Dynamics of Capital Flows and Global Factors: Case of Emerging and Developing Economies

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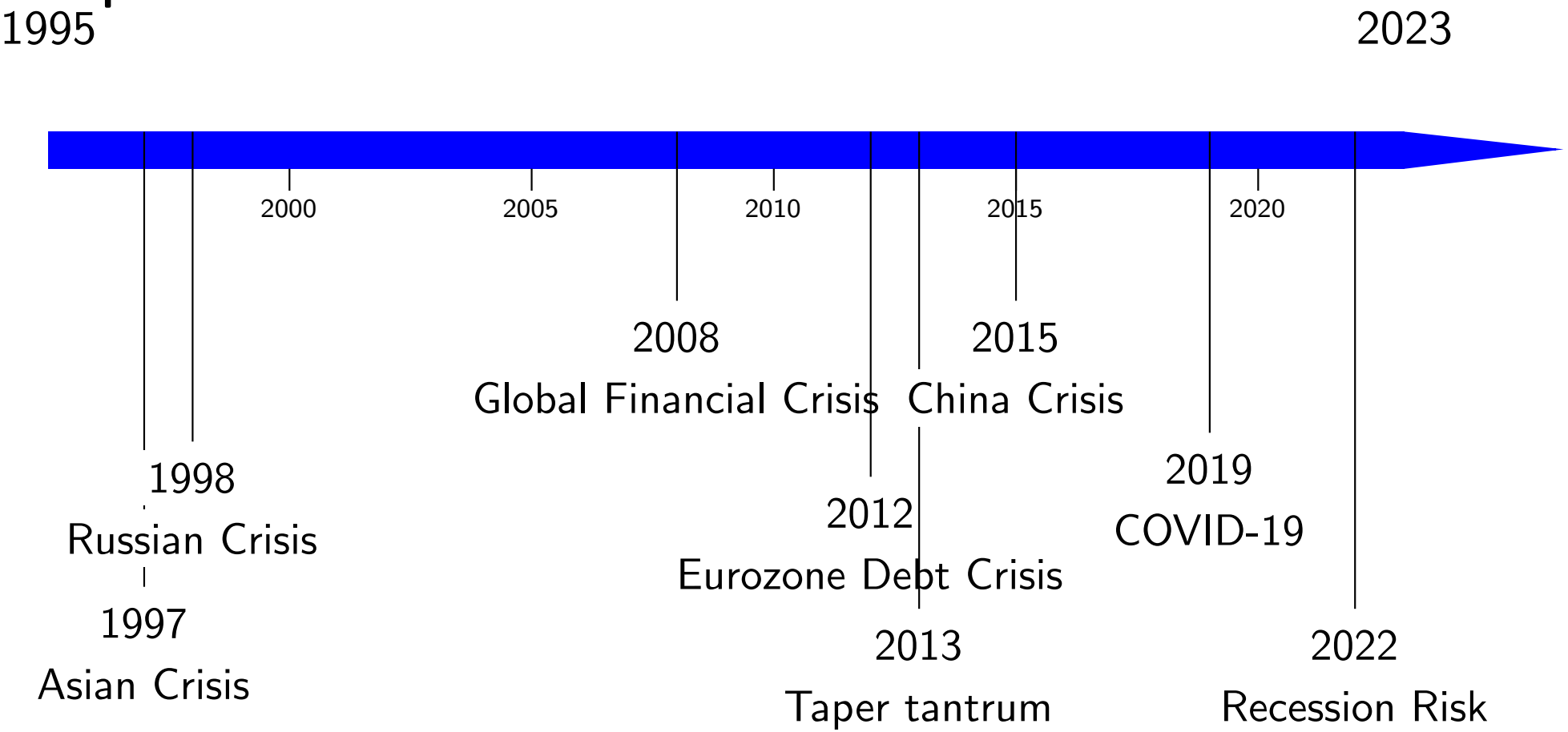
Outline of the presentation

- Introduction & Motivation
- Preview of Results
- Literature Review & Contribution
- Econometric Methodology
- Data and Variables
- Results
- Discussion & Conclusion

Introduction & Motivation I

- Expansion in international trade and cross-border movement of capital $\Longrightarrow$ enhanced integration with global financial markets.
- Recurring incidence of financial crisis and high capital flow volatility

Capital Flows over the decades



Introduction & Motivation II

- Capital flows have major consequences on macroeconomic fundamentals, financial stability and resilience in both host and source economies.
- The emerging and developing economies (EMDEs) are witnessing large and volatile capital flows since the Global Financial Crisis (GFC).
- Therefore, understanding the drivers of capital flows is important for designing policy in these economies.

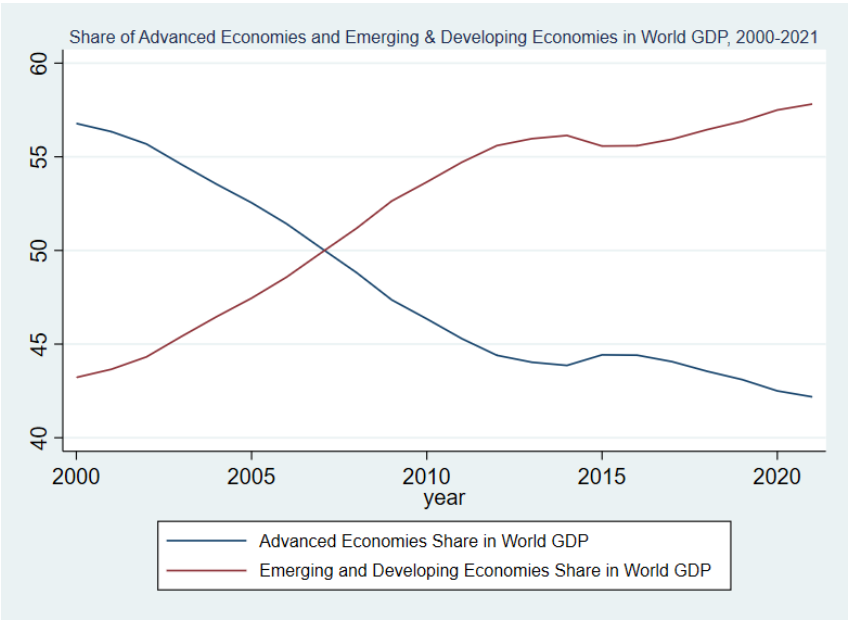
Introduction & Motivation III

Key Questions

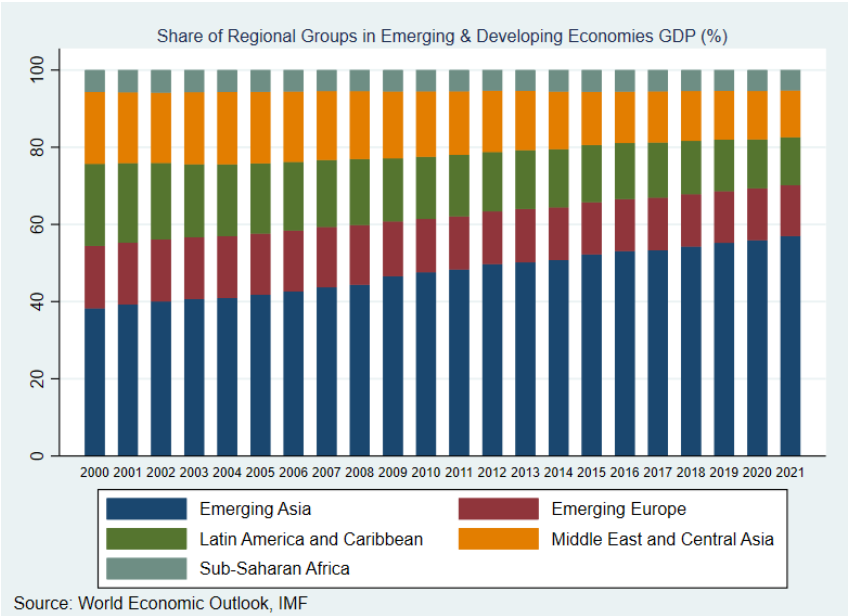
- What drives the capital flows to EMDEs? Global, regional or country-specific factors
- What factors cause the global economic fluctuations impacting the capital flows?
- How can EMDEs become resilient to global fluctuations and reduce the volatility in the capital flows?

Emerging and Developing Economies

Figure 1: Share in GDP



(a) Share in World GDP (%), 2000-2021



(b) Share in Emerging & Developing Countries GDP (%), 2000-21

Source: Authors' calculations using WEO data

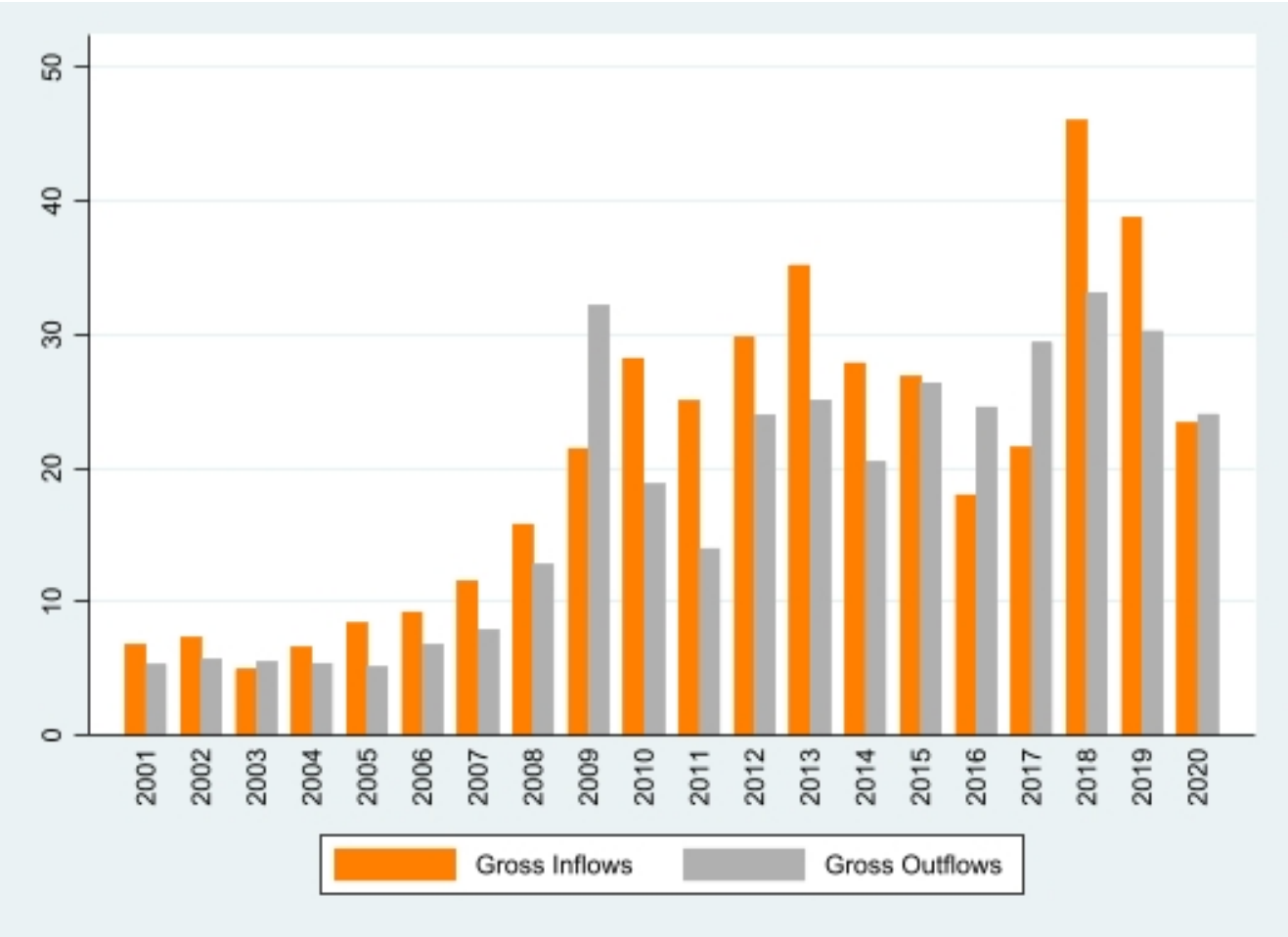
Overview of Capital Flow Data

Figure 2: Gross Capital Flows ($ mn)

Source: Authors' calculations using CEIC database

Overview of Capital Flow Data

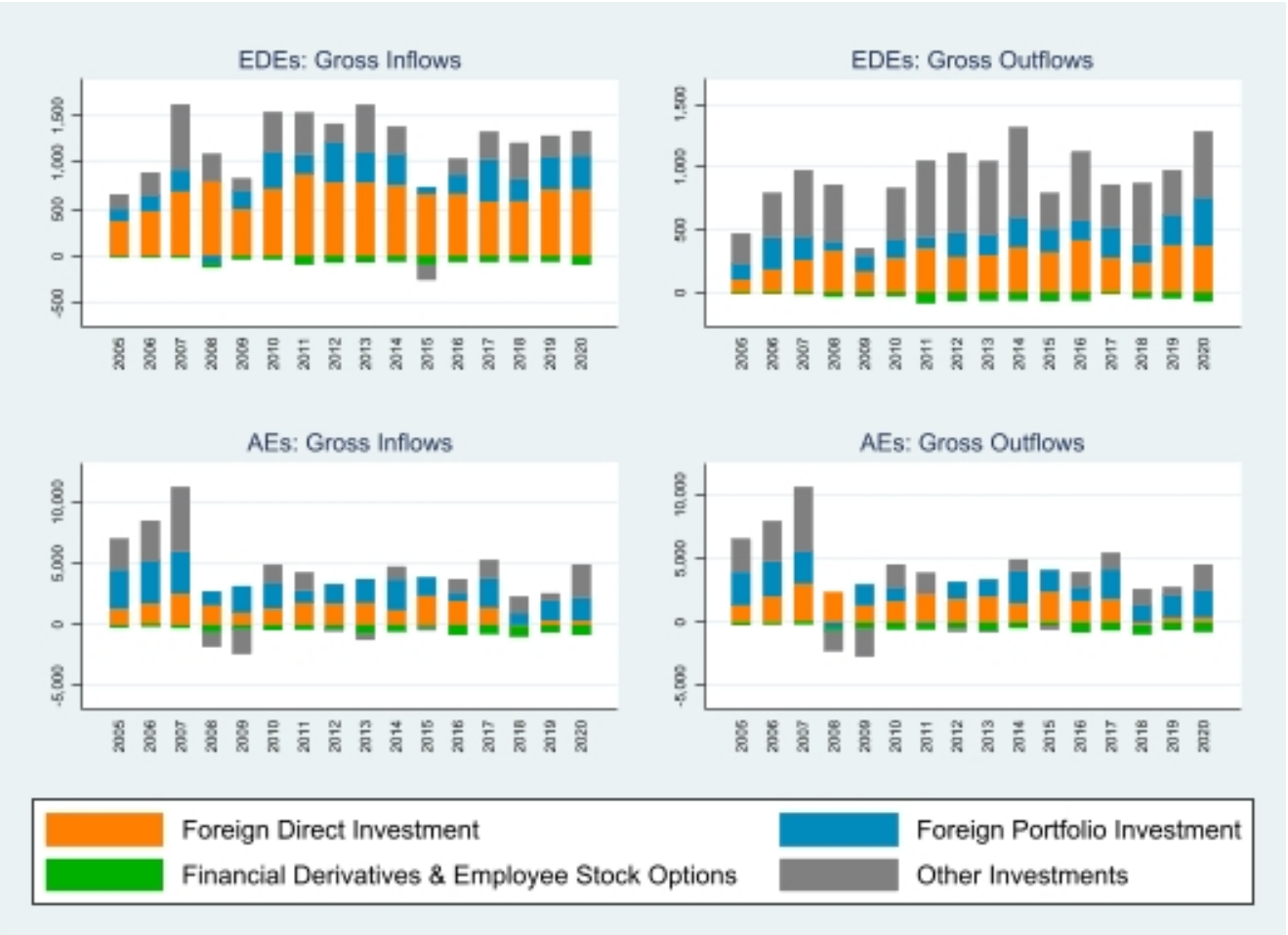
Figure 3: Share of Emerging and Developing Economies in World Capital Flows



Source: Authors' calculations using Molina & Viani (2019) and CEIC

Composition of Capital Flows

Figure 4: Composition of Capital Flows ($ mn)



Source: Authors' calculations using CEIC data

Research Question

Aim of the paper

To examine the role of domestic macroeconomic and structural factors in affecting the sensitivity of gross capital flows to variation in global factors in the case of emerging markets and developing economies.

- Estimate the common global and regional factors from cross-country panel data of gross capital flows for EDEs using two-level dynamic factor model
- Examine the drivers of global factors
- Examine the role of domestic macroeconomic and structural factors in affecting the sensitivity of gross capital flows to variation in global factors using the data on factor loadings

Preview of Results

- Common global factor explains much of the variation in the observed capital flow data, with marked heterogeneity across regions.
- The determinants of the global factors are found to be global risk, global liquidity, advanced economies' growth, commodity prices, US real effective exchange rate, and short-term interest rate.
- Among domestic macroeconomic variables, capital account openness, trade openness, macroeconomic and financial instability, FX reserves, and exchange rate flexibility are significant in affecting the sensitivity of capital flows to global factors.

Literature

- Drivers of Capital Flows
  e.g. Sarno et al. (2016); Forbes and Warnock (2012); Scheubel et al. (2019)

- Co-movement of capital flows
  e.g. Passari and Rey (2015); Förster et al. (2014); Fratzscher (2012); Eller et al. (2020)

- Relevance of Mundellian trilemma
  e.g. Georgiadis and Mehl (2015); Aizenman et al. (2016); Obstfeld et al. (2019); Lu et al. (2022)

Literature

- Estimation of common global factor and *global financial cycle*
  e.g. Rey (2015); Förster et al. (2014); Cerutti et al. (2019); Bruno and Shin (2015); Habib and Venditti (2019), Obstfeld (2021)

- Covariates of common factor
  e.g. Miranda-Agrippino and Rey (2012); Avdjiev et al. (2017); Cerutti et al. (2019); Obstfeld et al. (2019)

- Role of domestic macroeconomic factors
  e.g. Eller et al. (2020); Barrot and Serven (2018); Buono et al. (2020); Habib and Venditti (2019)

Contribution to the Literature

- We contribute to two sets of literature, studies examining *push* and *pull* factors and those estimating latent factor models to examine commonalities in capital flows.
- We extend the dimension of analysis in a few key areas with a wider set of explanatory variables while examining the heterogeneity in sensitivity of capital flows to global factors.
- The dataset employed for analysis is of quarterly frequency and records gross instead of net capital flows.
- Our sample excludes advanced economies as a sample consisting of both advanced and emerging economies can mask the volatility in the global factor.

Econometric Methodology

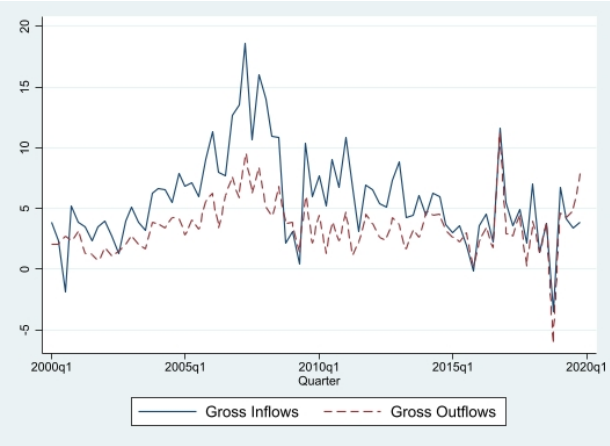
- Two-level dynamic factor model (DFM) is used to extract global and regional factors from the observed capital flow data, estimated via the Expectation-Maximization (EM) algorithm (Dempster et al. (1977); Banbura and Modugno (2010)).
- Autoregressive Distributed Lag Model (ARDL) is used to find the long-run relationship between the global factors for capital inflows and outflows with the global financial variables.
- Panel Generalized Least Squares (GLS) technique is used to regress the factor loadings of global factors for gross inflows and outflows on the country-specific macroeconomic and financial variables.

Country & Time Coverage

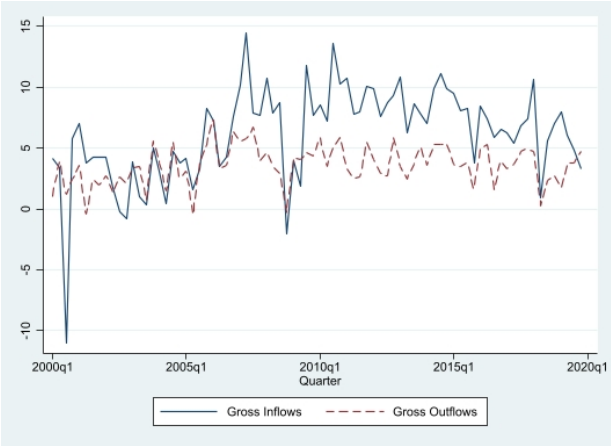
- The economies with a share of more than one percent of the region's GDP in the years 2001-2019 are selected in the sample.
- The sample includes 23 emerging and developing economies (7 from Latin America and the Caribbean, 7 from Asia, and 9 from Europe)
- The period covered is from 2000q1 to 2019q4.
- The selection of the period is motivated by the data coverage of the explanatory variables at a quarterly frequency and also to circumvent the structural break issues in capital flows during the 1980s and 1990s.
- This period is also indicative of the current level of financial integration in the global markets.

Descriptive Statistics

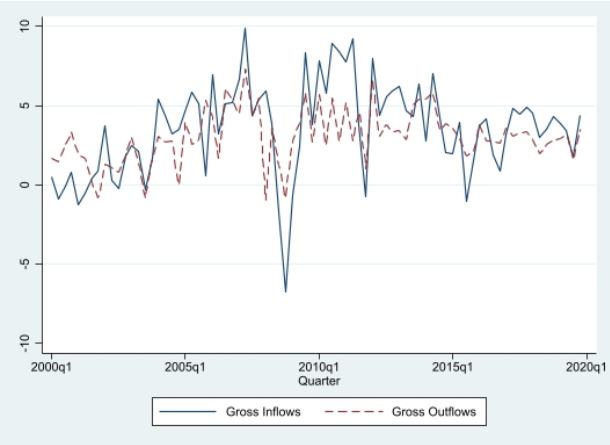
Figure 5: Gross Capital Flows (as a % of GDP)



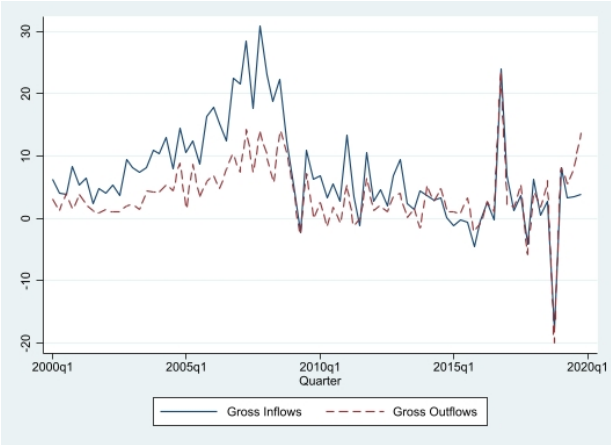
(a) All countries



(b) Latin America and the Caribbean



(c) Asia



(d) Europe

Cross-sectional Dependence in Capital Flows

- The exponent of strong dependence ranges from 0 to 1 and a value greater than 0.5 corresponds to evidence of strong dependence (Bailey et al., 2016, 2019).
- For testing weak dependence, Pesaran (2015) test is employed.

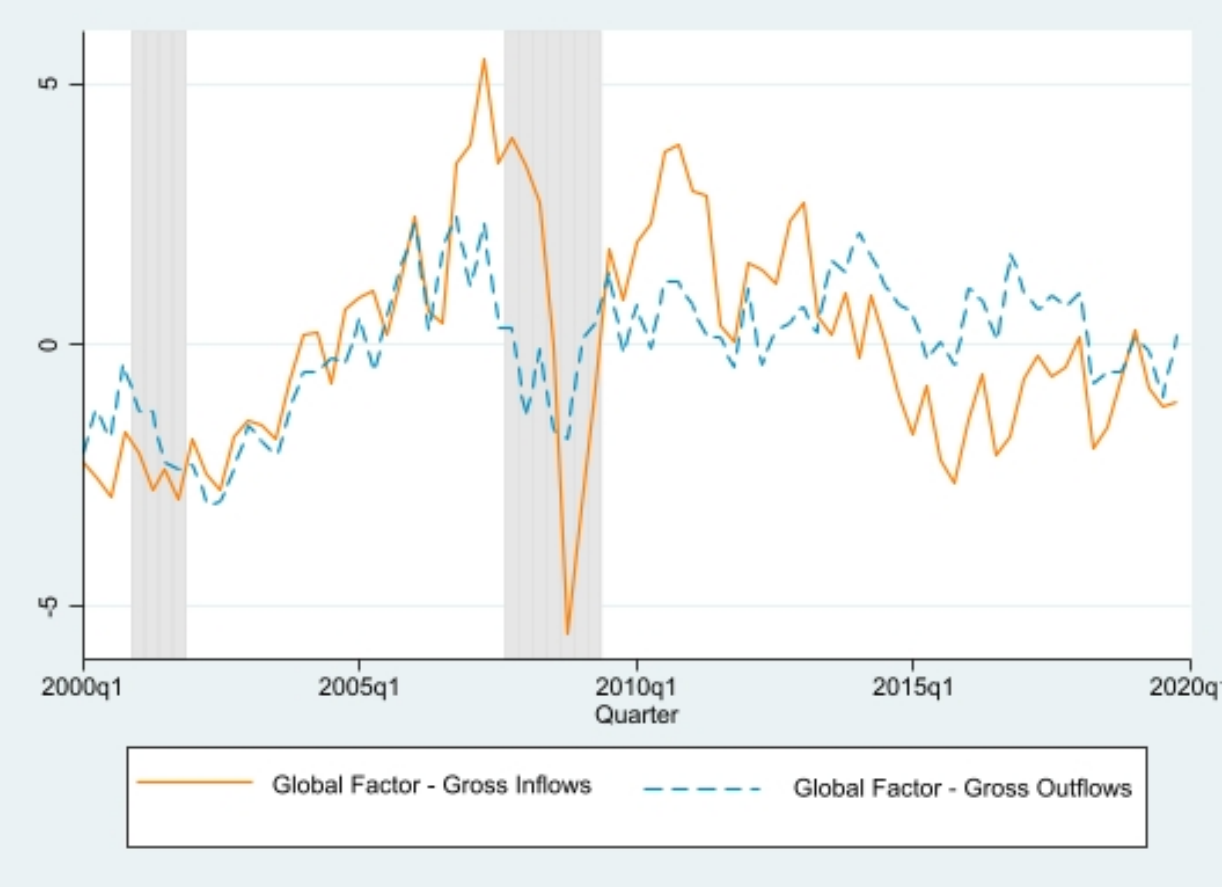
Table 1: Exponent of strong and weak cross-sectional dependence

Region	Gross Inflows	Gross Outflows	Gross Inflows	Gross Outflows
	Strong Dependence		Weak Dependence	
Total	0.99 (0.88, 1.10)	0.85 (0.75, 0.94)	25.72***	5.95***
Asia	0.99 (0.86, 1.14)	0.99 (0.87, 1.11)	10.52***	3.33***
Europe	0.99 (0.8, 1.2)	0.91 (0.82, 1.01)	17.51***	2.5**
Latin America & the Caribbean	0.99 (0.91, 1.08)	0.83 (0.76, 0.91)	9.608***	0.57

Confidence interval in the parentheses. *** p<0.01, ** p<0.05

Results: Estimation of Factors

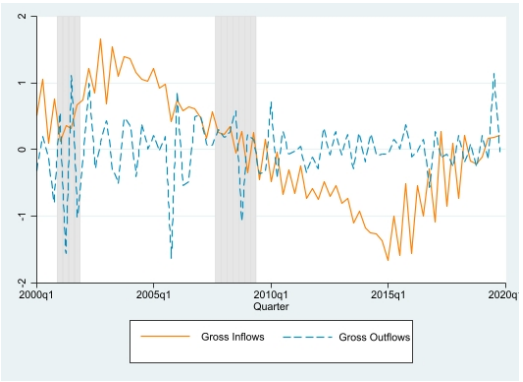
Figure 6: Global Factors



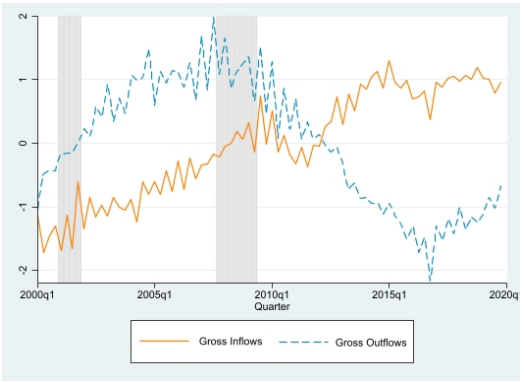
Note: Grey shaded area corresponds to the following NBER business cycle dates: March 2001 - November 2001, December 2007 - June 2009, and February 2020 - April 2020

Results: Estimation of Factors

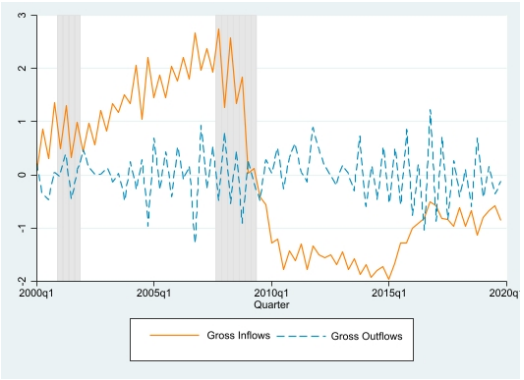
Figure 7: Regional Factors



(a) Latin America and the Caribbean



(b) Asia



(c) Europe

Note: Grey shaded area corresponds to the following NBER business cycle dates: March 2001 - November 2001, December 2007 - June 2009, and February 2020 - April 2020

Correlation of factors

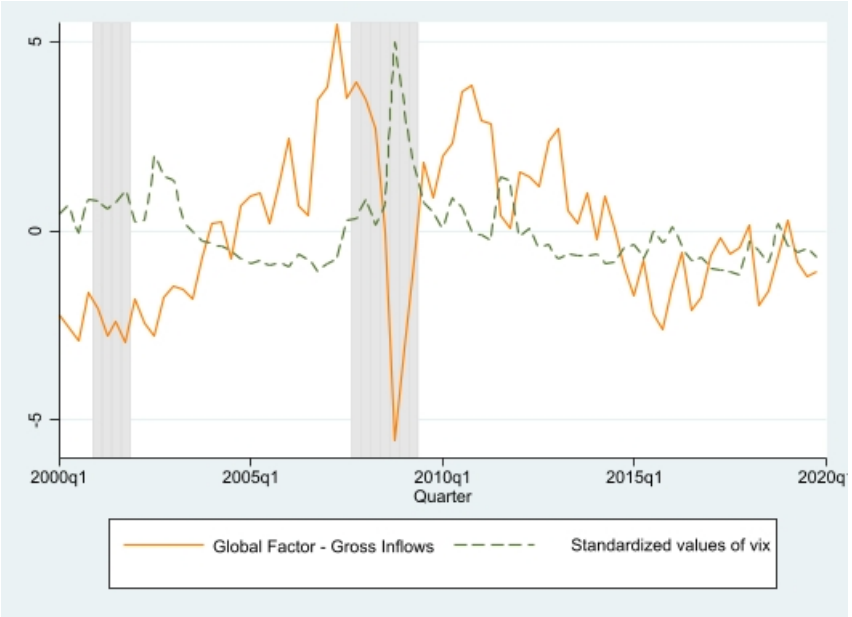
Table 2: Correlation of factors

Flow\Region		Gross Inflows				Gross Outflows			
		Total	Asia	Europe	LA	Total	Asia	Europe	LA
Gross Inflows	Total	1							
	Asia	-0.06	1						
	Europe	0.03	0.77*	1					
	LA	-0.07	0.78*	0.8*	1				
Gross Outflows	Total	0.59*	-0.5*	-0.26	-0.47*	1			
	Asia	0.41*	0.6*	0.65*	0.53*	-0.09	1		
	Europe	0.11	0.01	-0.14	0.09	-0.04	0.03	1	
	LA	0.19	-0.08	-0.06	-0.002	-0.01	0.03	-0.02	1

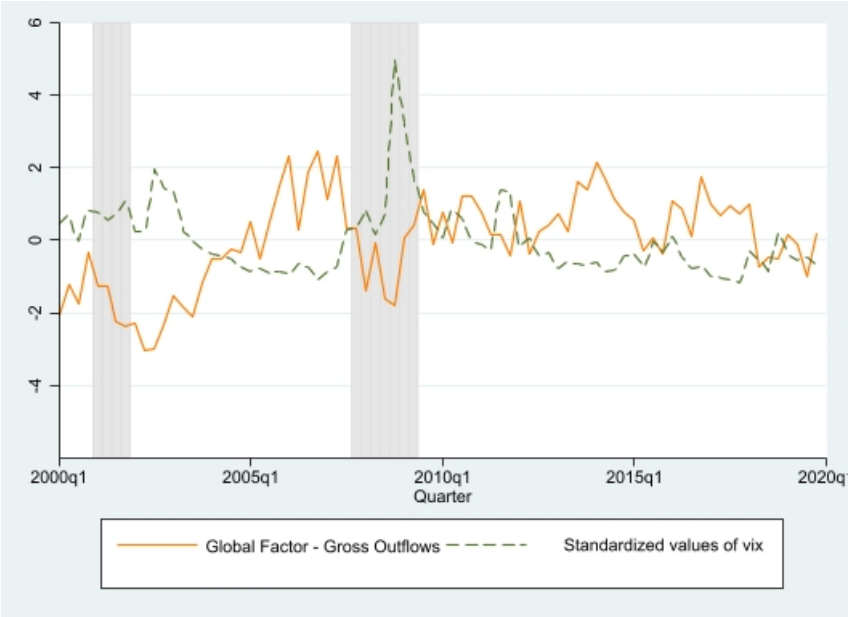
LA stands for Latin America & the Caribbean. * p<0.01

Global Factors and VIX

Figure 8: Global Factors and VIX



(a) Global Factor - Gross Inflows

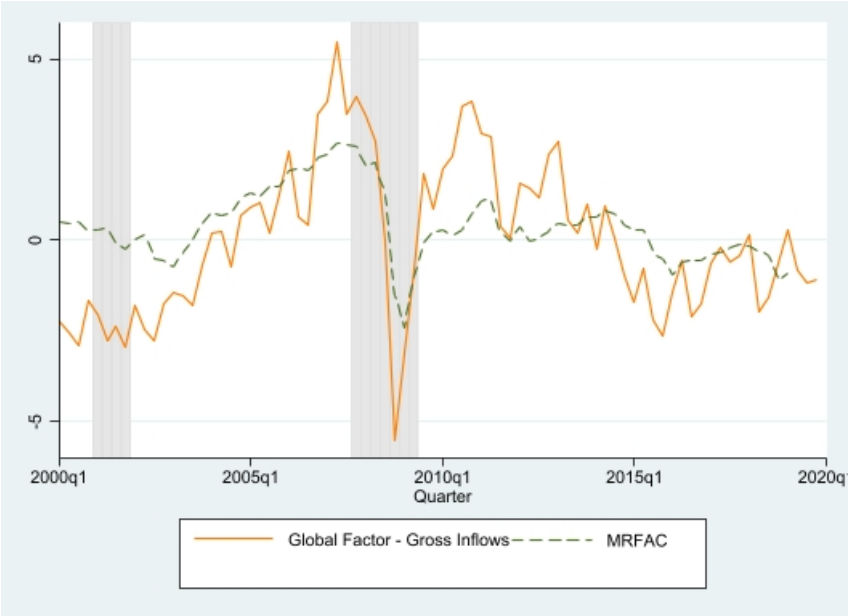


(b) Global Factor - Gross Outflows

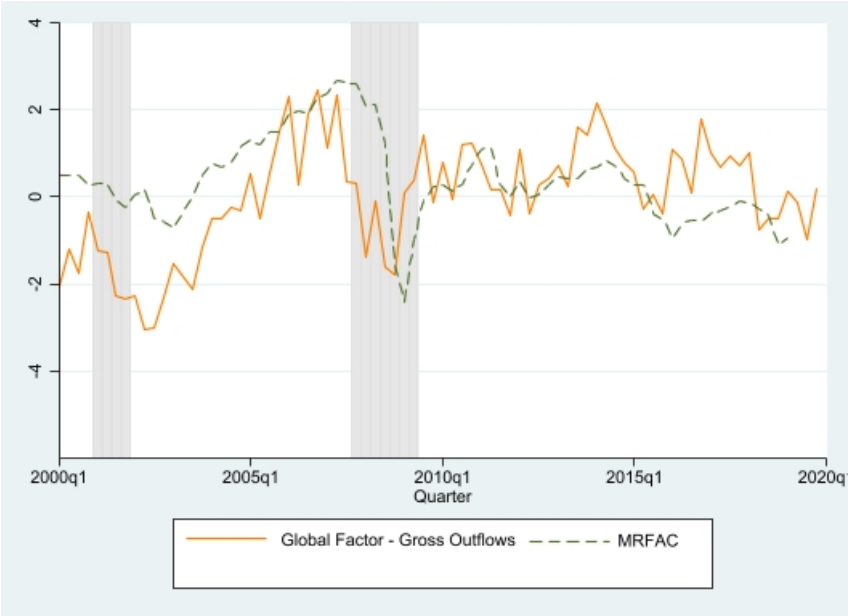
- Negative association between global factors and VIX
- The correlation coefficient between VIX and the global factors are -0.5 and -0.38 for gross inflows and outflows respectively

Global Factors and MRFAC

Figure 9: Global Factors and Miranda & Rey (2016) factor (MRFAC)



(a) Global Factor - Gross Inflows

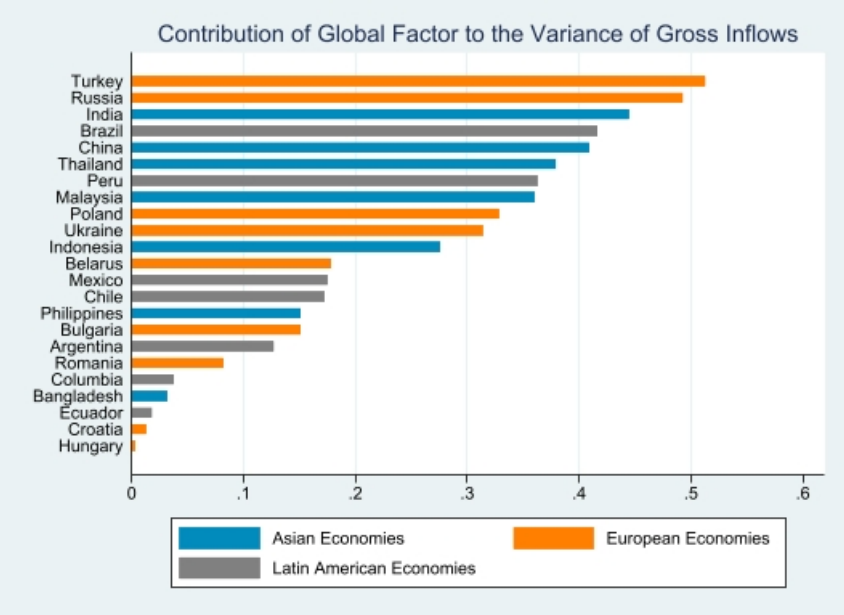


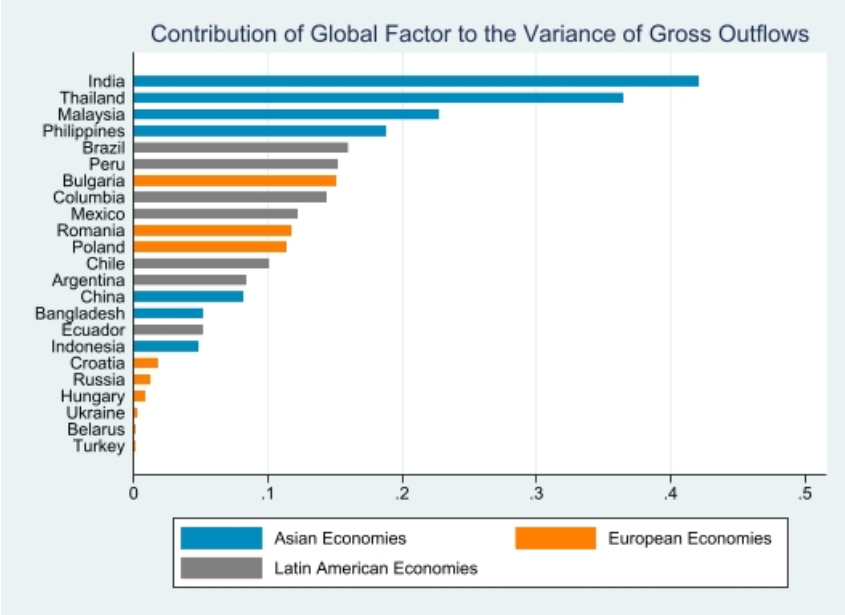
(b) Global Factor - Gross Outflows

- The global factors and MRFAC show high degree of commonality
- The correlation coefficient are 0.7 and 0.32 for gross inflows and outflows respectively
- It indicates the presence of a *global financial cycle* as discussed in Miranda-Agrippino and Rey (2020) and Rey (2015).

Variance Contribution of Global Factors

Figure 10: Variance Contribution of Global Factors





Results: Drivers of Global Factor

- ARDL regression results are presented. ECT refers to the error-correction term.
- For both the regressions, the bounds test following Pesaran et al. (2001) is conducted and the null of no levels relationship is rejected for gross inflows and outflows at 1 percent and 5 percent level of significance respectively.
- US IIP and US REER are included in logarithm terms in the model.
- Robustness checks: alternative measures of global risk and US monetary policy

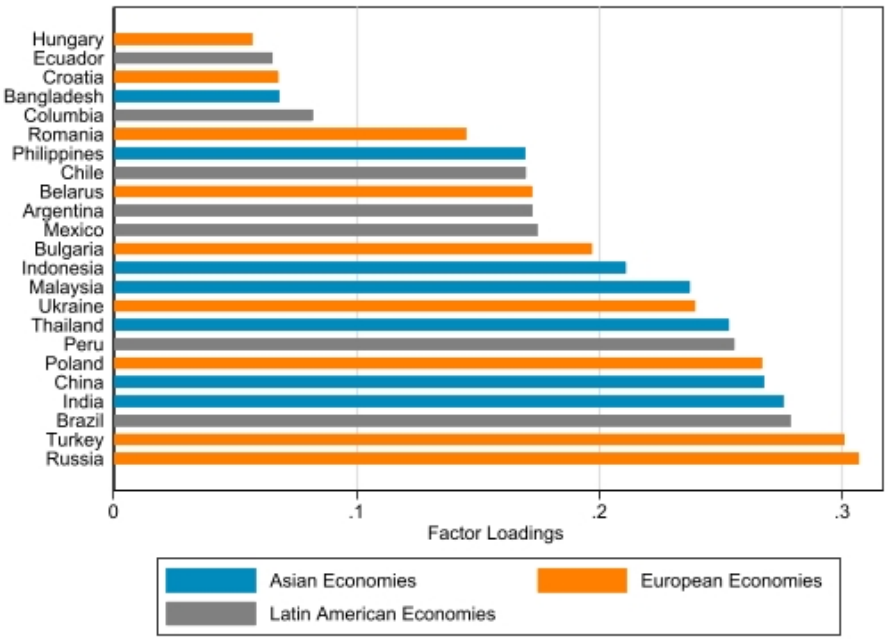
Table 3: Covariates of Global Factors

Variables	Gross Inflows	Gross Outflows
Global Risk	-0.086***	-0.094***
	(0.028)	(0.021)
Global Liquidity	0.069*	-0.073**
	(0.035)	(0.036)
Global Commodity Prices	0.046*	-0.039*
	(0.024)	(0.024)
US IIP	-12.516**	
	(4.909)	
US REER	-7.620	-19.580***
	(6.202)	(6.467)
US Monetary Policy	0.195*	0.246**
	(0.112)	(0.113)
ECT	-0.691***	-0.516***
	(0.113)	(0.141)
Constant	63.176***	49.912***
	(20.939)	(16.696)
Observations	75	75
R-squared	0.566	0.446

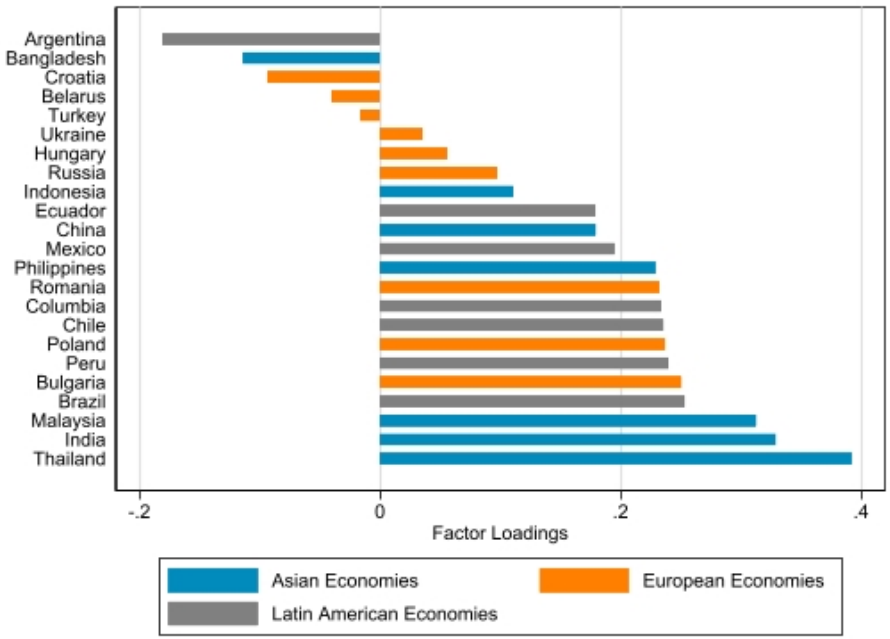
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results: Global Factor Loadings

Figure 11: Global Factor Loadings



(a) Gross Inflows



(b) Gross Outflows

Results: Role of Domestic Factors

- The global factor loadings are estimated over moving 20-quarter windows and the explanatory variables are averages over the respective window and enter the model with one-period lag.
- The panel GLS-AR(1) regression results are presented.

Table 4: Determinants of sensitivity of gross capital flows to global factor

VARIABLES	(1) Gross Inflows	(2) Gross Outflows
Trade Openness	-0.014*	0.006
	(0.008)	(0.004)
Exchange Rate Arrangement	-0.008**	-0.013***
	(0.004)	(0.004)
Macroeconomic Instability	0.095***	0.078***
	(0.028)	(0.016)
Financial Instability	0.029***	0.009
	(0.009)	(0.008)
Capital Account Openness	0.003	0.221***
	(0.071)	(0.046)
FX Reserves	0.010	-0.027***
	(0.010)	(0.006)
Constant	-0.396***	-0.296***
	(0.132)	(0.081)
Observations	1,380	1,380
Number of countries	23	23

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Discussion & Conclusion I

- The global factors for gross capital inflows and outflows are found to follow very similar patterns in the sample of emerging and developing economies, with a correlation coefficient of 0.59.
- The gross inflows are more strongly affected by the common shocks than the gross outflows for all three regions, with common factors contributing a much bigger share of the variance in the Asian economies.
- In terms of magnitude, the variance contribution of global factors remains low and the role of domestic fundamentals (*pull*) cannot be sidelined in the case of emerging economies.
- We find evidence of a tight link between the global factor summarizing the co-movement between the observed capital flows with the measure of global risk and the US financial and macroeconomic variables.

Discussion & Conclusion II

- We do not find evidence that the Mundellian trilemma is reduced to a dilemma, as postulated in Rey (2015) and our analysis suggests that the exchange rate regime and flexibility do affect the international transmission of global financial conditions when there is an open capital account.
- The results suggest that trade openness reduces the sensitivity of gross inflows to global shocks with no significant impact on gross outflows, while capital account openness increases the responsiveness of capital outflows to global shocks.
- A more financially open economy is found to have a larger exposure to global factors through capital flows.
- The opening of the capital account calls for a gradual and sequential approach with capital flow measures like controls and macroprudential measures in place.

Discussion & Conclusion III

- International coordination in terms of monetary policy and financial market regulations appears to be crucial, given the presence of global financial movement (or *cycle*).
- We find evidence that in economies with flexible exchange rates, macroeconomic and financial stability, high level of FX reserves, and integrated trade sector, global factors have less of an effect on capital flow volatility.