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Abstract

This paper assesses empirically whether global risk aversion (GRA) and some if its determinants (US economic growth and the US long term interest rates) explain developments in Latin American sovereign spreads. We find that GRA is significant and positively related to Latin American sovereign spreads and that its impact varies across countries and over time. Chile, with a lower sovereign risk, is relatively more affected. The opposite is true for Argentina, Ecuador and Venezuela. In addition, the influence of GRA on spreads has risen since the Enron scandal. Finally, both an increase in US economic growth and US long term interest rates are found to reduce spreads while the opposite is true for US short-term interest rates.

JEL Classification: F3, F34, E43
Key words: global risk aversion, sovereign spreads, Latin America

1 Introduction

If the cost of external financing is important for emerging countries, this is even more the case for Latin America. In fact, external bond financing has been used extensively in the last few decades, with Latin American countries accounting for half of the outstanding emerging countries' bonds in 2001. In addition, the region's economic growth appears to be closely associated with the magnitude of net capital flows [Calvo, Reinhart and Talvi (2001)].

The volatility of Latin American sovereign spreads, together with these countries' high dependence on external savings makes it particularly relevant for the region's economic authorities to identify which are the main driving forces of spreads. Much effort has already been made in this direction but there is no consensus yet.

For a strand of the literature domestic factors –i.e., economic fundamentals– are particularly relevant in determining sovereign spreads. Another strand considers external factors more important, such as international interest rates, global economic growth or contagion. In this study we focus on external factors and in particular on investors attitude towards risk, which we shall call global risk aversion (GRA). This has only recently received attention, particularly by practitioners, but less so by academics.

In the traditional literature, the main external factor affecting sovereign spread where risk-free interest rates in the US. While this is clearly relevant, investors' sentiment towards risk should also have a bearing on high risk markets, to which emerging countries' sovereign bonds belong. This is probably even more the case today with the sophistication of financial markets in which risk issues play an increasing role. The contribution of our paper will, therefore, be to analyse how investors' attitude towards risks affects Latin American sovereign spreads.

GRA is difficult to measure. In principle, it should be unrelated to the default risk but, rather, reflect factors such as the financial position of investors, liquidity risk in financial markets or investors' risk appetite. We clearly do not observe GRA but there is a widely accepted proxy the yield of US relatively high risk corporate bonds, commonly known as "high yield" [Herrera and Perry (2002), Calvo (2003), and Jingzhi Huang (2003)]. The argument behind is that most of the movements in the high yield are not related to the probability of default of that asset class, as could be the case with junk bonds, but rather to the change in investors' attitude towards risk.

The paper is divided in eight sections. After this short introduction, Section 2 reviews the existing literature and sets out the paper's objective. Section 3 describes the data used. Section 4 offers some stylised facts of the evolution of Latin American spreads and GRA. Section 5 introduces the empirical strategy. Section 6 offers the results on the relevance of GRA for spreads. Finally, Section 7 assess how the determinants of GRA, US growth and long term interest rates affect sovereign spreads and Section 8 concludes.

2 Literature review and paper's objective

Empirical work on the determinants of emerging countries' sovereign risk has grown markedly in the last few years. A strand of the literature has concentrated in the determinants of default, another on the phenomenon of contagion. In addition, there has been a lively debate on which factors are more relevant, external or domestic. This review focuses on external factors.

Probably the first papers pointing to the importance of external factors is that of Calvo, Leiderman and Reinhart (1993), although it does not concentrate on sovereign spreads but on capital inflows to Latin American countries. They find evidence that increases in US short term interest rates are responsible for the reduction in capital inflows to the region (Table 1 offers a snapshot of the literature review).

Several other studies have explored the impact of US short-term interest rates on sovereign spreads. Kamin and von Kleist (1999) report a non-significant relationship between the two for a group of emerging countries. Over a longer period, Arora and Cerisola (2000) show evidence of a positive and significant effect of US monetary policy, with higher elasticities for some countries (Brazil and Mexico) and lower for others (Argentina). Herrera and Perry (2002) jointly assess the importance of US monetary policy and of GRA, proxied by the US corporate high yield, allowing for different short and long run effects. They obtain a negative short run impact of the Federal Fund rate on Latin American sovereign spreads and a positive one in the long run. The relation between GRA (proxied with the high yield of the US corporate bond) and sovereign spreads is positive both in the long and short run.

Fernández-Arias (1996) has been the first to assess the importance of the US government bond yield, instead of the US short term rate. He analyzes the channels through which lower long term rates abroad affect the cost of capital in emerging countries, using a model of international portfolio allocation. He finds that low bond yields reduce sovereign spreads and that the impact is larger than that of domestic factors, with the only clear exception of Argentina. In the same vein, Eichengreen and Mody (1998) look into the determinants of the level, and differences, of sovereign spreads and capital inflows for a set of emerging regions. A reduction in the US government bond yield appears to increase the supply of sovereign bonds by emerging countries, raising thereby sovereign spreads. Cline and Barnes (1997), in turn, do not find any significant role for the US government bond yield for twelve emerging market countries and six industrial countries.

Apart from Herrera and Perry (2002), very few studies have looked into the importance of GRA for sovereign spreads. The fact that sovereign spreads are highly correlated with investors' appetite for risk is the basis for Calvo (2003)'s argument that domestic factors are almost irrelevant in explaining sovereign spreads, after accounting for the influence of the US corporate high yield. Favero and Giavazzi (2003) comment on Calvo's statement pointing to the fact that the correlation between the "appetite for risk" and sovereign spreads is not constant over time. As we shall show later, our results confirm Favero and Giavazzi's statement.

In addition, Grandes (2003) shows empirical evidence that GRA, together with contagion, influence Latin American sovereign spreads although macroeconomic fundamentals appear as more important determinants. Dungey et al (2003) explore the impact of GRA on emerging market debt in several crisis events and conclude that that the Russian crisis is characterized by a sharp increase in global credit risk, while the relative size of global risk factors is mixed for the Brazilian crisis. Finally, McGuire and Schrijvers (2003), using principal factor analysis, finds a single common factor –which can be interpreted as investors' risk tolerance– explaining a large proportion of the common variation in emerging

countries' sovereign bond spreads. This common factor accounts for one third of the total variation in daily spread changes. The authors argue that their result can explain the evidence of a negative correlation between investors risk tolerance and the US government bond yield, to the extent that changes in investor risk tolerance and expectations of future growth prospects are procyclical.

McGuire and Schrijvers' work is the one that gets closer to our objective but we improve on the empirical methodology and offer a theoretical benchmark for it. In fact, we move away from a pure statistical technique towards a structural model. This allows us to clarify, not only the relation between GRA and emerging countries' sovereign spreads, but also between other important external factors very much related to GRA and sovereign spreads.

The objective of this paper is, thus, to assess empirically the relevance of GRA (proxied by the US corporate high yield) in explaining Latin American sovereign spreads. We, then, endogenize GRA to analyze how its main determinants, US economic growth and US long term interest rates, affect Latin American sovereign spreads. Since these two factors are also relevant for emerging countries' sovereign spreads directly, we end up with a direct and an indirect channel of influence of US growth and long term interest rates on sovereign spreads. To disentangle the two, an SVAR will be used. This, and introducing US short term rates in the analysis, allows us to offer a more comprehensive answer to the long-debated question of how US interest rates influence Latin American sovereign spreads. This question appears particularly interesting for practitioners at the current juncture.

Table 1

Impact of GRA, US government bond yield, and US short term interest rates on Latin American Spreads

Author	Sample	GRA (US Corporate high yield)	US long term government bond yield	US short term interest rate
Calvo, Leiderman and Reinhart (1993)	10 Latin American countries	n.t.	n.t.	+*
Fernandez Arias (1995)	13 emerging countries	n.t.	+	n.t.
Cline and Bernes (1997)	12 emerging countries	n.t.	n.s.	n.t.
Min (1998)	Latin America and Asia	n.t.	n.t.	n.s.*
Eichengreen and Mody (1998)	main emerging countries	n.t.	-	n.t.
Kamin and Kleist (1999)	large group of emerging countries	n.t.	n.t.	n.s. ***
Arora and Cerisola (2001)	11 emerging countries	n.t.	n.t.	+**
Herrera and Perry (2003)	pool of 7 Latin American countries	+ in s/t and + in l/t	n.t.	-in s/t and + in l/t **
Grandes (2003)	Argentina	+	n.t.	n.s. **
Grandes (2003)	Brazil	+	-	- **
Grandes (2003)	Mexico	+	n.s.	+ **
Uribe and Yue (2003)	7 emerging countries	n.t.	n.t.	- in s/t and + in l/t *
Dungey et al (2003)	9 emerging countries	+ (during Russian crisis)	n.t.	n.t.
McGuire and Schrjvers (2003)	large group of emerging countries	+	n.t.	n.t.

n.t: not tested; n.s: not significant
-: negative impact; +: positive impact
* three-mont Tbill rate used
** Federal Fund rate
*** one-year benchmark yield

3 Data issues

Comparable data on emerging countries' sovereign spreads is generally scarce. The most widely used is offered by J. P. Morgan Securities, with relatively long time series of different daily indices. We choose the EMBI+, which includes external dollar-denominated Brady bonds and other non-local currency-denominated bonds, such as euro-bonds, and loans, starting from May 1994. This is preferred to the Emerging Local Currency Index, also produced by J. P. Morgan, because credit risk and local exchange rate risk are many times closely intertwined, which makes it difficult to work with domestic currency bonds for the question we pose ourselves. Furthermore, the EMBI+ offers a relatively longer series the other J. P. Morgan foreign currency index: the EMBI Global[1].

The EMBI+ is available for eight Latin American countries, namely those with the largest bulk of bonds held by non-residents but one, Chile. The eight countries are Argentina, Brazil, Colombia, Ecuador, Mexico, Panama, Peru, and Venezuela. In order to include Chile in the sample, we shall use the EMBI Global for which Chilean data is available.

We choose the largest time span possible. For Argentina, Brazil, Mexico and Venezuela data exist from May 1994 onwards. The other countries have shorter series. Panama and Peru's indices start in 1996, and Chile's and Colombia's as late as 1999. This means that we have a total of nine countries with a variable time span, whose maximum length is from May 1994 to October 2003. Monthly data is used since it is the highest frequency for which we can find indicators of US activity. This implies transforming J. P. Morgan daily indices by averaging daily data.

GRA is proxied by the US Baa corporate high yield in the benchmark exercise. Robustness tests are conducted with the JP. Morgan index of global volatility in stock markets (VIX index) and the US junk bond yield. Since forward looking indicators of US economic activity are preferred as potential determinants of financial variables, we choose the OECD leading indicator a main proxy of US economic activity. The Conference Board confidence index will also be used as a robustness test. Finally, the US long term interest rate is proxied by the 10-year Treasury bond rate. To determine the impact of US monetary, we use the Federal fund rate.

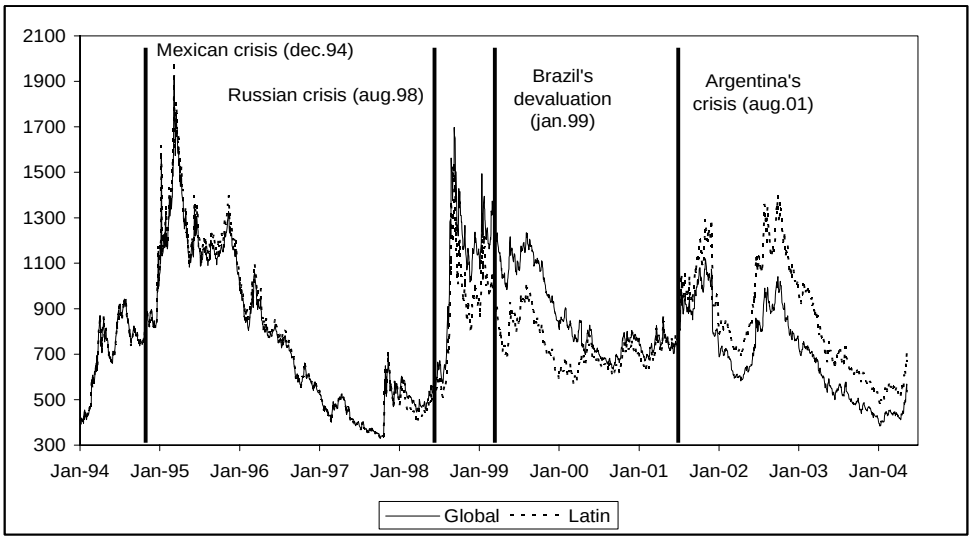
1. The EMBI Global summarizes total returns for US dollar-denominated debt instruments (not only external ones).

4 Some stylized facts

Latin America saw a strong revival of capital inflows starting in 1990 after a long period of external financing constraints during the debt crisis of the 1980s. With only a brief interruption during the Mexican crisis in 1994-1995, this resurgence continued until the Russian crisis erupted in 1998, when sovereign spreads skyrocketed. However, by the end of 1998, only three months after the peak of the Russian crisis, sovereign spreads had narrowed, recovering most of their losses. The Brazilian devaluation of January 1999 was no more than a brief interruption of this recovery, which was again underway as early as March 1999. The Argentine crisis, which started in 2001, led to a sharp increase in spreads, particularly in Latin America. This started to revert in October 2002, after Lula's won the Brazilian elections and the first signs of US economic recovery appeared. Sovereign spreads, then, fell close to historically low levels although they started to increase again since the beginning of 2004 (Graph 1).

Graph 1

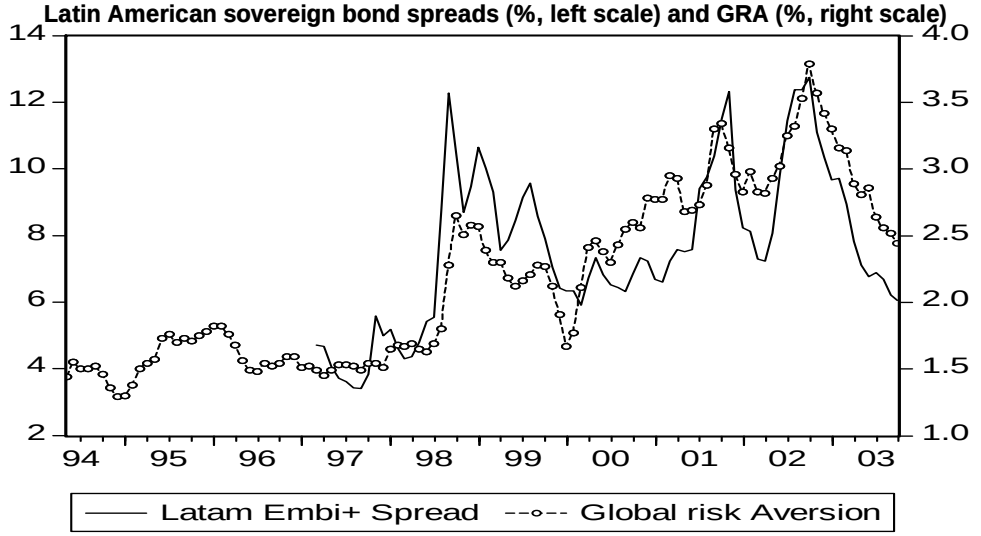
Latin American and Emerging countries sovereign spreads



Although it has only recently received attention, GRA (measured by the spread of the US corporate high yield) has always been closely and positively associated with Latin American sovereign risk (measured by the Latin American EMBI + spread). During the period prior to the Russian crisis, both yields moved very close. After the peak of the Russian crisis, the high yield remained below Latin American spreads until the first quarter of 2000 (Graph 2). Thereafter, the high yield hovered above the EMBI + until mid-2001 where they moved together, except for a few moths at end-2001 beginning 2002, where the high yield remained well above. Interestingly, the latter period coincides with the peak of the Argentine crisis, which was associated with the decoupling of other Latin American sovereign spreads from the Argentine one. The same pattern of an increasing US high yield started again in the third quarter of 2002, coinciding with the victory of the left-wing candidate, Lula, in the Brazilian elections.

Graph 2

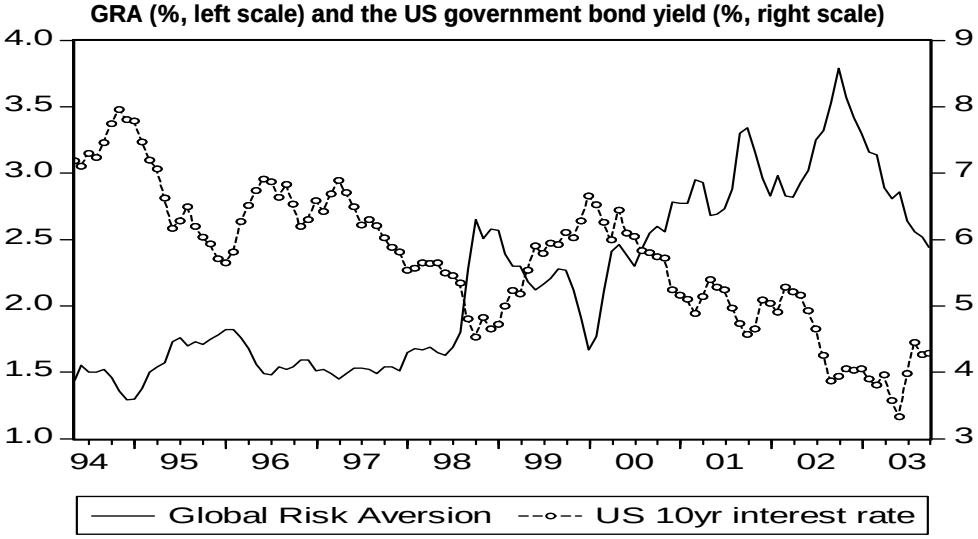
Latin American sovereign bond spreads (%, left scale) and GRA (%, right scale)



As regards the determinants of GRA, Graph 3 shows a clearly negative co-movement between the US corporate high yield spread and the US 10 year government bond yield throughout the sample. From 1994 to the summer of 1998, the bond yield was high and GRA was low. With the Russian crisis this relation reverted until mid-1999, where the bond yield remained above the high yield but with a narrower difference than in previous years. As the US economy entered a recession in late 2000, the relation reverted again and so has it remained until today although the difference between the two has narrowed since 2003.

Graph 3

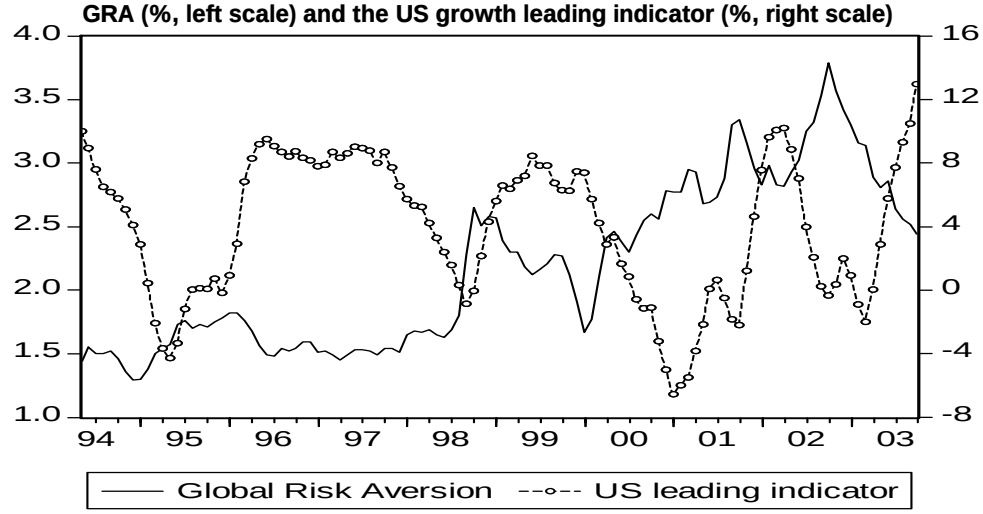
GRA (%, left scale) and the US government bond yield (%, right scale)



Graph 4 depicts the relation between the GRA and US economic growth, proxied by the OECD leading indicator of US economic activity. The relation is negative as for the US government bond interest rate.

Graph 4

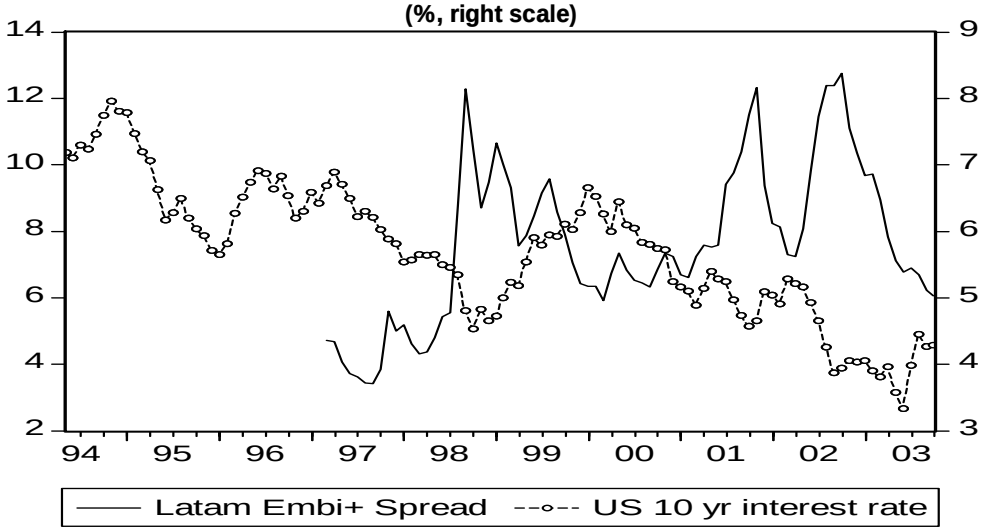
GRA (%, left scale) and the US growth leading indicator (%, right scale)



Graphs 5 and 6 illustrate the co-movement of Latin American sovereign spreads and the US economic growth and the US government bond yield, respectively. In both cases the relation appears to be negative but is less-clear cut than between these two variables and GRA. This makes the econometric exploration of the data all the more interesting.

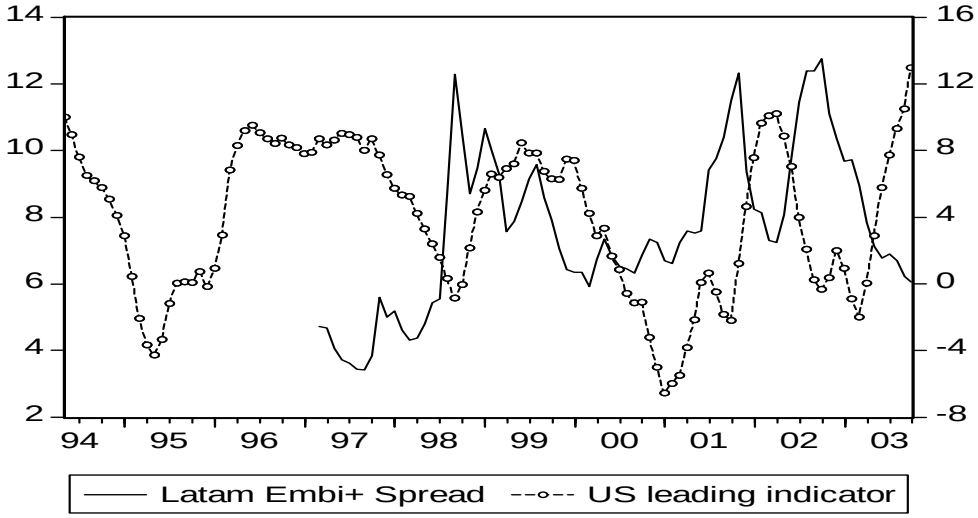
Graph 5

Latin American sovereign spreads (%, left scale) and US government bond yield (%, right scale)



Graph 6

Latin American spreads (%, left scale) and the US economic growth (%, right scale)



Finally, Tables 1 and 2 in Appendix 1 show the main statistics of the variables included in this analysis. Argentina, Ecuador and Venezuela are the countries with the highest average sovereign spreads (measured by the mean and the median) while Chile has the lowest average spread. Finally, the bi-variate correlation (Table 3 of Appendix 1) between GRA and each country's sovereign spread is positive for all countries except Chile and Ecuador. Finally, the correlation between GRA and the OECD leading indicator or US activity is negative and relatively high, in the same way as that of GRA and the US government bond yield.

5 Empirical strategy to assess the role of GRA

As previously mentioned, we use Blanchard's model as a basis to test empirically what has been the role of GRA in explaining Latin American spreads. Although his model has a different goal (i.e., showing that monetary policy suffers from fiscal dominance in Brazil), it is also useful for our purpose since he decomposes the sovereign spread in two parts: that related to GRA and the probability of default stemming from other factors. As Blanchard argues, these are mainly the country's fundamentals[2] although one could think of other external factors not related to the GRA, such as the terms of trade. We shall, thus, refer to all these factors as the idiosyncratic part of the sovereign spread. The model can be summarized in the following testable equation:

$$s_t = p_t + a\theta_i^* + u_t \tag{1}$$

where s_t is the semi-log approximation of the spread between the foreign-currency denominated sovereign bond in the Latin American country and the US risk free bond of the same maturity, after linearity has been assumed, p_t is the probability of default and a is the inverse of the real rate of return of the foreign currency denominated sovereign bond and u_t is the error term.

An interesting testable hypothesis is drawn from the above equation, namely those countries with higher returns in their dollar-denominated sovereign bonds should be more influenced by factors different than GRA (i.e., idiosyncratic factors). This hypothesis is confirmed in our results.

It is also important to note that the probability of default stemming from idiosyncratic factors is given not only by p_t but by $p_t + u_t$. This means that approximating the probability of default to p will only be correct if u is small. As Blanchard (2004) shows, this occurs only if capital flows are relatively elastic. Since there is no simple way out for this econometric problem, we will have to rely on this assumption. Another potential problem is that the estimate of *a* will be unbiased only if GRA (θ^*) is uncorrelated with the residual (u). This is unlikely to be true in as far as an increase in GRA raises the probability of default. Unfortunately, there is no obvious instrumental variable to account for this problem.

We use three estimation procedures: (i) OLS correcting by autocorrelation[3]; (ii) an SVAR model based on Blanchard's decomposition; and (iii) 2SLS with the two first lags of GRA as instrumental variables. This allows us to tackle the problem of the correlation between GRA and u_t. It should be noted that an SVECM is ruled out since all variables are stationary, i.e., I(0), after running Augmented Dickey-Fuller (DFT) tests (see Table 4 in Appendix 1).

There are several advantages in using an SVAR model but probably the most important one for our purposes is that we can calculate the variance composition and compare short-term and long-term effects. To estimate the SVAR model, we consider the following general structure, where e_t is the vector of innovations and u_t is the vector of structural orthogonal shocks.

$$Ae_t = Bu_t \tag{2}$$

2. Blanchard goes even further and argues that, in general terms, their information is summarized in the debt developments.
3. Blanchard (2004) uses this methodology for the case of Brazil.

We depart from the general form by restricting the A matrix to be lower triangular and B to be a diagonal matrix, so that the system is just identified. This yields the following structure:

$$e_t^{\theta} = b_1 u_t^{\theta}$$
$$e_t^{s} = b_2 e_t^{\theta} + u_t^{s} \qquad (3)$$

By imposing such short term restrictions we are assuming that GRA is not correlated with the error term, as in the first estimation strategy. Note that b_2 should be similar to the parameter *a* in equation 1 (i.e., the elasticity of the sovereign spread to GRA). Once b_2 is obtained, we can easily decompose the sovereign spread in two factors: the one depending on GRA and the probability of default stemming from idiosyncratic factors. Finally, four lags are chosen for the estimation, on the basis of the Akaike Information Criterion (AIC)[4].

4. The AIC yields the best lag specification for the model.

6 Results

6.1 Differences among countries

We obtain the elasticities of the sovereign spread to GRA with the three different estimation strategies described above, for the nine Latin American countries analyzed. The parameters are always significant and with a relatively high value. This is particularly in Chile, the country with the lowest average spread[5] (Table 2, first and second columns). Instead, Argentina, Ecuador and Venezuela (the three countries with the highest average sovereign spread) have much lower elasticities.

There are hardly any differences in the elasticities estimated with the first two methodologies The third (2SLS) yields similar results for a number of countries, namely Brazil, Mexico, Panama, Peru and Colombia (Table 2, third column). Differences appear for Argentina, Chile, Ecuador and Venezuela but, all in all, the same country order appears in terms of the size of the coefficient: Chile continues to have the highest elasticity and Argentina, Ecuador and Venezuela the lowest.

Table 2

Elasticities of the Modified Spread to GRA (1)			
Country	SVAR	OLS	TSLS (2)
Argentina	0.11*	0.11*	-0.04
Brazil	0.24*	0.22*	0.20*
Chile	0.45*	0.43*	0.29*
Mexico	0.24*	0.29*	0.28*
Venezuela	0.12*	0.13*	0.04*
Panama	0.19*	0.23*	0.21*
Ecuador	0.13*	0.12*	0.00
Peru	0.24*	0.25*	0.23*
Colombia	0.22*	0.26*	0.27*

(1) Coefficients significant to 95% level
(2) Two stage least squares (TSLS) estimated with two lags of GRA

From the SVAR estimation, we can obtain the variance decomposition, at different periods of time (months), for each country's sovereign spread (Table 3). Large differences appear over time and across countries. In line with the results found for the elasticities, Argentina, Venezuela and, to a lower extent, Ecuador are the countries for which the GRA is less important in determining sovereign spreads (5%, 6% and 12% of the variance in the first month, respectively). In addition, the relevance of GRA increases over time for the three of them, particularly for Argentina. Exactly the opposite happens in the case of Chile, where the GRA explains a large part of the variance at the beginning (37% in the first month) but its relevance is largely reduced over time.

These results are in line with what one should expect from our theoretical framework, where the elasticity of GRA (a) is defined as the inverse of the real rate of return of the domestic sovereign return. A plausible interpretation for the fact that countries with a higher idiosyncratic risk are the least affected by GRA in the short run and the most in the longer run is that higher GRA feeds into their relatively weaker fundamentals only slowly.

5. Given that Chile is the only country for which the Embi Global is used to calculate the spread, instead of the EMBI+, we conduct a robustness exercise to confirm that Chile's higher elasticity is not the consequence of the proxy used. Taking the EMBI Global for all countries, Chile continues to have the highest elasticity. In addition, these elasticities are relatively similar to those estimated with EMBI+ data.

Table 3

Variance Decomposition: SVAR estimation						
	Argentina		**Brazil**		**Chile**	
Period	GRA	Idiosyncratic	GRA	Idiosyncratic	GRA	Idiosyncratic
1	5	95	14	86	37	62
3	4	96	19	81	34	66
6	6	94	21	79	21	79
12	15	85	26	74	21	79
24	33	67	31	69	17	83
36	42	58	33	67	15	85
	Mexico		**Colombia**		**Venezuela**	
Period	GRA	Idiosyncratic	GRA	Idiosyncratic	GRA	Idiosyncratic
1	16	84	40	60	6	94
3	11	89	44	56	4	96
6	8	92	43	57	4	96
12	9	91	41	59	6	94
24	14	86	42	58	10	90
36	18	82	42	58	11	89
	Peru		**Ecuador**		**Panama**	
Period	GRA	Idiosyncratic	GRA	Idiosyncratic	GRA	Idiosyncratic
1	28	72	12	88	18	82
3	35	65	10	90	23	77
6	35	65	16	84	25	75
12	36	64	20	80	34	66
24	36	64	23	77	39	61
36	36	64	24	76	40	60

6.2 Differences over time

Another interesting issue is the increasing importance of GRA over time. The Graphs below show the decomposition of each country's sovereign spread into the part explained by GRA and that related to other factors. The former increases over time in practically all countries analyzed[6]. Still, it is lower than the rest (the idiosyncratic component), particularly in the riskier countries, as we had already concluded from the variance decomposition.

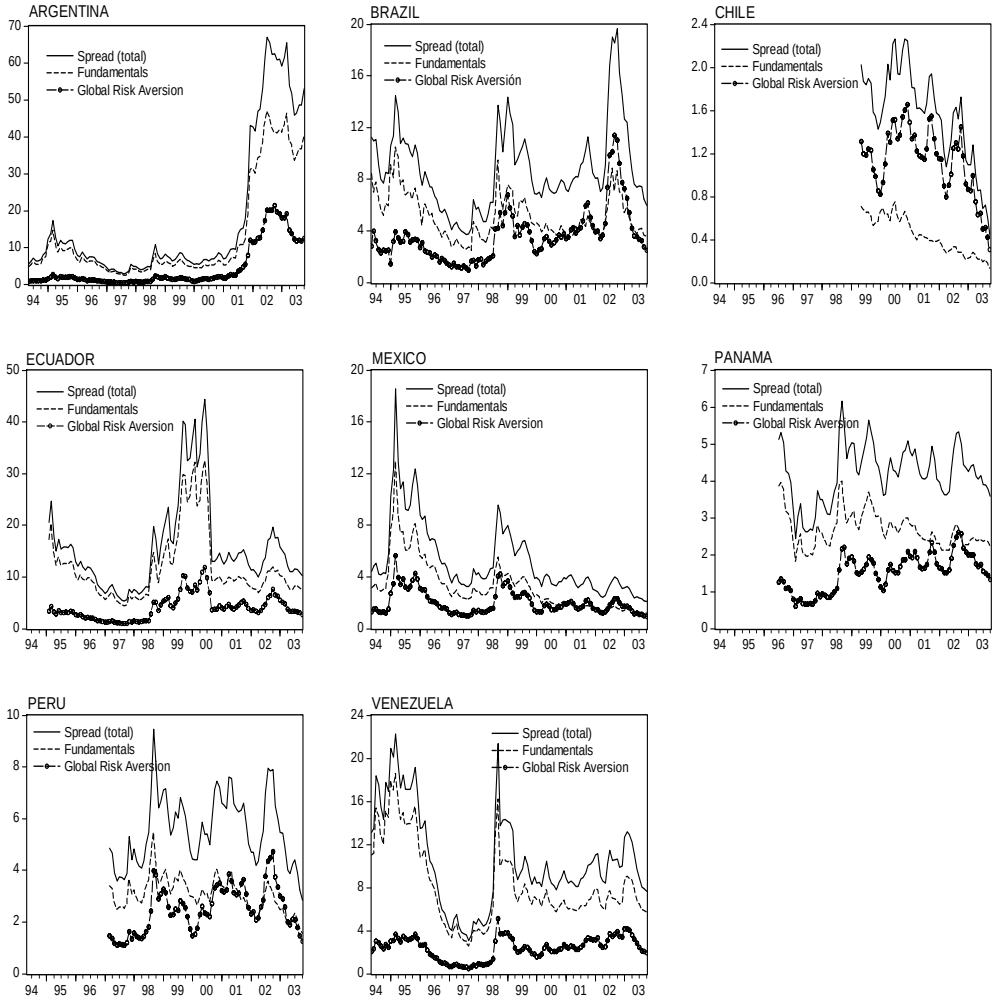
The larger importance of GRA over time might be explained by the increasing integration of Latin American sovereign bonds in investors' portfolios. As Wooldridge, Domanski and Cobau (2003) argue, the range of investors purchasing emerging market securities has broadened. While in the early-mid 1990s, mostly specialized investors, such as

6. It should be noted that we do test explicitly whether the estimated coefficient of GRA is time-varying.

hedge funds and mutual funds, purchased these securities, today investors who were traditionally limited to industrial countries also acquire this kind of paper. This includes pension funds, insurance companies and other institutional investors. This cannot but increase the interrelation between high yield corporate paper and emerging countries' sovereign bonds.

Finally, the set of graphs below show a relatively smaller contribution of GRA to explaining sovereign spreads during difficult periods. This is in line with the previously mentioned intuition by Favero and Giavazzi (2003). Difficult periods can be found for several countries, such as the Venezuelan banking crisis of 1994-1995, the Mexican crisis of end 1994-1995, the Ecuadorian crisis of 1999-2000 and the Argentine crisis of 2001-2002. It is also the case of Brazil's turbulences in 1999 and 2002, but to a lesser extent.

Set of graphs
Decomposition of sovereign spreads (%)



6.3 The Enron scandal

The Enron scandal has received enormous attention, not only because of its consequences on corporate governance, but also on emerging countries' sovereign bonds. In fact, the US corporate high yield rose sharply after ENRON defaulted in May 2002 and sovereign bonds in emerging countries followed exactly the same pattern.

We use Blanchard's decomposition again (dividing sovereign spreads in the part due to GRA and the idiosyncratic one) to assess what may have been the impact of Enron's scandal on Latin American countries' sovereign spreads. We shorten the sample to the period of interest and divide it in two different trends: (i) the upturn, from Enron's default until its effect started to fade away (i.e. from May 2002 to September 2002); and (ii) the downturn, from then until our last observation (i.e. from October 2002 to October 2003).

As for the previous results, the influence of GRA during the Enron scandal was highest in the case of Chile in relative terms (96% of total increase). In fact, the part of the sovereign spread explained by GRA increased by 84 basis points (bp) during the upturn while the idiosyncratic part rose by only 3 bp (Table 4[7]). A similar result is found during the downturn In general, the relevance of GRA during this Enron-period appears to be larger than for the full sample, based on the variance decomposition. These results support the idea that the role of GRA in explaining sovereign spreads varies over time. In particular, it seems to increase when a large shake in risk aversion occurs.

Table 4

Impact of GRA after Enron's default						
Enron Case: Impact on Sovereign Spreads (*in basis points)*						
Spread:Total	**Brazil**	**Chile**	**Colombia**	**Mexico**	**Peru**	**Venezuela**
Upturn	1478	88	490	186	377	236
Downturn	-1679	-124	-608	-235	-546	-422
Spread: idosyncratic part						
Upturn	614	3	175	58	124	91
Downturn	-699	-7	-219	-75	-199	-200
Spread: due to GRA						
Upturn	864	84	315	128	253	141
Downturn	-980	-117	-389	-160	-347	-222
% due to GRA						
Upturn	58,5	95,5	64,3	68,8	67,1	59,7
Downturn	58,4	94,4	64,0	68,1	63,6	52,6

Upturn of US high yield: (may 2002-September 2002)

Downturn of Us high yield: (October 2002-October 2003)

7. Argentina is disregarded in this analysis since it was in default during the full period.

6.4 Robustness tests

Until now, we have used the yield of relatively low risk corporate paper to proxy GRA, namely investment grade (Baa). Although there are reasons to think that this is the best available proxy (being less influenced by credit risk than junk paper), it is also true that Latin American countries have very different ratings. This could imply that those countries with a lower rating, i.e., perceived as more risky, could be more affected by movements in the prices of assets of the same risk (namely junk bonds). We test this hypothesis by using the junk bond yield as potential determinant of sovereign spreads for all countries analyzed. We comparing the estimated elasticities with those found for the Baa bond yield. The junk bond yield appears to have a much poorer explanatory power even in the case of the riskier countries (Table 5).

Table 5

Estimated elasticities of two different measures of GRA		
Countries	BBA US bond yield	Junk bond yield
Argentina	0.11	0.03
Brazil	0.24	0.07
Chile*	0.45	0.15
Mexico*	0.24	0.06
Venezuela	0.12	0.02
Panama	0.19	0.04
Ecuador	0.13	0.04
Peru	0.24	0.06
Colombia	0.22	0.04

* indicates investment grade countries

Another important question is the direction of causality between Latin American sovereign spreads and GRA. The case of the Russian crisis is a clear example of an opposite direction in the causality than the one we have analysed. In fact, a sharp increase in Russian bond spreads –due to idiosyncratic reasons– led to a sudden rise in the US high yield and, in general, in GRA. However, it seems hard to argue that emerging country developments, and for this particular case Latin American ones, generally determine investors' attitude towards risk in developed markets.

We explore this question empirically by conducting bi-variate Granger causality tests for the US high yield and Latin American sovereign spreads. Daily data is used to this end. The US high yield Granger causes the sovereign spread in a good number of countries although different exist depending on the number of lags taken (see Appendix 1, Table 5).

7 The impact of US growth and US interest rates on sovereign spreads

7.1 Endogenizing GRA

We now endogenize GRA, following Bernanke (1992) and Bernanke, Gertler and Girlchrist (1998). These authors stress the role of the "external finance premium" in the quantitative accelerator mechanism for the US economy. Later, Gertler Lown (2000) use the corporate bond yield spread as a proxy for this premium From the financing side, the external finance premium can be approximated to investors' attitude towards risk, namely GRA. However, it still lacks the idiosyncratic part of GRA, not explained by fundamentals. To take this into account, we add an stochastic term to the external finance premium. GRA, thus, is determined as follows:

$$\theta^* = -\Psi[n_t - (q_t + k_t)] + u^\theta \tag{4}$$

GRA is inversely proportional to the balance sheet strength of companies net wealth (n) minus the gross value of capital ($q + k$), plus a stochastic term which captures the pure risk aversion component u^θ. We consider the net wealth of companies to be a linear function of the aggregate real level of activity, as shown below:

$$n_t = b_1 y_t \tag{5}$$

We also assume the gross value of capital to be positively related to the aggregate level of activity and negatively to the risk-free interest rate.

$$q_t + k_t = b_2 y_t - b_3 i_t^* \tag{6}$$

We substitute equations (5) and (6) in (4) to obtain:

$$\theta^* = -\Psi(b_1 - b_2) y_t - \Psi b_3 i_t^* + u_t^\theta \tag{7}$$

The sign of the relation between GRA, US economic growth and the risk-free interest rate will, thus, depend on the elasticity of GRA to the net wealth of enterprises minus the value of their capital (ψ). It will also depend on how relevant is US growth for the net wealth of enterprises as compared to its importance for the value of their capital $(b_1 - b_2)$. Finally, it will also hinge on how much the risk free rate affects the value of capital (b_3).

On the basis of this theoretical framework, we expect the parameter of US growth ($-\Psi[(b_1 - b_2)]$) to be negative. The existing empirical literature confirms the negative relation between the US high yield and economic growth [Mody and Taylor (2003), and Huanh and Kong (2003)]. In the same way, the sign of the parameter for the risk free rate ($-\Psi b_3$), proxied by the US government bond yield, has been found negative in several studies [Duffe (1996), and Huanh and Kong (2003)][8].

7.2 Empirical strategy

We introduce US economic activity and the risk free rate, together with GRA and the sovereign spread in a more complete SVAR model (a four variable model). This will allow us to disentangle the direct and indirect influence of US economic growth and US interest rates

8. Morris, Neals and Rolph (1998) confirm this negative relation in the short run but the effect is reversed in the long run.

on Latin American spreads. To estimate the SVAR model we consider a general structure, where e_t is the vector of innovations and u_t is the vector of structural orthogonal shocks. Again, we restrict the A matrix to be lower triangular and B to be a diagonal matrix, so that the system is just identified. This yields the following structure:

$$
\begin{aligned}
e_t^y &= c_1 u_t^y \\
e_t^i &= c_2 e_t^y + c_3 u_t^i \\
e_t^\theta &= c_4 e_t^y + c_5 e_t^i + c_6 u_t^\theta \\
e_t^s &= c_7 e_t^y + c_8 e_t^i + c_9 e_t^\theta + c_{10} u_t^s
\end{aligned}
\tag{8}
$$

In the first equation US economic growth is exogenously determined. The second equation models the reaction function of US monetary policy, which is dependent on domestic economic growth[9]. The third equation models the behaviour of GRA, on the basis of equation 7. GRA is, thus, a function of US growth (c_4), the risk free rate (c_5), and the pure component of risk aversion (c_6). In the fourth equation we assume that US growth, the US risk free rate, and GRA affect the spread (through c_7, c_8 and c_9, respectively). In sum, US growth and the risk free rate influence both GRA –and through GRA the sovereign spread (though c_4 and c_5,, respectively)– and the sovereign spread directly (through c_7 y c_8).

7.3 Results

We first show the results for the case in which the US risk free rate is proxied by a long-term interest rate, namely the 10-year US government bond yield (Table 6). The direct impact of US economic growth (c_7) is negative, as expected, for all countries in the sample and significant except for Argentina. The indirect effect, through GRA, (c_4) is also negative but not significant for some of the countries.

As for the US government bond yield, the indirect impact (c_5) is always negative and significant for all countries except Ecuador. The direct impact (c_8) is also negative and significant in three countries (Chile, Mexico and Colombia). It should be noted that this direct negative impact is generally a short-term effect, which reverts a few months later, as can be seen in the impulse response functions in Appendix 2.

Table 6

SVAR of US growth[1/], US government bond yield[2/], GRA and Latin American sovereign spreads

	Argentina	Brazil	Chile	Mexico	Peru	Venezuela	Panama	Colombia	Ecuador
C_2	0.074**	0.059**	0.101**	0.078**	0.080**	0.072**	0.068**	0.102**	0.076**
C_4	-0.007	-0.009	0.001	-0.005	-0.004	-0.003	-0.006	-0.012	-0.008
C_5	-0.287**	-0.283**	-0.416**	-0.296**	-0.375**	-0.283**	-0.353**	-0.362**	-0.318**
C_7	-0.006	-0.025**	-0.018*	-0.19**	-0.017**	-0.013**	-0.012*	-0.011**	-0.012**
C_8	-0.026	-0.015	-0.146**	-0.087**	-0.040	-0.010	-0.050	-0.047*	-0.011
C_9	0.099	0.197**	0.224**	0.138**	0.189**	0.096*	0.143**	0.129**	0.127**
C_1	0.875**	0.867**	1.043**	0.844**	0.915**	0.842**	0.883**	1.026**	0.906**
C_3	0.206**	0.201**	0.192**	0.207**	0.212**	0.208**	0.203**	0.203**	0.204**
C_6	0.094**	0.095**	0.107**	0.094**	0.106**	0.093**	0.101**	0.107**	0.096**
C_{10}	0.062**	0.068**	0.070**	0.063**	0.054**	0.052**	0.052**	0.034**	0.045**
Log likelihood	130.149	122.729	41.193	132.972	85.757	152.892	109.297	75.472	148.041

* Significant at 10% level
** Significant at 5% level
1/ Proxied by OECD leading indicator
2/ 10 year government bond interest rate

9. For simplicity, we do not include inflation.

In sum, GRA, US economic growth and US long term rates are clearly important external factors determining Latin American spreads. GRA and US economic growth have the expected sign (positive and negative respectively). The generally negative relation found between US long term rates and Latin American spreads is in line with Eichengreen and Mody (1998)'s results and in contrast with those of Fernandez Arias (1995).

To explore the impact of the risk free rate further, we include US short term interest rates (namely the Federal Fund rate) instead of long term ones. This allows us to focus on how the US monetary policy may affect sovereign spreads. The results are very different in this case (Table 7) since both the direct and the indirect effect (through GRA) are positive and significant in a number of countries (Venezuela and Colombia for the direct effect and Brazil, Mexico, Peru, Panama and Ecuador for the indirect one). Such harmful effect of a tight monetary policy in the US on Latin American sovereign spreads is in line with Arora and Cerisola (2001).

Table 7

SVAR of US growth [1/], US short term interest rate [2/], GRA and Latin American sovereign spreads

	Argentina	Brazil	Chile	Mexico	Peru	Venezuela	Panama	Colombia	Ecuador
C_2	-0.029**	-0.035**	-0.051**	-0.028**	-0.020	-0.029**	-0.026*	-0.028*	-0.033**
C_4	-0.023*	-0.020	-0.075**	-0.024**	-0.036**	-0.025**	-0.034**	-0.060**	-0.034**
C_5	0.148	0.179*	0.174	0.168*	0.296**	0.140	0.286**	0.160	0.230**
C_7	-0.010	-0.020**	-0.022*	-0.023**	-0.012*	-0.007	0.008	-0.006	-0.008
C_8	0.077	0.007	0.050	-0.003	-0.018	0.080*	0.073	0.139**	0.066
C_9	0.104**	0.228**	0.320**	0.190**	0.238**	0.094*	0.151**	0.196**	0.114**
C_1	0.904**	0.878**	0.922**	0.840**	0.948**	0.874**	0.910**	1.098**	0.900**
C_3	0.115**	0.115**	0.143**	0.114**	0.119**	0.113**	0.113**	0.118**	0.101**
C_6	0.111**	0.110**	0.124**	0.110**	0.125**	0.109**	0.117**	0.116**	0.112**
C_{10}	0.060**	0.070**	0.059**	0.066**	0.055**	0.054**	0.059**	0.032**	0.048**
Log likelihood	167.380	156.154	56.716	168.146	105.160	185.013	124.080	88.575	187.621

* Significant at 10% level
** Significant at 5% level
1/ Proxied by OECD leading indicator
2/ Federal Funds rate

Finally, we conduct several robustness for different proxies of GRA, US economic growth and long-term interest rates.

Checking for the robustness of our results is particularly warranted in the case of GRA, not only because it is the main variable of interest for us, but also because there could be another reason, other than investors' appetite, for Latin American sovereign spreads to move close to the US corporate high yield. This is the growing integration of Latin American sovereign bonds and US corporate bonds in global portfolios [Woldridge, Domanski and Cobau (2003)]. This might make their yields move closer independently on GRA. To test whether such global integration is the reason for our result, rather than GRA, we use a different proxy for GRA, namely an index of volatility of the SP500 (namely the VIX constructed by J. P. Morgan). The results are similar to those obtained with the US corporate high yield, both when including the US long-term rate and the short term one[10].

We also take another leading indicator of US economic growth, namely the Conference Board confidence index, and the results hardly change both when including Us long term and short term rates. Finally, we use the US government bond swap instead of

10. These results, as well as the other two robustness tests are available at the authors request.

the US long term rate to make sure that changes in the supply of US government bonds is not affecting the results.

8 Conclusions

With the help of the theoretical benchmark proposed by Blanchard (2004), we explore empirically the role of GRA in explaining sovereign spreads for a number of Latin American countries. GRA, proxied by the US corporate high yield, is significant and positively related to Latin American sovereign spreads.

We also find that the impact of GRA on sovereign spreads varies across countries and over time. Chile, perceived to have a lower sovereign risk, is more affected by GRA while the opposite is true for Argentina, Ecuador and Venezuela. This result is robust to different estimation techniques. In addition, GRA has a higher explanatory power since the Enron scandal than in the full sample.

Finally, we endogeneize GRA and analyze how its main determinants, US economic growth and US long term interest rates affect Latin American sovereign spreads. Since these two factors are known to impact on Latin American sovereign spreads directly –and not only as determinants of GRA– we use an SVAR to disentangle the two channels of influence. Both channels point to US economic growth contributing to the reduction in Latin American sovereign spreads. The same is true for an increase in US long term interest rates although, in this case, the direct channel is more ambiguous. In any event, the reduction of spreads due to an increase in US long term rates appears to revert in the medium term.

It turn, an increase in US short term interest rates has the opposite effect: an immediate rise in sovereign spreads. Such difference may be explained by the fact that US long term rates are understood as a leading indicator of growth rather than of inflationary pressures, the latter leading to an increase in short-term interest rates.

These results seem particularly important in the current juncture, where Latin American spreads reverted their downward trend after having reached historically low levels. At the same time the US corporate BAA Spread remains at low levels not withstanding the sudden increase in US government bond yields last year, following expectations of a stricter monetary policy by the FED.

There are concerns among Latin American policy makers about an increase in US interest rates as the economy grows at or above potential and inflation expectations come back to the forefront. Our results point to the idea that a rise in the US long-term government yield might not constitute a large problem for Latin American sovereign spreads as long as the leading indicators of US growth remain strong, and GRA and US short-term rates remain low. The latter, however, is unlikely in the present circumstances.

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Appendix 1: Main statistics

Table 1
Main statistics of regressors

	Us growth leading indicator (OECD)	Us confidence indicator (Conference Board)	US 10y bond yield	US Federal Funds rate	BAA Spread	Junk bond Spread
Mean	3.96	1.41	5.71	4.50	2.18	5.16
Median	4.86	1.93	5.80	5.25	2.12	4.94
Maximum	12.96	3.63	7.96	6.50	3.79	10.18
Minimum	-6.56	-2.00	3.33	1.00	1.29	2.37
Std. Dev.	4.49	1.60	1.03	1.70	0.65	2.01
Observations	114	114	114	114	114	114

Table 2
Main statistics of dependent variables *

	Arg	Bra	Chi	Col	Ecu	Mex	Pan	Per	Ven
Mean	17.21	8.79	1.56	6.07	15.75	5.23	4.2	5.55	10.51
Median	7.69	8.11	1.61	5.93	13.52	4.1	4.25	5.45	9.6
Maximum	67	19.66	2.27	9.21	44.32	18.55	6.15	9.46	22.26
Minimum	2.89	3.75	0.45	3.8	5.34	2.09	2.43	2.84	3.07
Std. Dev.	19.39	3.25	0.44	1.26	8.81	2.81	0.78	1.34	4.47
Observations	114	114	54	54	114	114	88	80	114
Sample	5/94-10/04	5/94-10/04	5/99-10/04	5/99-10/04	5/94 -10/04	5/94-10/04	07/96-10/04	03/97-10/04	05/94-10/04

Table 3
Correlation Matrix

	US confidence indicator	US lead OECD	US 10Yr Rate	US Fed Funds R.	GRA BAA	GRA Junk	Latin	Arg	Bra	Chl	Col	Ecu	Mex	Pan	Per	Ven
US lead ind CB	1.00	0.89	0.24	-0.16	-0.37	-0.52	0.00	0.17	0.11	-0.25	-0.16	0.34	0.23	-0.08	-0.37	-0.03
US lead OECD	0.89	1.00	0.13	-0.32	-0.40	-0.69	-0.18	0.22	-0.14	-0.50	-0.49	0.13	-0.02	-0.38	-0.62	-0.10
US 10Yr Rate	0.24	0.13	1.00	0.84	-0.78	-0.35	-0.45	-0.81	-0.45	0.61	0.12	0.69	0.50	0.06	0.07	-0.49
US Fed Fund R.	-0.16	-0.32	0.84	1.00	-0.63	-0.12	-0.46	-0.91	-0.41	0.79	0.37	0.61	0.54	0.30	0.32	-0.47
GRA BAA	-0.37	-0.40	-0.78	-0.63	1.00	0.79	0.72	0.69	0.67	-0.17	0.29	-0.59	-0.37	0.15	0.36	0.50
GRA Junk	-0.52	-0.69	-0.35	-0.12	0.79	1.00	0.65	0.26	0.60	0.35	0.61	-0.30	-0.13	0.37	0.67	0.33
Latin	0.00	-0.18	-0.45	-0.46	0.72	0.65	1.00	0.48	0.89	0.06	0.41	-0.20	0.17	0.48	0.53	0.56
Arg	0.17	0.22	-0.81	-0.91	0.69	0.26	0.48	1.00	0.56	-0.69	-0.11	-0.52	-0.55	-0.19	-0.21	0.56
Bra	0.11	-0.14	-0.45	-0.41	0.67	0.60	0.89	0.56	1.00	0.01	0.55	-0.10	0.16	0.52	0.55	0.53
Chl	-0.25	-0.50	0.61	0.79	-0.17	0.35	0.06	-0.69	0.01	1.00	0.67	0.41	0.60	0.54	0.64	-0.15
Col	-0.16	-0.49	0.12	0.37	0.29	0.61	0.41	-0.11	0.55	0.67	1.00	0.17	0.44	0.70	0.78	0.19
Ecu	0.34	0.13	0.69	0.61	-0.59	-0.30	-0.20	-0.52	-0.10	0.41	0.17	1.00	0.52	0.20	0.01	-0.12
Mex	0.23	-0.02	0.50	0.54	-0.37	-0.13	0.17	-0.55	0.16	0.60	0.44	0.52	1.00	0.73	0.48	0.02
Pan	-0.08	-0.38	0.06	0.30	0.15	0.37	0.48	-0.19	0.52	0.54	0.70	0.20	0.73	1.00	0.77	0.27
Per	-0.37	-0.62	0.07	0.32	0.36	0.67	0.53	-0.21	0.55	0.64	0.78	0.01	0.48	0.77	1.00	0.07
Ven	-0.03	-0.10	-0.49	-0.47	0.50	0.33	0.56	0.56	0.53	-0.15	0.19	-0.12	0.02	0.27	0.07	1.00

Table 4

Stationarity Test : Augmented Dickey-Fuller (ADF) test

Variable	Lags*	ADF test	Result**
GRA	1	-0.11	I(0)
Argentina	2	1.00	I(0)
Brazil	0	-0.49	I(0)
Chile	0	-0.94	I(0)
Colombia	2	-0.55	I(0)
Ecuador	1	-0.57	I(0)
México	1	-0.77	I(0)
Panama	2	-0.24	I(0)
Perú	2	-0.32	I(0)
Venezuela	1	-0.51	I(0)

Lags based on SIC criterion.

** Mckinnon critical value at 10% level is -1.61

Table 5

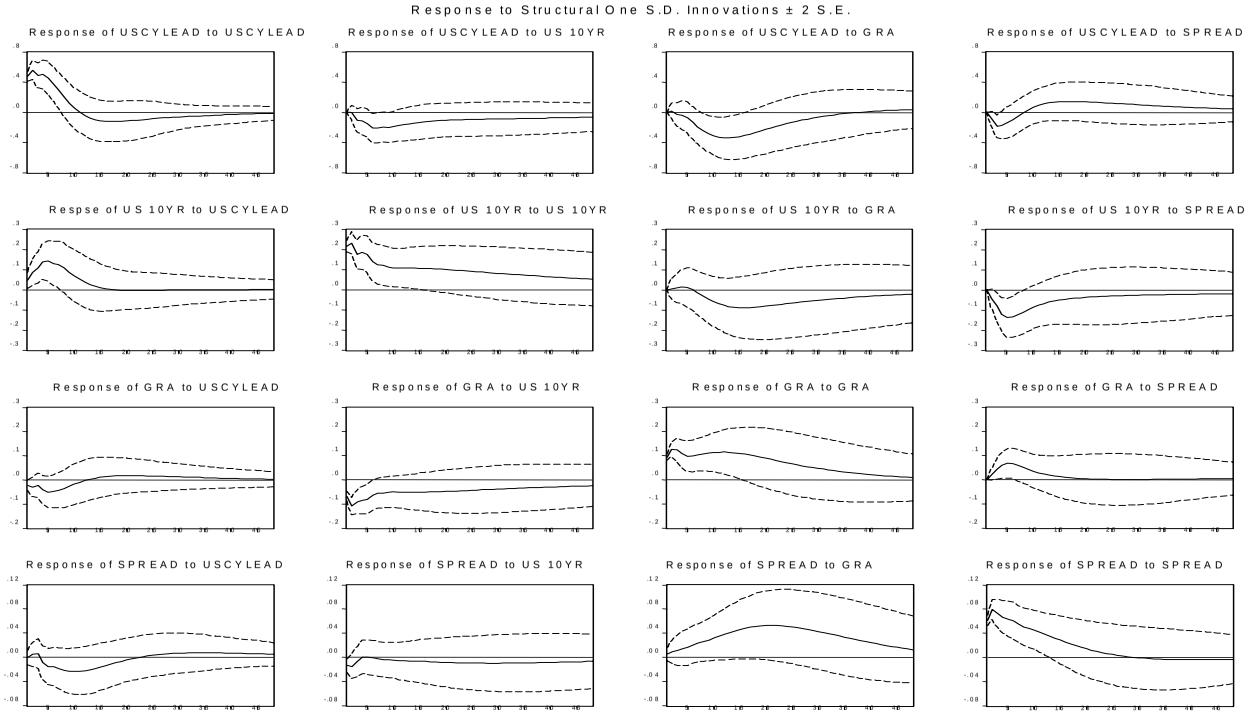
Granger Causality Tests: US BAA Spread and Country Risk

			5 lags (1 week)	30 lags (1 month)
Baa Spread	→	ARG EMBI+ Spread	Yes	Yes
ARG EMBI+ Spread	→	Baa Spread	No	Yes
Baa Spread	→	BRA EMBI+ Spread	Yes	Yes
BRA EMBI+ Spread	→	Baa Spread	Yes	Yes
Baa Spread	→	CHL EMBI Global Spread	Yes	Yes
CHL EMBI Global Spread	→	Baa Spread	No	No
Baa Spread	→	MEX EMBI+ Spread	Yes	Yes
MEX EMBI+ Spread	→	Baa Spread	No	No
Baa Spread	→	VEN EMBI+ Spread	Yes	No
VEN EMBI+ Spread	→	Baa Spread	Yes	Yes
Baa Spread	→	ECU EMBI+ Spread	No	No
ECU EMBI+ Spread	→	Baa Spread	No	Yes
Baa Spread	→	COL EMBIG Spread	No	No
COL EMBIG Spread	→	Baa Spread	Yes	Yes
Baa Spread	→	PAN EMBI+ Spread	No	Yes
PAN EMBI+ Spread	→	Baa Spread	No	No
Baa Spread	→	PER EMBI+ Spread	No	No
PER EMBI+ Spread	→	Baa Spread	No	No

Appendix 2

Table 1

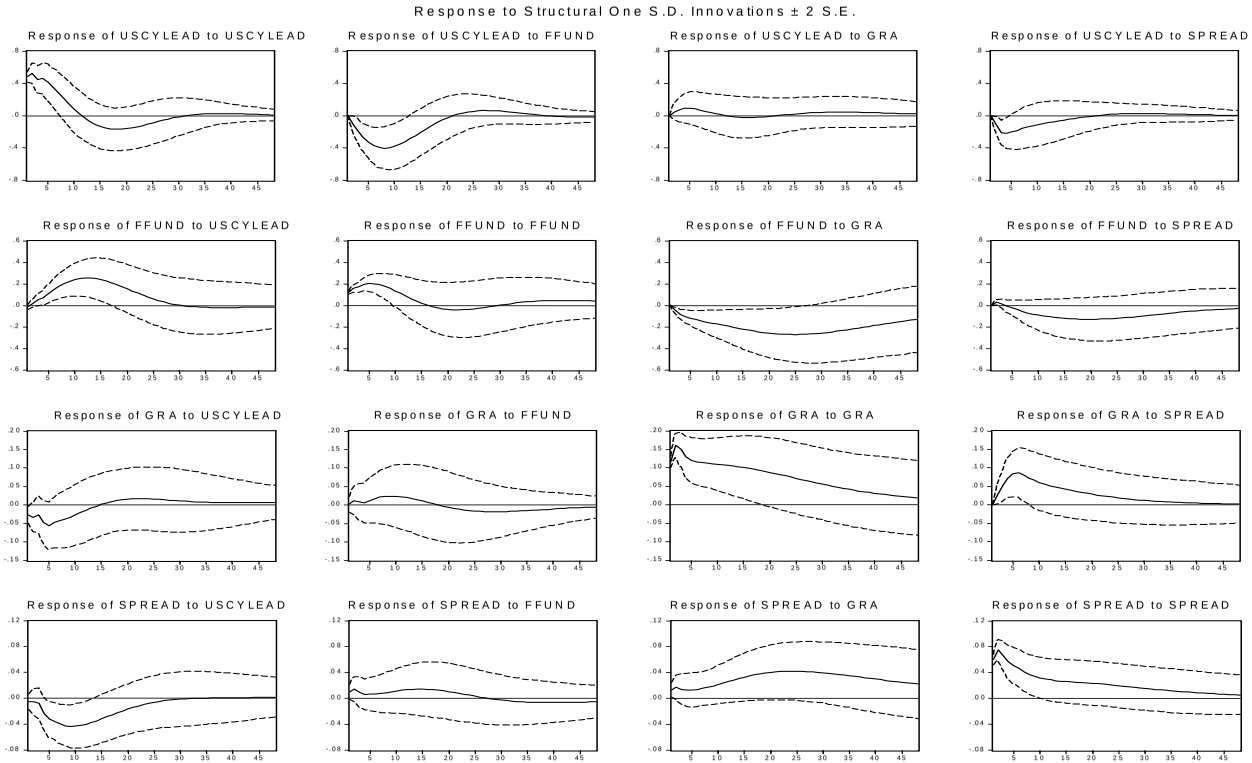
ARGENTINA: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Proxied by 10 year government bond interest rate (US10YR)

Table 2

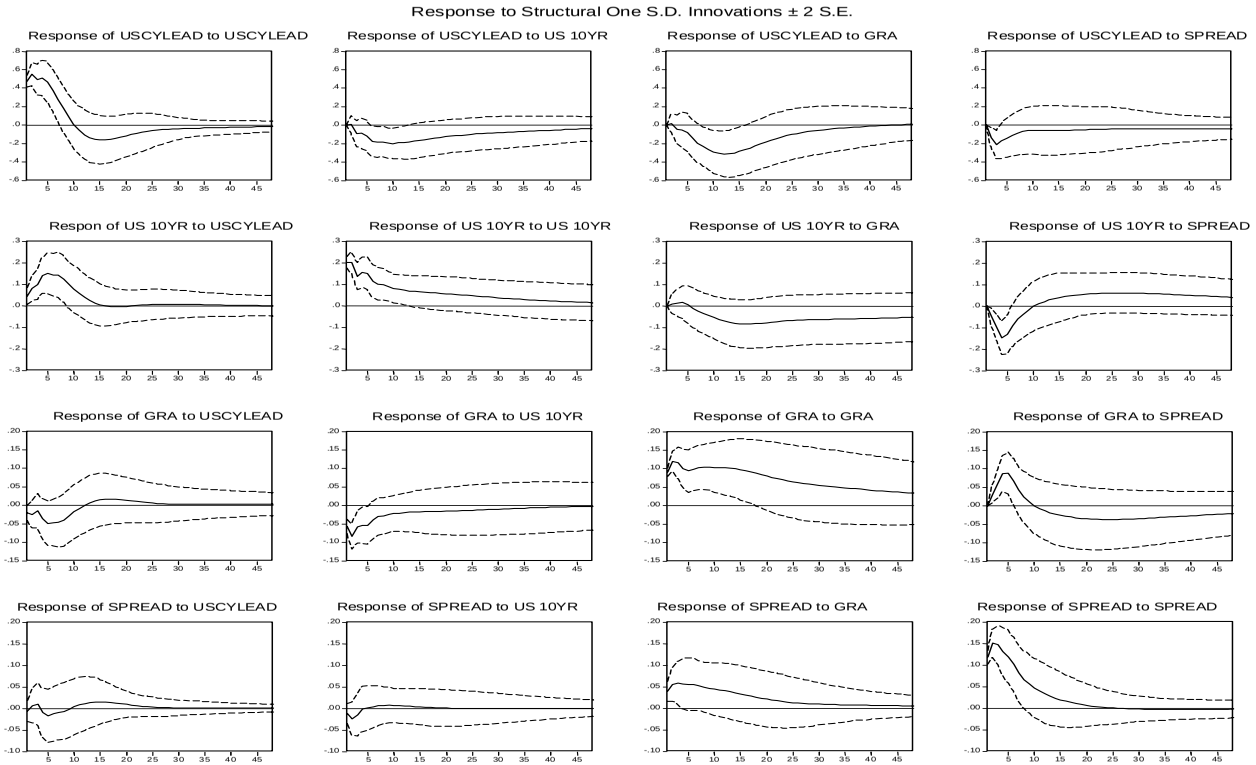
ARGENTINA: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD).
2/ Federal Fund Rate.

Table 3

BRAZIL: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread

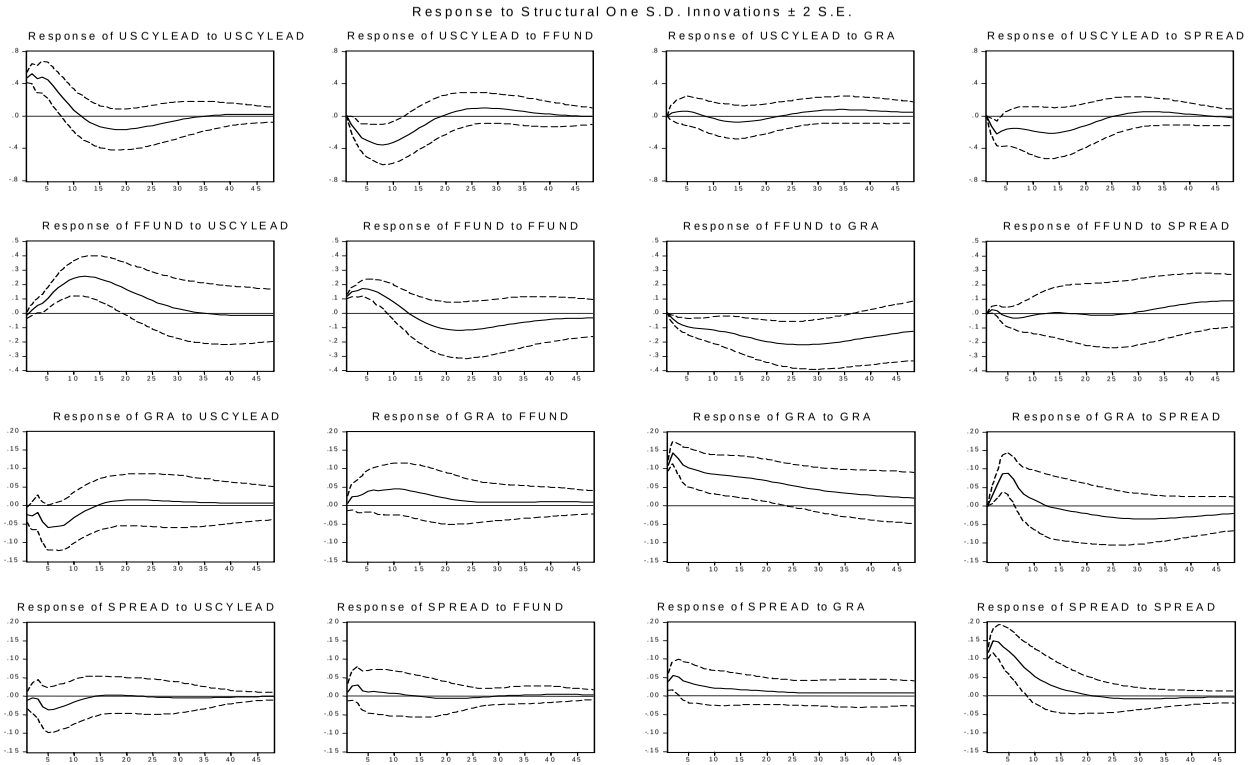


1/ US Conference Board confidence indicator (USCYLEAD).

2/ Proxied by 10 year government bond interest rate (US10YR).

Table 4

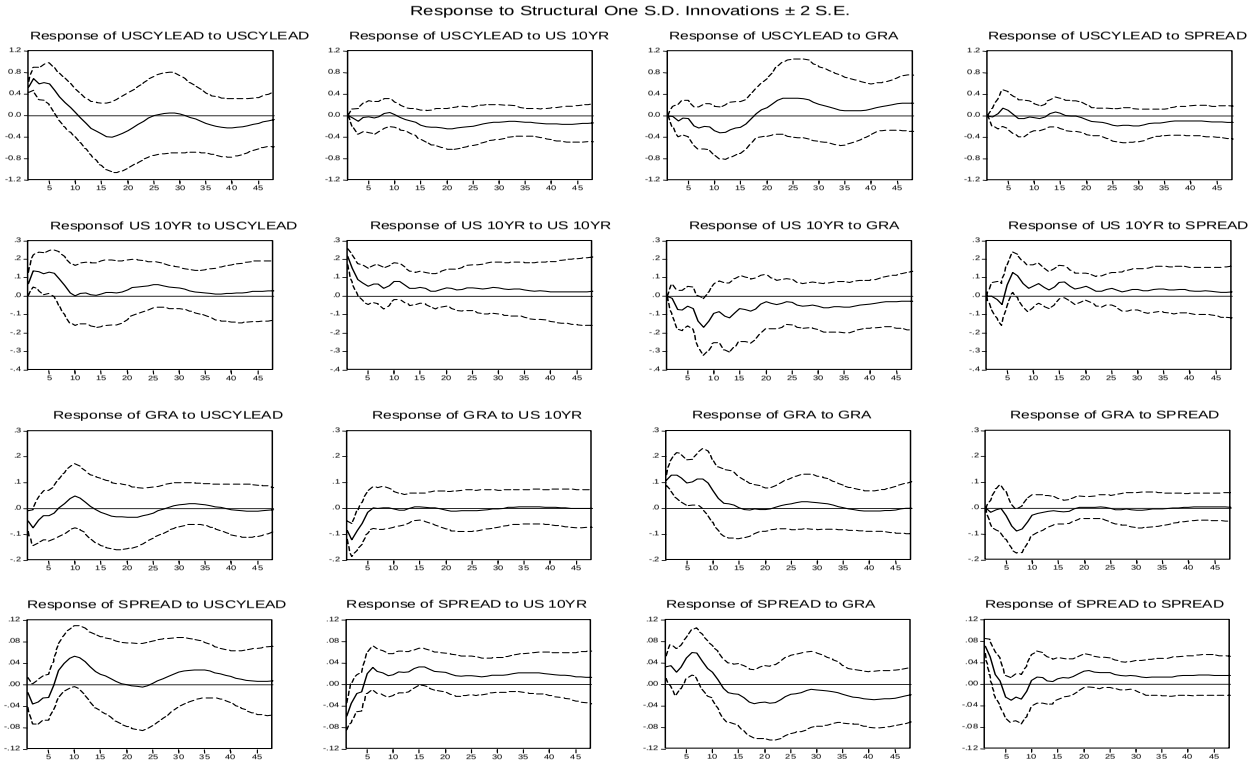
BRAZIL: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD).
2/ Federal Fund Rate.

Table 5

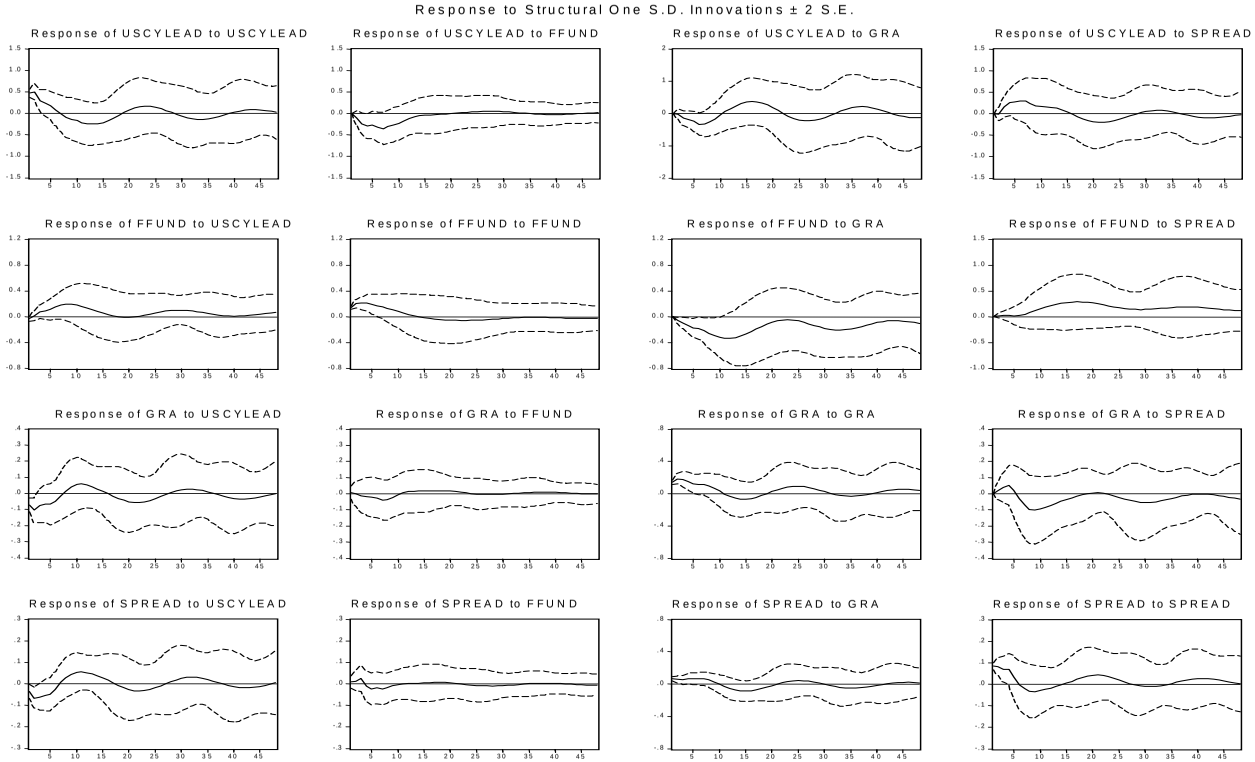
CHILE: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD).
2/ Proxied by 10 year government bond interest rate (US10YR).

Table 6

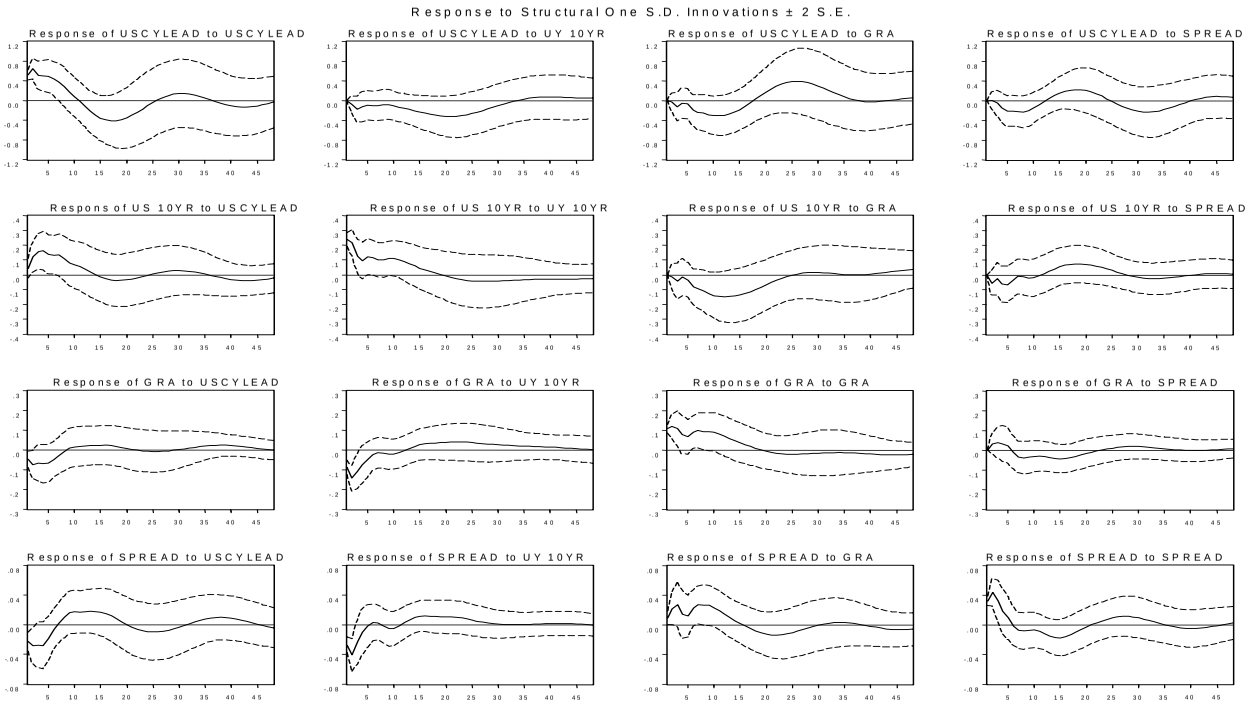
CHILE: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD).
2/ Federal Fund Rate.

Table 7

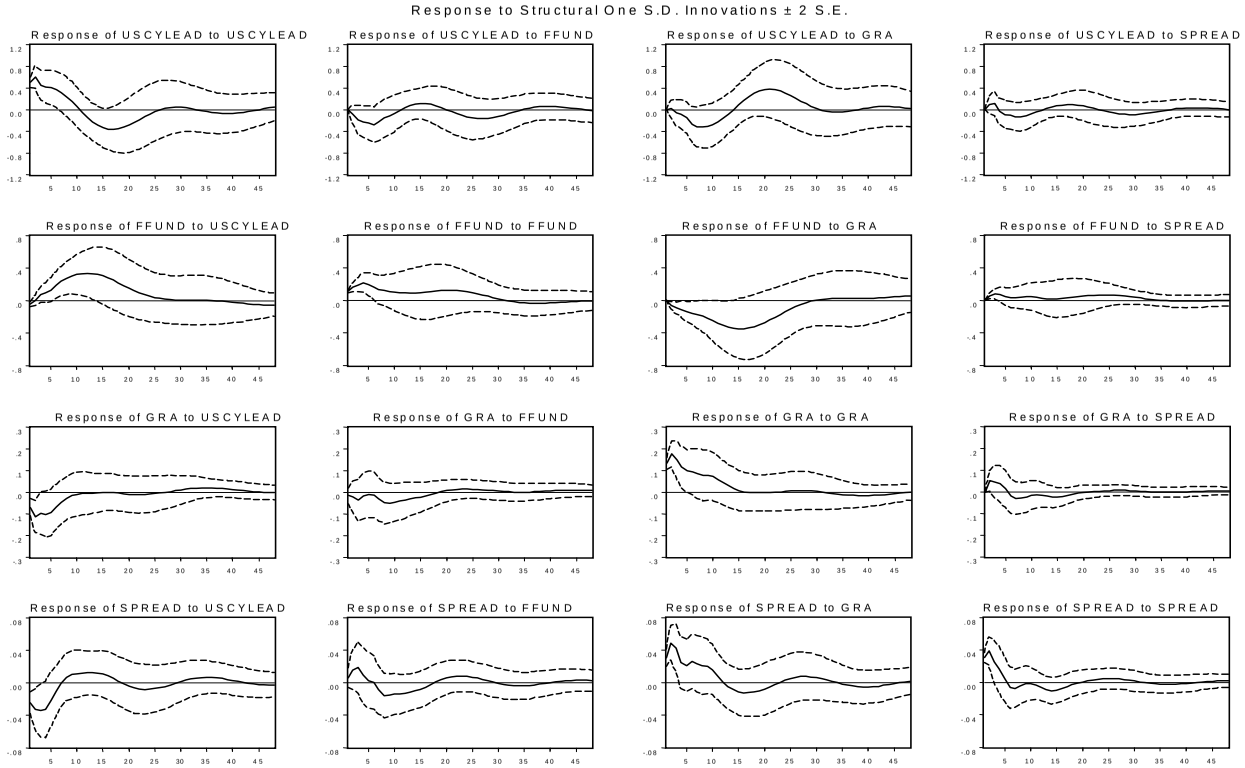
COLOMBIA: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD).
2/ Proxied by 10 year government bond interest rate (US10YR).

Table 8

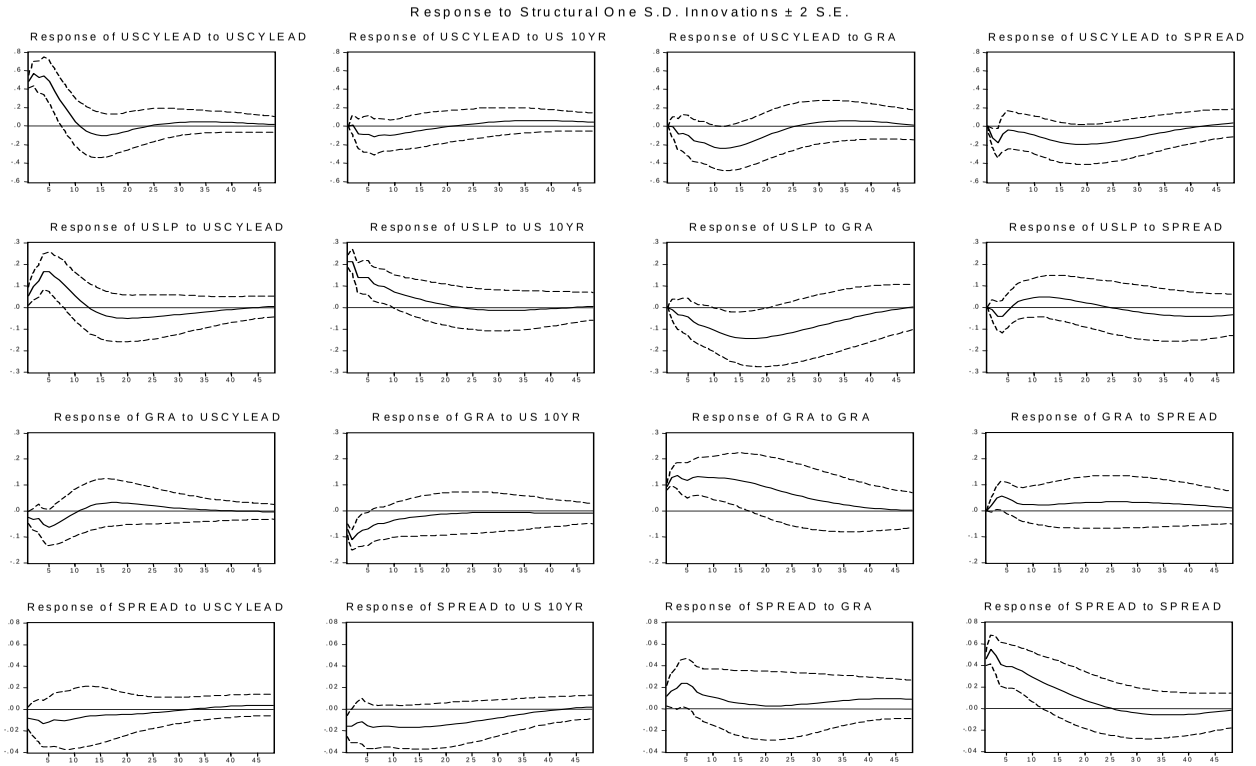
COLOMBIA: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Federal Fund Rate

Table 9

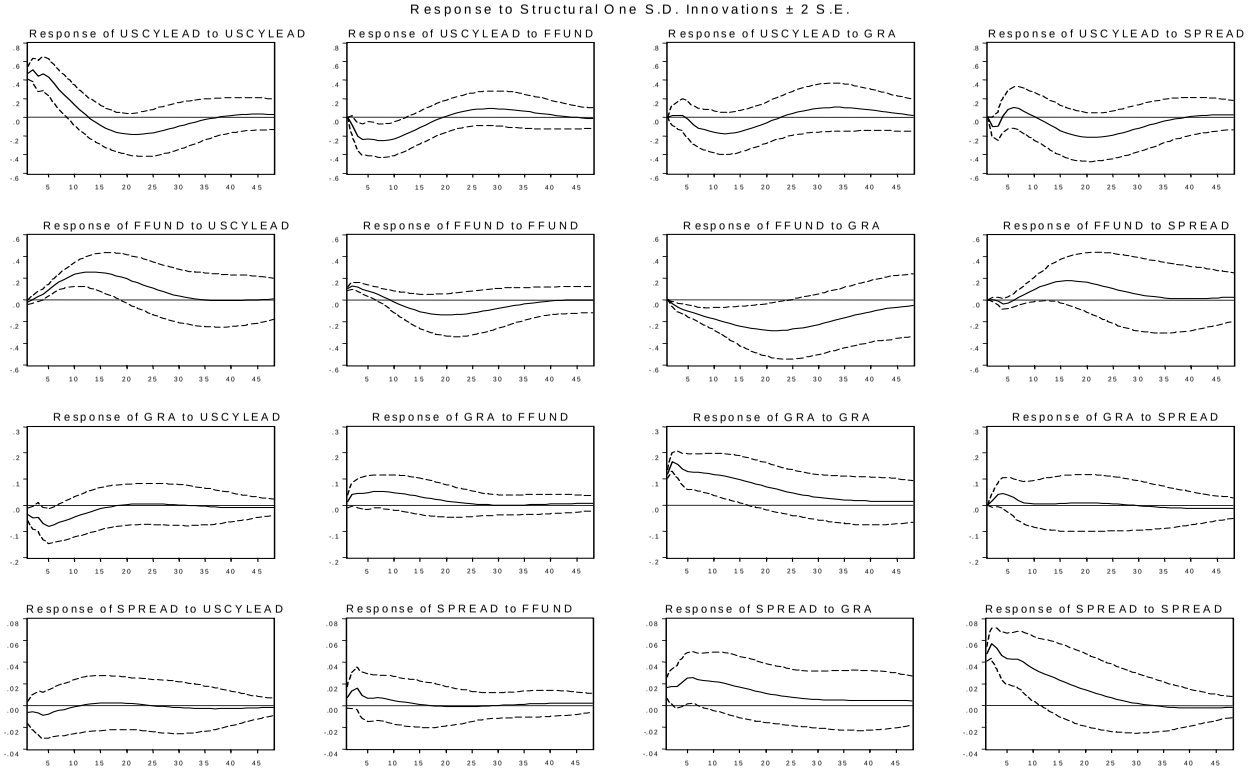
ECUADOR: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Proxied by 10 year government bond interest rate (US10YR)

Table 10

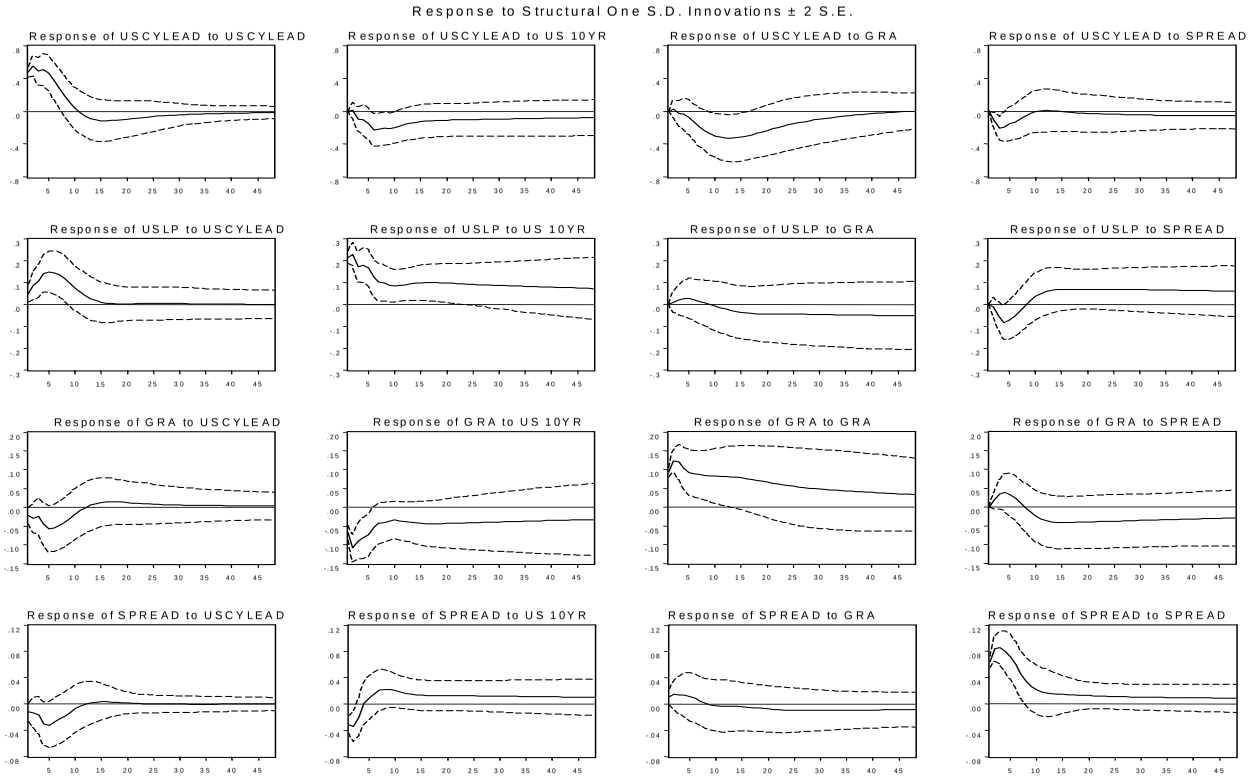
ECUADOR: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Federal Fund Rate

Table 11

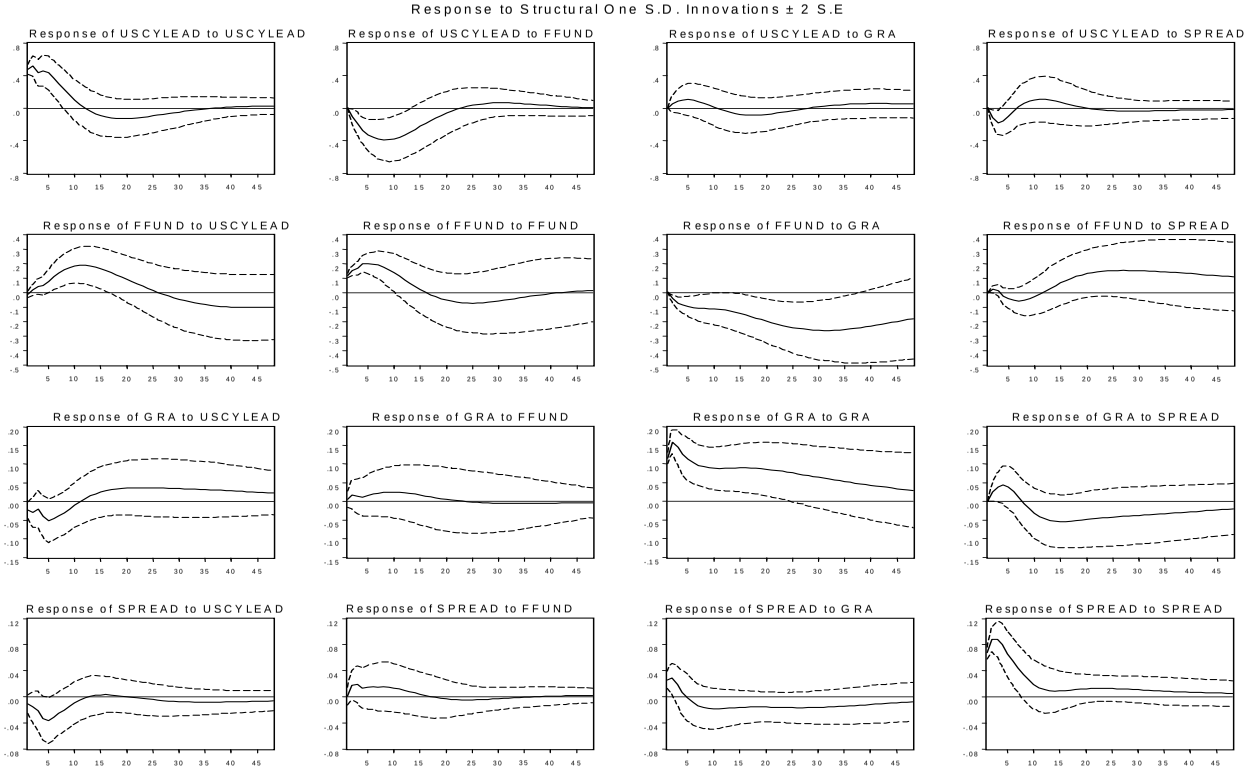
MEXICO: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Proxied by 10 year government bond interest rate (US10YR)

Table 12

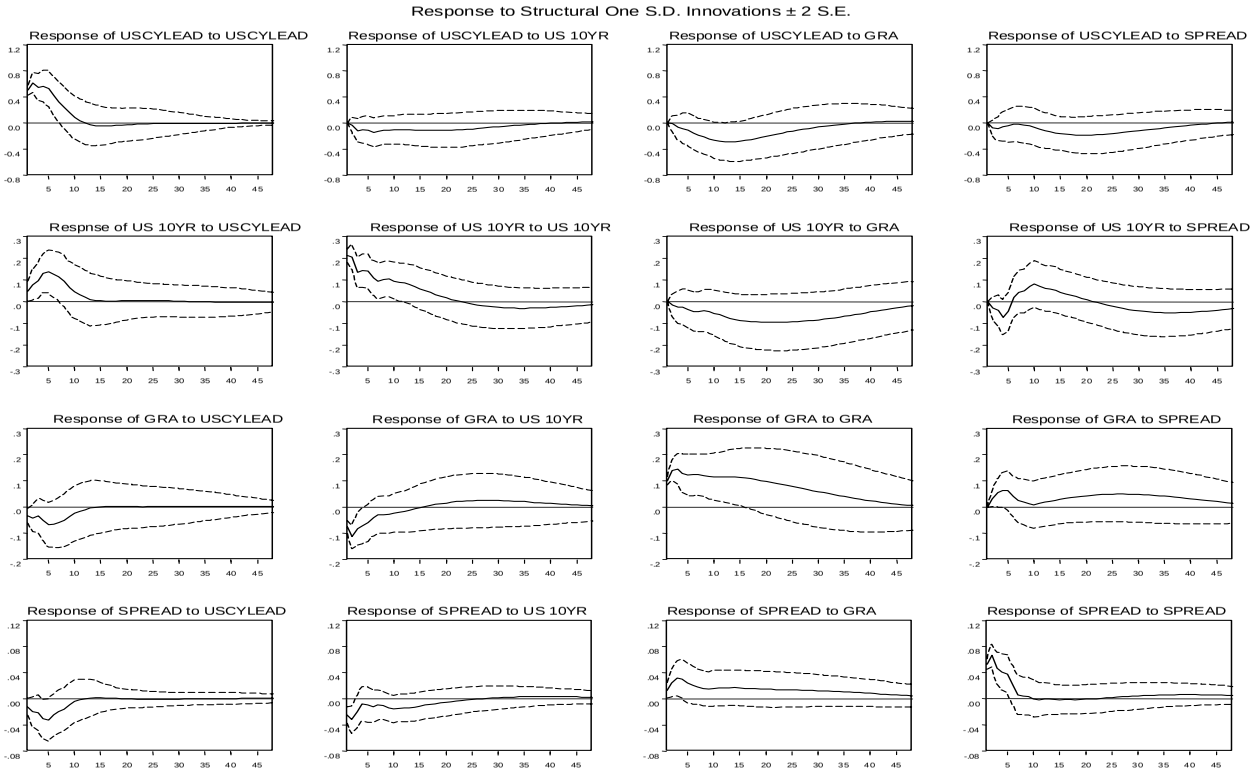
MEXICO: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Federal Fund Rate

Table 13

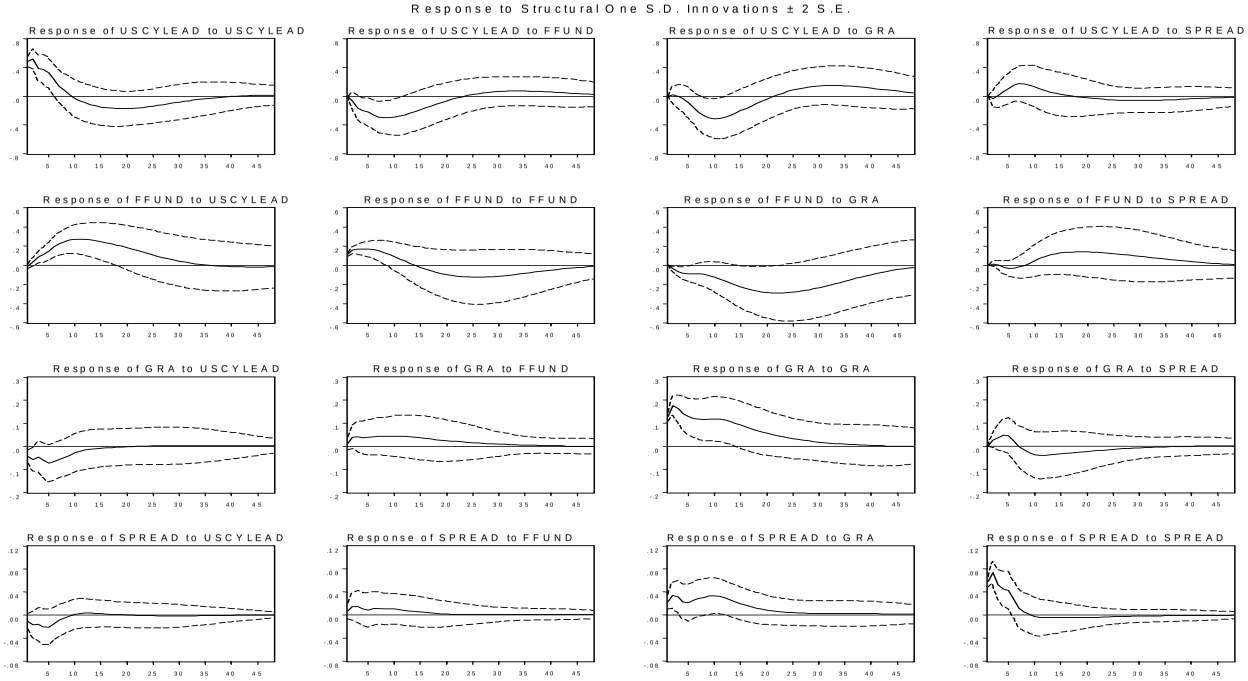
PANAMA: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Proxied by 10 year government bond interest rate (US10YR)

Table 14

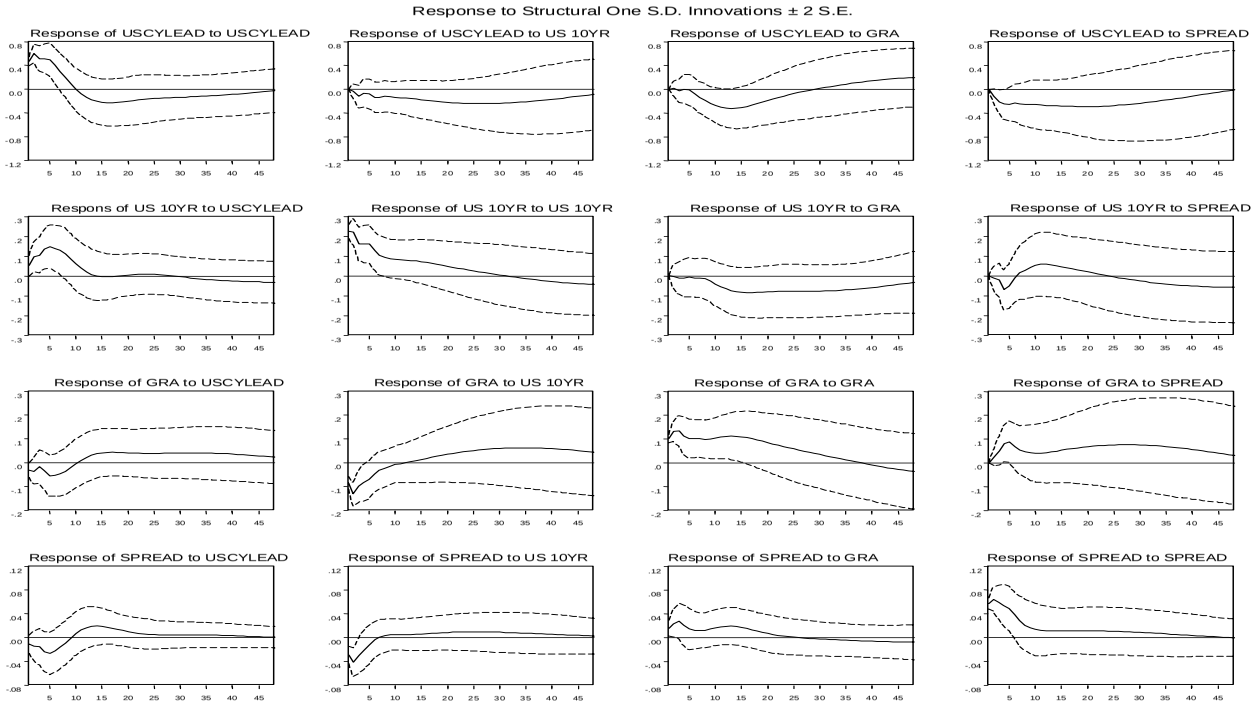
PANAMA: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Federal Fund Rate

Table 15

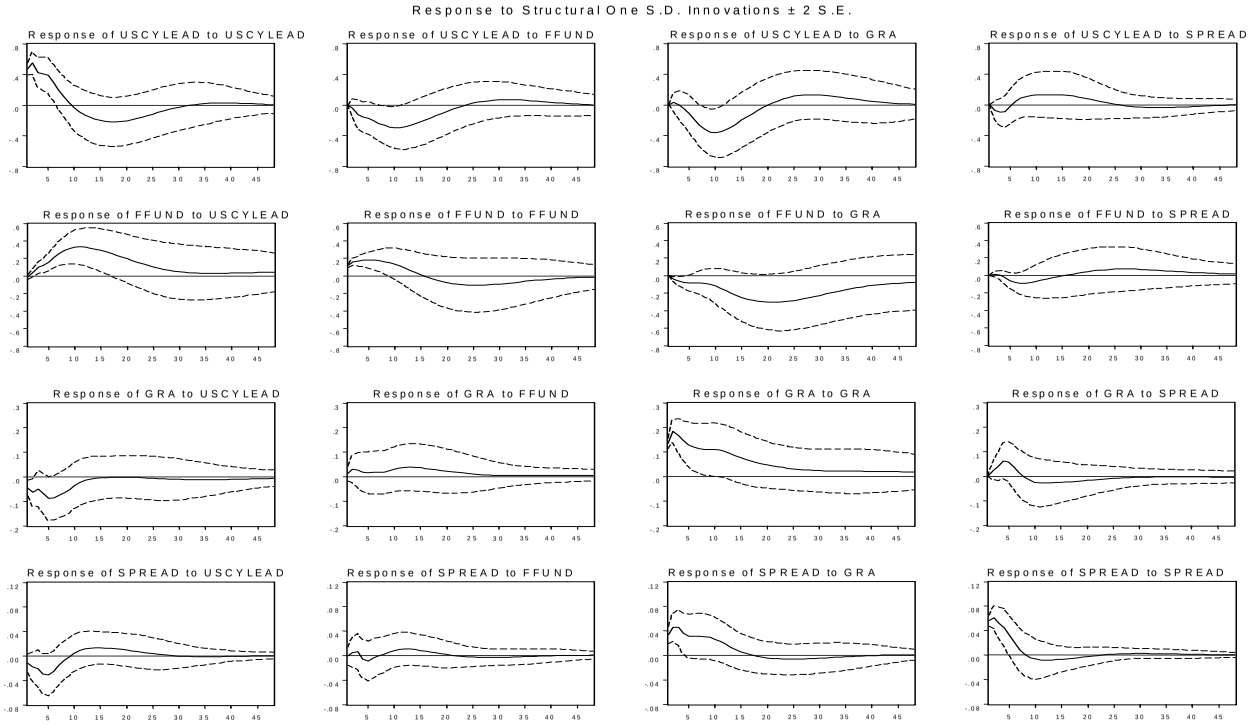
PERU: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Proxied by 10 year government bond interest rate (US10YR)

Table 16

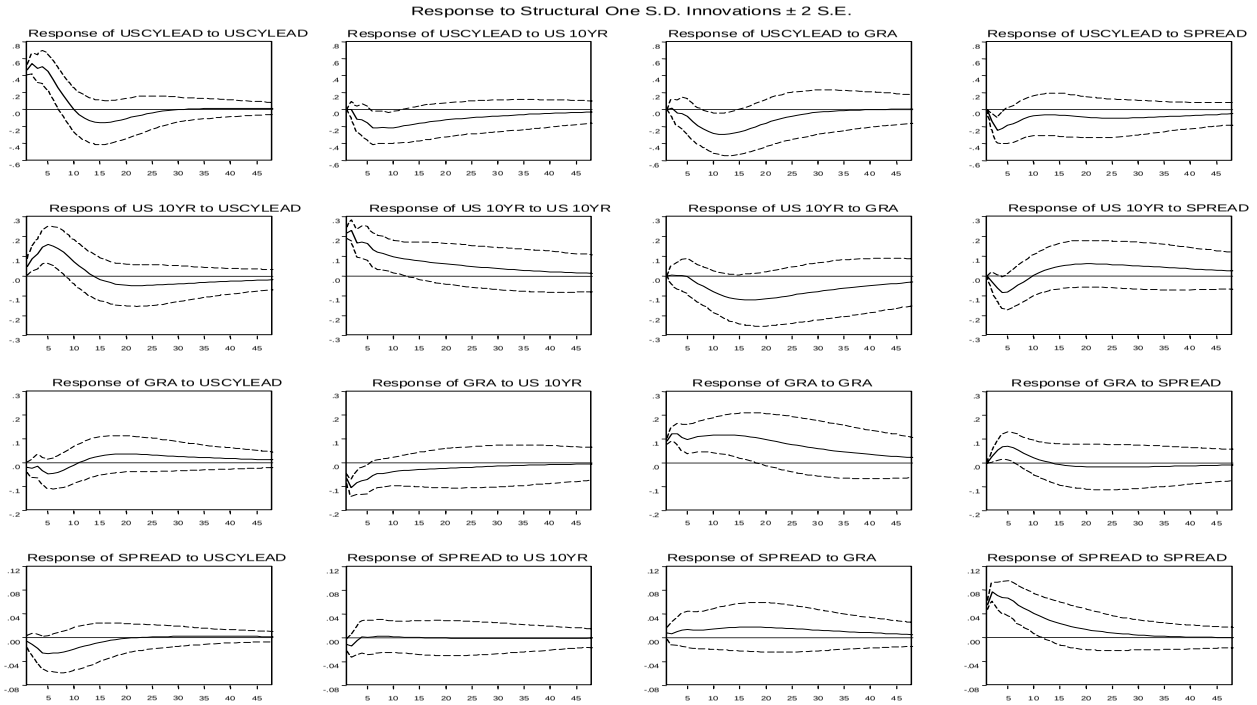
PERU: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Federal Fund Rate

Table 17

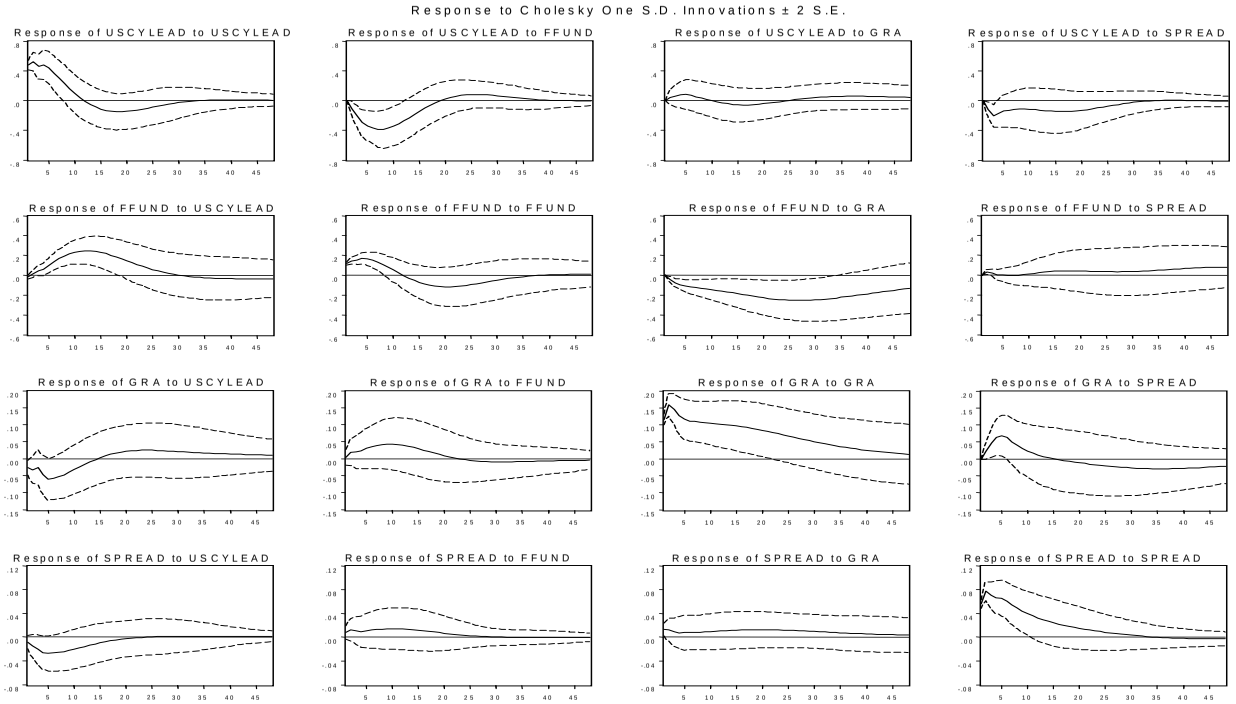
VENEZUELA: Impulse response functions US growth [1/], US government bond yield [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Proxied by 10 year government bond interest rate (US10YR)

Table 18

VENEZUELA: Impulse response functions US growth [1/], US short-term interest rate [2/], GRA and sovereign spread



1/ US Conference Board confidence indicator (USCYLEAD)
2/ Federal Fund Rate

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