and -2.61, and about 47% of the observations fall into the higher corruption regime ($Corruption^{\dagger}$ score is between -2.11 and 0). For the case of $Political\ instability^{\dagger}$, the threshold estimate is -47 (Note that, the political instability index ranges from -100 to 0). The Threshold estimate is higher than the mean (-61.1), with more than 12.8% of observations falling into the higher corruption regime ($political\ instability^{\dagger}$ score is between -47 and 0) . For the other indicators of Institutional quality (*Bureaucracy* and *Law and Order*), the test results based on CS-ARDL do not reject the null of no simple Bureaucracy and Law-threshold effects. Indeed, the SupF and AveF tests are not statistically significant.

It is important to note that the main objective of this section is not only the estimation of Political instability and Institutional quality threshold effects but also the estimation of the

long-run effects of these indicators on the real exchange rate. Therefore, we report in Table 3 the results of the estimation of the model presented above using the recently CS-ARDL approach of Chudik and Pesaran (2015b).

Table 3: Mean group estimates of the long-run effects of political instability and institutional quality on RER

	CS-ARDL	
Lags	(1,1)	(2,2)
Regressions with threshold variables: $g_1(ICRG_{it}, \tau) = I[ICRG_{it} > \tau]$		
$Investment\ profile^{\dagger}$	-0.004	-0.001
	(0.003)	(0.005)
$Bureaucracy^{\dagger}$	-0.002	-0.039
	(0.011)	(0.026)
$Corruption^{\dagger}$	-0.004**	-0.005**
	(0.002)	(0.024)
$Law\ and\ Order^{\dagger}$	-0.004	-0.002
	(0.045)	(0.052)
$Political\ instability^{\dagger}$	-0.016**	-0.022**
	(0.03)	(0.06)

Standard errors are given in parentheses. Statistical significance is denoted by (*), (**) and (***), at 10%, 5% and 1% level, respectively.

Table 3 reports the results for models with threshold variables. We have found that the coefficients of corruption and political instability are negative and statistically significant. Therefore, for the case of corruption, when the threshold values are beyond -2.11 (between -2.11 and 0) the real exchange rate significantly declines by 0.4%. In other words, an increase of one point in the corruption index, for example (from -2.11 to -1.11) implies that the country is perceived as highly corrupt, which would reduce the real exchange rate by 0.4%. As for political instability, an increase in the political instability index (from -47 to -46 for example) means that the deterioration of the political situation depreciates the real exchange rate by 1.6%.

IV-2 Robustness Analysis

In this section we conduct a robustness check of the results reported in table 3 and we include the Balassa-Samuelson effect as an additional regressor in the different specifications. The estimation results are reported in Table 4

Table 4: Tests of political instability and institutional quality-threshold effects and Mean group estimates of the long-run effects of political instability and institutional quality and Balassa-Samuelson on RER

		CS-ARDL	
Lags		(1,1)	(2,2)
Regressions with threshold variables:			
$Investment\ profile^{\dagger}$	$\hat{\tau}$	-1.92	-2.07
	SupF	2.51*	2.8*
	φ_{ICRG}	-0.003	-0.004
	$\varphi_{Balassa}$	0.6*	0.57*
$Bureaucracy^{\dagger}$	$\hat{\tau}$	-2.22	-2.31
	SupF	1.18	1.23
	φ_{ICRG}	-0.002	-0.001
	$\varphi_{Balassa}$	0.68	0.71
$Corruption^{\dagger}$	$\hat{\tau}$	-2.1	-2.42
	SupF	4.81**	4.13**
	φ_{ICRG}	-0.004**	-0.004**
	$\varphi_{Balassa}$	0.63*	0.62
$Law\ and\ Order^{\dagger}$	$\hat{\tau}$	-1.68	-1.71
	SupF	1.9	1.78
	φ_{ICRG}	-0.001	-0.001
	$\varphi_{Balassa}$	0.59*	0.63
$Political\ instability^{\dagger}$	$\hat{\tau}$	-46	-49
	SupF	11.5***	6.91**
	φ_{ICRG}	-0.011**	-0.027**
	$\varphi_{Balassa}$	0.57*	0.61*

Statistical significance is denoted by (*) and (**) at 10% and 5% level, respectively.

These results provide the least-squares estimates for all panel groups presented above. The political instability and institutional quality threshold effect is statistically significant in the case of $Investment\ profile^{\dagger}$, $Corruption^{\dagger}$ and $Political\ instability^{\dagger}$. The threshold is between -2.42 and -1.97 for the indicators of institutional quality, and between -49 and -46

for political instability index. The coefficients of political instability and institutional quality variables are negative and statistically significant. Consequently, Political instability and corruption adversely affects the real exchange rate especially when they exceed a threshold.

V- Conclusion and Policy Implications

Modeling exchange rate behavior remains one of the unsolved issues of research to be dealt with. Previous studies on this topic primarily focused on the economic variables influencing the real exchange rate, such as terms of trade, net foreign assets, or real interest rates of countries, government expenditures…etc. The literature has argued that the omission of political factors may in part be the reason for the lack of forecasting power. Indeed, although the impact of political and institutional factors on some macroeconomic variables has already been analyzed by previous studies, the empirical literature of exchange rate determination has largely been silent about political risk factors, which have been often omitted when modeling the exchange rate dynamics in emerging and transition economies in particular.

Our paper contributes to the scientific discussion in this field and bridges the gap in the empirical literature by shedding light on the relative importance of political instability and corruption as potential real exchange rate determinants in emerging and developing countries. In our theoretical framework movements in real exchange rates are in the long-run driven by the Balassa-Samuelson effect and by a stochastic exchange shock, which for our purpose may reflect the political risk (see Bahmani and Nasir 2002). Empirically, we have used data for a panel of 31 emerging and developing countries over the period 1984-2016, and we have implemented the recently developed method of cross-sectionally augmented ARDL approach (CS-ARDL) of Chudik and Pesaran (2015b), and the threshold estimation of Chudik *et al.* (2017), which is to our best knowledge, the first attempt to do so in our economic context. These econometric techniques permit, not only to test for the existence of a non-linear effect in the relationship between political instability (and institutional quality), and the real exchange rate, but also to estimate the long-term effects of political instability and institutional quality on the real exchange rate. Moreover, they take into account the dynamics, the cross-country heterogeneity, the cross-sectional dependence and the feedback effects between political risk and the real exchange rate.

Our findings can be summarized as follows. The CS-ARDL Approach of Chudik and Pesaran (2015b) and the threshold effects of Chudik *et al.* (2017) provide clear evidence that i) more unstable political systems along with corrupt economies and a high risk of investment depreciate the long-run real exchange rate in emerging and development countries, ii) there exists strong evidence for a threshold effect in the relationship between Investment profile-RER, Corruption-RER and Political instability-RER. Specifically, political instability and corruption adversely affects real exchange rate especially when they exceed the threshold, and iii) the effects of bureaucracy and law and order seem to be statistically insignificant on the real exchange rate. Besides, the robustness check using alternative measures of corruption and political instability show that RER in emerging countries depends on the Balassa-Samuelson effect and political risk factors.

On the whole our theoretical arguments which received strong empirical support showing that, indeed, more corruption control appreciates the real exchange rate in emerging and developing countries in the long run. Such a result confirms the findings of Bahmani-Oskooee and Nasir (2002). Similarly, our findings showed that stable political systems could appreciate long-run real exchange rate for emerging and developing economies. Moreover, RER depreciates in the long run when the risk of investment is higher. Such a result also goes in line with the findings of Bahmani-Oskooee and Nasir (2002) and Benjamin *et al.* (2013).

Eventually, our findings lead us to conclude that the exchange rate policy decisions are therefore not purely an issue of economic contingencies, but also a question of political and institutional priorities. Accordingly, emerging and developing countries need to pay more attention to the political factors which have contingent effects on their exchange rate policy. They are notably called to boost their system of corruption control, to promote and encourage the investment climate, strengthen their political stability, seriously confront terrorism, mitigate internal and external conflicts, and enhance their democratic approaches ... etc. Such measures are essential so that developing countries can strengthen their currencies and meet the international competitiveness challenges.

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Appendix A

	Political instability[8]			Corruption[9]		
Countries	Mean	Max	Min	Mean	Max	Min
Algeria	58.78	70.69	43.89	2.54	4.00	1.50
Argentina	78.16	89.44	62.78	2.93	4.00	2.00
Bangladesh	56.35	79.58	35.28	1.57	3.00	0.00
Bolivia	65.66	75.56	44.31	2.12	3.00	1.00
Brazil	76.21	82.50	68.61	3.10	4.00	1.83
Colombia	64.42	71.04	54.51	2.71	3.00	1.50
Costa Rica	80.91	90.42	70.00	3.83	5.00	1.50
Dominican Rep	71.52	80.83	57.08	2.72	4.00	1.72
Egypt	63.60	74.58	45.56	2.14	4.00	1.50
Gambia	67.82	81.39	51.25	2.82	3.83	2.00
Ghana	68.43	80.00	48.33	2.46	4.00	1.50
Guatemala	63.47	80.97	32.22	2.24	4.00	1.50
Indonesia	58.16	69.86	45.97	1.90	3.83	0.00
Iran	57.74	75.14	21.94	2.73	4.00	1.50
Kenya	63.90	78.75	47.78	2.21	3.46	0.50
Madagascar	67.14	78.54	48.33	3.77	4.00	2.00
Malaysia	75.25	85.28	61.67	3.33	5.00	2.38
Mexico	77.47	84.31	68.33	2.54	3.42	1.50
Morocco	68.89	83.89	43.33	2.80	3.00	2.00
Nigeria	53.65	63.19	46.25	1.61	2.00	1.00
Pakistan	46.14	69.03	28.61	1.96	3.00	1.00
Paraguay	68.27	81.81	57.36	1.31	3.00	0.00
Peru	61.17	75.83	42.08	2.75	3.67	2.00
Philippines	65.09	83.61	44.72	2.16	4.00	0.00
Sierra Leone	58.69	80.49	28.33	1.97	3.00	1.00
Sri Lanka	53.82	67.99	31.39	3.01	4.00	2.50
Syria	61.85	78.33	31.39	2.44	4.00	1.00
Thailand	66.11	83.06	53.33	2.36	3.00	1.50
Tunisia	72.59	82.85	46.67	2.69	3.00	2.00
Turkey	61.48	76.39	50.97	2.66	4.00	2.00
Uganda	52.21	64.79	31.39	2.17	3.00	1.00

[8]Political instability is the degree of propensity for a change in the governance of a country, which may include any type of insurrection, revolution, and military-led coups.

[9]The corruption is most commonly defined as the misuse or the abuse of public office for private gain (WorldBank, 1997, UNDP, 1999).

Appendix B

- *Ethnic tensions*: An assessment of the degree of tensions within a country which is attributable to racial, nationality or language divisions.
- *Government stability:* An assessment of the government's ability to carry out its declared programs and its ability to stay in office.
- *Internal conflicts:* An assessment of political violence in the country and its actual or potential impact on governance.
- *Religious tensions:* An assessment of the degree of tensions within a country which is attributable to religious divisions.
- *External conflicts:*An assessment of a struggle that occurs between a character and outside forces, which could be another character or the environment.
- *Democratic responsibility:* An assessment of degree of social integration that balances rights and responsibilities promotes equal opportunities and tackles social stresses.
- *Military Politics*: An assessment of implication of military power in politics.
- *Socio Economic Conditions*: Assessment of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction

Appendix C

Cross-Section Dependence

Panel unit root test

Cross-Section Correlation Test[10]

Panel A: Levels							
	REER	*Investment profile*	*Bureaucracy Quality*	*Balassa*	*Corruption*	*Political instability*	*Law and Order*
CD	8.17	7.81	11.64	7.77	11.04	11.28	8.27
p-Value	0	0	0	0	0	0	0

Panel A: Difference							
	REER	*Investment Profile*	*Bureacracy Quality*	*Balassa*	*Corruption*	*Political instability*	*Law and Order*
CD	7.35	11.17	10.41	8.91	10.87	9.13	9.54
p-Value	0	0	0	0	0	0	0

Test of the stationarity of the variables

Panel A: Levels							
	REER	*Investment Profile*	*Bureaucracy Quality*	*Balassa*	*Corruption*	*Political instability*	*Law and Order*
CIPS	-1.97	-1.6	-1.12	-1.17	-2.1	-2.03	-1.04
p-Value	0.1	0.18	0.52	0.41	0.07	0.08	0.64

Panel A: Difference							
	REER	*Investment Profile*	*Bureaucracy Quality*	*Balassa*	*Corruption*	*Political instability*	*Law and Order*
CIPS	-4.13	-5.39	-5.71	-7.59	-4.03	-4.09	-3.89
p-Value	0	0	0	0	0	0	0

Appendix D:

The critical value of and statistics at 10%

		CS-ARDL	
		(1,1)	(2,2)
Developing countries	S_i	2.4	2.74
	A_i	0.95	1.12

[10] The statistics is shown to have a N (0,1) distribution under the null hypothesis of independence.