The Role of Global Risk Aversion in Explaining Latin American Sovereign Spreads[1]

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Abstract

This paper explores the role of global risk aversion (GRA) and its main determinants, US economic growth and the US government bond yield, in explaining 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. Those countries with the lowest risk, such as Chile, are more affected by GRA. Its relevance has also risen over time, particularly since the sharp change in the perception of risk stemming from the Enron scandal. Finally, an increase in both US economic growth and the US government bond yield are found to reduce sovereign spreads in most Latin American countries, 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

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1. Introduction

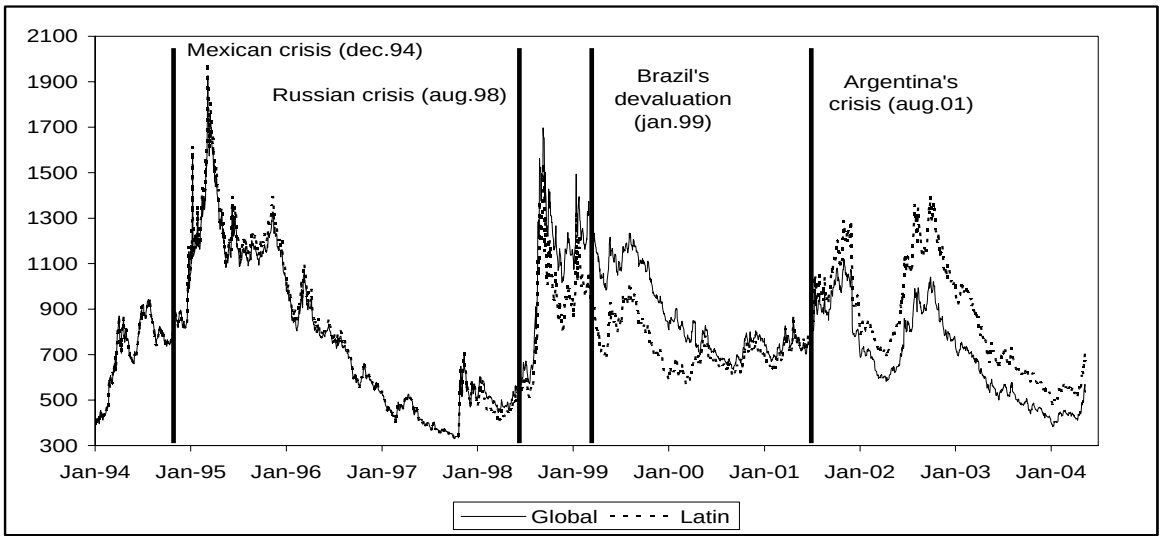
Sovereign spreads are crucial for emerging markets since bond financing has been used extensively in the last few decades and economic growth is closely associated with the magnitude of net capital flows (Calvo, Reinhart and Talvi, 2001). External sovereign bond financing (denominated in foreign currency) has been the first to develop in most countries, particularly in Latin America after the Brady bond rescheduling.

The fact, it is a very important region for the sovereign bond market, accounting for half of the emerging countries' sovereign bonds in 2001.

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 around the Mexican crisis in 1994-95, 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, sovereign spreads had narrowed, recovering most of their losses. The Brazilian devaluation of January 1999 was no more than a brief interruption of this downward trend, 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, which started to revert in October 2002, after Lula's won the Brazilian elections and the first signs of US economic recovery appeared. Sovereign spreads fell close to historically low levels although they started to increase again since the beginning of 2004 (Graph 1).

Graph 1:

Latin American Sovereign Spreads (Latin) and Global Sovereign Spreads (Global)



The volatility of sovereign spreads, together with the high dependence of Latin American countries on external bond financing, 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 a country' sovereign spread. Another strand of the literature considers external factors more relevant, including global ones (such as international interest rates or global economic growth) or contagion. In this study we shall focus on one external factor, which has recently received much attention, as it is highly correlated with emerging countries' sovereign spreads. This is the degree of global risk aversion (GRA).

GRA is difficult to measure. A country's sovereign spread captures the risk premium attached to the risk of default but also the degree of unwillingness to accept a risky asset. The latter may be unrelated to the actual default risk of that country but, rather, reflect factors such as the financial position of investors, liquidity risk in financial markets or investors' risk appetite at that time. This very complex concept is generally proxied by the yield of US relatively high risk corporate bonds, commonly known as "high yield". With the help of a theoretical benchmark proposed by Blanchard (2004), we shall assess empirically how important is GRA in explaining the developments of Latin American sovereign spreads. As a second step, we endogenize GRA, following Bernanke (1992), Bernanke, Gertler and Girlchrist (1998) and Gertler and Lown (2000). The main determinants of the high yield we concentrate on are the US economic growth and the interest rate on the US government bond, which happen to have long been considered important factors explaining Latin American sovereign spreads. In this way, apart from analyzing the role of GRA, we offer a more complete answer of how US interest rates influence Latin American sovereign spreads, a long debated question, which appears particularly interesting at the current juncture.

2. Review of the literature on determinants of sovereign spreads

The interest in sovereign spreads 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. Other authors have investigated the nature of the

determinants of sovereign spreads, either external or idiosyncratic. Given our paper's objective, this review concentrates on the latter, given the objective of the paper.

The first analysis of the determinants of emerging countries' sovereign spreads is probably that of Edwards (1986), who looked into the primary issuance of bank loans for some emerging countries and secondary-market bond spreads for Mexico. A number of domestic fundamentals were found significant (the debt to GNP ratio, the debt to exports ratio and the real effective exchange rate with a positive sign; the investment to GNP ratio, the debt maturity and the reserves to imports ratio with a negative sign). As regards external factors, only the price of oil was included explicitly in the analysis and was found significant only in the Mexican case but with an unexpected sign (positive).

A very influential paper is that of Calvo, Leiderman, and Reinhart (1993), although it does not concentrate on sovereign spreads but rather on capital inflows to Latin American countries. They find that increases in US short term interest rates were an important determinant of the reduction in capital inflows to the region.

Fernández-Arias (1996) analyzed the channels through which lower international interest rates affect the cost of capital in emerging countries, using a model of international portfolio allocation. He shows that a lower US government bond yield reduces sovereign spreads and that its impact is larger than that of fundamental-related factors, with the only clear exception of Argentina.

Cline and Barnes (1997) estimate a regression to explain Eurobond spreads for twelve emerging market countries and six industrial countries during 1992–96. The do not find any significant role for the US government bond yield.

Min (1998) estimated a similar equation to that of Edwards (1986) with pooled data for the emerging countries' primary bond market. He obtains similar results except for a number of additional relevant domestic fundamentals (the current account deficit, import growth and inflation, all with a positive sign). Only one external factor is found significant, the terms of trade with a positive sign, but not the price of oil or US short term interest rates.

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 is found significant in increasing the issuance of sovereign bonds by emerging countries and, through the larger supply, in reducing sovereign spreads. On the other hand, Kamin and von Kleist (1999) obtain that the relationship between the level of US short term interest rate and emerging countries' spreads is not significant.

In another multi-country analysis, over a longer period (1994-1999), Arora and Cerisola (2000) estimate the level of sovereign spreads against the Federal Funds Rate, a proxy for market volatility and a set of solvency and liquidity control variables. They find evidence of a positive and significant effect of the US monetary policy (i.e., a more restrictive monetary policy raises sovereign spreads), with higher elasticities for some countries, such as Brazil and Mexico, and lower for others, such as Argentina.

Herrera and Perry (2002) consider jointly the importance of US monetary policy and of GRA, proxied by the US corporate bond and allow 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 with GRA (proxied with the corporate high yield) is positive both in the long and short run.

Grandes (2003) finds that changes in the permanent component of several macroeconomic fundamentals account for the largest variation of Argentine, Brazilian and Mexican sovereign spreads, but contagion and external factors – particularly GRA - are also relevant.

Dungey et al (2003) look in detail at the impact of GRA on emerging market debt in several crisis events. They decompose GRA in three factors: volatility, credit and liquidity risks and find that the Russian crisis was characterized by a sharp increase in global credit risk, while the relative size of global risk factors is mixed for the Brazilian crisis.

McGuire and Schrijvers (2003), using principal factor analysis, show evidence of 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, indicating that each country's idiosyncratic conditions remain the most relevant determinant of spread movements. As for the relation with US government bond yields, 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. This work is the one that gets closer to our objective although with several differences. 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 (US economic growth and the government bond yield) and sovereign spreads.

Finally, observing that sovereign spreads are highly correlated with investors' appetite for risk, Calvo (2003) suggests that once we account for this component, domestic factors are almost irrelevant in explaining sovereign spreads. 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.

From this review of the literature (see summary in Table 1 below), it seems clear that no consensus emerges on the role of external determinants of sovereign spreads, particularly US interest rates GRA has been acquiring more importance over time although the evidence is more anecdotal than empirical.

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 rates
Calvo, Leiderman and Reinhart (1993)	10 Latin American countries	n.t.	n.t.	+ *
Fernández 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 regions	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 (2002)	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.s.	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 Schrijvers (2003)	large group of emerging countries	+	n.t.	n.t.

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

3. Paper's objective

In this study we focus on one external factor, which is receiving increasing attention in different fora but has only recently in the literature of emerging countries' sovereign spreads. This is the degree of global risk aversion (GRA), generally proxied with the US high yield corporate bonds. With the help of a theoretical benchmark proposed by Blanchard (2004), we assess empirically how important is GRA in explaining the developments of Latin American sovereign spreads in the last few years.

As a second step, we endogenize GRA based on its main determinants. The theoretical and empirical literature attaches large importance to US growth and interest rates in explaining US corporate high yield, which also happen to be important factors Latin American sovereign spreads. This means that there are two channels through which US growth and US interest rates may influence sovereign spreads: a direct one and an indirect one (through their impact on GRA). With the help of an SVAR we shall try to disentangle the two effects.

Finally, to provide additional evidence on the long-debated impact on US monetary policy, we also include US short-terms interest rates in the empirical analysis.

4. Sample, data and stylized facts

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. J.P. Morgan also produces an index of local currency-denominated bond paper (the Emerging Local Currency Index) but, we prefer to use foreign-currency denominated bonds since credit risk and local exchange rate risk are many times closely intertwined. Furthermore, the EMBI+ offers a relatively longer series than other J.P. Morgan emerging country bond indices.

The EMBI+ is available for eight Latin American countries, namely those with the largest bulk of bonds held by non-residents. Tóese are Argentina, Brazil, Colombia, Ecuador, Mexico, Panama, Peru, and Venezuela. Although the EMBI+ is not available for Chile, we include it in the sample using the EMBI Global for this specific case[4]. For Argentina, Brazil, Mexico and Venezuela data is available 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 May 1994-October 2003.

Monthly data is used since it is the highest frequency for which we can find indicators of US activity. This implies transforming JPMorgan daily indices by averaging daily data. As forward looking indicators of US economic activity are preferred as potential determinants of financial variables, we choose the OECD leading indicator of US economic activity and the Conference Board confidence index to conduct robustness tests of the results. The US government high yield is proxied by the 10-year Treasury bond rate. For the impact of US monetary policy included as a robustness test, we use the Federal fund rate.

Finally, as previously mentioned, GRA is proxied by the US Baa corporate high yield. A lower rating yield, namely that of the junk bond, is also used.

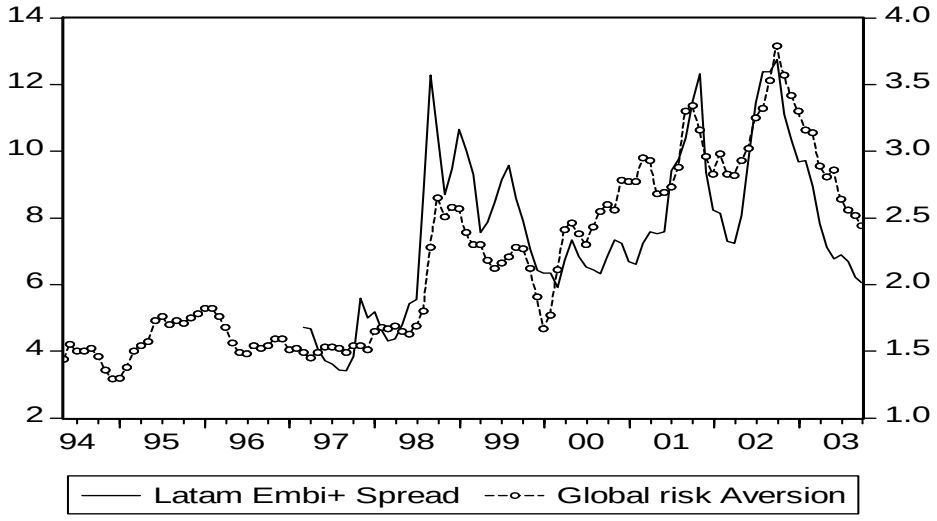
[4] The EMBI GLOBAL summarizes total returns for U.S-dollar-denominated debt instruments (not only external ones).

5. Some stylized facts

Although its importance has only been highlighted in the recent literature, GRA (- measured by the high yield US corporate spread) - has always been closely and positively associated with Latin American sovereign bond spreads (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 the Latin American EMBI + spread until the first quarter of 2000 (see Graph 2 below). 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 the Latin American sovereign spread. 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 (see the Argentine sovereign spread in the first top graph on the left in Appendix 2). 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:

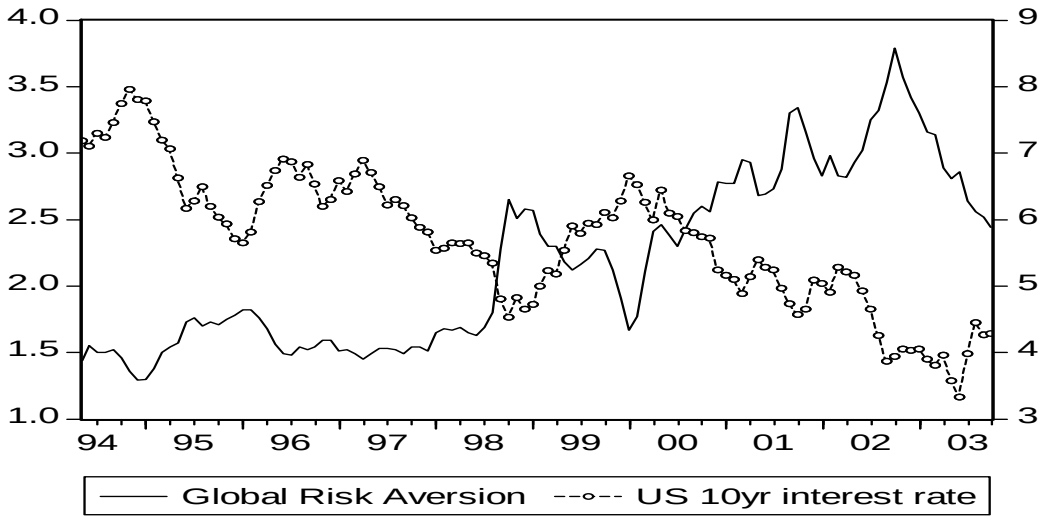
Latin American sovereign bond spreads (%, left scale) and GRA (%, right scale)



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 government 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)

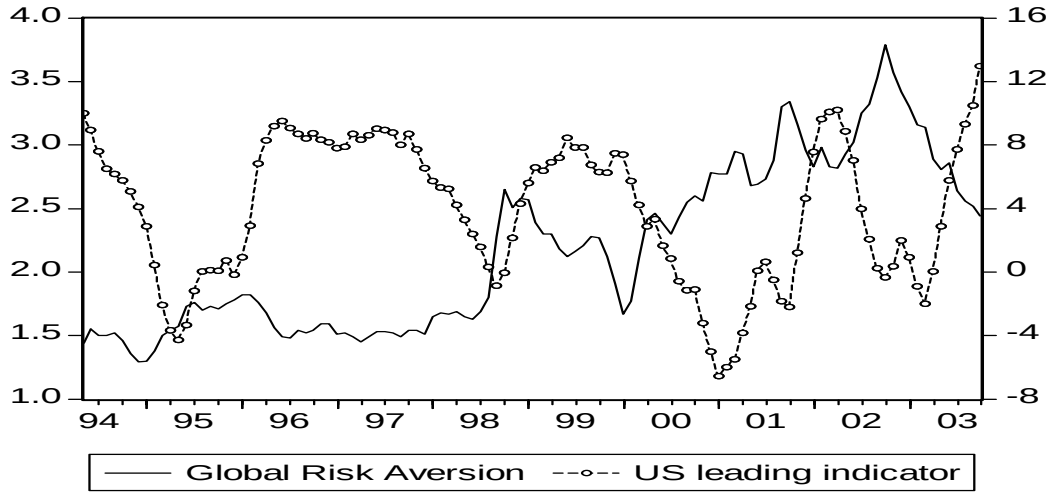


Graph 4 depicts the relation between the GRA and US economic growth, proxied by the OECD leading indicator of US economic activity. The relation is negative as for the US government bond interest rate.

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 (the same graphs are shown for each of the nine countries analyzed in Appendix 2). 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 4

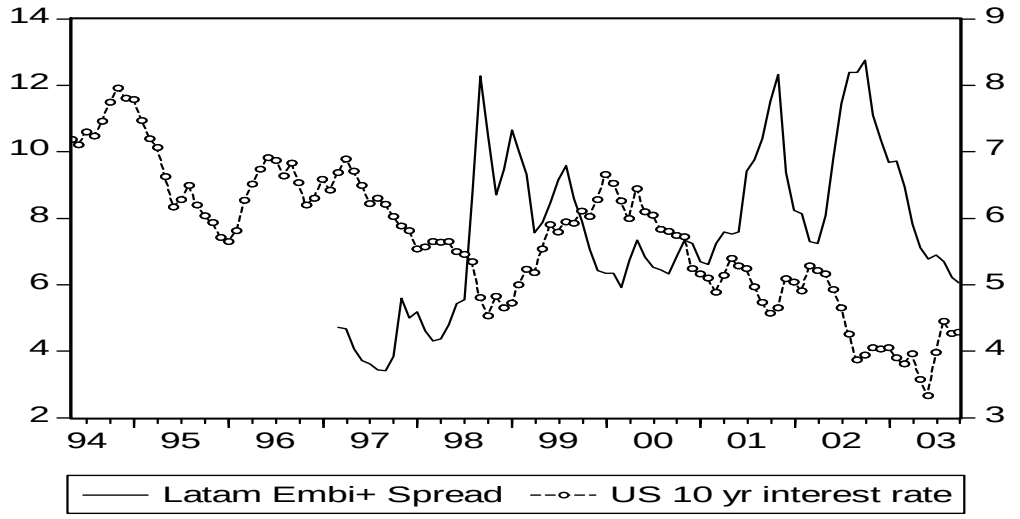
GRA (%, left scale) and the US growth leading indicator (%, right scale)



Graph 5

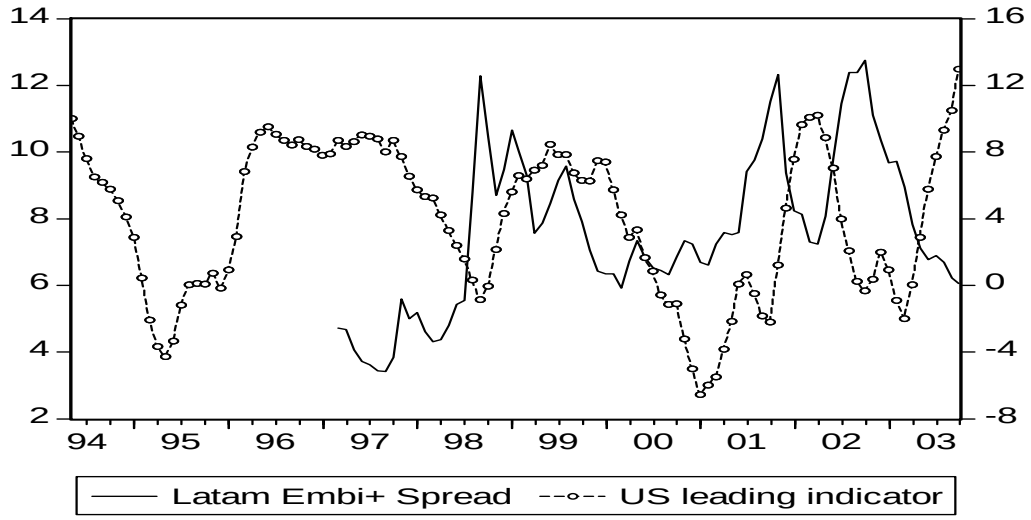
Latin American sovereign spreads (%, left scale)

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 shows 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 spreads. 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.

6. The role of GRA

6.1 Empirical strategy

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[5] 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:

$$s_t = p_t + a\theta_i^* + u_t \qquad (1)$$

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 the assumption of a large elasticity of capital flows. 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 two estimation procedures to analyse the role of GRA in explaining sovereign spreads: (i) OLS correcting by autocorrelation as Blanchard (2004) does for the case of Brazil; (ii) an SVAR model based on Blanchard's decomposition. An SVECM is ruled out since all variables are found stationary, I(0), after running Advanced Dickey-Fuller tests. (see Table 4 in Appendix 1)

[5] Blanchard goes even further and argues that, in general terms, their information is summarized in the debt developments.

There are several advantages in using an SVAR model but probably the most important one for our purposes is that we can obtain 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.

$$Ae_t = Bu_t \qquad (2)$$

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:

$$\begin{aligned} e_t^{\theta} &= b_1 u_t^{\theta} \\ e_t^{S} &= b_2 e_t^{\theta} + u_t^{s} \end{aligned} \qquad (3)$$

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)[6].

6.2 Differences in the role of GRA across countries and over time

We obtain the elasticities of the sovereign spread to GRA with the two different estimation strategies described above (OLS and SVAR). There are hardly any differences between the two elasticities, which are always found significant for all countries investigated and relatively high, particularly in the countries considered to have a lower intrinsic risk, such as Chile (Table 1). Argentina, Venezuela and Ecuador have the lowest elasticities.

Table 1

Elasticities of the Modified Spread to GRA

Country	SVAR	OLS
Argentina	0.11	0.11
Brasil	0.24	0.22
Chile	0.45	0.43
Mexico	0.24	0.29
Venezuela	0.12	0.13
Panama	0.19	0.23
Ecuador	0.13	0.12
Perú	0.24	0.25
Colombia	0.22	0.26

From the SVAR estimation, we can obtain the variance decomposition, at different periods of time (months), for the sovereign spread of each Latin American country analysed (see Table 2). 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 Latin American sovereign bond 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. Interestingly, these are the countries with the highest average sovereign spread (so probably with the highest risk), as mentioned in the stylised facts. 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.

[6] The AIC yields the best lag specification for the model.

Table 2

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

These results are in line with what one should expect from our theoretical framework, where the elasticity of GRA (the coefficient a) was defined as the inverse of the real rate of return of the domestic sovereign return. A plausible interpretation for this development (namely that the countries with the highest idiosyncratic risks are the ones least affected by GRA in the short run and most in the longer-term) is that the evolution of GRA slowly feeds into their relatively weaker fundamentals.

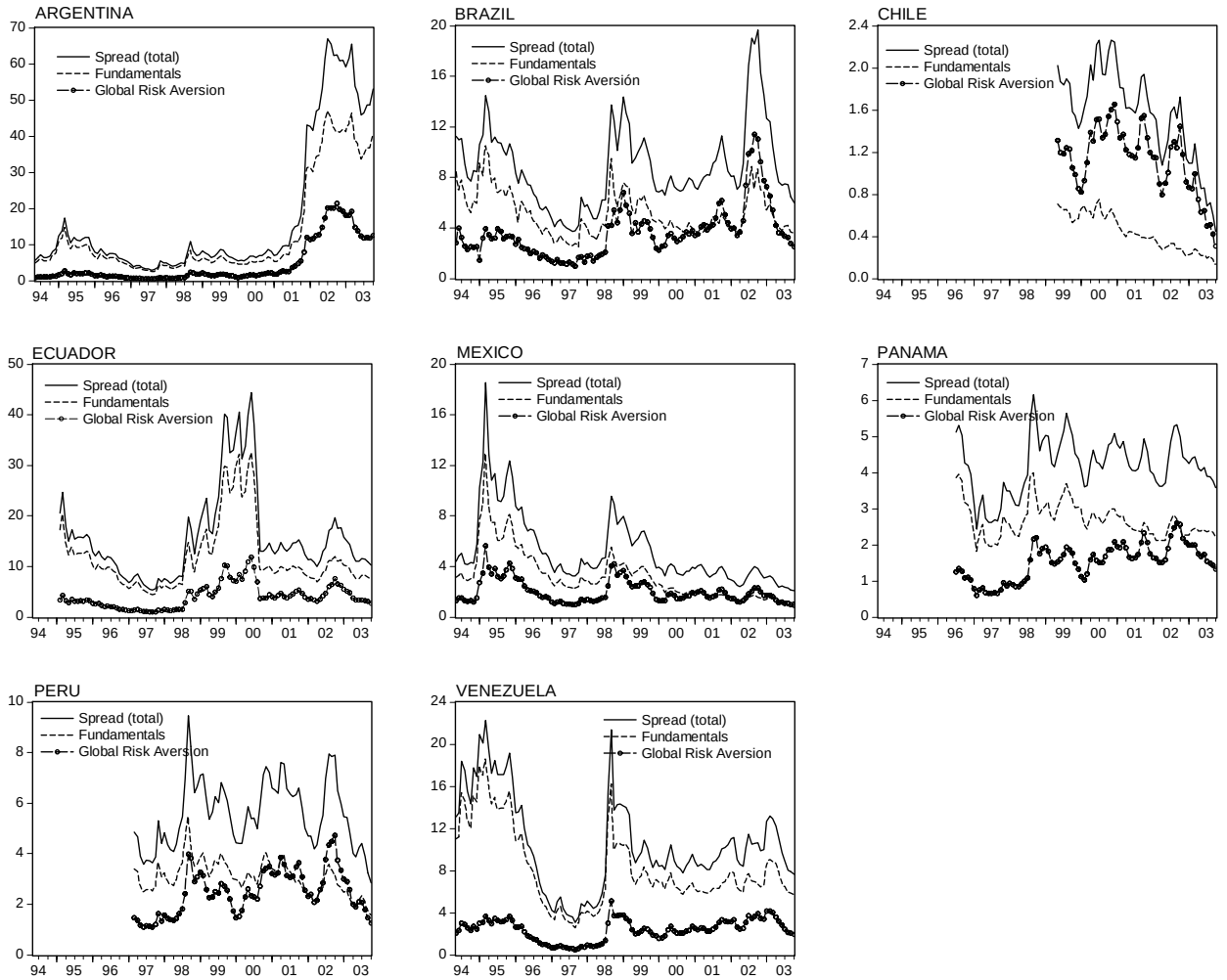
Another interesting issue is the increasing importance of GRA over time. The Graphs below show the decomposition of each country's sovereign spread into the part explained by GRA and that related to other factors. The former increases over time in practically all countries although it is still low in many of the Latin American countries analyzed, particularly in those considered the riskiest, as found for the variance decomposition.

The larger importance of GRA over time can be explained by the increasing integration of emerging countries' 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 hedge funds and mutual funds, purchased these securities, today investors who traditionally invested in industrial countries debt 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 us the Venezuelan banking crisis of 1994-95, the Mexican crisis of end 1994-95, the Ecuadorian crisis of 1999-2000 and the Argentine crisis of 2001-02. It is also the case of Brazil in 1999 and 2002, but to a lesser extent.

Set of graphs:

Decomposition of sovereign spreads (%)



6.3 Robustness tests to the definition of GRA

Latin American countries are not only different in terms of average spreads but also in terms of their ratings. This is particularly interesting in the case of investment grade ratings since the bonds of those countries can be part of global funds and not only of higher risk, emerging market, funds. Until now, we have used the yield of investment grade paper to proxy GRA, namely Baa US corporate paper as proxy for GRA. We now test whether the explanatory power of the GRA is higher –particularly in the riskier countries with lower ratings – when a lower-rating US corporate paper is used as a proxy, namely junk bonds. Interestingly the junk bond yield has a much poorer explanatory power of sovereign spreads, even in the case of the riskier countries (Table 4).

Table 4

Two different proxies for GRA: elasticities of the sovereign spread

Countries	BBA US bond yield	Junk bond yield
Argentina	0,11	0,03
Brasil	0,24	0,07
Chile*	0,48	0,15
México*	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

6.4 The Enron case

The Enron case has received enormous attention, not only due to its implication on corporate governance, but also on emerging countries' sovereign bonds. In fact, corporate high yields increased sharply after the ENRON event 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 the Enron event on the sovereign spreads of Latin American countries. To this end, we shorten the

sample to the period of interest, from the Enron event until its effect started to fade away, for the upturn (i.e. from May 2002 to September 2002), and from then until our last available observation for the downturn (i.e. from October 2002 to October 2003). Table 5 shows that the part of the sovereign spread related to GRA increased by 84 basis points (b.p.) in Chile during the upturn period while the part related to fundamentals increased by only 3 b.p. The total increase of the sovereign spread was, thus, 88 b.p. While this was the lowest increase in terms of b.p. for all countries reviewed, the importance of GRA was the largest (96% of the total increase in the upturn). A similar result is found during the downturn, where the total reduction in the Chilean sovereign spread was 124 b.p., 117 b.p. of which were directly related to the lower GRA. Argentina´s results must be taken with caution or even be disregarded because the country was in default during the full period included in the analysis. 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 5

Impact of GRA after Enron's default

Enron Case: Impact on Sovereign Spreads *(in basis points)*							
Spread (Total)	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Venezuela
Upturn	1646	1478	88	490	186	377	236
Downturn	-601	-1679	-124	-608	-235	-546	-422
Spread (idosyncratic part)							
Upturn	518	614	3	175	58	124	91
Downturn	372	-699	-7	-219	-75	-199	-200
Spread (GRA)							
Upturn	1128	864	84	315	128	253	141
Downturn	-972	-980	-117	-389	-160	-347	-222
% due to GRA							
Upturn	68,5	58,5	95,5	64,3	68,8	67,1	59,7
Downturn	161,7	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. The impact of US growth and US interest rates on sovereign spreads

7.1 Endogenizing GRA

We now move to endogenizing 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. We depart from this model by adding a stochastic term, to the "external finance premium". This should capture the part of GRA non-explained by fundamentals. The GRA is, thus, determined as follows:

$$\theta^* = -\psi\left[n_t - (q_t + k_t)\right] + u^{\theta} \qquad (4)$$

This shows that risk premium 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^0. We consider the net wealth of companies to be a linear function of the aggregate real level of activity, as shown below:

$$n_t = b_1 y_t \qquad (5)$$

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.

$$q_t + k_t = b_2 y_t - b_3 i_t^* \qquad (6)$$

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

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

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 important 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 a highly significant 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 to be negative in several studies (Duffe (1996) and Huanh and Kong, 2003). Morris, Neals and Rolph (1998) confirm this negative relation in the short run but the effect is reversed in the long run.

7.2 Empirical strategy

We introduce the US economic activity and the US government bond yield, together with the GRA and the sovereign spread in a more complete SVAR model (a four variable model) to determine empirically what is the role of US economic growth and interest rates both though their direct influence on spreads and their indirect one (on GRA). To estimate the SVAR model we consider again the 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:

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

In the first equation the US Growth is exogenously determined. The second equation models the US monetary policy reaction function, which is a function of domestic economic growth. 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 aversion component (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 indirectly the sovereign spread (though c_4 and c_5,, respectively) - and the sovereign spread directly (through c_7 y c_8).

We first show the results for the case in which the 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' analysed and significant in all countries but Argentina. The indirect effect (c_4) is also negative but not significant for each of the countries in the sample. 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) -the one generally analysed in the literature- is also negative and significant in three countries (Chile, Mexico and Colombia). Impulse response functions can be found in Appendix 4 for each of the countries considered, so as to compare short-term and long-term effects.

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*	-0.019**	-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

In sum, GRA and US economic growth and the government bond yield are clearly important external factors determining sovereign spreads of Latin American countries. The GRA and US economic growth have the expected sign. The result for the US

government bond yield is in line with Eichengreen and Mody (1998) but not with Fernandez Arias (1995).

To explore the impact of the risk free rate further, we include US short-term interest rates instead of long ones as a proxy. We, thus, focus on how the US monetary policy may affect sovereign spreads, proxying it with the Federal Fund rate. The results, which can be found in Table 7, offer a very different result than for the US long-term rates. Both the direct effect and the indirect one (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, robustness tests are conducted using a different leading indicator of US economic growth, namely the Conference Board confidence index. The results hardly change both when the US government bond yield proxies the risk free rate (Table 1 in Appendix 3) or when the Federal Fund rate is chosen (Table 2 in Appendix 3).

8. Conclusions

In this study, to explain the sovereign spreads of nine Latin American countries, we have focused on the role of one external factor, which has acquired considerable importance in recent times, namely global risk aversion (GRA). With the help of the theoretical benchmark proposed by Blanchard (2004) and endogenizing GRA following research by Bernake, Gertler and co-authors, we assess empirically how important is GRA, and its main determinants, in explaining the developments of Latin American sovereign spreads. The main determinants of GRA, US economic growth and the US government bond yield, are also generally considered important factors explaining Latin American sovereign spreads. This implies that they are two potentially relevant channels for US growth and the US government bond yield to affect sovereign spreads, a direct and an indirect one (through GRA).

We find that GRA is a relevant determinant of Latin American sovereign spreads, particularly for those countries with lower risk. Using two different estimation techniques (OLS and SVAR), the elasticities to GRA range from 0.11 in the case of Argentina to 0,45 in the case of Chile. The variance decomposition from the SVAR estimation confirms that the countries perceived as riskiest are the least influenced by t GRA and the opposite is true for the least risky ones. We also test for different proxies of GRA and find that the one with the largest explanatory power is the most frequently used in the literature (namely the US Baa corporate paper), independently on the risk of each Latin American country.

A specific case of a sharp change in GRA is analyzed, namely the Enron collapse. We find that, since the Enron collapse, GRA explains more of the change in Latin American sovereign spreads, in basis points, than for the full sample. This seems to indicate that the explanatory power of GRA has increased over time. This might change in the future if the risk appetite of investors becomes less of an issue but it could also remain very important if the incorporation of emerging countries' sovereign bonds in the same

investment funds as the US high yield bonds continues, in line with Wooldridge, Domanski and Cobau's (2003) argument

As for the role of US economic growth and the interest rate of US government paper, the two appear to reduce Latin American spreads in practically all countries. However, the opposite is found for US short- term interest. These results seem particularly important in the current juncture, where Latin American spreads have started to increase again after having reached historically low levels. At the same time the US corporate high yield remains at very low levels not withstanding the sudden increase in US government bond yields, following expectations of hikes in the Federal fund rate.

There are concerns among Latin American policy makers on an increase in US interest rates as the US economy recovers 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 especially unlikely in the present circumstances.

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Appendix 1:

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

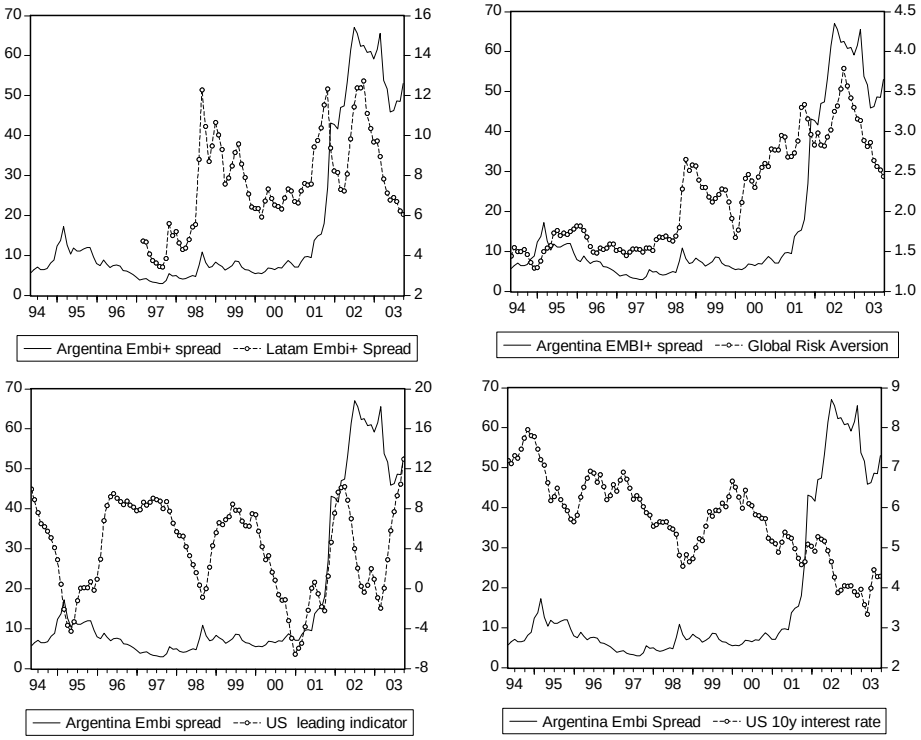
Stationarity Test (Advanced DF test)

Variable	Lags*	Augmented DF 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)

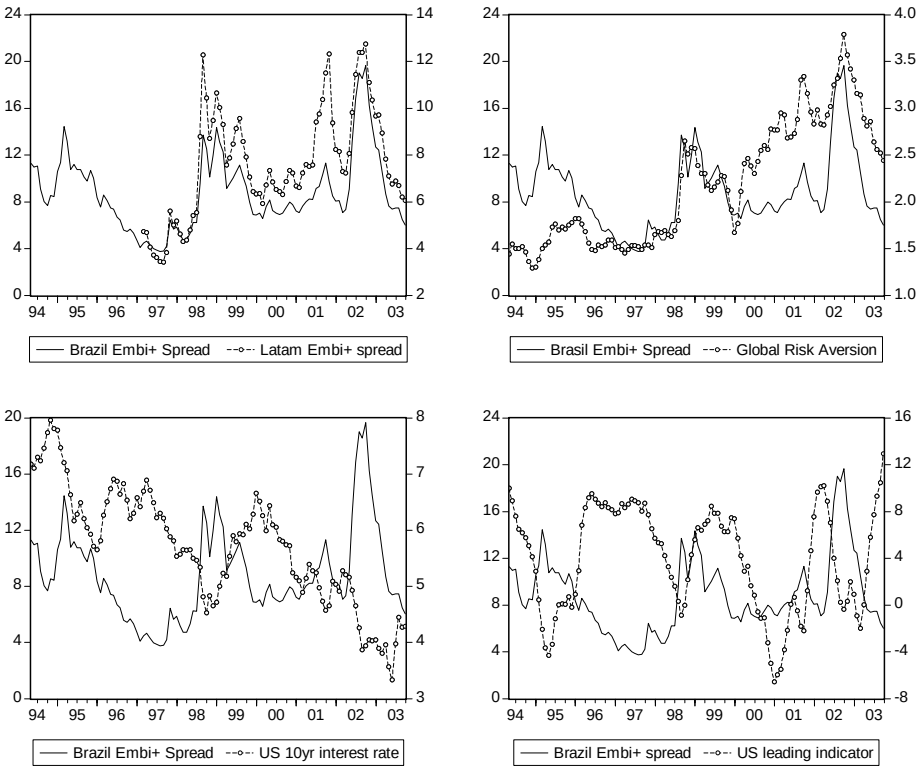
* Lags based on SIC criterion.** Mckinnon critical value at 10% level is -1.61

Appendix 2[7]:

Argentina

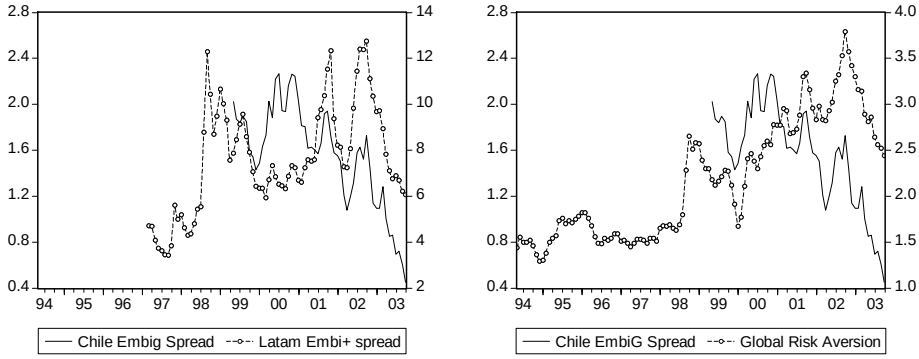


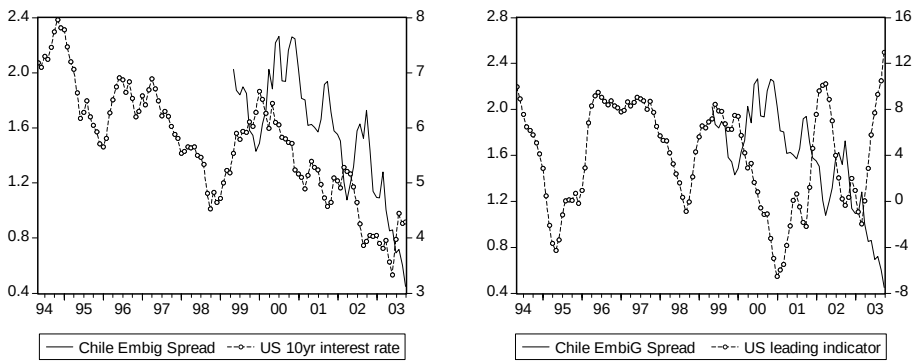
Brazil



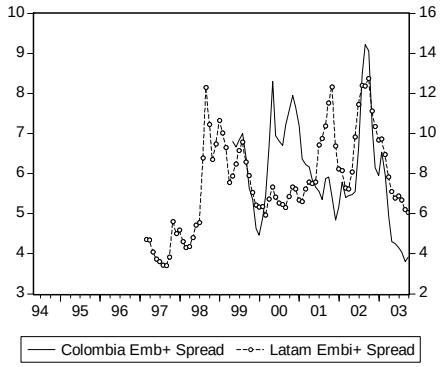
[7] The left scale is always for each country's EMBI spread (in %) and the right scale for the other variable.

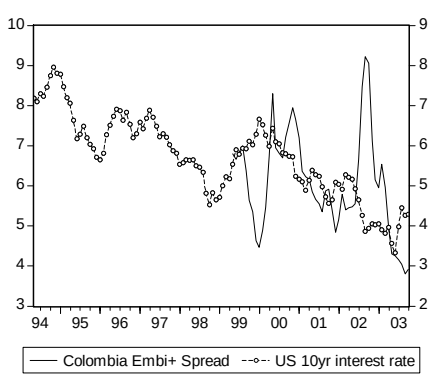
Chile

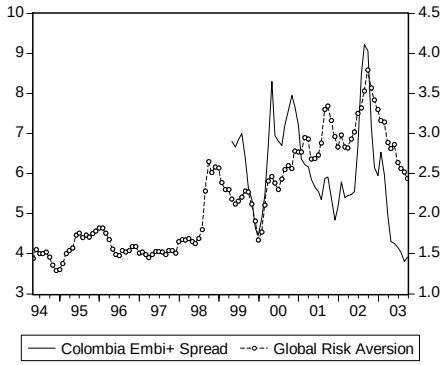


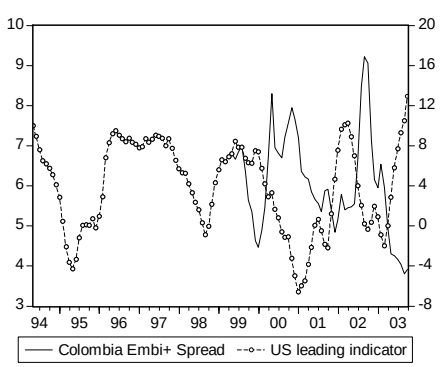


Colombia

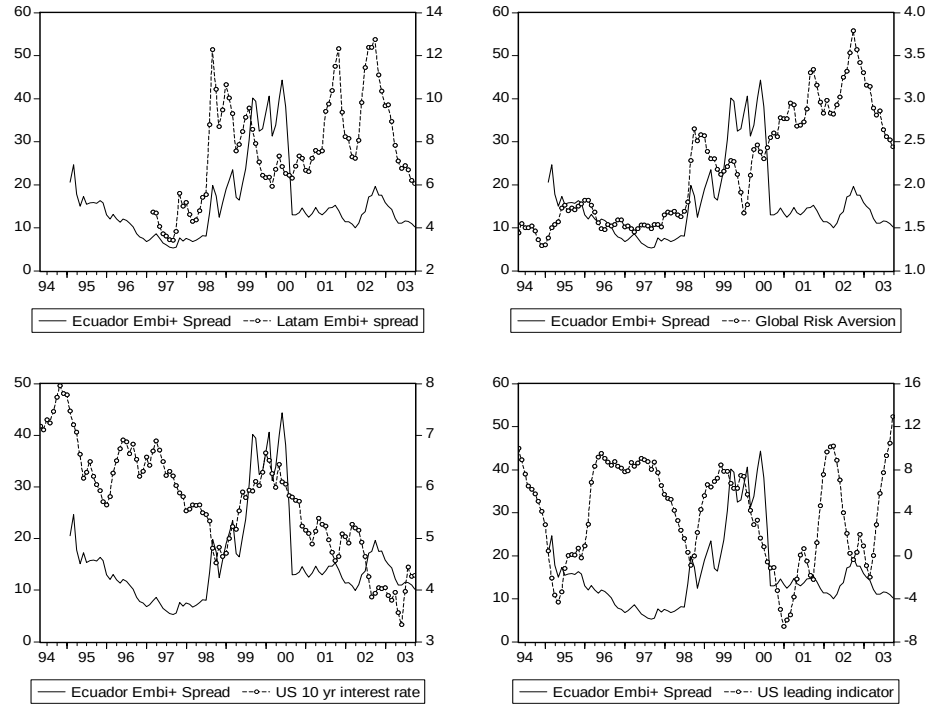




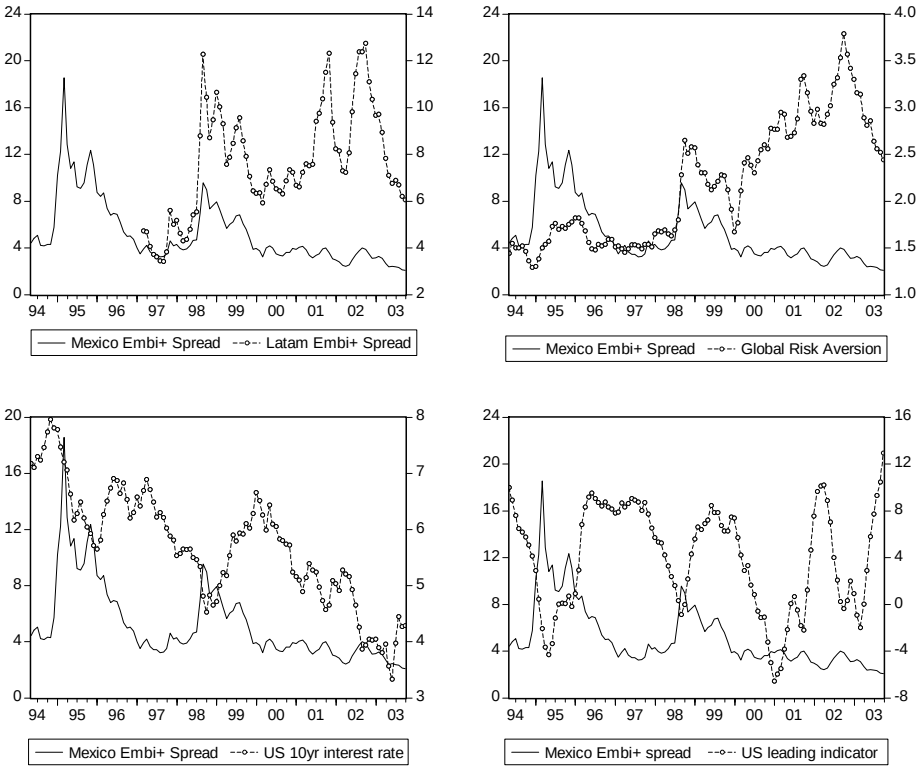




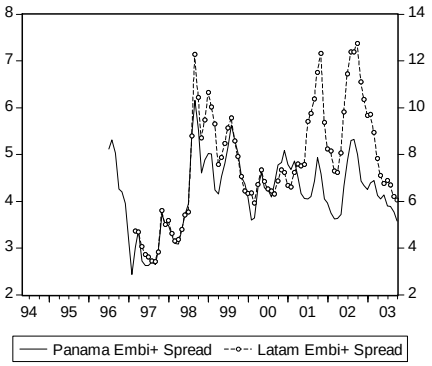
Ecuador

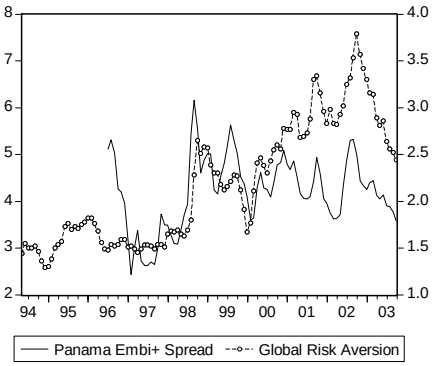


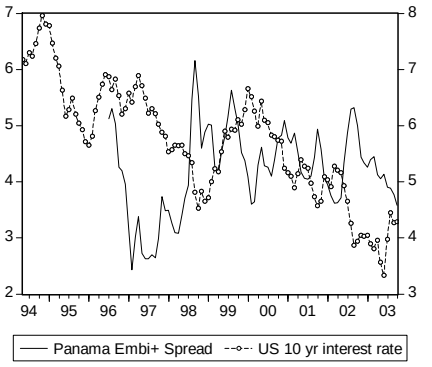
Mexico

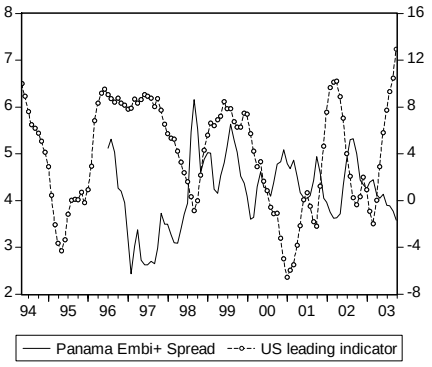


Panama

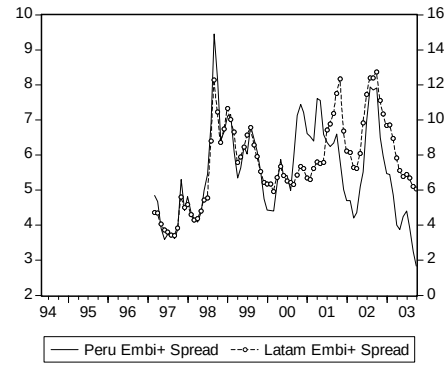

Panama Embi+ Spread
Latam Embi+ Spread

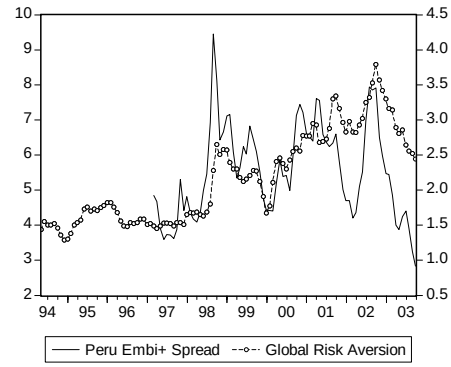

Panama Embi+ Spread
Global Risk Aversion

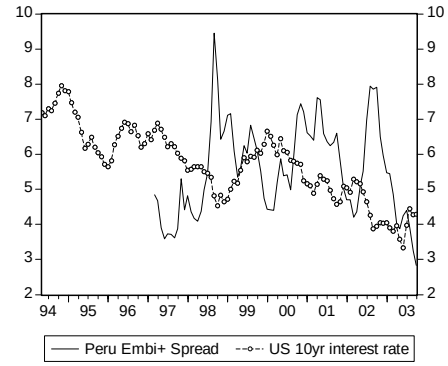

Panama Embi+ Spread
US 10 yr interest rate

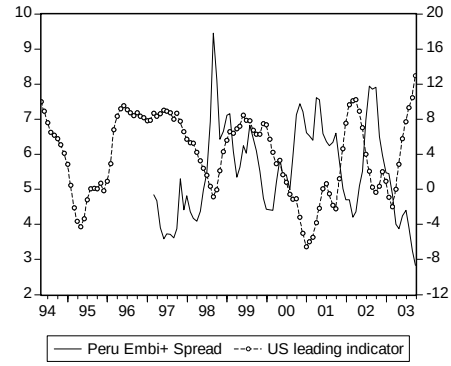

Panama Embi+ Spread
US leading indicator

Peru

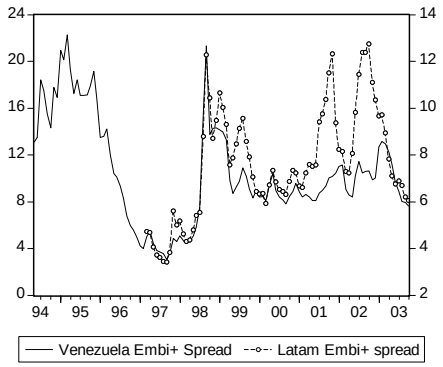

Peru Embi+ Spread
Latam Embi+ Spread

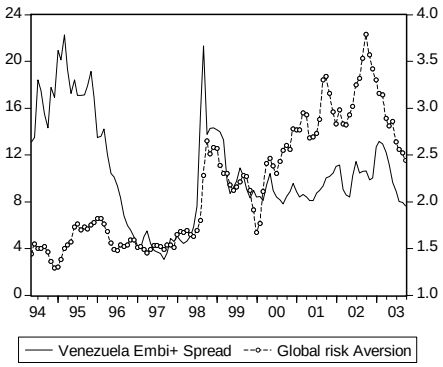

Peru Embi+ Spread
Global Risk Aversion

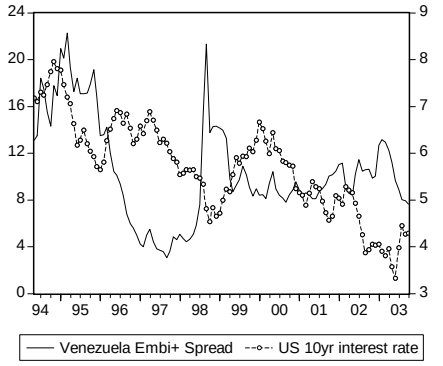

Peru Embi+ Spread
US 10yr interest rate

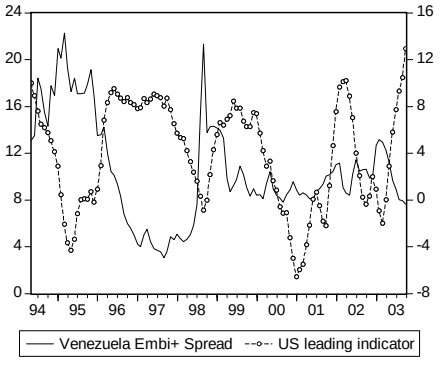

Peru Embi+ Spread
US leading indicator

Venezuela


Venezuela Embi+ Spread
Latam Embi+ spread


Venezuela Embi+ Spread
Global risk Aversion


Venezuela Embi+ Spread
US 10yr interest rate


Venezuela Embi+ Spread
US leading indicator

Appendix 3:

Robustness tests

Table 1

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

	Argentina	Brazil	Chile	Mexico	Peru	Venezuela	Panama	Colombia	Ecuador
C_2	0.098**	0.097**	0.129**	0.105**	0.109**	0.099**	0.094**	0.086	0.106**
C_4	-0.017	-0.019	-0.044	-0.013	-0.025	-0.010	-0.032	-0.060**	-0.016
C_5	-0.313**	-0.300**	-0.399**	-0.319**	-0.378**	-0.309**	-0.369**	-0.375**	-0.340**
C_7	0.006	-0.021	0.021	-0.009	-0.006	-0.008	-0.010	-0.030**	-0.007
C_8	-0.047	-0.032	-0.160**	-0.109**	-0.072*	-0.027	-0.072**	-0.083**	-0.034
C_9	0.060	0.179**	0.293**	0.116*	0.153**	0.083	0.124**	0.087**	0.125**
C_1	0.481**	0.484**	0.527**	0.475**	0.474**	0.469**	0.506**	0.514**	0.484**
C_3	0.217**	0.203**	0.214**	0.215**	0.224**	0.217**	0.211**	0.237**	0.213**
C_6	0.093**	0.093**	0.109**	0.093**	0.102**	0.092**	0.101**	0.109**	0.094**
C_{10}	0.062**	0.071**	0.071**	0.064**	0.057**	0.055**	0.053**	0.032**	0.046**
Log likelihood	191.886	183.228	68.641	190.222	129.595	207.853	150.078	104.466	206.063

* Significant at 10% level

** Significant at 5% level

[1/] Proxied by Conference Board confidence indicator

[2/] 10 year government bond interest rate

Table 2

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

	Argentina	Brazil	Chile	Mexico	Peru	Venezuela	Panama	Colombia	Ecuador
C_2	-0.022	-0.027	-0.073	-0.020	-0.020	-0.023	-0.017	-0.091**	-0.044**
C_4	-0.054**	-0.056**	-0.132**	-0.047**	-0.089**	-0.053**	-0.085**	-0.144**	-0.063**
C_5	0.049	0.096	0.140	0.078	0.176	0.070	0.170	-0.051	0.200
C_7	-0.001	-0.020	0.035	-0.012	-0.005	-0.008	-0.007	-0.008	-0.002
C_8	0.078	0.026	0.090	0.008	-0.023	0.064	0.061	0.122**	0.056
C_9	0.113**	0.216**	0.432**	0.216**	0.251**	0.109**	0.173**	0.225**	0.137**
C_1	0.486**	0.490**	0.482**	0.478**	0.486**	0.479**	0.497**	0.543**	0.484**
C_3	0.117**	0.118**	0.141**	0.115**	0.116**	0.115**	0.112**	0.112**	0.098**
C_6	0.117**	0.114**	0.152**	0.116**	0.135**	0.116**	0.129**	0.135**	0.121**
C_{10}	0.062**	0.072**	0.063**	0.069**	0.056**	0.057**	0.059**	0.031**	0.049**
Log likelihood	221.975	208.573	75.158	216.103	148.774	235.230	164.807	116.788	240.300

* Significant at 10% level

** Significant at 5% level

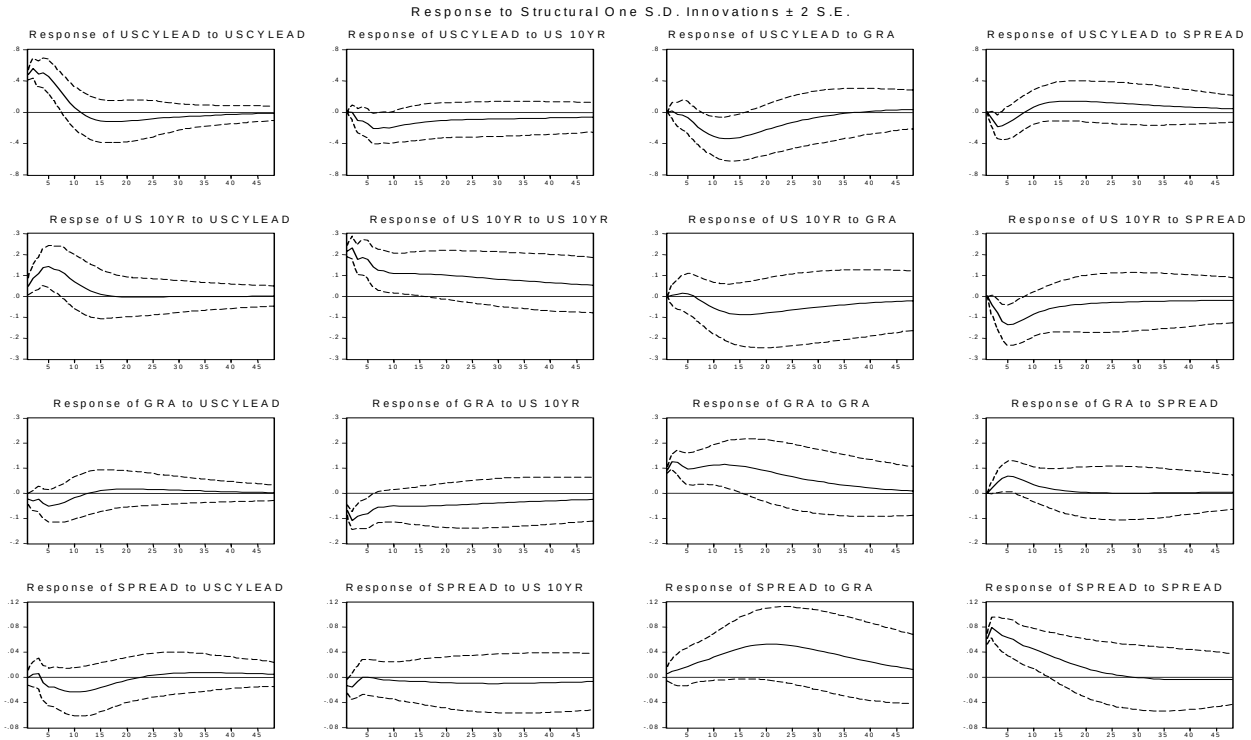
[1/] Proxied by Conference Board confidence indicator

[2/] Federal Funds rate

Appendix 4

Table 1

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

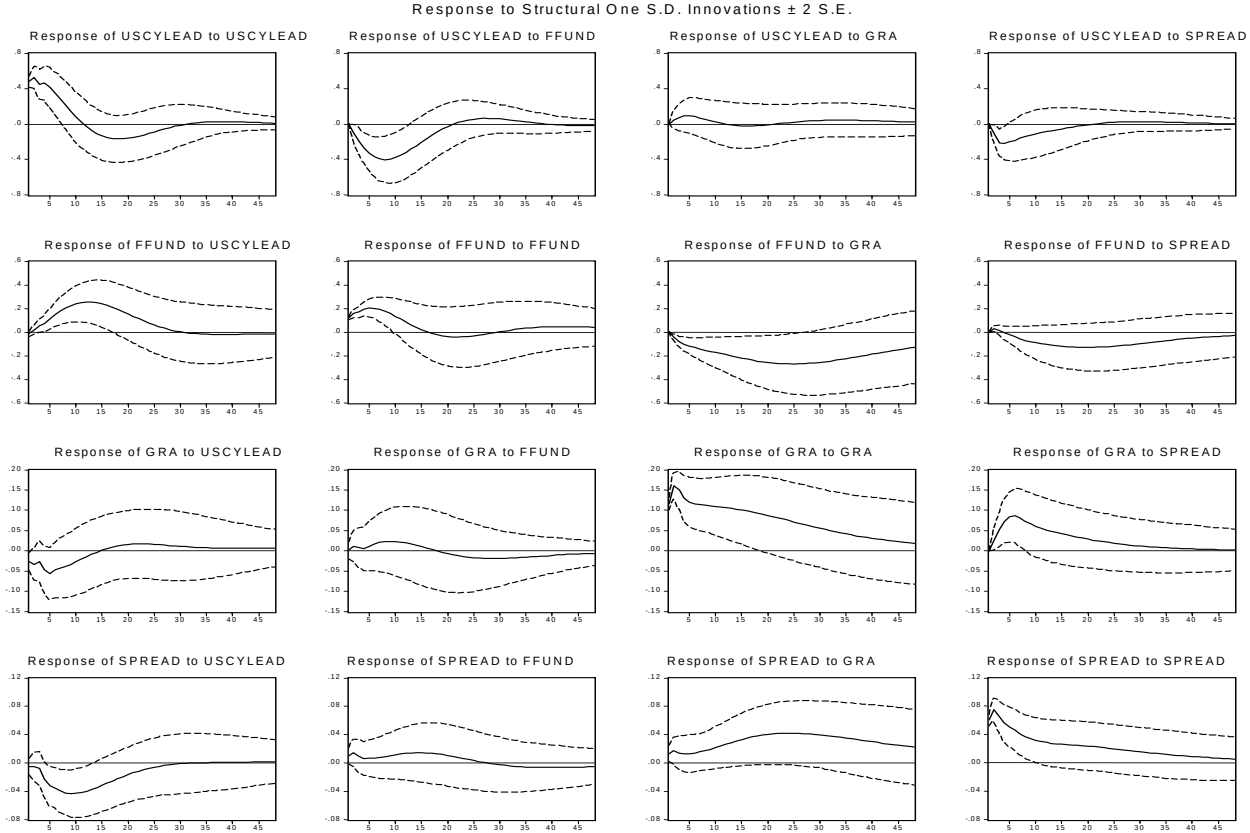


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

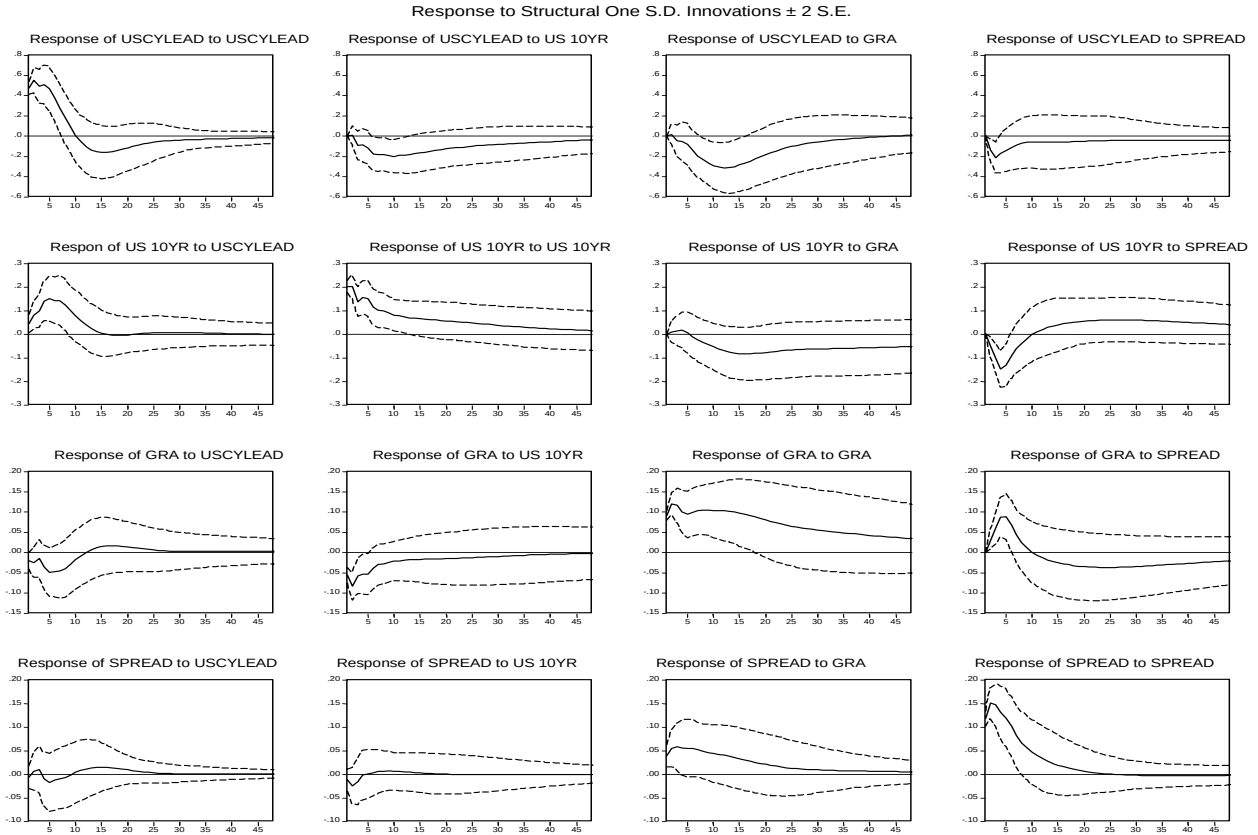


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 3

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

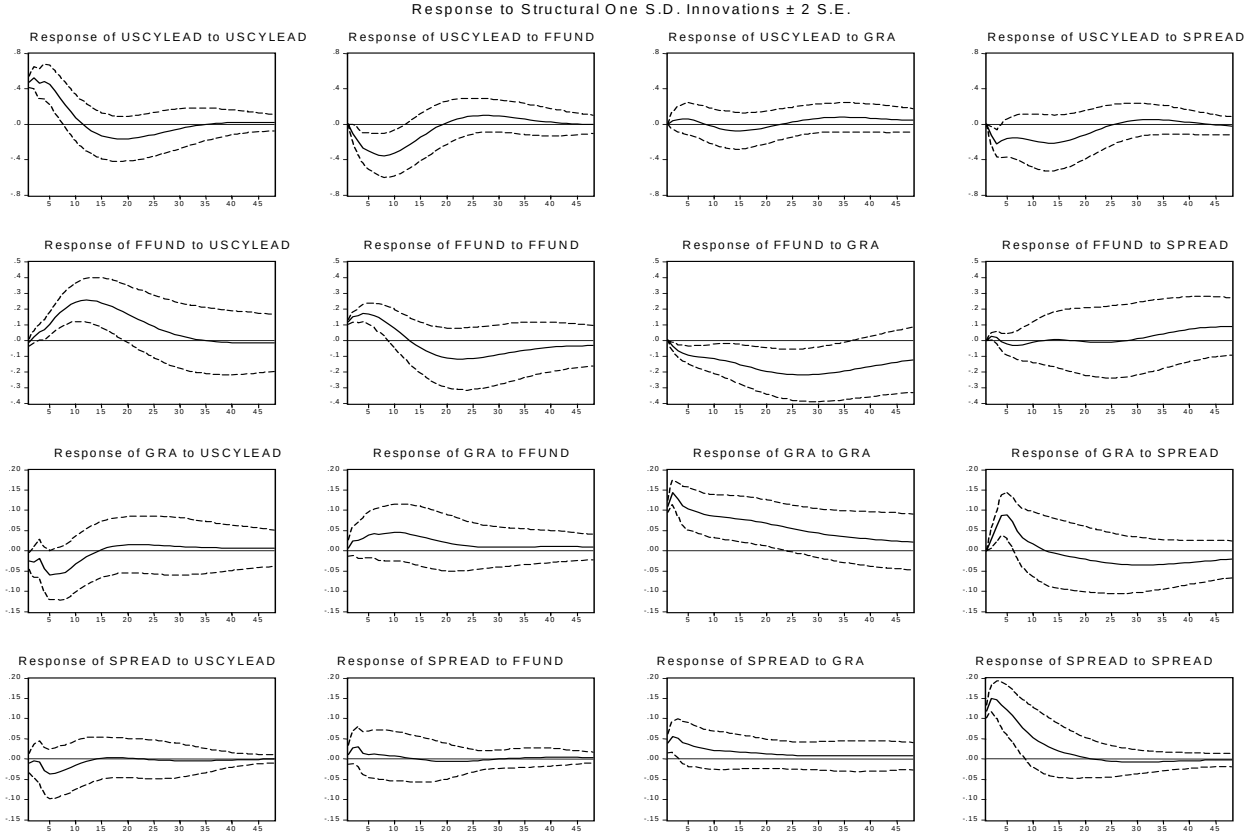


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

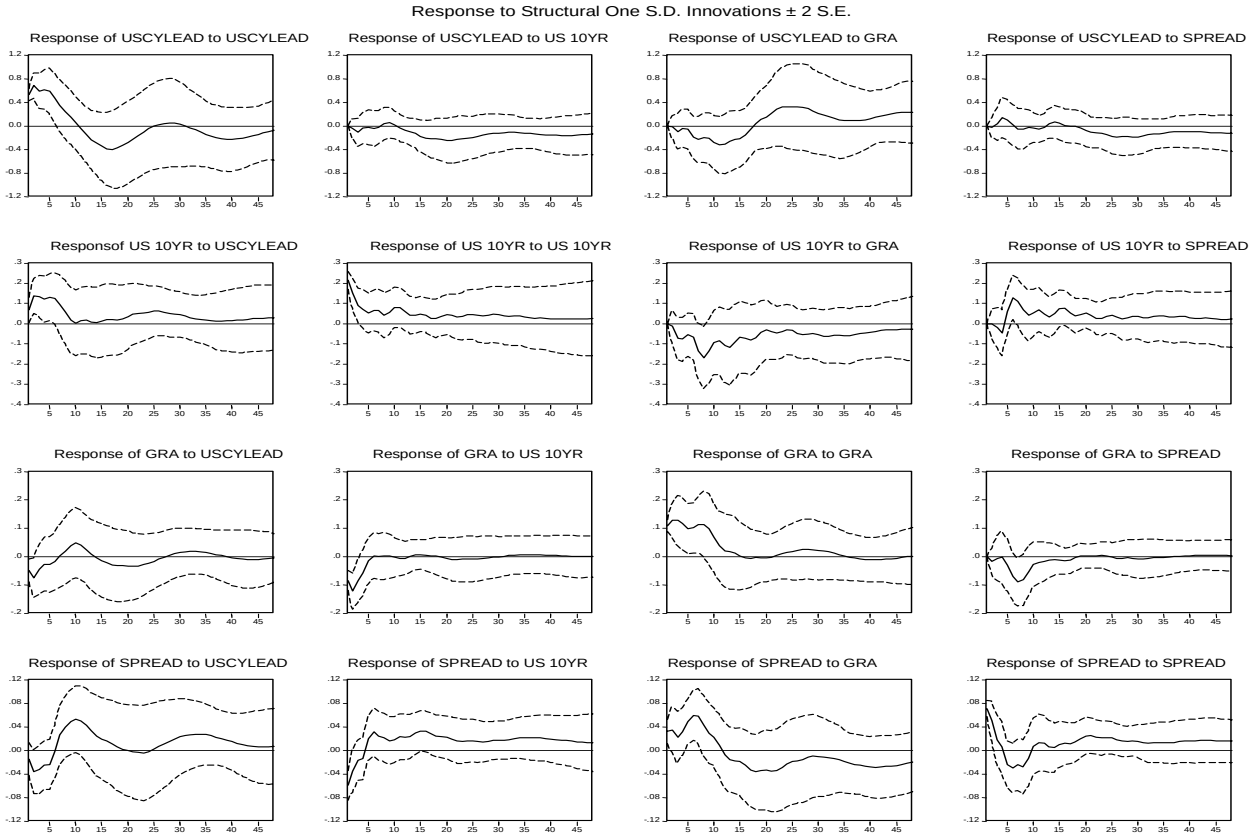


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 5

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

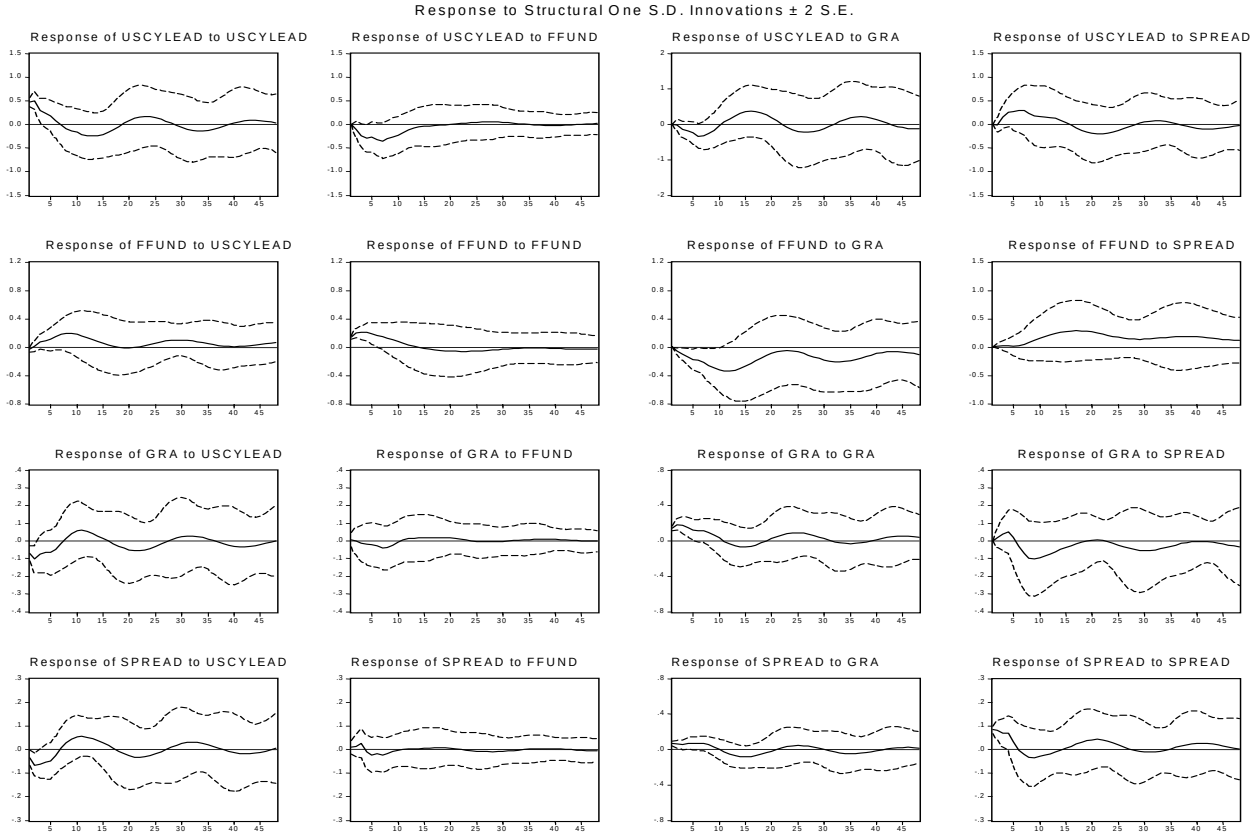


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

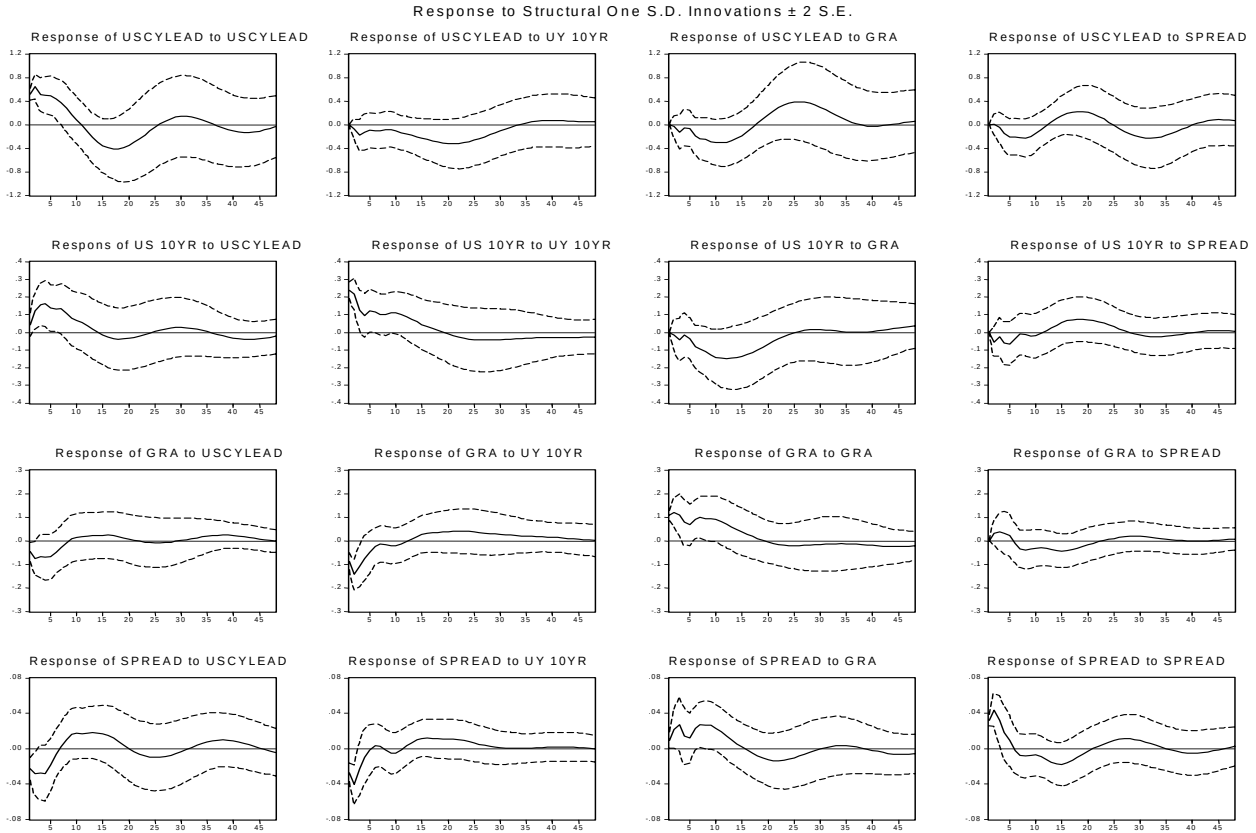


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 7

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

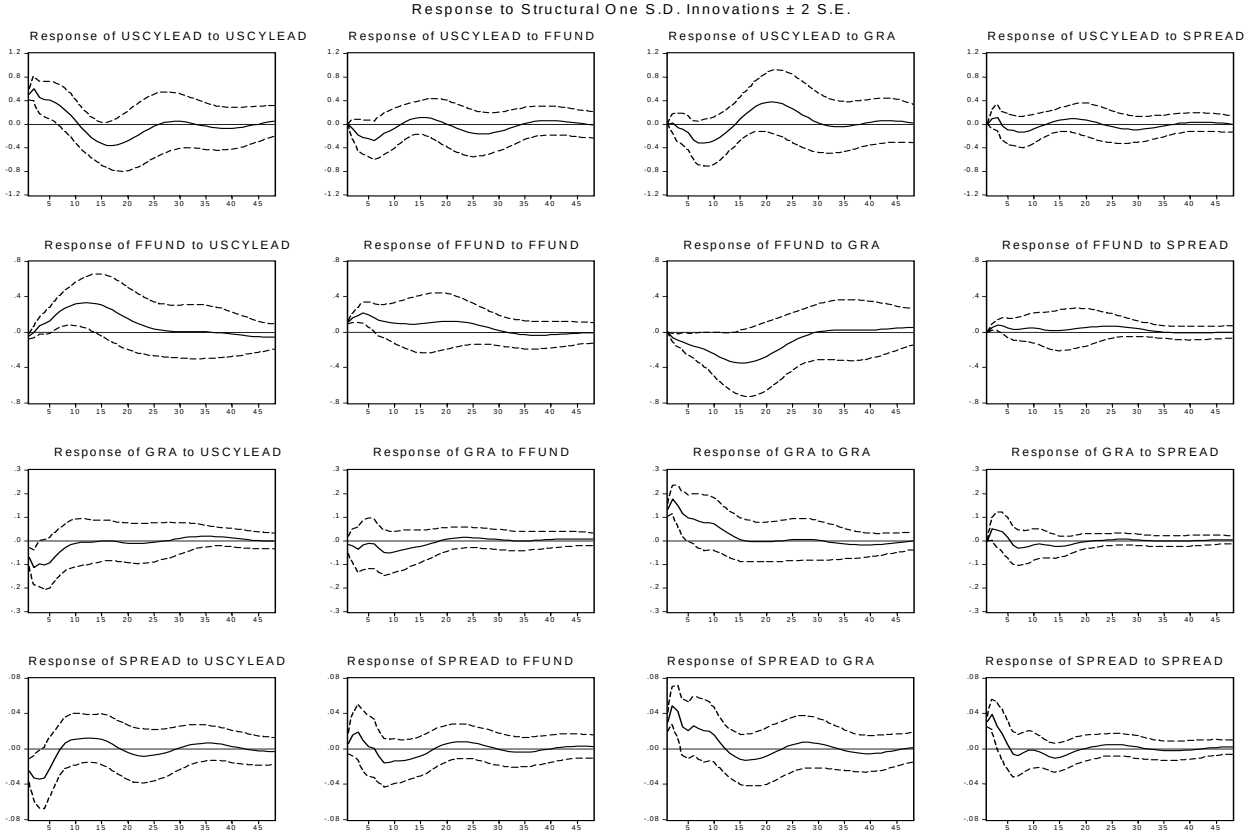


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

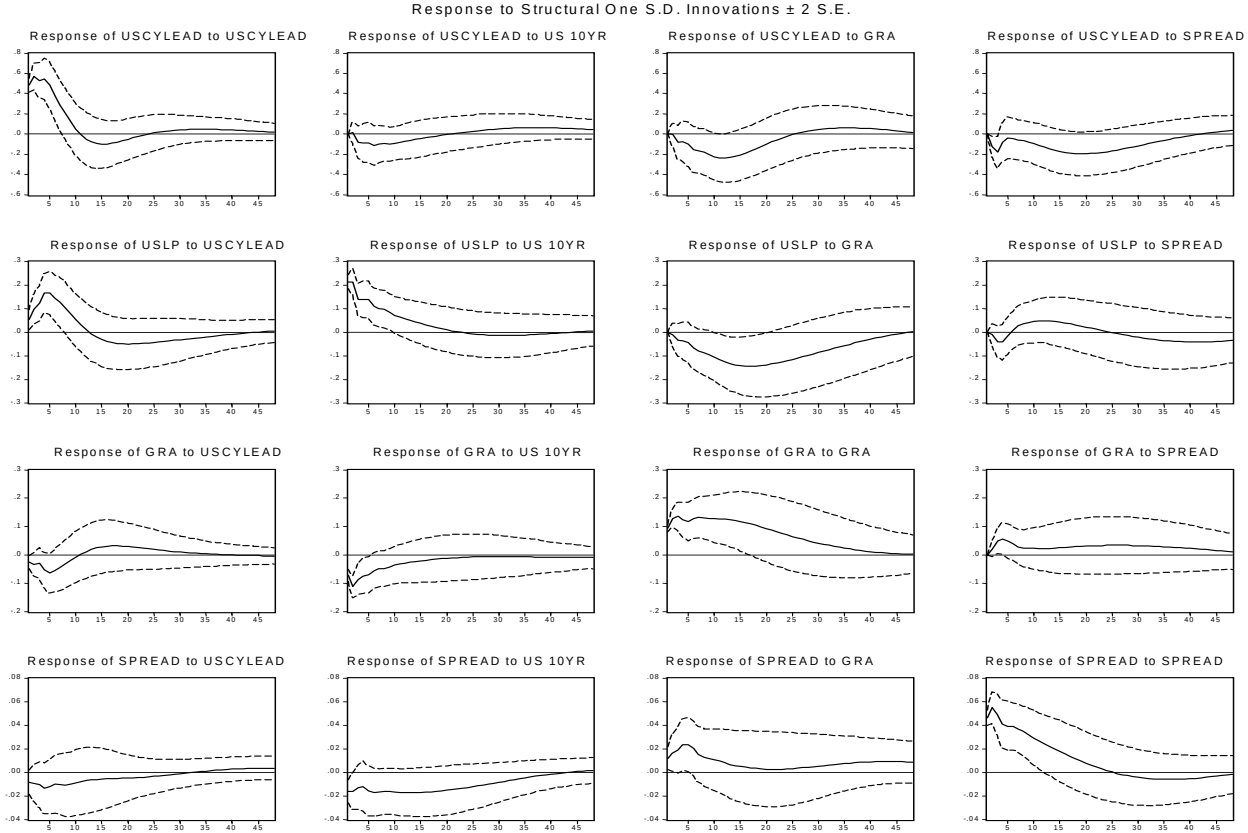


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 9

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

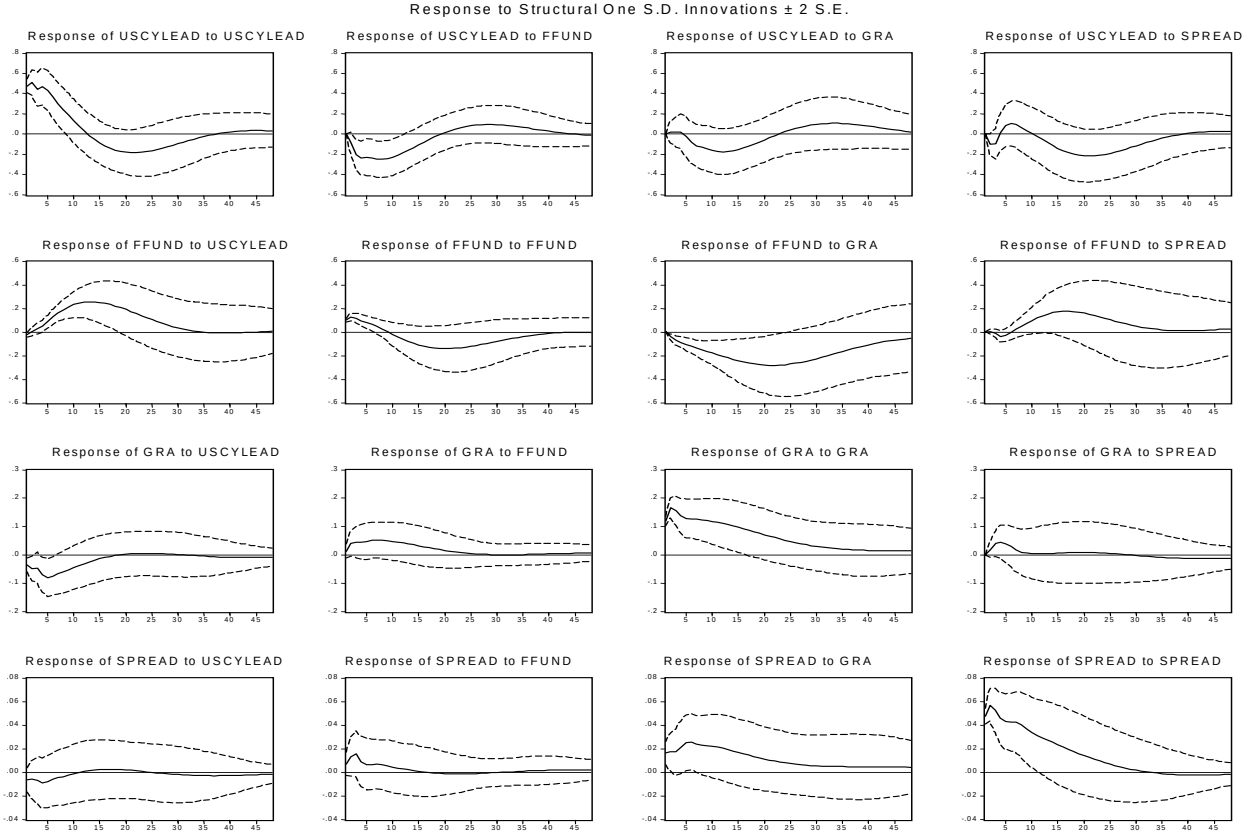


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

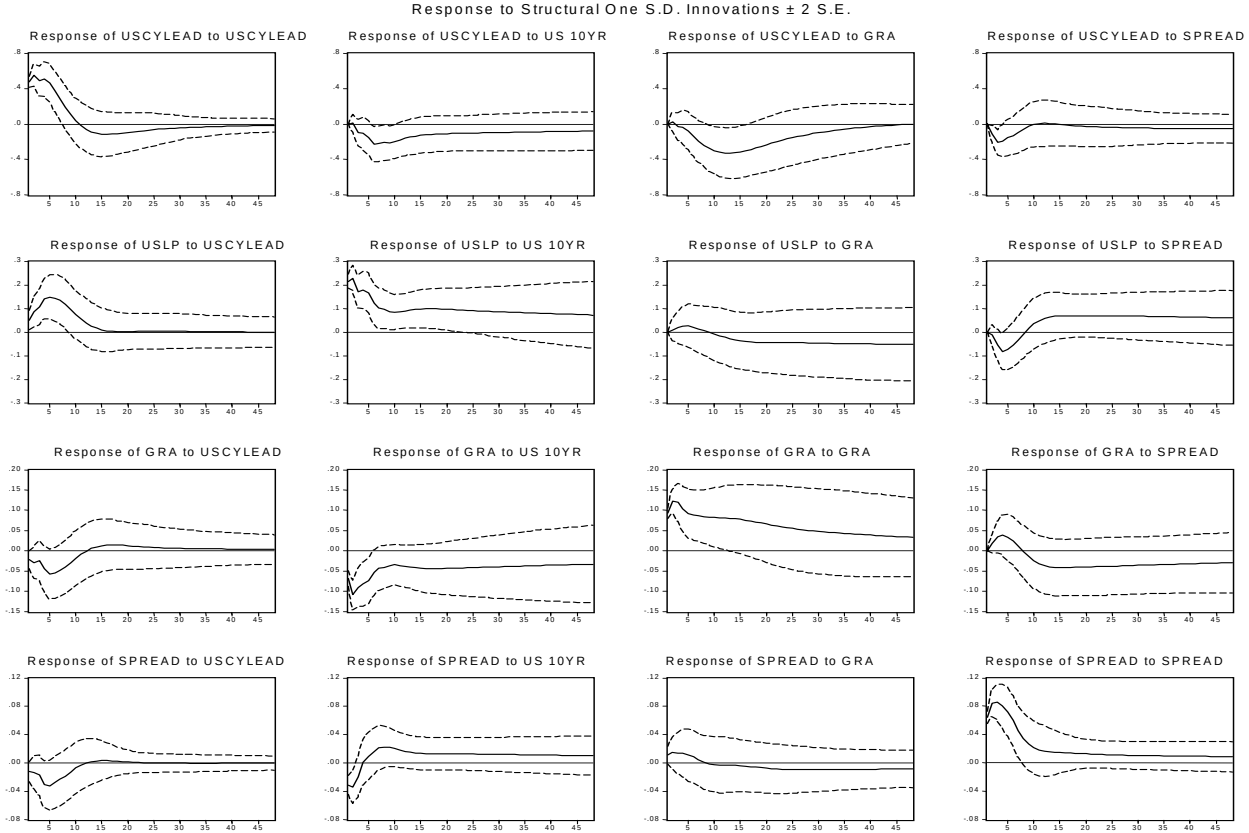


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 11

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

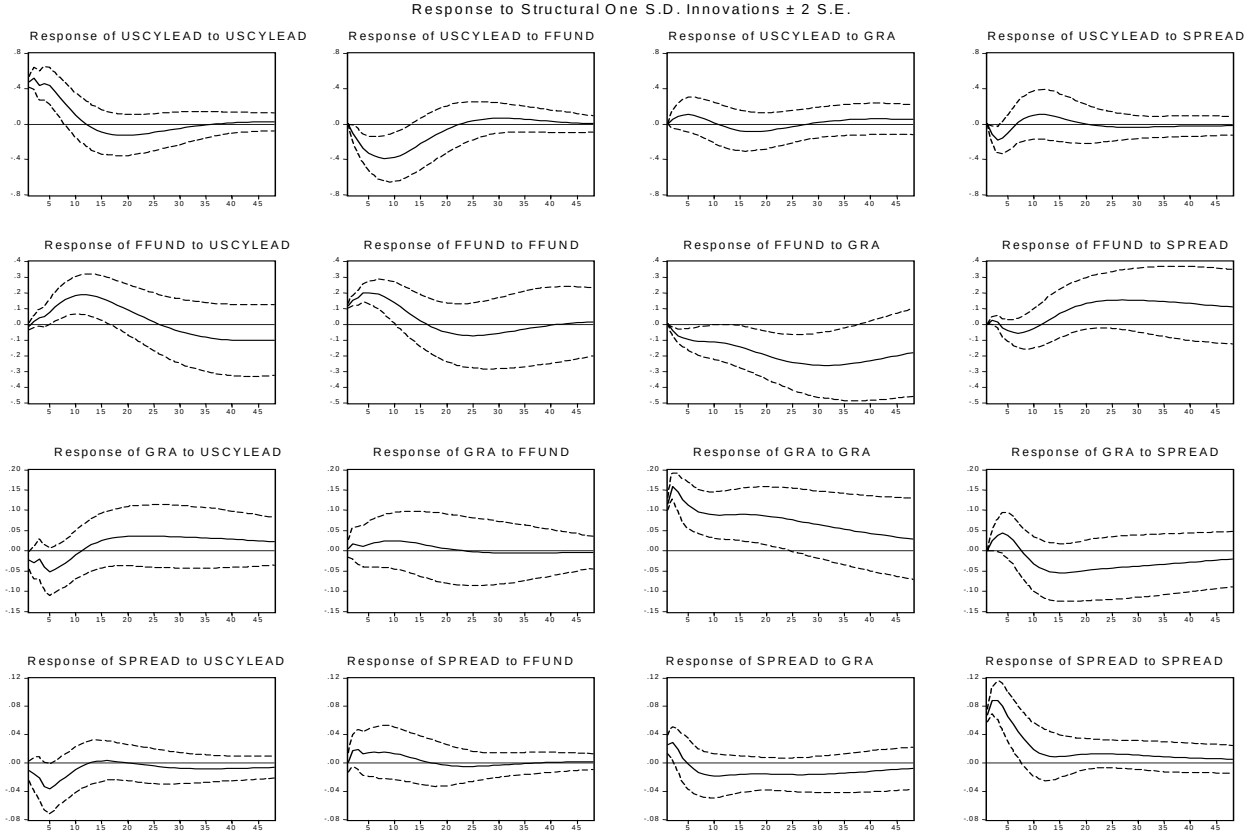


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

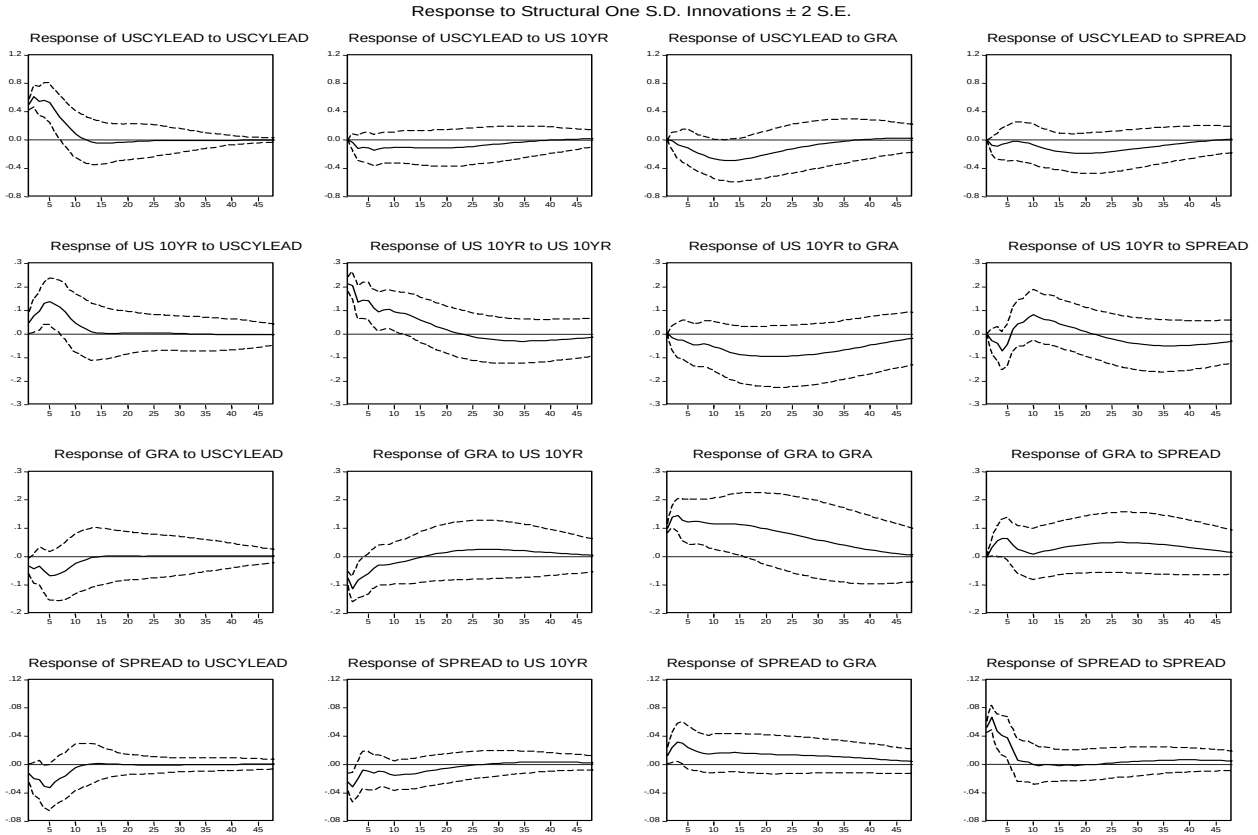


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 13

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

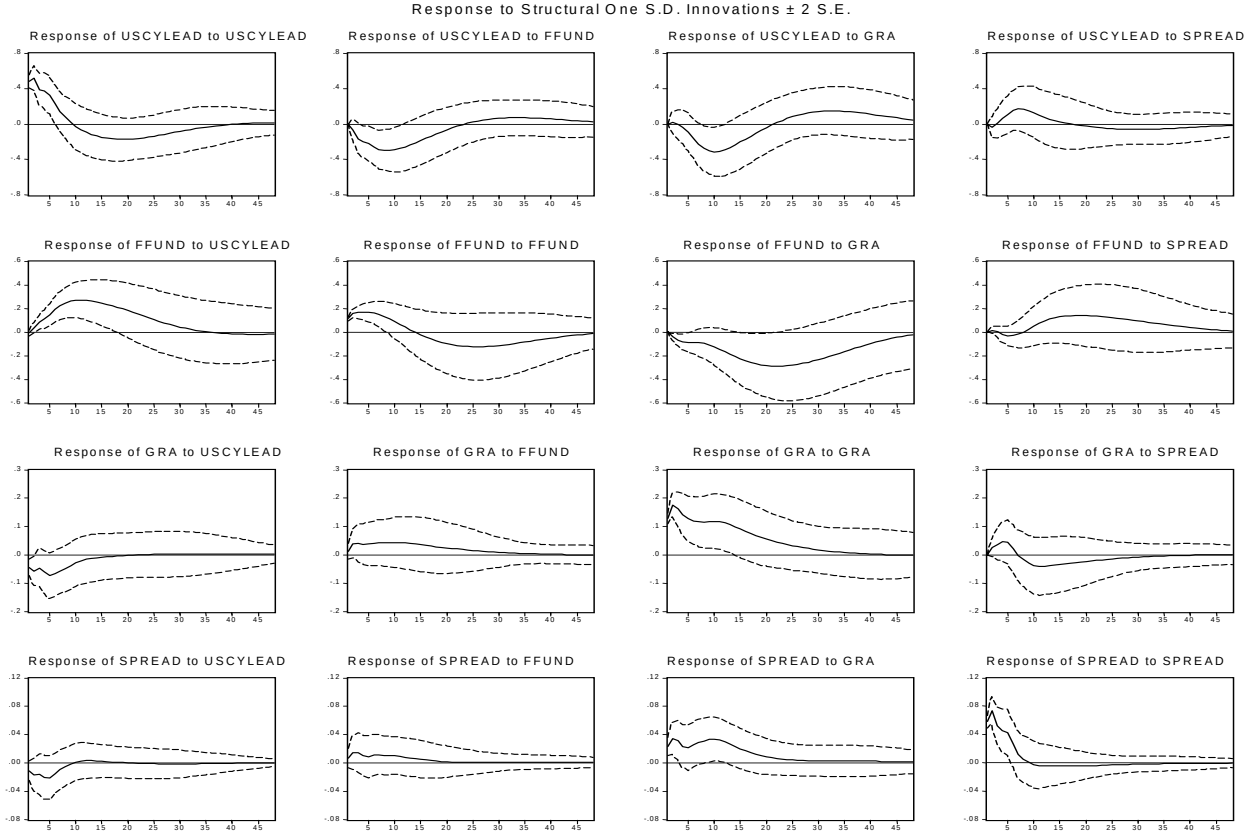


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

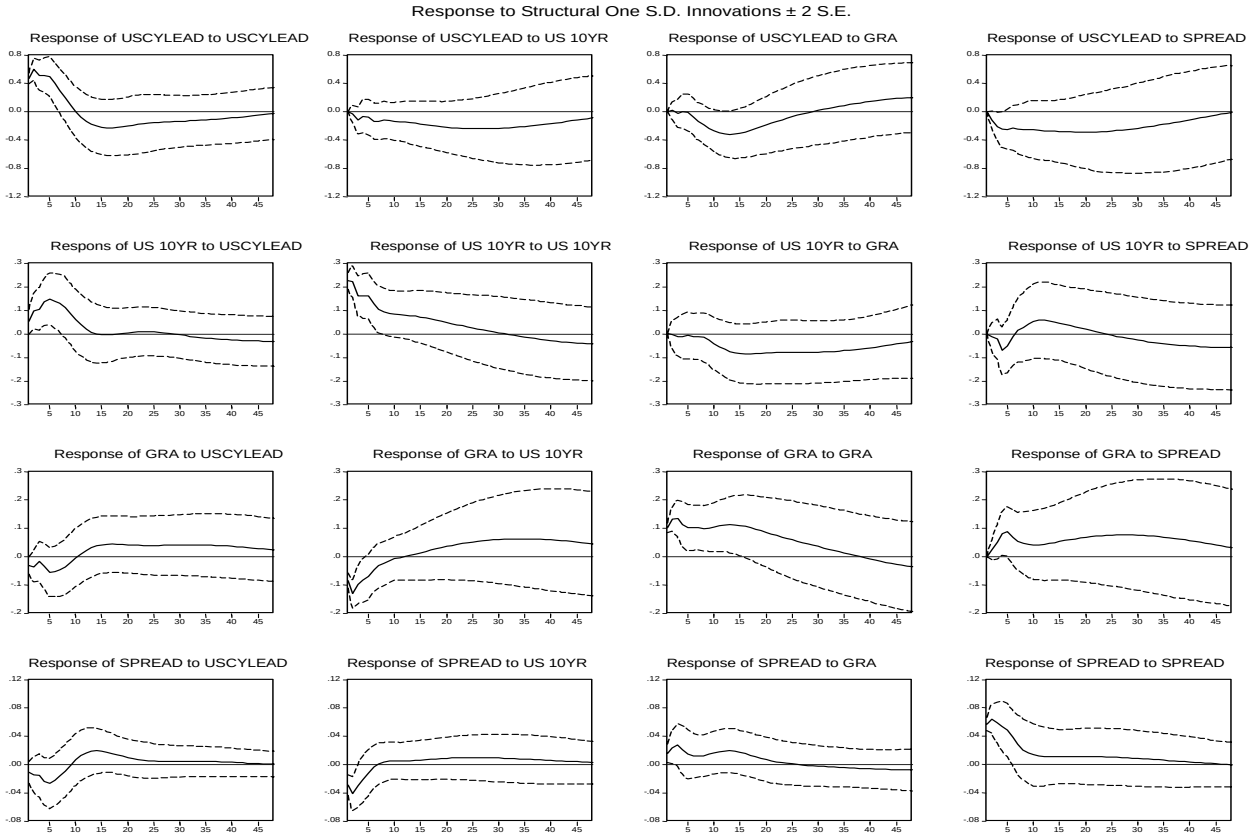


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 15

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

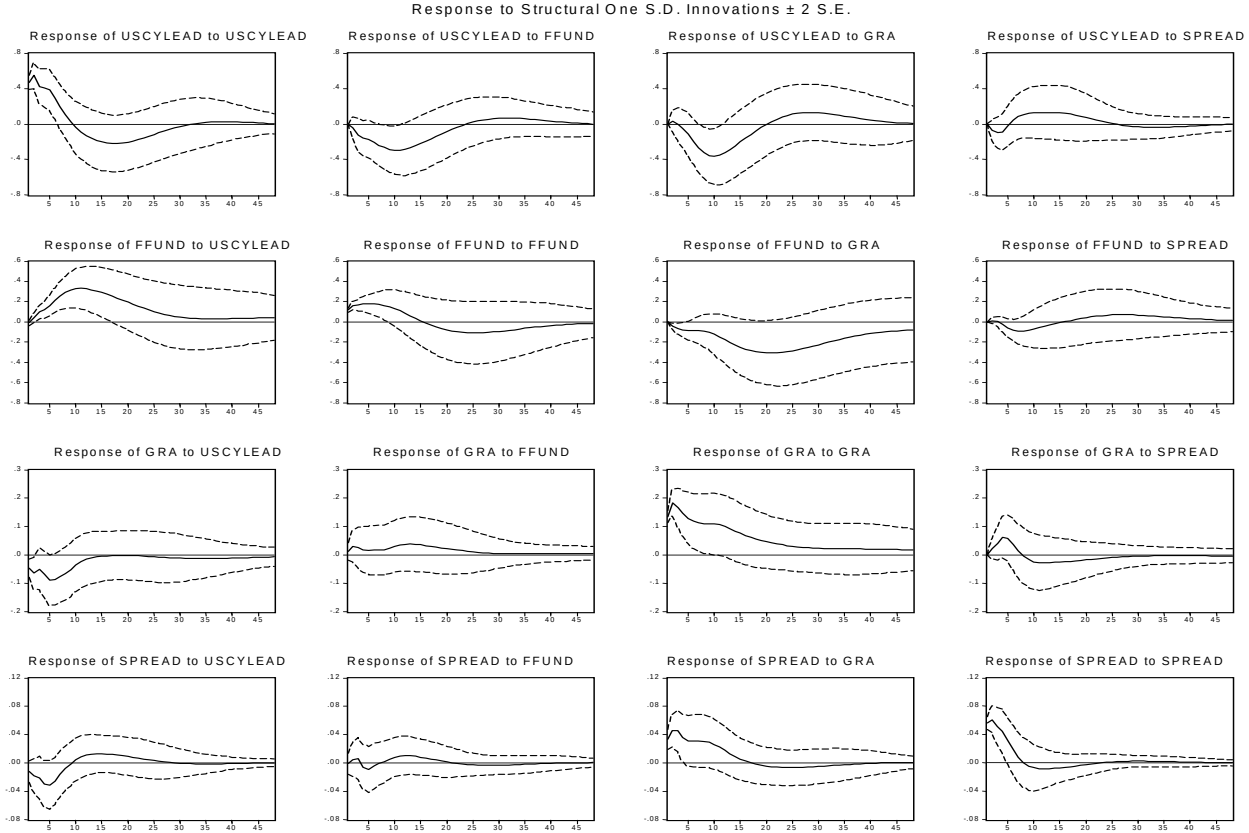


[1/] US Conference Board confidence indicator (USCYLEAD)

[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

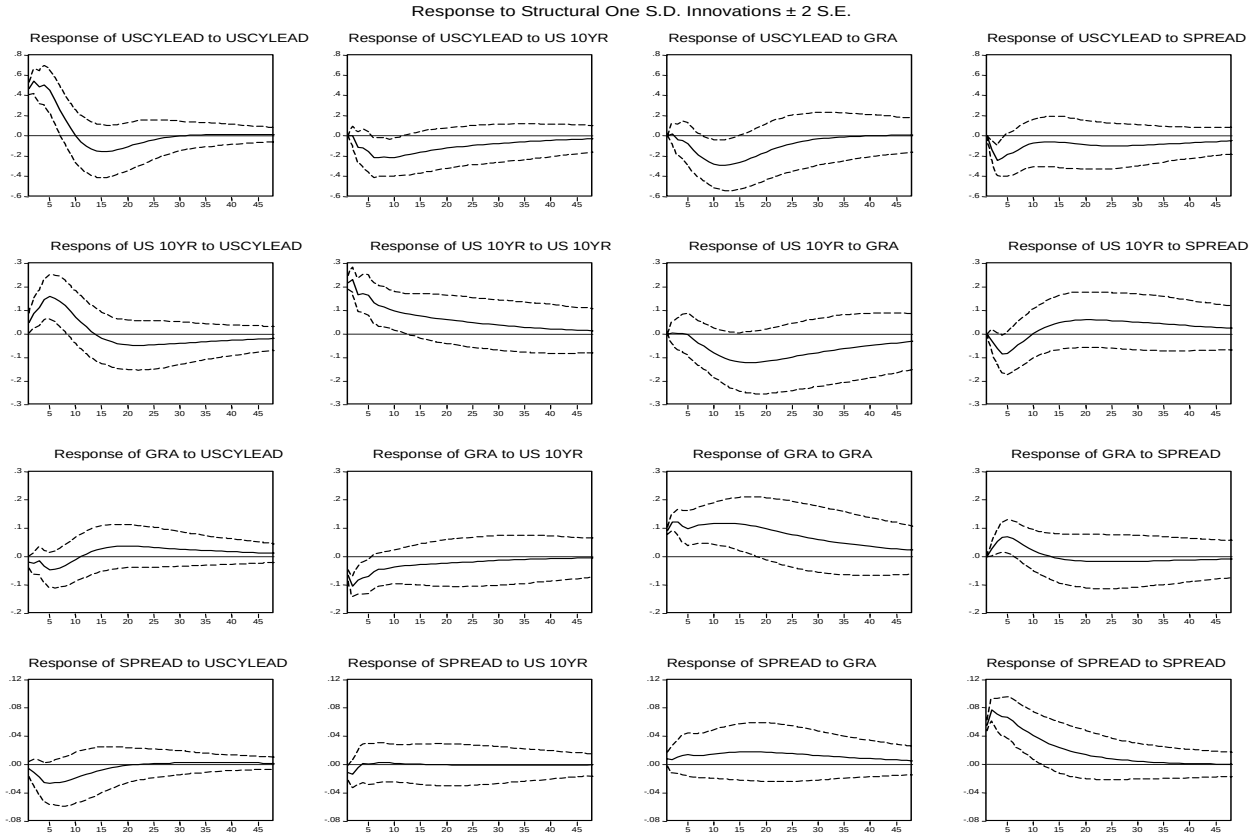


[1/] US Conference Board confidence indicator (USCYLEAD)

[2/] Federal Fund Rate

Table 17

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

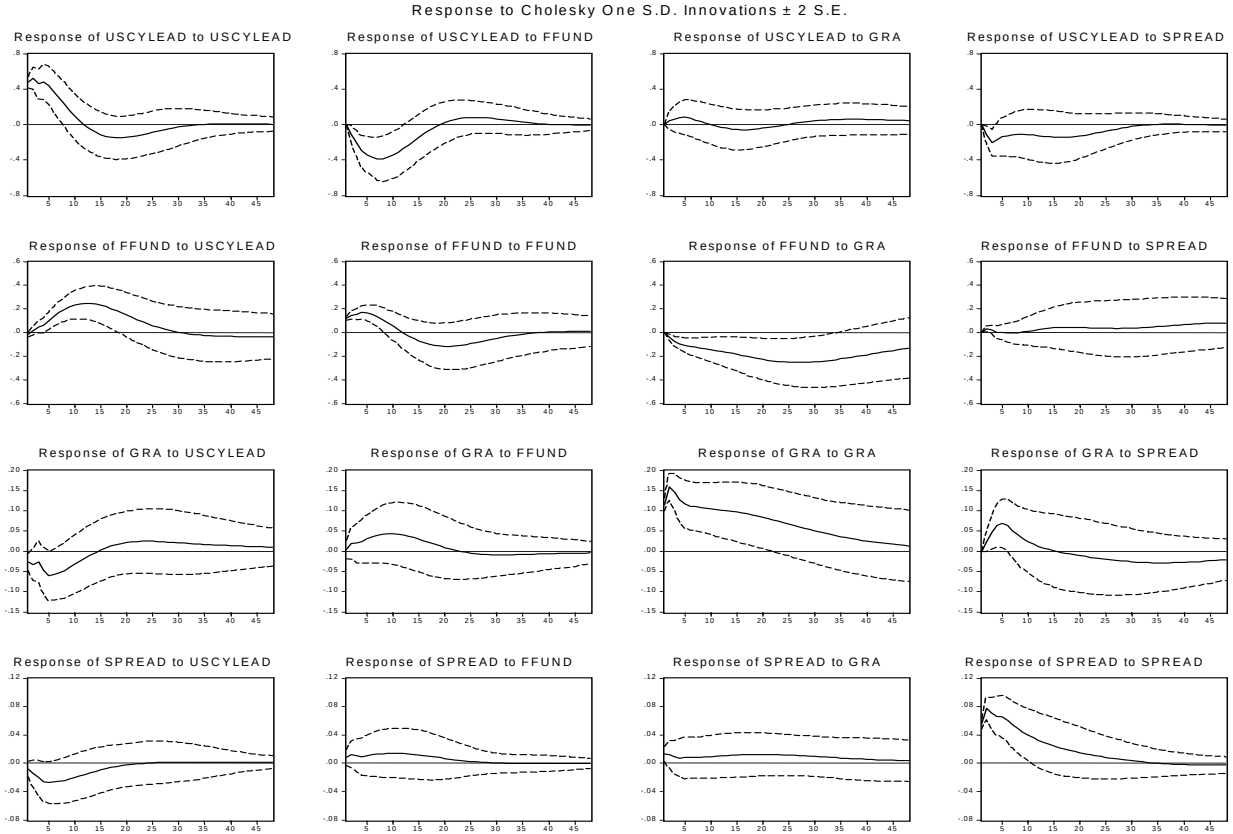


[1/] US Conference Board confidence indicator (USCYLEAD)

[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