Latin American Performance to External Shocks: What Has Really Been Sweat?

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How have external shocks affected the LA region? To what extent such shocks relate to US domestic conditions? Has the region engaged in procyclical or countercyclical monetary and fiscal policy in response to external shocks? In this paper we address these questions through an empirical exercise that involves the identification of US domestic structural shocks as LA external shocks, in a two-block model. We find that domestic US fluctuations have a significant impact on commodity prices, and such effect heavily conditions LA capital inflows and LA performance in terms of economic activity, inflation, domestic currency movements, and reserve accumulation. There is no clear evidence that regional fiscal policy has been countercyclical. On the contrary, monetary policy reactions have been visibly countercyclical, driven in part by the impact of capital flows. Capital outflows also seemed to have played an important role in reducing banking currency mismatches in the context of domestic currency depreciations.

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I. Introduction

The consequences of the sub-prime crisis were financial and real and hit both, advanced and developing countries. In the case of Latin American (LA) countries, most of them exhibited a quick recovery in terms of their performance. Authors such as Corbo and Schmidt-Hebbel (2013) have argued that the resilience to this crisis has been the result of a greater growth explained by the adoption of more prudent macroeconomic policies. These policies, mostly based on rules, were implemented basically in three directions: increasing international reserves to act as buffers against external shocks; applying more countercyclical policies and deepening capital and financial markets[1].

On the other hand, papers such as Izquierdo, Romero and Talvi (2008), and Addler and Magud (2013), tend to view the performance of the region more closely related to the behavior of external factors. Izquierdo, Romero and Talvi (2008) associate the growth performance of the region with a pooled of external variables (including terms of trade of LA countries). Addler and Magud (2013) claim that an adequate metric of terms of trade booms, i.e. the income windfall, reveals that the LA region in the last decade has been exposed to a larger windfall than in the seventies. This finding suggests that the improvement in fundamentals is mainly driven by the size of the windfall.

As it is stated, the inclination for one of these two views could be settled empirically by determining how much of the good performance of the region is actually related to the behavior of commodity prices and other external factors. Nonetheless, the empirical evidence available does not seem to be convincing enough to bring academics to a one common vision. Another question raised in this discussion is how monetary policy of advanced economies, in particular the US, has affected the performance of the region. There are two potential distinct stories in the literature on this regard. On one hand, there is the idea that rising commodity prices and capital inflows might have part of their explanation in recent expansionary monetary policy actions of US (Anzuini *et. al* 2012 and Akyuz 2011). So, LA performance could be indirectly benefited by expansionary monetary policy shocks, through positive trade or capital account balances. On the other hand, Canova (2005) claims that US monetary policy shocks have huge impacts on LA countries mainly through movements in local interest rates (interest rate channel). In his investigation, expansionary US monetary policy shocks have a detrimental effect on LA performance.

The above considerations, and the premise that LA countries are heavily exposed to external shocks, compel to carefully evaluate the role of these shocks on LA performance. But these external shocks seem to be intertwined with the US economy, not only because of its relative size and influence in the global economy, but also because of its potential connections with commodity prices. Therefore, the primary objective of this paper is to provide empirical evidence of the effects of US domestic shocks on LA performance in main policy areas: monetary, fiscal and external. On a general ground, this empirical exercise will answer, first, to what extent domestic US shocks have affected the behavior of commodity prices, and second, how the adjustments in the US economy and commodity prices have impacted the LA region. At

[1] This perception is also related to a former work of Loayza and Radatz (2007) that claim that structural country characteristics, such as labor market flexibility and financial openness, have reduced the external vulnerability of emerging economies.

a more detailed level, this evidence will provide an interpretation on whether the region, as a whole, has engaged in procyclical or countercyclical monetary and fiscal policy.

Since the evaluation of US shocks into the region can be traced at a country basis, estimation results can also determine if particular countries did not follow the regional tide in terms of their responses, and what macroeconomic conditions, if any, might be responsible for such behavior. The answer to these questions addresses the concerns about the degree of heterogeneity in LA economies, an issue partially advanced by Canova (2005), but not fully exploited since then in a single econometric setting.

The methodology to answer the above questions combines elements of the dynamic factor model and structural analysis within a two block model: the LA region and its external sector[2]. The LA region is modeled through a dynamic factor model that incorporates three weakly exogenous variables: commodity prices, US output growth and a measure of industrial activity from the rest of the world. The external sector to LA is portrayed through a structural VAR (SVAR) that combines US variables and commodity prices. Connections between the two blocks are allowed through two main channels: the potential contemporaneous correlation of residuals, and the presence of commodity prices and US growth in the LA dynamic. Identification of US domestic shocks is carried out using sign restrictions. At a technical level, the model structure can also be related to the FAVAR literature, but applied at a regional level.

One important piece of the model is the set of variables included for the LA analysis: the blend of basic macroeconomic variables and a proxy to monthly net accumulated capital inflows for 10 LA countries (Argentina, Brazil, Bolivia, Colombia, Chile, Ecuador, México, Perú, Uruguay y Venezuela). Basic macroeconomic variables range from indicators of performance in the goods, monetary and stock market, through indicators of conditions in the external, fiscal and banking sector.

Econometric results indicate that US domestic shocks have significantly affected commodity prices. Channels of transmission from the US economy to commodity markets are multiple, and do not seem to involve the behavior of a unique variable. These commodity price movements have triggered commercial and capital flows, both of which have translated into huge aggregate demand shocks for the LA region. As a consequence, adjustments in international reserves and foreign exchange rates have also taken place. From the point of view of regional policies, monetary policy has been visibly countercyclical. On the contrary, there is no clear evidence that fiscal policy has been countercyclical. In the context of domestic currency depreciations, capital outflows seemed to have also played a role in automatically reducing currency mismatches.

There is a considerable body of the literature currently developing on the subject of the recent LA performance. Other papers, such as Ceballos *et. al* (2012), De Gregorio (2013), Melo and Rincón (2013), Talvy and Munyo (2013), and Vegh and Vuletin (2013) have, in fact, contributed to partially answer the questions posed by this research. References to these papers will be addressed along the discussion. The contributions of this research can probably be framed in terms of applying econometric time series techniques that deal more adequately with the pervasive endogeneity problem.

[2] This choice is not new in the literature and it relates to Canova 2005.

General results of this research also relate tangentially with other topics in the literature. For instance, because of the role of capital flows in the interpretation of results, this paper relates to works addressing the determinants of capital inflows and the resulting policy responses, such as Reinhart and Reinhart (2008), Cardarelli *et al.* (2009) and Ahmed and Zlate (2013). This paper also relates to the literature studying the global impacts of US shocks, as for instance, Bagliano and Morana (2012) and Eickmeier and Bai (2011). While Bagliano and Morana (2012) identify several (univariate) US shocks and evaluate their effect on a large set of countries through factors, Eickmeier and Bai (2011) determine the international effect of US credit supply shocks through a GVAR model. Although these papers identify different US shocks and transmission mechanisms, the main agreeing point is the relevance of US shocks for explaining fluctuations of both, advanced and emerging economies.

Econometrically, there is also a large body of the literature using either sign restrictions to identify structural shocks and/or factors to convey large sets of data. Examples of these types of studies for the US or UK economy are: Bernanke, Boivin and Eliaz (2005), Mumtaz and Surico (2009), Eickmeier and Hofmann (2013) and Buch, Eickmeier and Prieto (2014). This investigation is the first one applying this combination of techniques for analyzing the LA region as a whole.

The structure of this research is the following. In the next section we provide a rational for our modeling strategy, and determine the conditions for identifying structural shocks. Section III explicitly addresses the structure of the model and the main estimation issues. Sections IV and V elaborate on the presentation and interpretation of econometric results with regard to the questions posed. That is, section IV presents the impact of US shock on the US economy and commodity prices, while section V elaborates on the results of the LA region, emphasizing endogenous policy responses. Section VI refers to the drivers of country heterogeneity in impulse responses. Summary of the main messages of the paper are in section VII.

II. External (structural) shocks to the LA region

The LA region has been subject to important changes in external factors or conditions in the last decade. The definitions of such factors in the literature may vary depending on the questions that are being answered. For instance, Izquierdo, Romero and Talvi (2008) construct an index of external conditions that contains information on terms of trade, yield spreads (with respect to long US yields) and long US yields. Other authors refer to these external conditions as the behavior of commodity prices or as merely financial conditions, typically summarized by the volatility index of the stock market (VIX).

The main problem of associating external conditions to single variables is that these measures, although informative, do not provide a comprehensive story of economic events. On one hand, these variables are mostly endogenous ones that are potentially affected by other conditions or variables, which ultimately provide an economic rationale for their behavior. Also, changes in single variables do not allow a proper identification of the conditions that drive them. In this paper, external conditions to the

LA region are defined in terms of structural shocks of the US economy[3]. In this way, the problems of endogeneity and economic interpretation of unexpected movements in external variables are directly addressed. However, it is not straightforward to figure out what US and other external variables need to be considered for the SVAR analysis and how these structural shocks are connected to the region.

The SVAR for the US economy is based on 6 key variables: US economic activity growth, US inflation, US monetary policy indicator, S&P500 index growth, implicit stock market volatility index (VIX), and commodity prices growth[4]. We identify four structural shocks for the US economy: supply, real demand, monetary and financial shock. These shocks constitute the external shocks to the LA region. On the other hand, the LA region is modeled through a dynamic factor model (DFM). Factors summarize country level information for 10 LA countries (Argentina, Brazil, Bolivia, Colombia, Chile, Ecuador, México, Perú, Uruguay y Venezuela), and regional information from regionally aggregated indicators. The way these regional indicators are constructed is shown in appendix 1. Variables of this block consider relevant information on key economic sectors and add up to a total of 217 variables. In this modeling, we also incorporate two weakly exogenous variables, price of commodities and US economic growth, to adequately control for the impact of external factors on the region.

This econometric set up, and the treatment of the two blocks as a single system, allows drawing two types of connections between external shocks and the LA region. The first connection we introduce is through commodity prices and US economic activity. By construction, we assume the existence of full endogeneity between the US economy and commodity prices. This presumption of endogeneity is justified on two grounds: the size and importance of the US economy in global conditions and, the work of Anzuini *et. al* (2012), which has stressed that US monetary policy has also had an impact on the price of commodities. Therefore, while the US economic activity and the index of commodity prices are treated as endogenous variables for the US economy, they represent two weakly exogenous variables for the region[5]. At the level of the transmission mechanism, as long as US domestic shocks have an impact on the real activity and commodity prices, these shocks will also be transmitted to LA variables through their mean.

The second and most important connection between US shocks and the LA region is through the contemporaneous correlations of residuals. That is, the US economy and the LA block, although seemingly unrelated on their structure, are correlated at the level of their residuals, as in SUR models. Intuitively, this entails stating that unexpected movements in any variable of the US block can have a direct contemporaneous impact on endogenous LA variables through factors. The inclusion of this type of connection between the two blocks allows capturing an endogeneity structure that is far richer than that of GVAR models. This is because it exploits the non-systematic part of transmission mechanisms.

Next, we turn to the identification strategy. For the identification of supply and real demand shocks in the US, we define them in term of their effect on the aggregate goods

[3] This approach is not new in the literature and resembles Canova (2005), which identifies US structural shocks as an important source of shocks to the region.
[4] All variations are computed on annual basis.
[5] This treatment of commodity prices departs from Canova (2005), where commodity prices are presumed a weakly exogenous variable to both, the US economy and the LA region.

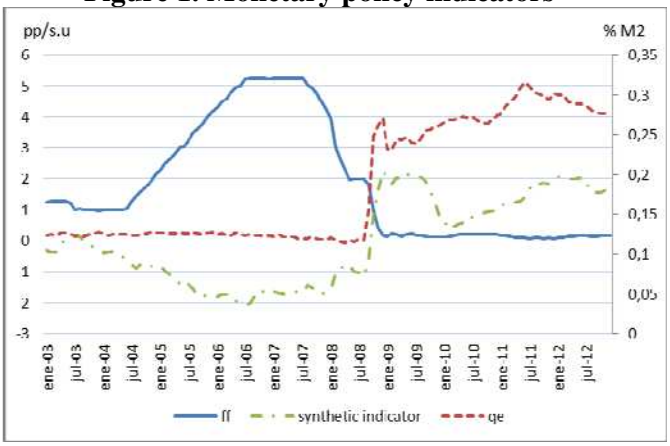
market. That is, while a supply shock moves industrial production and inflation in the opposite direction, a real demand shock moves them in the same direction.

For the case of the monetary shock, the problem that arises is that US monetary policy has partly been implemented by movements in the federal fund rate, and since the end of 2008, by unconventional actions of the monetary authority. These two strategies have been applied in mutually exclusive time periods, and ex-ante, it makes difficult to define a monetary instrument that fits the whole estimation sample (2004-2012). In fact, if monetary policy is measured through movements in either one of the instruments (the federal fund rate or Fed's asset purchases), residual correlations in the sample might be distorted.

One way to overcome this problem is to find a synthetic indicator of the stance of US monetary policy that reflects actions taken on both instruments. The simplest way to do this is by combining information on the federal fund rate and on Fed's asset purchases. In some papers in the literature, such as in Baumeister and Benati (2012), it has been argued that the spread between the long term Treasury yield and the federal fund rate is a suitable measure for the stance of the quantitative easing. In particular, it is claimed that expansionary monetary policy leads to a reduction in this spread. This is certainly true for the period subsequent to 2011, when the maturity extension program took place and Fed's purchases were directed to long term securities. Nonetheless, if we consider computing this spread for the whole estimation period, the relationship between the spread and monetary policy completely reverses. This is the case, because in normal times, reductions of the spread are associated with contractionary (and not expansionary) monetary policy. Therefore, we use the ratio between the assets held by the Fed and the quantity of money in the economy (M2) as a more adequate indicator of the stance of the unconventional monetary policy.

Computationally, the measure of the synthetic stance of US monetary policy for the whole sample is constructed as the principal component of the two monetary policy instruments and the growth rate of real balances. The introduction of real balances assures that whenever a monetary policy instrument changes, such change goes along with movements in the appropriate direction of real balances. In fact, as argued by Canova (2005), it is exactly the behavior of real balances what distinguishes a real demand from a monetary policy shock. The resulting measure assigns a positive weight to the relative size of Fed's assets and the growth of real balances, and a negative weight to the federal fund rate. As a result, any increase of this indicator signals a potential expansionary monetary stance. Figure 1, compares the behavior of the two (conventional and unconventional) monetary policy instruments and the synthetic monetary policy indicator. The behavior of this synthetic indicator seems to provide a reasonable description of the stance of monetary policy. In this context, the identification of a monetary policy shock refers to simultaneous movements of the monetary policy indicator, the growth of real activity and inflation, all in the same direction.

Figure 1. Monetary policy indicators



The last structural shock identified in the external block refers to a potential financial shock to the region. Papers such as Ahmed and Slate (2013) has stressed the importance of the VIX index as a driver of capital inflows, while Melo and Rincón (2013) has found significant responses of nominal exchange rates and several stock prices in the region to changes in the VIX. In this sense, it seems to be some degree of consensus about the fact that this implicit US stock volatility plays a role in the performance of the region. This is because the VIX is interpreted as a general measure of financial uncertainty or perceived risk that relates to portfolio re-arrangements[6]. Nonetheless, it is not clear which is the precise transmission mechanism that enables this connection. That is, empirically speaking, it is not clear what variables mediate between VIX changes and regional performance.

One possible, but not exclusive, channel is through commodity prices. In this case, portfolio reallocations might induce reductions in assets prices, but in particular, commodity prices, as a generalized flight to safety of global capitals takes place. This connection is also built on the empirical findings that support the thesis that increased financialization of oil and other commodity future markets has translated into stronger connections between stocks and commodity markets[7]. Therefore as a rise in uncertainty takes place, commodity prices drop, possibly leading too to capital outflows from emerging economies, such as LA ones. In particular, in our SVAR, we identify a contractionary financial shock as a simultaneous increase in the VIX index and a reduction in commodity prices.

A summary of the identifying conditions imposed on impulse responses to structural shocks are presented in the table 1.

[6] Adrian and Shin (2010) argue that risk-management constraints reduce the risk appetite of financial intermediaries in times of high VIX.

[7] Fattouh, Kilian and Mahadeva (2012) survey several empirical papers that have built the case for higher correlations between commodity futures and stock markets.

Table 1. Identifying conditions of external (structural) shocks to LA region

	Expansionary supply shock	Expansionary real demand shock	Expansionary monetary shock	Contractionary financial shock
US activity growth	+	+	+	
US inflation	-	+	+	
US monetary policy indicator			+	
US stock market volatility (VIX)				+
Commodity price growth				-

III. Structure of the model

As already mentioned, the econometric modeling assembles two apparently unrelated blocks: the US and the LA block.

The structure of the US block is described next. Define a column vector of endogenous variables for the US economy $Z^{US} = \left[Y^{US}, P^{US}, MP^{US}, STK^{US}, VIX, PCM\right]$, composed by US economic activity growth (Y^{US}), US inflation (P^{US}), US monetary policy indicator (MP^{US}), S&P500 index growth (STK^{US}), implicit stock market volatility index (VIX), and commodity prices growth (PCM). Define also an indicator of the economic activity from the rest of the world (Y^{RW}), which is computed as the first principal component of the annual growth rate of industrial production indexes from 31 advanced and emerging countries (including India, China and Russia), but different than the US and LA countries[8]. The dynamic properties of the endogenous variables in this system can be generally be described by the following VAR(1):

$$Z_t^{US} = \mathrm{A}^{US}\, Z_{t-1}^{US} + B^{US}\, Y_{t-1}^{RW} + e_t^{US} \qquad (1)$$

where A^{US} is the companion form of the system, Y^{RW} is considered a weakly exogenous variable, and e^{US} refer to the reduced form residuals of the VAR.

The LA block is built on a factor model explained next. Define X^{LA} as the set of LA country specific and regionally aggregated variables that describe the performance of the region. For our model X^{LA} has dimension $N = 217$. Consider also a set of latent static factors F that describe the co-movement of X^{LA}, such as:

$$X_t^{LA} = \Lambda F_t + \zeta_t \qquad (2)$$

where Λ is the loading matrix (Nxg) and ζ are the idiosyncratic errors, which might be weakly correlated. Likewise, factors follow a dynamic process represented by:

$$F_t = \mathrm{A}^{LA}\, F_{t-1} + C\, W_{t-1}^{US} + B^{LA}\, Y_{t-1}^{RW} + e_t^{LA} \qquad (3)$$

[8] These monthly statistics are obtained from the IMF global statistics.

where $W^{US} = \left[Y^{US}, PCM \right]$ is a subset of Z^{US} that enters in this block as weakly exogenous variables, and e^{LA} refers to the reduced form residuals, as in any VAR. The structure of equations (2) and (3) relates to an approximate dynamic factor model, as in Forni *et. al* (2009) and Forni and Gambetti (2010), but it also includes weakly exogenous variables.

The complete dynamic system is assembled as a SUR model, in order to capture the potential relationships between reduced form residuals. Succinctly, this entails writing the system as:

$$Z_t = \mathrm{A}\ Z_{t-1} + \mathrm{B}\ Y_{t-1}^{RW} + e_t \qquad (4)$$

where $Z = \left[Z^{US}, F \right]$, A adequately combines information of the matrices A^{US}, A^{LA}, C and several zero-restrictions, B combines B^{US} and B^{LA}, and $e = \left[e^{US}, e^{LA} \right]$ is distributed normal with variance-covariance matrix Σ. In this context, structural shocks $u = \left[u^{US}, u^{LA} \right]$, which have a diagonal variance-covariance matrix, come from the structural dynamic system:

$$\Psi^{-1} Z_t = \Gamma\ Z_{t-1} + D\ Y_{t-1}^{RW} + u_t \qquad (5)$$

which relates with the reduced form system through the equalities: $\mathrm{A} = \Psi\Gamma$, $\mathrm{B} = \Psi D$ and $e = \Psi\ u$. A proper identification of structural shocks provides an estimation for Ψ, based on the informational content of reduced form parameters.

Estimation of (4) is carried out in a two-step procedure. First, we estimate model factors, and then, use them to estimate parameter coefficients in (4). Sample information runs from 2004 through 2012, which leaves the model with observations $T = 108$. Since $N > T$, we can approximate F as the *g* first principal components of X^{LA}, as stated in Bai and Ng (2002). Factor uncertainty is considered negligible for estimating parameter coefficients in (4), as in the FAVAR model of Bernanke, Boivin and Eliasz (2005). The number of factors (*g*) included in (4) is determined qualitatively: including the minimum number of factors that produce stable impulse responses to structural shocks, but avoiding an excessive volatility of impulse responses as the number of factor increases. We finally chose the first 6 principal components of X^{LA} as the relevant factors, which explain around 73% of their joint variance[9]. This makes *Z* a vector of 12 endogenous variables. The estimation of parameters in (4) is carried out through GLS estimation in order to improve estimators' efficiency. The auto-regressive order of the system is determined looking at Schwarz and Hannan-Quinn criteria for each VAR block, systems (1) and (3). These criteria suggested the use of 1 lag in both cases.

Impulse-responses of the system are stated in terms of responses to structurally identified shocks (u^{US}). Identification of shocks is carried out imposing sign restrictions on impulse-responses. Details on how to perform sign restriction identification are provided in appendix 2.

[9] With 5 or 7 factors, impulse responses are qualitatively similar and differences are negligible.

IV. **Impact of shocks on the US economy and commodity prices**

In this section, we analyze the impact of US shocks on the domestic economy, as a first step to characterize and evaluate structural shocks. Results are summarized in table 2. Accumulated impulse-responses are available in appendix 3.

Table 2. Impacts of US shocks in the domestic economy

	Expansionary supply shock	**Expansionary real demand shock**	**Expansionary monetary policy shock**	**Contractionary financial shock**
Real activity growth	Strong increase for almost two years	Increase for one year	Increase for one year	Small drop for about six month
Inflation	Reduction for less than a year	Increase for almost year and a half	Increase for almost one year	Reduction after six months
MP stance	Contractionary policy after one year	Contractionary policy	Expansionary policy	Expansionary policy after three months
Stock index growth	Substantial rise after six months	Negligible (marginal) rise for about half year	Negligible (marginal) rise for about half year	Negligible (marginal) drop for about half year
Stock volatility	Important reduction after six months	Reduction for one year	No significant response	Substantial rise for one year
Commodity price growth	Initial reduction, and later increase	Marginal increase	Marginal increase	Important drop for more than a year

The first interesting finding is that all US domestic shocks affect commodity prices. This result is consistent with the one of Anzuini *et. al* (2012) that refers to the positive effect of an expansionary US conventional monetary policy on commodity prices. Likewise to their result, the effects of monetary policy shocks, although statistically significant, are not considerable. Nonetheless, our result is more general, since it is built on an indicator for the monetary policy stance that reflects decisions with both, conventional and unconventional instruments. So, also unconventional monetary policy decisions likely have a marginal effect on commodity prices. It is also a more general result, because there are three more US domestic shocks that relate to the behavior of commodity prices.

In terms of the effects of these other shocks, we also find some relevant patterns. On one side, contractionary financial shocks, which directly relate to the uncertainty in US stock markets, have an important long lasting effect on commodity prices. In this case, the transmission of the shock might seem to work directly through the re-balance of global portfolios, and then translate into a negative aggregate demand shock to the US economy. On the other hand, positive supply shocks to the US economy initially diminish commodity prices, as if part of the greater supply of US goods also translates into a larger supply of commodities in global markets. But this effect is transitory, and probably, as aggregate US demand expands, the pressure on global commodity, and domestic prices, becomes positive.

The general interpretation of these patterns is that all US fluctuations addressed end up having an impact on commodity markets. Nevertheless, one could additionally argue

that the channels of transmission from the US economy to commodity markets are multiple, and do not seem to involve the behavior of a unique variable. For instance, papers such as Frankel (2006) stressed the importance of declining US interest rates as a channel for observing higher commodity prices[10]. This does not seem to be the case for the last ten years, when increasing commodity prices can be observed either with expansionary or contractionary monetary policies[11]. It is not either the case, that rising commodity prices are exclusively observed with a vibrant US economy. In fact, as already suggested, a contractionary supply shock will drastically increase commodity prices, although temporarily. For instance, the strong increase of commodity prices prior august 2008 is mainly associated to the combined effects of contractionary supply shocks and expansionary real demand shocks, both of which had positive effects on commodity prices and inflation. Then after august 2008, the following drop of commodity prices is a combination of negative demand and financial shocks, summed up the impact of past contractionary supply shocks and some timid positive supply shocks that took place after the unraveling of the crisis[12].

Another interesting finding is that endogenous responses of monetary policy seem to operate in the expected directions. For instance, contractionary financial or real demand shocks trigger expansionary monetary policy responses few months after shocks occurred. Also a contractionary supply shock will bring about an expansionary monetary policy, once the positive effect of the shock on inflation has vanished. Another interesting result is that stock markets are always associated with positive real performance of the economy, but it responds more strongly to expansionary supply shocks.

V. Impact of shocks on LA region: good luck or good policy?

In this section, we analyze the impact of US shocks on the LA region as a whole. To interpret this empirical evidence, it is important to bear in mind two implications of the LA econometric modeling. First, because external shocks are supposed to affect all the countries in the region roughly at the same time, any response to those shocks should be captured by the co-movements of LA variables. This is the reason why factors are used as a mean to summarize all the LA information, country specific and regionally aggregated. The responses of the LA region "as a whole" refer to the responses of the regionally aggregated indicators through common factors. Therefore, any variation in variables not related to the selected static factors is attributable to idiosyncratic or country specific events that are not of interest for this research. The higher the share of factors' (common component) variance on total variance of variables, the less important the behavior of the idiosyncratic component is, and more meaningful our results become. The share of all the variables' variances explained by the selected factors (the common component) is available in appendix 4. Second, even when discussing country specific responses to shocks, those responses are also tamed by the time co-movement

[10] The empirical evidence of Frankel (2006) refers to 1950-2005.

[11] Rising commodity prices are observed for expansionary monetary policy shocks, but also for expansionary supply, real demand and financial shocks, where monetary conditions become endogenously contractionary and US federal fund rate rates could be rising.

[12] Although not shown, this description is based on the historical decomposition of commodity prices for each identified structural shock.

of LA variables. Therefore, heterogeneity is interpreted as the differences that arise in countries' responses to common forces or shocks.

Table 3 summarizes the impulse responses of aggregated regional indicators to structural US shocks. The analysis is described addressing different sectors in the economy: the aggregate goods market, and the external, fiscal, monetary and banking sectors. Accumulated impulse-responses are also available in appendix 5.

Table 3. Impacts of US shocks in the LA region

	Expansionary supply shock	**Expansionary real demand shock**	**Expansionary monetary policy shock**	**Contractionary financial shock**
Real activity growth	Initial reduction, and later increase	Marginal increase	Marginal increase	Important drop
Inflation	Initial reduction, and later increase	Marginal increase	Marginal increase	Important drop
Export growth	Initial reduction, and later increase	Marginal increase	Marginal increase	Important drop
International reserves growth	Initial reduction, and later increase	Marginal increase	Marginal increase	Important drop
Exchange rate (Dom/$) growth	Initial increase, and later reduction	Marginal decrease	Marginal decrease	Important rise
Capital inflows indicator	Initial reduction, and later increase	Marginal increase	Marginal increase	Important drop
Government expenditures growth	Late reduction (but prior to increase in real activity)	Marginal decrease	No significant response	Initial marginal increase and later important drop
Fiscal balance (as share of expenditures)	Initial no response, and later important increase	Marginal increase	Marginal increase	Late decrease
Monetary rate change	Initial (marginal) reduction, and later increase	Marginal increase	Marginal increase	Important drop
Loan rate change	Initial reduction, and later increase	Marginal increase	Marginal increase	Important drop
Monetary aggregates growth	Initial no response and later increase	No significant response	Marginal increase	Important drop
Stock market growth	Initial no response and later increase	No response	No response	Important late increase
Foreign assets growth	Initial increase	Reduction	Marginal reduction	Increase
Public debt growth	Initial marginal increase and later reduction	Reduction	Reduction	Late Increase
Loans growth	Initial marginal drop and later increase	Marginal decrease	Reduction	Initial marginal increase
Share of loans	Reduction	No significant response	No significant response	No significant response
Leverage	Initial reduction and later increase (with loans)	No significant response	No significant response	Important reduction
Currency mismatch (A/L) growth	Initial increase	Reduction	Marginal reduction	Increase

Taking in consideration the patterns of commodity prices, it seems clear that the performance of the goods market and the external sector of the region (exports, international reserves, exchange rates and capital inflows) basically follow commodity prices adjustments. In other words, when domestic US shocks translate in rising commodity prices, both, real activity growth and inflation increase. The opposite takes place when commodity prices fall. That is, an increase in commodity prices enters the region as a positive aggregate demand shock that has the intensity and duration of the commodity price adjustment.

This description of results is clearly consistent with the spread view in the literature that external factors have played a major role in the real growth of the region in the last decade. Nonetheless, such performance seem to rely more heavily on commodity prices than in any other variable, as opposed, for instance, to the results of Izquierdo, Romero and Talvi (2008), where growth performance is associated to a pool of external factors. The additional insight provided is that any adjustment in commodity prices behaves as an aggregate demand shock.

What is the role played by capital inflows? Do they increase aggregate demand or are they the consequence of it? One way to interpret results is the following. Because shocks originate in the US, we are prone to believe that commodity price increases (drops) represent focal points for global capital movements that translate in regional capital inflows (outflows). Once they occurred, these capital inflows produce additional aggregate demand pressures, in the same direction of commodity prices. These additional pressures could take place through diverse channels: by directly increasing investment and consumption, by rising domestic banking credit or by simply increasing the quantity of money in the economy. In all these cases, the final impact of inflows is an increase in aggregate demand: a simultaneous increase in areal activity and inflation.

Empirically, because the boost of aggregate demand and capital inflows take place simultaneously, one could also argue that capital inflows are simply the result of the greater economic growth. We take the stand of the first interpretation, because there is no clear theoretical reason to expect that rising commodity prices by themselves bring about an increase in inflation. For example, in the absence of capital inflows, growing commodity prices could have a positive effect on real activity but a negative effect on inflation, considering that intermediate imported production goods may become cheaper[13]. The fact that inflation is positively related with rising commodity prices indicates the existence of huge aggregate demand pressures that, theoretically, are clearly linked with capital inflows (see also the figure in appendix 6 for a qualitative association between capital inflows and inflation). Therefore, both, commodity prices and capital inflows, are the possible triggers for aggregate demand movements. This interpretation of the evidence is in line with Reinhart and Reinhart (2008) that points out that increasing commodity prices augment the likelihood of observing capital inflows.

In terms of the other external variables, empirically, growing commodity prices are observed with a systematic accumulation of international reserves and domestic currency appreciations. These two events reinforce the hypothesis that capital inflows

[13] In several studies about Venezuela, I have found that a simultaneous increase in oil prices and imports behaves as an expansionary supply shock.

play an important role in the interpretation of the results. Later in the document, this issue will be discussed in more depth.

In the fiscal sector, the behavior of the fiscal balance is greatly synchronized with the behavior of commodity prices and real activity. That is, when external and domestic conditions improve, fiscal balances do so too. In this sense, fiscal financial results seem to be mostly endogenous with respect to the economic cycle, and do not depend on expenditure decisions. When referring to government expenditures, under certain circumstances, expenditures react in the opposite direction of the cycle: for US real demand and financial shocks, fiscal expenditures increase (decrease) when regional real activity falls (rises). Nonetheless, these responses are marginal. In particular, for the case of contractionary US financial shocks, expenditures grow marginally few months after the shock, but as regional real contraction deepens, expenditures end up falling too. For the US expansionary supply shock, the response of expenditures seems endogenously driven by the initial decrease in real activity. For the US monetary policy shock there is no response of expenditures.

Our interpretation of results is that there is no clear evidence that regional fiscal policy has indeed been countercyclical. Since contractionary real demand and financial shocks are probably more observable in terms of US performance, then it is possible that LA fiscal authorities devote some effort to avoid their negative impact on regional growth. However, there presumably exist institutional rigidities that avoid a flexible management of fiscal expenditures in order to generate a proper countercyclical fiscal response. Later in the text, it will be shown that regional indicators are hiding a large degree of heterogeneity among country responses, and there are countries already implementing countercyclical fiscal policies. However, at this point, we want to argue that, as a region, LA has not engaged in a visible countercyclical fiscal policy.

This interpretation of fiscal responses could be considered at odds with part of the literature recently developed. For instance, Vegh and Vulettin (2013) argue that some countries in the region (Chile, Brasil and Mexico) have become more countercyclical in terms of their fiscal policy with respect to the nineties. Their claim is based on the sample correlations between government spending and GDP. On the other hand, Corbo and Schmidt-Hebbel (2013), based on a cross section empirical strategy, state that the performance of the fiscal policy helped to soften the recession of 2008-2009. In both studies, authors were more inclined to analyze average performances with respect to past crises. In our view, there is no contradiction in acknowledging that fiscal responses might have improved with respect to prior crises, but the question that remains unanswered is whether such responses are the result of more favorable external conditions. In this matter, De Gregorio (2013) in his qualitative analysis of the LA performance to the recent crisis, points out to less binding fiscal liquidity constraints as a reason for a better fiscal performance. Our empirical evidence is more consistent with this view, since the noticeable improvements in fiscal balances due to favorable external conditions might have played a role in allowing some efforts in the direction of implementing more countercyclical fiscal policy. Nonetheless, these efforts are far from being definite.

In terms of monetary policy, the short term money rate, which is used as a proxy of monetary policy actions, shows a clear positive association with the behavior of real activity and inflation. That is, monetary authorities seem to respond in the direction of

controlling aggregate demand pressures as external shocks translate in aggregate demand changes[14]. Because all countries in the sample, with the exception of Argentina, Ecuador and Venezuela, have implemented inflation targeting strategies, the countercyclical responses of monetary policy rates seem to be the natural behavior in the context of monetary institutions.

Therefore, suggesting that monetary policy reactions have been clearly countercyclical seems to coincide with most of the papers in the literature, such as Corbo and Schmidt-Hebbel (2013), De Gregorio (2013), and Vegh and Vulettin (2013). Nonetheless, the interesting discussion arises regarding the relationship between monetary policy and the external sector (exchange rate, international reserves and capital flows). The particular question that arises is whether the implementation of contractionary monetary policy has been a simple exercise of controlling aggregate demand, or has been influenced by the events or decisions in the external sector.

Our interpretation of results is that positive commodity price shocks have caused huge increments in exports, but also have triggered important capital inflows, both of which led to observe significant reserve accumulations in the region. The rational for the accumulation of reserves is twofold: to acquire an insurance instrument for deterring speculative attacks, and to counterbalance the strong appreciation of domestic currencies, as De Gregorio (2013) points out. We cannot distinguish ex-ante which of the two reasons led to the accumulation of reserves, but can the empirical evidence contribute to the interpretation of events? Empirically, capital inflows, domestic currency appreciation and accumulation of reserves are observed simultaneously. This could suggest that reserve accumulation is importantly driven by foreign exchange interventions, which were meant to preclude an excessive domestic currency appreciation. Because reserve accumulation has a clear expansionary monetary effect, monetary authorities could either engage in sterilize interventions or increase monetary rates further[15]. This mix of policies, and other potential capital control measures, possibly endorsed the view that capital inflows were clearly related to external conditions, and that for instance, increasing domestic interest rates would not represent further incentives for capital inflows. The argument is symmetric for capital outflows.

On the other hand, the implementation of inflation targeting strategies has forced countries to engage in more flexible exchange rate management in order to gain degrees of freedom for the exercise of monetary policy. In fact, most countries, with the exception of Argentina and Venezuela, have declared to promote floating exchange rates with controlled interventions. But, have capital inflows affected the degree of exchange rate adjustments? In appendix 6, we present the regional indicator for capital inflows and several flotation indexes, in the spirit of Calvo and Reinhart (2002), computed by countries, for the whole sample and relevant sub-periods. As shown, in average, higher levels of floatation started after 2007, when stronger regional capital

[14] Another interesting result is that loans rates follow the same patterns as money rates. This could bring out the philosophical issue of whether the movements in monetary policy rates are the result of the greater demand of goods and credit in the economy or loan rates are influenced by the monetary policy rate. Although interesting, in this particular exercise, we cannot try to address this question because the timing of impulse responses seems identical.

[15] In our view, pursuing contractionary monetary policy can be considered an equivalent strategy to sterilized interventions. Montiel (2014) explains in details the costs associated to sterilized foreign exchange interventions and suggests that fiscal contractionary policy constitutes an alternative policy to capital inflows.

inflows were observed. In 2009-2010, although capital outflows were not as strong, floatation increased, probably because the impact of the crisis was not still pondered, and domestic currency depreciations were, on one side, not harmful for export growth, and on the other hand, not a threat from the point of view of inflation targeting objectives[16]. Comparing floatation indexes with and without interest rates variability, suggests that the variability of interest rate was extremely high during this period: interest rates suffer an intensive decline in early 2009 and a sudden increase during 2010. After 2010, high levels of floatation have been maintained.

Therefore, although capital flows have had an important influence in the magnitude of international reserve variability, exchange rate variability has been relatively larger and has increased since 2007. The influence of capital flows also pervaded monetary policy reactions, especially during 2009-2010. Nonetheless, it is not clear whether the impact of capital flows on monetary reactions works through an exacerbation of aggregate demand pressures or through the monetary effect of foreign exchange interventions, which may lead to stronger monetary policy reactions. Independently of the transmission mechanism, it seems that with the convergence to more flexible exchange rate systems, monetary policy adjustments have also become less intense than during critical capital outflows episodes. So, the exercise of monetary policy has been a discretional choice, driven by the desire of accomplishing a countercyclical policy, but also influenced by the impact of capital flows.

Another element related to the above discussion, refers to the connection between capital inflows and the response of banking balance sheets. Results indicate that when external shocks bring about capital inflows and domestic currency appreciations, foreign asset positions of banks (denominated in domestic currency) shrink. This behavior could probably be related to the reduction of the nominal exchange rate, which makes assets denominated in domestic currency to decrease in value during capital inflows episodes. The question that arises is whether these adjustments in banking balance sheets are solely associated to modifications in valuation prices or are also related to real adjustments in foreign currency holdings. Do these adjustments come only from the asset side of the banking balance sheet or liabilities' changes are also relevant?

To answer this question, we look at the ratio between foreign assets and liabilities in the banking system, an indicator of currency mismatches, and evaluate its growth rate[17]. The response of this ratio to shocks is identical to that of foreign assets. This implies that during capital outflows, the ratio of asset to liabilities increases as large positions of banks in foreign assets grow, either because of an accumulation of assets or a reduction of foreign exchange liabilities. This leads to a reduction of currency mismatches, since the depreciation of the domestic currency has a smaller contractionary impact on banks' equity. This result is also consistent with the evidence presented in Tobal (2013) that

[16] Besides the fact that inflation in 2009-2010 reached very low levels, the rational for allowing greater exchange rate adjustments can also be related to the documentation of smaller pass-through coefficients since the implementation of inflation targeting strategies.

[17] For this ratio, the valuation effect of the exchange rate should be muted, and changes should reflect the relative holdings of assets (in terms of liabilities) in foreign currency.

reports positive correlations between the growth rate of the ratio assets to liabilities and domestic currency depreciations for most countries in the region[18].

According to our empirical evidence, mismatches' reductions and domestic currency depreciations seem to be simultaneous responses associated to capital outflows. There are two possible (non-mutually exclusive) interpretations in terms of the role played by capital inflows. First, during outflows, foreign exchange liabilities of banks automatically reduce, improving relative asset holdings without an active portfolio management by banks. Second, domestic currency depreciations associated to capital outflows signal further depreciation expectations that induce an explicit accumulation of foreign assets by banks. In any of these two interpretations, causality clearly runs from capital outflows to domestic currency depreciation and currency mismatch reduction. This view, nonetheless, is clearly at odds with the notion that the reduction of currency mismatches has encouraged exchange rate floatation, as Ceballos *et. al* (2012) suggests. In their interpretation, emerging economies were willing to depreciate their domestic currencies because of larger positions in foreign assets during the 2000s. This hypothesis could have been valid only up to 2007, before capital inflows in the region started profusely and significant short foreign exchange positions started to build.

In terms of the other components of banking balance sheets, it is interesting that an increase (decrease) in public debt assets is related to a reduction (improvement) in fiscal balances. Therefore, any increase in commodity prices that improve fiscal balances has its counterpart in the reduction of public debt holdings by banks. This evidence seems to comply with the notion that during times of fiscal stress, the government turns to the financial system as a source of funding. Regarding loans, only a significant increase in aggregate demand is related to a sustained boost in loans, i.e. with an important increase in commodity prices. Banking leverage seems to be positively, but weakly related to the behavior of loans, but results are not totally clear in this respect.

Finally, the behavior of the stock market in the region varies, depending on the types of shocks. For instance, a positive US supply shock translates in an increase of regional stock prices, as long as US stock prices boost. In this case, although there are temporary capital outflows from the region, local stock markets seem to be more connected to US equity prices. On the contrary, when there are adverse financial shocks in the US that deprive US stock prices and commodity prices, regional stock prices do not respond immediately, but increase significantly after volatility has returned to its original pre-shocks levels. This occurs in spite of absence of explicit recovery for US stock prices. Therefore, one could relate regional stocks markets with booming US stock prices (positive US supply shocks), but also with deprived US stock market, once financial shocks have passed away. Therefore, a simple characterization of regional stock market is ruled out and additional research on this topic might be necessary. Nevertheless, it seems clear that regional stock prices do not necessarily relate to capital inflows, as someone could intuitively think.

[18] In Tobal (2013) calculations of currency mismatch in LA countries are based on banking information directly compiled by regional Central Banks.

VI. Country heterogeneity: what conditions policy responses?

In this section, we attempt to determine how particular country characteristics have affected the magnitude of responses of monetary rates and government expenditures, for all identified shocks. Country differences are established in terms of the features that, according to the previous discussion, have affected monetary policy and fiscal decisions: the existence of an explicit inflation targeting regime, the degree of exchange rate flexibility, the degree of foreign currency exposure (measured as the average ratio of foreign assets to liabilities in the banking system), the average size of capital inflows, and the relative lack of restrictions in fiscal policy (measured as the average size of the fiscal balance in terms of fiscal expenditures). Since these variables intent to capture relatively structural characteristics of countries, we use them to discriminate the magnitude of response in decision variables. Operationally, we use impulse responses at one year horizon, for all countries and all sets of structural parameters[19]. These impulse responses are then regressed against average country specific variables. In order to get a clean interpretation of results, we run separate regressions for positive and negative responses for each shock, and all shocks considered altogether. Results of OLS regressions are shown in appendix 7. Complete accumulated impulse responses of monetary interest rates and government expenditures are shown for all countries in appendix 8.

Monetary rates

Regarding the responses of monetary rates, the first observation is that the largest proportion of responses is associated to countercyclical monetary authority actions. That is, there are substantially more positive responses for US expansionary real demand and monetary shocks, but more negative responses for the contractionary financial shock[20]. This confirms the remarks made at regional level, indicating that monetary authorities tend to increase interest rates during expansions of the domestic aggregate demand, but reduce them during contractions. In terms of countries, Bolivia, Brazil, Chile, Colombia, Mexico and Perú tend to show countercyclical interest rate responses, while Argentina, Uruguay and Venezuela do not. Because the absolute coefficient values associated to the inflation targeting dummies are clearly bigger than the rest of individual coefficients, for countercyclical responses, countries with inflation targeting regimes modify interest rates much more intensely than Argentina and Venezuela[21]. In this sense, results are consistent with the statement that the implementation of inflation targeting strategies significantly conditions the exercise of monetary policy.

In terms of the degree of floatation of the exchange rate, more flexible arrangements tend to moderate the magnitude of interest rate variations, but only in the margin. This finding could be consistent with the idea that part of the adjustments to shocks can be

[19] Since impulse response analysis are based on 156 accepted draws of Q's, out of 2 million of potential candidates, implicitly, there are 156 sets of structural parameters that satisfy sign restrictions. Responses of all countries per shock add up to a total of 1,404.

[20] For US expansionary supply shocks, interest rate responses are equally divided among positive and negative values. This is because commodity prices and aggregate demand fluctuate from negative to positive values along the impulse response horizon. So, it is difficult to interpret responses associated to this shock.

[21] A country characteristic intensifies a type of response if its coefficient (or its net effect: the coefficient times the sign of the characteristic) has the same sign as the regression constant.

absorbed by the exchange rate. When this is the case, the role played by monetary policy reactions diminishes.

The second larger (absolute) coefficient values are those corresponding to the average size of capital inflows during the period. Since this variable can take positive and negative values, countries with greater capital inflows will moderate the magnitude of countercyclical interest rate responses, while countries with average capital outflows, will respond with stronger countercyclical interest rate movements. It is important to recall that the average capital inflow indicator reflects if the country is typically a net lender (has outflows) or borrower (has inflows) of capital. One possible interpretation is that countries with structurally positive flows could employ other policy instruments (such as reserve requirements, capital taxation or sterilization instruments) to deal with the expansionary monetary effects of inflows or foreign exchange interventions. Therefore, movements of interest rates can be moderated with respect to countries that face average capital outflows. According to these coefficients, Bolivia, Colombia and Mexico seem to respond less countercyclically than Brazil, Chile and Peru in terms of interest rates. Because compiling information regarding the particular policy strategies of countries to capital inflows is beyond the scope of this paper, interpretations to this respect are merely a working hypothesis that need further test.

The coefficients values associated with the average foreign currency exposure in the banking system, although statistically significant, are very close to zero. Likewise the degree of exchange rate flexibility, coefficient signs indicate that having longer foreign asset positions will moderate the countercyclical responses of monetary policy rates. There is no a priori interpretation for this result.

Government expenditures

Different from the former case, the positive/negative allocation of responses (draws) for government expenditures does not follow a countercyclical pattern. In fact, a slightly greater proportion of positive responses are registered for US expansionary real demand and monetary policy shocks (55% and 53% respectively), while 63% of negative responses are observed for the contractionary financial shock. Interpretation of this aspect of results would point out that fiscal policies tend to be more procyclical than countercyclical. For the expansionary US supply shock, most responses (73%) are negative, indicating that expenditures are falling after a year of the shock, probably due to the initial drop observed in commodity prices. This response is clearly procyclical.

Another difference with respect to monetary policy responses is that, except for some cases, coefficients values associated to inflation targeting dummies and floatation indexes tend to be not statistically significant, precluding a clear interpretation of results. In the margin, countries with more flexible exchange rate regimes are slightly less procyclical in their fiscal response.

Interpretations of coefficient values for average capital inflows or fiscal balance variables are relatively more complicated in this case than in the former, not only because variables can have positive and negative values, but also because procyclical and countercyclical responses are more evenly distributed in the sample. So, we cannot focus only on one type of responses. Recall that a country characteristic reinforces the magnitude of a given type of response if its effect (variable x coefficient value) has the

same sign as the regression constant. For instance, countries with average capital inflows will respond with stronger government expenditures movements, independently of the direction of the response. That is, in countries with structurally positive flows, expenditure variations will be more countercyclical or more procyclical than in countries with average capital outflows. This is suggesting that the presence of inflows tend to magnify the responses of fiscal policy, independently of its intention. So, while the direction or intention of fiscal responses could depend on the existing fiscal institutions in each country, the presence of capital inflows seem to reinforce such responses.

Finally, when countries engage in procyclical fiscal policy responses, the existence of average fiscal surpluses intensifies the magnitude responses. On the contrary, when countries implement countercyclical fiscal policy responses, the presence of structural deficits is associated with larger magnitude responses.

Since responses of fiscal expenditures are difficult to rationalize in terms of econometric results, we turn to check which countries tend to react procyclically or countercyclically. We do this by checking the list of countries that enter in each regression and examining complete impulse-responses for individual countries. We find that Bolivia, Colombia, Mexico and Uruguay are the countries that tend to engage in countercyclical fiscal policies, while Argentina, Brazil, Ecuador, Peru and Venezuela implement mostly procyclical fiscal policies. Coincidently, Bolivia, Colombia, Mexico and Uruguay are the countries with average positive capital flows in the sample. In this sense, one could conjecture that having capital inflows make countries more willing to use fiscal policy countercyclically.

The role of average fiscal balances seems to relate more to the intensity of responses. While major countercyclical responses are exhibited by Bolivia and Colombia, which have average deficits for the estimation sample, Argentina, Brasil and Perú show average fiscal surpluses and stronger procyclical responses.

What conditions policy responses?

Country analysis suggests fiscal policy responses are by far more heterogeneous than monetary policy responses. As already pointed out, the implementation of inflation targeting strategies has greatly conditioned the exercise of monetary policy, making interest rate decisions homogeneously more countercyclical.

A second element that arises is that persistent capital inflows in certain countries have conditioned the application of both, monetary and fiscal policy decisions. In the case of monetary policy, the countercyclical use of interest rates becomes more moderate, presumably because there are other set of policy instruments that deal with the undesirable effects of inflows. In terms of fiscal policy these countries seem also more willing to undertake countercyclical fiscal policies.

Finally, although in the margin, countries with more flexible exchange rates seem to use monetary and fiscal policy instruments less intensively.

VII. Conclusions

Currently, there is a large body of the literature developing to answer related questions to the ones posed by this research. In this sense, consensuses are still building using different methodological approaches. In this paper, we take the stand of empirical modeling in order to try to answer such questions. The modeling combines elements of the SVAR, dynamic factors model and FAVAR literature, in order to adequately address the dynamic problems of endogeneity and identification of shocks. The answers provided by the paper spread in two directions.

The first important result is that the references to external shocks to the LA region can perfectly be addressed in terms of US domestic shocks. This is the case, because US shocks are indeed intertwined with the behavior of commodity prices. Extending the results of Anzuini *et.al* (2012), we find that not only US monetary policy shocks have played a role in the behavior of commodity prices, but also supply, real demand and financial shocks have done so. Channels of transmission from the US economy to commodity markets are multiple, and do not seem to involve the behavior of a unique variable. As a corollary for policy evaluation in the region, this result suggests that monitoring US performance could provide forward information on the external conditions for the region.

The second set of results reinforce the view that external conditions play a substantial role in the performance of the region, as several authors have suggested (Canova 2005, Izquierdo, Romero and Talvi 2008, Addler and Magud 2013, among others). Nonetheless, the performance in real activity growth, inflation and external variables seem to rely heavily on commodity prices more than in any other variable. In this story, commodity prices adjustments are also likely to provide a focal point for global capitals, and consequently induce significant capital inflows (outflows) for increasing (dropping) commodity prices. Both, movements in commodity prices and capital flows, regionally behave as huge aggregate demand shocks that trigger policy responses in the region. Independently of their origin, the presence of capital flows in the last decade has posed important challenges for the conduct of policies. On one hand, capital flows have represented an additional burden for monetary policy to dampen cyclical aggregate demand fluctuations. Also, capital flows have been accompanied with more intense foreign exchange interventions that not necessarily had the expected results. This tension has likely been resolved with a general progressive implementation of more flexible exchange rate systems, while some countries, facing persistent capital inflows, have also resort to using other policy instruments.

In terms of fiscal policy, the evidence is mixed for determining its overall motivation at regional level. Nonetheless, individually, there are some countries already implementing countercyclical fiscal policies. Since the empirical evidence suggests that the behavior of commodity prices has largely conditioned fiscal balances, fiscal authorities have probably had some degrees of freedom to improve fiscal performance with respect to past crises. Nevertheless, there presumably exist other institutional rigidities that avoid a flexible management of fiscal expenditures in order to generate a proper countercyclical fiscal response to external shocks.

Finally, the behavior of commodity prices has also linked with the response of banking balance sheets, especially in terms of foreign assets and public debt holdings. Also in

this case, capital outflows seemed to have played a role in reducing currency mismatches in the context of domestic currency depreciations.

Summarizing all these interpretations, we could state that the LA experience in the last decade has probably related to a new combination of circumstances. These circumstances are adequately summarized by the behavior of commodity prices, and the resulting capital flows that emerge in a more connected global economy. In our view, these connections come in part from the augmented links between the US economy and commodity markets. In terms of the regional policies, although more sophisticated responses have been implemented, results in final variables seem mainly driven by the magnitude and duration of commodity booms and capital inflows. Under this perception, the resilience to the subprime crisis is mainly the combination of a prolonged prior commodity boom and a relatively short posterior bust.

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Appendix 1. Regional Indicators

The analysis of the LA region as a whole, it requires the creation of regional indicators for the variables of interest. These indicators can be constructed ex-post, if estimations are carried out in a country by country basis, or ex-ante, if regional estimation is undertaken. In this paper, the estimation we implement treats the region as a whole, and it uses individual countries' information and aggregate measures simultaneously. Therefore, the selection of an aggregation criterion must be addressed.

Among the possible candidates, we can consider basically two forms of aggregation: medians and weighted means. Medians usually tend to be adequate and simple, unless all series considered tend to be very noisy or erratic, as in the case of capital inflows or fiscal expenditure series. Weighted averages can solve this problem, if weights are more statistical, and less historical or structural. We chose an aggregation that resembles the notion of stochastic pooling, that is, we use the inverse of the volatility of the series as our benchmark weight[22].

One important element in the discussion of the regional resilience to shocks is the behavior of capital inflows. However this statistic is not available in monthly basis (except for Chile). We address this problem by constructing a proxy of yearly accumulated net capital inflows using the account identity:

$$\frac{Trade\ balance + Net\ Capital\ Inflows}{Initial\ IR\ Stock} = \frac{IR\ Accumulation}{Initial\ IR\ Stock}$$

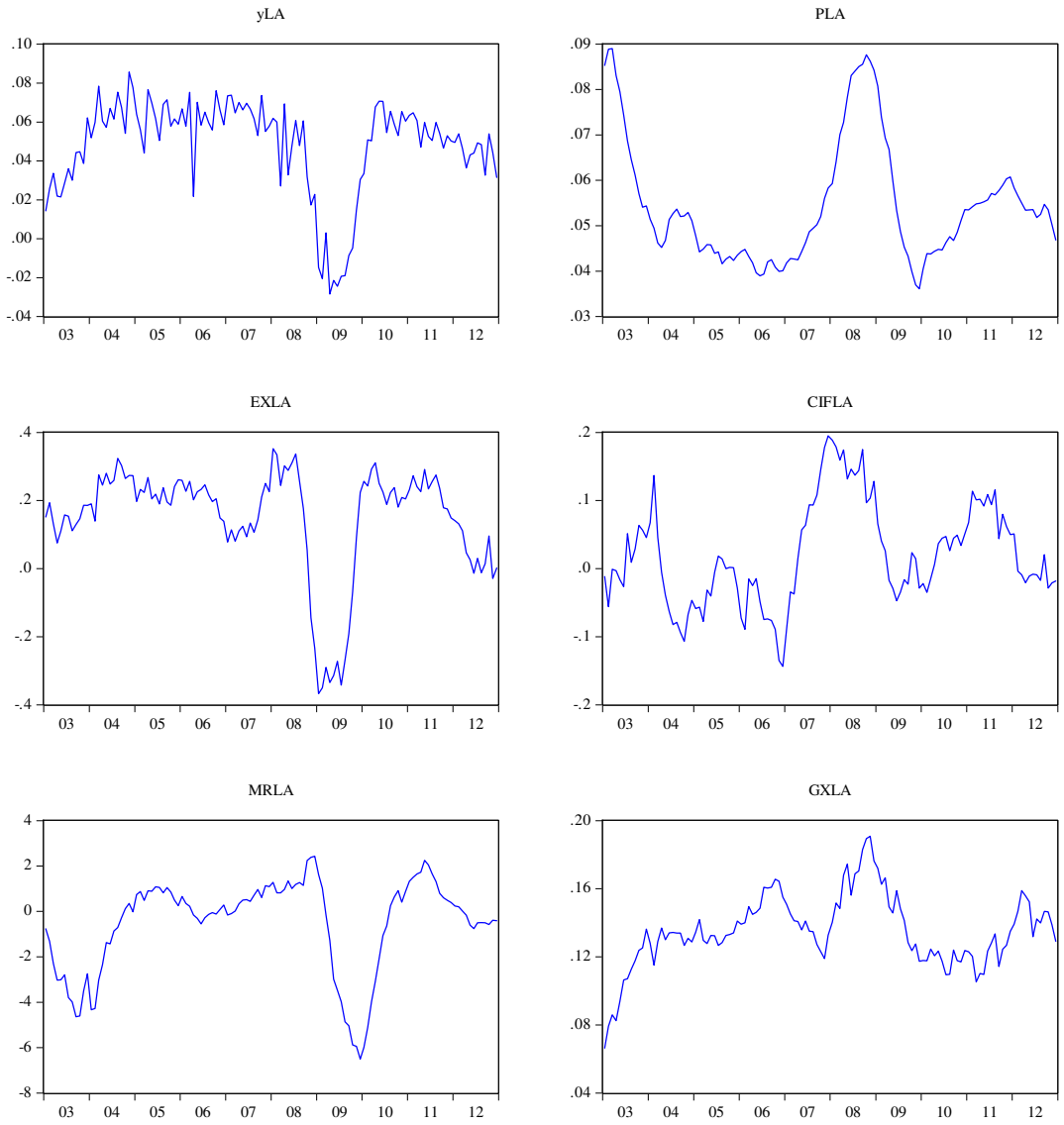
In this case, net accumulated capital inflows (for a year span) are the result of evaluating the difference between the relative accumulation of reserves and the relative size of the net export flows (all in terms of international reserves at the beginning of the period).

The stance of regional fiscal policy is the weighted average of the annual growth of government expenditures. In this case, the annual variation is computed based on the yearly accumulated expenditures.

The stance of regional monetary policy refers to the weighted average of the (absolute) change in the short term money market rate in the last year.

Data on real activity indicators, consumer price index, exports, imports, exchange rates, international reserves, interest rates, monetary aggregates and fiscal variables come from publications of Central Banks of the region. Data on countries' financial systems corresponds to IMF statistics referred as "other depositary corporation surveys". Data on commodity prices (fuel and non-fuel) are also provided by the IMF.

[22] In most cases, this weighted average scheme delivers results closer to the median of the pool of countries, and it differentiates strongly from simple mean indicators.



yLA: regional annual real growth indicator, PLA: regional annual inflation, EXLA: annual export growth, CIFLA: regional proxy for capital inflows (as a share of international reserves), MRLA: regional annual variation of short term rates (in percentage points), GXLA: annual government expenditure growth.

Appendix 2. Sign restriction identification

Sign restriction identification starts by finding a set of orthogonal errors ε in the estimated model (4) : $Z_t = \mathrm{A}\ Z_{t-1} + \mathrm{B}\ Y_{t-1}^{RW} + e_t$. Orthogonalization is carried out by finding any matrix decomposition that satisfies $\hat{\Sigma} = \hat{V}\,\hat{V}'$. In this way, orthogonal errors can be retrieved from reduced form residuals through $\hat{\varepsilon}_t = \hat{V}^{-1}\,\hat{e}_t$. We use the Cholesky decomposition of $\hat{\Sigma}$ to obtain $\hat{V}$. Because structural shocks are strictly identified by their expected effect on economic variables, orthogonal shocks may not necessarily qualify as such. Therefore, the way sign restriction identification works is by combining orthogonal shocks in such a way that the resulting structural (also orthogonal) shocks have the properties imposed by the researcher. Operationally, if we assume that structural shocks are related to orthogonal shocks through a matrix Q, such that $\varepsilon_t = Q\,u_t$ then, we can write structural impulse responses of Z as $I\hat{R}Z(h) = \hat{\mathrm{A}}^{h-1}\hat{V}\,Q$ for the h^{th} horizon. However, Q must be a rotation matrix, which by definition satisfies $Q'Q = \mathrm{I}$. In this way, we can always write $\hat{\Sigma} = \hat{V}\,Q\,Q'\hat{V}' = \hat{V}\,\hat{V}'$ and the properties of the estimated covariance matrix are preserved. According to Rubio, Waggoner and Zha (2010), Q can be obtained from applying the QR decomposition to a uniform random matrix.

Since Z contains factors for the LA block, and factors cannot be directly interpreted, impulse responses on final variables are given by $\left[IRZ^{US}(h), IRX^{LA}(h)\right]$, where $IRX^{LA}(h) = \Lambda\, IRF(h)$. Therefore, sign restriction identification consists on finding several (enough) rotation matrices Qs that satisfy the restrictions imposed on impulse responses of final variables[23]. Notice that this procedure avoids imposing null restrictions on contemporaneous correlations of variables, as it is the case when using Cholesky decomposition as a structural identification procedure. In other words, $\hat{\Psi} = \hat{V}\,Q$ does not exhibits zero restrictions, as it does $\hat{V}$.

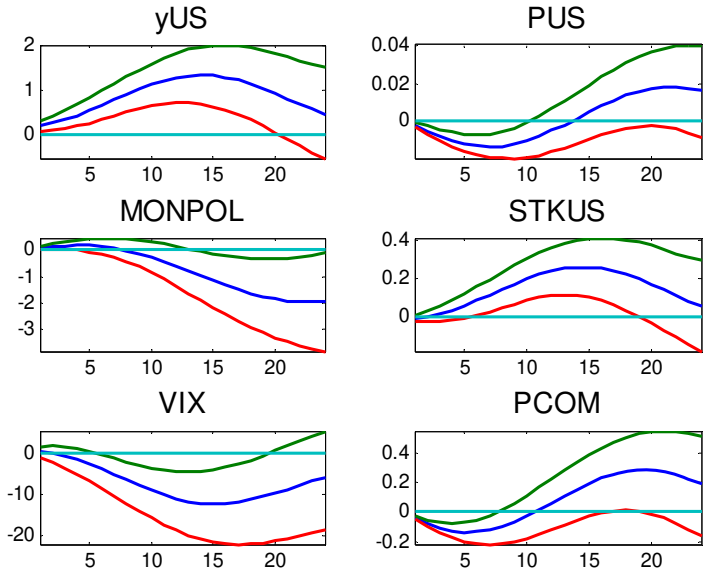
Because we want to identify structural US shocks, we strictly identify these shocks using information coming from US variables. On this account, we impose a block diagonal form to matrix Q, such that $\begin{bmatrix} Q_1 & 0 \\ 0 & Q_2 \end{bmatrix}$. Notice that the non-zero blocks of Q, say Q_1 and Q_2, also satisfy $Q_1'Q_1 = \mathrm{I}$ and $Q_2'Q_2 = \mathrm{I}$. Since the US economy is characterized by six variables, in our model Q_1 and Q_2 are 6x6 matrices. The use of this block diagonal structure for Q is a generalization of the procedure used in Mumtaz and Surico (2009), which define Q as $\begin{bmatrix} Q_1 & 0 \\ 0 & I \end{bmatrix}$, in order to distinguish international from domestic shocks, in a FAVAR for the UK economy augmented with international factors. In this model, we only identify four structural external shocks, out of six potential external shocks. We do not attempt to identify any LA regional shock.

Restrictions on impulse responses are applied for six consecutive months to identify sufficiently long lasting structural shocks.

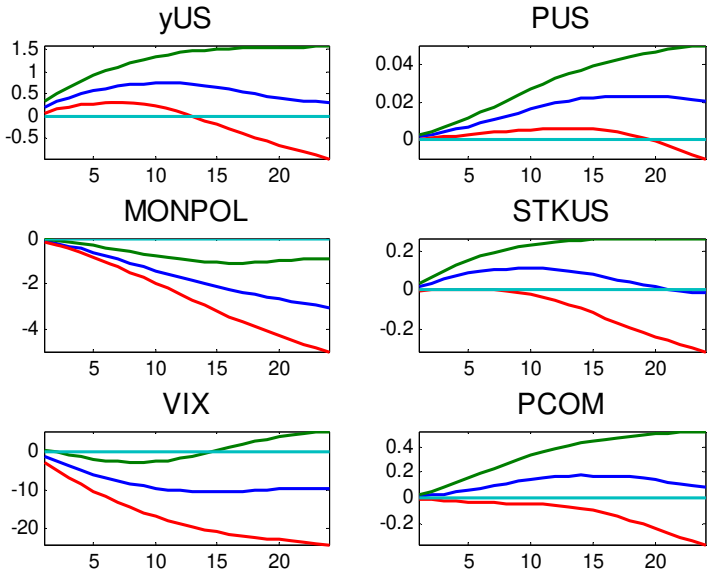
[23] For each potential draw of Q that generates impulse responses, identification entails to keeps only those draws that satisfy restrictions imposed, but for *all identified* shocks simultaneously. This is so in order to preserve orthogonality among structural shocks.

Appendix 3. Accumulated impulse responses of the US economy and commodity prices to US domestic shocks

US expansionary supply shock

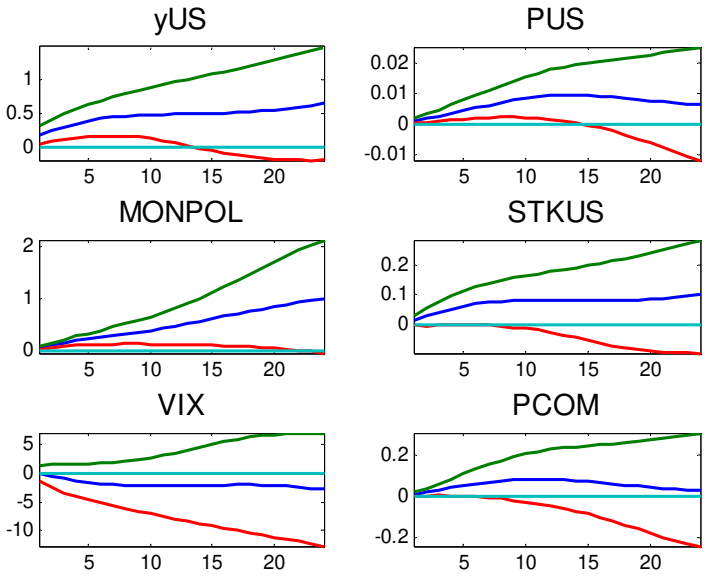


US expansionary (real) demand shock

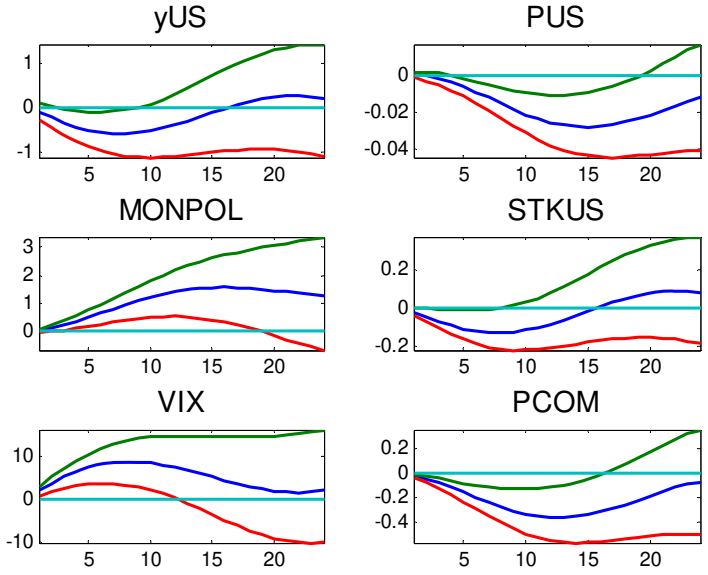


yUS: growth of industrial activity; PUS: inflation; MONPOL: monetary policy indicator; STKUS: S&P500 index growth; VIX: volatility index; PCOM: Commodity price growth. Lines represent the 84th, 50th and 16th percentiles of all impulse responses that satisfied sign restrictions.

US expansionary monetary policy shock



US contractionary financial shock



yUS: growth of industrial activity; PUS: inflation; MONPOL: monetary policy indicator; STKUS: S&P500 index growth; VIX: volatility index; PCOM: Commodity price growth. Lines represent the 84th, 50th and 16th percentiles of all impulse responses that satisfied sign restrictions.

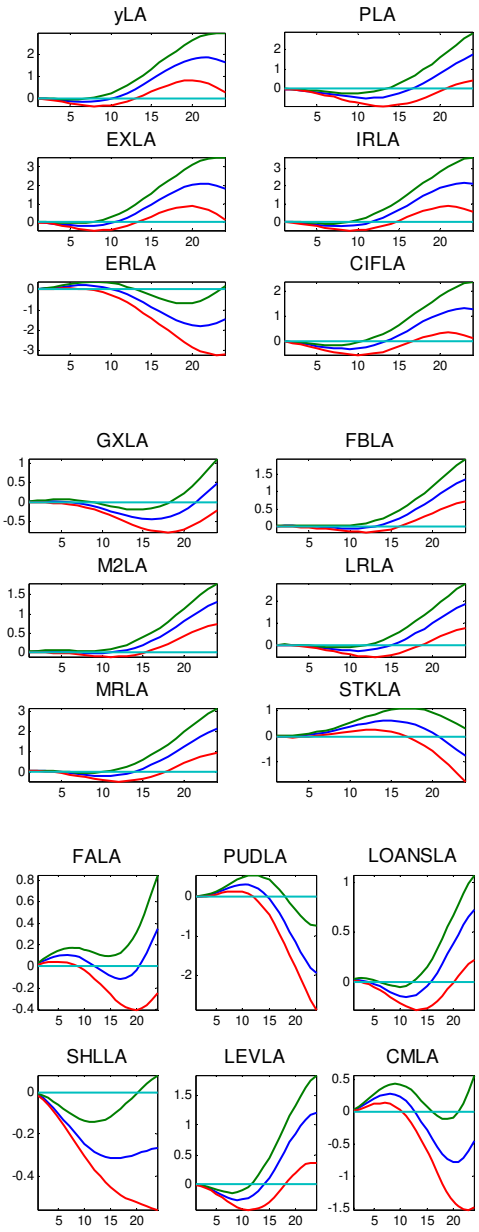
Appendix 4. Weight of selected factors in LA variables' variance

	Variable Name	Variance share of the common component	Variance share of the idiosyncratic component	Average of the common component variance share
Real activity growth	yarg	78,1%	21,9%	73,9%
	ybra	78,0%	22,0%	
	ychl	60,9%	39,1%	
	ycol	91,1%	8,9%	
	yecu	35,3%	64,7%	
	ymex	82,0%	18,0%	
	yper	75,4%	24,6%	
	yurg	72,1%	27,9%	
	yven	92,3%	7,7%	
Inflation	parg	93,3%	6,7%	81,6%
	pbol	85,5%	14,5%	
	pbra	73,9%	26,1%	
	pchl	94,6%	5,4%	
	pcol	88,2%	11,8%	
	pecu	86,9%	13,1%	
	pmex	62,2%	37,8%	
	pper	89,1%	10,9%	
	purg	59,8%	40,2%	
	pven	82,7%	17,3%	
Export growth	exarg	77,6%	22,4%	72,9%
	exbol	64,9%	35,1%	
	exbra	79,6%	20,4%	
	exchl	81,3%	18,7%	
	excol	69,0%	31,0%	
	execu	71,2%	28,8%	
	exmex	87,3%	12,7%	
	exper	77,7%	22,3%	
	exurg	59,4%	40,6%	
	exven	60,8%	39,2%	
Import growth	imarg	90,9%	9,1%	80,9%
	imbol	72,9%	27,1%	
	imbra	84,9%	15,1%	
	imchl	91,1%	8,9%	
	imcol	83,5%	16,5%	
	imecu	73,8%	26,2%	
	immex	88,2%	11,8%	
	imper	87,7%	12,3%	
	imurg	61,4%	38,6%	
	imven	74,6%	25,4%	
International reserves growth	irarg	71,9%	28,1%	70,2%
	irbol	73,5%	26,5%	
	irbra	80,2%	19,8%	
	irchl	60,0%	40,0%	
	ircol	47,4%	52,6%	
	irecu	66,6%	33,4%	
	irmex	67,9%	32,1%	
	irper	79,9%	20,1%	
	irurg	83,7%	16,3%	
	irven	71,2%	28,8%	
Exchange rate (Dom/$) growth	erarg	78,3%	21,7%	71,7%
	erbol	96,0%	4,0%	
	erbra	79,3%	20,7%	
	erchl	51,7%	48,3%	
	ercol	74,4%	25,6%	
	ermex	79,1%	20,9%	
	erper	63,3%	36,7%	
	erurg	77,4%	22,6%	
	erven	45,8%	54,2%	
Capital inflows indicator	cifarg	88,0%	12,0%	72,0%
	cifbol	51,6%	48,4%	
	cifbra	83,9%	16,1%	
	cifchl	94,3%	5,7%	
	cifcol	60,8%	39,2%	
	cifecu	50,5%	49,5%	
	cifmex	60,7%	39,3%	
	cifper	64,6%	35,4%	
	cifurg	80,2%	19,8%	
	cifven	85,8%	14,2%	
Government expenditure growth	gxarg	82,8%	17,2%	67,7%
	gxbol	91,0%	9,0%	
	gxbra	51,9%	48,1%	
	gxcol	26,1%	73,9%	
	gxecu	92,2%	7,8%	
	gxmex	73,0%	27,0%	
	gxper	44,9%	55,1%	
	gxurga	63,9%	36,1%	
	gxven	83,2%	16,8%	
Fiscal balance as a share of government expenditure	fbarg	92,1%	7,9%	85,9%
	fbbol	78,9%	21,1%	
	fbbra	88,1%	11,9%	
	fbcol	84,2%	15,8%	
	fbecu	70,6%	29,4%	
	fbmex	91,7%	8,3%	
	fbper	94,4%	5,6%	
	fburg	90,1%	9,9%	
	fbven	83,0%	17,0%	
M2 growth	m2arg	84,1%	15,9%	77,8%
	m2bol	92,6%	7,4%	
	m2bra	90,3%	9,7%	
	m2chl	82,8%	17,2%	
	m2col	75,0%	25,0%	
	m2ecu	76,3%	23,7%	
	m2mex	65,3%	34,7%	
	m2per	85,8%	14,2%	
	m2urg	44,6%	55,4%	
	m2ven	81,5%	18,5%	

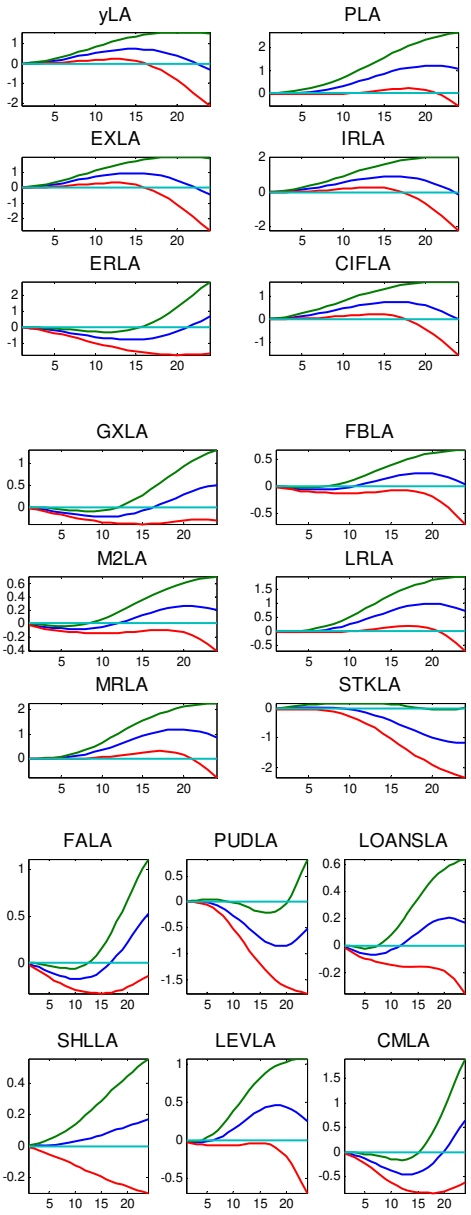
	Variable Name	Variance share of the common component	Variance share of the idiosyncratic component	Average of the common component variance share
Loan interest rate variation	lrarg	85,4%	14,6%	73,9%
	lrbol	21,9%	78,1%	
	lrbra	83,7%	16,3%	
	lrchl	89,7%	10,3%	
	lrcol	80,5%	19,5%	
	lrecu	65,4%	34,6%	
	lrmex	58,3%	41,7%	
	lrper	78,1%	21,9%	
	lrurg	86,7%	13,3%	
	lrven	89,7%	10,3%	
Monetary policy rate variation	mrarg	75,1%	24,9%	73,9%
	mrbol	70,1%	29,9%	
	mrbra	88,0%	12,0%	
	mrchl	89,3%	10,7%	
	mrcol	92,8%	7,2%	
	mrmex	55,9%	44,1%	
	mrper	82,8%	17,2%	
	mrurg	69,3%	30,7%	
	mrven	42,0%	58,0%	
Stock market index growth	stkarg	82,9%	17,1%	86,0%
	stkbra	88,8%	11,2%	
	stkchl	78,5%	21,5%	
	stkcol	80,8%	19,2%	
	stkmex	93,2%	6,8%	
	stkper	91,9%	8,1%	
Foreign asset growth in the financial system	nfaarg	82,9%	17,1%	54,3%
	nfabol	77,2%	22,8%	
	nfabra	57,6%	42,4%	
	nfachl	53,1%	46,9%	
	nfacol	46,4%	53,6%	
	nfaecu	76,9%	23,1%	
	nfamex	24,8%	75,2%	
	nfaper	21,9%	78,1%	
	nfaurg	44,7%	55,3%	
	nfaven	57,3%	42,7%	
Public Debt growth in the financial system	pudarg	78,0%	22,0%	71,6%
	pudbol	45,7%	54,3%	
	pudbra	80,5%	19,5%	
	pudchl	78,9%	21,1%	
	pudcol	62,9%	37,1%	
	pudecu	80,5%	19,5%	
	pudmex	83,0%	17,0%	
	pudurg	70,3%	29,7%	
	pudven	65,0%	35,0%	
Loans growth in the financial system	loansarg	90,4%	9,6%	85,2%
	loansbol	81,8%	18,2%	
	loansbra	85,4%	14,6%	
	loanschl	84,0%	16,0%	
	loanscol	87,9%	12,1%	
	loansecu	87,8%	12,2%	
	loansmex	88,6%	11,4%	
	loansper	90,0%	10,0%	
	loansurg	79,6%	20,4%	
	loansven	75,9%	24,1%	
Share of loans in the financial system	shlarg	97,5%	2,5%	84,0%
	shlbol	88,0%	12,0%	
	shlbra	98,8%	1,2%	
	shlchl	75,8%	24,2%	
	shlcol	92,4%	7,6%	
	shlecu	75,9%	24,1%	
	shlmex	62,1%	37,9%	
	shlper	87,1%	12,9%	
	shlurg	73,1%	26,9%	
	shlven	89,7%	10,3%	
Leverage in the financial system	levarg	91,8%	8,2%	84,6%
	levbol	94,4%	5,6%	
	levbra	80,3%	19,7%	
	levchl	66,5%	33,5%	
	levcol	90,1%	9,9%	
	levecu	75,3%	24,7%	
	levmex	81,0%	19,0%	
	levurg	87,6%	12,4%	
	levven	94,6%	5,4%	
Currency mismatch indicator growth in the financial system	cmarg	32,4%	67,6%	62,3%
	cmbol	59,5%	40,5%	
	cmbra	74,3%	25,7%	
	cmchi	77,3%	22,7%	
	cmcol	46,3%	53,7%	
	cmmex	78,1%	21,9%	
	cmper	69,3%	30,7%	
	cmuru	79,2%	20,8%	
	cmven	44,1%	55,9%	
Regional Indicators	y	90,1%	9,9%	83,9%
	p	96,4%	3,6%	
	ex	91,6%	8,4%	
	im	95,4%	4,6%	
	ir	90,5%	9,5%	
	er	83,0%	17,0%	
	cif	67,1%	32,9%	
	gx	66,1%	33,9%	
	fb	96,5%	3,5%	
	m2	93,4%	6,6%	
	lr	89,2%	10,8%	
	mr	92,1%	7,9%	
	stk	95,1%	4,9%	
	fa	45,7%	54,3%	
	pud	80,2%	19,8%	
	loans	97,4%	2,6%	
	sh	58,5%	41,5%	
	shl	94,1%	5,9%	
	lev	75,3%	24,7%	
	cm	80,7%	19,3%	

Appendix 5. Accumulated impulse responses for the LA region

US expansionary supply shock

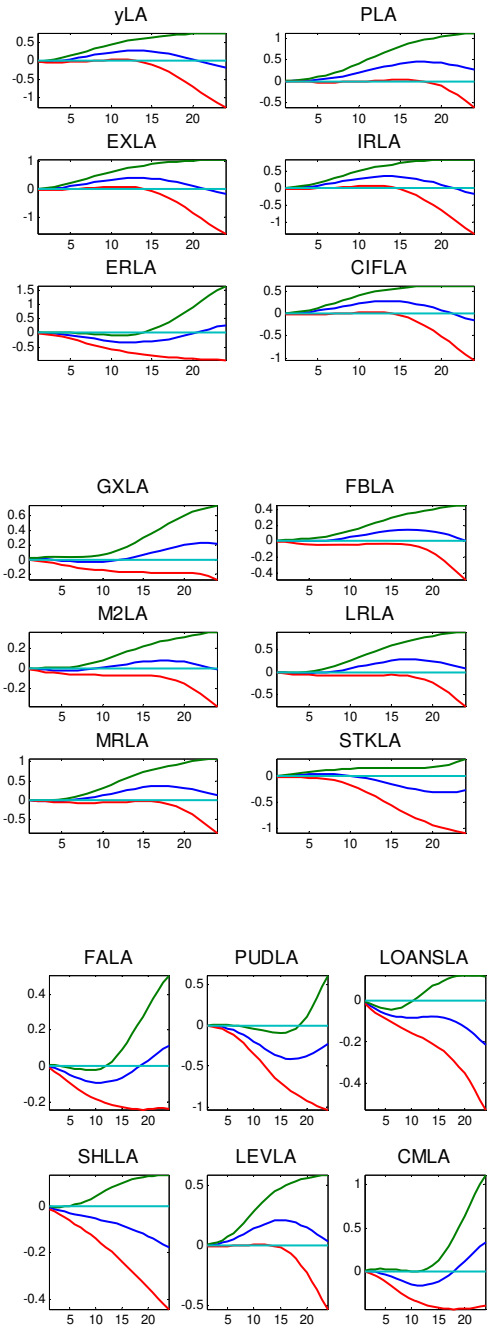


US expansionary demand shock

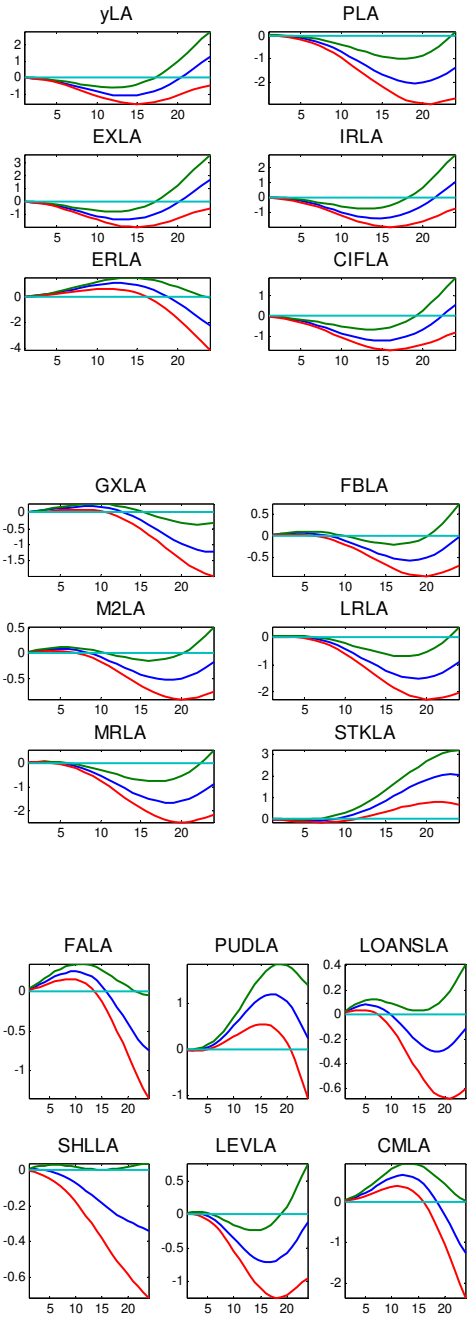


YLA: real activity growth, PLA: inflation, EXLA: export growth, IR: international reserves growth; ERLA: exchange rate growth (Domestic/US$); CIFLA: capital inflows indicator; GXLA: government expenditure growth; FBLA: fiscal balance as a share of expenditures; M2LA: M2 growth; LRLA: loan interest rate change; MRLA: monetary rate change; STKLA: stock index growth; FALA: foreign asset growth; PUDLA: public debt growth; LOANSLA: loan growth; SHLLA: share of loans with respect to assets(FA+PUD+LOANS); LEVLA: leverage (assets/equity); CMLA: currency mismatch indicator (FX assets/liabilities) growth. All variables are expressed in standardized units. Lines represent the 84th, 50th and 16th percentiles of all impulse responses that satisfied sign restrictions.

US expansionary monetary shock

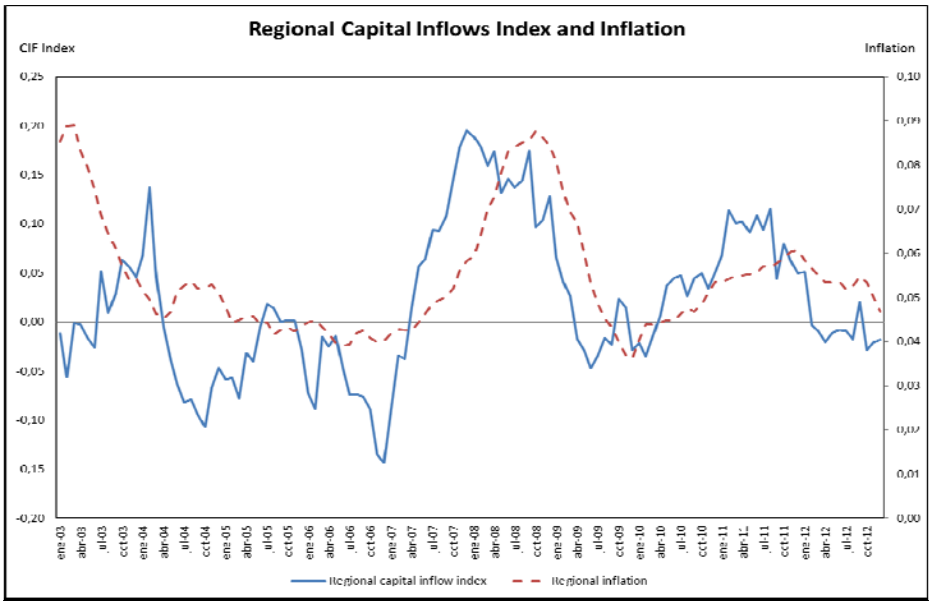


US contractionary financial shock



YLA: real activity growth, PLA: inflation, EXLA: export growth, IR: international reserves growth; ERLA: exchange rate growth (Domestic/US$); CIFLA: capital inflows indicator; GXLA: government expenditure growth; FBLA: fiscal balance as a share of expenditures; M2LA: M2 growth; LRLA: loan interest rate change; MRLA: monetary rate change; STKLA: stock index growth; FALA: foreign asset growth; PUDLA: public debt growth; LOANSLA: loan growth; SHLLA: share of loans with respect to assets(FA+PUD+LOANS); LEVLA: leverage (assets/equity); CMLA: currency mismatch indicator (FX assets/liabilities) growth. All variables are expressed in standardized units. Lines represent the 84th, 50th and 16th percentiles of all impulse responses that satisfied sign restrictions.

Appendix 6. Regional capital inflows and floatation indexes



Floatation index (including interest rate variability)					
	Complete sample 2004-2012	2004-2006	2007-2008	2009-2010	2011-2012
Chile	0,01	0,02	0,05	0,00	0,01
Bolivia	0,03	0,02	0,09	0,02	0,00
Perú	0,06	0,04	0,21	0,06	0,02
Uruguay	0,07	0,04	0,13	0,30	0,36
Argentina	0,11	0,05	0,07	0,23	0,18
Venezuela	0,13	0,12	0,40	0,19	0,07
Mexico	0,27	0,12	0,49	0,40	1,77
Colombia	0,28	0,36	0,57	0,49	0,17
Brasil	0,35	0,25	0,33	0,54	0,34
Average	0,15	0,11	0,26	0,25	0,33

Floatation index (including only exchange rate and reserve variability)					
	Complete sample 2004-2012	2004-2006	2007-2008	2009-2010	2011-2012
Chile	0,14	0,31	0,08	0,17	0,13
Bolivia	0,15	0,06	0,52	0,36	0,11
Uruguay	0,28	0,19	0,49	1,16	0,58
Perú	0,28	0,17	0,35	0,50	0,20
Argentina	0,61	0,32	0,13	1,34	0,36
Brasil	0,78	0,73	0,55	1,86	1,51
Mexico	0,95	0,73	0,77	1,02	2,22
Venezuela	1,06	1,13	1,58	3,14	2,30
Colombia	1,53	1,08	1,26	7,52	1,12
Average	0,64	0,52	0,64	1,90	0,95

Floatation indexes are computed as ratios of standard deviations of series, all of which are expressed as annual growth rates. These indexes measure the relative variability of the exchange rate in terms of the variability of international reserves and interest rates: $FI = \frac{s.d.(ERgrowth)}{s.d.(IRgrowth) + s.d.(MRgrowth)}$. For Venezuela, we use the non-official exchange rate growth.

Appendix 7. Results of OLS regressions for determining country heterogeneity.

Dependent variable: monetary rate responses of all countries at 12 months

	Expansionary supply shock	Expansionary demand shock	Expansionary monetary policy shock	Contractionary financial shock	All shocks
	Positive responses				
c	0,074*** (0,004)	0,015** (0,006)	0,020*** (0,004)	0,012*** (0,001)	0,017*** (0,004)
Inflation targeting dummy	-	0,101*** (0,006)	0,036*** (0,003)	-	0,065*** (0,004)
Floatation index	-0,004 (0,004)	-0,012*** (0,004)	-0,008*** (0,002)	-	-0,008*** (0,002)
FX Assets/Liabilities	-0,005*** (0,001)	-0,006*** (0,001)	-0,003*** (0,000)	-	-0,004*** (0,000)
CIF Indicator	-0.025*** (0,007)	-0,081*** (0,006)	-0,0286*** (0,003)	-	-0,049*** (0,003)
R^2	0,050	0,290	0,172	-	0,184
N° Obs.	696	1198	1125	101	3120
Proportion of draws	0.496	0.853	0.80.1	0.072	0.555
	Negative responses				
c	-0,092*** (0,003)	-0,011*** (0,002)	-0,010*** (0,002)	-0,034*** (0,006)	-0,392*** (0,004)
Inflation targeting dummy	0,045*** (0,003)	-0,001 (0,003)	-0,002 (0,002)	-0,123*** (0,006)	-0,084*** (0,004)
Floatation index	0,018*** (0,003)	-0,005** (0,002)	-0,001 (0,001)	0,020*** (0,004)	0,018*** (0,003)
FX Assets/Liabilities	0,003*** (0,000)	0,001*** (0,000)	0,001*** (0,000)	0,008*** (0,001)	0,008*** (0,001)
CIF Indicator	-0,004 (0,003)	0,007** (0,003)	0,007*** (0,002)	0,105*** (0,006)	0,093*** (0,004)
R^2	0,431	0,095	0,093	0,355	0,278
N° Obs.	708	206	279	1303	2496
Proportion of draws	0.504	0.147	0.199	0.928	0.445

*, ** and *** denote coefficient significance at 10%, 5% y 1%, respectively. Standard deviations of parameter estimators are in parentheses. The variable "Inflation targeting dummy" was dropped from the regression when all countries in the sample satisfied the criterion. All the positive responses in the contractionary financial shock correspond to a single country (Venezuela).

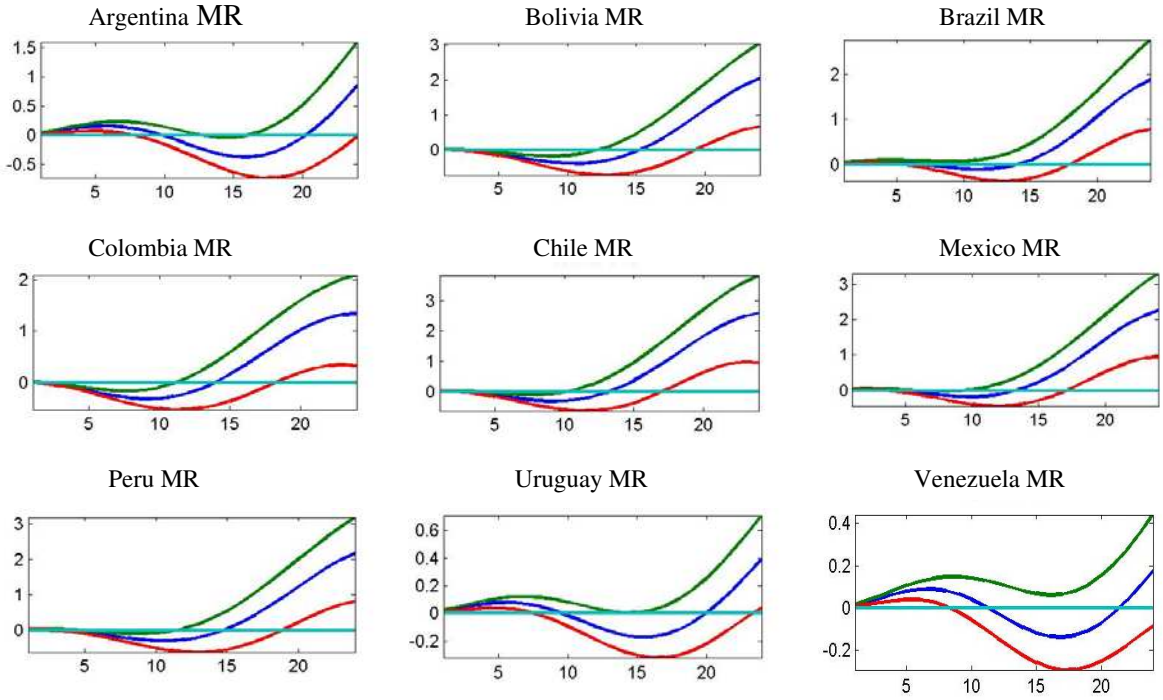
Dependent variable: government expenditure responses of all countries at 12 months

	Expansionary supply shock	Expansionary demand shock	Expansionary monetary policy shock	Contractionary financial shock	All shocks
	Positive responses				
C	0,025*** (0,007)	0,035*** (0,003)	0,028*** (0,002)	0,006 (0,014)	0,040*** (0,002)
Inflation targeting dummy	0,062*** (0,007)	-0,007** (0,003)	-0,003 (0,002)	-	-0,000 (0,002)
Floatation index	-0,058*** (0,005)	-0,010** (0,004)	-0,007** (0,003)	0,014 (0,024)	-0,002 (0,002)
FX Assets/Liabilities	-0,006*** 0,001	0,010*** (0,001)	0,002*** (0,001)	0,010** (0,005)	0,002*** (0,000)
CIF Indicator	-0,107*** (0,012)	0,051*** (0,010)	0,011** (0,005)	0,078*** (0,021)	0,020*** (0,003)
Fiscal balance	-0,166*** (0,027)	0,189*** (0,034)	0,019 (0,018)	-0,110 (0,119)	-0,035*** (0,009)
R^2	0,597	0,190	0,093	0,262	0,061
N° Obs.	381	766	739	525	2411
Proportion of draws	0.271	0.545	0.526	0.374	0.429
	Negative responses				
C	-0,049*** (0,002)	-0,015*** (0,005)	-0,013*** (0,003)	-0,052*** (0,003)	-0,053*** (0,002)
Inflation targeting dummy	0,028*** (0,004)	-0,008* (0,005)	-0,001 (0,002)	0,029*** (0,003)	0,031*** (0,002)
Floatation index	-0,032*** (0,003)	-0,005 (0,003)	-0,000 (0,002)	0,007* (0,004)	-0,013*** (0,002)
FX Assets/Liabilities	-0,001 (0,001)	-0,004*** (0,001)	-0,001*** (0,000)	-0,017*** (0,001)	-0,003*** (0,000)
CIF Indicator	-0,053*** (0,006)	-0,050*** (0,005)	-0,018*** (0,002)	-0,114*** (0,010)	-0,037*** (0,003)
Fiscal balance	-0,029** (0,012)	0,067*** (0,018)	0,028*** (0,009)	-0,282*** (0,037)	0,019** (0,008)
R^2	0,219	0,278	0,176	0,400	0,093
N° Obs.	1023	638	665	879	3205
Proportion of draws	0.729	0.455	0.474	0.626	0.571

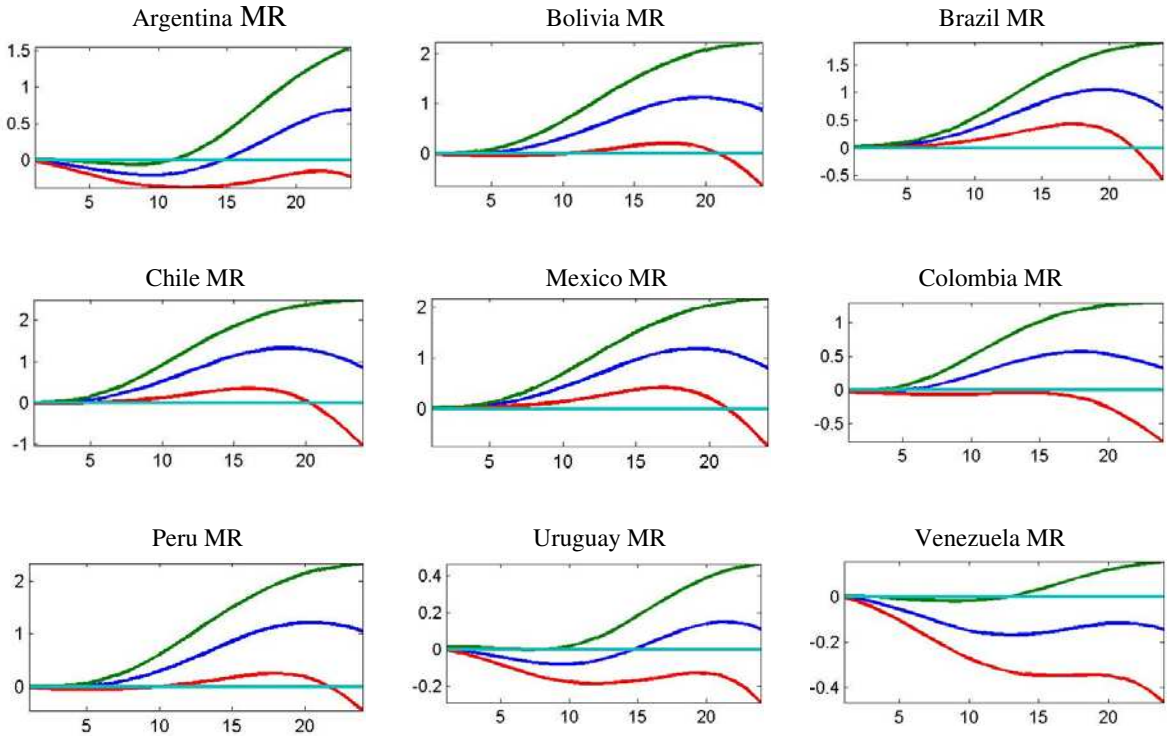
*, ** and *** denote coefficient significance at 10%, 5% y 1%, respectively. Standard deviations of parameter estimators are in parentheses. The variable "Inflation targeting dummy" was dropped from the regression when all countries in the sample satisfied the criterion.

Appendix 8. Countries accumulated impulse responses

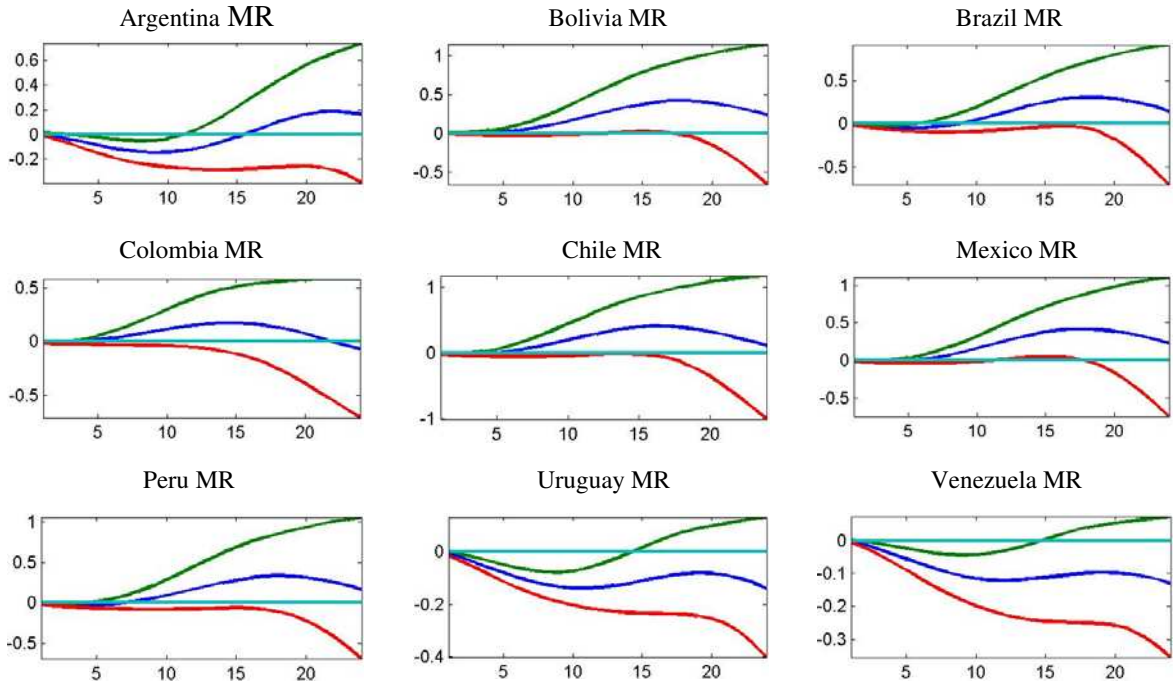
Monetary interest rate responses to US expansionary supply shock



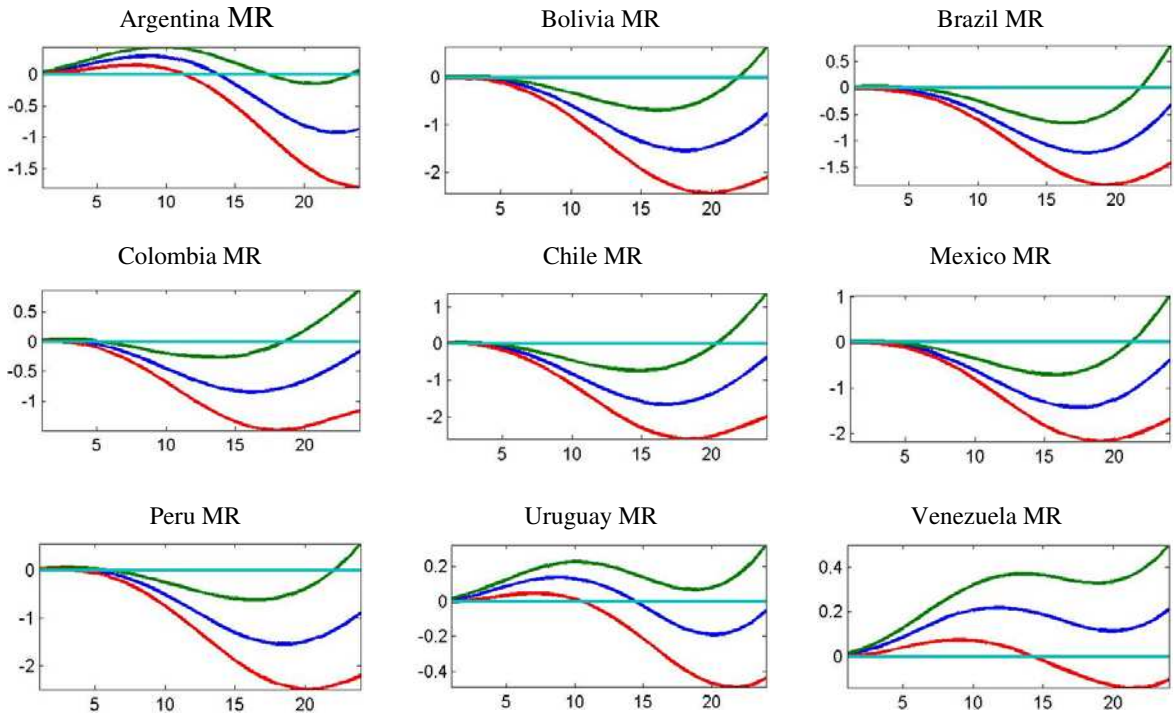
Monetary interest rate responses to US expansionary real demand shock



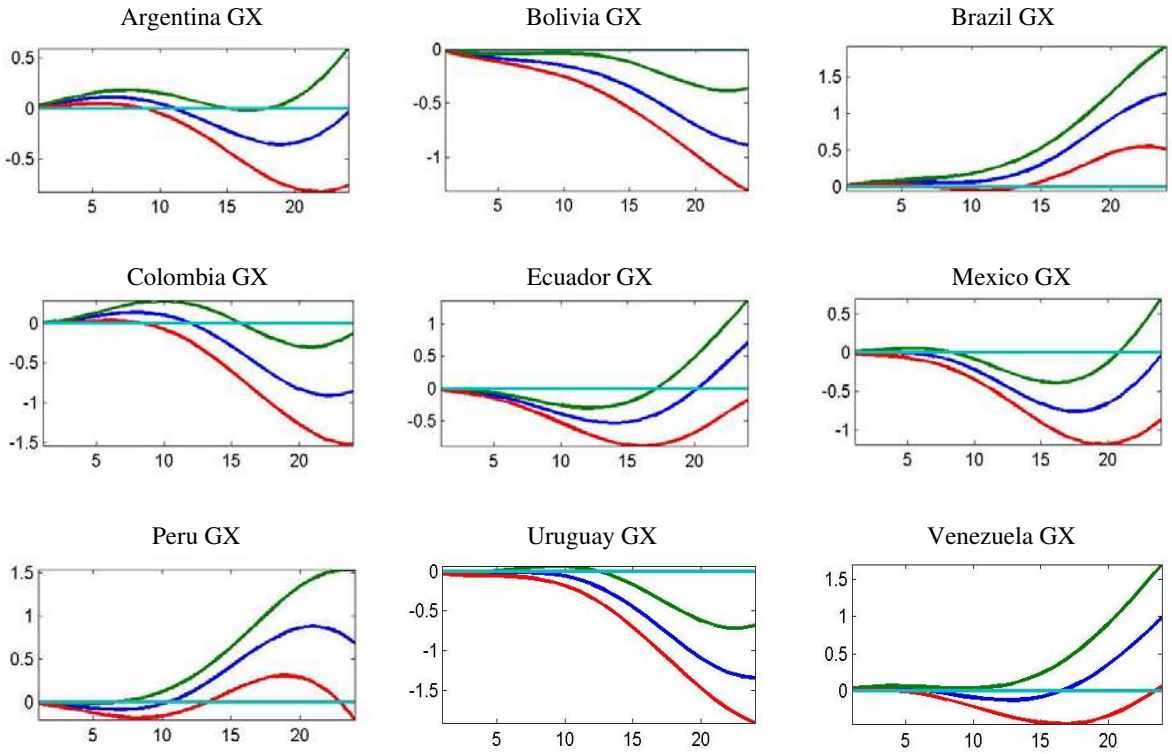
Monetary interest rate responses to US expansionary monetary shock



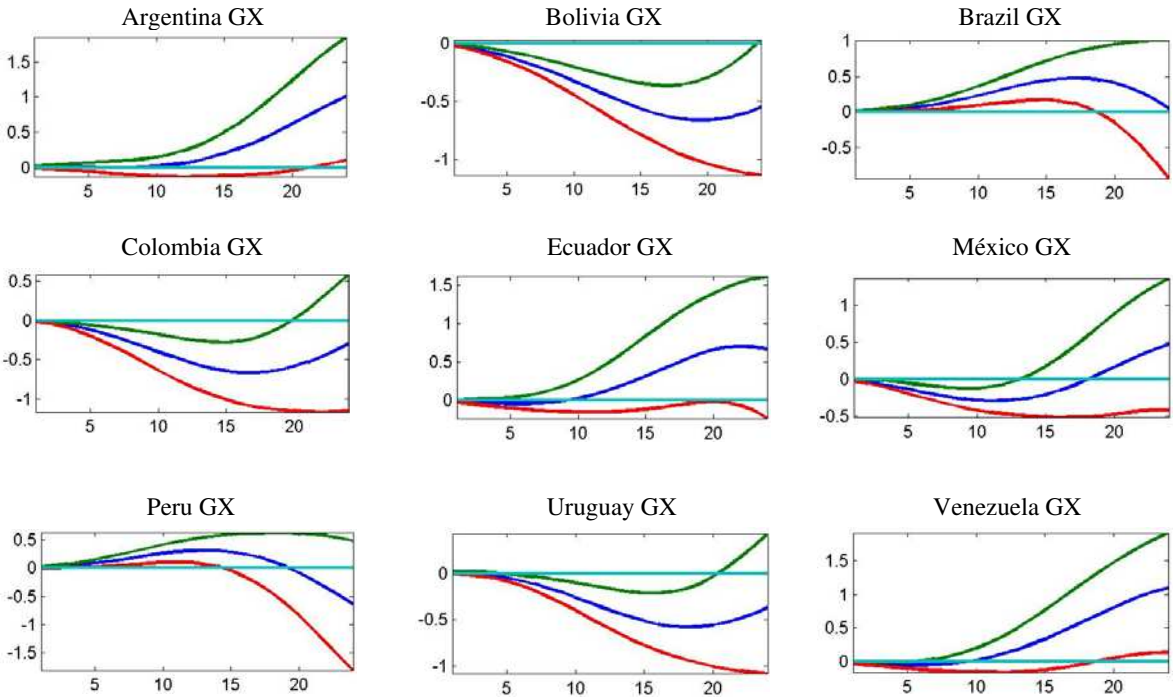
Monetary interest rate responses to US contractionary financial shock



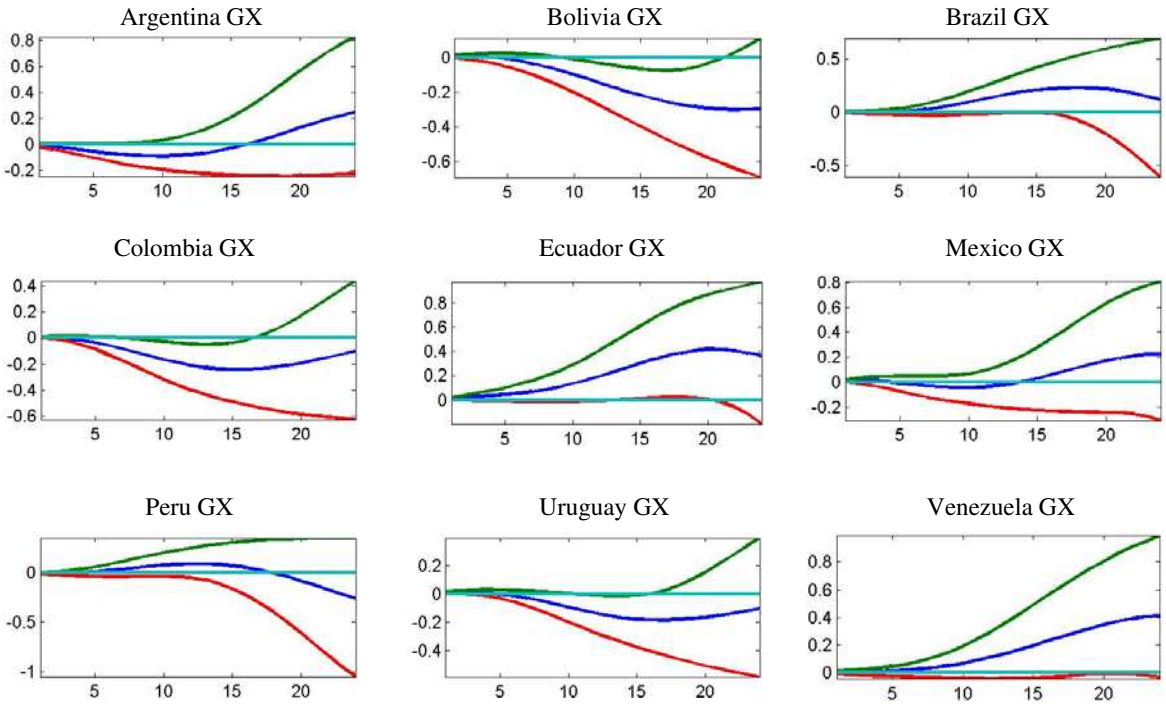
Fiscal expenditures responses to US expansionary supply shock



Fiscal expenditures responses to US expansionary real demand shock



Fiscal expenditures responses to US expansionary monetary shock



Fiscal expenditures responses to US contractionary financial shock