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Determinants of foreign capital inflows. The role of push versus pull factors

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Abstract. *Our robust findings based on the recently developed methodology of sequential (two-stage) estimation of linear panel-data model (SELPDM), alongside the two-step system GMM model contributes significantly to the extant literature on the determinants of foreign capital flows in developing countries. Our focused discussion on the push and pull framework and its effects on foreign capital flows using annual data for a panel of 47 developing economies over 2000 to 2019 draws interesting observations. We find the role of market size is more nuance for FDI flows than for any other types of capital flows, furthermore on the side of domestic drivers, host countries trade openness, quality of institutions, capital account openness and the level of financial development matter to all the capital flows. Whereas, on the other hand, global risk aversion, US bond yield, shadow rates, global returns and liquidity were found to be significant drivers of substantial amounts of capital flows to the developing world. Our findings suggest the relative merit of global factors over the domestic once in explaining significant surges in the capital flows to the developing economies. In essence the study suggests key domestic fundamentals and global factors for sound policies to induce surges in foreign capital for developmental goalmouths.*

Keywords: foreign capital flows, determinants, dynamic panel data, developing countries, global drivers, domestic drivers.

JEL Classification: C51, D81, E02, F21, O11.

1. Introduction

The earliest flows of foreign capital dates back to almost the pre-World War I era, initiated by the British, to the emerging markets for the purpose of infrastructural developments particularly railways. In fact, according to (Glob. Dev. Financ., 2000) the world bank report, there were at least four major surges in capital flows identified since 1870s to 2000s, during the times of rapid economic expansions and strong growth, technology outburst and expansion in world trade.

The robust modern day literature emphasising on capital flows emerged only in the early 1970s on account of rise in lending by the international bank to the developing countries due to oil price shocks. The next decade witnessed a sharp drop due to the occurrence of Latin American debt crisis. However, the flows rebounded to Latin America in the late 80s and the 90s against the improvement in fundamentals due to the backdrop experience of US recession. The capital flows experienced an upward trend thereafter, until the Asian Financial crisis hit the world in the late 90s with a prolonged decline over the years. The resurgence was only experienced in the 2000s until the eruption of Global Financial Crisis (GFC) in 2008. Although, the downturn was colossal, capital flows were flowing in a laggard state until 2016 as an aftermath effect of GFC, and then picked up with the high pace thereafter in 2017.

The experience of surges and flights in the capital flows following the events of crisis and other economic downturns, provided a seed to the most captivating question to the researchers which still pertains in the field of capital flows i.e. what drives capital flows? Is it external factors or domestic fundamentals? The experience of rebounded capital flows to Latin America in the 1990s, led this question to surface more ominously. Researchers were keen to understand what prompted capital flows to Latin America, was it the Crisis or the strong domestic fundamentals of the country? Beginning from this vintage point, the growing literature has focused immensely on explaining how global conditions and domestic fundamentals contributed in explaining the evolution of capital flows over time.

The widespread discussion on the determinants of capital flows have been carried out at length in the literature. According to the conventional school of thought, domestic factors are more significant in explaining the surges in capital flows in the 1990s (López Mejía, 1999; Schadler et al., 1993). On the other hand, taking an alternate view (Calvo et al., 1993) argued that fundamental and political reforms matter to capital inflows. The study showed that global factors such as drop in US short term interest rates, US recession, US BOP and change in international capital markets regulations were significant drivers of capital flows in the Latin American countries. Alongside, many studies such as that of (Fernandez-Arias, 1996) supported this claim whereas studies like that of (Chuhan et al., 1998) contested the findings of (Calvo et al., 1993).

The traditional literature on the determinants of capital inflows relies heavily on the importance of domestic factors which are presumed to influence the risk-return perception of investors. The traditional studies rely on local macroeconomic fundamentals, official

policies of the government and market imperfections to explain the capital inflows surges (Ghosh et al., 2014). The literature highlights several factors like domestic interest rates, domestic capital formation, human capital development, infrastructural development, level of inflation, level of financial development, economic openness, quality of domestic institutions, level of public debt, current account balances, real exchange rates and a range of other relevant variables that drive capital flows (see Ahlquist, 2006; Alfaro et al., 2007; Papaioannou, 2009; Milesi-Ferretti and Tille, 2011; Fratzscher, 2012; Bruno and Shin, 2013; Nier et al., 2014; Ahmed and Zlate, 2014; Brafu-Insaidoo and Biekpe, 2014; Olaberriá, 2015; Dell'Erba and Reinhardt, 2015; Hashimoto and Wacker, 2016; Iamsiraroj, 2016; Baek and Song, 2016; Arias-Rodríguez et al., 2016; Nguyen and Do, 2020; NGUYEN, 2020; Ngo et al., 2020; Ahmed Hannan, 2017).

On the contrary, several other recent studies on determinants of capital flows suggest that the push factors hold more relevance than the pull factors. The push factors are closely related to the neoclassical theory, which argues that capital reacts to interest rate differentials between countries. According to (Ahmed Hannan, 2018) under the neoclassical theory, capital flows from countries with low returns to those countries that offers higher rate of returns on the capital. In similar approach several studies like (see Arias-Rodríguez et al., 2016; Baek and Song, 2016; Bruno and Shin, 2013; Byrne and Fiess, 2016; Egly and American, 2010; Forbes and Warnock, 2012; Reinhart and Reinhart, 2009; Sarno et al., 2016), suggest that other variables apart from interest rates such as global economic growth, risk aversion, global liquidity and commodity prices also act as prominent push factors that drive capital flows in other countries.

The widespread debate on the prominence of push versus pull factors have continued in the 2000s in the context of evolving global and macroeconomic fundamentals. With more granular data available to the researchers, the focus has moved from estimating aggregate capital flows determinants to individual capital flows and their determinants. The 2008-2009 global financial crisis (GFC) has proved to be one of the crude example of plausible adversities of free financial flows and globalization and its effects on global capital flows landscapes. Understanding the nature and behaviours of different types of capital flows is of paramount importance particularly to the authorities and policy makers, to draft appropriate policies. Literature has shown that capital flows can deter the strength of domestic markets particularly the financial system, which was evident during the GFC. In line with the same policy makers need to draft appropriate mix of policies that can strengthen the domestic markets and systems which can face any future global meltdowns unlike the GFC. Hence, policies in both source and recipient countries are important in driving capital flows to emerging markets.

The rest of the paper is organised as follows. Section II documents the data and the econometric specification underlying the study explaining the push versus pull framework and the main model used to understand the drivers of capital flows. Section III offers the results and discussions. And section IV concludes.

2. Data and econometric specifications

The rationale for the movement of cross border capital flows is theoretically based on the premise that capital flows contributes to economic welfare on the production side by means of optimum allocation of capital, while on the consumption side by smoothening of consumption and thus it improves the consumption path for the provider as well as the recipient of capital flows (Koepke, 2019).

The empirical literature classifies the determinants of capital flows into external 'push' factors and domestic 'pull' factors. According to (Ahmed Hannan, 2017; Ahmed and Zlate, 2014), the idea behind this approach is based on the portfolio balance theory/approach which suggest that expected returns, risk and investor risk preferences across countries determines capital flows. The dissection between push and pull determinants originates from the study of (Calvo et al., 1993; Fernandez-Arias, 1996) and is being used as a theoretical framework since 1990s. However, an alternative approach proposed by Bohn and Tesar (1996) using Capital Assets Pricing Model (CAPM) exist, but this approach is not extensively used as in the case of push-pull framework.

Using the push-pull framework proposed by (Calvo et al., 1993; Fernandez-Arias, 1996) following the study of (Ahmed Hannan, 2017), the general empirical model is as follows:

$$y_{it} = \alpha_0 + \sum_{i=1}^{n-1} \alpha_i D_i + \beta_0 External_t + \beta_1 Domestic_{it} \qquad [1]$$

Where, y_{it} denotes the dependent variables representing the aggregate and disaggregate capital inflows (Direct investments, Foreign portfolio investments, other investments expressed as a ration to GDP) for country 'i' and period 't'. The capital flows as a share of GDP are modelled as a function of fixed effects (D_i=1 if the observation pertains to the country 'i' and D_i= 0 otherwise). The equation is followed by a vector of external or push factors and a vector of pull factors or domestic factors.

Although, a vast literature exists, the relative merit of findings from this study confine to the use of traditional OLS and fixed effects or otherwise a random effects model. One of the major drawback of this estimation methodologies is the disregard to the dynamic nature of the model. Thus to overcome this shortfall we have introduce the Equation [1] with its dynamic nature as follows:

$$y_{it} = \alpha_0 + \beta_0 y_{it-1} + \beta_1 External_t + \beta_2 Domestic_{it} \qquad [2]$$

Where y_{it-1} represents one period lag of the dependent variable representing the aggregate and disaggregate capital inflows. Due to the dynamic nature, we apply the two-step system GMM for the estimation of dynamic panel data. The systems generalized method of moments (GMM) estimator is applied when the empirical estimation is faced with a severe problem of endogeneity (Nickell, 1981). Our estimation following Equation [2] with a lagged value of dependent variable introduces a risk of endogeneity. Many previous studies like that of (Armah and Fosu, 2018; Globerman and Shapiro, 2002; Liu et al., 2002) faced

with an issue of endogeneity, thus making the results biased. A solution to the pertinent issues was first offered by (Anderson and Hsiao, 1982) and (Arellano and Bond, 1991) who propped the use of GMM estimation which was later improved by (Arellano and Bover, 1995).

Further extension was proposed by (Blundell and Bond, 1998) to reduce bias estimation in fixed effects in short panels and to reduce endogeneity in dynamic panels. Although the usability of the two-step systems GMM is undoubtable, according to (Windmeijer, 2005), the GMM methodology may produce bias of uncorrected standard errors. Thus to overcome this, recently (Kripfganz, 2017) proposed a new method of estimating dynamic panels named 'Sequential (two-stage) estimation of linear panel-data model (SELPDM)'. In (Kripfganz, 2017) methodology, the conventional standard errors are no longer valid as the residuals from the first stage are regressed on another set of explanatory variables (often time-invariant) in the second stage. Therefore, following this we first estimate the Equation [2] using the Sequential (two-stage) estimation of linear panel-data model (SELPDM) as proposed by (Kripfganz, 2017) as a major benchmark estimation. We also apply the two-step systems GMM following (Blundell and Bond, 1998) for the purpose of checking robustness of the estimates. With the inclusion of a lagged value of dependent variable, all estimated coefficients in the model represents short term effects of the independent variables. Thus, in order to gaze into the long run effects, we follow (Papke and Wooldridge, 2005) to compute the long run elasticities of the explanatory variables.

Our sample is composed of 47 developing countries(1) over the period of 2000-2019. Following the literature, we use a large set of control variables composed of push and pull factors. The pull factors include GDP growth rate annual percentage (GDP_g), General government gross debt percentage of GDP (Gross_debt), Inflation, average consumer prices Index (linf2), General government final consumption expenditure percentage of GDP (GC_exp), Trade openness (TO), Real effective exchange rate (REER), Financial Development Index (FD_index), Institutional Quality (IQ) and Capital account openness (KO). The pull factors comprise of variables like Liquidity, Global growth, S&P 500 returns, US bond yield, VIX index and Wu-Xia shadow federal funds rate (see Appendix, Table A2 for detailed description of data and data sources).

Table 1 below presents the description of the whole dataset. The mean aggregate investment is 27.74% of GDP, with 6.18%, 5.71% and 15.91% of domestic investment, foreign portfolio investment and other investments respectively.

Table 1. *Descriptive statistics*

Variable	Obs	Mean	Std.Dev.	Min	Max
AI	940	27.747	25.014	0	161.227
DI	940	6.183	9.092	-.317	78.122
FPI	940	5.712	10.149	0	68.99
OI	940	15.912	17.518	0	153.168
GDP_pcg	940	2.937	3.631	-16.576	16.262
GC_exp	940	13.59	4.974	0	33.23
Gross_debt	940	44.326	25.629	0	214.449
linf2	940	5.692	4.333	0	31.166
IQ	940	-0.282	0.389	-1.529	0.926

Variable	Obs	Mean	Std.Dev.	Min	Max
REER	940	3.159	2.432	-2.434	9.564
TO	940	74.587	34.347	0	220.407
KO	940	.452	.338	0	1
FD_index	940	0.277	0.15	0.039	.753
Liquidity	20	4.349	0.296	3.867	4.801
Global_growth	20	2.915	1.375	-1.674	4.408
SP_500	20	5.599	17.619	-38.49	29.6
Bond_Yield	20	3.284	1.128	1.78	5.12
VIX	20	19.663	7.153	11.04	40
WuXia_rate	20	1.134	2.354	-2.421	5.989

Table 2 below presents the correlation between types of capital flows and explanatory variables employed in the study. The results indicate the existence of strong and significant correlation amidst the all the types of capital flows. The correlation analysis exhibits a strong positive correlation between the types of capital flows and institutional quality, level of financial development and governments consumption expenditure, while a negative correlation with GDP growth rate and inflation. The primary results from correlation analysis are consistent with the theoretical literature.

Table 2. *Pairwise correlations*

Variables	AI	DI	FPI	OI	GDP_pcg	GC_exp	Gross_debt	Inf	IQ	REER	TO	FD_index	KO
AI	1.00												
DI	0.583	1											
FPI	0.448	0.431	1										
OI	0.871	0.334	0.177	1									
GDP_pcg	0.010	-0.118	-0.103	0.022	1								
GC_exp	0.287	0.168	0.142	0.202	-0.060	1							
Gross_debt	-0.051	0.064	0.010	-0.041	-0.127	0.059	1						
Inf	-0.090	-0.025	-0.006	-0.077	-0.029	-0.163	0.087	1					
IQ	0.206	0.256	0.353	0.011	-0.075	0.347	0.062	-0.114	1				
REER	-0.048	-0.049	-0.008	-0.038	0.029	-0.269	-0.080	-0.046	-0.171	1			
TO	0.192	-0.015	0.020	0.238	0.132	0.515	-0.052	-0.217	0.205	-0.090	1		
FD_index	0.340	0.560	0.363	0.080	-0.013	0.280	0.175	0.000	0.302	-0.217	-0.029	1	
KO	0.045	0.013	0.078	0.074	-0.046	0.089	0.057	-0.047	0.171	-0.008	0.186	-0.078	1

Table 3 shows the results from the cross sectional dependence test and unit root test on level data series. We employ the cross-sectional dependence test proposed by (Pesaran, 2004) along with different panel unit root tests like Im-Persaran-Shin unit root test (Im et al., 2003), Levin-Lin-Chu unit-root test (Levin et al., 2002) and Fisher based on Phillips-Perron type (Z-Inverse normal) unit root test (Choi, 2001). The CD test validates the presence of cross-sectional dependence in all the data series. Furthermore, we find that all the data series (except General government gross debt percentage of GDP and Trade openness) are stationary at level. The following section discusses empirical results from estimations.

Table 3. *Cross-sectional dependence test and stationary tests*

Variable	Im-Pesaran-Shin unit-root test		Levin-Lin-Chu unit-root test		Fisher-type unit root test		CD-test	
	Z-t-tilde-bar Statistic	p-value	Adjusted t*	p-value	Inverse chi-squared-P Statistic	p-value	CD-test statistics	p-value
AI	-4.0339***	0.0000	-4.2978***	0.0000	177.6096***	0.0000	34.151***	0.0000
DI	-1.0799	0.1401	-3.5977***	0.0002	125.7889***	0.0159	47.405***	0.0000
FPI	-3.1165***	0.0009	-3.4222***	0.0003	164.3130***	0.0000	5.34***	0.0000
OI	-5.7473***	0.0000	-7.3471***	0.0000	168.6718***	0.0000	11.336***	0.0000
GDP_pcg	-9.2624***	0.0000	-8.4677***	0.0000	206.1580***	0.0000	38.48***	0.0000
GC_exp	-0.1069	0.4574	-2.1250***	0.0168	72.1888	0.9539	14.262***	0.0000
Gross_debt	0.8603	0.8052	-4.1115***	0.0000	229.5671***	0.0000	32.841***	0.0000
linf	0.9884	0.8385	-5.6601***	0.0000	140.4575***	0.0000	136.596***	0.0000
IQ	-3.8451***	0.0001	-8.4479***	0.0000	98.4170	0.3573	4.79***	0.0000
REER	n/a	n/a	-1.8453**	0.0325	81.6759	0.8139	45.43***	0.0000
TO	-0.5640	0.2864	-3.2478***	0.0006	91.7379	0.5468	17.41***	0.0000
FD_index	1.1932	0.8836	-2.9722***	0.0015	67.4152	0.9825	67.981***	0.0000
KO	n/a	n/a	-1.2435	0.1068	172.1769***	0.0000	3.235***	0.0001

Note: *, **, *** are significant levels at 10%, 5%, 1%, respectively.
Source: Author's computation using STATA 16.

3. Results and discussion

The results of our preliminary estimation of Equation [1] using the fixed effects model are presented in Table 4[(2)]. The results derived fail to show the significance of domestic as well as global factors as key determinants of capital flows. These findings are conflicting to the findings of other researchers. As seen from Table 4, with regards to foreign direct investments (FDIs) only growth rate of GDP, economic openness and quality institutions were positive and significant whereas government expenditure and global risk were found to be negatively influencing FDI inflows. The same persists with other flows like foreign portfolio investments (FPIs) where host countries level of debt borrowings, economic openness, financial development and institutional quality are significant and positive drivers, while inflation and exchange rates were negative factors. In the case of the residual category of investments i.e. other investments (OIs) similar results are evident as in the case of FDIs and FPIs. Although the estimations are reliable, the loss of relative significance of key domestic and global factors raises red flags.

To validate the outcomes of the classical FEM model, we use the estimation methodology proposed by (Driscoll and Kraay, 1998) with fixed effects, the results are presented in the subsequent Table 5. The determinants are sub-classified as domestic (pull) factors and global (push) factors. The empirical results suggest the relative importance of global push factors over the domestic pull factors. The coefficient of the variable representing the size of the market is positive and significant only for FDI, which accurately reflects the theoretical expectation. While, the other key domestic factors include inflation, which is found to be exerting a negative effect on capital inflows. Whereas economic openness and good quality institutions has a positive and significant effect indicating key domestic drivers for all the capital flows. The role of global factors emerged as quite significant through our analysis. We find that all the global push factors are significant across types of

capital flows. The coefficient of global liquidity is positive and significant indicating that with every 1 percent increase in world liquidity, capital flows to developing economies increases by 0.89 percent as aggregate while a 0.27 percent and 0.60 percent can be seen in FDI and OIs respectively. The coefficient of global growth variable is found to be negatively associated with capital flows except FPI flows. While, an increase in the US governments bond yield induces a push to capital flows in developing economies. We also find that the coefficients of global returns on portfolio, global risk measured by VIX and shadow rates were negative and significant thus suggesting that this factors can cause high inflows and high outflows of foreign capital. Although, the estimated results from the fixed effects estimation and the (Driscoll and Kraay, 1998) methodology, are reliable and valid, yet both the methods fail to incorporate a dynamic form of equation necessary to view a broader continuum.

Thus to allow for the Equation [1] to be dynamic form, we use the upgraded Equation [2] with the use of lagged value of the dependent variable in the system to capture its dynamic effects. The analysis of the dynamic Equation [2] is carried out using the sequential (two-stage) estimation of linear panel-data model (SELPDM), developed by (Kripfganz, 2017) as a benchmark estimation, alongside we also employ the two-step system GMM model in line with (Blundell and Bond, 1998) for robustness check purpose.(3)

Table 5 reports the empirical findings based on the (SELPDM) method of (Kripfganz, 2017) for aggregate investment flows along with foreign direct investments, portfolio investments and other investments. The inclusion of a lagged value of the dependent variable suggest the existence of the adaptive expectation, i.e. if the past values determine the present values. The intriguing results indicate that the one period lag is positive and significant across the types of capital flows suggesting that past values of capital flows explain the current values of capital flows.

Table 4. *Baseline regression estimates for determinants of foreign capital flows*

	Fixed effects estimation				Driscoll-Kraay standard errors with fixed effects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Aggregate Investments	Direct Investments	Portfolio Investments	Other Investments	Aggregate Investments	Direct Investments	Portfolio Investments	Other Investments
Domestic (Pull) Factors								
GDP_g	-0.0096	0.0313***	-0.0094	-0.0095	-0.0096	0.0313***	-0.0094	-0.0095
	(0.0078)	(0.0080)	(0.0111)	(0.0074)	(0.0076)	(0.0092)	(0.0145)	(0.0068)
Gross_debt	0.0247	0.0473	0.3165***	0.0208	0.0247	0.0473	0.3165**	0.0208
	(0.0467)	(0.0498)	(0.0667)	(0.0444)	(0.0538)	(0.0630)	(0.1360)	(0.0420)
linf2	-0.1639***	0.0113	-0.0885***	-0.1373***	-0.1639***	0.0113	-0.0885***	-0.1373***
	(0.0234)	(0.0849)	(0.0334)	(0.0222)	(0.0343)	(0.0367)	(0.0322)	(0.0309)
GC_exp	-0.0528	-0.3706***	-0.0212	0.0029	-0.0528	-0.3706***	-0.0212	0.0029
	(0.0750)	(0.0847)	(0.1071)	(0.0713)	(0.1241)	(0.1111)	(0.1312)	(0.1099)
TO	0.1711***	0.2493***	0.2651***	0.1355**	0.1711	0.2493***	0.2651***	0.1355
	(0.0579)	(0.0611)	(0.0826)	(0.0550)	(0.1057)	(0.0696)	(0.0841)	(0.1000)
REER	0.3158***	0.0226	-0.3226***	0.3996***	0.3158***	0.0226	-0.3226*	0.3996***
	(0.0729)	(0.0934)	(0.1040)	(0.0692)	(0.0858)	(0.0694)	(0.1912)	(0.0847)
FD_index	1.2449**	-0.4452	3.4011***	0.9195*	1.2449**	-0.4452	3.4011***	0.9195**
	(0.5785)	(0.5918)	(0.8258)	(0.5496)	(0.5016)	(1.2610)	(0.7302)	(0.4494)
IQ	0.2287	0.7961***	0.6261***	0.2290	0.2287	0.7961***	0.6261*	0.2290
	(0.1600)	(0.1703)	(0.2283)	(0.1520)	(0.1976)	(0.2108)	(0.3603)	(0.2192)
KO	-0.3443**	-0.0439	0.0840	-0.3354**	-0.3443	-0.0439	0.0840	-0.3354

	Fixed effects estimation				Driscoll-Kraay standard errors with fixed effects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Aggregate Investments	Direct Investments	Portfolio Investments	Other Investments	Aggregate Investments	Direct Investments	Portfolio Investments	Other Investments
	(0.1380)	(0.1403)	(0.1970)	(0.1311)	(0.2128)	(0.2014)	(0.2692)	(0.2342)
Global (Push) factors								
Liquidity	1.4070**	-0.7862	0.9891	0.7823	0.8943***	0.2709***	-0.1342	0.6018***
	(0.5820)	(0.6032)	(0.8308)	(0.5529)	(0.1291)	(0.0976)	(0.1234)	(0.1352)
Global_growth	-0.0619	-0.0092	-0.0868	-0.0761	-0.1145***	-0.0540***	0.0238***	-0.1024***
	(0.1659)	(0.1690)	(0.2369)	(0.1577)	(0.0032)	(0.0063)	(0.0073)	(0.0031)
SP_500	-0.0132**	-0.0094	-0.0110	-0.0113**	-0.0277***	-0.0132***	0.0064***	-0.0258***
	(0.0058)	(0.0059)	(0.0083)	(0.0055)	(0.0014)	(0.0014)	(0.0021)	(0.0014)
Bond_Yield	0.0896	-0.2699	0.0913	0.0687	0.0442***	0.0734***	-0.1603***	0.0946***
	(0.2895)	(0.2954)	(0.4132)	(0.2750)	(0.0135)	(0.0236)	(0.0252)	(0.0147)
VIX	-0.0250*	-0.0253*	-0.0299	-0.0205	-0.0653***	-0.0115***	-0.0057	-0.0560***
	(0.0133)	(0.0134)	(0.0190)	(0.0126)	(0.0016)	(0.0024)	(0.0038)	(0.0015)
WuXia_rate	-0.0612	0.0212	0.0023	-0.0417	-0.1212***	-0.0588***	-0.0213***	-0.1103***
	(0.0448)	(0.0457)	(0.0640)	(0.0426)	(0.0055)	(0.0074)	(0.0033)	(0.0047)
Constant	-3.7428	5.5783*	-4.8136	-1.8989				
	(3.2580)	(3.3355)	(4.6507)	(3.0955)				
Observations	940	910	940	940	940	910	940	940
R-squared	0.3446	0.198	0.155	0.241	0.34	0.20	0.15	0.24
Number of c_id	47	47	47	47	47	47	47	47
F test	16.24***	7.35***	5.66***	9.79***				
Hausman test	150.19*** (0.000)	166.22*** (0.000)	22.34* (0.099)	136.84*** (0.000)				
Country & time effects	yes	yes	yes	yes				

Note: Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1.
Table 4 reports the estimation from fixed effects model only, although the alternative random effects models had originally been computed, the Hausman test proposed by (Hausman, 1978) validated the use of FEM over the REM model, the Hausman test statistics is reported.
Source: Author's computation using STATA 16.

We find that the GDP growth rate as a proxy for market size is negative and significant across the types of capital flows except FDI inflows, both in the short as well as in the long run. This indicate that market size matter more for FDIs then other capital flows. Similarly, the variable of trade openness indicates the relative openness of the economy, which is expected to be a positive determinants of capital flows, countries with relative high levels of economic openness attract more foreign capital, our empirics suggest this association for all the types of capital flows except FPIs, where the coefficient is insignificant however positive. The role of quality institutions surfaced recently as a significant driver of capital inflows. A notion so developed was that countries with good institutions attract much of the foreign capital. Our empirical results suggest the validity of this notion in the context of developing countries, we find that coefficient of institutional quality is highly significant across the different types of foreign capital flows in the short as well as in the long run. Although this finding are not evident for other investments category given that it is a residual category consisting of several types of capital which may find quality institutions as a key factor hindering profit potentials. Another domestic factors pertaining to the real effective exchange rates is found to be positive and significant for FPI and OIs but no such association was seen for FDIs.

We also model the role of host countries level of financial development, interestingly we find to be positive for all types of capital flows except FDIs. The role of domestic factors as strategic pull factors attracting foreign capital has been widely documented, our empirical results also confirm the previous findings.

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Table 5. *Estimates for determinants of foreign capital flows using sequential (two-stage) estimation of linear panel-data model (SELPDM) (Kripfganz, 2017)*

	Aggregate Investments		Direct Investments		Portfolio Investments		Other Investments	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	short run	long run	short run	long run	short run	long run	short run	long run
Domestic (Pull) Factors								
L.AI	0.8341***		0.8038***		0.9691***		0.8584***	
	(0.0168)		(0.0340)		(0.0084)		(0.0128)	
GDP_g	-0.0240***	-0.1447***	0.0214***	0.1091***	-0.0297***	-0.9618***	-0.0225***	-0.1585***
	(0.0029)	(0.0220)	(0.0051)	(0.0276)	(0.0061)	(0.2680)	(0.0025)	(0.0227)
GC_exp	0.0024	0.0144	0.0225	0.1145	-0.0444	-1.4372	-0.0197	-0.1394
	(0.0187)	(0.1126)	(0.0253)	(0.1302)	(0.0309)	(1.0164)	(0.0151)	(0.1048)
Gross_debt	-0.0424***	-0.2553***	0.0451***	0.2297***	-0.0202	-0.6538	-0.0209*	-0.1472*
	(0.0123)	(0.0708)	(0.0157)	(0.0852)	(0.0337)	(1.1142)	(0.0122)	(0.0849)
linf2	0.0056***	0.0340***	0.0046***	0.0233***	-0.0039	-0.1245	0.0017	0.0120
	(0.0018)	(0.0122)	(0.0016)	(0.0065)	(0.0046)	(0.1449)	(0.0020)	(0.0139)
TO	0.1476***	0.8896***	0.0510**	0.2600***	0.0142	0.4599	0.1570***	1.1083***
	(0.0149)	(0.8832)	(0.0224)	(0.0968)	(0.0260)	(0.7940)	(0.0172)	(0.1062)
IQ	0.0428*	0.2579**	0.0835**	0.4255**	0.0825*	2.6665	-0.0466**	-0.3287**
	(0.0225)	(0.1288)	(0.0425)	(0.1847)	(0.0461)	(1.6376)	(0.0231)	(0.1632)
REER	0.0139***	0.0835***	-0.0005	-0.0025	0.0161**	0.5219**	0.0072**	0.0511**
	(0.0040)	(0.0266)	(0.0049)	(0.0248)	(0.0068)	(0.2338)	(0.0032)	(0.0236)
KO	0.0550**	0.3316**	0.1060***	0.5405***	-0.0100	-0.3234	0.0421*	0.2971*
	(0.0259)	(0.1722)	(0.0337)	(0.1667)	(0.0415)	(1.3505)	(0.0230)	(0.1669)

	Aggregate Investments		Direct Investments		Portfolio Investments		Other Investments	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	short run	long run	short run	long run	short run	long run	short run	long run
FD_index	0.4140***	2.4956***	-0.3659***	-1.8651***	0.5178***	16.7431***	0.1331*	0.9394**
	(0.0947)	(0.5558)	(0.0997)	(0.4242)	(0.1343)	(5.9691)	(0.0681)	(0.4812)
Global (Push) Factors								
Liquidity	0.0121	0.0732	-0.8353***	-4.2578***	-1.3438***	-43.4532**	-0.0496	-0.3500
	(0.0456)	(0.2716)	(0.2088)	(1.2783)	(0.4207)	(21.6513)	(0.0758)	(0.5371)
Global_growth	-0.0079	-0.0474	0.1073***	0.5470***	0.0155	0.49976	-0.0232***	-0.1641***
	(0.0081)	(0.0477)	(0.0321)	(0.1773)	(0.0379)	(1.2327)	(0.0086)	(0.0597)
SP_500	-0.0037***	-0.0225***	0.0049*	0.0247**	0.0361***	1.1675**	-0.0069***	-0.0488***
	(0.0010)	(0.0066)	(0.0028)	(0.0126)	(0.0119)	(0.5964)	(0.0014)	(0.0136)
Bond_Yield	0.0537***	0.3239***	-0.2960***	-1.5089***	-0.1007	-3.2577	0.0214	0.1507
	(0.0160)	(0.0966)	(0.0637)	(0.3871)	(0.0892)	(3.1315)	(0.0291)	(0.2069)
VIX	-0.0127***	-0.0768***	0.0104	0.0529	0.0385	1.2465	-0.0156***	-0.1104***
	(0.0018)	(0.0102)	(0.0076)	(0.0350)	(0.0257)	(1.0104)	(0.0026)	(0.0186)
WuXia_rate	-0.0200***	-0.1206***	0.0150	0.0766	0.0295	0.9553	-0.0138*	-0.0975
	(0.0067)	(0.0451)	(0.0141)	(0.0754)	(0.0318)	(1.0766)	(0.0083)	(0.0613)
Constant	0.0351		3.7823***		5.2977***		0.3982	
	(0.2140)		(1.2216)		(1.9988)		(0.4298)	
Observations	893		850		893		893	
Number of c_id	47		47		47		47	
Number of IVs	37		37		37		37	
AR(2) (p-value)	0.138		0.209		0.589		0.501	
Hansen's J-test (p-value)	0.122		0.551		0.757		0.114	

Note: Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Author's computation using STATA 16.

The role of global factors as determinants of capital inflows surfaced after the studies of (Calvo et al., 1993; Fernandez-Arias, 1996). Through our estimations, we find that the role of global liquidity measured as the growth rate of M2 in G7 countries is significant only for the FDI and FPI flows indicating the detrimental effect of growth of global liquidity on the capital inflows to developing countries. For every 1percent increase in the liquidity, FDI and FPI flows to developing countries fall by 0.83 and 1.34 percent respectively. The variable of global growth is a significant and positive determinant of FDIs both in the short and long run where for every 1 percent increase in word GDP growth, FDIs increase by 0.10 and 0.54 percent in the short and long run respectively. The coefficient of global growth is also found to be negatively correlated with other investments in developing countries. The variable of S&P 500 returns is used as a proxy for global portfolio returns, remains another significant driver of capital inflows. The notion being that when returns increase, an optimistic trend follows causing more flows of FDI and FPIs to the developing countries, our estimates also suggest that with increase in returns FDI reacts to the same in a positive manner. The VIX defines global risk aversion, which suggest for every point increase in global risk, capital flows reduce in proportion to the developing and emerging markets. Our estimates suggest that a fall in aggregate investment and other investments for every 1 point increase in global risk. The coefficient for FDIs and FPIs however are insignificant. Finally, the coefficient of shadow rates used suggest a negative correlation as opposed to bond yield. Similar results are derived from our estimation using the two-step systems GMM as a robustness check shown in Appendix (Table A1).

4. Conclusion

This study contributes significantly to the extant literature on the determinants of foreign capital flows in developing countries. Our focused discussion on the push and pull framework and its effects on foreign capital flows using a panel of 47 developing economies over 2000 to 2019 draws interesting observations. We find the role of market size is more nuance for FDI flows than for any other types of capital flows, furthermore in the side of domestic drivers, host countries trade openness, quality of institutions, capital account openness and the level of financial development matter to all the capital flows. Whereas, on the other hand, global risk aversion, US bond yield, the shadow rates and global returns and liquidity were found pushing substantial amounts of capital flows to the developing world. Our robust findings based on the recently developed methodology alongside the two-step system GMM model in line with (Blundell and Bond, 1998), suggest the relative merit of global factors over the domestic once in explaining significant surges in the capital flows to the developing economies. Policy drafters should consider sound domestic policies in consort with favourable global factors, which can induce surges in foreign capital for developmental goalmouths. In the context of today's time, where a global pandemic like situation created significant turmoil in both the developed as well as developing world, developing countries like India and other must resort to creating safe heavens with suitable policies to attract huge foreign capital to revive its core economy and substantiate to restore a growing trend in the economy.

Notes

(1) Argentina, Armenia, Bangladesh, Belarus, Benin, Bolivia, Botswana, Brazil, Bulgaria, Cambodia, China, Colombia, Costa Rica, Dominican Republic, Egypt, Arab Rep., El Salvador, Georgia, Ghana, Guatemala, Honduras, India, Indonesia, Jamaica, Jordan, Kazakhstan, Kyrgyz Republic, Malaysia, Mexico, Moldova, Morocco, Namibia, Nicaragua, Nigeria, Pakistan, Paraguay, Peru, Philippines, Russian, Federation, Senegal, Solomon Islands, South Africa, Thailand, Tunisia, Turkey, Ukraine, Vanuatu and Venezuela, RB.

(2) Table 4 reports the estimation from fixed effects model only, although the alternative random effects models had originally been computed, the Hausman test proposed by (Hausman, 1978) validated the use of FEM over the REM model, the Hausman test statistics is reported.

(3) The two-step system GMM estimation results are presented in the Appendix.

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Appendix

Table A1. *Estimates for determinants of foreign capital flows using the two-step systems GMM following (Blundell and Bond, 1998)*

	Aggregate Investments		Direct Investments		Portfolio Investments		Other Investments	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	short run	long run	short run	long run	short run	long run	short run	long run
Domestic (Pull) Factors								
L.AI	0.6112***		0.3054***		0.7329***		0.6240***	
	(0.0432)		(0.0515)		(0.0585)		(0.0463)	
GDP_g	-0.0283***	-0.0727***	0.0221***	0.0318***	-0.0086	-0.0321	-0.0246***	-0.0653***
	(0.0035)	(0.0146)	(0.0080)	(0.0112)	(0.0107)	(0.0415)	(0.0034)	(0.0149)
GC_exp	0.0749**	0.1924**	0.0061	0.0088	-0.0817	-0.3060	0.0347	0.0922
	(0.0367)	(0.0998)	(0.0620)	(0.0895)	(0.0814)	(0.3222)	(0.0395)	(0.1080)
Gross_debt	-0.0799***	-0.2055***	0.0551	0.0793	-0.0926	-0.3468	-0.0287*	-0.0762*
	(0.0175)	(0.0488)	(0.0600)	(0.0873)	(0.0713)	(0.2601)	(0.0163)	(0.0455)
linf2	0.0101	0.0260	0.0207***	0.0297***	-0.0007	-0.0025	0.0036	0.0094
	(0.0063)	(0.0178)	(0.0057)	(0.0076)	(0.0118)	(0.0437)	(0.0075)	(0.0205)
TO	0.1635***	0.4206***	0.3101***	0.4464***	0.0821	0.3074	0.1985***	0.5280***
	(0.0314)	(0.0854)	(0.0552)	(0.0821)	(0.0702)	(0.3082)	(0.0470)	(0.1343)
IQ	0.0715	0.1838	0.3360***	0.4837***	0.3487**	1.3054***	-0.1272**	-0.3384**
	(0.0485)	(0.1236)	(0.1073)	(0.1459)	(0.1647)	(0.4474)	(0.0584)	(0.1500)
REER	0.0151	0.0387	0.0203	0.0292	0.0455	0.1705	0.0069	0.0183
	(0.0109)	(0.0270)	(0.0162)	(0.0237)	(0.0402)	(0.1428)	(0.0112)	(0.0298)
KO	0.0924	0.2377*	0.3307***	0.4760***	0.2484	0.9301*	0.0696	0.1852
	(0.0565)	(0.1432)	(0.0887)	(0.1312)	(0.1538)	(0.5572)	(0.0710)	(0.1876)
FD_index	0.8616***	2.2163***	-0.5086**	-0.7322**	0.5647	2.1143	0.2776*	0.7382**
	(0.2408)	(0.4721)	(0.2414)	(0.3459)	(0.5232)	(1.6783)	(0.1522)	(0.3737)
Global (Push) Factors								
Liquidity	0.0093	0.0238	-1.2723***	-1.8318***	2.0141***	7.5411**	-0.0493	-0.1311
	(0.0562)	(0.1451)	(0.2946)	(0.4406)	(0.6429)	(3.4734)	(0.0821)	(0.2161)
Global_growth	0.0253***	0.0651**	0.0178	0.0256	-0.1281**	-0.4797**	-0.0016	-0.0043
	(0.0095)	(0.0280)	(0.0226)	(0.0333)	(0.0510)	(0.2345)	(0.0115)	(0.0304)
SP_500	-0.0032***	-0.0082***	0.0066***	0.0095***	-0.0414***	-0.1551***	-0.0050***	-0.0134***
	(0.0010)	(0.0023)	(0.0020)	(0.0031)	(0.0125)	(0.0588)	(0.0013)	(0.0034)
Bond_Yield	0.0224	0.0576	-0.2532***	-0.3644***	0.5730***	2.1453***	0.0126	0.0335
	(0.0149)	(0.0390)	(0.0427)	(0.0700)	(0.0750)	(0.5845)	(0.0189)	(0.0505)
VIX	-0.0117***	-0.0300***	0.0125**	0.0180**	-0.0632**	-0.2365**	-0.0133***	-0.0353***
	(0.0029)	(0.0073)	(0.0058)	(0.0086)	(0.0267)	(0.1138)	(0.0030)	(0.0080)
WuXia_rate	-0.0172***	-0.0442***	0.0213	0.0306	-0.2425***	-0.9078***	-0.0109*	-0.0289*
	(0.0056)	(0.0158)	(0.0159)	(0.0229)	(0.0610)	(0.3271)	(0.0056)	(0.0162)
Constant	0.4009		5.0097***		-8.5449***		0.4736	
	(0.3330)		(1.6609)		(2.7645)		(0.5582)	
Observations	893		850		893		893	
Number of c_id	47		47		47		47	
Number of IVs	38		38		38		38	
AR(2) (p-value)	0.166		0.435		0.221		0.540	
Hansen's J-test (p-value)	0.178		0.322		0.317		0.194	

Note: Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1.
Source: Author's computation using STATA 16.

Table A2. *Data source*

Variable	Data Definition	Data Source
AI	Aggregate Investment % of GDP	Authors Computation using IMF BOP statistics.
DI	Direct Investment or Foreign Direct Investment % of GDP	Authors Computation using IMF BOP statistics.
FPI	Foreign Portfolio Investment % of GDP	Authors Computation using IMF BOP statistics.
OI	Other Investment % of GDP	Authors Computation using IMF BOP statistics.
GDP_g	GDP growth rate annual %	WDI, World Bank.
GC_exp	General Government Final Consumption Expenditure annual %	WDI, World Bank
Gross_debt	Gross Debt % of GDP	WDI, World Bank
linf2	Log of Inflation	WDI, World Bank
IQ	Institutional Quality	Authors Computation using, mean of 6 governance indicators (Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law and Voice and Accountability) WGI, World Bank.
REER	Real Effective Exchange rate	WDI, World Bank
TO	Trade Openness	WDI, World Bank
KO	Capital Account Openness Index	(Chinn and Ito, 2007)
FD_index	Index of Financial Development	IMF (Svirydzenka, 2016)
Liquidity	Global Liquidity	Growth rate of M2 of G7 economies, WDI, World Bank
Global_growth	Growth Rate of World GDP annual %	WDI, World Bank
SP_500	Global Returns S&P 500 index returns	Annual Data extracted from www.macrotrends.net
Bond_Yield	US Government Bond yield (10Yr Treasury Bond)	Bloomberg
VIX	Global Volatility Index (VIX/VXO)	Chicago Board Options Exchange's CBOE Volatility Index
WuXia_rate	Wu-Xia shadow federal funds rate	Board of Governors of the Federal Reserve System and Wu-Xia (2016)