

# Exchange rate dynamics of emerging and developing economies: Not all capital flows are alike

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## Abstract

The increasing cross-border capital flows have raised the question of whether capital inflows and outflows have different impacts on exchange rates in emerging markets than they do in developed markets and economies. To explore the potential heterogeneity in the impacts that can arise from the different types and directions of capital flows, we classify them according to whether they involve foreign direct investment (FDI) or foreign portfolio investment (FPI) and examine these inflows and outflows separately. The characteristics of these different types of capital flows and their effects on the real exchange rate in both advanced and emerging markets during 2002–2017 are investigated using a set of estimation approaches. To capture the relationship between real exchange rates and capital flows while controlling for other variables, a dynamic panel data model is utilized for the dataset covering emerging countries. Key findings suggest that the composition of capital flows determines the impact of those flows on real exchange rates, whereby FPI brings a faster appreciation of the real exchange rate than FDI and capital outflows bring a sharper degree of exchange rate adjustment than capital inflows. F20F30.

## KEYWORDS

capital flows, exchange rate volatility, FDI, FPI, institutions, trade openness

## 1 | INTRODUCTION

The relationship between capital flows and exchange rate dynamics remains an interesting and debatable issue that has multifaceted implications for the economic and financial stability of underlying economies. The relationship of capital flows to exchange rates raises various questions; one of the most crucial but underexplored issues is the heterogeneity in the impact of inflows and outflows. Furthermore, whether various forms of capital flows, such as FDI and foreign portfolio investment (FPI)

have different impacts on real exchange rates (RERs) and exchange rate uncertainty, manifested in the exchange rate volatility, has yet to be determined. Theoretically, the inflows and outflows of capital in an economy shall have crucial implications for the interest rates and exchange rates of the domestic currency in light of interest rate parity. But the heterogeneity in the impact merits further research. Also, the increased magnitude of capital flows in emerging and developing economies has been the subject of many empirical investigations seeking to find the determinants of RERs and capital flows (del

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Castillo, 2002, Tchorek et al., 2017, Hannan, 2018, Shahbaz et al., 2021). The nexus between direct investment, portfolio investment and exchange rates have been investigated at length but mostly focusing on the advanced economies, neglecting the emerging and developing economies. Most importantly, the difference between the impacts of FDI and FPI is vital to account for but has often been ignored. This article contributes to the existing body of knowledge and addresses these research gaps in the literature by separately evaluating the impact of FDI and FPI on RERs as well as by taking into the dimension of exchange rate volatility in emerging and developing economies.

Financial development is often considered vital for economic growth (Nasir et al., 2015, Shahbaz et al. 2022), and capital flows and capital flights are vital for emerging economies in particular due to the need for investment (see Shahbaz et al., 2021). Capital inflows are expected to support the value of a domestic currency, whereas outflows are expected to have a negative impact. However, these effects will partly depend on how the markets perceive the impact of capital flows (Lartey, 2017). Similarly, Mallick and Moore (2008) showed that capital flows lead to economic growth in middle-income countries but not in low-income countries suggesting capital misallocation in the latter. In a more recent study, Nemlioglu and Mallick (2020) have reported positive effects of capital flows in the G7 but not in the non-G7 economies. They associated the contrast in the results with the differences in intellectual capital and institutional quality. Therefore, certain questions need to be answered which also is the aim of this treatise. For instance, does the composition of capital flows correlate with RERs? Do the effects of FPI and FDI on RERs differ in magnitude between emerging and developing countries and advanced economies? In this article, we investigate the effects of FDI and FPI on the exchange rate in 156 countries (emerging and developing economies as well as advanced economies) over the period 2002–2017 by employing a set of estimation approaches including ordinary least squares (OLS), a fixed-effects model (FEM) and a random effects model (REM) and to capture the endogeneity and heteroskedasticity, we also employed first difference GMM and system GMM. We also measure the effect of exchange rate volatility on FDI. Our key findings suggest that not all capital flows are alike. Specifically, the composition of capital flows determines their overall impact on RER dynamics: FPI brings faster RER appreciation than FDI and capital outflows bring a different degree of exchange rate adjustment than capital inflows. These findings have profound policy implications and contribute to the literature in various ways. First, we investigate FDI, FPI, the real effective exchange rate (REER) and other factors in

156 countries. Second, the impacts of capital flows are separately evaluated for advanced economies and for emerging and developing economies. Third, we measure the effects of exchange rate volatility on FDI and the effects of FDI on exchange rate volatility in emerging and developing economies.

This article is divided into sections as follows. A review of the literature on the factors affecting RERs, FDI and exchange rate volatility is presented in Section 2. The dataset, research methodology and empirical models are presented in Section 3. The results are discussed in Section 4, and Section 5 concludes the article with the policy implications of the study's findings.

## 2 | LITERATURE REVIEW

### 2.1 | Impacts of capital flows on the real exchange rate

The nexus between capital flows (both FDI and FPI) and RERs in various regions have been explored. The literature suggests that the RER is affected by various factors (Baffes et al., 1999; Edwards, 1989; Hinkle & Monteil, 1999). The RERs and capital inflows are negatively correlated, and the effects on RERs of capital outflows and inflows do not parallel each other; moreover, the effects more specifically of FDI and FPI differ. Athukorala and Rajapatirana (2003) have argued that FPI inflows and bank loans have a stronger effect on RER than FDI inflows. The stability of FDI is higher than FPI, and RER is more sensitive to FPI than FDI. There is also evidence that suggests that FDI in the form of inflows and outflows can have different effects on the exchange rate and the appreciation of the RER is promoted by government expenditure (Jongwanich & Kohpaiboon, 2013). Focusing on the developing economies, Lartey (2017) reported that a surge in FDI inflow leads to a reduction in the tradable-nontradable ratio while RER depreciation leads to an increase in the tradable-nontradable ratio; both effects were more pronounced with greater degrees of financial openness. This implies that the non-tradable sector grows with an increasing inflow of FDI because the latter leads to RER appreciation, contingent on a high degree of financial openness. While capital flows are important for economic growth and investment, it is often considered crucial to have effective capital flow management policies in emerging markets (Hwang et al., 2018).

In a study focusing on productivity, Obstfeld et al. (1996) reported that productivity growth in goods and services of a country versus partners negatively affects the RER. Moreover, empirical evidence also indicates

that in developing countries, trade openness can lead to the appreciation of RER because of the income effect (Baffes et al., 1999; Elbadawi, 1994). The demand for goods and services and trade openness are positively related.

## 2.2 | Impacts of exchange rate volatility on FDI

Exchange rate dynamics can have implications for the foreign investors' prospects of profitability and hence their intentions to invest are influenced by the volatility of the exchange rate. Therefore, exchange rate dynamics can have significant implications for foreign investment, particularly in emerging economies (Ma & Du, 2022). A number of studies have reported a negative effect of exchange rate volatility on FDI. For instance, looking at data from Japan, Kiyota and Urata (2004) reported that the appreciation of the exchange rate between the currencies of the host country and the home country reduces FDI inflows, while lower volatility of the exchange rate encourages FDI inflows. Their results support the notion that policymakers should ensure exchange rate stability to attract more FDI. In another study on Japanese FDI to China and ASEAN-4 (Indonesia, Malaysia, the Philippines and Thailand) economies by Xing and Wan (2006), it was found that the exchange rate is a significant determinant of the FDI. Chen et al. (2020) analysed the effect of economic policy uncertainty (EPU) on exchange rate volatility in various business sectors. They showed that EPU has a significant and positive effect on exchange rate volatility in China, the US, Europe and Japan. Examining the effect of exchange rate volatility on FDI, Sharifi-Renani and Mirfatah (2012) showed that there is a negative relationship. Furthermore, they also reported that other macroeconomic variables such as GDP and trade openness have positive effects, while the oil price has a negative effect on FDI. Hence, it was argued that in order to attract FDI, policymakers should reduce the volatility of the exchange rate.

A number of studies have only focused on a single country. For instance, Kyereboah-Coleman and Agyire-Tettey (2008) reported that in Ghana RER volatility impacts FDI inflow negatively while FDI is increased due to political factors. Moraghen et al. (2020), analysed the impact of exchange rate and exchange rate volatility FDI in on Mauritius, they reported that the exchange rate and exchange rate volatility have negligible impact on FDI inflow in the short run, a real depreciation has been beneficial over the long term in enhancing FDI inflow. Pozo (2001), in a study on the USA, found that FDI increases if exchange rate uncertainty decreases in the short run

when using a conditional measure of exchange rate volatility. In a study on Pakistan, Ullah et al. (2012) reported that FDI was negatively associated with the appreciation of the Pakistani rupee and was also influenced by exchange rate volatility; furthermore, according to the Granger causality test, it was the exchange rate volatility that affected FDI, rather than FDI affecting exchange rate volatility. In a study on Germany, Buch and Kleinert (2008) argued that changes in the exchange rate can have implications for FDI and trade.

There is also a strand of literature that focuses on multiple countries. For instance, Cavallari and d'Addona (2013) employed bilateral data on the FDI inflows of 24 OECD economies from 1985 to 2007 and found that exchange rate volatility significantly impacts FDI. It led them to argue that, to promote FDI, policymakers should reduce exchange rate volatility. Chowdhury and Wheeler (2008) analysed data from the United States, Canada, and Japan and found that exchange rate volatility significantly affects FDI in the long term. Ramirez (2010) provided evidence on Latin America and reported that lagged changes in RER volatility have a negative effect on FDI. Saini and Singhania (2018) investigated FDI determinants in a dataset of 20 countries. The results varied among different groups of countries: in developed countries, FDI determinants were found to be policy-related, whereas in developing countries FDI was positively related to economic determinants. Similarly, Solomon and Ruiz (2012) investigated the determinants of FDI in Latin American, African, and Asian economies and discovered that exchange rate volatility and political risk reduce the FDI, but the magnitude of those impacts depends on the continent and was higher for Africa.

Crowley and Lee (2003) found a threshold in the relationship between exchange rate volatility and FDI: the relationship was weak when exchange rate volatility was moderate but strong when volatility was extremely high. MacDermott (2008), using a gravity model, reported that lower exchange rate volatility encourages FDI flows. Moreover, Caporale et al. (2017) measured the effects of FPI on exchange rate volatility in seven countries in Asia and reported that higher FPI causes higher exchange rate volatility. They concluded that, in order to reduce exchange rate volatility, governments should control capital flows. While their findings are intriguing and manifest the importance of capital flows, it is crucial to account for the heterogeneity in the impact of inflows and outflows. Furthermore, whether various forms of capital flows, such as FDI and FPI have different impacts on real exchange rates (RERs) and exchange rate uncertainty, manifested in the exchange rate volatility, has yet to be determined. The increased magnitude of capital

flows in emerging and developing economies requires investigations seeking to find the determinants of RERs and capital flows. The overview of the literature in this section clearly shows that the nexus between direct investment, portfolio investment and exchange rate have been investigated at length but mostly focusing on the advanced economies and neglecting the emerging and developing economies. Most importantly, the difference between the impacts of FDI and FPI is vital to account for but has often been ignored. This article contributes to the existing body of knowledge and addresses these research gaps in the literature by separately evaluating the impact of FDI and FPI on RERs as well as by taking into the dimension of exchange rate volatility in emerging and developing economies.

### 3 | RESEARCH METHODOLOGY

#### 3.1 | Data

In this study, we draw on a large dataset covering 156 countries (emerging and developing economies as well as advanced economies). Using dynamic unbalanced panel data from 2002 to 2017, we collect observations on various flows of investment such as FDI and FPI in aggregate form for these countries. Other macroeconomic variables, namely economic growth, trade and money supply, are collected from World Bank World Development Indicators, and institutional quality is added to the data from World Governance Indicators. Exchange rates are analysed in the form of REERs collected from the World Bank, while exchange rate volatility is calculated from the Thomson Reuters dataset of daily exchange rates. The exchange rate volatility is calculated by the yearly standard deviation of the logarithmic daily returns of the exchange rate.

Table 1 defines the variables and lists sources of data (selected on the basis of availability and reliability). Because we are examining large-scale national economies, most variables are relative to GDP.

#### 3.2 | Models

For model specification, we draw on the work of Athukorala and Rajapatirana (2003) and Jongwanich and Kohpaiboon (2013). Specifically, the dependent variable is the REER and independent variables are government expenditure, FDI, FPI, trade openness, GDP growth and broad money. To measure the effect of capital flows on REER, this article employs the following models:

TABLE 1 Summary description of the data and sources

Variable	Definitions	Sources
FDI	FDI net inflows (%GDP)	WDI
FPI	FPI net (%GDP)	WDI
Exchange	Exchange rate volatility	Thomson Reuters
REER	REER	WDI
govexpen	Government expenditure (%GDP)	WDI
growth	GDP growth rate (%)	WDI
trade	Trade openness (%GDP)	WDI
broadm	Broad money (M2) (%GDP)	WDI
GFCF	Gross fixed capital formation (Domestic Investment)	WDI
Institution	Institutional quality	WGI

Source: The World Bank, IMF.

$$REER_{i,t} = \alpha_{i,t} + \beta_{i,t}FDI_{i,t} + \gamma_{i,t}broadm_{i,t} + \delta_{i,t}govexpen_{i,t} + \theta_{i,t}trade + \vartheta_{i,t}growth_{i,t} + \mu_{i,t}institution_{i,t} + \varepsilon_{i,t}, \quad (1)$$

$$REER_{i,t} = \alpha'_{i,t} + \beta'_{i,t}FPI_{i,t} + \gamma'_{i,t}broadm_{i,t} + \delta'_{i,t}govexpen_{i,t} + \theta'_{i,t}trade + \vartheta'_{i,t}growth_{i,t} + \mu'_{i,t}institution_{i,t} + \varepsilon'_{i,t}, \quad (2)$$

where  $REER_{i,t}$  denotes the real effective exchange rate of country  $i$  at time  $t$ ,  $FDI_{i,t}$  is the FDI net inflows in year  $t$  for country  $i$ ,  $FPI_{i,t}$  is the FPI net in year  $t$  for country  $i$ ,  $broadm_{i,t}$  is the broad money in year  $t$  for country  $i$ ,  $govexpen_{i,t}$  is the government expenditure in year  $t$  for country  $i$ ,  $trade_{i,t}$  is the trade openness in year  $t$  for country  $i$ ,  $growth_{i,t}$  is the GDP growth in year  $t$  for country  $i$ ,  $institution_{i,t}$  is the institutional quality in year  $t$  for country  $i$ , and  $\varepsilon_{i,t}$  is the error term.

To measure the impact of exchange rate volatility on FDI inflows, this article employs the following models:

$$FDI_{i,t} = \alpha''_{i,t} + \beta''_{i,t}exchange_{i,t} + \gamma''_{i,t}broadm_{i,t} + \delta''_{i,t}govexpen_{i,t} + \theta''_{i,t}trade + \vartheta''_{i,t}growth_{i,t} + \mu''_{i,t}institution_{i,t} + \varepsilon''_{i,t}, \quad (3)$$

$$FPI_{i,t} = \alpha''_{i,t} + \beta''_{i,t}exchange_{i,t} + \gamma''_{i,t}broadm_{i,t} + \delta''_{i,t}govexpen_{i,t} + \theta''_{i,t}trade + \vartheta''_{i,t}growth_{i,t} + \mu''_{i,t}institution_{i,t} + \varepsilon''_{i,t}, \quad (4)$$

where  $FDI_{i,t}$  again denotes the FDI net inflows in year  $t$  for country  $i$  and  $exchange_{i,t}$  is the exchange rate volatility in year  $t$  for country  $i$ , while the other parameters are as above.

Similarly, the following models are used to investigate the effect of FDI and FPI on exchange rate volatility:

$$\begin{aligned} \text{exchange}_{i,t} = & \alpha_{i,t} + \beta_{i,t} \text{FDI}_{i,t} + \gamma_{i,t} \text{broadm}_{i,t} + \delta_{i,t} \text{govexpen}_{i,t} \\ & + \theta_{i,t} \text{trade} + \vartheta_{i,t} \text{growth}_{i,t} + \mu_{i,t} \text{institution}_{i,t} \\ & + \varepsilon_{i,t}, \end{aligned} \quad (5)$$

$$\begin{aligned} \text{exchange}_{i,t} = & \alpha'_{i,t} + \beta'_{i,t} \text{FPI}_{i,t} + \gamma'_{i,t} \text{broadm}_{i,t} \\ & + \delta'_{i,t} \text{govexpen}_{i,t} + \theta'_{i,t} \text{trade} + \vartheta'_{i,t} \text{growth}_{i,t} \\ & + \mu'_{i,t} \text{institution}_{i,t} + \varepsilon'_{i,t}, \end{aligned} \quad (6)$$

where once again,  $\text{exchange}_{i,t}$  denotes the exchange rate volatility in year  $t$  at country  $i$ ;  $\text{FDI}_{i,t}$  is the FDI net inflows in year  $t$  at country  $i$ ,  $\text{FPI}_{i,t}$  is the FPI net in year  $t$  at country  $i$ ,  $\text{broad}_{i,t}$  is the broad money in year  $t$  at country  $i$ ,  $\text{govexpen}_{i,t}$  is the government expenditure in year  $t$  at country  $i$ ,  $\text{trade}_{i,t}$  is the trade openness in year  $t$  at country  $i$ ,  $\text{growth}_{i,t}$  is the GDP growth in year  $t$  at country  $i$ ,  $\text{institution}_{i,t}$  is the institutional quality in year  $t$  at country  $i$ , and  $\varepsilon_{i,t}$  is the error term.

### 3.3 | Estimation methods

To measure the relationship between REER, exchange rate volatility and capital flows (FDI and FPI) and other variables, we use panel regression. For inclusivity, we employ a set of estimation approaches: OLS, a FEM and a REM; and to capture the endogeneity and heteroskedasticity, we also employed first difference GMM and system GMM (for discussion on endogeneity and use of the GMM approach, see Ullah et al., 2018, 2021).

## 4 | RESULTS AND DISCUSSION OF RESULTS

The initial dataset contained 265 countries and regions. After we had matched the main dependent variables of FDI inflows, FPI (inflows and outflows), GDP, and REER to exchange rate volatility and eliminated the missing observations, we were left with 156 countries in our final sample for further estimations.

Table 2 represents the summary descriptive statistics for the variables, both for the full sample and for two sub-groups, of advanced economies and emerging markets. There are five main points to note. First, our dataset can be categorized as unbalanced panel data. Second, the advanced countries have much higher levels of FDI inflow but lower levels of FPI, whereas the developing

and emerging economies managed to attract FPI inflow. Third, while exchange rate volatility had the same mean level for the two sub-groups, the emerging markets recorded the maximum value (0.59), while in advanced economies the maximum value was 0.03. Fourth, by way of a robustness check, the advanced economies exhibit an average negative value for FPI/GDP of  $-2.66$ , and indeed the developed markets did move their capital to other places through FPI over the study period. Finally, the values of the other control variables fall within a realistic range, which enhances the reliability of the variables.

Table 3 shows the correlations between variables. The highest positive value is 0.4766, between institutional quality and money supply, and the lowest is 0.0110, between government expenditure and exchange rate volatility. The highest negative value is  $-0.1201$ , between money supply and exchange rate, and the lowest negative value is  $-0.0106$ , between exchange rate and FDI inflows.

Table 4 details the results of three regressions: the first difference GMM for the full sample, for advanced economies, and for emerging and developing economies (columns 1–3, respectively). The impact of FPI on REER is positive and statistically significant for the full sample and for the advanced economies but is not significant for the emerging and developing economies. FPI net inflows for advanced countries provide more capital to their domestic markets and make their domestic currencies appreciate, and this increase in REER promotes the trading capabilities of these countries. This is in line with the Athukorala and Rajapatirana's (2003) argument on the impact of FPI on exchange rate. However, for the emerging and developing countries, the situation is not so clear, because it depends on the quality of institutions in these countries.

The impact of the GDP growth rate on the exchange rate is found to be positive, which supports the idea that development leads to REER appreciation. Institutional quality also plays an important role in promoting REER appreciation; in other words, higher (lower) quality of institutions induces higher (lower) trading capabilities in advanced as well as in emerging and developing economies.

The results of the same set of regressions for FDI inflows are reported in Table 5. FDI net inflows have a positive impact on REER in all three estimations but are significant at the 1% level only in the full sample. This means that we have no strong evidence of the impact of FDI net inflows on REER. Seeing these results in the context of studies by Athukorala and Rajapatirana (2003) and Jongwanich and Kohpaiboon (2013), it is prima facie evident that the impact of capital inflows needs to be seen in a specific context. All the capital flows are not alike and hence, although FDI impact is non-negligible,

TABLE 2 Summary of descriptive statistics

Variable	Observations	Mean	Std. dev.	Min	Max
<i>Panel A: Full sample (156 countries)</i>					
FDI	2492	6.07	17.68	−58.32	451.72
FPI	2111	−0.36	23.95	−595.80	232.68
exchange	1919	0.01	0.02	0.00	0.59
REER	1472	99.79	13.55	56.51	190.49
govexpen	2293	15.59	5.38	0.95	47.19
trade	2403	90.31	55.70	0.17	442.62
broadm	2147	60.80	46.37	2.92	395.72
GFCF	2284	24.15	7.91	1.53	69.53
Institution	2496	0.02	0.89	−1.99	1.97
<i>Panel B: Emerging and developing economies (127 countries)</i>					
FDI	2028	4.78	6.78	−37.15	103.34
FPI	1653	0.28	6.75	−80.34	105.20
exchange	1679	0.01	0.02	0.00	0.59
REER	1008	99.00	14.43	56.51	190.49
govexpen	1829	14.69	5.26	0.95	47.19
trade	1939	84.19	37.03	0.17	311.35
broadm	1919	53.71	36.68	2.92	289.36
GFCF	1820	24.59	8.57	1.53	69.53
Institution	2032	−0.29	0.66	−1.99	1.32
<i>Panel C: Advanced economies (29 countries)</i>					
FDI	464	11.70	37.96	−58.32	451.72
FPI	458	−2.66	49.76	−595.80	232.68
exchange	240	0.01	0.00	0.00	0.03
REER	464	101.52	11.23	69.40	157.30
govexpen	464	19.12	4.28	8.42	27.94
trade	464	115.86	97.71	20.69	442.62
broadm	228	120.50	70.35	46.24	395.72
GFCF	464	22.45	3.99	10.22	37.41
Institution	464	1.36	0.40	0.16	1.97

Note: Our sample covers the period from 2002 to 2017.

Source: Authors' calculations.

Abbreviation: SD, standard deviation.

there are other factors that may also have an even stronger influence. Theoretically, seeing it through the lens of interest rates parity and the International Fisher effect, the FDI may not always be very influential in significantly influencing the exchange rates through these channels. Again, GDP growth and institutional quality have positive and significant effects on REER. Higher GDP growth and higher quality of institutions induce higher trading capabilities in advanced as well as in emerging and developing economies.

Table 6 presents the results of two further regressions for the full sample: regression (7) measures the

impact of FDI inflows on exchange rate volatility, and regression (8) measures the impact of FDI on exchange rate volatility. While FDI inflows have a positive and significant impact on exchange rate volatility, FPI has no effect. The former result is consistent with the findings of Caporale et al. (2017) and the notion that capital flows induce exchange rate volatility. But the present study shows that this effect depends on the type of flows considered: our empirical evidence shows that FDI in the full sample plays a significant role in promoting exchange rate volatility while FPI does not.

**TABLE 3** Correlations analysis

	FDI	FPI	Exchange	REER	Govexpen	Trade	Broadm	GFCF	Institution
FDI	1								
fpi	0.0723*	1							
exchange	-0.0106	-0.0308	1						
reer	0.0147	0.0119	-0.0709*	1					
govexpen	0.0285	-0.0068	0.0110	-0.0831*	1				
trade	0.3432*	-0.1051*	-0.0325	0.0292	0.0925*	1			
broadm	0.1907*	0.1145*	-0.1201*	0.1033*	0.0913*	0.3822*	1		
gfcf	0.0329	0.0083	-0.0942*	-0.0266	0.0024	0.0667*	0.1122*	1	
institution	0.1304*	-0.0571*	-0.0802*	0.0091	0.4095*	0.3092*	0.4766*	-0.023	1

Source: Authors' calculations.

\*Significant at the 5% level.

**TABLE 4** Impact of FPI on REER

REER	(1)	(2)	(3)
L.reer	0.485*** [12.770]	0.732*** [16.185]	0.538*** [12.552]
fpi	0.119*** [3.393]	0.169*** [4.048]	0.055 [0.845]
growth	0.226*** [3.257]	0.428** [2.290]	0.158** [2.051]
broadm	-0.070*** [-2.621]	-0.007 [-0.267]	-0.059 [-1.441]
govexpen	0.320* [1.777]	-0.429 [-0.715]	0.142 [0.760]
institution	8.078** [2.460]	15.301** [2.012]	8.593** [2.352]
Constant	48.504*** [10.119]	13.114 [0.847]	47.304*** [8.446]
Observations	806	197	609
Number of countries	64	15	49

Source: Authors' calculations.

\*Significance at the 10% level (numbers in brackets are t-stat.).

\*\*Significance at the 5% level (numbers in brackets are t-stat.).

\*\*\*Significance at the 1% levels (numbers in brackets are t-stat.).

**TABLE 5** Impact of FDI inflows on REER

REER	(4)	(5)	(6)
L.reer	0.473*** [13.489]	0.720*** [15.260]	0.514*** [13.937]
Fdi	0.078* [1.752]	-0.051 [-0.581]	0.077 [1.477]
Growth	0.107* [1.827]	0.516*** [2.639]	0.055 [0.880]
Broadm	-0.022 [-0.882]	-0.002 [-0.078]	0.054 [1.525]
Govexpen	0.201 [1.284]	-0.524 [-0.810]	-0.023 [-0.143]
Institution	5.117* [1.735]	11.955 [1.500]	5.506* [1.764]
Constant	49.536*** [11.529]	20.691 [1.287]	46.417*** [9.653]
Observations	916	197	719
Number of countries	70	15	55

Source: Authors' calculations.

\*Significance at the 10% level (numbers in brackets are t-stat.).

\*\*Significance at the 5% level (numbers in brackets are t-stat.).

\*\*\*Significance at the 1% level (numbers in brackets are t-stat.).

Broad money (M2) has a positive and significant effect on exchange rate volatility because a change in money supply implemented by a central bank causes a change in the

value of a domestic currency, and this makes the exchange rate more volatile. Trade openness, GDP growth, and institutional quality have negative and significant impacts on

TABLE 6 Capital flows and exchange rate volatility

Exchange	(7)	(8)
L.exchange	0.666*** [2077]	0.286*** [10.575]
L.fdi	0.000*** [50.479]	
L.fpi		-0.000 [-0.271]
L.broadm	0.000*** [11.589]	-0.000*** [-3.716]
L.gfcf	-0.000*** [-118.821]	0.000 [1.504]
L.trade	-0.000*** [-36.614]	-0.000 [-0.138]
L.growth	-0.000*** [-170.514]	-0.000*** [-3.466]
L.institution	-0.001*** [-39.030]	
Constant	0.004*** [120.115]	0.004*** [8.860]
Observations	1568	1378
Number of countries	123	113

Source: Authors' calculations.

\*Significance at the 10% level (numbers in brackets are t-stat.).

\*\*Significance at the 5% level (numbers in brackets are t-stat.).

\*\*\*Significance at the 1% level (numbers in brackets are t-stat.).

TABLE 7 Exchange rate volatility, FDI inflows and FPI

	(9) FDI	(10) FPI
L.FDI	0.488*** [86.372]	
L.FPI		0.156*** [-24.483]
L.Exchange	-6.142*** [-14.232]	-1.940*** [-10.177]
L.Gfcf	-0.028*** [-4.661]	-0.223*** [-3.595]
L.Trade	0.029*** [18.893]	0.028*** [3.798]
L.Growth	0.155*** [20.394]	0.165** [-2.290]
L.Institution	0.046 [0.607]	-1.201 [-1.886]
Constant	-0.094 [-0.505]	0.150*** [8.033]
Observations	1645	1416
Number of countries	127	115

Source: Authors' calculations.

\*Significant at the 10% level (numbers in brackets are t-stat.).

\*\*Significant at the 5% level (numbers in brackets are t-stat.).

\*\*\*Significant at the 1% level (numbers in brackets are t-stat.).

exchange rate volatility because a better national economic situation will reduce the volatility of the exchange rate.

We also employ system GMM and the results for the full sample are presented in Table 7. Similar to other studies, trade openness and GDP growth have a positive and significant impact on FDI and FPI, while exchange rate volatility discourages FDI and FPI, as manifested in the negative impact. This implies that in order to attract more FDI, policymakers should reduce the economic uncertainties, such as reducing the volatility of the exchange rate, to promote more capital flows from the

rest of the world to their countries, together with a better and more stable macroeconomic environment.

## 5 | CONCLUSION AND POLICY IMPLICATIONS

Countries are always eager to attract FDI to boost their domestic economic growth and development. In this regard, the exchange rate is an important determinant and also a cause of concern for domestic but most importantly for foreign investors. The dynamic of the exchange rate has profound implications for the prospect of profitability for any foreign investors. The financial markets and institutions can provide hedging services and instruments, but they do not come cheap. Concomitantly, exchange rate volatility plays an important role in discouraging FDI in emerging and developing countries. Nevertheless, the composition of the investment matters; that is, FPI and FDI differently affect REERs in the host countries. Employing a large dataset and various empirical approaches, we investigate the characteristics of these flows in advanced and in emerging and developing countries. Our key results lead us to conclude that FDI has a stronger effect than FPI on REER in the two groups of countries. Furthermore, we also conclude that institutional quality and GDP growth have a positive impact on the exchange rate and a negative impact on REER volatility.

Our findings lead us to draw various inferences and provide guidance on the policy of encouraging FDI and the role that exchange rate dynamics play in that context. In a policy setting, economic growth and stability can strengthen the exchange rate and also overcome its volatility, which is very beneficial both for the domestic economy and for domestic and foreign investors. Nevertheless, institutional quality also plays a critical role in strengthening the exchange rate and overcoming its volatility. Therefore, it is important for countries, particularly developing countries, to strengthen their institutions. We can also conclude that exchange rate volatility discourages FDI, as there is a significant negative impact of the former on the latter (the higher the exchange rate volatility, the lower FDI becomes, and vice versa). On the other hand, FDI has a positive impact on exchange rate volatility. This implies that, in a policy setting, in order to attract more FDI, countries should reduce economic uncertainties, such as reducing the volatility of the exchange rate and providing good business and economic conditions for investors and enterprises. Lastly, from a policy point of view, the greater trade openness that accompanies good institutional quality is paramount to attracting global capital flows. Therefore, countries in general, and emerging economies in particular, should focus on



strengthening the quality of their institutions while allowing more economic and trade openness.

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## CONFLICT OF INTEREST

The authors have no conflict of interest to report.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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