Developing Countries' Policy Responses to Large Private Capital Inflows: Control or Liberalise?

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ABSTRACT

The influx of large private capital inflows, although provide substantial macroeconomic benefits for developing countries, the integration process also carries with it some difficult macroeconomic challenges. This paper explores whether policy responses to large private capital inflows affect highly integrated developing countries differently. The paper at first propose a methodology for measuring degree of capital account openness. Then, we assess the effectiveness of policy responses to key macroeconomic fundamentals for countries with open, gate and wall capital accounts using a time-varying vector-autoregressive (VAR) model. We also exploit crisis incidence to measure the short-run effects of external shock using a variance decomposition and impulse response analyses for a sub-sample of highly integrated countries. The results indicate that the periods following the liberalization of the capital account usually witness an expansion of economic activity, however, such effect is not likely to last indefinitely and the boom phase may tend to reverse itself as the economy reaches its potential. While, countries that adopted controls on capital inflows, seem to have been relatively well insulated against external disturbances. Moreover, we conclude that there is evidence that the capital controls allowed for greater policy autonomy. The results imply that highly integrated countries is different suggesting that policies that have been successful in closed-economies may not be equally successful in others.

Key Words: Large Private Capital Inflows, Capital Controls, Capital Account Liberalisation, Developing Countries.

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1 Introduction

Capital account liberalization is just another manifestation of the policies of financial deregulation that countries adopt as they develop economically and institutionally, and specifically as they acquire the capacity to operate market-led financial systems. Capital account liberalization can be counterproductive, if it takes place before severe policy-related distortions have been removed to generate confidence that foreign finance will be channeled in productive directions. On the other hand, capital controls shelter financial intermediaries from foreign competition. They weaken the market discipline on policymakers. Although there is theoretical support for both positions, the unfortunate fact is that the evidence on them does not speak clearly.

Many developing countries over the past two decades have taken measures to liberalize their capital and financial accounts in order to capitalize on a larger pool of global liquidity that seeks opportunities for higher return across the globe against the backdrop of easing monetary policy in many advanced economies in the wake of the global financial crisis that has left the world awash of liquidity searching for competitive returns across borders. There is a widespread belief that more financial and capital inflows could play a fundamental role in boosting growth and welfare by improving the allocation of capital based on productivity and rate of return across recipient countries.

While attracting substantial amount of private capital inflows may provide substantial macroeconomic benefits for developing countries, the integration process also carries with it some difficult macroeconomic challenges. In particular, financially integrated developing countries will find themselves operating in a very different macroeconomic environment, one in which capital movements are highly sensitive to changes in prospective foreign and domestic rates of return. With global economic risks now on the rise, developing countries would be particularly vulnerable if global risk sentiment shifts—especially those with large fiscal deficits, high debt burdens, and limited buffers. Policymakers in these countries have been concerned with three types of problems: (1) The potential for macroeconomic overheating in the form of an excessive expansion of aggregated demand as a consequence of capital inflows, (2) the potential vulnerability to large, abrupt reversals of capital flows because of changes in creditor perceptions, and (3) the more general, long-term implications of financial integration for the conduct of macroeconomic policy. As integration advances, policymakers will have to manage the enhanced macroeconomic volatility that may prevail when the economy becomes more exposed to external shocks. In addition, policymakers will need to face these and other shocks with reduced policy autonomy.

There is a substantial body of literature that addresses capital mobility under, both capital controls and financial account liberalization. There are two opposing views about each of the two regimes. One strand of literature addresses the circumstances under which capital accounts are opened and the circumstances under which

restrictions are retained. The common observation in literature is the negative association between controls and per capita income as a proxy for economic development. In addition, the removal of restrictions on capital flows by high-income countries indicate capital account liberalization a consequence of economic development and maturation. This latter observation raises concerns on the abilities and characteristics of developing countries to accommodate capital account liberalization. The literature on the effects of capital mobility under financial account liberalization follows two theoretical tracks. The first approach draws heavily on the predictions of the neoclassical model where financial liberalization is expected to facilitate the efficient allocation of resources at an international level (Fischer, 1998; Obstfeld and Rogoff, 1996; Obstfeld, 1998; Rogoff, 1999). The second view, presented by Rodrik (1998), raises much doubt of the wisdom of liberalizing financial flows as a strategic public choice. The concerns were further substantiated in Eichengreen (2001, 2004) and Prasad, Rogoff, Wei, and Kose (2003) who questioned the wisdom of liberalization in the absence of defined measures to ensure the productive usage of inflows and the right institutional setting—including financial channels—to facilitate the efficient intermediation of these inflows. Despite its importance, this issue has not been thoroughly explored (for a survey see Edwards, 2001; Eichengreen, 2001; Grilli and Milesi-Ferretti, 1995; Henry, 2003; Stiglitz, 2000).

There have been fewer studies on recent episodes and fewer attempts at comprehensive cross-country examination of policy responses under capital control and/or liberalisation. This study attempts to fill this gap through addressing four research questions, which are not yet adequately covered in the literature: (1) How macroeconomic fundamentals respond to different external shocks? (2) whether the controls on capital inflows adopted by some of the highly integrated developing countries were successful in reducing the vulnerability of those economies to external shocks? (3) How financial liberalisation affects the dynamics of domestic macroeconomic variables in countries that have embarked on a higher degree of liberalization? (4) whether liberalisation of financial flows necessarily increase the risk of crises or is it possible that it could be beneficial to growth by allowing for higher levels of capital accumulation?

The paper structure is divided into six sections as follows. Section 2 explores the transmission mechanism through which an influx of private capital inflows can trigger disturbances of the domestic macroeconomy and the policies that were adopted by developing countries in response to the most recent waves of large private capital inflows under capital account controls and liberalizations. Section 3 with this background, examine the macroeconomic performances of these countries and evaluate their success in avoiding disturbances in the domestic macroeconomy. Section 4 lay out empirical strategy and dataset. Sections 5 present the main findings and discussion. Section 6 concludes.

2 The Transmission Mechanism and Policy Responses

The transmission of external shocks[3], either positive or negative, is a key concern to policymakers in developing countries especially highly integrated ones. These shocks can be transmitted rapidly into domestic financial systems with potentially adverse implications for financial stability, increasing vulnerability of highly integrated countries. The episodes of surges ("large") and stops ("reversals") in capital inflows, are outcomes of these exogeneous shocks.

There are major differences in the transmission mechanism across developing countries. Research attribute these differences to the different economic structures and policy-regimes adopted including the exchange rate regime, restrictions on capital flows, trade openness, among others (Desroches, 2004).

The key short-run macroeconomic concern associated with a surge in capital inflows, at the one hand, is that of an excessive expansion of aggregate demand (that is, "macroeconomic overheating"). This outcome can be produced through the following transmission mechanism. If a country maintains an officially determined exchange rate, the commitment to defend the parity causes the central bank to intervene in the foreign exchange market to purchase the foreign exchange generated by the capital inflow. To do so, the central bank creates high-powered domestic money. This expansion of the monetary base creates a corresponding expansion in broader measures of the money supply, lowering domestic interest rates and raising domestic asset prices. This action in turn triggers an expansion of aggregate demand. If the economy possesses excess capacity, the short-run implications may be to increase domestic economic activity and cause the current account of the balance of payments to deteriorate. Eventually, however (and perhaps rather quickly if domestic excess capacity is limited), excess capacity will be absorbed and the expansion in demand will trigger an acceleration in domestic inflation. If the exchange rate peg is maintained, rising domestic prices will cause the real exchange rate to appreciate, abetting the current account deterioration associated with the expansion in aggregate demand.

Large surges of capital flows also pose significant challenges to the recipient countries apart from the concerns about excessive appreciation and unsustainable credit expansions, there is a risk of a sudden reversal in capital flows, with negative consequences for both financial stability and economic activity. In fact, developing countries have been subject to abrupt reversals in capital inflows, which have adverse consequences for economic activity and financial stability. An important question for policymakers is how to respond to a sudden loss of external financing and its negative effects on the domestic economy. The experience of emerging economies through the recent financial crisis shows that those economies with

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[3] The non-extensive list external shocks include shocks to global supply, foreign interest rates and terms of trade (see section 2 for detailed review).

relatively better economic fundamentals were able to implement countercyclical policies (Capistran et al., 2014).

These challenges has induced policymakers to adopt a number of measures to deal with the consequences of the influx of large capital inflows (surges) or reversals (sudden stops) resulting from external shocks. The surge episodes may result in overheating and real currency appreciation, and increase the economy's vulnerability to a sharp reversal of the capital inflows. On the other hand, sudden stops in private capital inflows may result in disturbances in financial account and adverse effects on development and growth (output decelerations).

In order to avoid potential overheating and real currency appreciation, and reduce the economy's vulnerability to a sharp reversal of the capital inflows, developing countries can and have intervened at every step in this transmission process. Policy can attempt to reduce the required scale of intervention in the foreign exchange market, restrict the monetary expansion associated with a given magnitude of intervention, and offset through other means the effects on aggregate demand of a given magnitude of monetary expansion. These policies are not exclusive, and most countries have brought a wide variety of these instruments into play.

A key policy decision for countries facing large capital inflows is to what extent to resist pressures for the currency to appreciate by intervening in the foreign exchange market (Lane, Lipschitz, and Mourmouras, 2002). One policy response is reducing inflows of foreign exchange. Some policies have restricted the required scale of intervention in the foreign exchange market, either through reducing the capital account surplus of the balance of payments or through an offsetting increase in the current account deficit. The main instruments available to the authorities are the following: (1) The magnitude of gross capital inflows can be reduced by imposing a variety of direct or indirect controls on inflows, (2) Even if gross inflows are freely allowed, the liberalization of capital outflows or the accelerated repayment of public debt can be undertaken to attempt to reduce net inflows, (3) the implications of a net capital account surplus on the foreign exchange market can be counteracted by accelerating trade liberalization to increase the current account deficit, and (4) The most extreme option in this category would be to eliminate all foreign exchange market intervention by floating the exchange rate. The resulting appreciation of the domestic currency would both reduce net inflows through the capital account and create a current account offset.

One of the main motivations for intervention is the concern that massive and rapid capital inflows may induce steep exchange rate appreciation in a short period of time, damaging the competitiveness of export sectors and potentially reducing economic growth. Moreover, if net capital inflows occur in the context of a current account deficit, the real appreciation could exacerbate the external imbalance, heightening vulnerability to a sharp reversal of capital inflows. From a macroeconomic stabilization perspective, however, the accumulation of foreign reserves required to keep the exchange rate from appreciating may lead to

excessively loose monetary conditions, thus creating the potential for overheating and financial system vulnerabilities. In this case, real appreciation could occur through higher inflation, rather than through an increase in nominal exchange rates. Allowing the exchange rate to fluctuate could also discourage short-term speculative capital inflows, by introducing uncertainty on the changes in the value of the currency (Calvo, Leiderman, and Reinhart, 1996).

The "impossible trinity" paradigm of open economy macroeconomics—the inability to simultaneously target the exchange rate, run an independent monetary policy, and allow full capital mobility—suggests that in the absence of direct capital controls, countries facing large capital inflows need to choose between nominal appreciation and inflation[4]. In practice, however, given that capital mobility is not perfect—even in the absence of direct capital controls—policymakers may have more scope to pursue intermediate options than this paradigm would suggest, and they have generally used the full menu of available measures[5]. When they have intervened to prevent exchange rate appreciation, they have often sought to sterilize the monetary impact of intervention through open market operations and other measures such as increasing bank reserve requirements or transferring government deposits from the banking system to the central bank. With perfect substitution between domestic and foreign assets, maintaining predetermined exchange rates would amount to giving up monetary autonomy, as suggested by the strict form of the impossible trinity. Under these circumstances, sterilization would be futile, because any uncovered interest rate differential would be quickly eliminated by international interest arbitrage but because foreign and domestic assets are not perfect substitutes, interest rate differentials can and do persist. In some cases, policymakers have tried to restrict the net inflow of capital by imposing controls on capital inflows or by removing controls on capital outflows.

Other responses include offsetting the impact of capital inflows on domestic monetary aggregates. There are two policies that restrict the magnitude of the monetary expansion associated with a given amount of intervention in the foreign exchange market: (1) Expansion of base money associated with a given amount of intervention can be restricted by sterilizing the effects of intervention on the monetary base, that is, by contracting domestic credit to offset the expansion of the net foreign assets of the central bank, through mechanisms such as open market operations or transferring public sector deposits from commercial banks to the central bank, (2) Increasing reserve requirements on domestic financial institutions reduces the impact of the expansion of the monetary base on the growth of broader monetary aggregates. Although the motives for sterilization are clear, its effectiveness is less so, and it can entail substantial costs. Because sterilization is designed to prevent a decline in interest rates, it maintains the incentives for continuing capital inflows, thus perpetuating the problem. Moreover, sterilization

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[4] For a general discussion of the impossible trinity paradigm, see Obstfeld and Taylor (2002).
[5] Reinhart and Reinhart (1998); Montiel (1999); and World Bank (1997) for a survey of the theory behind policy responses to capital inflows and some empirical evidence.

often implies quasi-fiscal costs, because it generally involves the central bank exchanging high-yield domestic assets for low-yield reserves. If sterilization is implemented by increasing unremunerated bank reserve requirements, this cost is shifted to the banking system, promoting disintermediation.

While, offsetting the impact of monetary expansion on aggregated demand is another important tool. If the arrival of capital inflows is permitted to result in the expansion of broad monetary aggregates, the expansionary effects on aggregate demand can be neutralized through fiscal contraction. Fiscal policy is another instrument available to attenuate the effects of capital flows on aggregate demand and the real exchange rate during a surge of inflows and in its aftermath. Typically, fiscal policy in emerging markets receiving capital inflows is procyclical, because a fast-growing economy generates revenues that feed higher government spending, thus aggravating overheating problems (see Kaminsky, Reinhart, and Végh, 2004; and Mendoza and Ostry, 2007). By contrast, greater restraint on expenditure growth has three benefits. First, by dampening aggregate demand during the period of high inflows, it allows lower interest rates and may therefore reduce incentives for inflows. Second, it alleviates the appreciating pressures on the exchange rate directly, given the bias of public spending toward nontraded goods (Calvo, Leiderman, and Reinhart, 1994). Third, to the extent that it helps address or forestall debt sustainability concerns, it may provide greater scope for a countercyclical fiscal response to cushion economic activity when the inflows stop. Although discretionary fiscal tightening during a period of capital inflows may be problematic because of political constraints and implementation lags, avoiding fiscal excesses—holding the line on spending—could nonetheless play an important stabilization role in this context. In particular, fiscal rules based on cyclically adjusted balances could help resist political and social pressures for additional spending in the face of large capital inflows[6]. In fact, fiscal adjustment was a key component of the stabilization and market-oriented reform programs that many countries undertook prior to receiving capital inflows. Consequently, it is difficult to interpret a tight fiscal stance, or a further tightening of that stance, as a policy response to capital inflows rather than as a continuation of an ongoing adjustment process. Whatever the reason, a tighter fiscal stance during the inflow episode does help reduce aggregate demand pressures.

3 The Macroeconomic Consequences of Policy Responses

In this section we turn to examine the macroeconomic consequences of the policy responses to large capital inflows into developing regions. A first step in this analysis is to examine the behavior of [1] real GDP growth, [2] real aggregate demand, [3] the current account balance, and [4] the real effective exchange rate before, during, and after the episodes. The analysis also extends to include exports

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[6] A relevant example is provided by Chile, which aims at achieving a cyclically adjusted fiscal surplus, with an additional adjuster to save excess copper revenues, thereby contributing to offset appreciation pressures on the currency, see IMF, 2007c.

and inflation. Hencefore, the pattern of key macroeconomic fundamentals on the run-up to waves of surges, with focuses on those that ended in crisis are examined in what follows.

We first examine the behaviour of the above-mentioned macroeconomic variables before, during, and after the episodes (see figure 2). The main findings indicate that episodes of large capital inflows were associated with an acceleration of GDP growth, but afterward growth often dropped significantly. The post-inflow decline in GDP growth is significantly larger for episodes that end "abruptly". In these cases, average GDP growth in the two years after the end of the episodes tends to be about 3 percentage points lower than during the episode, and about 1 percentage point lower than during the two years before the episode. This suggests that for episodes ending abruptly, it may take some time to fully recover from the economic slowdown associated with the "hard landing". Fluctuations in GDP growth have been accompanied by large swings in aggregate demand and in the current account balance, with a strong deterioration of the current account during the inflow period and a sharp reversal at the end. Consistent with the literature on capital outflows, the end of the inflow episodes typically entailed a sharp reversal of non-FDI flows, whereas FDI proved much more resilient (Becker et al., 2007).

The surge in capital inflows also appears to be associated with a real effective exchange rate appreciation, but the lack of statistical significance in the difference between median appreciation before and during the surge in capital inflows reflects the considerable variation across country experience. The mechanism generating real appreciation during an episode has not, on average, been higher inflation. This reflects the fact that for a significant group of episodes, the surge in capital inflows occurred in the context of inflation stabilization plans such as Peru (1992–97), Brazil (1994–96), Bulgaria (1992–93), and others. As noted in Calvo and Végh (1999), except for the behavior of inflation, exchange rate-based inflation stabilization typically leads to the same outcome as an "exogenous" capital inflow, that is, a surge in capital inflows, a pickup in aggregate demand, and a larger real appreciation of the domestic currency that, together with larger current account deficits, disseminate a much stronger decline in GDP growth at the end of an episode.

In light of these findings, an important test of the effectiveness of policies during the inflow period is whether they helped a country achieve a soft landing, that is, a moderate decline in GDP growth after the inflows abated. Episodes characterized by a sharper post-inflow decline in GDP growth tend to experience a faster acceleration in domestic demand, a sharper rise in inflation, and a larger real appreciation during the inflow period (Figure 3). These episodes also lasted longer, as shown by the much higher cumulative size of the inflows. Hence, the sharper post-inflow decline in GDP growth seems to be associated with persistent, expansionary capital inflows, which compound external imbalances and disseminate the eventual sharp reversal. From a policy perspective, it is striking that hard landings have also been associated with a strong increase in government

spending during the inflow period, whereas expenditure restraint helps reduce upward pressures on both aggregate demand and the real exchange rate and facilitates a soft landing (Figure 3).

By contrast, a higher degree of resistance to exchange rate changes during the inflow period and a greater degree of sterilization were unable to prevent real appreciation and were generally unsuccessful in achieving a soft landing. The correlation between post-inflow GDP growth and the macroeconomic policies captured by scatter plots shown in figure 3. In particular, the plots shows that countercyclical fiscal policy through expenditure restraint during episodes of large capital inflows is associated with a smaller post-inflow decline in GDP growth. These plots do not control for the endogeneity of the variables and should therefore not be interpreted as indicating a causality relationship among them. Their only purpose is to analyze the correlation between the dependent and policy variables in a multivariate context. The plots also present evidence indicating that greater resistance to exchange market pressures is associated with a sharper economic slowdown in the aftermath of the episodes. Moreover, episodes that ended with a sudden stop tend to have a sharper decline of GDP growth in the aftermath of the episode, and also tend to be associated with higher resistance to exchange market pressures—20 of the 34 episodes that ended with a sudden stop are characterized by a high (above median) value of the resistance index. Moreover, these findings suggest that a smaller real exchange rate appreciation in response to large capital inflows may help reduce an economy's vulnerability to a sharp and costly reversal.

By splitting the episodes between those with high (above-median) real appreciation and those with low (below-median) real appreciation offers a first attempt at investigating policies that have been effective in containing upward pressure on the exchange rate. Figure 4 reveals that greater real appreciation has been associated with stronger acceleration of CPI inflation, more sterilized intervention, and rising government expenditure. These results suggest that a policy of sterilized intervention is unlikely to prevent real appreciation and often tends to be associated with higher inflation. Moreover, in these episodes, a greater increase in nominal interest rates—that is, a more countercyclical monetary policy—is strongly associated with greater real appreciation, because higher returns on domestic assets end up attracting more capital inflows and fueling upward pressures on the currency. In contrast, countercyclical fiscal policy in the form of slower growth in government expenditure is again strongly associated with lower real appreciation. Finally, tighter controls on capital flows do not appear to be associated with lower real appreciation.

The importance of fiscal restraint in reducing the degree of real exchange rate appreciation and in smoothing GDP fluctuations in the periods surrounding the episodes is also borne out from a regional perspective. The regions with stronger real appreciation during the episodes, Latin America and emerging Europe and the CIS, also experienced larger increases in public expenditure in those periods (Figure 4). By contrast, the economies that have followed more countercyclical

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fiscal policies and have refrained from resisting exchange market pressures appear to have experienced less real appreciation and smaller GDP growth fluctuations around the episodes.

It is also important to examine whether the policy responses and outcomes depend on the persistence of inflows and the current account position. Episodes that lasted less than two years display somewhat different patterns than longer episodes, with significantly larger resistance to exchange rate changes, less real appreciation, and better post-inflow GDP growth. However, these results do not show that resistance is more effective in such cases, because during short inflow episodes higher resistance was not associated with significantly smaller real appreciation or better post-inflow growth. This suggests that resisting exchange market pressures may be more feasible when facing transitory inflows, but it does not generate significantly better outcomes, at least when assessed over the entire duration of the episodes. Moreover, in practice, it may be difficult for policymakers to identify ex-ante when an episode of inflows will turn out to be temporary.

The fiscal policy response appears to have been less decisive in episodes associated with high balance of payments pressures (defined as an above-median sum of the current account and net private capital inflows). For such episodes, lower government spending growth is not associated with significantly lower real appreciation or better post-inflow GDP growth. By contrast, fiscal spending restraint is associated with significantly better outcomes when the episodes are characterized by low balance of payments pressures. This suggests that a countercyclical policy stance may be most important when inflows occur in the context of a large current account deficit.

Because the analysis in this section does not consider the transitional dynamics within the episodes, this finding does not necessarily exclude that sterilized intervention may be effective for short periods of time. Longer episodes are also characterized by higher levels of capital controls, even if the difference is rather small.

These variations in economic structure and the different degrees of global financial integration have implications for the conduct of macroeconomic policies and for the transmission of global macroeconomic shocks. Macroeconomic policies in fact are the same. The traditional policy instruments, in developing economies, are fiscal policy and monetary policy, but the range and the reach of these policies differ between countries. It is also important to recognize the somewhat different macroeconomic implications of the interaction between fiscal and monetary policy in developing countries. The monetary impact of fiscal policy is perhaps greater in developing countries because a much larger proportion of the fiscal deficit is financed by borrowing from the central bank. In developing countries, borrowing from the central bank is the principal source of reserve money which makes it the most important determinant of monetary expansion. This is no longer the case in most Latin American economies, but remains the reality in most other developing

countries. Similarly, the fiscal impact of monetary policy is perhaps greater in developing countries, because, in situations where public debt is large as a proportion of GDP and interest payments on these debts are large as a proportion of government expenditure, even modest changes in interest rates exercise a strong influence on fiscal flexibility.

The essential point to emerge from this section is that the nature of relationships and the direction of causation in macroeconomies, on which the study build the analysis, findings and recommendations, depend upon the institutional setting. Therefore, it is important to understand not only the internal structure of a specific country but also its degree of integration in the global economy to which we now turn.

4 Empirical Strategy

4.1 Capital Account Measures

Cross-country time series of capital controls typically draw from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (*AREAER*)[7]. There was a fundamental change in the reporting on capital controls beginning with the 1996 volume of the *AREAER* when it began including more detailed information both across a disaggregated set of assets and by distinguishing between controls on outflows and controls on inflows.

This paper uses a new dataset of capital control restrictions on both inflows and outflows following Fernández et al. (2015). This new dataset present and describe capital control restrictions on both inflows and outflows of ten categories of assets for 100 countries building on the data first presented in Martin Schindler (2009), and IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. It includes additional asset categories, more countries and a longer time period. Moreover, the dataset characterize the data with respect to the prevalence of controls across asset categories, the correlation of controls across asset categories and between controls on inflows and controls on outflows, the aggregation of the separate categories into broader indicators, and the comparison of our dataset with other indicators of capital controls.

There are a variety of ways to aggregate these data series in order to obtain a smaller set of indicators than the full set. This paper refines a subset of the highly integrated 21 countries classified according to the private capital inflows and re-classified according to the degree of capital account openness as shown in table 1. The classification of country as open, gate or wall follows Fernandez et al. (2015). The open country has virtually no capital controls on any asset category over the sample period, a Wall country has pervasive controls across all, or almost all,

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[7] The early works that use the *AREAER* to create panel data sets of capital controls include Vittorio Grilli and Gian Maria Milesi-Ferretti (1995), Quinn (1997), and Chinn and Ito (2006).

categories of assets and a Gate country uses capital controls episodically. The direction refers to whether the control is on inflows or outflows.

Table 1: Capital Account Measures

	Country	Capital Controls by Asset/ Direction Category
1	Argentina	Gate
2	Brazil	Gate
3	Bulgaria	Gate
4	China	Wall
5	Colombia	Gate
6	Egypt	Open
7	India	Wall
8	Indonesia	Gate
9	Kazakhstan	Gate
10	Lebanon	Gate
11	Mexico	Gate
12	Nigeria	Gate
13	Peru	Open
14	Philippines	Wall
15	Russia	Gate
16	South Africa	Gate
17	Thailand	Gate
18	Turkey	Gate
19	Ukraine	Wall
20	Venezuela	Gate
21	Vietnam	Gate

4.2   Methodology

We first employ a VAR modelling approach to investigate the private capital inflows response to external shocks. A simple VAR model in which all variables are endogenous and interdependent can be presented as follows. Let Y_t be a G×1 vector of endogenous variables.

Then, a VAR representation of Y_t can be presented as follows:

$$Y_t = A_0(t) + A(1) Y_{(t-1)} + u_t \qquad (1)$$

where $u_t \sim iid(0, \sigma_u)$.

To study the macroeconomic effects of capital account liberalization, we approximate an economy represented by a VAR model composed of a capital inflow variable and a vector of key macroeconomic variables, as follows:

$$\begin{bmatrix} 1 & a12 \\ a21 & 1 \end{bmatrix} \times \begin{bmatrix} x_t \\ w_t \end{bmatrix} = \begin{bmatrix} a_1 0 \\ a_2 0 \end{bmatrix} + \begin{bmatrix} \sigma_1 1 & \sigma_1 2 \\ \sigma_2 1 & \sigma_2 2 \end{bmatrix} \times \begin{bmatrix} x_{t-1} \\ w_{t-1} \end{bmatrix} + \begin{bmatrix} \epsilon_{x_t} \\ \epsilon_{w_t} \end{bmatrix} \quad (2)$$

where x_t and w_t represent the capital inflows variable and a vector of macroeconomic variables respectively. ϵ_{x_t} and ϵ_{w_t} are orthogonalized disturbances.

Equation (2) can also be written in the following matrix form:

$$AY_t = B_0 + B_1 Y_{(t-1)} + u_t \quad (3)$$

Since there is under-identification of the VAR in Equation (3), we may use a recursive system to identify the model by forming A as a lower triangular (Sims, 1980). This implies that x_t has a contemporaneous effect on w_t but the reverse is not true.

Accordingly, Equation (3) is rewritten in a way that allows the identification of the structural shocks from the residuals of the recursive VAR model, as follows:

$$Y_t = C_0 + C_1 Y_{(t-1)} + e_t \quad (4)$$

where $C_0 = A^{-1} B_0$, $C_1 = A^{-1} B_1$ and $e_t = A^{-1} \epsilon_t$. Thus, the structural shocks are identified from the residuals ϵ_{x_t} (the residual of x_t in Equation (4)) and ϵ_{w_t} (the residual vector of w_t in Equation (4)).

Both residuals ϵ_{x_t} and ϵ_{w_t} affect the vector of key economic variables of interest w_t contemporaneously. However, ϵ_{x_t} affects contemporaneously only x_t. The identification of the orthogonalized residuals of the VAR according to a triangular form is known as the Cholesky decomposition.

Thus, an asymmetry is brought to the system through this latter restriction which makes the order of the variables important. The economy is assumed to be affected by capital inflows, but not vice versa, being small open economy with still many structural issues and political instability and foreign direct investment is not sizable enough compared to its economic performance.

4.3 Data

We use quarterly data from the IMF's international debt statistics (IDS) database, which records private capital flows. We therefore obtain a country-time-specific value of net private capital inflows for each country. We treat the data separately as they come with varying country coverage and sample start dates (see table 4). Data are extracted from international debt statistics (IDS) and the World Development Indicators (WDI) of World Bank, the International Financial Statistics (IFS) and World Economic Outlook (WEO) of IMF. While, data on policy measures include Ito and Chinn openness index and sterilization index and exchange rate pressure index of IMF.

Table 2: Explanatory Variables

Abb.	Variable
INTER	Real Interest Rate
REER	Real Effective Exchange Rate
y	Real Output measured by GDP in constant prices
M	Money stock in circulation (M1)
CON	Consumption in constant prices
INV	Investment in constant prices
P	Price level measured by the consumer price index.

To examine how individual developing countries have fared in coping with the macroeconomic consequences of private capital inflows, we have compiled data on private capital flows to a sample of 21 developing countries as shown in table 3. These countries together accounted for 95 percent of the total private capital flows to developing countries of these types during study period 1990:01-2020:04. Table 3 indicate that the private capital inflows remain highly concentrated in just a few of the largest developing-country economies. In 2019, five countries accounted for over half of bond issuance; 20 countries accounted for nearly 90 percent. The largest borrower, Russia, accounted for almost one-quarter of the total, well above its share (9 percent) of total developing-country GDP. In contrast, lower-middle- income countries, which accounted for just over half of GDP, received less than 20 percent. Nonetheless, the concentration of private capital flows among the top five developing-country borrowers has declined over the past several years.

5 Empirical Findings

5.1 The Role of Capital Controls in Reducing Vulnerability to External Shocks

In this section, we attempt to analyze whether price-based controls on private capital inflows are successful in insulating economies against external shocks. We

present results from VAR models for selected developing countries that adopted controls on capital inflows. Subsequently, we use the ARDL approach to cointegration in order to isolate the effects of the capital controls on the pass-through of external disturbances to domestic interest rates in those economies.

We construct our VAR model to account for the fact that in periods of stress due to external shocks the burden of adjustment does not fall exclusively on interest rates (INTER), but it is also reflected in changes in international reserves (RES) and changes in the nominal exchange rate (REER). We estimated the VAR model using quarterly data from 1990:Q1 to 2020:Q4 and included the private capital flows and the pressure indexes, as constructed above for the different countries, as endogenous variables in our system. The summary statistics are shown in table 7 in the appendix.

We chose a lag structure of 4 for this model, as there was a conflict between the different information criteria; the LM test does not detect serial correlation of the residuals for this specification. The unit root tests performed and reported in appendix showed that all the exogeneous variables are stationary.

The generalized impulse responses presented in Figure 6 demonstrate that the pressure indexes for Brazil and Egypt do not respond significantly to shocks to the private capital inflows nor do they respond significantly to shocks in the other countries (India) pressure indexes. Nevertheless, the Indian index do respond to private capital inflows shocks and is the country that presents the strongest response.

Figure 7 shows the variance decomposition for the VAR model estimated above. One should note that only a small percentage of the forecast errors in the Brazilian and Egyptian pressure indexes can be attributed to capital flows shocks. In fact, the figures are 0.07 percent and 1.17 percent for the first quarter for each country respectively. Nevertheless, when we look at the Indian index for the same horizon, those figures become much larger (15.69 percent and 40.26 percent respectively).

These results indicate that the unremunerated reserve requirements (combined with other capital account polices) might have helped to insulate the Brazilian and Egyptian economies from certain types of global external financial shocks, namely the ones captured by the capital inflows. Evidently, at this stage, we cannot distinguish whether this difference is due to capital account policies, other macroeconomic policies, or simply the type of exchange rate regime adopted by the different countries. One also has to note that the precise role played by the capital controls in insulating those economies was not clarified in our empirical analysis so far.

In order to confirm the validity of our results we decided to estimate models for Brazil and Egypt individually, including a wider selection of macroeconomic variables. The theoretical foundations of those VAR models are standard New

Keynesian sticky-price models of the monetary transmission mechanism applied to small open economies, assuming that the domestic central bank responds (possibly with a lag due to information frictions and measurement limitations) to deviations of domestic inflation from the inflation target, to the output gap and to external conditions captured by the terms of trade and the real exchange rate gap.

One should note that the domestic exchange-rate-indexed deposit rate does not present a statistically significant response to shocks to the private capital inflows, whereas the real exchange only presents a marginally significant response between the second and fourth quarters. Therefore, the impact of private capital inflow shocks on the real exchange rate seems to be relatively short-lived and small. In addition, the domestic interest rate also seems to be resilient to shocks and so does the real exchange rate.

These conclusions are confirmed by the variance decomposition analysis (see Figure 8). Shocks to the private capital inflows are only responsible for a small part of the forecast errors in the real exchange rate and the domestic interest rate. In the first period, the private capital inflows accounts for 1.13 percent of forecast errors in the interest rate and 1.17 percent in the real exchange rate, whereas in period 10 the figures are 4.79 percent and 10.43 percent respectively. Hence, it seems that interest rates were insulated against external shocks in countries imposing capital controls, whereas the real exchange rate is slightly more vulnerable. To sum up, the capital account policies seem to have been capable of reducing the pass-through of external shocks as far as the interest rates are concerned. Nonetheless, the capital account policies did not completely insulate countries against external shocks, as the real exchange rate was more vulnerable to shocks.

While, the variance decomposition analysis shows that shocks to the private capital inflows explain 23.24 percent of the forecast errors in the Brazilian after 2 months, but only 3.32 percent of errors in interest rates and 2.66 percent of errors in the real exchange rate. These results clarify the conclusions obtained from the impulse response functions. The Brazilian country risk seems to co-move with global risk premia, whereas domestic interest rates and the real exchange rate are relatively insulated from those shocks. We may conclude that the capital account management policies were relatively successful in insulating the Brazilian economy against global shocks.

In conclusion, countries that adopted controls on capital inflows, seem to have been relatively well insulated against external disturbances. Moreover, we conclude that there is evidence that the capital controls allowed for greater policy autonomy.

5.2   The Capital Account Liberalisation Effect on Real Economic Activity

The effect of capital account liberalization in selected developing countries is analyzed using a VAR model and we infer the effects of capital account liberalization and the resulting private capital flow shocks on macroeconomic variables, exploiting crisis episodes to measure the short-run effects of these shocks. The variables included in the VAR are capital account liberalization (KAL), real interest rate (INTER), real effective exchange rate (REER), the money stock (M), real output (y) and the price index (CPI). The real private consumption and real investment are also included in the VAR afterward to test how demand variables respond to private capital shocks.

Regarding the measures of the variables, the capital account liberalization (KAL) is proxied by net international reserves. The widespread empirical literature reports many measures for capital account liberalization and most of them are indices or proportions (Chinn and Ito, 2006; Quinn, 1997; Rodrik, 1998). The set of indicators include net international reserves as a proxy of capital account liberalization, real GDP growth, inflation based on the consumer price index, fiscal deficit, change in the real effective exchange rate, money growth (M1) and the interest rate measured by the overnight interbank rate. We use the net international reserves as a quantitative proxy. The VAR framework is based on the contributions of Kraay (1998) and Lane and Milesi-Ferretti (2001). INTER refers to the real interest rate. REER is the real effective exchange rate. M is the money stock in circulation (M1), y is the GDP in constant prices, RCP is consumption in constant prices, RINV is investment in constant prices and P is the price level measured by the consumer price index as a measure of the price level. All data are obtained from the WEO of IMF. Table 3 reports the descriptive statistics of some key indicators during the pre- and post- capital account liberalisation periods for subsample of our dataset.

The variables are expressed in logarithm with the exception of the real interest rate. We also add constant quarterly seasonal dummies and dummy variable for the crisis. The different integration tests (Augmented Dickey-Fuller, Phillips-Perron and KPSS Tests) show that the variables are integrated of order one (I(1)) and their first differences are stationary (I(0)). Finally, the optimal lag of the VAR is determined using the Akaike information criteria. They are available upon request.

It stands out from Table 4 that developing economies are characterized by less volatility in real growth during the post crisis period despite the lower average real growth. We note, likewise, high and persistent inflation during the pre-crisis period whereas in the second sub-period, the inflation rate decreased to single-digit numbers. The significantly lower inflation may be attributed to tight monetary policy and structural reforms. Indeed, monetary growth was significantly higher in the pre-crisis period, and higher inflation reflected itself in the much higher interbank rate, compared to the post-crisis period. Efforts to improve public finances in the post-crisis period have resulted in larger surpluses, which coupled with higher growth, helped to put the public debt ratio on a downward trajectory. Indeed, the public debt ratio decreased significantly after crisis and the debt ratio remained at sustainable levels estimated at 51 percent of GDP in 2019, despite

higher fiscal deficits ($\neg$6 percent of GDP in 2019) even during the height of the global crisis in 2008. The external position was further boosted by economic liberalization that led to mobilizing exports, as the share of exports to GDP increased from 18.66 percent to 23.63 percent, on average between the two sub-periods, resulting in improvement in the current account balance in the post crisis period. Further, economic reforms have paid off to mobilize investors' confidence and reduce uncertainty which increased the scope to attract financial inflows and high amount of international reserves, relative to imports. External stability was further boosted by greater flexibility of the exchange rate in the post-crisis period which resulted in an increase of the local currency in nominal terms from 0.8 to 1.5 per USD. Despite significant reduction in the inflation rate, nominal appreciation of the domestic currencies has resulted in, on average, higher real appreciation of the currency, reflecting stronger external position in the post-crisis period.

Figures 10 and 11 display the impulse responses with 95 percent probability bands, using the bootstrap method with 500 draws, for the different variables included in the VAR after one standard deviation in private capital flows over 16 quarters or four years. The middle lines in the different figures refer to the median of the draws. It stands out from the figures that the effects are different if we consider the two sub-periods. Indeed, the effect of the capital inflow shock on the interest rate is negative during the first two quarters of the first sub-period 1990:01–2008:01, and it becomes insignificant during the second sub-period 2008:02 2019:04.

Regarding the real effective exchange rate, a capital flow shock led to an appreciation of the local currency during three quarters of the first sub-period. Nevertheless, the appreciation seems to be short lasting, as it converges to its pre-shock level. In contrast, the insignificance of the effects during the post-crisis period may reflect less inflationary pressures and, therefore, better ability to control real appreciation, compared to the earlier period. During the second sub-period, impulse responses indicate a negative response of the money stock to capital inflows followed by a long-lasting positive effect. The difference reflects a deliberate attempt by monetary authorities to sterilize capital inflows in the post-crisis period in an effort to contain further surge in inflationary pressures which dominated the macroeconomic structure and demanded first priority in the design of macroeconomic policies.

To reinforce the previous points, we note that the effect of the shocks on consumer price inflation is also different between the pre- and post-crisis periods. Accordingly, sterilization efforts in the post-crisis period aimed at mitigating the inflationary effects of higher capital inflows. This is in contrast to price inflation in the pre-crisis period where the responses to capital inflows are almost insignificant. Finally, regarding the impulse response function of real GDP to capital flows, the different figures show a general decrease in real output within the first quarter following the shock for each sub-period. In other words, the dynamic effect of one standard deviation shock in capital flows does not generate

significant changes in real output starting from the second quarter. However, in light of significant sterilization, the positive effects of capital flows on real GDP appear shorter-lived and the reaction magnitude is smaller in the post-crisis period, compared to the pre-crisis period.

The variance decomposition analysis is carried out to see the importance of shocks to capital flows in explaining changes of key macroeconomic variables of the VAR model. Specifically, the variance measures the cumulative fluctuations over different horizons in the forecast error of changes in the capital flows proxy. We perform the forecast error variance decomposition of capital flows during pre- and post-crisis periods with 2, 4 and 8 quarters and the results are displayed in Figure 12. The first panel of results, relative to the pre-crisis period, indicates that capital account movements are accounted for mainly by their own shocks, which dissipate gradually over time (95–60 percent). Likewise, shocks to the capital account contribute also to the change of the money stock, the consumer price index within a year and the interbank interest rate, after 8 quarters, with 17 percent of total variability. However, the effect of capital account movements on real GDP appears significantly smaller. The results, reported in the second panel of the post-crisis period, are quite different from the first set, as the autonomous capital account shocks are explaining variations in capital flows with at least 76 percent. Moreover, with the exception of the money stock, the effects of the shocks have smaller effects on the remainder of key macroeconomic variables, compared to the earlier period. The evidence indicates persistent capital inflows to the selected economy, attesting to higher investors' confidence in the economy in the post-crisis period. Moreover, available liquidity through this pool has contributed to the growth of the money supply towards mobilizing investment and real growth. Successful sterilization policies have mitigated the nominal effects of capital flows, compared to the earlier period.

The second objective of this section is to investigate if the selected economies experienced a boom–bust cycle after the capital account liberalization. Generally, in economies with tight control of the financial account and less developed financial sector, liberalization of capital flows is likely to have large marginal returns. Accordingly, the periods following the liberalization of the capital account usually witness an expansion of economic activity with substantial increase in credit for investment and consumption, an appreciation of the real exchange rate and asset price bubbles. However, such effect is not likely to last indefinitely and the boom phase may tend to reverse itself as the economy reaches its potential and the bubble is bound to burst.

Indeed, continued appreciation of the real exchange rate in the face of persistent capital inflows may generate loss in the international competitiveness of exports, while increasing demand for imports and widening the current account deficits. The loss of competitiveness helps to slowdown the momentum of capital inflows as it reverses expectations about a booming economy that has large capacity to continue attract foreign capital flows. This, coupled with prudent policies including

fiscal consolidation and tight monetary growth, usually help to reverse the cycle. If the reversal is managed gradually the adverse effects on the economy could be contained in the form of a gradual return to potential. However, if the reversal cycle is significantly delayed and abrupt, adjustments in the exchange rate following a bubble burst could mark the beginning of a bust cycle that exhibits higher capital outflows and a severe slowdown in economic activity. Indeed, the recent experience of a surge of capital outflow has been identified as a key risk factor for subsequent busts of the financial cycle. To stem the risk, macro prudential measures should be invoked in a timely manner in response to continued monitoring of the implications of capital flows to the domestic economy to ensure the stability of the financial system and hedge against the potential risks of capital outflows that could slow down the macro economy and risk stability of the financial system.

To test if a boom–bust cycle happened after the liberalization of the capital account, we perform impulse responses to see how demand variables respond to capital shocks. We use the same VAR structure as in Equation (3), although the w_t vector includes real demand variables which are real private consumption (RCP), real investment (RINV) and consumer price index (CPI). This latter variable is put last because of the possible effect of a higher domestic demand on price inflation.

As far as the selected economy is concerned, a close inspection of the impulse response functions of consumption, investment and the price index in Figure 13 clearly demonstrates that the real activity seems to be closely linked to the evolution of aggregate demand during the two sub-periods. In contrast, during the post-crisis sub-period, the responses of aggregate demand to capital flows are larger and long-lasting, preserving the positive effects on growth and inflation (Figure 14). It is worth noting the divergent nature of the impulse responses in Figure 14, attesting to significant structural break that boosted aggregate demand in the post-crisis period on a sustainable basis, beyond the effect of capital flows. Such findings are similar to those of Montiel (1996) and Calvo, Leiderman, and Reinhart (1993), Calvo (1996) for the case of Latin American countries who found evidence of real exchange rate appreciation and consumption booms following capital inflows. However, it is worth noting a significantly smaller effect on consumption, compared to that on investment. The difference attests to the success of policies in developing countries to capitalize on capital inflows towards increasing investment and exports, hence mobilizing real growth and mitigating the corresponding inflationary effects.

6   Conclusion

The assessment of the temporal dynamics for a large set of emerging economies is desirable and important for policymakers for at least two reasons. First, it is important to better understand the transmission of shocks across the global financial system. These shocks can be transmitted rapidly into domestic financial

systems with potentially adverse implications for financial stability. Second, it is often of first order importance for central banks and various other policy institutions to monitor international capital flow dynamics in a timely manner. Since BoP data are released at low frequencies and with substantial time lags, the use of capital flow data provides timely information for monitoring emerging patterns more thoroughly and gives policy-makers additional time to respond.

To this end, the findings indicate that countries that experience more volatile macroeconomic fluctuations including a sharp reversal of inflows tend to have higher current account deficits and experience stronger increases in both aggregate demand and the real value of the currency during the period of capital inflows. Episodes during which the decline in GDP growth following the surge in inflows was more moderate tend to be those in which the authorities exercised greater fiscal restraint during the inflow period, which helped contain aggregate demand and limit real appreciation. Third, countries resisting nominal exchange rate appreciation through intervention were generally not able to moderate real appreciation in the face of a persistent surge in capital inflows and faced more serious adverse macroeconomic consequences when the surge eventually stopped. Tightening capital controls has, in general, been associated neither with lower real appreciation nor with reduced vulnerability to a sharp reversal of inflows. That is, countries that adopted controls on capital inflows, seem to have been relatively well insulated against external disturbances. Moreover, we conclude that there is evidence that the capital controls allowed for greater policy autonomy.

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Appendix

**Table 3: Share of Net Private Capital flows by type of flows (% of total),
developing countries (average 1990-2019)**

Country	Rank	Net Private Capital Inflows (Total)	Net Equity (FDI + Equity)	FDI	Portfolio Equity	Net Debt (Long + Short)
Argentina	8	2.76	2.09	2.32	0.44	3.67
Brazil	2	10.42	11.28	10.41	17.50	8.38
Bulgaria	21	0.60	0.45	0.51	0.05	0.77
China	1	34.61	37.20	36.68	40.96	28.18
Colombia	10	1.89	2.06	2.21	0.99	1.75
Egypt, Arab Rep.	18	0.96	1.20	1.36	0.00	0.98
India	3	7.11	7.42	6.04	17.34	6.58
Indonesia	7	3.33	2.51	2.81	0.41	4.24
Kazakhstan	12	1.67	0.86	0.96	0.11	2.74
Lebanon	19	0.71	0.64	0.69	0.28	0.76
Mexico	4	6.32	5.95	5.96	5.85	6.43
Nigeria	17	0.99	1.33	1.19	2.29	0.44
Peru	16	1.01	1.20	1.36	0.08	0.53
Philippines	20	0.61	0.57	0.69	-0.31	0.56
Russia	5	4.96	4.58	5.64	-3.04	4.28
South Africa	11	1.85	1.66	0.48	10.09	2.07
Thailand	9	2.17	2.01	2.14	1.08	2.11
Turkey	6	4.11	2.59	2.55	2.89	6.10
Ukraine	14	1.12	0.89	0.96	0.43	1.44
Venezuela, RB	15	1.09	0.45	0.47	0.30	2.00
Vietnam	13	1.27	1.48	1.53	1.13	1.48
Top 5		**32.9**	**31.8**	**30.6**	**40.6**	**31.8**
Top 10		**44.9**	**42.2**	**40.6**	**53.6**	**45.6**
Top 20		**54.9**	**51.2**	**50.3**	**57.9**	**57.3**
Top 21		**89.6**	**88.4**	**87.0**	**98.9**	**85.5**

<h3 style="text-align:center">Table 4: Extreme Private Capital Flows Episodes</h3>

No.	Country	Surges*		Stop	
		Start	End	Start	End
1	**Argentina**	1990q4	1992q3	1989q2	1990q3
		2015q1	2015q3	1998q4	1999q3
		2016q4	2018q2	2000q4	2002q2
				2008q2	2009q4
2	**Brazil**	1990q2	1991q1	1993q1	1993q3
		1992q2	1992q3	1995q1	1995q2
		1994q1	1994q3	1999q1	1999q2
		1995q4	1996q2	2008q2	2009q3
		2006q3	2007q4	2015q3	2016q2
3	**Bulgaria**				
4	**China**				
5	**Colombia**	2005q4	2006q3	2015q2	2016q3
		2010q4	2011q2		
		2013q4	2014q2		
6	**Egypt, Arab Rep.**				
7	**India**	1987q1	1987q3	1989q4	1990q4
		1993q4	1994q4	1991q3	1992q1
		1996q2	1997q1	2008q3	2009q3
		2003q3	2004q2	2015q3	2016q4
		2004q4	2005q3		
		2006q4	2008q1		
8	**Indonesia**	1990q3	1991q2	1997q4	1998q3
		1995q2	1996q3	2006q4	2007q1
		2005q4	2006q1	2009q1	2009q3
		2010q1	2010q4	2011q4	2012q2
		2017q4	2018q1	2015q3	2016q2
9	**Kazakhstan**				
10	**Lebanon**				
11	**Mexico**	1989q2	1991q2	1994q4	1995q4
		2005q1	2005q2	2006q4	2007q2
		2007q4	2008q3	2008q4	2009q3
				2014q4	2016q1
12	**Nigeria**				
13	**Peru**	2006q4	2008q2	1998q4	1999q3
				2005q4	2006q1
				2008q4	2009q3
				2013q4	2014q3
14	**Philippines**	1994q2	1994q3	1992q1	1992q2
		1996q1	1997q1	1997q3	1998q4
		2007q1	2007q3	2008q1	2009q1
		2017q4	2018q3		

15	**Russia**	2003q2	2004q2	2008q4	2009q3
		2007q1	2008q1	2014q1	2015q2
16	**South Africa**	1994q3	1995q4	1998q3	1999q2
		1997q2	1998q1	2000q3	2001q1
		2003q4	2004q4	2008q3	2009q2
		2005q2	2006q2	2015q3	2016q2
17	**Thailand**	1987q4	1990q3	1986q3	1986q4
		1995q2	1996q1	1992q1	1992q4
		2004q3	2006q1	1996q3	1998q2
		2009q4	2010q4	2007q1	2007q2
				2008q2	2009q1
				2011q4	2012q3
18	**Turkey**	1990q1	1990q4	1991q3	1991q4
		1992q3	1993q4	1994q2	1995q1
		2000q1	2000q3	2001q1	2001q4
				2007q4	2008q2
				2008q4	2009q4
19	**Ukraine**				
20	**Venezuela, RB**	2005q2	2005q4	2006q2	2006q4
		2007q2	2008q1	2012q2	2012q3
21	**Vietnam**				

Source:
*The period during which the country experienced a significant surge in net private capital inflows.
**Surge and Sudden stops episodes of total capital flows follows Forbes & Warnock (2019).

Table 5: Capital Market Liberalizations, Capital Controls and Major Economic Reforms

No.	Country	Exchange Arrangements		Capital Transactions		Economic Reform					
		Exchange Rate Structure	Exchange Rate Classification	Capital Controls by Asset/ Direction Category*	Controls on Capital and Money Market Instruments	Year of Liberalization	Means of Liberalization	Stabilization Program	Trade Liberalization	Privatization	Brady Plan Debt Relief
1	Argentina	Multiple	Fixed	Gate	No	November 1989	Policy Decree	November 1989	April 1991	February 1988	April 1992
2	Brazil	Multiple	Floating	Gate	Yes	March 1988	Country Fund	January 1989	April 1990	July 1990	August 1992
3	Bulgaria	Dual	Pegged to Euro	Gate	Yes	—	—	—	—	—	—
4	China	Dual	Pegged to USD	Wall	Yes	—	—	—	—	—	—
5	Colombia	Multiple		Gate	Yes	December 1991	Policy Decree	na	1986	1991	na
6	Egypt, Arab Rep.	Multiple		Open	No	—	—	—	—	—	—
7	India	Dual	Fixed	Wall	Yes	June 1986	Country Fund	November 1981	1994	1991	na
8	Indonesia	Unitary	Managed Float	Gate	Yes	September 1989	Policy Decree	May 1973	1970	1991	na
9	Kazakhstan	Multiple	Floating	Gate	Yes	—	—	—	—	—	—
10	Lebanon	Multiple	Pegged to USD	Gate	Yes	—	—	—	—	—	—

No.	Country										
11	Mexico	Dual	Floating	Gate	Yes	May 1989	Policy Decree	May 1989	July 1986	November 1988	September 1989
12	Nigeria	Multiple		Gate	Yes	August 1995	Policy Decree	January 1991	na	July 1988	March 1991
13	Peru	Multiple	Floating	Open	No	—	—	—	—	—	—
14	Philippines	Dual	Flexible	Wall	Yes	May 1986	Country Fund	October 1986	November 1988	June 1988	August 1989
15	Russia	Dual	Floating	Gate	Yes	—	—	—	—	—	—
16	South Africa	Multiple	Flexible	Gate	Yes	—	—	—	—	—	—
17	Thailand	Dual	Managed Float	Gate	Yes	September 1987	Country Fund	June 1985	Always Open	1988	na
18	Turkey	Multiple	Floating	Gate	Yes	August 1989	Policy Decree	July 1994	1989	1988	na
19	Ukraine	Multiple	Floating	Wall	Yes	—	—	—	—	—	—
20	Venezuela, RB	Dual	Pegged to USD	Gate	Yes	January 1990	Policy Decree	June 1989	May 1989	April 1991	June 1990
21	Vietnam	Dual	Pegged to a Basket of Currencies	Gate	—	—	—	—	—	—	—

Source:

*The direction refers to whether the control is on inflows or outflows. The classification of country as open, gate or wall follows Fernandez et al. (2015). The open country has virtually no capital controls on any asset category over the sample period, a Wall country has pervasive controls across all, or almost all, categories of assets and a Gate country uses capital controls episodically.

Figure 1: Private Capital Flows and Selected Macroeconomic Variables

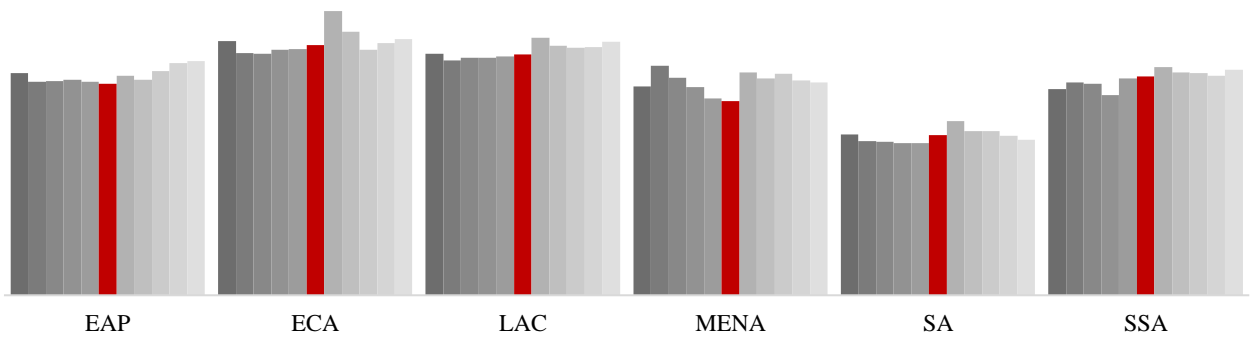**(a) Net Private Inflows (% GDP)**

(b) FDI Inflows (% GDP)

(b) Real GDP Growth (%)

(c) Real Domestic Demand Growth (%)

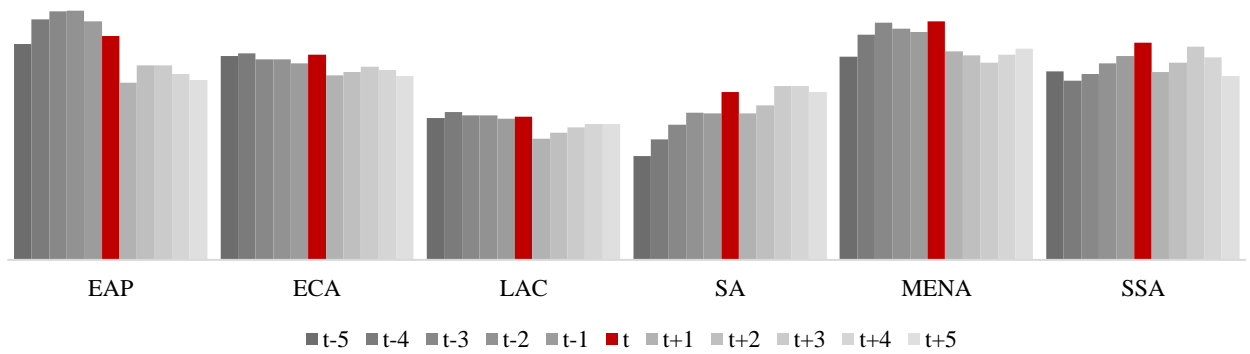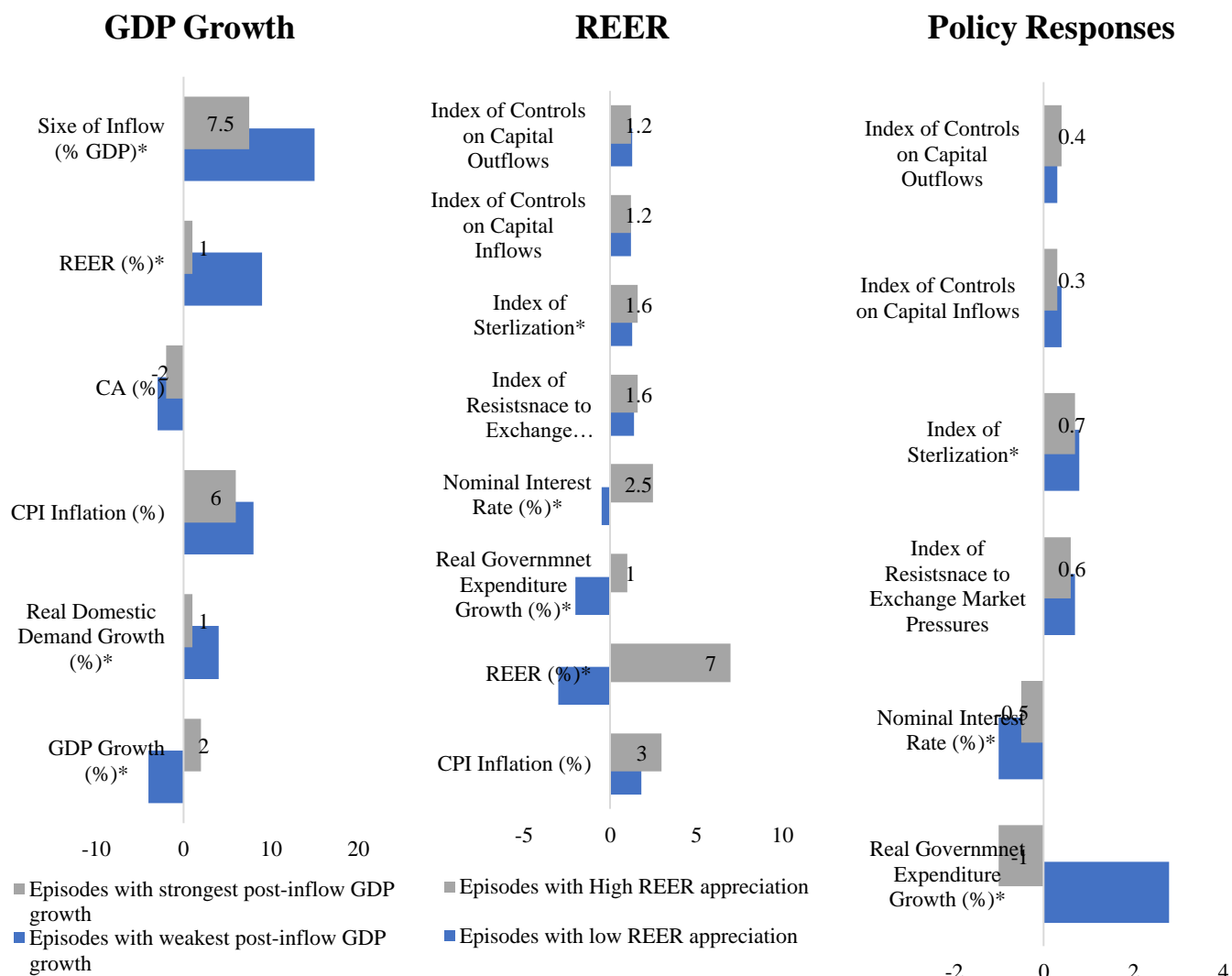**(d) Inflation, Consumer Prices (Annual %)**

(e) Trade Openness

Figure 2: Private Capital Flows and Selected Macroeconomic Variables by Region
(a) Net Private Inflows (% GDP)
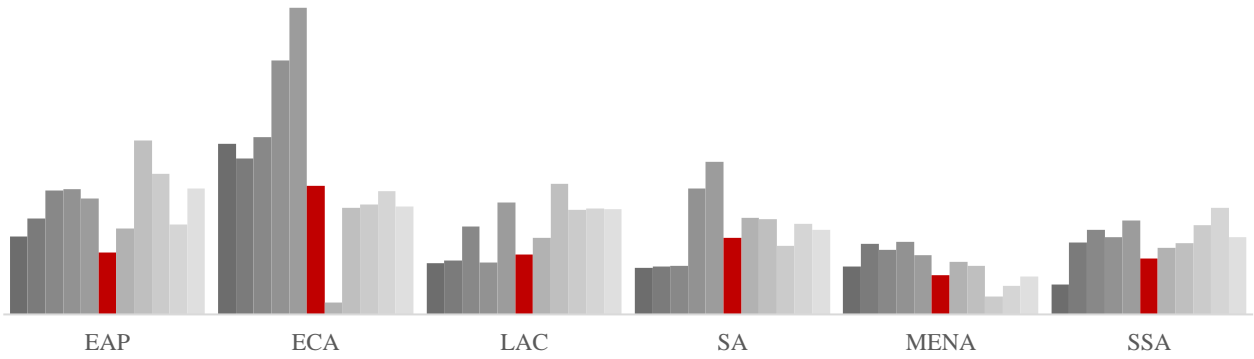
(b) FDI Inflows (% GDP)
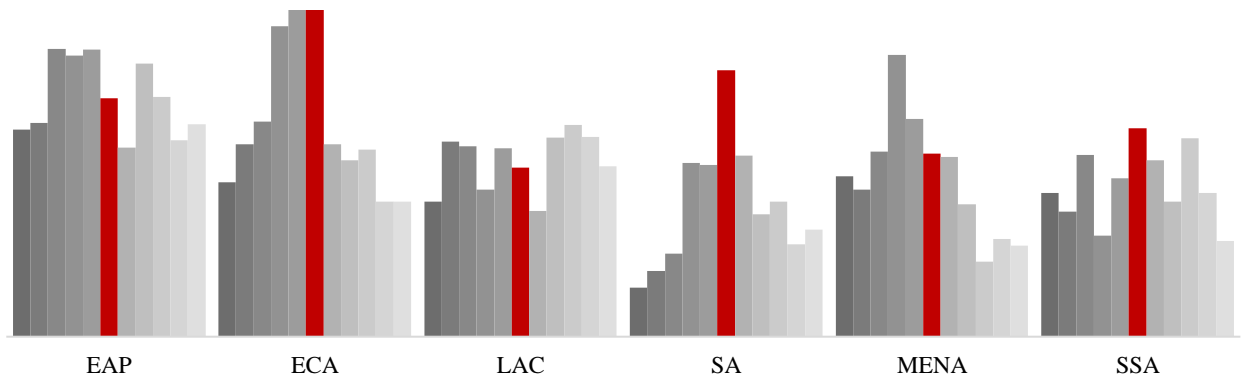
(c) Real GDP Growth (%)
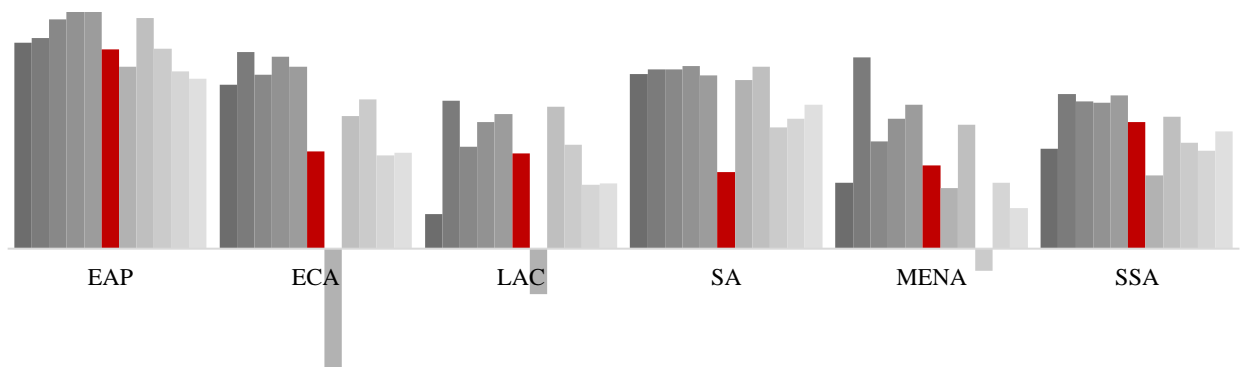
(d) Real Domestic Demand Growth (%)

(e) Inflation, Consumer Prices (Annual %)

(f) Trade Openness

■t-5 ■t-4 ■t-3 ■t-2 ■t-1 ■t ■t+1 ■t+2 ■t+3 ■t+4 ■t+5
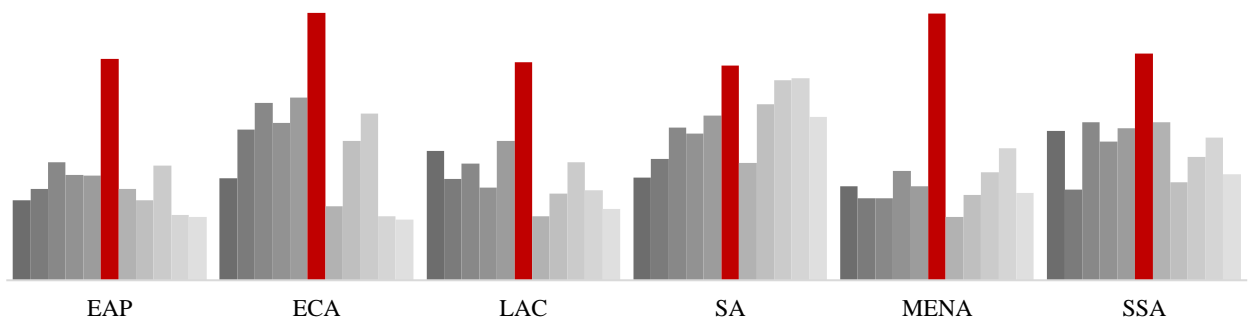
Figure 3: Post-Inflow GDP Growth, Real Effective Exchange Rate Appreciation, Selected Macroeconomic Variables and Policy Responses

GDP Growth

- Sixe of Inflow (% GDP)* — 7.5
- REER (%)* — 1
- CA (%)* — -2
- CPI Inflation (%) — 6
- Real Domestic Demand Growth (%)* — 1
- GDP Growth (%)* — 2

Axis: -10, 0, 10, 20

■ Episodes with strongest post-inflow GDP growth
■ Episodes with weakest post-inflow GDP growth

REER

- Index of Controls on Capital Outflows — 1.2
- Index of Controls on Capital Inflows — 1.2
- Index of Sterlization* — 1.6
- Index of Resistsnace to Exchange… — 1.6
- Nominal Interest Rate (%)* — 2.5
- Real Governmnet Expenditure Growth (%)* — 1
- REER (%)* — 7
- CPI Inflation (%) — 3

Axis: -5, 0, 5, 10

■ Episodes with High REER appreciation
■ Episodes with low REER appreciation

Policy Responses

- Index of Controls on Capital Outflows — 0.4
- Index of Controls on Capital Inflows — 0.3
- Index of Sterlization* — 0.7
- Index of Resistsnace to Exchange Market Pressures — 0.6
- Nominal Interest Rate (%)* — 0.5
- Real Governmnet Expenditure Growth (%)* — 1

Axis: -2, 0, 2, 4

Sources: IMF, Annual Report on Exchange Arrangements and Exchange Restrictions; IMF, Balance of Payments Statistics.

* Values reported are medians for the two groups of episodes. Episodes with the weakest (strongest) post-inflow GDP growth are those with below (above) median difference between average GDP growth in the two years after the episode and the average during the episodes. The asterisk (*) indicates that the difference between medians is significant at a 10 percent confidence level or better.

**Values reported are medians for the two groups of episodes. Episodes with high (low) real effective exchange rate (REER) appreciation are those with above (below) median cumulative REER appreciation in the group of events for which CPI inflation accelerates during the episode. The asterisk (*) indicates that the difference between medians is significant at a 10 percent confidence level or better.

Table 6: Data Period by Country, Full Sample

Country	Start Date
Argentina	2004Q1
Brazil	1996Q1
Bulgaria	1995Q1
China	1990Q1
Colombia	2005Q1
Egypt, Arab Rep.	2001Q1
India	2000Q1
Indonesia	2000Q1
Kazakhstan	2000Q1
Lebanon	2000Q1
Mexico	1993Q1
Nigeria	2000Q1
Peru	2000Q1
Philippines	2013Q1
Russia	2000Q1
South Africa	2010Q1
Thailand	2003Q1
Turkey	1998Q1
Ukraine	2010Q1
Venezuela, RB	2000Q1
Vietnam	2000Q1

Table 7: Descriptive Statistics – Pre- and Post-Liberalisation

Variable	Pre-				Post-			
	Mean	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**
International Reserves (Million USD)	20582.9	35924.7	6278.8	9214.29	69173.2	117611.7	29698.3	32457.37
Real GDP Growth (%)	2.59	47.64	−21.68	20.82	4.84	21.66	−13.84	11.98
Inflation (CPI %)	7.4	8.0	7.`5	6.3	4.20	20.53	-0.37	4.46
Fiscal Balance (% GDP)	7.2	8.3	7.5`	8.8	-5.54	2.63	-18.19	5.47
Change in REER (%)	7.6	4.9	6.8	3.6	1.51	19	-17.86	8.70
Monetary Growth (M1%)	8.3	1.5	6.4	22.6	8.27	69.91	-9.66	13.07
Interest Rate (%)	3.1	6.5	4.1	0.8	26.64	71.8271.82	8.05	17.34

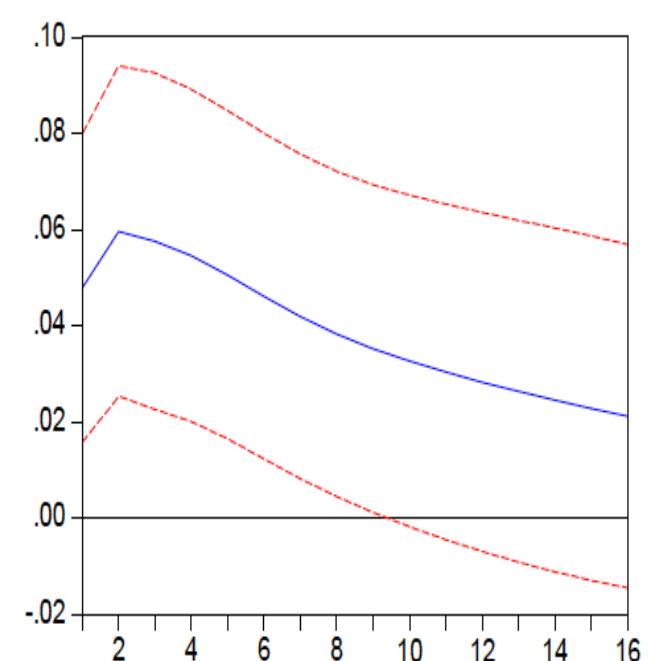**Figure 4: Impulse Responses of Real Activity to 1 Standard Deviation of Monetary Shock, Brazil**

INTER to MON   LREER to MON   LCPI to MON
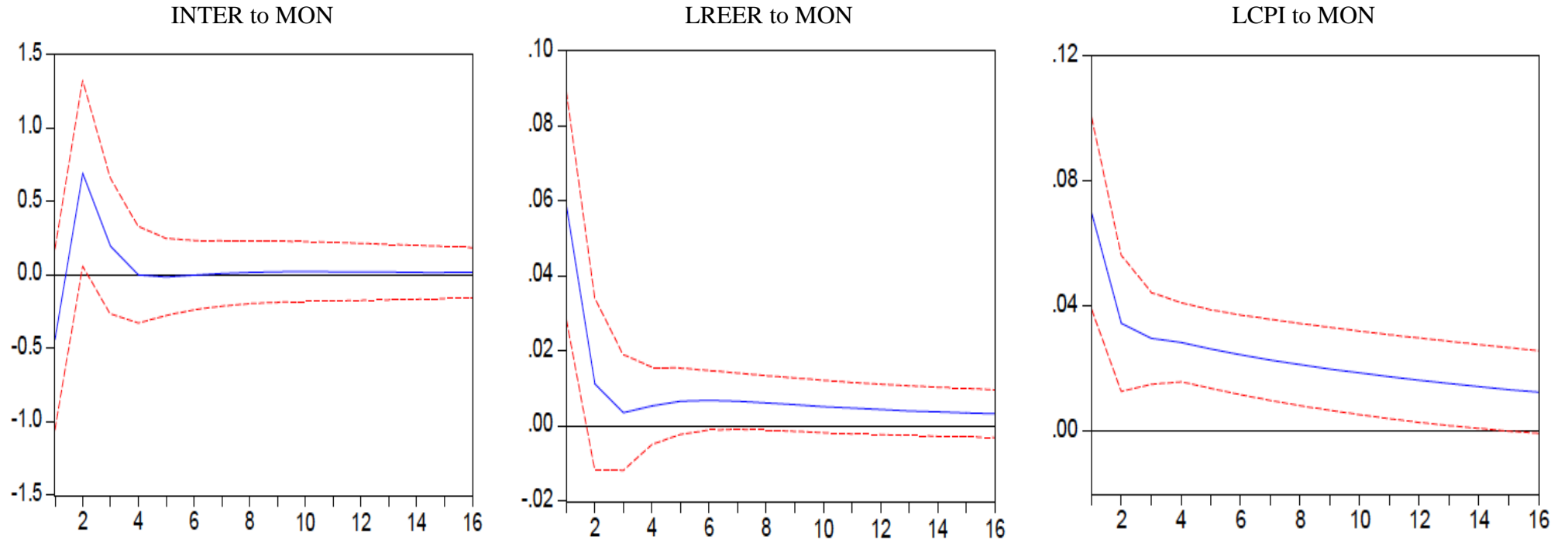
Figure 5: Impulse Responses of Real Activity to 1 Standard Deviation of Fiscal Shock, Brazil
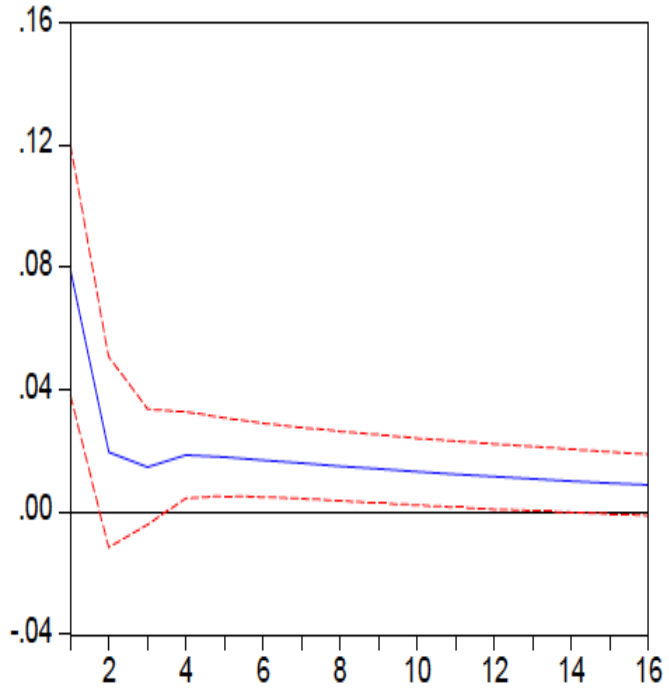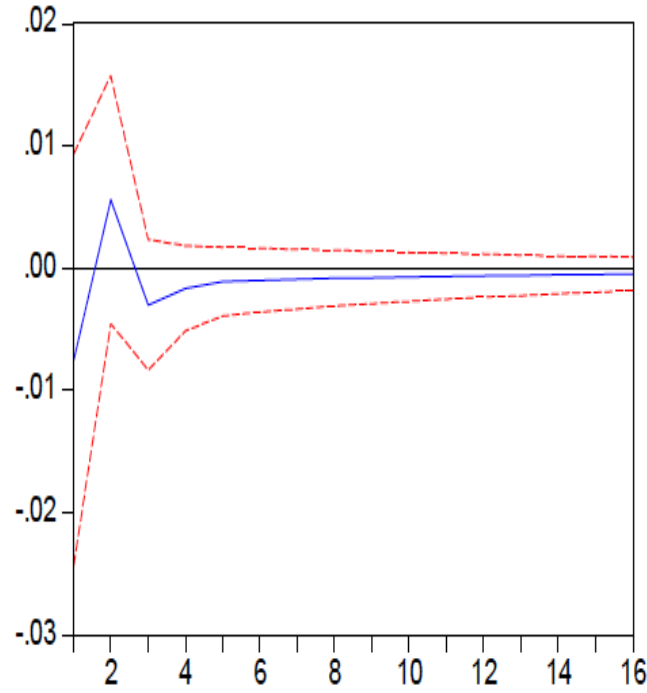
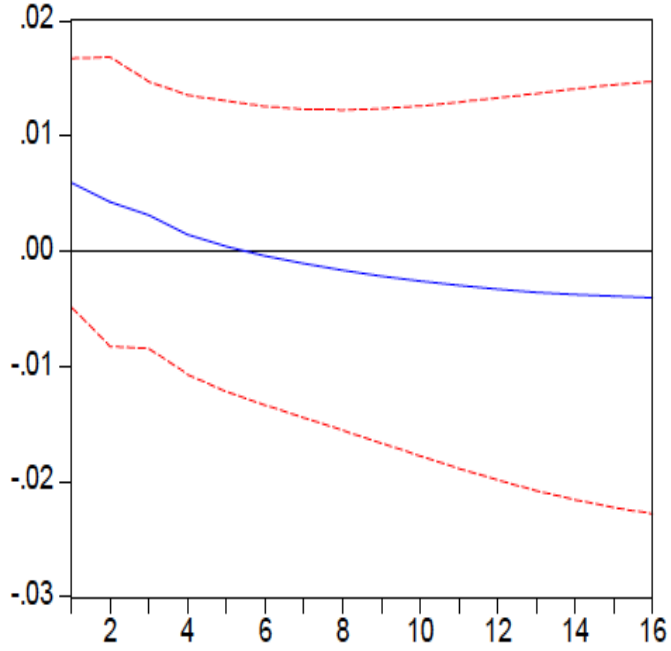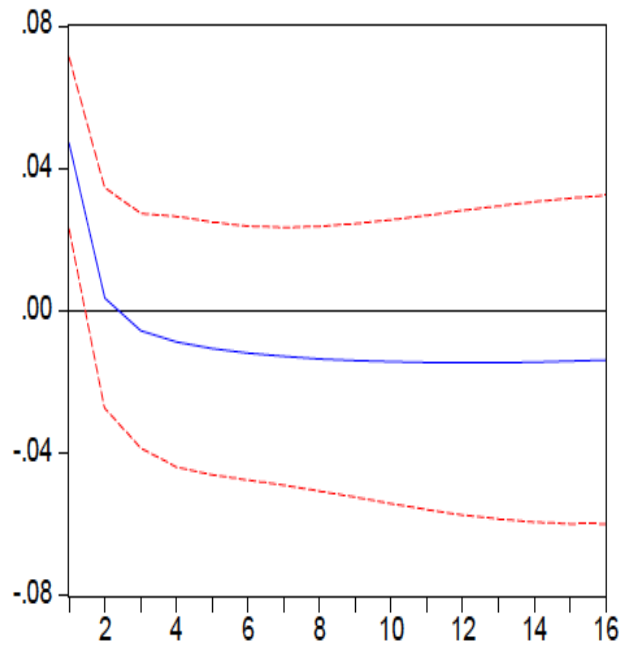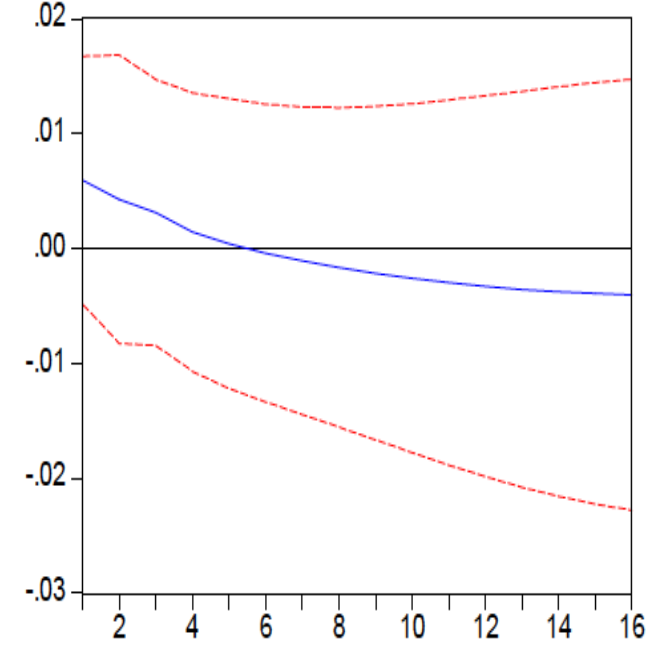INTER to FIS   LREER to FIS   LCPI to FIS
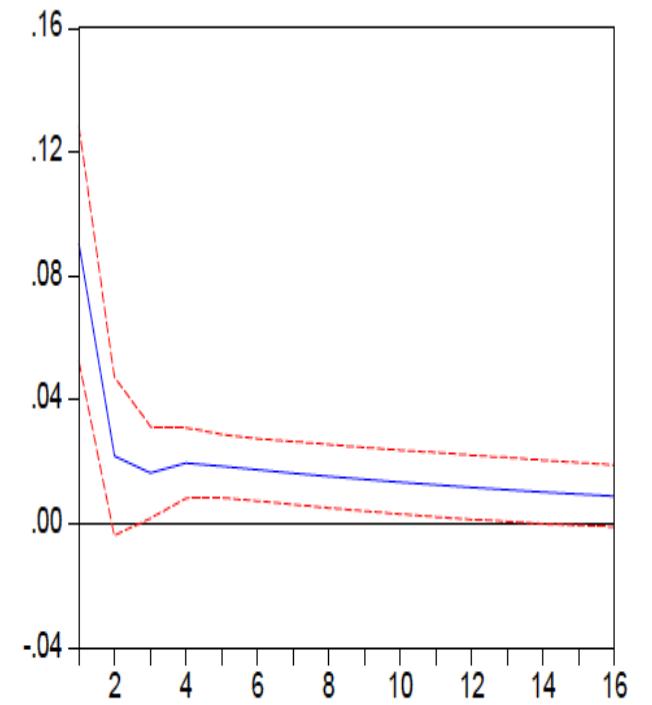
Figure 6: Impulse Responses of Real Activity to 1 Standard Deviation of Monetary Shock, India
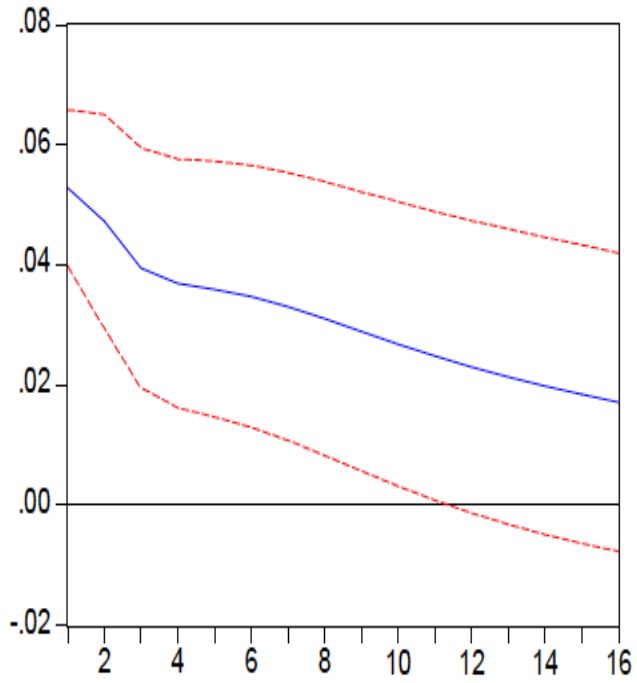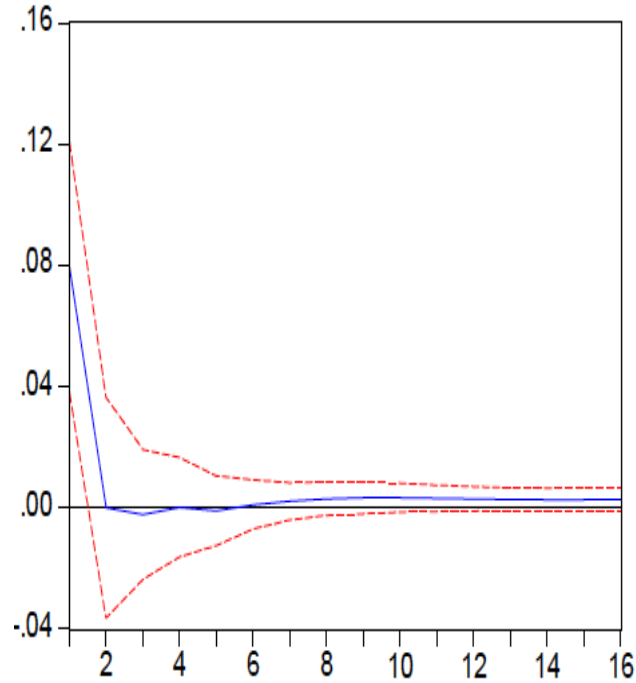
INTER to MON   LREER to MON   LCPI to MON
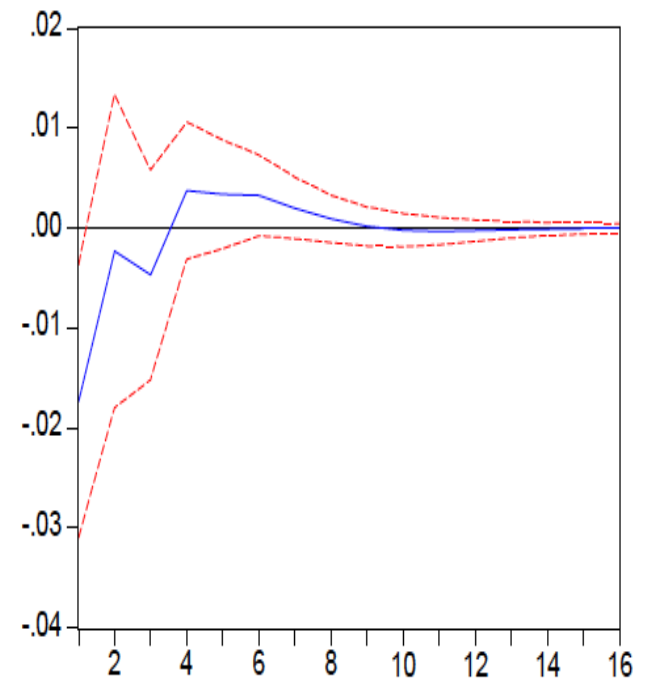
Figure 7: Impulse Responses of Real Activity to 1 Standard Deviation of Fiscal Shock, India
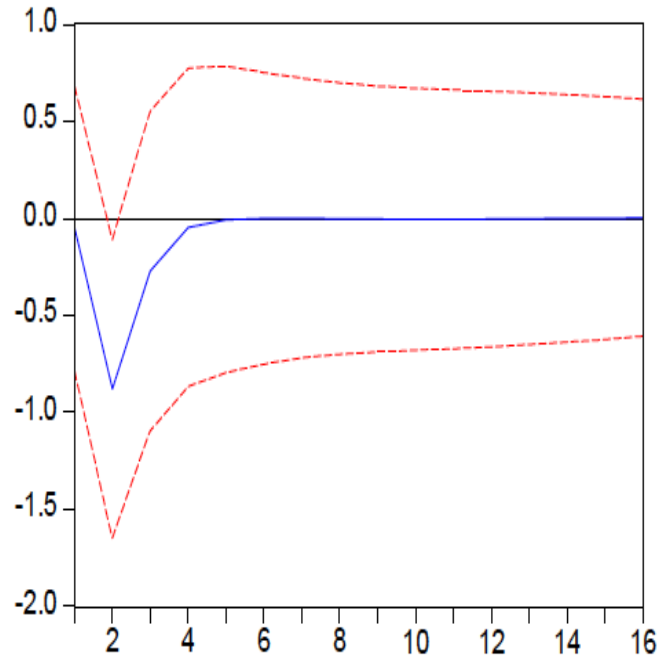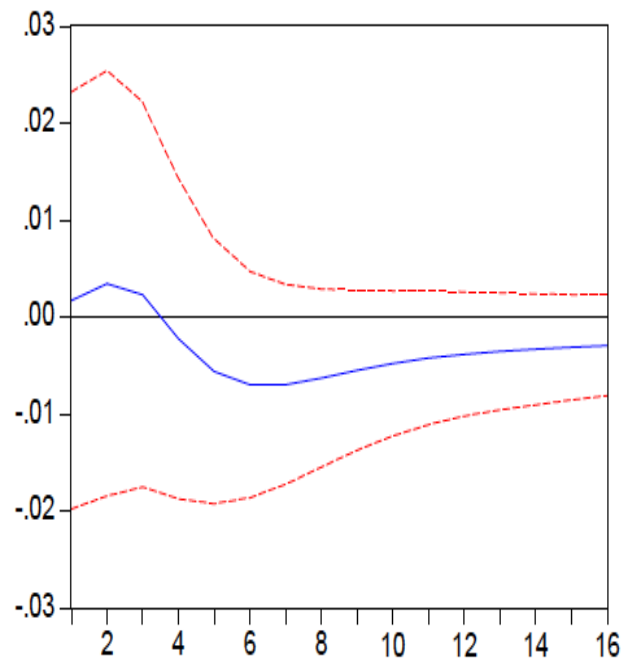
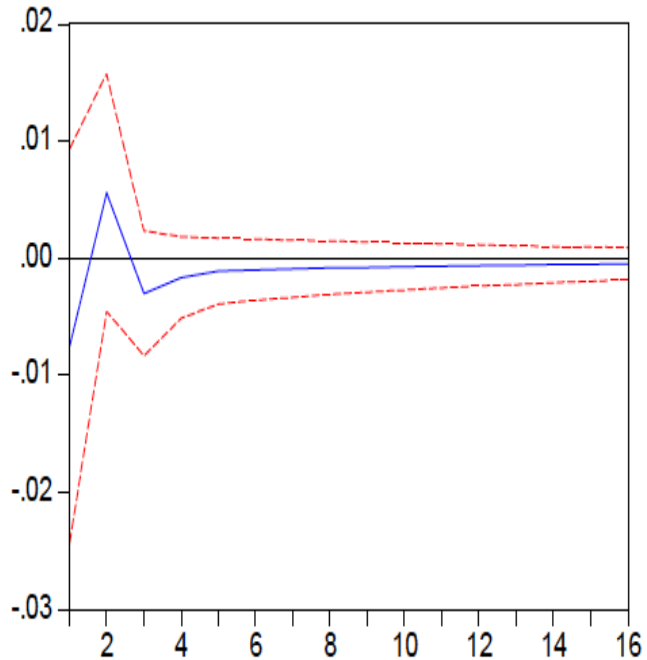INTER to FIS   LREER to FIS   LCPI to FIS

Figure 8: Impulse Responses of Real Activity to 1 Standard Deviation of Monetary Shock, Egypt

INTER to MON   LREER to MON   LCPI to MON

Figure 9: Impulse Responses of Real Activity to 1 Standard Deviation of Fiscal Shock, Egypt

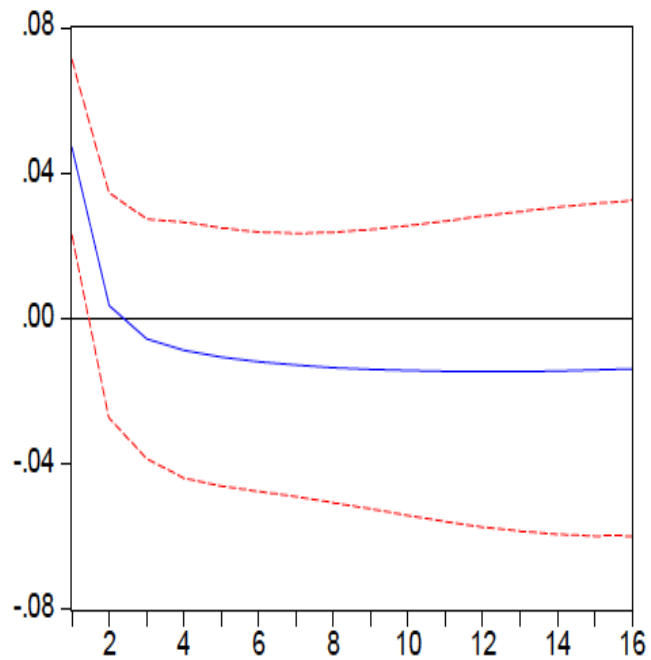INTER to FIS   LREER to FIS   LCPI to FIS
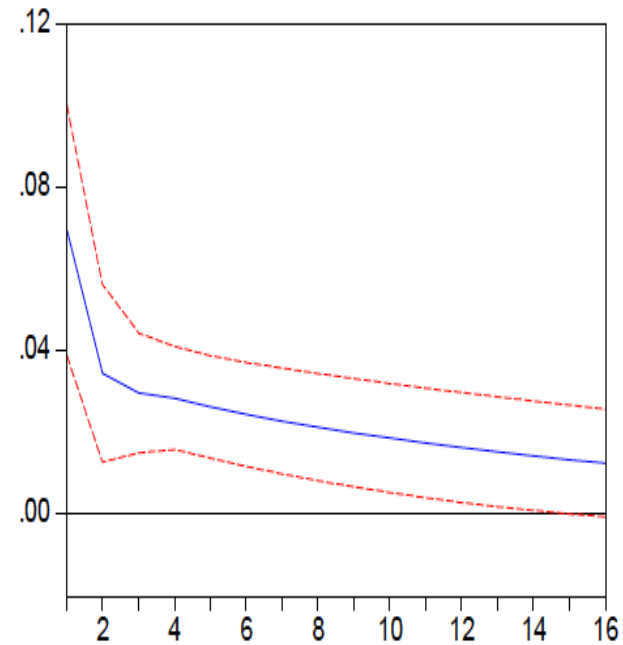
Figure 10: Impulse Responses of Macroeconomic Variables to 1 standard Deviation of Private Capital Inflows before the Crisis

LKAL to LKAL

LY to LKAL
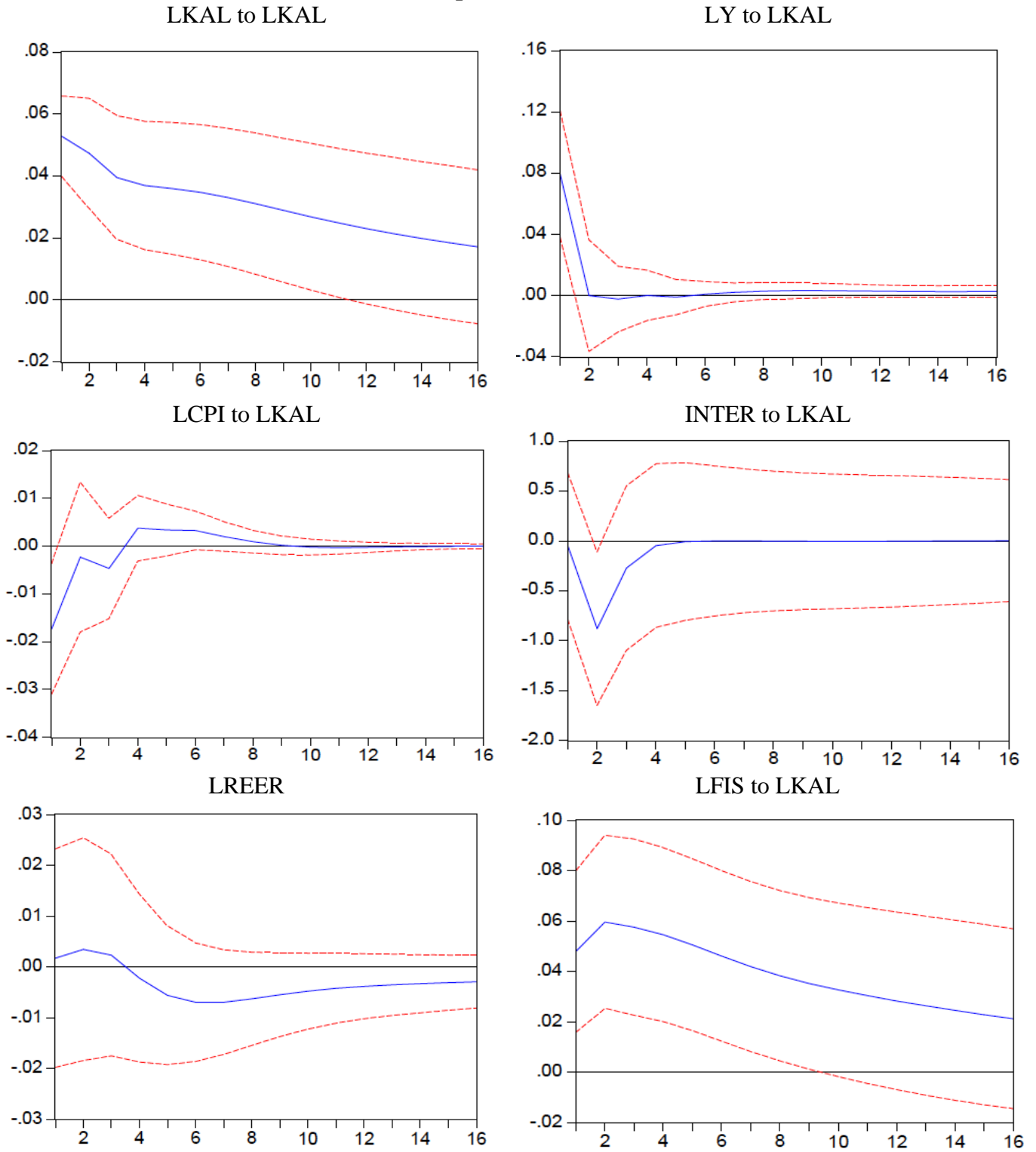
LCPI to LKAL

INTER to LKAL

LREER

LFIS to LKAL

Figure 11: Impulse Responses of Macroeconomic Variables to 1 standard Deviation of Private Capital Inflows after the Crisis

LKAL to LKAL

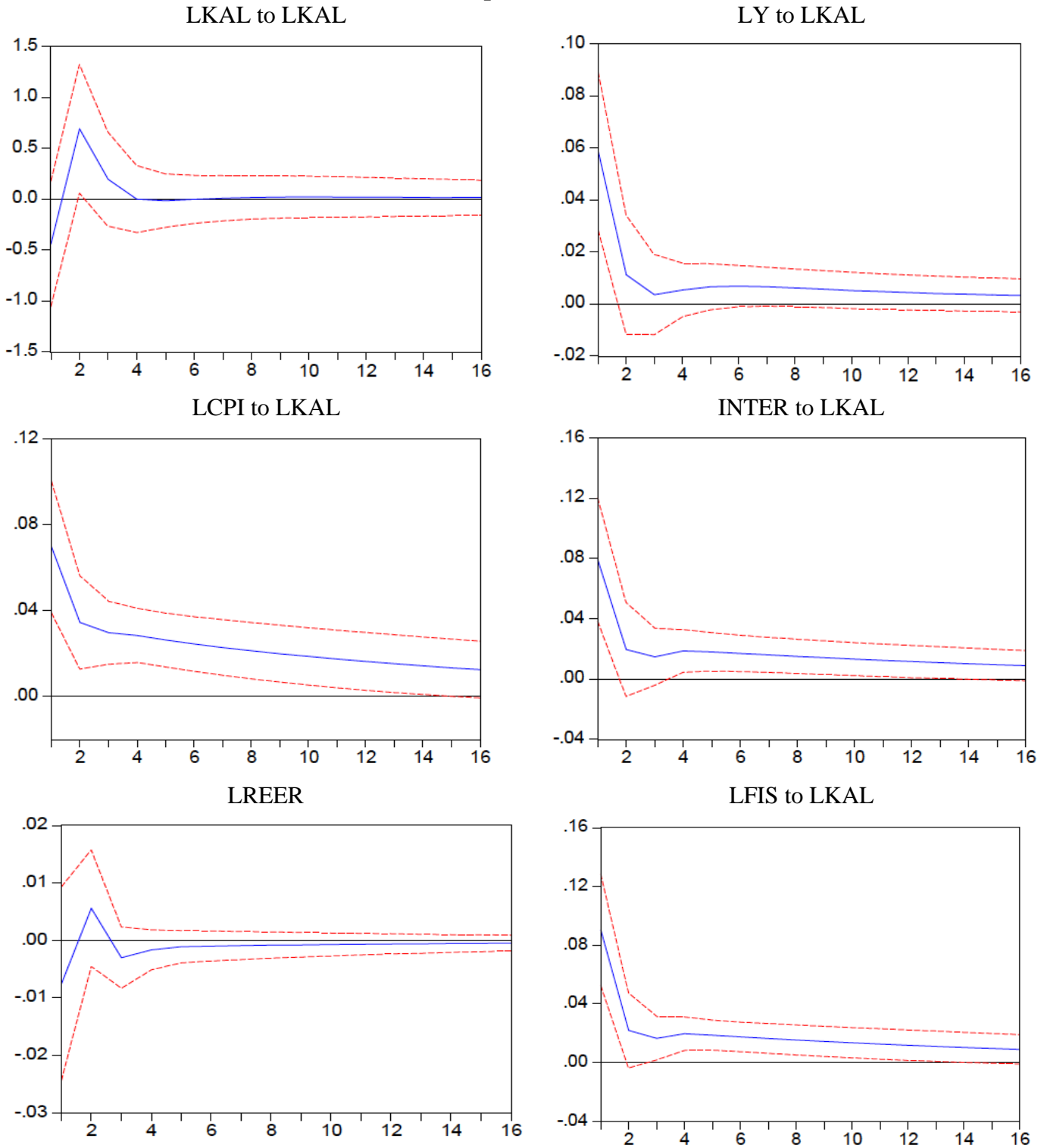LY to LKAL

LCPI to LKAL

INTER to LKAL

LREER

LFIS to LKAL

**Figure 12: Impulse Responses of Aggregate Demand to 1 Standard Deviation
before the Crisis**

Response of LCONS TO LKAL

Response of LINV to LKAL
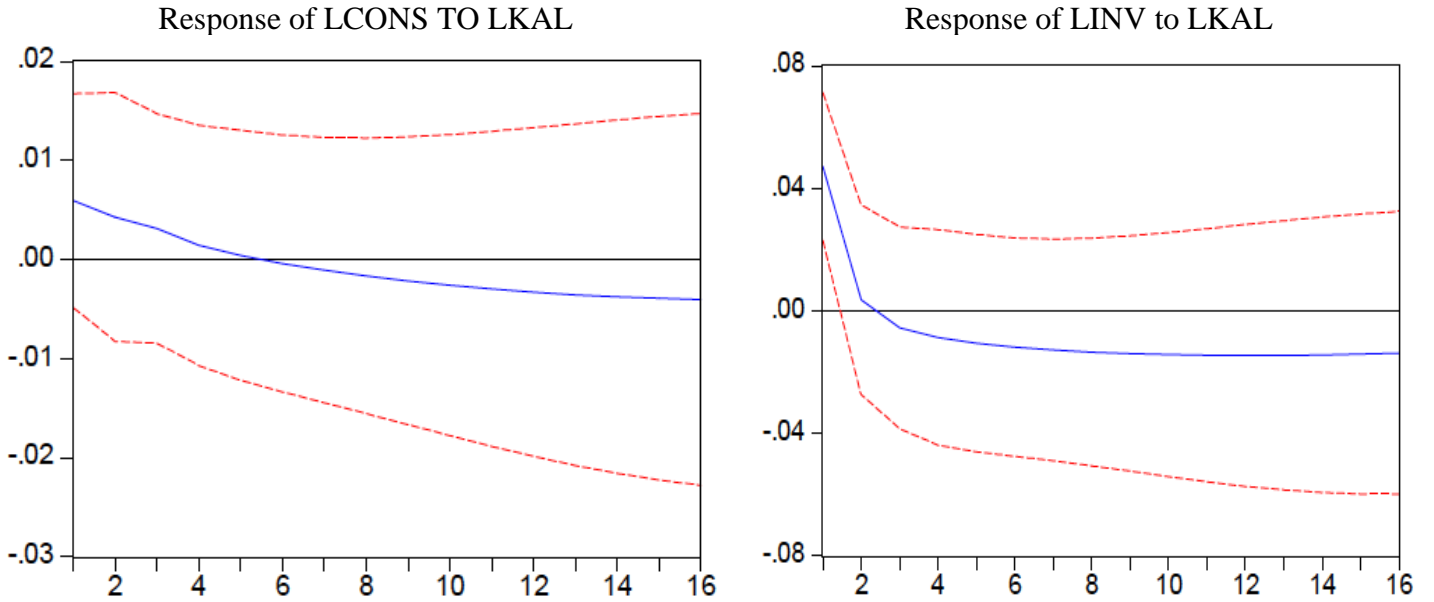
**Figure 13: Impulse Responses of Aggregate Demand to 1 Standard Deviation
after the Crisis**

Response of LCONS TO LKAL

Response of LINV to LKAL
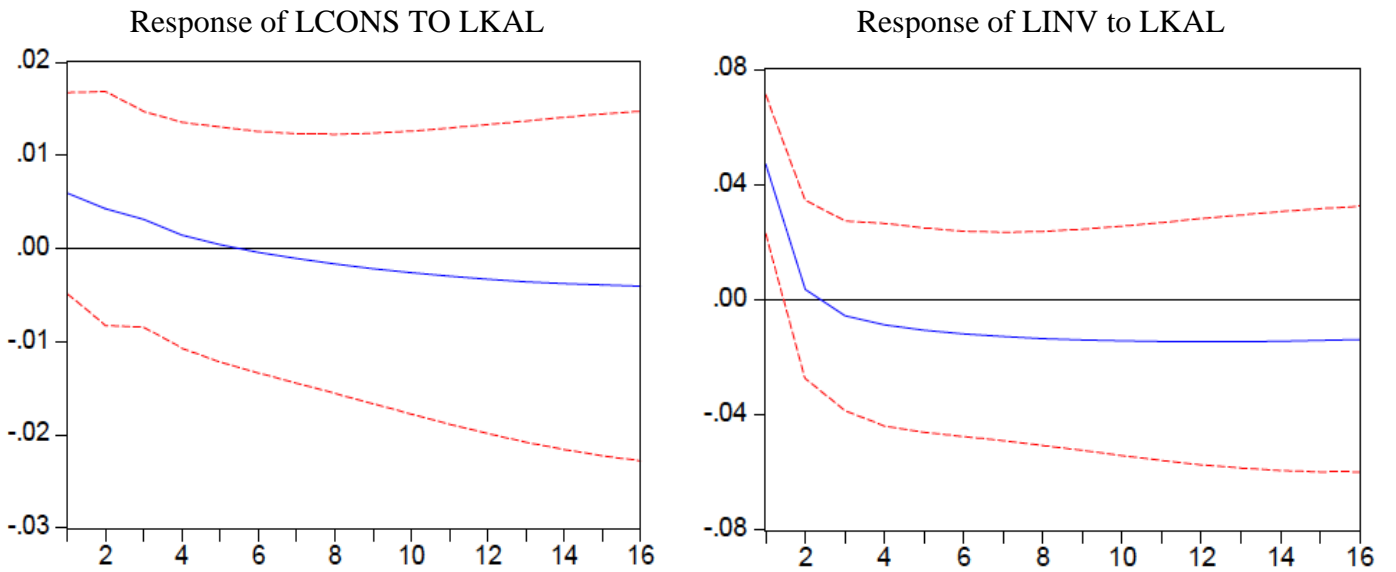
Table 8: Forecasted Error Variance Decompositions (FEVD) Associated with EMBI Shocks

Horizon	INTER	RISK	REER
1	1.13	17.28	1.17
2	1.37	29.54	3.67
5	3.01	33.69	8.87
10	4.79	28.83	10.43

Figure 14: Plots of Forecasted error variance decompositions (FEVD)
FEVD for LKAL

FEVD for GDPPER