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Brief Article

The Main Determinants of Capital Inflows in Emerging Market Economies: Does the Exchange Rate Regime Matter?[a]

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There is a bulk of literature in analyzing the impacts of exchange rate regimes (ERRs) on capital flows into emerging market economies. However, these studies mainly do not take into account integration and cointegration properties of variables. This paper aims to tackle this important issue by investigating whether ERRs matter for the impacts of the main push (global financial conditions, GFC) and pull (real GDP) factors on capital inflows into emerging market economies. We find that worsening GFC decreases all types of capital inflow except foreign direct investments in case of floating ERR. This impact is statistically significant only for portfolio inflows in case of managed ERR. The pull factor is often positive and statistically significant in determining capital inflows in the long-run only under floating ERRs. These results suggest that the long-run impacts of the main pull and push factors on capital inflows are often magnified under more flexible ERRs.

JEL codes: C13, F21, F30, F41

Keywords: Capital inflows, Emerging market economies, Exchange rate regimes, Global financial conditions

1 Introduction

Do exchange rate regimes (ERRs) matter for the impacts of global financial conditions (GFC) and real GDP on capital inflows in emerging market economies (EMEs)? The literature provides mixed answers to this question. For instance, Obstfeld et al. (2019) finds that the sensitivity of capital flows to global financial conditions is higher under more rigid ERRs. On the other hand, Cerutti et al. (2019) reports that capital flows do not respond to GFC regardless of ERR, Passari & Rey (2015) finds no robust effect of ERRs on the sensitivity of capital flows to GFC, and Ghosh et al. (2014) argues that countries with less flexible ERRs are more likely to experience capital inflow surges.

Following Calvo et al. (1996) and Taylor & Sarno (1997), the literature classifies the main determinants of capital flows as domestic (pull) and global (push) factors (Koepke, 2019).

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The "push" factors refer to global financial and monetary conditions in advanced economies. Rey (2016) suggests that the VIX index (Chicago Board Options Exchange's equity options volatility index) proxies global financial cycle which is closely related to capital flows. The variables representing domestic macroeconomic and institutional conditions are contained in "pull" factors.

The studies investigating the impact of ERRs on capital flows often do not take into account integration and cointegration properties of variables. This paper aims to tackle this important issue. In this context, we investigate the long-run (cointegration) relationships between gross capital inflows (and their components) and the main pull (real GDP) and push (GFC) factors across different ERRs for EMEs.[1] The following section presents our estimation results and Section 3 concludes.

2 Empirical Results

To investigate the main determinants of capital inflows, we consider the following benchmark equation:

$$CIF_{it} = \beta_0 + \beta_1 gdp_{it} + \beta_2 vix_t + u_{it} \tag{1}$$

where the subscripts i and t denote, respectively, country and time, CIF is capital inflows scaled by GDP in current US dollars, gdp is the log of real GDP and vix is the log of VIX. A decrease in VIX implies better GFC. Equation (1) maintains that capital inflows may parsimoniously be explained by the main pull (gdp) and push (vix) factors. We consider the de facto classification of Ilzetzki et al. (2019): "coarse" –pegged, limited flexibility, managed floating and freely floating – categories, with higher values denoting more flexible exchange rate arrangements.[2] We consider also the main components of capital inflows: portfolio equity, foreign direct investment (FDI) and other investment. Our unbalanced panel data set contain 35 EMEs during the annual period between 1986 and 2015 and the choice of the sample determined according to data availability.

Table 1: Unit Root Tests

	LLC	
Variables	Levels	First Differences
Capital Inflows$_{it}$	1.24[2]	-7.86[1]**
Portfolio Eq. Inflows$_{it}$	3.53[2]	-9.02[1]**
FDI Inflows$_{it}$	3.15[2]	-12.81[1]**
Other Inv. Inflows$_{it}$	2.36[2]	-14.38[1]**
gdp$_{it}$	-0.07[1]	-12.51[1]**
	ADF	
vix$_t$	0.96[0]	-8.22[0]**

Note: LLC and ADF are the Levin et al. (2002) panel unit root and augmented Dickey-Fuller tests, respectively. ** denotes the rejection of the unit root null at the 5% level. The unit root test equations contain also a constant term and the values in brackets [.] are augmentation lag lengths chosen by AIC.

[1] The earlier literature often focuses on net capital inflows; "there has been a shift in the empirical capital flows literature towards a focus on gross capital flows basically due to the enormous increase in gross assets and liabilities and international financial integration in many countries" (Davis et al., 2019, p.1) .

[2] Ilzetzki et al. (2019) also provides a fifth (freely falling) and sixth (dual markets) categories in the "coarse" classification. However, Rogoff et al. (2004) and Ilzetzki et al. (2019) warn that classifying these two categories as floating, intermediate or pegged may be misleading. Therefore, in our empirical models, we do not consider these two categories as ERRs.

Table 1 reports unit root test results for capital inflows and their main components, real GDP and VIX. The results suggest that all the variables in equation (1) are nonstationary in levels, i.e I(1). The stationary residuals from the estimation of equation (1) imply the presence of a long-run equilibrium relationship (cointegration) between the variables.

Considering the potential joint endogeneity of real GDP and capital inflows, we estimate equation (1) by employing fully modified OLS (FM-OLS) procedure of Phillips & Hansen (1990) and Pedroni (2000). The FM-OLS procedure takes into account endogeneity and serial correlation along with the potential heterogeneity in the long-run relationships. Given that the I(1) variables in the model are cointegrated, the FM-OLS procedure provides super-consistent estimators (Pedroni, 2000).

Table 2: Exchange Rate Regimes and the Determinants of Capital Inflows

	vix_t	gdp_{it}	Statistics				
			R^2	LRV	N	NT	LLC
Capital Inflows$_{it}$	-1.088 (0.542)**	1.158 (0.654)*	0.206	18.794	33	645	-17.73[0.00]
Managed ERR	-0.351 (0.647)	1.691 (0.856)**	0.234	13.797	29	374	-16.35[0.00]
Floating ERR	-1.224 (0.525)**	3.973 (0.784)**	0.459	7.222	20	269	-14.10[0.00]
Portfolio Eq. Inflows$_{it}$	-0.786 (0.185)**	0.198 (0.226)	0.191	2.109	34	632	-20.59[0.00]
Managed ERR	-0.759 (0.239)**	0.378 (0.313)	0.193	1.722	30	360	-17.78[0.00]
Floating ERR	-0.769 (0.226)**	0.27 (0.337)	0.245	1.347	20	270	-13.89[0.00]
FDI Inflows$_{it}$	-0.063 (0.260)	0.58 (0.247)**	0.247	5.525	35	829	-18.86[0.00]
Managed ERR	-0.098 (0.331)	0.063 (0.355)	0.222	5.085	31	497	-15.58[0.00]
Floating ERR	-0.172 (0.235)	1.78 (0.321)**	0.425	1.667	24	329	-13.24[0.00]
Other Inv. Inflows$_{it}$	-0.856 (0.406)**	0.067 (0.385)	0.150	13.472	35	831	-17.57[0.00]
Managed ERR	-0.113 (0.472)	0.563 (0.496)	0.178	10.378	31	501	-14.27[0.00]
Floating ERR	-0.771 (0.362)**	1.567 (0.497)**	0.302	3.92	24	327	-14.79[0.00]

Note: LRV denotes long-run variance. The values in parentheses are the standard errors. * and ** denote the significance at 10% and 5%, respectively. N and NT are the numbers of countries and observations for the sample, respectively. LLC is the Levin et al. (2002) panel unit root test for the corresponding equation residuals. The optimum lag lengths for the tests are chosen by the AIC. The values in brackets [.] are the p-values for the corresponding null hypothesis.

Table 2 reports the FM-OLS results. In the table, "managed ERR" corresponds to the pegged and limited flexibility whilst "floating ERR" refers to the managed floating and freely floating ERR classification of Ilzetzki et al. (2019). According to the panel unit root tests, all the equation residuals are stationary. Therefore, the equations in Table 2 may be interpreted as representing cointegrating relationships.

According to the results for the equations which do not consider ERRs, worsening GFC (an increase in VIX) leads to a decrease in capital inflows and their main components, except for FDI. The long-run impact of real GDP in attracting capital inflows is positive and significant only for the aggregate capital inflow and FDI. These results, however, do

not remain invariant to the prevailing ERRs. The impact of GFC is much higher under more flexible ERRs for aggregate and other investment inflows. For these capital inflows, exchange rate stability appears to provide insulation from the adverse GFC under managed ERRs. The response of portfolio inflows to GFC tends to be the same for both of the ERRs. GFC appears to be insignificant in explaining FDI inflows under both managed and floating ERRs.

The main pull factor, real GDP, is significant in attracting aggregate capital inflows under both managed and floating ERRs, albeit this impact appears to be much higher under floating ERRs. Portfolio inflows do not respond to domestic conditions regardless of the ERRs. This is consistent with a view that the evolution of portfolio inflows is mainly determined by changes in domestic fundamentals. FDI and other investment inflows are mainly determined by the domestic pull factor under floating ERRs.

3 Conclusion

The results from FM-OLS estimations strongly suggest that the long-run impacts of the main pull and push factors are not invariant to the prevailing ERRs. In accord with Eichengreen et al. (2018), we find that portfolio flows are driven mainly by the push factor, FDI flows are determined mainly by the pull factor and other investment flows are explained both by the pull and push factors. However, these results are often the case for more flexible ERRs. Exchange rate stability does not significantly alleviate capital inflows in the case of better domestic fundamentals. Under floating ERRs, capital inflows, except portfolio inflows, are found to be pro-cyclical as suggested by the positive real GDP coefficient estimates. To sum, ERRs matter for the long-run impacts of the main determinants of capital inflows.

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Appendix: Data Sources and Sample

All capital flows data are from International Financial Statistics of the IMF. Following the IMF's BOP Statistics, capital inflows are defined as net purchases of domestic assets by foreign residents. Real GDP data are from World Bank World Development Indicators. The VIX data are from Chicago Boards Options Exchange website.

The sample comprises EMEs that are included in the Morgan Stanley Capital International Index: Argentina, Bangladesh, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Czechia, Egypt, Hungary, India, Indonesia, Israel, Jamaica, Kenya, Lithuania, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Peru, Philippines, Poland, Romania, Russian F., Serbia, Slovak R., Slovenia, S. Africa, S. Korea, Thailand and Turkey.