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The role of the exchange rate in the conduct of monetary policy in emerging economies

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The Taylor rule is an important formula for studying the behaviour of the central bank. However, the high external exposure of emerging economies requires modification. This study investigates the exchange rate in the reaction function of monetary policy in emerging economies following inflation targeting. Unlike previous studies, we consider the effect of global financial crisis, the asymmetric effect of exchange rate, and measurement sensitivity. We used the GMM model to investigate various augmented Taylor rules. This study finds that the fear of floating emerges in most emerging economies and is more pronounced during the post-crisis period. Furthermore, there is strong evidence for fear of appreciation, especially against the main currencies of international transactions, such as the US dollar or the euro. Finally, the measurement sensitivity analysis suggests that the fear of floating or appreciation emerges strongly with the monthly deviation of the exchange rate.

Keywords: exchange rate, crisis, asymmetric effect

Does the exchange rate matter in implementing monetary policy in emerging economies following inflation targeting? The conventional Taylor rule suggests that monetary authorities can set interest rate instruments according to changes in inflation and output gaps, which are deviations of the two from their benchmark levels. However, *Ball (1999)* argues that such a simple reaction function may not be optimal for emerging economies that are small and open. Therefore, studies on the Taylor rule for emerging economies require some modifications to account for their vulnerability to international shocks.

High external exposure implies the importance of the exchange rate in implementing monetary policy in emerging economies (*Calvo–Reinhart, 2002*). Remarkably, there is a difference between the de jure and de facto regimes of

exchange rates in emerging economies (*Calvo–Reinhart, 2002; Menkhoff, 2013*). The adoption of inflation targeting does not prevent monetary authorities in emerging economies from intervening in foreign exchange markets. Consequently, many emerging economies fall into intermediate groups, in which the exchange rate is managed to a certain degree. However, most inflation-targeting economies do not openly recognise that the exchange rate is an important input in the reaction function of monetary policy. Therefore, the exchange rate is an empirical question requiring country-specific evidence.

Many studies (e.g. *Aizenman–Hutchison–Noy, 2011; Caporale et al. 2018; Cermeño–Villagómez–Polo, 2012; Cívirci–Akçağlayan, 2010; Furlani–Portugal–Laurini, 2010; Granville–Mallick, 2010; Kim–Kim–Wang, 2009; Lueangwilai, 2012; Peters, 2016; Pontines–Siregar, 2012; Sánchez-Fung, 2011*) argue that the exchange rate is a significant determinant of the interest rate setting in emerging economies. However, these studies often use a single measure of exchange rate changes (which can be effective, bilateral, nominal, or real exchange rates) and mainly focus on the linear response of monetary policy to the exchange rate. There is a dearth of studies examining the asymmetric or post-crisis effects of the exchange rates. Furthermore, to the best of our knowledge, no study has emphasised the measurement sensitivity problem when analysing the effect of the exchange rate on the setting of the interest rate.

This study aims to fill these gaps by investigating whether the exchange rate is useful for predicting changes in monetary policy in emerging economies that are inflation-targeting adopters. In particular, it answers important questions regarding the role of the exchange rate under inflation targeting. First, how does the exchange rate influence the interest rates? Second, how did it matter after the global financial crisis of 2007? Third, does monetary policy respond asymmetrically to exchange rate movement? Finally, does the exchange rate matter differently when the measure of the exchange rate changes?

This study contributes to the literature by providing new insights into the exchange rate in implementing monetary policy in emerging economies. First, the use of monthly and yearly changes in the exchange rate can provide comparative evidence of the response of monetary policy to the short- and long-run movements of the exchange rate. Such an analysis can help us better understand the effect of short- and long-run external shocks on the behaviour of monetary authorities. Therefore, this study provides more evidence on the relevance of flexible inflation targeting in emerging economies. Second, unlike previous studies (e.g. *Aizenman–Hutchison–Noy, 2011; Bjørnland–Halvorsen, 2014; Cívirci–Akçağlayan, 2010; Demir, 2014; Furlani–Portugal–Laurini, 2010; Granville–Mallick, 2010; Hammermann, 2005; Mohanty–Klau, 2005; Sánchez-Fung, 2011; Shrestha–Semmler, 2015*), we employ forward-looking specifica-

tions of the Taylor rule, which emphasises the proactive behaviour of monetary authorities to ensure exchange rate stability. Finally, it sheds light on the nonlinear response of monetary policy to exchange rate movement.

The remainder of this study is organised as follows. Section 1 reviews the literature on the effect of the exchange rate on the economy and its implications for monetary policy implementation in emerging economies. Further, Section 2 presents the methodology used to investigate the pass-through from the exchange rate to interest rate. Subsequently, Section 3 presents and discusses the empirical results of the study. Finally, Section 4 presents our conclusions.

1. Literature review

This section discusses the theoretical reasons and empirical evidence for fear of floating in emerging economies following inflation targeting. It also lists the advantages and disadvantages of including the exchange rate to capture the behaviour of monetary authorities in emerging economies.

1.1 Reasons for the fear of floating

Many studies (*Aizenman–Hutchison–Noy, 2011; Caporale et al., 2018; Cermeño–Villagómez–Polo, 2012; Minella et al., 2003; Mohanty–Klau, 2005; Paez–Farrell, 2007; Sánchez–Fung, 2011*) support the view that monetary authorities in emerging economies may actively respond to exchange rates when setting interest rates. According to *Calvo and Reinhart (2002)*, monetary authorities in emerging economies may not be willing to allow large swings in the exchange rate, although the exchange rate is officially stated as flexible or free-floating. In practice, these interventions can be conducted implicitly (*Aizenman–Hutchison–Noy, 2011; Mohanty–Klau, 2005*). In some economies, the response of monetary policy to the exchange rate is greater than that of expected inflation (*Ghosh–Ostry–Chamon, 2016*). Further, some countries can slowly shift from a fixed to a flexible regime after adopting inflation targeting (*Frömmel–Garabedian–Schobert, 2011*), which suggests the relevance of the exchange rate in the conduct of monetary policy (*Calvo–Reinhart, 2002; Galimberti–Moura, 2013*), at least in the early phases.

Monetary authorities' deep concern about exchange rate stability is referred to as the fear of floating (*Calvo–Reinhart, 2002*). There are many reasons for explicitly or implicitly considering the exchange rate. From a theoretical

perspective, adding the exchange rate to the Taylor rule may improve the welfare of the interest rate setting. *Wollmershäuser (2006)* supports this idea by comparing the seven specifications of the Taylor rule. Similarly, *Yilmazkuday (2007)* indicates that welfare is highest under flexible inflation targeting in Turkey from 2001M8 to 2005M1.

From a practical perspective, *Aizenman, Hutchison and Noy (2011)* argue that inflation-targeting countries prefer stabilising the exchange rate when they export basic commodities. In this case, the volatile exchange rate leads to a strong fluctuation in import prices, preventing monetary authorities from achieving inflation targets and reducing the credibility of the central bank (*Minella et al., 2003*). Moreover, the fear of floating can stem from low confidence in the strength of the domestic currency, especially when numerous debts are denominated in foreign currencies (*Acosta-Ormaechea–Coble, 2011*). As noted by *Georgiadis and Zhu (2021)*, when the balance sheet of an economy is exposed to foreign currency, the fear of floating is particularly pronounced. Furthermore, the exchange rate may not be freely floating for other reasons, such as liquidity or reserve management (*Montoro–Moreno, 2011*), competitiveness, growth, and price stabilisation (*Ghosh–Ostry–Chamon, 2016; Keefe–Rengifo, 2015*).

Nevertheless, in emerging economies, the fear of floating can manifest as a fear of appreciation or depreciation. This means that monetary authorities are reluctant to allow the exchange rate to move in one direction and tolerate movement in the other direction. Fear of appreciation occurs when an appreciation has a serious contractionary effect on the economy. According to the mercantilist view, appreciation causes domestic goods to be more expensive in foreign markets, which negatively affects export and current account balance. Consequently, export-oriented countries can experience losses in national competitiveness and output. Monetary authorities can adjust interest rates to reverse or postpone appreciation to solve these problems. Further, the fear of appreciation can contribute to economic growth through its positive effect on savings and capital accumulation (*Levy-Yeyati–Sturzenegger, 2007*) or its protection of immature or strategic industries. However, some countries may prefer to avoid depreciation. If a country copes with surges in capital inflows, financial distress may occur if there is a sudden stop or reversal in capital flows. If investors believe in the rigidity of depreciation, international liquidity shortages can be severe in times of crisis. Moreover, high dollarisation is another explanation for the fear of depreciation, as it increases the debt burden of domestic borrowers.

Another explanation for the different reactions of interest rate setting to appreciation and depreciation is the existence of information asymmetry. As pointed out by *Gürkaynak et al. (2021)*, the conclusion of the public about

monetary authorities' policy decisions can be based on their observations of some variables. For instance, the public may react strongly to an unexpected rise in the value of the domestic currency when monetary authorities prefer to maintain a lengthy period of low 'valued' domestic currency. This is likely to happen in emerging economies, where a considerable proportion of gross domestic product comes from exporting low-value-added products, such as raw materials or commodities. Owing to the behaviour of the public, monetary authorities must respond differently to appreciation and depreciation to maintain the effect of monetary policy on the course of the economy.

1.2 Empirical evidence of the matter of the exchange rate

Bjørnland and Halvorsen (2014) used a SVAR model to investigate whether the exchange rate matters in six developed countries: Australia, New Zealand, Canada, Norway, Sweden, and the UK. Using both sign and zero restrictions, they find a contemporaneous interaction between monetary policy and the exchange rate in all countries except Australia and the UK. In particular, changes in monetary policy counter the effect of the exchange rate movement on inflation. Nevertheless, the exchange rate does not matter in Australia and the UK. *Dybowski, Hanisch and Kempa (2018)* used a TVP-BVAR model to assess whether the exchange rate plays different roles over time in Canada. They find that, after a long period of continuous reduction, the exchange rate regains its importance by the onset of the global financial crisis. They also emphasise that the augmented Taylor rule captures the interest rate dynamics from the mid-1990s only. *Demir (2014)* uses various methods (OLS, IV, VAR) and finds that the ECB is reluctant to float. However, *Demir (2014)* argues that the quantitative effect of the exchange rate is too small to conclude its significance in monetary policy setting.

Since the 2000s, there has been increasing evidence on the exchange rate in the conduct of monetary policy in emerging economies. *Minella et al. (2003)* investigated this problem in Brazil and found that yearly rather than monthly changes in the exchange rate are significant, and interest rate adjustments accommodate the exchange rate movement. *Sánchez-Fung (2011)* also supports such a response to monetary policy in Brazil using an ADL model with 12 lags. Conversely, *Furlani, Portugal, and Laurini (2010)* use a VAR model to consider the contemporaneous interaction between monetary policy and exchange rates and find opposite evidence for Brazil, whereby the interest rate response is consistent with the anti-inflation preference.

Hammermann (2005) used VAR models to investigate the same issue in Poland and Chile. This study finds a break in the fear of floating in Poland. From 1992 to 1998, the interest rate immediately decreased after appreciation. From 1998 to 2002, interest rate cuts occurred only in the medium run, suggesting that the exchange rate was not as important as in the previous period. However, there was no break in Chile. An appreciation increases the interest rate only from the fifth month onwards in Chile. *Civcir and Akçağlayan (2010)* also use the VAR model to investigate how the exchange rate gap affects Turkey's interest rate before and after the crisis in 2001. They find that the interest rate responses differ between the two periods. A positive depreciation gap is indicated by a reduction in the interest rate in the first period and an increase in the second period, implying that the monetary policy response was consistent with inflation targeting after the crisis. Furthermore, after the crisis, the exchange rate became Turkey's main driving force behind interest rate changes. Using a similar method, *Granville and Mallick (2010)* favour the relevance of an augmented Taylor rule in Russia from 1995 to 2009. However, they emphasise that exchange rate targeting is a possible explanation for Russia's failure to reduce double-digit inflation. *Lueangwilai (2012)* uses a Bayesian model to investigate the case of Thailand from 2000M6 to 2011M6 and finds that the Bank of Thailand mainly focuses on stabilising inflation and that the focus on the exchange rate is weaker than that on output.

Generally, the existing literature on emerging economies is on a case-by-case basis. Only a few empirical studies have conducted comparative analyses of a group of countries. *Aizenman, Hutchison and Noy (2011)* use the LSDV method to investigate a panel of 16 emerging economies and find that the fear of floating is pronounced in inflation-targeting countries that export basic commodities. Nevertheless, many studies have used time-series models to investigate the fear of floating in emerging economies. *Mohanty and Klau (2005)* used a GMM model to estimate an open economy interest rate rule for 13 emerging economies. They find that the interest rate reacts strongly to the exchange rate movement in most emerging economies. In some economies, the response to the exchange rate is larger than that to inflation or the output gap. Such a finding may stem from either the persistence of exchange rate shocks or the strong preference of central banks to stabilise the exchange rate. *Yilmazkuday (2008)* also finds a matter of the exchange rate in the Czech Republic, Hungary, and Poland. Remarkably, in Hungary, monetary policy responds only to the exchange rate over the period 1994M1–2007M6 and inflation and foreign interest rates in some subperiods. In other countries, however, monetary policy responds to exchange rates and other variables. *Frömmel, Garabedian, and Schobert (2011)* used the cointegration approach and found that the role of the

exchange rate is diminishing in most Central and Eastern European countries, except for Slovakia, where the exchange rate remains significant.

Peters (2016) uses maximum likelihood estimation to investigate four emerging economies (South Africa, Indonesia, Mexico, and Thailand) and finds mixed evidence of the fear of floating from 1980 to 2007. In particular, fear of floating does not emerge in South Africa or Mexico. Conversely, interest rates show an increase in response to real depreciation in Indonesia and Thailand. *Caporale et al. (2018)* used the GMM method to investigate augmented Taylor rule in Indonesia, Israel, South Korea, Thailand, and Turkey. They make two extensions to the conventional Taylor rule: adding the exchange rate and allowing non-linearity concerning inflation. They find the significance of the exchange rate in a regime of low inflation, suggesting that there is a comfort zone to smooth the exchange rate movement (*Ghosh–Ostry–Chamon, 2016; Mohanty–Berger, 2013*). They also note that compared to a linear Taylor rule, an augmented nonlinear Taylor rule is better for capturing the interest rate dynamics in these countries. *Shrestha and Semmler (2015)* used an ARDL model to examine five East Asian countries: Malaysia, Korea, Thailand, Indonesia, and the Philippines. They concluded that the augmented rule is superior because it can account for financial instability. Nevertheless, exchange rates play a significant role only in Thailand and the Philippines.

Further, much less evidence on the nonlinear response of the interest rate to the exchange rate is available in emerging economies. *Cermeño, Villagómez, and Polo (2012)* provide evidence of the fear of depreciation in Mexico by observing the squared and cubic terms of real exchange rate changes. Using a GMM model, they find that monetary policy strongly responds to depreciation. Nevertheless, *Keefe and Shadmani (2018)* argue that in emerging economies, the interest rate responds to the fear of appreciation rather than depreciation, even during the global financial crisis.

In summary, while there is increasing evidence of the fear of floating in emerging economies, few studies have conducted a comparative analysis of this problem. Moreover, there is much less evidence about the asymmetric effect of exchange rate movement or the effect of the exchange rate during the post-crisis period. Finally, to the best of the author's knowledge, no study has emphasised the sensitivity of empirical results to the measures of exchange rate changes. Nonetheless, they can affect the interpretation of the exchange rate.

1.3 Taylor rule and the exchange rate

Given the effect of the exchange rate on economic management, many studies support its inclusion in the Taylor rule. *Ball (1999)* does not support the exclusion of the exchange rate in the Taylor rule because it may lead to the instability of the output and exchange rate. Similarly, *Taylor (2000)* suggests that including the exchange rate can remove its direct effect on inflation. Further, such augmentation can reduce exchange rate volatility and thus provide a buffer against external shocks. Augmentation can also mitigate the variance of the consumer price index (*Ball, 1999*) as well as the uncertainty in output and inflation (*Debelle, 1999*). *Stone et al. (2009)* and *Garcia, Restrepo and Roger (2011)* argue that responses to exchange rates can protect financially vulnerable, emerging economies. However, it seems that developed countries benefit little from adding the exchange rate to the Taylor rule (*Garcia–Restrepo–Roger, 2011*).

Conversely, *Torres (2003)* argues that an augmented Taylor rule is of limited use. If the exchange rate is strongly related to inflation and output, its inclusion may not be necessary because inflation and output already capture the inflationary pressure of the exchange rate movement. Nevertheless, there is no need for the appearance of an exchange rate if it has no effect on inflation or output. *Granville and Mallick (2010)* argue that high inflation occurs in Russia because of the intention to target the exchange rate.

Taylor (1993) provides a theoretical framework for studies on the behaviour of the central bank. A simple specification of the Taylor rule is

$$\bar{i}_t = \alpha_0 + \alpha_\pi (\pi_t - \pi_t^*) + \alpha_y y_t + \varepsilon_t \quad (1)$$

where \bar{i}_t is the policy rate officially stated by the monetary authorities, and π_t is the inflation rate. $(\pi_t - \pi_t^*)$ and y_t are the inflation and output gaps, respectively. Here, the inflation target π_t^* is time-varying. After adopting inflation targeting, emerging economies gradually reduced the annual inflation rate target and, ultimately, most maintained a fixed target of 3% and a tolerance band of 1%.

As shown in Equation (1), the interest rate contemporaneously reacts to inflation and output gaps. To ensure the stabilisation effect, the response of the interest rate to the output gap and inflation gap should satisfy the Taylor principle, whereby interest rate adjustments should be greater than the changes in the inflation gap and positive in response to changes in the output gap. A violation of the Taylor principle indicates that monetary policy tends to accommodate rather than stabilise shocks.

Nonetheless, the *Taylor (1993)* rule copes with the critique when using it to examine the behaviour of monetary authorities in emerging economies. The following studies modify the conventional Taylor rule to account for the complexity of monetary policy implementation in emerging economies. Two important augmentations are smoothing behaviour and a forward-looking outlook. In this study, we employ the forward-looking specification proposed by *Clarida, Gali and Gertler (1998)* to investigate the exchange rate.

$$i_t = \rho i_{t-1} + (1-\rho) \left[\alpha_0 + \alpha_\pi (\pi_{t+k} - \pi_{t+k}^*) + \alpha_y y_{t+m} + \alpha_e \Delta e_{t+n} + \varepsilon_t \right] \quad (2)$$

where ρ notes the smoothing coefficient. A high ρ value of ρ indicates that monetary authorities in emerging economies are likely to adjust their interest rates gradually. $(\pi_{t+k} - \pi_{t+k}^*)$, y_{t+m} and e_{t+n} represent the expectations of the inflation gap, output gap, and exchange rate, respectively.

For simplicity, Equation (2) can be reparameterised as follows:

$$i_t = \rho i_{t-1} + \beta_0 + \beta_\pi (\pi_{t+k} - \pi_{t+k}^*) + \beta_y y_{t+m} + \beta_e \Delta e_{t+n} + v_t \quad (3)$$

where $\beta_0 = (1-\rho) \alpha_0$, $\beta_\pi = (1-\rho) \alpha_\pi$, $\beta_e = (1-\rho) \alpha_e$, and $v_t = (1-\rho) \varepsilon_t$. Accordingly, the response of monetary policy to inflation can be indirectly calculated by the ratio of inflation gap coefficients in Equations (3) and (2), $\alpha_\pi = \beta_\pi / (1-\rho)$. If $\beta_\pi / (1-\rho)$ is greater than one, monetary policy is effective in stabilising inflation. Conversely, β_y and α_y have the same sign in Equations (3) and (2), suggesting that a positive value of β_y indicates the stabilising effect of monetary policy on the real economy.

In this study, we implement departures from the linear response of the interest rate to exchange rate changes. First, monetary authorities likely put greater emphasis on exchange rate stability during the post-crisis period. To examine this problem, we add the interaction between exchange rate changes and a crisis dummy that takes the value of one after 2008M9 (Equation 4).

$$i_t = \rho i_{t-1} + \beta_0 + \beta_\pi (\pi_{t+k} - \pi_{t+k}^*) + \beta_y y_{t+m} + \beta_e \Delta e_{t+n} + \beta_{ec} \Delta e_{crisis,t+n} + v_t \quad (4)$$

where $\Delta e_{crisis,t+n} = \Delta e_{t+n} * C_{t+n}$, C is the crisis dummy.

Following *Cermeño, Villagómez, and Polo (2012)* and *Keeffe and Shadmani (2018)*, we examined the asymmetric response of monetary policy to appreciation and depreciation by observing the squared term of the exchange rate

in the augmented Taylor rule (Equation 5). If β_{e^2} is negative, monetary authorities show a fear of appreciation. Conversely, a positive value of β_{e^2} indicates fear of depreciation.

$$i_t = \rho i_{t-1} + \beta_0 + \beta_\pi (\pi_{t+k} - \bar{\pi}_{t+k}) + \beta_y y_{t+m} + \beta_e \Delta e_{t+n} + \beta_{e^2} \Delta e_{t+n}^2 + v_t \quad (5)$$

2. Methodology and data

In this study, we use the GMM method to investigate how the exchange rate affects monetary policy in emerging economies that target price stability. The GMM method is appropriate for solving the problems of endogeneity, autocorrelation, and heteroscedasticity.

2.1 Methodology

Existing literature suggests two methods that can be used to investigate the fear of floating. The first method is to use a VAR model to examine the significance of the exchange rate in the monetary policy equation (*Aizenman–Hutchison–Noy, 2011; Bjørnland–Halvorsen, 2014; Cıvıç–Akçağlayan, 2010; Demir, 2014; Dybowski–Hanisch–and Kempa (2018); Frömmel–Garabedian–Schobert, 2011; Furlani–Portugal–Laurini, 2010; Granville–Mallick, 2010; Hammermann, 2005; Lueangwilai, 2012*). An advantage of this method is that it considers the dynamic relationship between the interest rate, the exchange rate, and other endogenous variables. The second method involves estimating the Taylor rule with the augmentation of exchange rate changes (*Caporale et al., 2018; Cermeño–Villagómez–Polo, 2012; Mohanty–Klau, 2005; Peters, 2016; Pontines–Siregar, 2012; Sánchez-Fung, 2011*). In this study, the second method was used.

The GMM method resolves the endogeneity problem by constructing a vector of instrumental variables that contains some or all elements of the explanatory variables. Subsequently, it solves for unknown parameters using orthogonality conditions (see Equation 6), of which the idea is to match the sample moments $g_t(w_t, \beta)$ with the population moments $E[Z_t v_t] = 0$.

$$E[g_t(w_t, \beta)] = E[Z_t v_t] = E[Z_t (i_t - X_t' \beta)] = 0 \quad (6)$$

where w_i is the non-constant vector comprising the response variable i_t (interest rate), explanatory variables X_i' (e.g. inflation gap, output gap, and exchange rate changes), and instrumental variables Z_i (lags of explanatory variables). The J-test statistic (p-value is greater than 5%) confirms the validity of the selected instruments.

The estimation of the unknown parameters β is conditional on the order condition in which the number of instruments (l) is equal to or greater than the number of explanatory variables (k). In justified cases ($l=k$), the solution of β is unique under suitable regularity conditions. In over-justified cases ($l>k$), there is no unique solution for β and GMM solves the problem by minimising the following objective function:

$$\hat{\beta}(W) = \arg \min_{\beta} n \hat{g}_n' W \hat{g}_n \quad (7)$$

where W denotes the weighting matrix, n is the number of observations, and \hat{g}_n is the estimate of g_n .

The asymptotic variance-covariance matrix is

$$V = (\Sigma_{xz}' W \Sigma_{xz})^{-1} \Sigma_{xz}' W S W \Sigma_{xz} (\Sigma_{xz}' W \Sigma_{xz})^{-1} \quad (8)$$

where $\Sigma_{xz} = E(X'Z)$. S is an $l \times l$ matrix indicating the asymptotic covariance matrix of the moment conditions g . Following previous studies (e.g. *Aizenman–Hutchison–Noy, 2011; Paez-Farrell, 2007*), we use the Newey–West procedure (*Newey–West, 1994*) to correct the problem of autocorrelation and heteroskedasticity.

As the fear of floating may cope with the problem of measurement sensitivity, we aim to investigate the robustness of the empirical results to various measures of exchange rate changes. First, we use two benchmarks to calculate exchange rate changes: the values of the previous month and the previous year. Accordingly, monthly and yearly changes can help investigate the effect of the exchange rate's short- and long-run movements on the interest rate, respectively. Furthermore, the exchange rate indicator can be an effective, bilateral, nominal, or real index. These indicators indicate whether monetary authorities closely watch a single currency or a basket of currencies. In sum, we use monthly and yearly changes in the nominal effective exchange rate (NEER), the real effective exchange rate (REER), and the bilateral exchange rate.

Furthermore, from an empirical perspective, it is difficult to obtain data on the expected values of the variables of interest. Therefore, we used the ex-post value

to replace the expected value. In this case, forecast errors are incorporated into the error term. To solve the endogeneity problem, we used the GMM method to estimate the reaction functions specified in Equations (3), (4), and (5). This method also has the advantage of correcting autocorrelation and heteroskedasticity problems.

2.2 Data

This study analyses a sample of 12 emerging economies that follow inflation targeting: Brazil, Chile, Colombia, Mexico, Hungary, Poland, Romania, Turkey, Korea, the Philippines, Thailand, and South Africa. Samples were collected from January 2000 to June 2018. The industrial production and consumer price indices were derived from the International Monetary Fund (IMF). The exchange rate was mainly derived from the IMF. Turkey, Korea, and Thailand are not available from the IMF and are thus collected from the Bank for International Settlements.

Table 1 presents the monthly and yearly changes in various exchange rate indicators in emerging economies. As observed, different measures of exchange rate changes can provide conflicting interpretations of changes in the value of the domestic currency. For instance, in Hungary, the monthly changes in NEER and bilateral exchange rates have a negative mean, suggesting depreciation. Conversely, monthly changes in REER had a positive mean, suggesting appreciation. A similar observation can be made for other countries such as Poland, Romania, Korea, and the Philippines. Hence, the monetary policy response can be affected by using different exchange rate indicators. Turning to the standard deviation of exchange rate changes, monthly figures, when annualised (multiplied by 12), are much greater than yearly figures. This result indicates that the exchange rate is highly volatile in the short run, whereas its long-run movement is more stable. Consequently, monetary authorities that want to stabilise the exchange rate may react strongly to short-term changes.

Table 1

Mean and standard deviation of exchange rate changes in emerging economies

Country	Mean and standard deviation	Monthly change			Yearly change		
		NEER	REER	EX	NEER	REER	EX
Brazil	\bar{e}	-0.20	-0.03	-0.33	-2.09	-0.10	-3.39
	σ_e	4.09	4.10	3.83	15.91	14.81	18.80
Chile	\bar{e}	-0.03	-0.03	-0.09	-0.40	-0.52	-0.84
	σ_e	2.17	2.08	2.62	7.77	7.08	11.38
Colombia	\bar{e}	-0.06	-0.03	-0.18	-0.61	-0.36	-1.91
	σ_e	2.61	2.63	3.02	10.75	10.39	13.74
Mexico	\bar{e}	-0.35	-0.17	-0.34	-4.06	-1.99	-3.90
	σ_e	2.30	2.29	2.49	8.40	8.15	9.50
Hungary	\bar{e}	-0.07	0.08	-0.11	-0.49	1.28	-1.04
	σ_e	1.87	1.90	1.80	5.70	6.50	5.56
Poland	\bar{e}	0.02	0.02	-0.02	0.28	0.13	-0.31
	σ_e	2.07	2.08	2.13	8.51	8.55	9.09
Romania	\bar{e}	-0.35	0.10	-0.42	-4.02	0.95	-4.82
	σ_e	1.60	1.49	1.72	9.02	6.12	9.73
Turkey	\bar{e}	-1.00	-0.09	-1.03	-11.25	-0.89	-11.88
	σ_e	3.91	3.79	4.09	17.87	12.13	18.72
Korea	\bar{e}	0.00	0.03	0.01	-0.23	0.21	0.17
	σ_e	1.97	1.96	2.33	9.63	9.31	10.74
Philippines	\bar{e}	-0.15	0.01	-0.12	-1.36	0.50	-0.88
	σ_e	1.38	1.41	1.50	6.22	5.91	7.28
Thailand	\bar{e}	0.06	0.07	0.06	0.95	1.02	1.20
	σ_e	1.26	1.26	1.39	5.59	5.66	6.49
South Africa	\bar{e}	-0.35	-0.12	-0.35	-3.97	-1.24	-3.53
	σ_e	3.36	3.34	3.95	14.20	13.60	17.64

Source: Authors' calculation.

Notes: \bar{e} and σ_e are the mean and standard deviation of the exchange rate changes, respectively. EX is the bilateral exchange rate, measured by the number of USD/EUR to purchase a unit of the domestic currency.

3. Empirical analysis

3.1 Fear of floating

Table 2 presents the estimates of the effect of yearly changes in NEER in the Taylor rule. As observed, its effect is negative and statistically significant in most emerging economies, suggesting that monetary policy is expansionary in response to future appreciation pressure. Such evidence for the fear of floating is consistent with most of previous studies (*Aizenman–Hutchison–Noy, 2011; Bjørnland–Halvorsen, 2014; Hammermann, 2005; Cermeño–Villagómez–Polo, 2012; Dybowski–Hanisch–Kempa, 2018; Lueangwilai, 2012; Furlani–Portugal–Laurini, 2010; Mohanty–Klau, 2005; Peters, 2016; Yilmazkuday, 2008*) but is in contrast with *Caporale et al. (2018), Minella et al. (2003), and Sánchez-Fung (2011)*. However, the positive effect of the exchange rate is documented for Chile and Korea, implying that interest rate increases when expecting a rise in the value of the domestic currency. Hence, monetary policy accommodates rather than stabilises the exchange rate movement. In Colombia and Poland, the exchange rate does not matter, which is not consistent with the empirical results in other studies (*Hammermann, 2005; Yilmazkuday, 2008*).

Turning to the classical coefficients of the Taylor rule, the response of the interest rate to the output gap and inflation gap satisfies the Taylor principle. First, the interest rate reacts positively to the output gap, suggesting that monetary policy can stabilise the real economy. Moreover, the response to inflation calculated by the ratio $\beta_{\pi}/(1-\rho)$ is greater than unity; thus, monetary policy is useful for achieving price stability.

We further investigate the sensitivity of interest rate elasticity to various exchange rate change measures. This study uses both monthly and yearly changes in NEER, REER, and bilateral exchange rates. Therefore, there are six possible specifications for each emerging economy. As shown in Table 3, the exchange rate addresses the problem of measurement sensitivity. First, the choice of the exchange rate indicator and reference value can affect the interpretation of the exchange rate effect in monetary policy implementation. For instance, in Brazil, monetary policy shows an accommodating response when observing monthly changes in NEER and REER, whereas it shows a countering response in other cases. We can conclude that REER plays no role in monetary policy implementation for Chile. However, fear of floating appears with respect to the bilateral exchange rate in Chile. A similar situation occurs in other countries.

Table 2

Exchange rate effect in the Taylor rule

Country	β_0	i_{t-1}	$(\pi_{t+k} - \pi_{t+k}^*)$	y_{t+m}	Δe_{t+n}
Brazil	-0.049 (0.098)	0.991*** (0.009)	0.076*** (0.018)	0.094*** (0.012)	-0.008** (0.003)
Chile	0.135* (0.074)	0.966*** (0.020)	0.053*** (0.019)	0.004 (0.022)	0.011** (0.005)
Colombia	0.266*** (0.064)	0.945*** (0.012)	0.078*** (0.020)	0.040*** (0.011)	0.001 (0.003)
Mexico	0.182 (0.117)	0.934*** (0.024)	0.173*** (0.050)	0.142*** (0.036)	-0.009* (0.005)
Hungary	0.011 (0.067)	0.977*** (0.015)	0.036* (0.021)	0.012 (0.020)	-0.030* (0.015)
Poland	0.172** (0.078)	0.952*** (0.019)	0.037*** (0.013)	0.016* (0.010)	-0.001 (0.004)
Romania	0.168** (0.070)	0.953*** (0.011)	0.073 (0.067)	0.040* (0.021)	-0.028** (0.013)
Turkey	-0.002 (0.095)	0.974*** (0.005)	0.044** (0.018)	0.027** (0.013)	-0.026*** (0.008)
Korea	0.003 (0.020)	0.999*** (0.006)	0.025*** (0.010)	0.006** (0.003)	0.006*** (0.001)
Philippines	0.003 (0.023)	0.995*** (0.005)	0.006 (0.008)	0.007* (0.004)	-0.008*** (0.002)
Thailand	0.143*** (0.027)	0.931*** (0.014)	0.044*** (0.006)	-0.012*** (0.003)	0.004* (0.002)
South Africa	0.026 (0.061)	0.993*** (0.008)	0.012* (0.007)	0.059*** (0.009)	-0.004** (0.002)

Source: Authors' calculation.

Notes: *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively. The standard deviations are shown in parentheses. Δe_{t+n} is the yearly change in NEER.

Table 3

Interest rate responses to different measures of exchange rate changes

Country	Yearly change			Monthly change		
	NEER	REER	EX	NEER	REER	EX
Brazil	−0.008** (0.003)	−0.009** (0.003)	−0.008*** (0.003)	0.121* (0.066)	0.118* (0.069)	−0.042** (0.016)
Chile	0.011** (0.005)	0.010 (0.009)	0.009*** (0.003)	0.061** (0.030)	−0.172 (0.295)	−0.156* (0.084)
Colombia	0.001 (0.003)	0.002 (0.003)	0.003* (0.002)	−0.097** (0.047)	−0.098** (0.048)	−0.067** (0.027)
Mexico	−0.009* (0.005)	−0.008* (0.004)	−0.007* (0.004)	0.118* (0.060)	0.124** (0.062)	0.121* (0.065)
Hungary	−0.030* (0.015)	−0.020* (0.011)	−0.027** (0.011)	0.079 (0.075)	−0.036 (0.044)	0.001 (0.051)
Poland	−0.001 (0.004)	−0.000 (0.004)	0.006 (0.007)	−0.044 (0.036)	−0.040 (0.035)	−0.161* (0.083)
Romania	−0.028** (0.013)	−0.020* (0.011)	−0.028** (0.012)	−0.238* (0.137)	−0.133 (0.137)	0.140 (0.128)
Turkey	−0.026*** (0.008)	−0.026*** (0.008)	−0.015*** (0.005)	0.205** (0.084)	0.426*** (0.134)	0.157** (0.068)
Korea	0.006*** (0.001)	0.004** (0.002)	0.004*** (0.001)	−0.080* (0.041)	−0.087* (0.046)	−0.080** (0.040)
Philippines	−0.008*** (0.002)	−0.008*** (0.002)	−0.005* (0.003)	0.049** (0.023)	0.057** (0.022)	0.105* (0.060)
Thailand	0.004* (0.002)	0.004* (0.003)	0.000 (0.002)	0.098* (0.057)	−0.090* (0.051)	−0.058* (0.034)
South Africa	−0.004** (0.002)	−0.004** (0.002)	−0.002* (0.001)	−0.032* (0.017)	−0.031* (0.017)	0.022* (0.013)

Source: Authors' calculation.

Notes: *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively. The standard deviations are shown in parentheses.

Second, the yearly coefficients are considerably small, whereas the monthly ones are large and much greater than the yearly ones. This implies that monetary policy is more responsive to the short-run exchange rate movement, whereas the effect of the long-run movement of the exchange rate is negligible. This finding is in line with the descriptive statistics of exchange rate changes presented in

Section 2.2, whereby the exchange rate is highly volatile when observing monthly changes.

Despite the generalisations above, there is a slight difference in the exchange rate effect between emerging economies that follow inflation targeting. Although the exchange rate has a negative effect on the interest rate in most emerging economies, a positive or statistically insignificant effect is visible in other economies. This heterogeneity is conditional on country-specific factors such as the relevant importance of tradable and non-tradable goods in the product basket of a country. For instance, *Edwards and Cabezas (2022)* argued that the effect of the exchange rate is higher for tradable goods than that for non-tradable goods in Iceland. Therefore, monetary authorities that export these goods require strong responses to maintain price stability. Furthermore, heterogeneity can stem from the stock of foreign reserves in emerging economies. *Ahmad and Pentecost (2020)* found evidence of the fear of floating in a regime of high reserves.

3.2 Effect of crisis

Table 4 presents the effect of yearly changes in NEER after the global financial crisis. As observed, the normal-time coefficients are negative and statistically significant in most economies, suggesting that monetary policy aims to postpone the exchange rate's expected movement. However, the post-crisis coefficients are positive and statistically significant in all emerging economies except Colombia, Romania, and Thailand. Since the post-crisis coefficients have opposite signs and greater sizes than normal-time coefficients, there is a reversal in the response of monetary policy to the exchange rate during the post-crisis period. Moreover, notably, the sum of normal and post-crisis coefficients is extremely small, suggesting that the effect of NEER's long-run movement can be negligible.

The analysis proceeded by further investigating the measurement sensitivity problem. For a brief description, Table 5 presents only the exchange rate's post-crisis effects. The results provide evidence of measurement sensitivity. In particular, the yearly and monthly coefficients have different signs in most emerging economies (Brazil, Chile, Mexico, Hungary, Poland, Turkey, and South Africa). While the yearly coefficients are positive in most cases, the monthly coefficients are negative in most cases. Therefore, monetary policy will likely counter or postpone short-run exchange rate movement during the post-crisis period. Moreover, the monthly coefficients are much greater than the yearly coefficients, implying that monetary policy still places a greater emphasis on the short-run movement of the exchange rate after the crisis. Further, there is consistency when using yearly or monthly changes in the exchange rate. This

means that the preferable response to the exchange rate is consistent in the short and long terms. This also implies that the interpretation of the exchange rate is not robust to the selection of the benchmark value.

Table 4

Effect of the exchange rate during the post-crisis period

Country	β_0	i_{t-1}	$(\pi_{t+k} - \pi_{t+k}^*)$	y_{t+m}	Δe_{t+n}	$\Delta e_{crisis,t+n}$
Brazil	0.091 (0.104)	0.983*** (0.009)	0.064*** (0.022)	0.094*** (0.013)	-0.026*** (0.006)	0.027*** (0.008)
Chile	0.138 (0.151)	0.967*** (0.045)	0.127*** (0.045)	0.036* (0.019)	-0.040** (0.018)	0.115*** (0.038)
Colombia	0.379*** (0.074)	0.921*** (0.015)	0.083*** (0.019)	0.032*** (0.012)	0.021* (0.011)	-0.030* (0.015)
Mexico	0.400*** (0.153)	0.911*** (0.028)	0.084 (0.069)	0.078*** (0.030)	-0.074** (0.037)	0.093** (0.046)
Hungary	0.052 (0.076)	0.974*** (0.024)	0.037* (0.022)	0.030 (0.025)	-0.030 (0.051)	0.022 (0.095)
Poland	0.293*** (0.089)	0.934*** (0.021)	0.079*** (0.022)	0.017** (0.009)	-0.014* (0.008)	0.027** (0.013)
Romania	-0.030 (0.130)	0.965*** (0.014)	0.304** (0.153)	0.009 (0.016)	0.016 (0.031)	-0.163* (0.085)
Turkey	0.093 (0.176)	0.961*** (0.009)	0.063*** (0.022)	0.030** (0.015)	-0.058*** (0.019)	0.033 (0.027)
Korea	0.019 (0.039)	0.995*** (0.011)	0.055*** (0.021)	0.009 (0.006)	-0.006 (0.006)	0.024*** (0.009)
Philippines	0.056 (0.038)	0.987*** (0.007)	0.023* (0.014)	-0.006 (0.004)	-0.014** (0.006)	0.023 (0.016)
Thailand	0.417** (0.205)	0.802*** (0.100)	0.073*** (0.024)	0.011* (0.006)	0.047* (0.027)	-0.087* (0.048)
South Africa	0.125* (0.071)	0.980*** (0.010)	0.016** (0.008)	0.058*** (0.012)	-0.011*** (0.003)	0.017** (0.007)

Source: Authors' calculation.

Notes: *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively. The standard deviations are shown in parentheses.

As the post-crisis coefficients of the exchange rate are statistically significant in most emerging economies, this has some implications. On the one hand, the exchange rate showed an increase in its importance in emerging economies after

the Great Crisis. A rise in the fear of floating is conditional on many factors, such as large and sudden changes in the exchange rate and the frequent occurrences of international shocks, such as a rise in crude oil or gold. A close look at the exchange rate is key for maintaining the stability of domestic economies. On the other hand, the fact that the exchange rate becomes more important also stems from the ineffectiveness of the other policies. As argued by *Montes and Ferreira (2020)*, although monetary policy credibility can reduce or prevent interventions by monetary authorities, its effect reduces after the crisis.

Table 5

Sensitivity of the post-crisis effect of the exchange rate

Country	Yearly change			Monthly change		
	NEER	REER	EX	NEER	REER	EX
Brazil	0.027*** (0.008)	0.053*** (0.015)	0.062*** (0.013)	-0.166** (0.074)	-0.158** (0.078)	-0.161*** (0.047)
Chile	0.115*** (0.038)	0.047* (0.027)	0.008 (0.013)	-0.126** (0.058)	-0.220** (0.088)	-0.211*** (0.063)
Colombia	-0.030* (0.015)	-0.064* (0.037)	-0.018* (0.011)	-0.197** (0.091)	-0.073* (0.041)	-0.108** (0.045)
Mexico	0.093** (0.046)	0.039* (0.022)	0.067* (0.038)	-0.192** (0.078)	-0.167** (0.084)	-0.152* (0.091)
Hungary	0.022 (0.095)	-0.058 (0.088)	0.059 (0.104)	-0.367* (0.215)	-0.517* (0.292)	-0.611* (0.319)
Poland	0.027** (0.013)	0.047*** (0.016)	0.035* (0.018)	-0.093 (0.091)	-0.065 (0.085)	-0.342** (0.159)
Romania	-0.163* (0.085)	-0.148** (0.066)	-0.096 (0.073)	-0.133 (0.278)	0.064 (0.466)	0.252 (0.289)
Turkey	0.033 (0.027)	0.008 (0.022)	0.031 (0.019)	-0.333* (0.184)	-0.355** (0.161)	-0.342** (0.137)
Korea	0.024*** (0.009)	0.021*** (0.005)	0.018*** (0.005)	0.036 (0.057)	-0.023 (0.117)	0.060** (0.027)
Philippines	0.023 (0.016)	-0.058** (0.023)	0.036*** (0.010)	0.222** (0.106)	-0.016 (0.127)	0.046 (0.054)
Thailand	-0.087* (0.048)	-0.096* (0.053)	0.024** (0.010)	-0.075* (0.044)	-0.104** (0.043)	-0.230*** (0.059)
South Africa	0.017** (0.007)	0.016** (0.008)	0.016*** (0.004)	-0.081** (0.034)	-0.112*** (0.038)	-0.075*** (0.025)

Source: Authors' calculation.

Notes: *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively. The standard deviations are shown in parentheses.

3.3 Fear of deprecation or depreciation

This section investigates asymmetry in the monetary policy response to exchange rate movements. As shown in Table 6, monetary authorities differently weigh appreciation and depreciation when making monetary policy decisions. Note that we only present the coefficient of the squared term of the exchange rate specified in Equation (5). First, the coefficients pertaining to yearly changes in REER are not significant and do not have the same signs in all countries. While it is positive and statistically significant in Brazil, Chile, the Philippines, and South Africa, it is negative and statistically significant in Mexico, Turkey, Korea, and Thailand. In other countries, this effect was not statistically significant. There are more negative and statistically significant cases concerning NEER and bilateral exchange rates.

Turning to monthly effects, there are even more statistically significant and negative coefficients, especially for the bilateral exchange rate. Moreover, the empirical results show that monthly coefficients are greater than yearly coefficients, suggesting the high relevance of the fear of appreciation in the short run. However, as the quantitative effect of yearly changes in the exchange rate is small and negligible, we can ignore them and conclude that the fear of appreciation does not emerge in the long run.

These findings have several important implications. First, emerging economies closely watch the short-run appreciation of the main currencies of international transactions. Obviously, the US dollar is the main currency for international transactions worldwide, especially in Asia, Latin America, and certain parts of Africa. For European countries, the euro is important because it is the official currency of the European Union. Consequently, the expected appreciation of these currencies requires an interest rate cut to maintain the economy's competitiveness. Second, the fear of appreciation may suggest that emerging economies still emphasise export as an important driver of economic growth and are concerned about the loss of competitiveness caused by appreciation. The evidence for fear of appreciation is in line with *Keefe and Shadmani (2018)*, but is in contrast with *Cermeño, Villagómez, and Polo (2012)*. The difference between our findings and those of *Cermeño, Villagómez, and Polo (2012)* can be attributed to changes in the exchange rate effects during the post-crisis period, which *Cermeño, Villagómez, and Polo (2012)* do not consider.

Table 6

Asymmetric response of interest rate to exchange rate changes

Country	Yearly change			Monthly change		
	NEER	REER	EX	NEER	REER	EX
Brazil	0.0005*** (0.0001)	0.0004*** (0.0002)	0.0002* (0.0001)	0.0108** (0.0046)	0.0078** (0.0034)	0.0220*** (0.0084)
Chile	0.0049** (0.0025)	0.0046* (0.0027)	-0.0010** (0.0004)	-0.0155* (0.0093)	-0.0348* (0.0202)	-0.0147* (0.0083)
Colombia	0.0001 (0.0001)	0.0001 (0.0002)	-0.0003** (0.0001)	-0.0127** (0.0054)	-0.0132** (0.0055)	-0.0057* (0.0030)
Mexico	-0.0010* (0.0006)	-0.0031* (0.0018)	0.0001 (0.0006)	-0.0105* (0.0056)	-0.0100* (0.0057)	-0.0098* (0.0055)
Hungary	-0.0005 (0.0022)	0.0007 (0.0024)	-0.0001 (0.0021)	0.0221** (0.0102)	0.0222** (0.0106)	0.0199* (0.0109)
Poland	-0.0017*** (0.0004)	-0.0010 (0.0008)	-0.0010** (0.0005)	0.0022 (0.0121)	-0.0217* (0.0124)	-0.0114* (0.0063)
Romania	-0.0042*** (0.0014)	0.0004 (0.0013)	-0.0023** (0.0011)	0.0932* (0.0497)	0.1226** (0.0550)	-0.0817* (0.0485)
Turkey	-0.0017** (0.0008)	-0.0015*** (0.0004)	-0.0010** (0.0004)	0.0092 (0.0131)	0.0141** (0.0071)	-0.0338** (0.0171)
Korea	-0.0002** (0.0001)	-0.0002* (0.0001)	-0.0003*** (0.0001)	-0.0068*** (0.0017)	-0.0072*** (0.0018)	-0.0062*** (0.0019)
Philippines	-0.0017** (0.0007)	0.0012** (0.0006)	-0.0008** (0.0004)	-0.0409*** (0.0110)	-0.0319** (0.0159)	-0.0253** (0.0118)
Thailand	-0.0011* (0.0006)	-0.0014*** (0.0005)	-0.0010*** (0.0003)	-0.0203** (0.0091)	-0.0200* (0.0106)	-0.0589* (0.0335)
South Africa	0.0002* (0.0001)	0.0002** (0.0001)	0.0001 (0.0001)	-0.0046* (0.0025)	-0.0050* (0.0026)	0.0002 (0.0009)

Source: Authors' calculation.

Notes: *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively. The standard deviations are shown in parentheses.

4. Conclusions

Although the literature on exchange rates is vast for advanced economies, empirical evidence is limited and mixed for emerging economies. This study used the GMM method to examine crucial questions about the exchange rate in 12 emerging economies that follow inflation targeting. First, does the exchange rate matter under inflation targeting? Second, the exchange rate plays a different role during the post-crisis period. Third, the fear of appreciation or depreciation is significant in emerging economies. Finally, are empirical results sensitive to short-run and long-run movements of various exchange rate indicators?

The empirical results provide evidence of the exchange rate in the reaction function of monetary policy in emerging economies that are inflation-targeting adopters. In particular, the fear of floating emerges in most emerging economies and is more pronounced during the post-crisis period. Moreover, there is strong evidence for the fear of appreciation, especially against the main currencies of international transactions, such as the US dollar or the euro. Finally, the measurement sensitivity analysis suggests that the fear of floating or appreciation emerges only with the short-run movement of the exchange rate.

Our findings have several important policy implications. First, the fear of appreciation is consistent with the continuous accumulation of international reserves in emerging economies as well as the dependence of these economies on exports. Moreover, the tolerance to depreciation forces monetary authorities to face difficulties in achieving the objective of price stability. Second, as the monthly deviation of the exchange rate has a stronger effect than the yearly deviation, the interest rate is likely to adjust more frequently. This can confuse market participants' expectations and increase uncertainty in the financial market. *Montes and Ferreira (2020)* suggested that monetary policy credibility could be a cure to ease the fear of floating. An increase in the credibility of monetary policy can lead to a reduction in the exchange rate pass-through (*Kabundi–Mlachila, 2019*), which causes a decrease in the exchange rate in the conduct of monetary policy. The reason is that the public expects less intervention by monetary authorities when the credibility of these policymakers is high (*Montes–Ferreira 2019, 2020*). However, notably, monetary policy credibility reduces its mitigating effect during the post-crisis period.

References

- Acosta Ormaechea, S. – Coble Fernandez, D. (2011): Monetary transmission in dollarized and non-dollarized economies: The cases of Chile, New Zealand, Peru and Uruguay. IMF Working Papers, International Monetary Fund, Washington
- Ahmad, A. H. – Pentecost, E. J. (2020), Testing the ‘fear of floating’ hypothesis: a statistical analysis for eight African countries. *Open Economies Review*, Vol. 31. No. 2. pp. 407–430.
- Aizenman, J. – Hutchison, M. – Noy, I. (2011): Inflation targeting and real exchange rates in emerging markets. *World Development*. Vol. 39. No. 5. pp. 712–724.
DOI: <https://doi.org/10.1016/j.worlddev.2010.11.005>
- Ball, L. (1999): Policy rules for open economies. In: J. B. Taylor (ed.): *Monetary Policy Rules*. University of Chicago Press, Chicago, pp. 127–144. DOI: <https://doi.org/10.3386/w6760>
- Bjørnland, H. C. – Halvorsen, J. I. (2014): How does monetary policy respond to exchange rate movements? New international evidence. *Oxford Bulletin of Economics and Statistics*, Vol. 76. No. 2. pp. 208–232.
- Calvo, G. A. – Reinhart, C. M. (2002): Fear of floating. *The Quarterly Journal of Economics*, Vol. 117. No. 2. pp. 379–408. DOI: <https://doi.org/10.1162/003355302753650274>
- Caporale, G. M. – Helmi, M. H. – Çatık, A. N. – Ali, F. M. – Akdeniz, C. (2018): Monetary policy rules in emerging countries: is there an augmented nonlinear Taylor rule? *Economic Modelling*. Vol. 72. pp. 306–319.
- Cermeño, R. – Villagómez, F. A. – Polo, J. O. (2012): Monetary Policy Rules In: A Small Open Economy: An Application to Mexico. *Journal of Applied Economics*. Vol. 5. No. 2. pp. 259–286.
- Civcir, I. – Akçağlayan, A. (2010): Inflation targeting and the exchange rate: Does it matter in Turkey? *Journal of Policy Modeling*. Vol. 32. No. 3. pp. 339–354.
- Clarida, R. – Galí, J. – Gertler, M. (1998): Monetary policy rules in practice: Some international evidence. *European Economic Review*. Vol. 42. No. 6. pp. 1033–1067.
DOI: [https://doi.org/10.1016/S0014-2921\(98\)00016-6](https://doi.org/10.1016/S0014-2921(98)00016-6)
- Debelle, G. (1999): *Inflation targeting and output stabilisation*. Reserve Bank of Australia, Sydney
- Demir, İ. (2014): Monetary policy responses to the exchange rate: Empirical evidence from the ECB. *Economic Modelling*. Vol. 39. pp. 63–70.
- Dybowski, T. P. – Hanisch, M. – Kempa, B. (2018): The role of the exchange rate in Canadian monetary policy: evidence from a TVP-BVAR model. *Empirical Economics*. Vol. 55. pp. 471–494.
- Edwards, S. – Cabezas, L. (2022), Exchange rate pass-through, monetary policy, and real exchange rates: Iceland and the 2008 crisis. *Open Economies Review*. pp. 1–34.
- Frömmel, M. – Garabedian, G. – Schobert, F. (2011): Monetary policy rules in Central and Eastern European Countries: Does the exchange rate matter? *Journal of Macroeconomics*. Vol. 33. No. 4. pp. 807–818.
- Furlani, L. G. C. – Portugal, M. S. – Laurini, M. P. (2010): Exchange rate movements and monetary policy in Brazil: Econometric and simulation evidence. *Economic Modelling*, Vol. 27. No. 1. pp. 284–295.

- Galimberti, J. K. – Moura, M. L. (2013): Taylor rules and exchange rate predictability in emerging economies. *Journal of International Money and Finance*. Vol. 32. pp. 1008–1031.
- Garcia, C. J. – Restrepo, J. E. – Roger, S. (2011): How much should inflation targeters care about the exchange rate? *Journal of International Money and Finance*. Vol. 30. No. 7. pp. 1590–1617.
- Georgiadis, G. – Zhu, F. (2021): Foreign-currency exposures and the financial channel of exchange rates: Eroding monetary policy autonomy in small open economies? *Journal of International Money and Finance*. Vol. 110, 102265.
- Ghosh, A. R. – Ostry, J. D. – Chamon, M. (2016): Two targets, two instruments: Monetary and exchange rate policies in emerging market economies. *Journal of International Money and Finance*. Vol. 60. No. 2. pp. 172–196.
- Granville, B. – Mallick, S. (2010): Monetary Policy in Russia: Identifying exchange rate shocks. *Economic Modelling*. Vol. 27. No. 1. 432–444.
- Gürkaynak, R. S. – Kara, A. H. – Kısacıkoglu, B. – Lee, S. S. (2021): Monetary policy surprises and exchange rate behavior. *Journal of International Economics*. Vol. 130, 103443.
- Hammermann, F. (2005). Do exchange rates matter in inflation targeting regimes? Evidence from a VAR analysis for Poland and Chile. *Monetary policy and macroeconomic stabilization in Latin America*. Springer. pp. 115–148.
- Kabundi, A. – Mlachila, M. (2019): The role of monetary policy credibility in explaining the decline in exchange rate pass-through in South Africa. *Economic Modelling*. Vol. 79. pp. 173–185.
- Keefe, H. G. – Rengifo, E. W. (2015): Options and central bank currency market intervention: The case of Colombia. *Emerging Markets Review*. Vol. 23. pp. 1–25.
DOI: <https://doi.org/10.1016/j.ememar.2015.04.011>
- Keefe, H. G. – Shadmani, H. (2018): Foreign exchange market intervention and asymmetric preferences. *Emerging Markets Review*. Vol. 37. pp. 148–163.
- Kim, S. – Kim, S. H. – Wang, Y. (2009): Fear of floating in East Asia? *Pacific Economic Review*. Vol. 14. No. 2. pp. 176–193.
- Levy-Yeyati, E. – Sturzenegger, F. (2007): Fear of appreciation. *Policy Research Working Papers*. World Bank, Washington, DC
- Lueangwilai, K. (2012): Monetary policy rules and exchange rate uncertainty: A structural investigation in Thailand. *Procedia Economics and Finance*. Vol. 2. pp. 325–334.
- Menkhoff, L. (2013): Foreign exchange intervention in emerging markets: a survey of empirical studies. *The World Economy*. Vol. 36. No. 9. pp. 1187–1208.
- Minella, A. – De Freitas, P. S. – Goldfajn, I. – Muinhos, M. K. (2003): Inflation targeting in Brazil: constructing credibility under exchange rate volatility. *Journal of International Money and Finance*. Vol. 22. No. 7. pp. 1015–1040. DOI: <https://doi.org/10.1016/j.jimonfin.2003.09.008>
- Mohanty, M. S. – Berger, B.-E. (2013): Central bank views on foreign exchange intervention. *BIS Paper* No. 73.
- Mohanty, M. S. – Klau, M. (2005): Monetary policy rules in emerging market economies: issues and evidence. In R. J. Langhammer & L. V. d. Souza (Eds.), *Monetary Policy and Macroeconomic Stabilization in Latin America*. Springer. pp. 205–245.
- Montes, G. C. – Ferreira, C. F. (2019): Effect of monetary policy credibility on the fear of floating: evidence from Brazil. *Journal of Policy Modeling*. Vol. 41. No. 5. pp. 981–1004.

- Montes, G. C. – Ferreira, C. F. (2020): Does monetary policy credibility mitigate the fear of floating? *Economic Modelling*. Vol. 84. pp. 76–87.
- Montoro, C. – Moreno, R. (2011): The use of reserve requirements as a policy instrument in Latin America. *BIS Quarterly Review*.
- Newey, W. K. – West, K. D. (1994): Automatic lag selection in covariance matrix estimation. *The Review of Economic Studies*. Vol. 61. No. 4. pp. 631–653. DOI: <https://doi.org/10.2307/2297912>
- Paez-Farrell, J. (2007): Understanding monetary policy in Central European countries using Taylor-type rules: the case of the Visegrad four. *Economics Bulletin*. Vol. 5. No. 3. pp. 1–11.
- Peters, A. C. (2016): Monetary policy, exchange rate targeting and fear of floating in emerging market economies. *International Economics and Economic Policy*. Vol. 13. No. 2. pp. 255–281.
- Pontines, V. – Siregar, R. Y. (2012): Fear of appreciation in East and Southeast Asia: the role of the Chinese renminbi. *Journal of Asian Economics*. Vol. 23. No. 4. pp. 324–334.
- Sánchez-Fung, J. R. (2011): Estimating monetary policy reaction functions for emerging market economies: The case of Brazil. *Economic Modelling*. Vol. 28. No. 4. pp. 1730–1738. DOI: <https://doi.org/10.1016/j.econmod.2011.03.007>
- Shrestha, P. K. – Semmler, W. (2015): Monetary policy and international reserves in emerging economies: theory and empirics. *Emerging Markets and Sovereign Risk*. Springer. pp. 213–230.
- Stone, M. M. R. – Nordstrom, A. – Roger, M. S. – Shimizu, S. – Kisinbay, T. – Restrepo, J. (2009): *The Role of the Exchange Rate in Inflation: Targeting Emerging Economies*. International Monetary Fund. Washington, DC.
- Taylor, J. B. (1993): Discretion versus policy rules in practice. *Carnegie-Rochester conference series on public policy*. Vol. 39. No. 12. pp. 195–214. DOI: [https://doi.org/10.1016/0167-2231\(93\)90009-L](https://doi.org/10.1016/0167-2231(93)90009-L)
- Taylor, J. B. (2000): The monetary transmission mechanism and the evaluation of monetary policy rules. Santiago: Central Bank of Chile.
- Torres, A. (2003): Monetary policy and interest rates: evidence from Mexico. *The North American Journal of Economics and Finance*. Vol. 14. No. 3. pp. 357–379.
- Wollmershäuser, T. (2006): Should central banks react to exchange rate movements? An analysis of the robustness of simple policy rules under exchange rate uncertainty. *Journal of Macroeconomics*. Vol. 28. No. 3. pp. 493–519.
- Yilmazkuday, H. (2007): Inflation targeting supported by managed exchange rate. *Applied Economics*. Vol. 39. No. 16. pp. 2011–2026. DOI: <https://doi.org/10.1080/00036840600707068>
- Yilmazkuday, H. (2008): Structural breaks in monetary policy rules: Evidence from transition countries. *Emerging Markets Finance and Trade*. Vol. 44. No. 6. pp. 87–97.