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Abstract

Although the influx of large private capital inflows provides developing countries with substantial macroeconomic benefits, the integration process carries some difficult macroeconomic challenges. This paper examines the implications of large private capital inflows episodes on the macroeconomic fundamentals of highly integrated developing countries under the two policy regimes. We begin by classifying developing countries according to their degree of capital account openness. Then, we exploit large capital inflow episodes to measure their short-run effects on key domestic macroeconomic fundamentals for a sub-sample of highly integrated countries that adopted the two policy regimes using a VAR framework. The results indicate that countries experiencing 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 large capital inflows. In this respect, countries with a liberalized capital account usually witness an expansion of economic activity. However, such an effect is not likely to last indefinitely, and the boom phase may tend to reverse itself as the economy reaches its potential. Meanwhile, countries that adopt tightening capital controls on capital inflows experience more moderate GDP growth following the surge in inflows. Nonetheless, capital controls don't completely insulate countries against external disturbances, as the real exchange rate is more vulnerable to shocks.

JEL classification: E44, F36, F41.

Keywords: Large private capital inflows, capital controls, capital account liberalization, developing countries.

ملخص

رغم أن تدفقات رأس المال الخاص الكبيرة الوافدة إلى البلاد يوفر فوائد كبيرة على صعيد الاقتصاد الكلي للبلدان النامية، إلا أن عملية التكامل تحمل في طياتها أيضا بعض التحديات الصعبة في مجال الاقتصاد الكلي. تصنف هذه الورقة البحثية في البداية البلدان النامية وفقا لدرجة انفتاحها على حسابات رأس المال. نستغل هنا حلقات تدفق رأس المال الكبيرة لقياس آثارها قصيرة الأجل على أساسيات الاقتصاد الكلي المحلية الرئيسية لعينة فرعية من البلدان عالية التكامل التي اعتمدت نظامي السياسة العامة عن طريق إطار القيمة المعرضة للخطر أو (VAR). أشارت النتائج إلى أن البلدان التي تعاني من تقلبات أكثر حدة في الاقتصاد الكلي، بما في ذلك انعكاس حاد للتدفقات الوافدة، تميل إلى أن يزداد بها العجز بالحساب الجاري وتشهد زيادات أقوى في كل من الطلب الكلي والقيمة الحقيقية للعملة خلال فترة التدفقات الرأسمالية الوافدة الكبيرة. وفي هذا الصدد، تشهد البلدان التي لديها حساب رأسمالي تم تحريره عادة توسعا في النشاط الاقتصادي، غير أنه من غير المرجح أن يستمر هذا التأثير إلى أجل غير مسمى، وقد تميل مرحلة الازدهار إلى أن تعكس مسارها مع بلوغ الاقتصاد إمكاناته. في حين أن البلدان التي تبنت تشديد ضوابط رأس المال على تدفقات رأس المال الوافد إليها تشهد نموا أكثر اعتدالا في الناتج المحلي الإجمالي في أعقاب الزيادة في التدفقات الوافدة. ومع ذلك، فإن ضوابط رأس المال لم تعزل البلدان تماما ضد الاضطرابات الخارجية، لأن سعر الصرف الحقيقي كان أكثر عرضة للصدمات.

1. Introduction

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

Over the past two decades, many developing countries have taken measures to liberalize their capital and financial accounts in order to capitalize on a larger pool of global liquidity seeking opportunities for higher returns. This is relevant against the backdrop of easing monetary policy in many advanced economies in the wake of the global financial crisis that left the world awash of liquidity and searching for competitive returns across borders. There is a widespread belief that increased 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 a substantial amount of private capital inflows may provide considerable macroeconomic benefits for developing countries, the integration process carries some difficult macroeconomic challenges. Financially integrated developing countries will find themselves operating in a very different macroeconomic environment 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 the 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 the 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 indicates capital account liberalization as a consequence of economic development and maturation. This latter observation raises concerns about the characteristics of developing countries and their ability 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 doubts about 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 few studies on recent episodes and attempts at comprehensive cross-country examinations of policy responses under capital control and/or liberalization. This study attempts to fill this gap by addressing two research questions not yet adequately covered in the literature: (1) were the controls on the capital inflows adopted by some of the highly integrated developing countries at some point successful in reducing the vulnerability of those economies to the adverse consequences of large capital inflows? and (2) does the liberalization 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 is divided into six sections as follows. Section 2 explores the transmission mechanism through which an influx of private capital inflows can trigger disturbances in the domestic macro economy, as well as the policies adopted by developing countries in response to the most recent waves of large private capital inflows. Section 3 examines the macroeconomic performances of developing regions to large capital inflows. Sections 4 and 5 lay out the methodology and dataset. Section 6 presents the main findings and discussion, and section 7 concludes.

2. The transmission mechanism and policy responses

The key short-run macroeconomic concern associated with a surge in capital inflows 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 defending 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, thereby 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 (and perhaps rather quickly if domestic excess capacity is limited), the 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. Apart from concerns about excessive appreciation and unsustainable credit expansions, large surges of capital flows also pose significant challenges to the recipient countries. There is a risk of a sudden reversal in capital flows, with negative consequences for both financial stability and economic activity.

In order to avoid potential overheating and real currency appreciation, and to reduce the economy's vulnerability to a sharp reversal of the capital inflows, developing countries can (and have) intervened at every step of 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, through other means, offset 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 the extent to which they should resist pressures to appreciate the currency by intervening in the foreign exchange market (Lane, Lipschitz, and Mourmouras, 2002). One policy response is to reduce the inflows of foreign exchange. Some policies have restricted the required scale of intervention in the foreign exchange market either by 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 in an 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.
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 about the changes in the value of the currency (Calvo, Leiderman, and Reinhart, 1996).

The “impossible trinity” paradigm of open economy macroeconomics (meaning, 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.² In practice, however, and 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.³ When intervening 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. However, 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 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 monetary expansion associated with a given amount of intervention in the foreign exchange market:

1. The expansion of base money associated with a given amount of intervention can be restricted by sterilizing the effects of the intervention on the monetary base. This is done 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 by 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.

² For a general discussion of the impossible trinity paradigm, see Obstfeld and Taylor (2002).

³ See 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.

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 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, thereby promoting disintermediation.

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; Mendoza and Ostry, 2007). In contrast, greater restraint on expenditure growth has three benefits. First, dampening aggregate demand during the period of high inflows allows for 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 non-traded 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 (i.e., 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.⁴ 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.

The essential point to emerge from this section is that the nature of relationships and the direction of causation in macro economies – on which our study builds its analysis, findings, and recommendations – depend on 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 A relevant example is provided by Chile, which aims to achieve 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).

3. The macroeconomic consequences of large capital inflows

In this section, we examine the macroeconomic consequences of policy responses to large capital inflows in developing regions. The first step in this analysis is to examine the behavior of real GDP growth, real aggregate demand, the current account balance, and the real effective exchange rate before, during, and after the episodes. The analysis also extends to include exports and inflation (see Figure 2).

The main findings indicate that episodes of large capital inflows were associated with an acceleration of GDP growth; afterward, however, 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 around three percentage points lower than during the episode, and around one 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 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 the 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).

In 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. Figure 3 shows the correlation between post-inflow GDP growth and the macroeconomic policies captured by scatter plots. In particular, the plots show 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) resistance index value. 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.

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. Latin America, emerging Europe, and the Commonwealth of Independent States (CIS), which are the regions with stronger real appreciation during the episodes, also experience larger increases in public expenditure during those periods (Figure 4). In contrast, the economies that followed more countercyclical fiscal policies and 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 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. This is because higher resistance was not associated with significantly smaller real appreciation or better post-inflow growth during short inflow episodes. 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, ex-ante identification may be difficult for policymakers when an episode of inflows turns 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. In 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 the notion 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 the transmission of global macroeconomic shocks. Macroeconomic policies are the same. In developing economies, the traditional policy instruments are fiscal policy and monetary policy, but the range and 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.

4. Methodology

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:

$$\begin{bmatrix} 1 & a_{12} \\ a_{21} & 1 \end{bmatrix} \times \begin{bmatrix} x_t \\ w_t \end{bmatrix} = \begin{bmatrix} a_1 0 \\ a_2 0 \end{bmatrix} + \begin{bmatrix} \sigma_1 1 & \sigma_1 2 \\ \sigma_2 1 & \sigma_2 2 \end{bmatrix} \times \begin{bmatrix} x_{t-1} \\ w_{t-1} \end{bmatrix} + \begin{bmatrix} \epsilon_{x_t} \\ \epsilon_{w_t} \end{bmatrix} \quad (2)$$

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 an 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 for 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} only contemporaneously affects 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 a small open economy with many structural issues, political instability, and foreign direct investment is not sizable enough compared to its economic performance.

5. Dataset

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 for a sample of 21 developing countries as shown in Table 4. Together, these countries accounted for approximately 90 percent of the total private capital flows to developing countries of these types during the period 1990-2020. Table 4 indicates that the private capital inflows remain highly concentrated in just a few of the largest developing economies. During the study period, five countries (excluding China) accounted for over a third of private capital inflows, and 20 countries accounted for nearly 55 percent. The largest borrower, China, accounted for almost one-quarter of the total, well above its share (nine 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.

Table 1. Explanatory variables

Abb.	Variable
y	Real output measured by GDP in constant prices
CPI	Price level measured by the consumer price index
INTER	Real interest rate
REER	Real effective exchange rate
M	Money stock in circulation (M1)
CON	Consumption in constant prices
INV	Investment in constant prices

Regarding the measures of the variables, the set of indicators include real GDP in constant prices (Y); inflation based on the consumer price index; change in the real effective exchange rate (REER); the interest rate (INTER), which refers to the real interest rate; the money stock in circulation (M1); consumption in constant prices (RCP); and investment in constant prices (RINV). All data are obtained from the IMF's World Economic Outlook. We 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 5). The variables are expressed in a logarithm with the exception of the real interest rate.

6. Findings and discussion

6.1. 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).⁵ There was a fundamental change in the reporting on capital controls when the 1996 volume of the AREAER began including more detailed information both across a disaggregated set of assets and by distinguishing between controls on outflows and controls on inflows.

⁵ The early works that use the AREAER to create panel datasets of capital controls include Vittorio Grilli and Gian Maria Milesi-Ferretti (1995), Quinn (1997), and Chinn and Ito (2006).

This paper uses a new dataset of capital control restrictions developed by Fernández et al. (2015). This dataset presents and describes capital control restrictions on the inflows and outflows of 10 categories of assets for 100 countries building on the data first presented in Martin Schindler (2009) and the AREAER. It includes additional asset categories, more countries, and a longer time period. Moreover, the dataset characterizes 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 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 set of indicators smaller than the full set. This paper refines a subset of the highly integrated 21 countries classified according to the private capital inflows and reclassified according to the degree of capital account openness as shown in Table 3. The classification of a country as open, gate, or wall follows Fernandez et al. (2015). An *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. The direction refers to whether the control is on inflows or outflows.

6.2. *The macroeconomic effects of capital account liberalization and controls to large capital inflow episodes*

In this section, we attempt to analyze whether price-based controls on private capital inflows or liberalized capital accounts are more successful in insulating economies against the adverse consequences of large capital inflow episodes. The effect of capital account liberalization and controls on selected developing countries is analyzed using a VAR model and we infer the effects on macroeconomic variables by exploiting large capital inflow episodes⁶ to measure the short-run effects of these shocks. We present results from VAR models for selected developing countries according to the degree of capital account openness as gate, wall, and open countries as explained in the previous section. The variables included in the VAR are real output (y), real interest rate (INTER), real effective exchange rate (REER), money stock (M), and price index (CPI). Real private consumption and real investment are also included in the VAR afterward in the next section to test how demand variables respond to private capital inflow episodes before and after crises.

We estimate the VAR model using quarterly data from the first quarter of 1990 to the fourth quarter of 2020. 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 Akaike information criteria. We choose a lag structure of 4 for this model as there was a conflict between the different information criteria; the LM test does not detect the serial correlation of

⁶ The capital inflow episodes are extracted from the comprehensive work of Forbes and Warnock (2019),

the residuals for this specification. The unit root tests performed show that all the exogenous variables are stationary.⁷

The impulse responses presented in Figure 6 demonstrate that the gate and open groups do not respond significantly to shocks to the private capital inflows, nor do they respond significantly to shocks in the other wall group. Nevertheless, the wall group responds to large private capital inflows shocks and represents the countries with the strongest response. It stands out that developing economies are characterized by less volatility in real growth during the post-inflow period despite the lower average real growth. Similarly, there is high and persistent inflation during the pre-inflow period, while the inflation rate decreases to single digits in the second sub-period. The significantly lower inflation may be attributed to tight monetary policy and structural reforms. Indeed, monetary growth was significantly higher in the pre-inflow period, and higher inflation reflected itself in the much higher interbank rate compared to the post-inflow period. Despite a significant reduction in the inflation rate, the nominal appreciation of the domestic currencies has resulted in, on average, higher real appreciation of the currency, thereby reflecting a stronger external position in the post-crisis period.

Regarding the real effective exchange rate, a large capital inflow episode led to an appreciation of the local currency during three quarters of the first sub-period. Nevertheless, the appreciation seems to be short-lived, as it converges to its pre-inflow level. In contrast, the insignificance of the effects during the post-inflow period may reflect less inflationary pressures and, therefore, a 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-inflow period in an effort to contain a further surge in the inflationary pressures that dominated the macroeconomic structure and demanded 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-inflow periods for the three groups of countries. Accordingly, sterilization efforts in the post-inflow period aimed to mitigate the inflationary effects of higher capital inflows. This contrasts with 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-inflow period compared to the pre-inflow period.

⁷ They are available upon request.

The variance decomposition for the VAR model is estimated above. Specifically, the variance measures the cumulative fluctuations over different horizons in the forecast error of changes in the capital flows proxy. One should note that only a small percentage of the forecast errors in the gate and open indexes can be attributed to capital flow shocks. In fact, the figures are 0.07 percent and 1.17 percent for the first quarter for each group, respectively. Nevertheless, when we look at the wall 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 policies) might have helped insulate the wall economies from certain types of global external financial shocks, namely the ones captured by the large private capital inflows. We cannot, however, 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. It is also important to note that the precise role played by the capital controls in insulating those economies was not clarified in our empirical analysis so far.

The evidence indicates persistent capital inflows to the selected economy, attesting to higher investor confidence in open economies in the post-inflow period. Moreover, available liquidity through this pool has contributed to the growth of the money supply toward mobilizing investment and real growth. Successful sterilization policies have mitigated the nominal effects of capital flows compared to the earlier period. Meanwhile, countries that adopt controls on capital inflows don't seem relatively well insulated against external disturbances.

6.3. The pre- and post-effect of capital account controls and liberalization on real economic activity

The second objective of this section is to investigate if the selected economies experience a boom-bust cycle after capital account liberalization. Generally, in economies with tight control of the financial account and a less developed financial sector, the 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 a substantial increase in credit for investment and consumption, an appreciation of the real exchange rate, and asset price bubbles. However, such an 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 (Kandil, M., & Trabelsi, M., 2015).

To test if a boom-bust cycle happens 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: real private consumption (RCP), real investment (RINV), and consumer price index (CPI). This latter variable is put last because of the possible effect of 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-inflow 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). The divergent nature of the impulse responses in Figure 14 is worth noting, attesting to a significant structural break that boosts aggregate demand in the post-crisis period on a sustainable basis, beyond the effect of capital flows. However, there is a significantly smaller effect on consumption compared to that on investment. The difference attests to the success of developing countries' policies in capitalizing on capital inflows toward increasing investment and exports, hence mobilizing real growth and mitigating the corresponding inflationary effects.

7. Conclusion

This paper examines the implications of large private capital inflows episodes on the macroeconomic fundamentals of highly integrated developing countries under the two policy regimes. We employ a VAR framework to test whether the degree of capital account openness has a different response to the adverse consequences of large private capital inflows. The paper refines a subset of the highly integrated 21 countries classified according to the amount of net private capital inflows (90 percent of total net private capital inflows into developing countries over the study period 1990-2020) and reclassified according to the degree of capital account openness as open, gate, or wall following Fernandez et al. (2015). Then, the large capital inflow episodes are identified for the subset of countries over the study period.

The findings indicate that countries experiencing 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. In addition, 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, not been associated with lower real appreciation or a reduced vulnerability to a sharp reversal of inflows. In other words, countries that adopt controls on capital inflows aren't completely insulated against external disturbances as the real exchange rate is more vulnerable to shocks.

To this end, the essence of the paper is of policy relevance to developing countries striving to understand the effectiveness of capital controls vis-à-vis liberalization in countering the adverse implications of large capital inflows. Nonetheless, the macroeconomic and structural benefits of large private capital inflows may take time to materialize, which, in turn, depends

on countries' macroeconomic policy stances as indicated in the paper. Therefore, it is important to understand not only the internal structure of a specific country but also its degree of integration into the global economy.

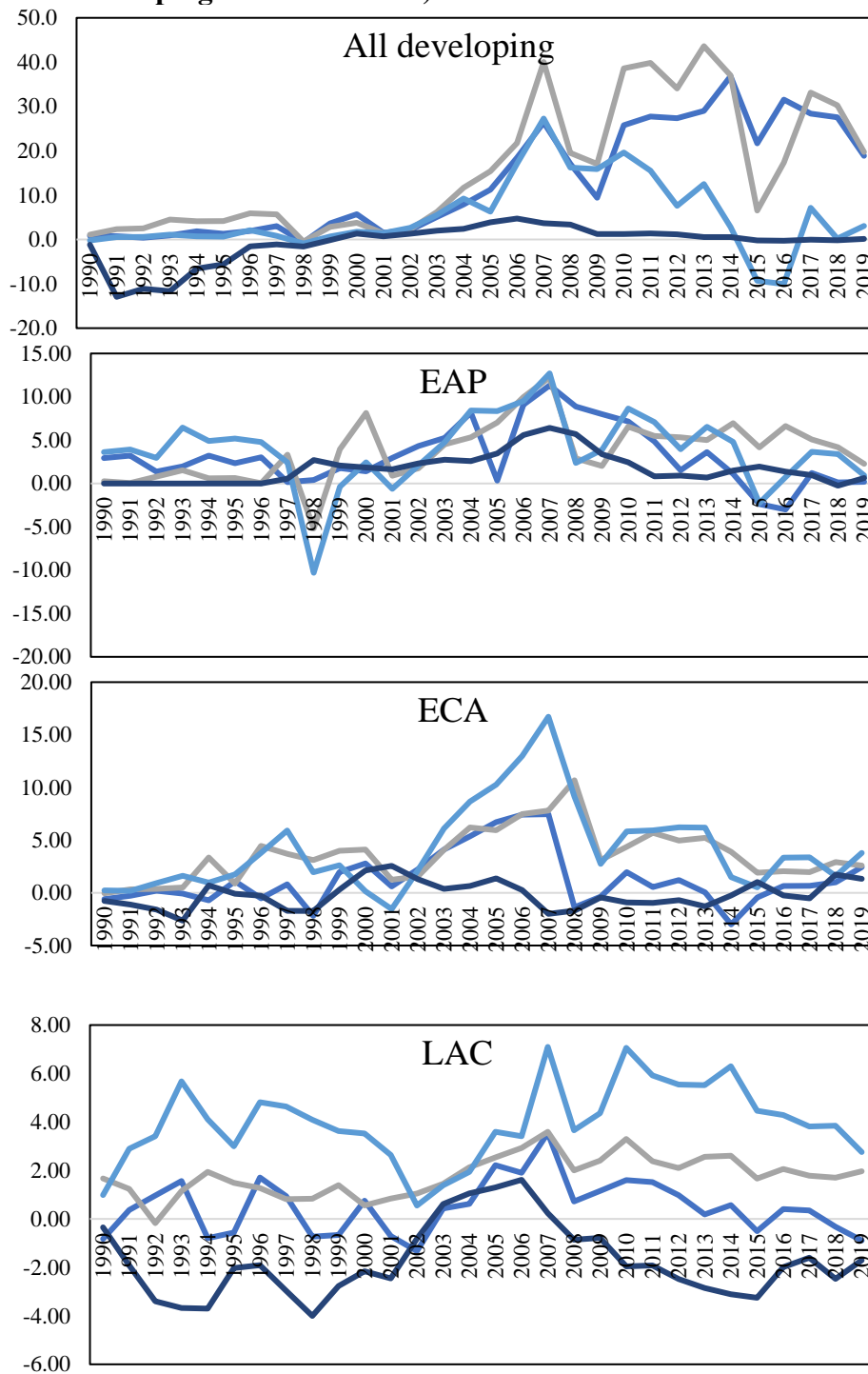
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Appendix

Figure 1: Private capital flows, current account balance and reserve accumulation (% of total developing countries' GDP)



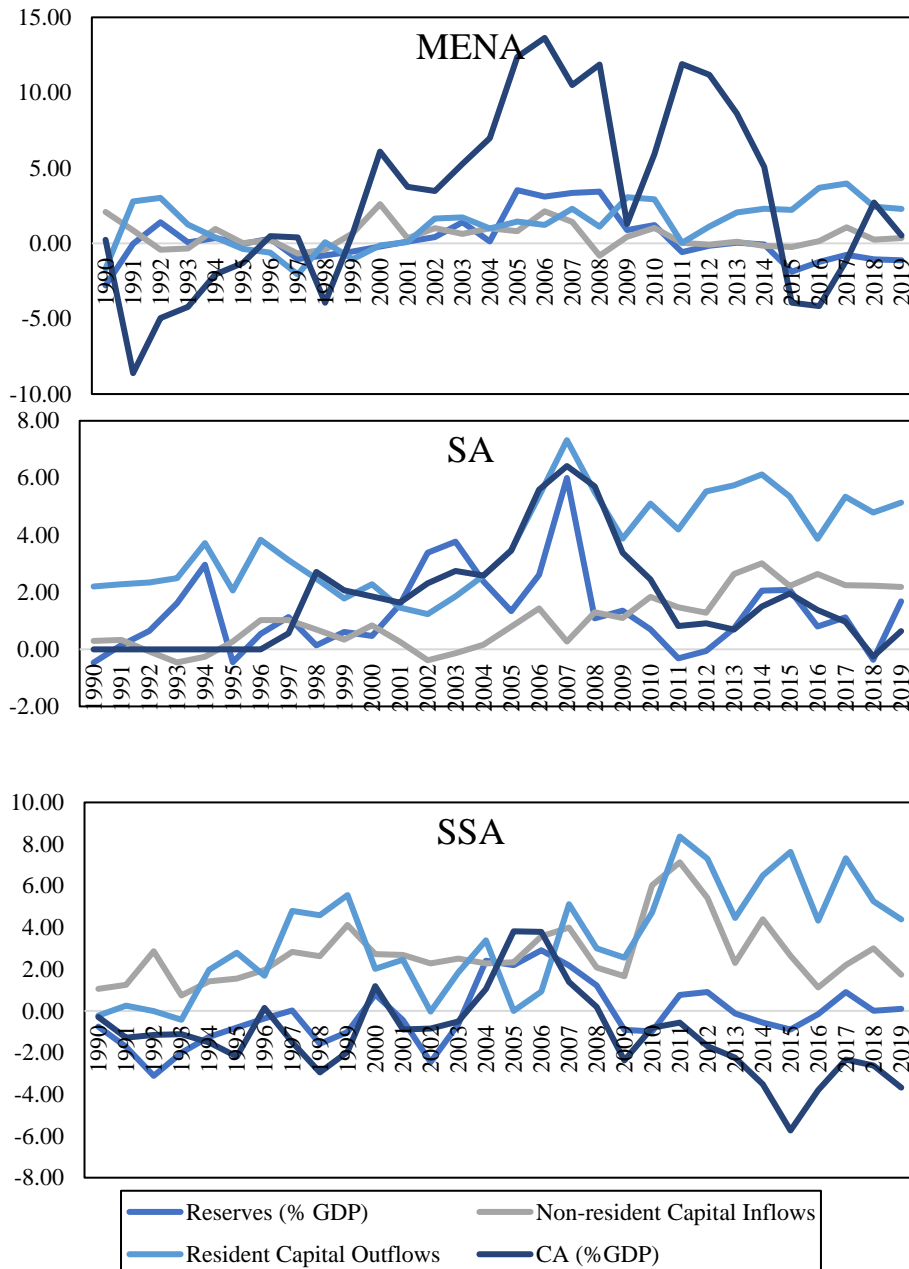


Figure 2: Private capital flows and selected macroeconomic variables

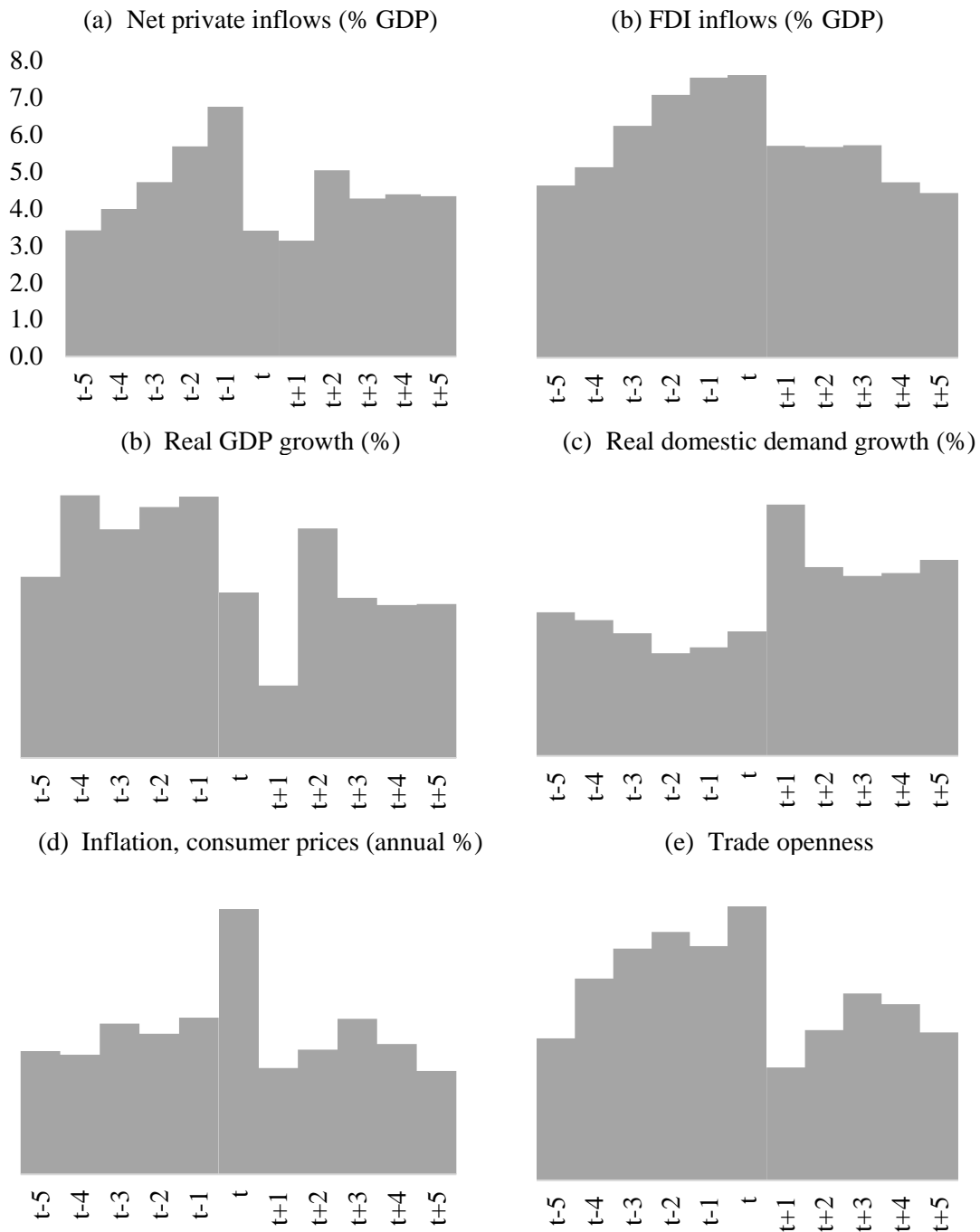
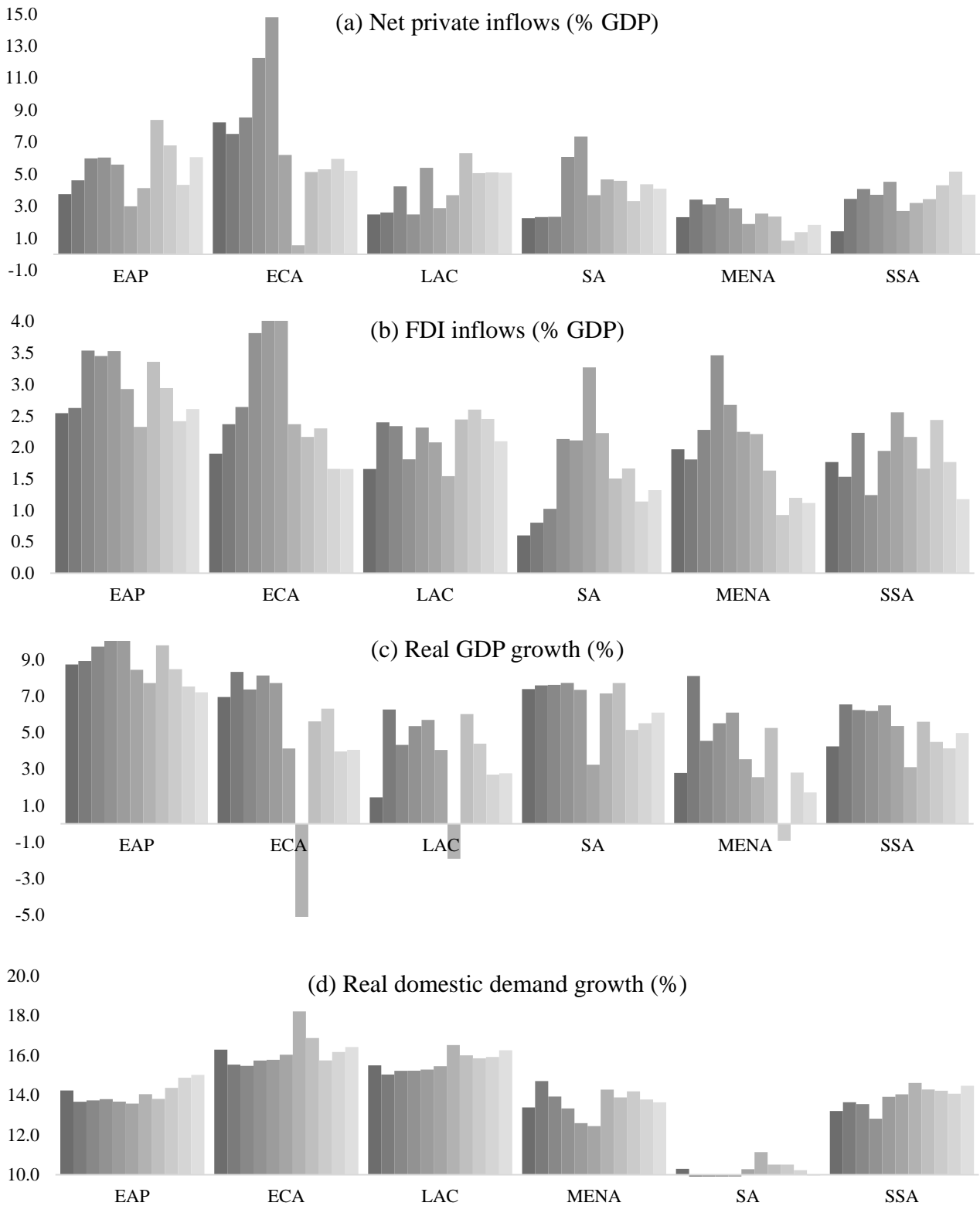


Figure 3: Private capital flows and selected macroeconomic variables by region



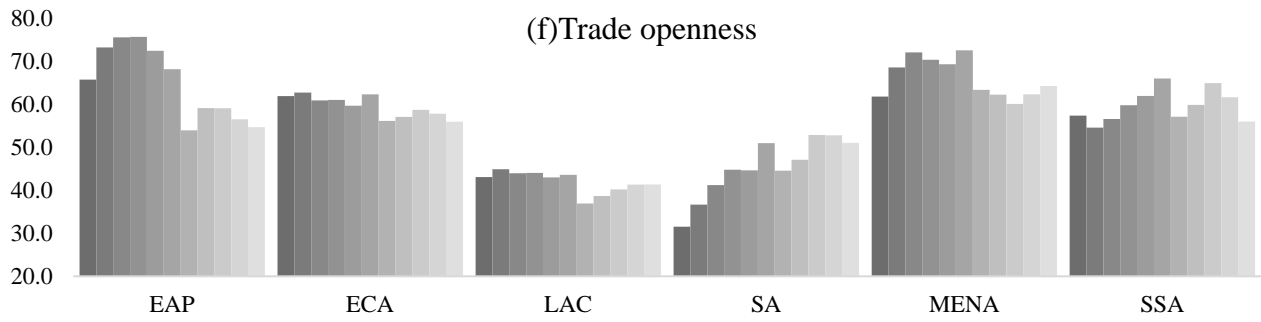
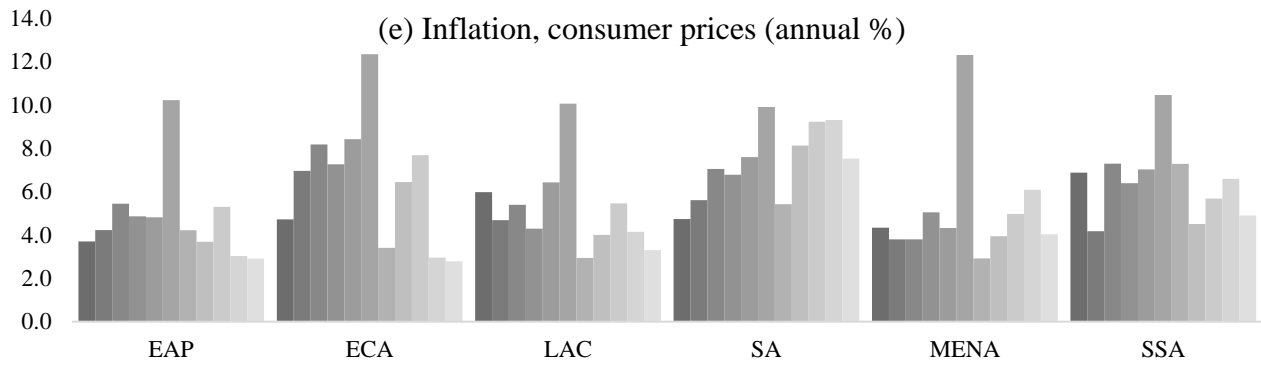


Table 2: Share of net private capital flows by type of flows (% of total), developing countries (average 1990-2019)

	Country	Rank	Net Private Capital Inflows (total)
1	Argentina	8	2.76
2	Brazil	2	10.42
3	Bulgaria	21	0.60
4	China	1	34.61
5	Colombia	10	1.89
6	Egypt, Arab Rep.	18	0.96
7	India	3	7.11
8	Indonesia	7	3.33
9	Kazakhstan	12	1.67
10	Lebanon	19	0.71
11	Mexico	4	6.32
12	Nigeria	17	0.99
13	Peru	16	1.01
14	Philippines	20	0.61
15	Russia	5	4.96
16	South Africa	11	1.85
17	Thailand	9	2.17
18	Turkey	6	4.11
19	Ukraine	14	1.12
20	Venezuela, RB	15	1.09
21	Vietnam	13	1.27
	Top 5		32.9
	Top 10		44.9
	Top 20		54.9
	Top 21		89.6

Source: Authors' calculations based on IMF's BOP data.

Note: Net private capital inflows are defined as the net financial account excluding other investment liabilities in USD billion.

Table 3: List of net private capital inflow episodes

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

17	Thailand	1987q4 1995q2 2004q3 2009q4	1990q3 1996q1 2006q1 2010q4
18	Turkey	1990q1 1992q3 2000q1	1990q4 1993q4 2000q3
19	Ukraine		
20	Venezuela, RB	2005q2 2007q2	2005q4 2008q1
21	Vietnam		

Source: Forbes and Warnock (2019), authors.

Table 4: 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

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		Multiple	Floating	Gate	Yes	March 1988	Country Fund	January 1989	April 1990	July 1990	August 1992
3	Brazil	Dual	Pegged to Euro	Gate	Yes	—	—	—	—	—	—
4	Bulgaria	Dual	Pegged to USD	Wall	Yes	—	—	—	—	—	—
5	China	Multiple		Gate	Yes	December 1991	Policy Decree	na	1986	1991	na
6	Colombia	Multiple		Open	No	—	—	—	—	—	—
7	Egypt, Arab Rep.	Dual	Fixed	Wall	Yes	June 1986	Country Fund	November 1981	1994	1991	na
8	India	Unitary	Managed Float	Gate	Yes	September 1989	Policy Decree	May 1973	1970	1991	na
9	Indonesia	Multiple	Floating	Gate	Yes	—	—	—	—	—	—
10	Kazakhstan	Multiple	Pegged to USD	Gate	Yes	—	—	—	—	—	—
11	Lebanon	Dual	Floating	Gate	Yes	May 1989	Policy Decree	May 1989	July 1986	November 1988	September 1989
12	Mexico	Multiple		Gate	Yes	August 1995	Policy Decree	January 1991	na	July 1988	March 1991
13	Nigeria	Multiple	Floating	Open	No	—	—	—	—	—	—
14	Peru	Dual	Flexible	Wall	Yes	May 1986	Country Fund	October 1986	November 1988	June 1988	August 1989
15	Philippines	Multiple		Gate	Yes	—	—	—	—	—	—
16	Russia	Dual	Floating	Gate	Yes	—	—	—	—	—	—
	South Africa	Multiple	Flexible	Gate	Yes	—	—	—	—	—	—

17		Dual	Managed Float	Gate	Yes	September 1987	Country Fund	June 1985	Always Open	1988	na
	Thailand										
18	Turkey	Multiple	Floating	Gate	Yes	August 1989	Policy Decree	July 1994	1989	1988	na
19	Ukraine	Multiple	Floating	Wall	Yes	—	—	—	—	—	—
20		Dual	Pegged to USD	Gate	Yes	January 1990	Policy Decree	June 1989	May 1989	April 1991	June 1990
	Venezuela, RB										
21		Dual	Pegged to a Basket of Currencies	Gate	—	—	—	—	—	—	—
	Vietnam										

Source: Authors, based on various sources.

*The direction refers to whether the control is on inflows or outflows. The classification of a country as open, gate, or wall follows Fernandez et al. (2015). An 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.

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

Variable	Gate				Wall				Open			
	Mean	Std. Dev.	Min	Max	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	43100.3	27711.7	41699.9	48900.6
Real GDP Growth (%)	2.59	47.64	-21.68	20.82	4.84	21.66	-13.84	11.98	3.44	18.56	-15.11	9.88
Inflation (CPI %)	7.4	8.0	7.5	6.3	4.20	20.53	-0.37	4.46	10.10	25.45	-0.77	8.64
Fiscal Balance (% GDP)	7.2	8.3	7.5	8.8	-5.54	2.63	-18.19	5.47	-8.54	3.55	-10.56	7.57
Change in REER (%)	7.6	4.9	6.8	3.6	1.51	19	-17.86	8.70	5.56	25	-1.66	7.70
Monetary Growth (M1%)	8.3	1.5	6.4	22.6	8.27	69.91	-9.66	13.07	12.9	3.5	10.56	25.6
Interest Rate (%)	3.1	6.5	4.1	0.8	26.64	71.8271	8.05	17.34	11.5	69.88	8.00	12.00

Figure 4: Impulse responses of real activity to 1 standard deviation of NKF, gate countries

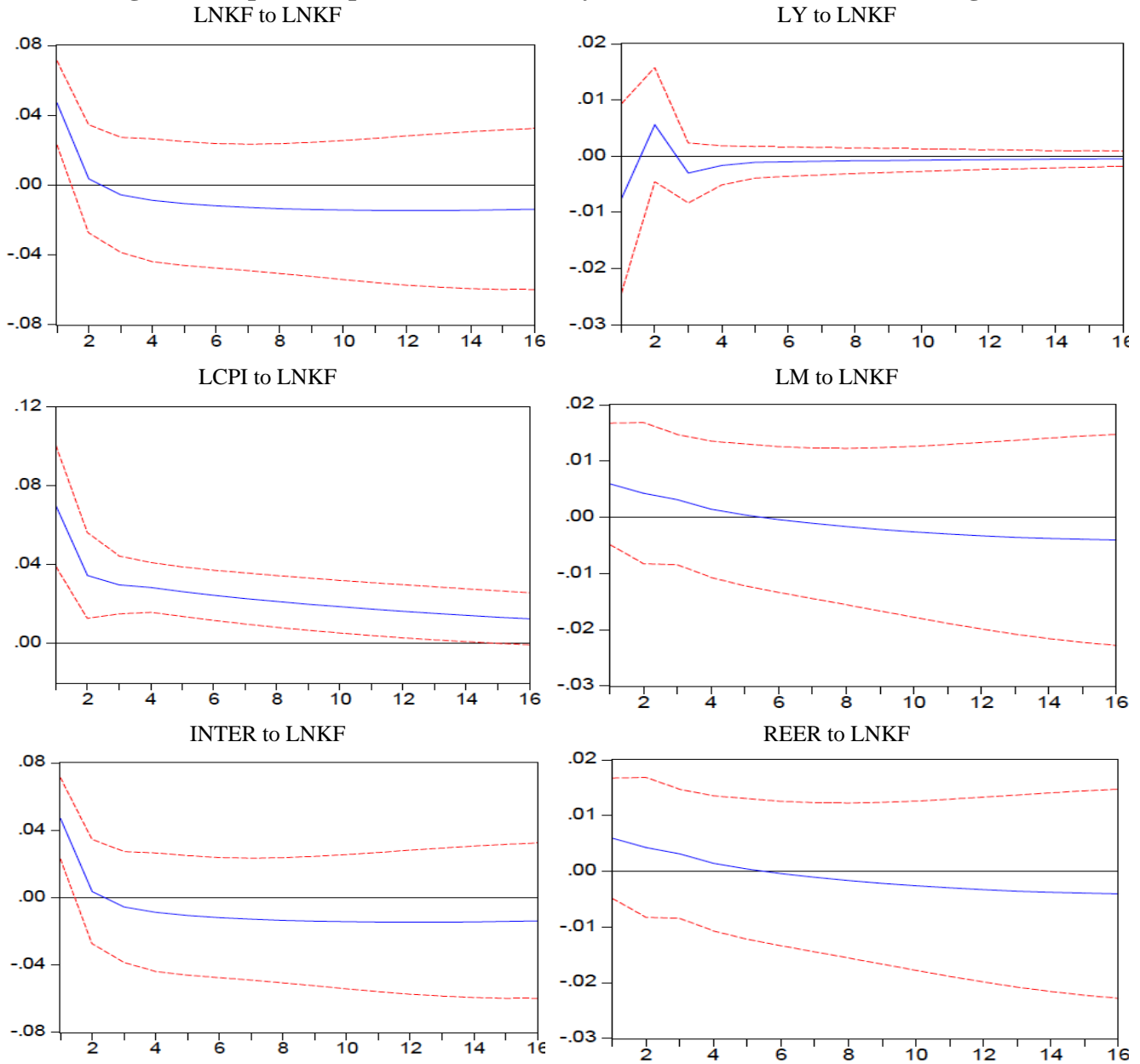


Figure 5: Impulse responses of real activity to 1 standard deviation of NKF, wall countries

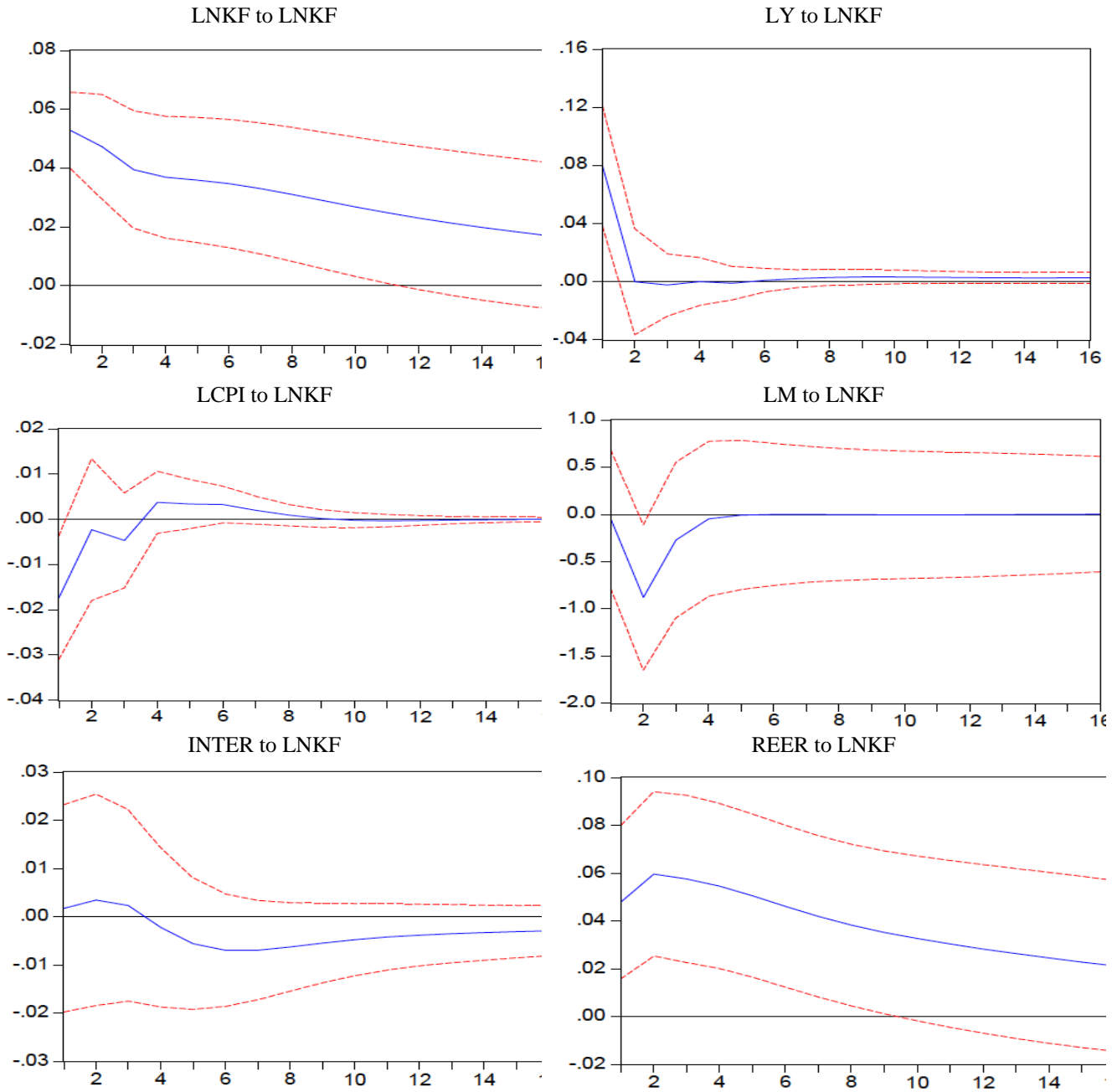


Figure 6: Impulse responses of real activity to 1 standard deviation of NKF, open countries

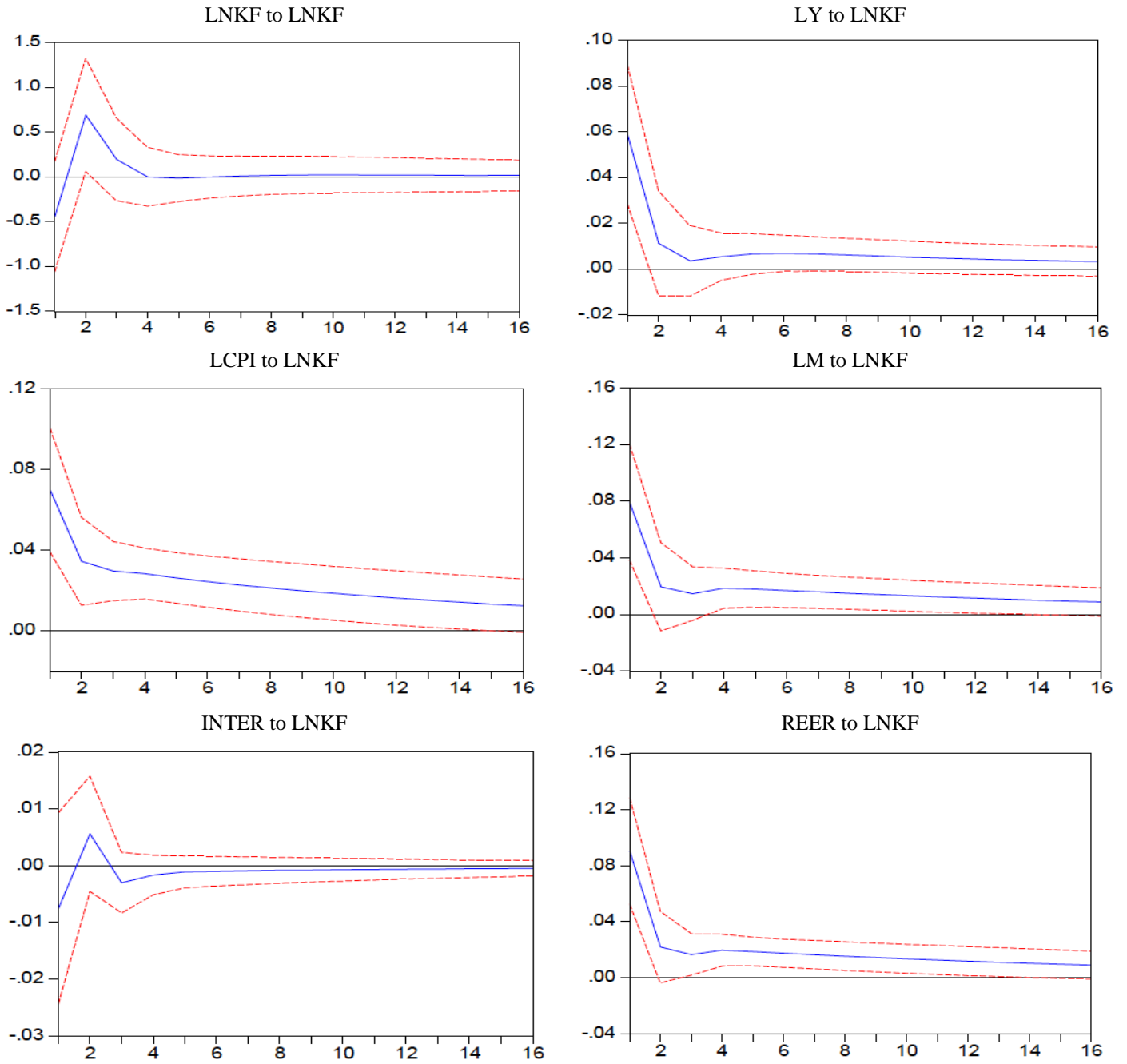
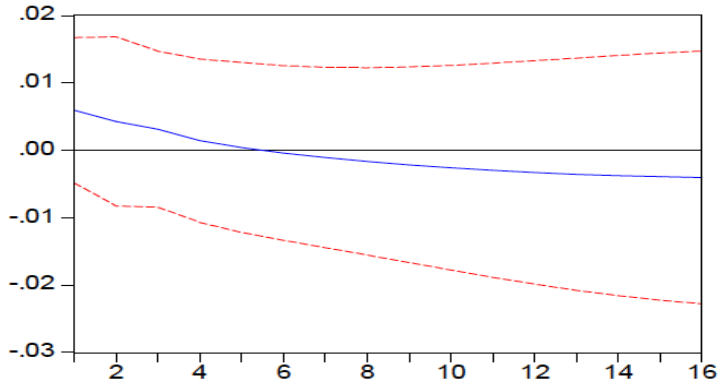


Figure 7: Impulse responses of aggregate demand to 1 standard deviation of NKF before the crisis, gate countries

LCONS to LKAL



LINV to LKAL

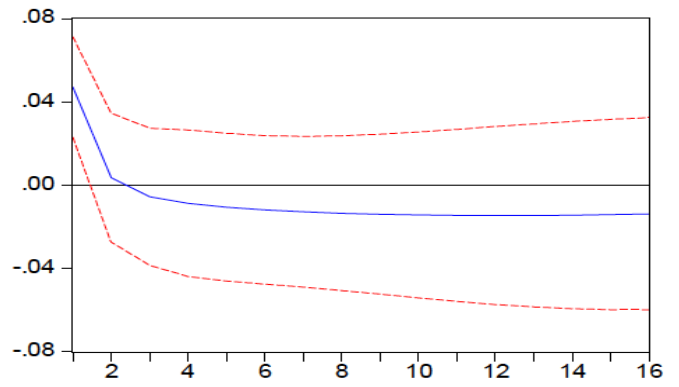
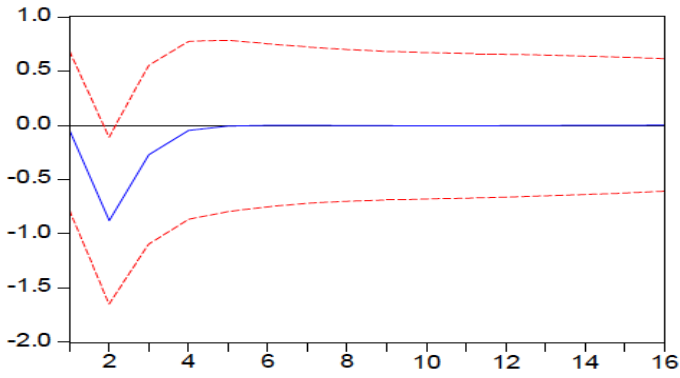


Figure 8: Impulse responses of aggregate demand to 1 standard deviation of NKF after the crisis, gate countries

LCONS to LKAL



LINV to LKAL

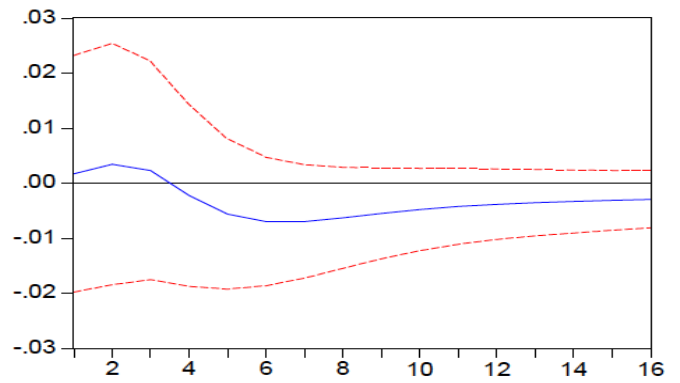
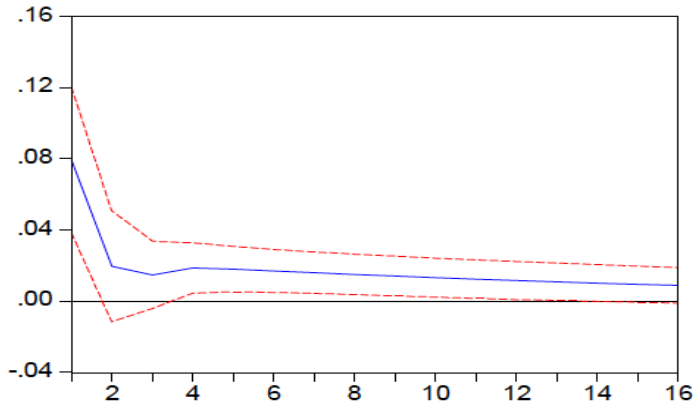


Figure 9: Impulse responses of aggregate demand to 1 standard deviation of NKF before the crisis, wall countries

LCONS to LKAL



LINV to LKAL

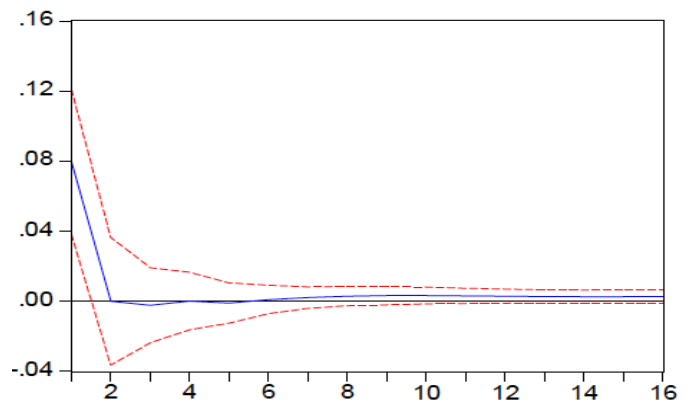
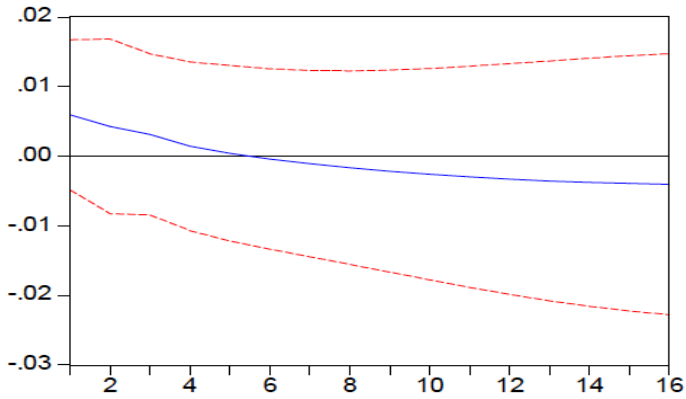


Figure 10: Impulse responses of aggregate demand to 1 standard deviation of NKF after the crisis, wall countries

LCONS to LKAL



LINV to LKAL

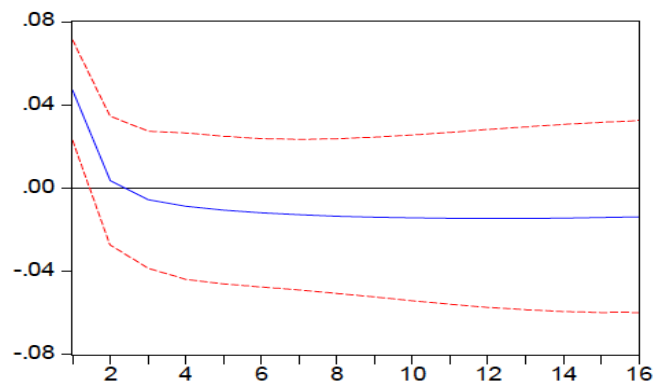
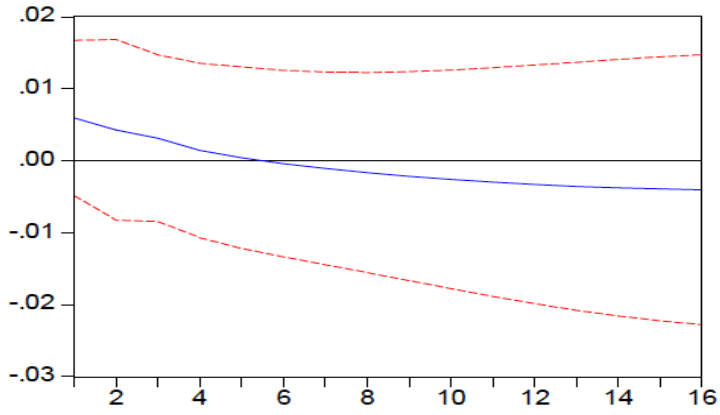


Figure 11: Impulse responses of aggregate demand to 1 standard deviation of NKF before the crisis, open countries

LCONS to LKAL



LINV to LKAL

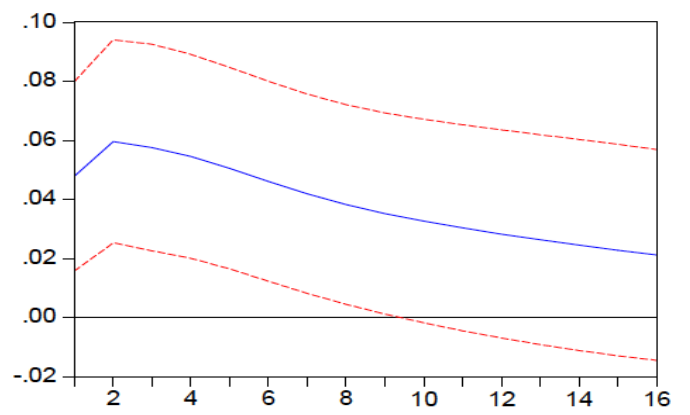
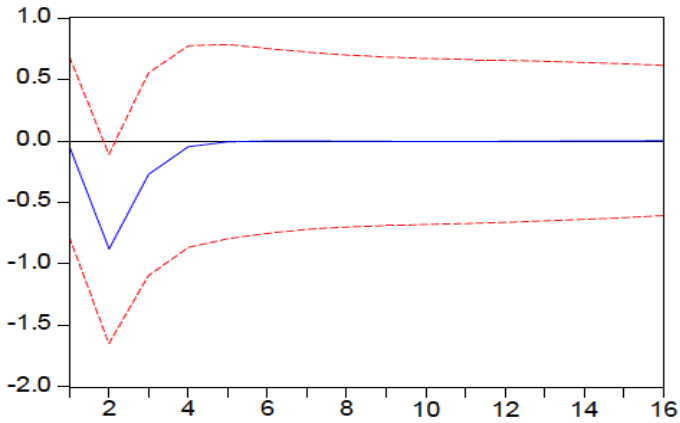


Figure 12: Impulse responses of aggregate demand to 1 standard deviation of NKF after the crisis, open countries

LCONS to LKAL



LINV to LKAL

