

# The Transmission of Global Monetary and Credit Shocks on Exchange Market Pressure in Emerging Markets and Developing Economies

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# Research Goals

- To analyze how shocks in global monetary liquidity and global credit conditions transmit to exchange market pressure in emerging market and developing economies.
- To assess the impact of the shocks based on the degree of trade openness and capital account openness.

# Research Motivation

- After Global Financial Crisis, understanding the transmission of shocks from advanced economies to macroeconomic and financial conditions in emerging and developing economies has been of great interest.
- There has not been enough consideration about the effects of shocks on exchange market conditions.
- Exchange rates and foreign exchange market dynamics are important for this subset of countries: vulnerable to conditions that lead to excessive volatility or a build up of appreciation/depreciation pressure.
- Such conditions can translate to slowed growth, decreased trade, and adverse domestic economic conditions, since underdeveloped domestic markets may be less likely to fully absorb such shocks.
- Since many EMEs engage in some degree of exchange rate management, using EMPI assesses the build up of pressure in currency markets from the shocks.
- This research builds on Hossfeld and Pramor (2018): surges in monetary liquidity, credit provision and short-term funding in advanced economies increase appreciation pressure in emerging economies, using various calculations of EMPI and regression analysis.

# Research Findings

- Spikes in global monetary liquidity or increases in credit globally correspond to greater appreciation pressure in emerging markets and developing economies.
- Countries that are more open in trade and capital accounts are less susceptible to global shocks.
- Highly open group of countries experience smaller or non-significant effects on their EMPI from global monetary shocks. The results are mixed for global credit shocks. In post-2009 era, shocks in credit conditions yield appreciation pressure in EMPI of equal magnitude regardless of openness.
- In general, economies that are less open experience a more sizeable build-up of exchange market pressure in response to global shocks.
- From a policy perspective, this is critical in supporting greater international integration.

# Summary of Quantitative Approach

## Panel Vector-Autoregression analysis to determine:

- The effect of shocks in global monetary liquidity on EMPI (monthly data)
- The effect of shocks in global credit liquidity on EMPI (quarterly data)

## Data:

- Balanced panel of 40 emerging market and developing economies: 1998-2016
- Exchange Market Pressure Index: Patnaik, Felman and Shah (2017)
- Segment panel based on degree of openness:
  - Trade Openness: Exports + Imports (%GDP)
  - Capital Account Openness: IMF Wang-Jahan Index

# Exchange Market Pressure Index: EMPI

## Patnaik EMPI:

- Representation of the build-up of pressure in foreign exchange market.
- Value of the exchange rate that would have occurred if the central bank did not conduct foreign exchange intervention.

$$EMP_t = \Delta e_t + \rho_t I_t \quad (1)$$

- $\Delta e_t$ : percentage change in the local currency against the US dollar (USD)
- $\rho_t$ : conversion factor associated with an intervention of USD 1 billion
- $I_t$ : size of the foreign exchange intervention measured in billions of US dollars

# Global Monetary and Credit Liquidity Shocks

## Global Monetary Liquidity Shocks:

- $\Delta M1$ : monthly log difference in the sum of M1 in the United States, Japan and UK in USD billion (IMF)
- $\Delta M3$ : monthly log difference in the sum of M3 in the United States, Japan and UK in USD billion (IMF)

## Global Credit Liquidity Shocks:

- $\Delta CBC$ : the quarterly log difference of total cross-border claims (BIS)
- $\Delta LCC$ : the quarterly log difference of local claims (BIS)

# Panel Vector Autoregression Analysis

**Panel VAR technique following Love and Zicchino (2006) and Abrigo and Love (2015):**

$$z_{i,t} = \rho_0 + \rho_1 z_{i,t-1} + \mu_{i,t} + e_{i,t} \quad (2)$$

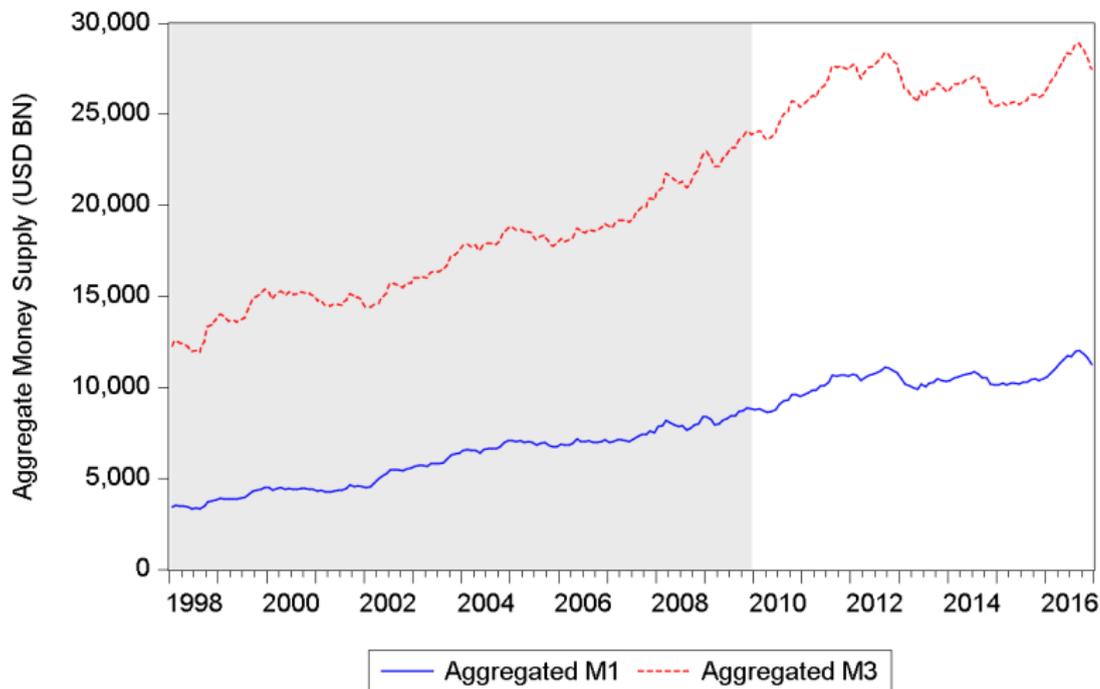
where  $z_{i,t}$  represents one of two vectors:

- (1)  $EMPI, \Delta M1, \Delta M3$  for assessing shocks in global monetary liquidity.
- (2)  $EMPI, \Delta CBC, \Delta LCC$  for assessing shocks in global credit conditions.
- $\mu_{i,t}$  and  $e_{i,t}$  are vectors of dependent variable-specific fixed effects and idiosyncratic errors, respectively.
- The optimal lag length: minimizing the Akaike, Bayesian and Hannan-Quinn information criteria.

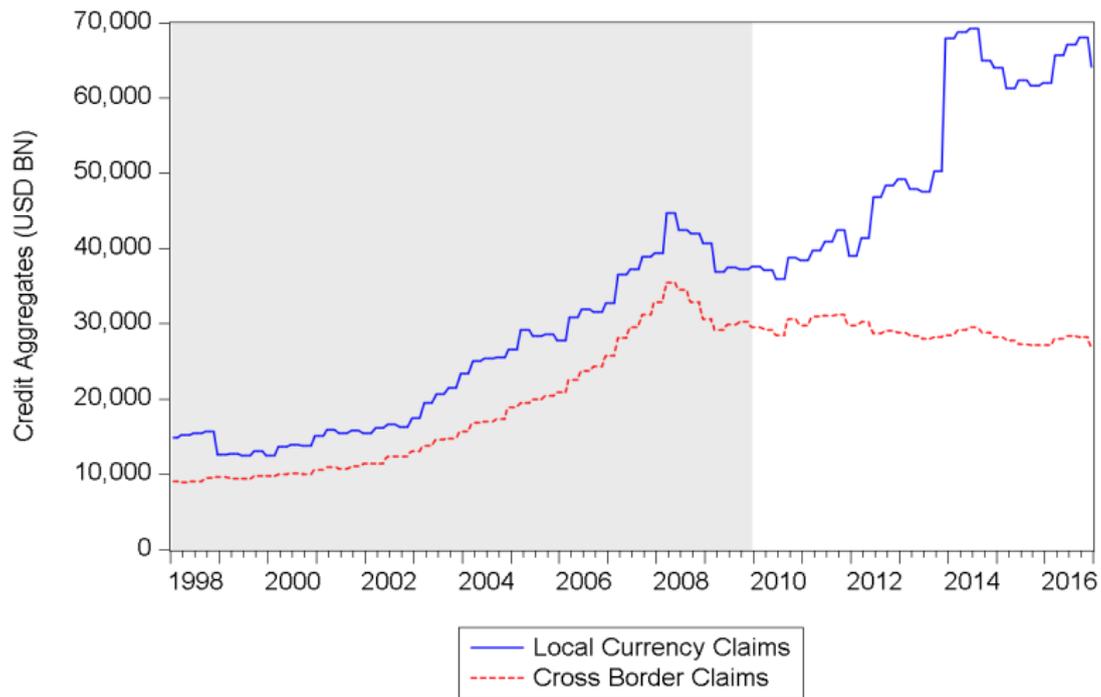
**Estimate using panel data set segmented based on the degree of openness in trade and capital accounts.**

| Degree of Trade Openness           |       |               |       |
|------------------------------------|-------|---------------|-------|
|                                    | High  |               | Low   |
| Belize                             | 37.90 | Argentina'    | 6.33  |
| Bulgaria*                          | 25.66 | Bangladesh'   | 5.56  |
| Costa Rica*                        | 21.14 | Belarus'      | 13.40 |
| Croatia                            | 29.69 | Bolivia       | 11.25 |
| Czech Republic*                    | 20.35 | Brazil'       | 4.38  |
| Dominican Republic*                | 19.61 | Chile         | 10.74 |
| Egypt*                             | 17.58 | Colombia'     | 5.54  |
| Honduras*                          | 23.61 | Guatemala     | 10.20 |
| Hungary*                           | 26.14 | Indonesia     | 8.29  |
| Kenya *                            | 14.49 | Mexico'       | 4.21  |
| Lithuania*                         | 19.59 | Pakistan'     | 6.26  |
| Madagascar                         | 22.01 | Peru          | 6.82  |
| Malaysia                           | 27.57 | Philippines'  | 12.70 |
| Moldova                            | 27.58 | Poland'       | 13.92 |
| Morocco                            | 22.32 | Romania'      | 12.66 |
| Mongolia*                          | 21.58 | Russia '      | 9.07  |
| Singapore*                         | 82.98 | South Africa' | 9.50  |
| Slovakia*                          | 18.10 | Sri Lanka'    | 13.83 |
| Slovenia*                          | 20.32 | Turkey'       | 8.12  |
| Thailand                           | 23.86 | Uruguay       | 12.08 |
| Degree of Capital Account Openness |       |               |       |
|                                    | High  |               | Low   |
| Bolivia                            | 0.87  | Argentina     | 0.33  |
| Bulgaria                           | 0.89  | Belize        | 0.05  |
| Chile                              | 0.74  | Bangladesh    | 0.36  |
| Costa Rica                         | 0.95  | Belarus       | 0.05  |
| Czech Republic                     | 0.84  | Brazil        | 0.48  |
| Dominican Republic                 | 0.70  | Colombia      | 0.23  |
| Egypt                              | 0.86  | Croatia       | 0.47  |
| Guatemala                          | 1.00  | Madagascar    | 0.05  |
| Honduras                           | 0.64  | Malaysia      | 0.25  |
| Hungary                            | 0.91  | Mexico        | 0.32  |
| Indonesia                          | 0.50  | Moldova       | 0.11  |
| Kenya                              | 0.68  | Morocco       | 0.27  |
| Lithuania                          | 0.77  | Pakistan      | 0.30  |
| Mongolia                           | 0.73  | Philippines   | 0.23  |
| Peru                               | 1.00  | Poland        | 0.32  |
| Romania                            | 0.91  | Russia        | 0.40  |
| Singapore                          | 0.82  | South Africa  | 0.34  |
| Slovakia                           | 0.82  | Sri Lanka     | 0.02  |
| Slovenia                           | 0.71  | Thailand      | 0.31  |
| Uruguay                            | 1.00  | Turkey        | 0.47  |

# Aggregate Global Money Supply



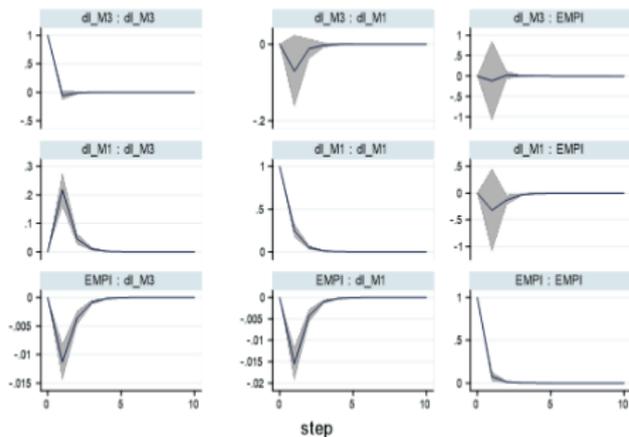
# Aggregate Global Credit Growth



# Global Monetary Shocks and Trade Openness

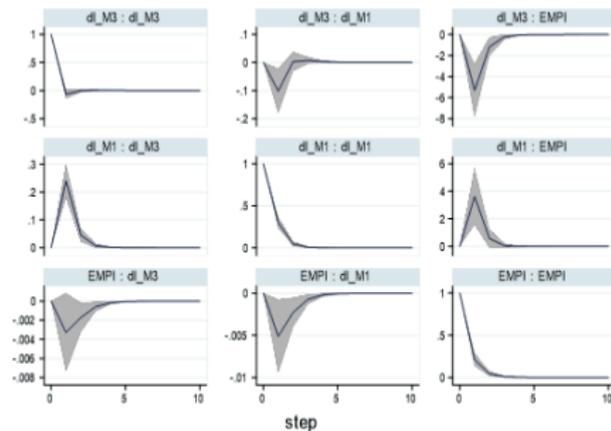
## 1998-2016

High Trade Openness



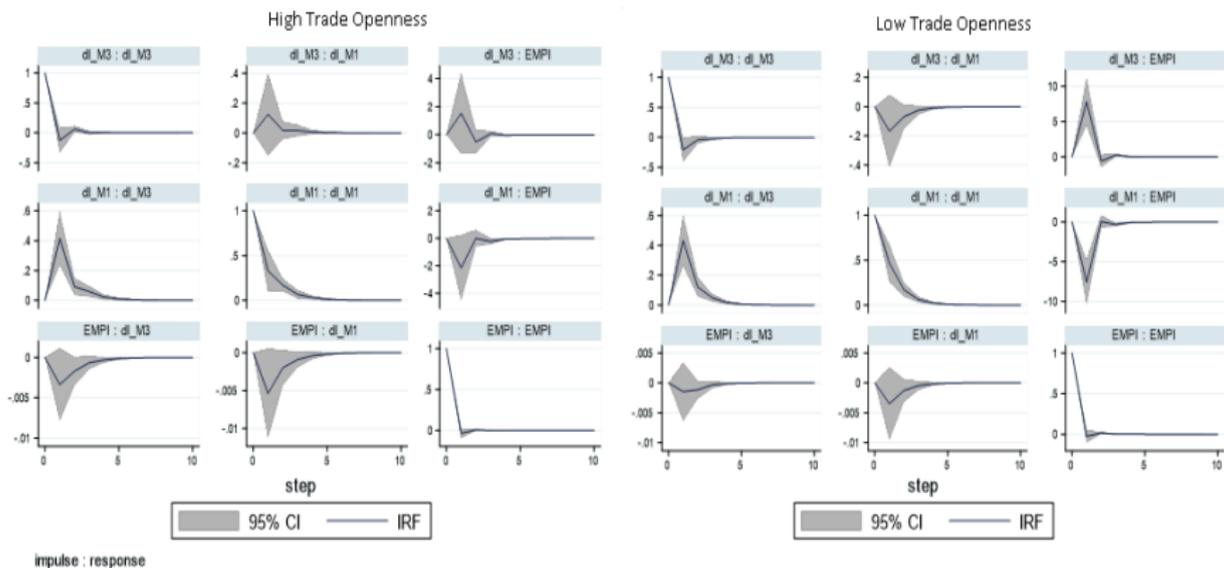
impulse : response

Low Trade Openness



# Global Monetary Shocks and Trade Openness

## 2010-2016

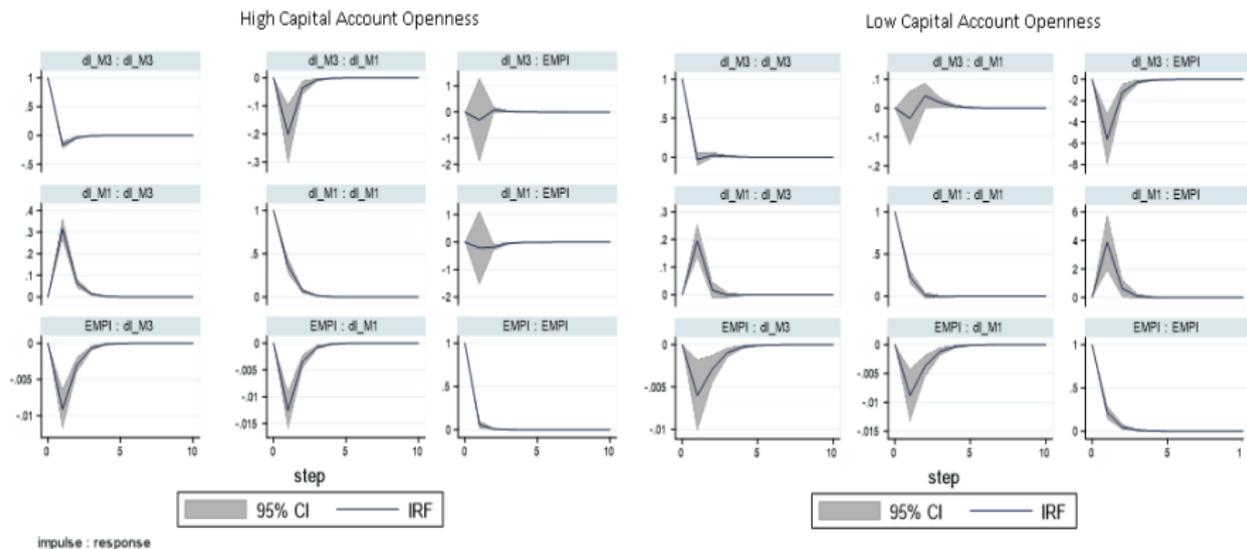


# Variance Decomposition of Monetary Shocks based on Trade Openness

| Variance of:        | Explained by (1998-2016): |             |             | Explained by (2010-2016): |             |             |
|---------------------|---------------------------|-------------|-------------|---------------------------|-------------|-------------|
|                     | <i>EMPI</i>               | $\Delta M1$ | $\Delta M3$ | <i>EMPI</i>               | $\Delta M1$ | $\Delta M3$ |
| High Trade Openness |                           |             |             |                           |             |             |
| <i>EMPI</i>         | 0.996                     | 0.003       | 0.000       | 0.985                     | 0.014       | 0.000       |
| $\Delta M1$         | 0.039                     | 0.960       | 0.000       | 0.018                     | 0.981       | 0.000       |
| $\Delta M3$         | 0.032                     | 0.859       | 0.108       | 0.016                     | 0.956       | 0.027       |
| Low Trade Openness  |                           |             |             |                           |             |             |
| <i>EMPI</i>         | 0.966                     | 0.004       | 0.029       | 0.954                     | 0.031       | 0.016       |
| $\Delta M1$         | 0.002                     | 0.996       | 0.000       | 0.016                     | 0.983       | 0.000       |
| $\Delta M3$         | 0.001                     | 0.891       | 0.107       | 0.013                     | 0.958       | 0.028       |

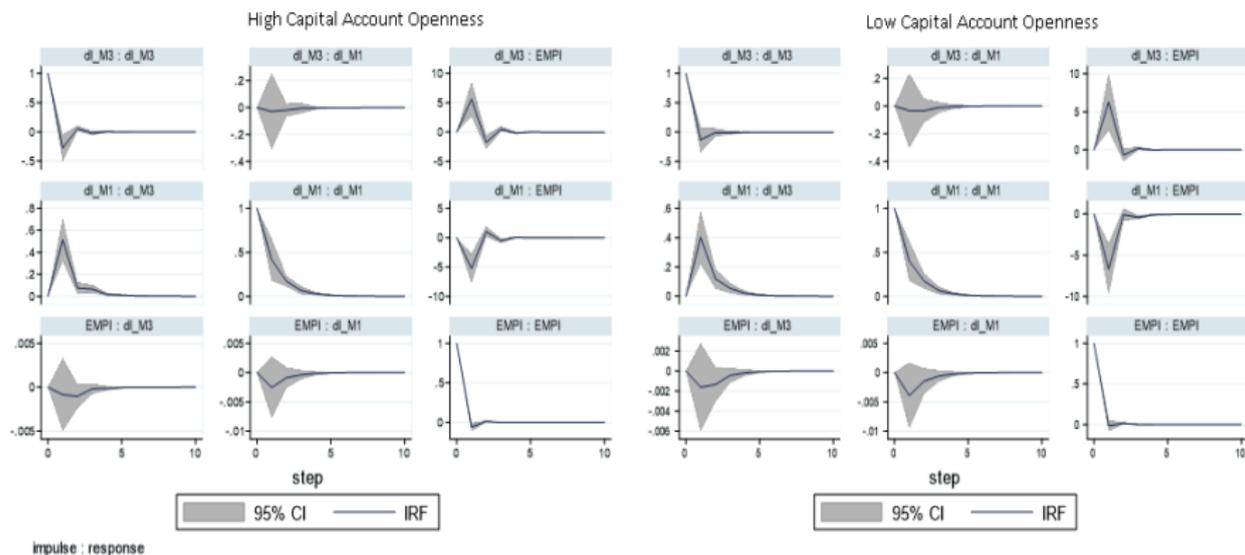
# Global Monetary Shocks and Capital Account Openness

## 1998-2016



# Global Monetary Shocks and Capital Account Openness

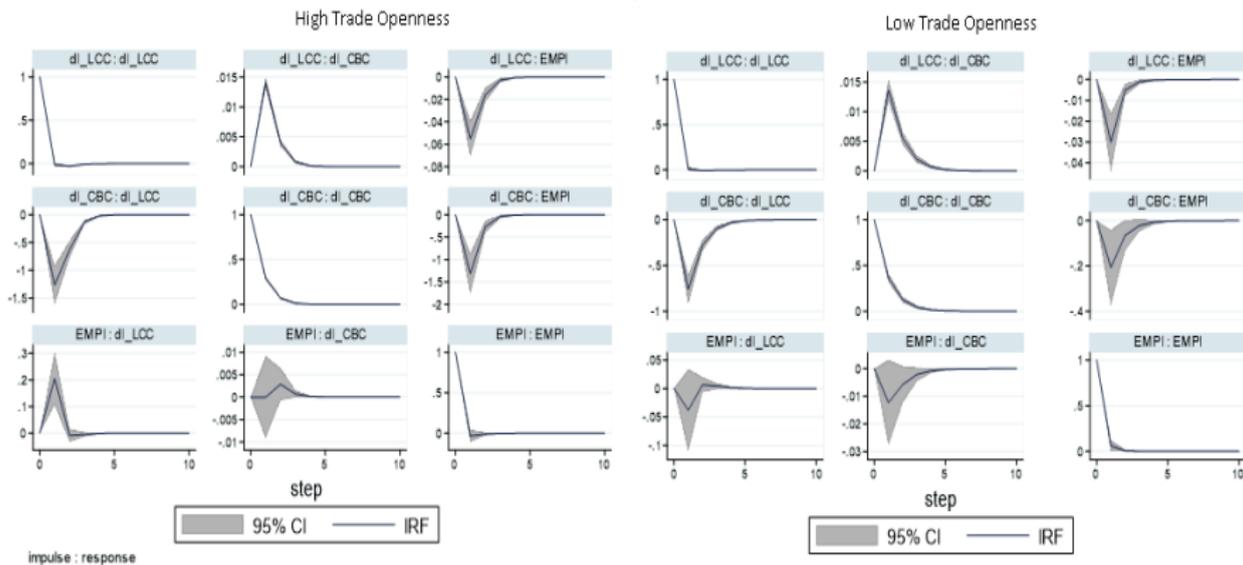
## Openness 2010-2016



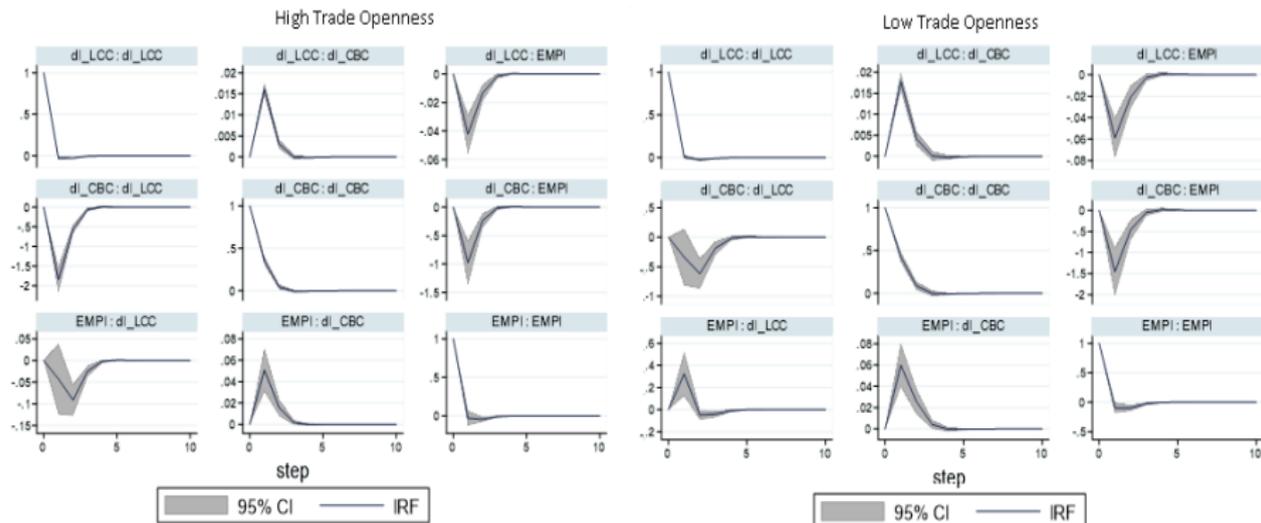
# Variance Decomposition of Monetary Shocks based on Capital Account Openness

| Variance of:       | Explained by (1998-2016): |             |             | Explained by (2010-2016): |             |             |
|--------------------|---------------------------|-------------|-------------|---------------------------|-------------|-------------|
|                    | <i>EMPI</i>               | $\Delta M1$ | $\Delta M3$ | <i>EMPI</i>               | $\Delta M1$ | $\Delta M3$ |
| High C.A. Openness |                           |             |             |                           |             |             |
| <i>EMPI</i>        | 0.995                     | 0.004       | 0.000       | 0.976                     | 0.012       | 0.011       |
| $\Delta M1$        | 0.020                     | 0.976       | 0.003       | 0.008                     | 0.992       | 0.000       |
| $\Delta M3$        | 0.016                     | 0.874       | 0.111       | 0.006                     | 0.962       | 0.031       |
| Low C.A. Openness  |                           |             |             |                           |             |             |
| <i>EMPI</i>        | 0.965                     | 0.003       | 0.031       | 0.951                     | 0.039       | 0.009       |
| $\Delta M1$        | 0.012                     | 0.987       | 0.000       | 0.025                     | 0.975       | 0.000       |
| $\Delta M3$        | 0.007                     | 0.884       | 0.108       | 0.022                     | 0.952       | 0.026       |

# Global Credit Shocks and Trade Openness 1998-2016



# Global Credit Shocks and Trade Openness 2010-2016

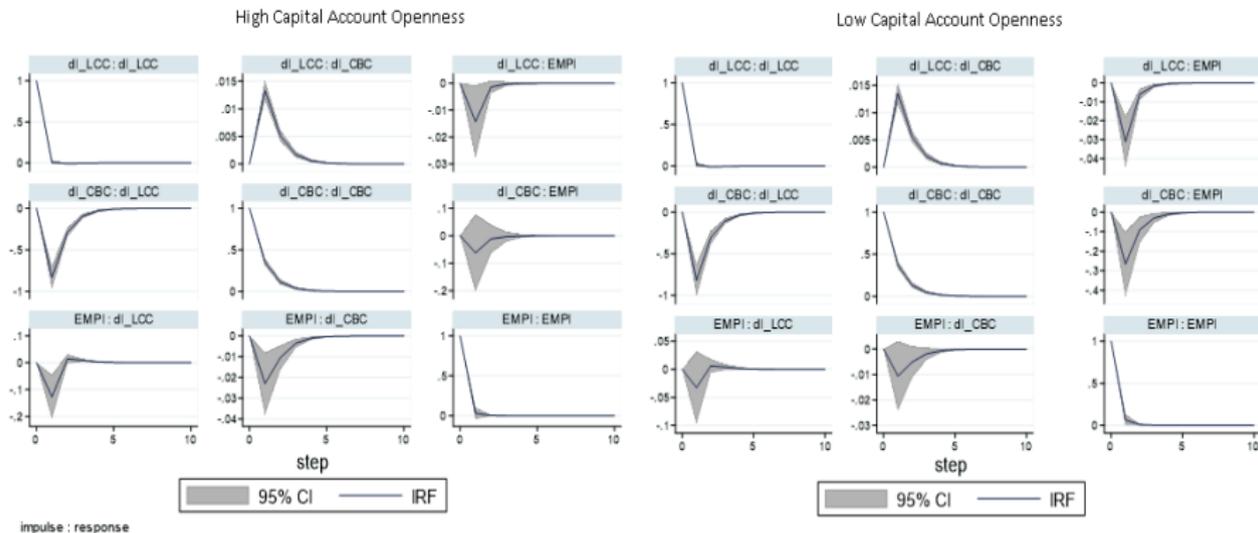


# Variance Decomposition of Credit Shocks based on Trade Openness

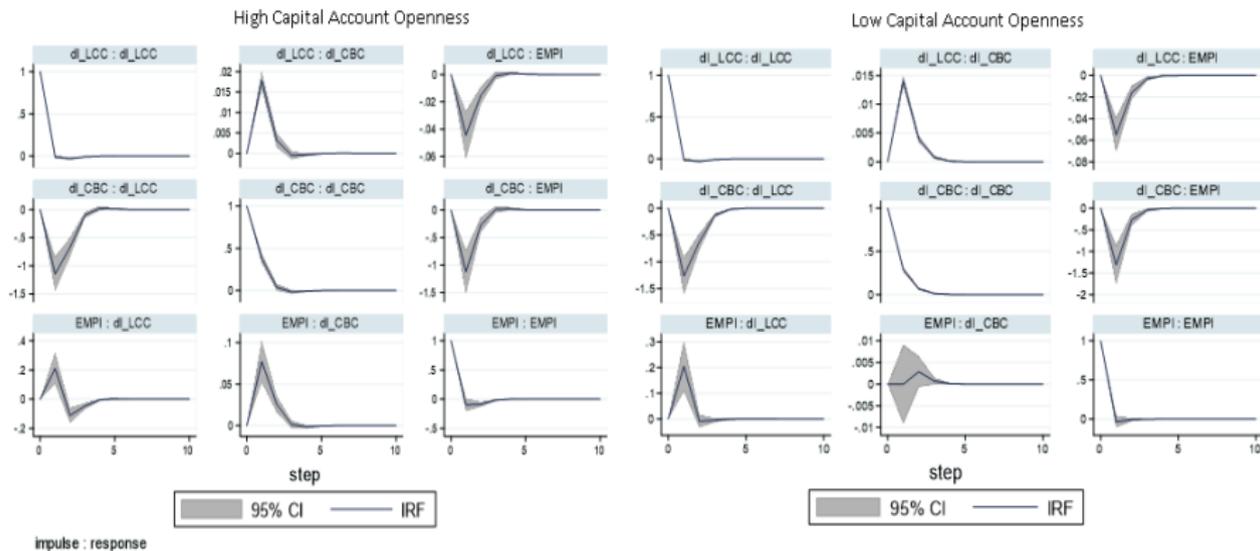
| Variance of:            | Explained by (1998-2016): |                         |                         | Explained by (2010-2016): |                         |                         |
|-------------------------|---------------------------|-------------------------|-------------------------|---------------------------|-------------------------|-------------------------|
|                         | <i>EMPI</i>               | <i>dCBC<sub>t</sub></i> | <i>dLCC<sub>t</sub></i> | <i>EMPI</i>               | <i>dCBC<sub>t</sub></i> | <i>dLCC<sub>t</sub></i> |
| High Trade Openness     |                           |                         |                         |                           |                         |                         |
| <i>EMPI</i>             | 0.997                     | 0.001                   | 0.002                   | 0.961                     | 0.009                   | 0.029                   |
| <i>dCBC<sub>t</sub></i> | 0.056                     | 0.930                   | 0.012                   | 0.062                     | 0.843                   | 0.094                   |
| <i>dLCC<sub>t</sub></i> | 0.003                     | 0.031                   | 0.966                   | 0.006                     | 0.232                   | 0.761                   |
| Low Trade Openness      |                           |                         |                         |                           |                         |                         |
| <i>EMPI</i>             | 0.991                     | 0.002                   | 0.005                   | 0.946                     | 0.004                   | 0.049                   |
| <i>dCBC<sub>t</sub></i> | 0.034                     | 0.951                   | 0.014                   | 0.081                     | 0.786                   | 0.131                   |
| <i>dLCC<sub>t</sub></i> | 0.004                     | 0.027                   | 0.968                   | 0.016                     | 0.383                   | 0.601                   |

# Global Credit Shocks and Capital Account Openness

## 1998-2016



# Global Credit Shocks and Capital Account Openness 2010-2016



# Variance Decomposition of Credit Shocks based on Capital Account Openness

| Variance of:            | Explained by (1998-2016): |                         |                         | Explained by (2010-2016): |                         |                         |
|-------------------------|---------------------------|-------------------------|-------------------------|---------------------------|-------------------------|-------------------------|
|                         | <i>EMPI</i>               | <i>dCBC<sub>t</sub></i> | <i>dLCC<sub>t</sub></i> | <i>EMPI</i>               | <i>dCBC<sub>t</sub></i> | <i>dLCC<sub>t</sub></i> |
| High C.A. Openness      |                           |                         |                         |                           |                         |                         |
| <i>EMPI</i>             | 0.998                     | 0.002                   | 0.001                   | 0.938                     | 0.022                   | 0.036                   |
| <i>dCBC<sub>t</sub></i> | 0.032                     | 0.954                   | 0.013                   | 0.080                     | 0.816                   | 0.103                   |
| <i>dLCC<sub>t</sub></i> | 0.004                     | 0.028                   | 0.967                   | 0.015                     | 0.187                   | 0.798                   |
| Low C.A. Openness       |                           |                         |                         |                           |                         |                         |
| <i>EMPI</i>             | 0.991                     | 0.004                   | 0.005                   | 0.957                     | 0.007                   | 0.035                   |
| <i>dCBC<sub>t</sub></i> | 0.061                     | 0.925                   | 0.013                   | 0.047                     | 0.863                   | 0.089                   |
| <i>dLCC<sub>t</sub></i> | 0.002                     | 0.029                   | 0.967                   | 0.011                     | 0.258                   | 0.731                   |

# Significance of Study

## Contributions:

- This research aims to bridge a gap in the literature on the transmission of global economic conditions on currency markets and exchange rate.
- Although spikes in monetary liquidity and global credit conditions correspond to a build up of appreciation pressure in these economies, the size of the impact depends on the degree of openness.
- Economies with greater degrees of trade openness and capital account openness are less susceptible to the transmission of global economic shocks.
- Countries that are more integrated in the global economy are better able to absorb the shocks, perhaps due to more liquid currency markets, more flexibility in their exchange rates, or better institutional quality.

**Thank you.**

# References

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