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ABSTRACT

This paper analyzes the fiscal and monetary policy responses to crises in Latin America over the last 40 years. We argue that, on average, Latin American countries have "graduated" in terms of their policy responses in the sense that they have been able to switch from procyclical to counteryclical policy responses. This average response, however, masks a great deal of heterogeneity with some countries (such as Chile, Brazil, and Mexico) leading the graduation process and others (like Argentina and Venezuela) still showing procyclical policy responses. We further show that countercyclical policy responses have been effective in reducing the duration and intensity of crises. Finally, we relate our analysis to the current crisis in the Eurozone and argue that, like in many instances in Latin America, procyclical fiscal policy has increased the duration and intensity of the crisis.

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1 Introduction

As much as one may wish otherwise, economic and financial crises have long proved to be an inescapable feature of emerging markets' landscape and will undoubtedly stay with us for as far as one can reasonably foresee.[1] If anything, after the so-called "great moderation" – which, with the benefit of hindsight, proved to be more a mirage than anything else – the recent crises in Eurozone countries such as Greece, Portugal, Ireland, Italy, and Spain clearly suggest that, far from being an endangered species, crises do not discriminate between emerging and industrial countries and will erupt whenever and wherever conditions "warrant it." Moreover, good times – often driven in emerging markets by booms in commodity prices and/or surges in capital inflows – have often tended to mask a myriad of vulnerabilities that only become apparent once the rainy days hit again. At that point, unfortunately, it is typically too late to prepare for the crisis and the rainy days often become hurricane-force storms, aided and abated by contractionary monetary and fiscal policy aimed at defending the currency and averting a debt crisis.

Latin America's "love story" with boom-bust cycles goes literally to its birth as an independent continent. As Marichal (1989) masterfully recounts, the first Latin American debt crisis took place in 1826-1828, after the loan boom of 1822-1825 (which had originated mainly in London, the world financial center at the time) came to a screeching halt with the European financial crisis of 1825-1826. We then observed a succession of new loan booms, followed by major debt crises in 1873, 1890, and 1931. By now, the first century of crises in Latin America covered by Marichal has reached almost two centuries, with major crises in 1982 (Mexico's default), 1994-1995 (the Tequila crisis, triggered by Mexico's December 1994 devaluation), 1997-1998 (global downturn, capital account reversal, and contagion from the 1997 Asian and 1998 Russian crises), 2001-2002 (Argentina's default and exit from a 10-year fixed peg to the dollar), and 2008-2009 (reverberations of the the global financial crisis). We thus count 8 major regional crisis in 200 years of history plus a myriad of lesser and/or more localized crises.

[1] As First Deputy Managing Director of the IMF (from September 1994 to August 2001), Stan was, of course, an astute observer of, and critical protagonist in, many of these crises (in particular, the Tequila crisis that started in December 1994, the Asian crises of 1997-1998, and the Argentinean debacle that culminated in the December 2001 default). Through many speeches and lectures, Stan left us with a wealth of insights and policy lessons that future policymakers will only ignore at their peril.

Latin America's crisis-filled history has thus provided an invaluable, if unwilling, laboratory for the study of financial crises, as a profuse literature can attest.[2] Part of the analysis (particularly in case studies) has, of course, focused on how policymakers have responded to crises from a macroeconomic point of view, how such responses may have helped (or perhaps aggravated) the crisis, and how they may have been shaped by "initial conditions;" that is, the state of the economy when the crisis hit. Much less focus, however, has been put on studying in a more systematic way how policy responses have evolved over time and in particular on how their cyclical properties (countercyclical, acyclical, procyclical?) may have changed, if at all, over time. In fact, casual observation suggests that in some countries (Chile immediately comes to mind) the policy response to crises has been evolving over time (i.e., over the last 30-40 years), with early policy responses involving contractionary (i.e., *procyclical*) monetary/fiscal policy and later responses involving expansionary (i.e., *countercyclical*) monetary/fiscal policy.

In an ironic twist, this phenomenon seems to have coincided with several Eurozone countries travelling back through an economic time tunnel and pursuing during the current crisis contractionary policies (particularly on the fiscal side) that are reminiscent of the typical response in Latin America several decades ago (and still resorted to by several Latin American countries today).

Our goal in this paper is to provide some concrete evidence for the above questions; in particular: how have Latin American countries responded to crises over the last 40 years or so? How has the policy response evolved over time, if at all? Specifically, do we observe, at least in some cases, what we will refer as "policy response graduation"; that is a switch over time from procyclical to countercyclical policy responses to crises? And, finally, is the current policy response in some Eurozone countries of the early Latin American type? After hopefully answering these factual questions, we want to know how initial conditions (debt/GDP ratio, fiscal position, international reserves, and so forth) have affected the policy response? In other words, how can we explain the phenomenon of policy response graduation (or lack thereof?)?[3]

[2] In addition to Marichal (1989), see Calvo (1986), Calvo and Vegh (1999), Corbo and de Melo (1987), Corbo, de Melo, and Tybout (1986), Diaz-Alejandro (1984, 1985), Dornbusch and Edwards (1991), Fischer (1995), Galiani, Heymann, and Tommasi (2002), Hanson and de Melo (1983), Mussa (2002), and Reinhart and Rogoff (2009).

[3] We should note that we will focus only on fiscal and monetary policy. We are therefore

Although our focus on "policy response graduation" is closely related to our recent work on graduation from fiscal and monetary procyclicality in developing countries (see Frankel, Vegh, and Vuletin (2013) and Vegh and Vuletin (2013)), here we take quite a different angle by focusing on policy responses during crises rather than on the overall cyclical behavior of monetary/fiscal policy over the business cycle. Our approach is, in fact, very much in the spirit of Didier, Hevia, and Schmukler (2012), who show that, unlike the crises of the 1990s when emerging economies usually lacked the policy tools that were available to advanced economies to respond countercyclically to external shocks, the 2008-2009 global crisis represented a structural break in the way emerging economies conducted their policies, as many of them were able to implement countercyclical monetary and fiscal policies. A related take is offered by Ortiz *et al* (2009), who argue that looser policies during episodes of sudden stops have reduced output losses during crises, and Corbo and Schmidt-Hebbel (2013) and Alvarez and De Gregorio (2014), who compare the policy responses in Latin America during the global financial crisis to the response to the 1997-1998 Asian crises. Our analysis also complements that of Forbes and Klein's (2014), who focus specifically on the macroeconomic effects of policy responses rather than on how they may have varied over time.

The paper proceeds as follows. Section 2 lays the groundwork by providing an operational definition of a "GDP crisis" for a sample of eight Latin American countries for various sample periods starting as early as 1970:1.[4] We define a crisis as beginning in the quarter in which real GDP falls below the preceding 4-quarter moving average and ending in the quarter in which real GDP reaches the pre-crisis level. Using this definition, we identify 34 crises and characterize their average duration and intensity. Since casual analysis for countries such as Chile and others in the region suggests a policy shift around the year 2000, we choose the year 1998 (a year without any crisis) to divide our sample into a "before" and "after." We show that, just as a descriptive matter, the frequency, duration, and intensity of crises in

abstracting from other, potentially important, policy tools such as reserve requirements. In Federico, Vegh, and Vuletin (2012), we show how developing countries (and Latin American countries in particular) have actively used reserve requirements for macro-stabilization purposes.

[4] As will become clear, quarterly data is essential for our purposes because we wish to characterize monetary/fiscal policy often during relatively narrow windows. This has imposed some limitations in terms of available data.

Latin America has fallen in the post-1998 period. In Section 3, we proceed to analyze the cyclical properties of the fiscal and monetary policy responses to crises. We show that, *on average*, Latin America's fiscal and monetary policy responses to crises have shifted from being procyclical before 1998 to being countercyclical after 1998.[5] In this sense, therefore, we could argue that, on average, Latin America has *graduated* in terms of the policy response to crises. This average response, however, masks a great deal of heterogeneity within our sample, with countries such as Chile and Brazil (and, to some extent, Mexico) leading the way in this graduation process and countries such as Argentina, Uruguay, and Venezuela still showing heavily procyclical policy responses. But have countercyclical policy responses worked? This is the question that we address in Section 4. Leaving aside at this point potential endogeneity problems, we conclude that the evidence suggests that countercyclical policies (particularly fiscal policy) have contributed to lessen both the duration and intensity of crises in Latin America.

Unfortunately, endogeneity problems (hard to tackle and esoteric as they may get) are critical in assessing many policy questions. While our small data sample and peculiar nature of our dependent variable (pooled data from narrow windows) prevent us from running typical IV regressions, we still go some way towards addressing these issues in Sections 5 and 6 by coming up with "instruments" and providing evidence for our main storyline: monetary and fiscal policy have been true responses to crises (as opposed to causing them) and hence the countercyclicality of such policy responses has indeed lessened the duration and intensity of crises (as opposed to policy responses being determined by the duration and intensity of crises). Specifically, in Section 5 we argue that, by and large, most of the 34 GDP crises were driven or triggered by external shocks. To support this, we analyze the context in which each crisis occurred (akin to a narrative approach). We show that external factors such as the oil shocks of the 1970s, increases in global interest rates in 1979-1981, Asian 1997 and Russian 1998 crises, and 2008 global financial crisis have been key determinants or triggers of most GDP crises we identify in Latin America. We provide complementary evidence to this narrative analysis by showing the very high synchronicity (i.e., simultaneous occurrence) of crises in our sample and its very high correlation with external

[5] This is the result of an unweighted average across countries. A similar picture emerges if one calculates a weigthed average (e.g. using the share of each country's GDP in the region), given the relatively importance of Brazil and Mexico.

factors such as the Federal Funds rate (as an indicator of global liquidity) and commodity prices which also suggest that crises have been, to a large extent, exogenous to the policy responses.

In Section 6, we construct what we call "readiness" indices, which are based on initial conditions, and are thus, in principle, exogenous to subsequent policy responses to argue that it is indeed policy responses that have caused changes in duration and intensity of crises.

In Section 7, we turn our attention to the current Eurozone crisis to argue that countries such as Greece, Ireland, Italy, and Portugal have been pursuing procyclical (i.e., contractionary) fiscal policy, as all Latin American countries used to do (and some still do of course). We provide evidence in the form of a fiscal readiness index that suggests that this procyclical fiscal policy has indeed magnified the duration and intensity of the underlying crises.

Section 8 offers some concluding remarks.

2 Crises in Latin America: Definition and basic statistics

Our sample for Latin American countries will consist of what is commonly referred to as LAC-7 (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela) and Uruguay. These 8 economies' GDP comprise almost 93 percent of the Latin American and the Caribbean region's GDP. Table 1 lists the sample period for each of these countries. Unfortunately – and due to the need to have quarterly data for our analysis – the sample period for some countries begins later than in others. For Argentina, for instance, our sample starts in 1970:1, whereas for Venezuela it starts in 1998:1. For all countries except Venezuela, however, our sample starts in 1980 or earlier, which gives us at least 33 years of quarterly data.[6]

Analyzing policy responses to "crises" obviously requires defining a "crisis." For our purposes – and as already mentioned – we will define a crisis as beginning in the quarter in which real GDP falls below the preceding 4-quarter moving average and ending in the quarter in which real GDP reaches the pre-crisis level. As indicated in Table 1, using this definition we identify 34 crises in our 8 Latin American countries. The countries with the largest number of crises are Argentina and Brazil (7 crises each) and the country

[6] See Appendix 9.1 for sources of all the data used in the analysis.

with the least number of crisis is Colombia (2 crises). Given the different sample periods (and the different duration of each individual crisis), the table also reports the frequency of crises (defined as the number of quarters that a given country is in crisis over the total number of quarters in the sample period). Under this metric, Argentina is the country with the highest frequency (0.49), implying that, over the last 43 years, it has been in one crisis or another half of the time, while Colombia is the country with the lowest frequency (0.13). Table 1 also reports the average duration of crises, which is 11 quarters for the whole sample. Uruguay exhibits the longest average duration (18 quarters). The average intensity of crises (measured as the fall in the level of GDP from the start of the crisis to the trough) is 8.6 percent, with Uruguay also having the largest average intensity (14.8 percent).[7]

If we take 1998 as our before-after date, how has the frequency, duration, and intensity of crises change?[8] Table 2 shows the results. On average, we seem to observe higher frequencies before than after 1998. The average frequency of crises fell from 0.42 before 1998 to 0.29 afterwards. This shift is particularly pronounced in Brazil, Chile, Mexico, and Peru where the frequency of crises is halved. A similar shift is observed with the duration of crises; the average duration of crises before 1998 (17.5 quarters) falls to 8 quarters after 1998. As was the case with frequency and duration, the average intensity has diminished after 1998. While the average fall in GDP before 1998 was 14 percent from the start of the crisis to its trough, it is

[7] Appendix 9.2 lists and characterizes each crisis in detail. In particular, it identifies the crisis period, the duration and intensity of the crisis, and, for later purposes, describes the context in which each GDP crisis occurred, paying particular attention to the role of external versus domestic factors as determinant or triggering factors. The appendix also identifies the shape of the GDP crisis (W, L, U, or V shaped), the most prevalent exchange rate regime, and, based on Reinhart and Rogoff (2009), other type of crises (debt, currency, inflation, banking, and stock market) that may have occurred at the same time. Regarding the exchange rate regime, in most cases the exchange rate had some flexibility (in 56 percent of the cases, compared to 35 percent with crawling bands and 9 percent with fixed exchange rates).

[8] While admittedly arbitrary, the choice of 1998 seemed a natural one. First – and as discussed in Frankel, Vegh, and Vuletin (2013) – the late 1990s appears to have been a period where one can detect (through formal regressions using institutional quality as an explanatory variable) a marked improvement in macroeconomic policy. Within this period, 1998 seemed a natural candidate because no crisis took place in that year providing us with a clean break in the series. We also wanted to leave a reasonably large window (15 years in this case) where one can observe the "after" effects. If we modify our before-after date slightly (e.g., 1997 or 2000) our main results are not affected.

just 6.6 percent after 1998. A similar message is conveyed when analyzing the shape of GDP crises in Appendix 9.2. Before 1998 most crises are L, U, or W shaped; however, V shaped crises are more prevalent after 1998. It is important to note that after 1998 the sample includes the global crisis as well as other late 1990s and early 2000s crises triggered by the Asian and Russian and the end of the "dotcom" bubble in the United States in 2001. This proves to be important because, unlike the tail winds in terms of cheap capital and high commodity prices observed during the global crisis, this external bonanza was not present in the late 1990s and early 2000s.

In sum, the evidence is clear in suggesting that the frequency, duration, and intensity of crises in Latin America has fallen in the post-1998 period. Of course, at this point, there is not much more that we can say about what this may mean in terms of the role of policy responses. The reason is that the fall in any of the three elements (frequency, duration, and intensity) could be due to exogenous factors (for instance, if crises have been mainly caused by external factors, the frequency, duration, and intensity of such shocks could have fallen) or endogenous factors (for example, it might be that the frequency of shocks has fallen exogenously but that the fall in duration and intensity has been due to better policy responses). To begin to address these issues, the next section will characterize the policy responses to crises in Latin America and subsequent sections will focus on endogeneity issues.

3 Policy responses

This section looks at the behavior of fiscal and monetary policy in response to the 34 crises identified in Latin America in the previous section.[9] We begin by looking at the fiscal policy response, both on the spending and taxation side. Table 3 shows for each of the 8 countries in the sample the average correlation during crises periods between the cyclical component of government spending and tax policies and GDP before and after 1998.[10] [11] The table is very telling, as it pinpoints two countries (Chile and Mexico) that

[9] For the time being, we will refer to them as "responses" implying, of course, that the causality has run from the GDP crises to fiscal/monetary policy and not viceversa. We will come back to these issues of causality below.

[10] The cyclical components have been estimated using the Hodrick-Prescott filter.

[11] Notice that for government spending, a positive (negative) correlation indicates procyclical (countercyclical) spending policy, whereas for the tax index, a negative (positive) correlation indicates procyclical (countercyclical) tax policy.

have clearly switched from having a procyclical fiscal policy response before 1998 to a countercyclical policy response after 1998. Not coincidentally, these are countries that are often hailed in the financial press for having considerably improved their macroeconomic management over the years.[12] Some other countries like Brazil and Peru have notably improved in some fiscal dimension (spending or tax). The other four countries tend to show procyclical fiscal response after 1998.[13] In particular, Argentina, Uruguay, and Venezuela all show pronounced procyclical spending responses.

Table 3 also shows the monetary policy response by calculating the average correlation during crises between the cyclical component of a policy rate and/or short-term market rate and real GDP.[14] [15] The four countries that exhibit countercyclical monetary policy response after 1998 are Brazil, Chile, Colombia, and Peru. As illustrated in Figure 1, the monetary policy response to the 2008-2009 global crisis captures much of the 1998 behavior. In Panel B, we can see the sharp drop in policy rates in Chile, Colombia, Peru, and though less dramatic, in Brazil.[16] These are, of course, the same four countries that have shown countercyclical monetary policy in the post-1998 period.[17] In contrast, Panel A shows that in Argentina, Venezuela, and

[12] In fact, Mexico and Chile formally became members of the OECD in 1994 and 2010, respectively.

[13] We should note that Colombia did not have crises before 1998 and we do not have data for Venezuela before 1998.

[14] Notice that in this case a positive (negative) correlation indicates a countercyclical (procyclical) policy response.

[15] Conceptually, any standard open economy model with imperfect asset substitution would allow monetary authorities to use interest rates as a policy instrument, even under predetermined exchange rates (see, for instance, Lahiri and Vegh (2003) and Flood and Jeanne (2005)). Needless to say – and although we do not explicitly incorporate it into our analysis of policy responses – the exchange rate regime has typically been a critical dimension of the overall macroeoconomic policy framework, as emphasized in many pieces by Stan Fischer himself (see, for instance, his 1986 and 2001 contributions). Having said that, and as mentioned in Section 2, in most cases the de facto arrangement during the crisis period had some flexiblility.

[16] Chile is the most prominent case, with the Central Bank lowering the monetary policy rate by 775 basis points from 8.25 percent in December 2008 to 0.5 percent in July 2009.

[17] One may argue that the post-1998 countercyclical monetary policies may be heavily influenced by the post-2008 period, particularly if one thought that countries have been able to pursue aggressive countercyclical monetary policies not because countries have improved fundamentals or shifted policy, but rather because reduced rates in advanced economies allowed emerging markets to also cut policy rates without generating large depreciations. Our results do not seem to be driven by this possibility because if we

Uruguay, policy rates actually increased during the global crisis.

While in light of the different fiscal and monetary "graduation" stories described above it is difficult to assess the overall policy stand in the region, it seems that, *on average*, Latin America seems to have improved fiscal and monetary management. While in the pre-1998 period, the spending policy response was clearly procyclical (with a correlation coefficient of 0.56), it fell to almost half (the correlation is 0.27) in the post-1998 period. In terms of taxation policy, the shift from procyclicality to countercyclicality between pre- and post-1998 is even more dramatic (from -0.27 in the pre-1998 period to 0.08 in the post-1998 period). In terms of monetary policy, the shift from procyclicality to countercyclicality between the pre- and post-1998 periods is also quite noticeable (from -0.28 in the pre-1998 period to 0.05 in the post-1998 period). In sum, we have show that, *on average*, Latin America's fiscal and monetary policy responses to crises has shifted from being procyclical before 1998 to being acyclical or even countercyclical after 1998. In this sense, therefore, we could argue that, on average, Latin America has graduated in terms of the policy response to crises.

This average response, however, masks a great deal of heterogeneity across countries. On the one hand, we have countries such as Chile and Brazil, which have switched from pro- to countercyclical policy responses on both the fiscal and monetary front. On the other hand, we have countries such as Argentina and Uruguay that have shown consistent procyclical fiscal and monetary policy responses throughout the entire sample or a country such as Venezuela (for which we do not have data before 1998), which has been procyclical in both its monetary and fiscal policy response after 1998. In other words, while we find helpful to characterize the average behavior for the region, we cannot overemphasize the heterogeneity across the different countries in the region.

4 Has countercyclical policy worked?

We have just shown that, on average, both fiscal and monetary response to crisis in Latin America have become countercyclical (or less procyclical) in

calculate the cyclicality of monetary policy using the difference between the country policy rate and the U.S. Treasury bill rate, our main results remain valid. We should also note that, as follows from Appendix 9.2, 10 of the 18 post-1998 crises are not related to the global financial crisis.

the post-1998 period. We know, of course, that in models of sticky prices countercyclical macroeconomic policies are optimal. For instance, recent theoretical work by Christiano, Eichenbaum, and Rebelo (2011) and Nakata (2013) shows that the optimal fiscal policy in a model with sticky prices is indeed countercyclical.[18] While Christiano, Eichenbaum,and Rebelo (2011) take monetary policy as given, Nakata (2013) shows how both countercyclical monetary and fiscal policy complement each other. In fact, if fiscal policy were not available, the Central Bank would reduce interest rates even more aggressively to raise output and consumption. In related work, which focuses exclusively on monetary policy in a New-Keynesian, small open economy model, Yakhin (2008) shows that the optimal cyclicality of monetary policy may depend on the degree of financial integration: countries integrated in international capital markets find it optimal to pursue countercyclical monetary policy while the opposite is true of countries in financial autarky.

Theoretical work thus clearly suggests that countercyclical policy should alleviate the severity and duration of crises. What does the evidence for our 8 Latin American countries say? To begin to address this question, we will look at correlations between policies and outcomes.[19] Needless to say, this does *not* establish a causal relationship from countercyclical policies to duration and intensity. We will address this issue later in the paper.[20]

Panel A in Figure 2 shows the relation between the cyclicality of spending policy (as captured by the correlation between the cyclical components of government spending and GDP) and the duration of crises. The relation is positive (implying that the more countercyclical fiscal policy is, the lower is the duration of the crisis) and significantly so at least at the 5 percent level. One possible interpretation of this relationship is that countercyclical fiscal policy has indeed helped in reducing the duration of crises in Latin America. Panel B shows that the same is true of the intensity of the crisis: the more countercyclical is spending policy, the lower the fall in GDP from start to trough. Panels C and D show similar findings to those of panels A and B

[18] In fact, both papers show that countercyclical fiscal policy is even more powerful when monetary policy has hit the zero lower bound, though this is naturally much less relevant for emerging countries.

[19] Naturally, this approach does not allows us to account for omitted variables that might be correlated with fiscal and monetary policy.

[20] Having said that – and just for the sake of exposition – we will discuss some of the results in terms of policies causing outcomes but, again, formally the issue of endogeneity is addressed below.

when focusing on tax policy. While the statistical significance decreases, the relationship supports that the more countercyclical tax policy is, the lower is the duration of the crisis and the lower the fall in GDP from start to trough.[21]

In turn, Panels E and F in Figure 2 show the relation between the cyclicality of monetary policy and the duration and intensity of crises. In both cases the slope of the curves is negative, as expected (implying that a more countercyclical monetary policy reduces both the intensity and the duration of crises).

In sum – and leaving aside for the moment potential endogeneity problems – the evidence suggests that countercyclical spending policy has contributed to lessen both the duration and intensity of crises in Latin America. While the evidence is weaker for tax and monetary policy, there is some evidence that it has contributed to reducing the duration and intensity of crisis. In this light, we would interpret the fact that both the average duration and intensity of crises in Latin America has fallen in the post-1998 period as partly reflecting sounder macroeconomic policies in Latin America.

5 Endogeneity problem I: Is the policy response really a "response"?

Needless to say, we need to be very careful with how we interpret the data that we have shown above because of potential endogeneity problems. Further, we must be explicit about our view of the world to determine where the main endogeneity problems may arise. To this effect, Figure 3 offers a very schematic (and admittedly simple) flow chart of our view of the world: (i) external shocks cause a GDP crisis (i.e., whether a crisis takes place or not); (ii) a GDP crisis in turn is characterized by two components: intensity and duration; (iii) the GDP crisis will in turn cause a certain policy response; and (iv) the policy response, in turn, will affect the intensity and duration of

[21] Our finding that countercyclical fiscal policy has helped in reducing the duration and intensity of GDP crises is, of course, related to the issue of how big are fiscal multipliers; see, for instance, Auerbach and Gorodnichenko (2011) and the references therein. In fact, Auerbach and Gorodnichenko (2011) argue that multipliers are larger in bad times than in good times. Riera-Crichton, Vegh, and Vuletin (2014) further suggest that it may matter whether government spending is going up or down and show that, at least for OECD countries, fiscal multipliers are even bigger in bad times when government spending is actually increasing.

the crisis (but not, of course, whether a crisis existed or not to begin with).

In this view of the world, there are two potential reverse causality problems. The first (labeled R1 in Figure 3) is that, contrary to the direction in the flow chart, expected changes in policy could cause a GDP crisis. For example, limited fiscal space may cause markets to expect procyclical responses and, as a result, to withdraw funds immediately after a global or domestic shock. In other words, expected changes in fiscal/monetary policy could be causing a GDP crisis. The second (labeled R2 in Figure 3) is that, contrary to the direction in the flow chart, the duration/intensity of the crisis could be influencing the policy response (for example, the more severe the crisis, the more policymakers may have to contract fiscal policy because of lack of external financing).

This section addresses the first endogeneity problem (R1). This has been a standard issue in the fiscal procyclicality literature, where the typical regression is meant to capture the following relationship:

$$\text{change in fiscal policy} = \alpha + \beta * \text{change in GDP} + \varepsilon,$$

where α and β are coefficients and ε is the error. A positive β would be interpreted as evidence that fiscal policy is procyclical; that is, it expands (contracts) in response to higher (lower) output.[22] In principle, we could try to address this endogeneity problem by instrumenting for GDP, as in Jaimovich and Panizza (2007), Ilzetzki and Vegh (2008), and Vegh and Vuletin (2012). A good instrument would be, of course, some variable that is highly correlated with the change in GDP but does not affect directly the change in fiscal policy.[23] While this is the approach that we have followed in previous work, we would hesitate to do so here because our "relevant sample" (i.e., the set of 34 crises) is small and discontinuous in the sense that it includes isolated and small groups of observations from different periods.

Instead, we first evaluate the background of each crisis in Appendix 9.2 following a narrative approach. We find that, even though domestic policy failures were a factor in many instances, most of the 34 GDP crises were,

[22] Rigobon (2004) and Jaimovich and Panizza (2007) have argued that reverse causality may be responsible for the now standard finding in developing countries that fiscal policy has been procyclical. Ilzetzki and Vegh (2008), however, use several econometric methodologies to establish that there is indeed causality from the cycle to fiscal policy.

[23] The three most common instruments are (i) a trade-weighted average of trade partners' GDP; (ii) some measure of terms of trade; and (iii) the real rate on U.S. treasury bills.

by and large, driven or triggered by external shocks.[24] In fact, the last 40 years have been marked by major regional/global crises that have often hit countries far away from the original epicenter. Examples are the two oil shocks of 1973 and 1979, the rise in international interest rates triggered by Volcker's Federal reserve in 1979-1981, the Latin American debt crisis following Mexico's default in 1982, the Tequila crisis of 1995, the Asian crisis of 1997, the Russian crisis of 1998, Argentina's massive default in 2001, and the global financial crisis of 2008. The global financial crisis is perhaps the most clear example of an exogenous shock hitting Latin American countries and leading to a recession. But other regional crisis, such as the Asian 1997 and Russian 1998 crises, also affected Latin American countries by drastically reducing the supply of international credit and forcing many countries to raise interest rates to defend their currencies.

Second, we provide complementary evidence to this narrative analysis by showing the very high synchronicity (i.e., simultaneous occurrence) of crises in our sample and its very high correlation with external factors such as the Federal Funds rate (as an indicator of global liquidity) and commodity prices, which also suggests that GDP crises have been, to a large extent, exogenous to the policy responses.[25] We define "synchronicity" as the fraction of countries that are in a crisis (as per our definition) in any given quarter. An index of 100 percent, for example, would mean that all of our eight countries are in crisis in a given quarter. An index of 0 percent would mean that no country is in crisis. We take a high synchronicity index as evidence that the crises are being caused mainly by external factors affecting the whole region since the probability that many of our countries are in crisis at the same time for strictly endogenous (and independent) reasons is clearly a very low probability event.[26] If, in addition, we can establish a significant correlation between our synchronicity index and some global factor, we then have an explanation that complements our previous narrative approach as to what is

[24] A few crises, like Peru 2000-2001 and Venezuela 2002-2004, were caused by domestic political factors which, for our purposes, are still exogenous to monetary/fiscal policy.

[25] Conceptually, this approach is very much in the spirit of Ortiz *et al* (2009) who focus on episodes of "systemic sudden stops" as a way of ensuring "exogeneity" of the policy responses.

[26] As a very simple illustration, if we assume that the probability that a country is in crisis for domestic reasons is, say, 50 percent (and domestic-induced crisis are independent events), the probability that all eight countries would be in crisis simultaneously is 0.4 percent (i.e., less than one percent).

causing these simultaneous crises.

Panel A in Figure 4 plots our synchronicity index and the Federal Funds rate. Let us focus first on the synchronicity index. We clearly see four periods of very high synchronicity, which essentially coincide with the timing of major financial crises over the last 35 years, which had widespread international repercussions:

1. **Latin America's debt crisis**: Covers the period from the early to mid/late 1980s, with the synchronicity index starting above 80 percent in 1982:2 and remaining very high throughout the decade. This period essentially covers the infamous "lost decade" that "officially" began with Mexico's default on August 12, 1982, which ushered the most serious debt crisis in Latin America's history.[27] This is also roughly the period analyzed in Diaz-Alejandro's 1982 celebrated paper, which covers the crises in six (Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela) of our eight countries. While acknowledging the relevance of some domestic policy failures, Diaz-Alejandro forcefully argues that the role of negative external shocks (in particular what he refers to as "the breakdown of international financial markets and abrupt change in conditions and rules for international lending" as well as the sharp decline in terms of trade in the early 1980s) played a critical role in turning "a serious but manageable recession into a crisis unprecedented since the early 1930s." The very tight global liquidity conditions were, of course, mainly caused by the rise in the Federal Funds rate engineered by Paul Volcker's Federal Reserve from an average of 11.2 percent in 1979 to a peak of 20 percent in June 1981, pushing unemployment in the United States above 10 percent. Fueled also by interest rate increases in Europe, the corresponding contraction in world trade in 1981 caused prices of primary commodities to fall. The effects of the Latin America's debt crisis persisted throughout the decade with the region's per-capita GDP falling from 112 to 98 percent of world average and from 34 to 26 percent of developed countries (Ocampo, 2013). The lost decade's dramatic effect on GDP shows up clearly in

[27] The 1980's debt crisis was the fifth (and most recent) major debt crisis in almost 200 years of Latin American history. As Marichal (1989) describes in masterful detail, major debt crises took place in 1826-28 (shortly after independence), 1873, 1980, and 1931. Every one of these major debt crises was preceded by heavy borrowing from industrial countries in a context of abundant global liquidity.

Figure 4, Panel A, where we see a high synchronicity from 1982:1 until the end of the decade, followed by fewer and fewer countries in crisis until the index reaches a minimum of 14.3 percent in 1993:3.

2. **Tequila crisis**: Covers the year 1995, when the synchronicity index is almost 60 percent. This is, of course, the immediate aftermath of the so-called Tequila crisis,which started in December 1994 with the devaluation of the Mexican peso and followed a sharp rise in the Federal Funds rate from 3 to 6 percent in five quarters (from 1993:4 to 1995:1). A popular explanation for the Mexican crisis was that an unwillingness of international investors to roll over Tesobonos (short-term dollar- denominated debt), fueled by concerns about global illiquidity and domestic political events (such as the assassination in March 1994 of presidential candidate Colosio), precipitated the crisis. More generally, it has been argued that a high degree of capital mobility and financial globalization was at the root of Mexico's crisis (see Calvo and Mendoza, 1996), which explains why it was dubbed the first financial crisis of the 21st century.

   One of the most notable aspects of the Mexican peso crisis was the surprisingly large spillover effects, particularly on Brazil and Argentina, which endured large capital outflows and increases in interest rates.[28] The contagion was less severe, but still present, in other Latin American countries. Empirical studies, such as Kaminsky and Reinhart (2000) suggest that financial sector linkages, be it through banks or, more generally, international capital markets, explain the bulk of the propagation.

3. **Asian, Russian, and Argentinean crises**: Covers the period from 1999:1 (when the synchronicity index reaches close to 80 percent) to 2001:2 (when the synchronicity index is still 62.5 percent). This period encompasses a series of major international/regional crises that started with the 1997 Asian financial crisis, continued with the Russian 1998 crisis, and culminated with Argentina's massive default in December 2001.

   The Asian financial crisis erupted in July 1997 when the Thai baht was allowed to float after a prolonged and futile defense of a peg. The crisis

[28] See, for example, Calomiris (1999), Galiani, Heymann, and Tommasi (2003), and Appendix 9.2 on Brazil 1995 crisis, based on Carvalho and Pires de Souza, 2011.

quickly spread through East Asia, particularly Indonesia, Korea, and Malaysia. In the aftermath of the Asian financial crisis, international investors cut lending to many developing countries, triggering a global growth slowdown and sharp fall in the price of oil.

The Asian financial crisis was promptly followed by the August 1998 crisis in Russia, when the government devalued the currency and defaulted on the domestic debt. A fixed exchange rate and large fiscal deficits, compounded by the Asian financial crisis and the resulting fall in the prices of crude oil and non-ferrous metals, were the main factors behind this crisis. The crisis quickly spread to the Baltic states and other countries in the region and led to financial tremors around the world.[29]

Finally, in December 2001 Argentina abandoned its 10-year Convertibility regime, whereby the peso was tied to the dollar on a one to one basis in a currency-board type arrangement, and defaulted on more than 90 billion worth of external debt.[30] The Argentinean crisis led in turn to a severe banking crisis in Uruguay in July 2002, as Argentineans withdrew about a third of deposits from Uruguay's banking system in response to a banking freeze in Argentina (see background in Table A.1, based on De la Plaza and Sirtaine, 2005).

4. **Global financial crisis**: The full impact of the global financial crisis in Latin America was felt in the first quarter of 2009, when the synchronicity index reaches 100 percent implying that all of our 8 countries were undergoing a GDP crisis. The collapse of Lehman Brothers on September 15, 2008, triggered major shockwaves around the world as many large financial institutions teetered on the brink of disaster, unable to get short-term funding and with asset prices imploding. The credit crunch and fall in international trade resulting from Lehman's

[29] In fact, the Brazilian crisis of January 1999 (when the peg to the dollar was abandoned and the domestic currency allowed to float) is often partly attributed to the Asian and Russian financial crises, which forced Brazil to raise interest rates to defend the currency and cut fiscal spending to maintain credibility and prevent further capital outflows; see, for instance, Federal Reserve Bank of Dallas (1999) and the Brazilian 1998-1999 crisis in Table A.1, based on De Carvalho and Pires de Souza (2011). In turn, the collapse of Brazil's exchange rate policy was an important factor in Argentina's 1999-2001 recession, which precipitated the December 2001 crisis (see Mussa, 2002).

[30] See Mussa (2002) and Galiani, Heymann, and Tommasi (2003).

fall hit emerging markets very hard, with capital flowing out and currency, asset, and stock market prices plummeting in late 2008/early 2009 (see, for example, Dooley and Hutchison, 2009).

Panel A in Figure 4 indicates that there is a highly significant (at the one percent level) and positive relationship between the level of the Federal Funds rate and our synchronicity index. The corresponding correlation is 0.39. In a similar vein, Panel B shows a highly significant (again at the one percent level) and negative relationship between an index of commodity prices and the synchronicity index (with a correlation of -0.53).[31] Given that both the Federal Funds rate and the index of commodity prices are exogenous to the region, this complementary evidence supports our previous narrative approach in that external factors have played a major role in most of the region's crises during the last 35 years.[32]

6 Endogeneity problem II: The readiness index

As illustrated in Figure 3, a second endogeneity problem could arise because there could be reverse causality from duration/intensity of the crisis to the policy response (labeled R2 in the figure). In other words, our implicit regression would read as:

$$\text{duration/intensity of crisis} = \alpha + \beta * \text{monetary/fiscal response} + \varepsilon.$$

But one could imagine reverse causality in the sense that the duration and/or intensity of a given crisis could affect the corresponding fiscal and/or monetary policy response. For example, a less intense crisis could induce policymakers to act more countercyclically when it comes to fiscal policy (because,

[31] The correlation of our synchronicity index with capital flows to this region is -0.58 (and significant at the one percent level). We should note that there is a large literature on the role of external factors in accounting for capital flows into Latin America. For example, both Calvo, Leiderman, and Reinhart (1993) and Izquierdo, Romero, and Talvi (2008), conclude that around 50 percent of the flows can be accounted for by external factors. This is fully consistent with our main storyline that external factors have accounted for an important fraction, though certainly not all, of crises in Latin America.

[32] Needless to say, some of our eight countries are major commodity producers (two prime examples would be oil in the case of Venezuela and copper in the case of Chile) and their behavior could influence world prices but the effect on a global commodity price index is likely to be minor, if any.

say, less financing is needed). One could misconstrued this fact as implying that a more countercyclical fiscal policy reduced the intensity of the crisis.

To address this endogeneity problem, we develop an index of initial conditions that we will label as the "readiness index." In theory, this readiness index could be a good instrument for the policy response because it tells us how much "fiscal and monetary space" (to use today's jargon) policymakers have to embark on countercyclical monetary and fiscal policy. Hence, we might expect the readiness indices to be positively correlated with the policy response. Furthermore, the readiness index cannot, in principle, directly cause the duration and/or intensity of the crises because the readiness index consists of initial conditions (i.e., variables that have been determined in previous periods and that therefore cannot directly cause today's GDP).[33]

To construct the overall readiness index, we first compute fiscal and monetary readiness indices:

1. Fiscal readiness index: This index attempts to measure the soundness of fiscal policy during the eight quarters (or two calendar years for annual indicators) preceding a crisis. In other words, the index is trying to measure the existing "fiscal space," which in turn should partly determine the extent to which policymakers can engage in countercyclical fiscal policy during the crisis.

   The fiscal readiness index is defined as the sum of two components, each normalized between 0 and 10, which implies that the index may range between 0 (lowest fiscal readiness) and 20 (highest fiscal readiness).[34] The two components are: (i) fiscal deficit as percentage of GDP and (ii) total (public plus private) external debt as percentage of GDP. These variables are widely used in recent papers that formally analyze the issue of fiscal space. In particular, Ostry *et al* (2010) define fiscal space as the difference between a historical debt limit, derived from the

[33] In other words, there is no reason to expect variables such as, say, the current account deficit or debt to GDP ratio in time $t-1$ to have a direct effect on GDP at time t. For this reason, and as will become clear below, we have chosen variables that are, in principle, backward-looking.

[34] We pool together data for Latin American and Eurozone countries to facilitate cross-country comparisons. The only exception in which the lower bound (i.e., worst scenario) of the normalization is carrried out at the regional level is for total (public plus private) external debt as percentage of GDP. For this variable, values for some European countries (such as Ireland in recent times) is close to 1,000 percent of GDP, while the highest value for Latin American economies is about 50 percent of GDP.

country's historical record of fiscal adjustment, and the current level of public debt. Under this definition, either a lower level of existing public debt or a larger primary surplus (in response to, say, rising debt service) would increase the fiscal space.

2. Monetary readiness index: This index attempts to measure the possible limitations faced by central banks in using monetary policy for countercyclical purposes. As argued by Didier, Hevia, and Schmukler (2012) and Vegh and Vuletin (2013), many developing countries have felt the need to use policy interest rates to defend the domestic currency, as opposed to stabilizing output fluctuations. Since bad (good) times are usually associated with capital outflows (inflows), central banks have historically responded by increasing (decreasing) policy rates thus magnifying busts (booms).[35]

   The monetary readiness index is the sum of two components, each normalized between 0 and 10. The index thus ranges between 0 (lowest monetary readiness) and 20 (highest monetary readiness). As in the case of the fiscal readiness index, the monetary components are measured over the eight quarters (or two calendar years) prior to a GDP crisis. The components are: (i) foreign reserves as percentage of GDP and (ii) current account deficit as percentage of GDP. The rationale is as follows. A larger stock of international reserves offers a buffer (or insurance) in bad times which, by reducing the country's vulnerability to sudden shifts in markets' sentiments, should lead to smaller outflows in bad times and hence less currency depreciation. This is, turn, should

[35] The need to defend the domestic currency in bad times is best exemplified by IMF advice during the 1997 Asian crisis. To quote Stanley Fischer himself (at the time the IMF's First Deputy Managing Director) from a 1998 lecture, "[i]n weighing [the question of whether programs were too tough], it is important to recall that when they approached the IMF, the reserves of Thailand and Korea were perilously low, and the Indonesian rupiah was excessively depreciated. Thus, the first order of business was, and still is, to restore confidence in the currency. To achieve this, countries have to make it more attractive to hold domestic currency, which, in turn, requires increasing interest rates temporarily, even if higher interest costs complicate the situation of weak banks and corporations. This is a key lesson of the tequila crisis in Latin America 1994-95, as well as from the more recent experience of Brazil, the Czech Republic, Hong Kong and Russia, all of which have fended off attacks on their currencies in recent months with a timely and forceful tightening of interest rates along with other supporting policy measures. Once confidence is restored, interest rates can return to more normal levels."

allow the monetary authority to engage in countercyclical monetary policy as the need to defend the currency in bad times is not present. A similar argument could be used for the current account deficit, to the extent that a larger current account deficit has traditionally indicated to international credit markets that the risk of a debt crisis is higher which, in turn, should lead to a larger currency depreciation and hence less monetary space because of the need to defend the currency.

Since both the fiscal and the monetary readiness indices take a maximum value of 20, the overall readiness index (which simply adds them up) can take a maximum value of 40. Table 4 shows the fiscal readiness index for each of our eight countries for the pre- and post-1998 periods. With the exception of Argentina and Uruguay, the other four countries (Brazil, Chile, Mexico, and Peru) for which we have pre-and post-1998 data have improved their fiscal readiness index in the post-1998 period compared to before. On average, the fiscal readiness index has increased from 8.6 to 11.1. The best prepared countries from a fiscal point of view are Chile and Colombia.

Table 4 also shows the same figures for the monetary readiness index. In this case, all six countries with pre- and post-1998 data have increased their readiness. On average, the monetary readiness index increased from 8.6 in the pre-1998 period to 10.4 in the post-1998 period.

Finally, Table 4 also reports each of our eight countries's overall readiness index in the pre- and post-1998 periods. A couple of observations are worth making: (i) for the six countries for which we have pre and post-1998 data, all but Uruguay show higher readiness in the post-1998 period than before and, in some instances, by a wide margin (the cases of Chile, Mexico, and Peru stand out); and (ii) on average, the readiness index rose from 17.2 in the pre-1998 period to 21.5 in the post-1998, with a corresponding reduction in the standard deviation as well.

In Figure 5, we correlate the fiscal and monetary readiness indices with the cyclicality of, respectively, fiscal and monetary policy to assess whether they may be good instruments. While in most cases the statistical significance is relatively weak (which is not surprising given that we are using at most 14 observations), in all cases the sign of the relationship is as expected. Using these relationships, Figure 6 shows the relation between the instrumented variable and duration and intensity. In the three cases – and in spite of the small sample – the coefficients have the expected sign and are significant at the 15 percent level for both duration and intensity. In sum, our evidence

suggests a causal relationship from a more countercyclical fiscal/monetary policy response to lower duration/intensity of the crisis.[36]

7 Europe: the new Latin America?

The ongoing crisis in the Eurozone has brought to the table many themes familiar to the Latin American experience in recent decades, such as debt crises, debt restructuring, IMF involvement, and, most importantly for our purposes, the cyclicality of fiscal policy.[37] [38] Our purpose here is to look a the current Eurozone crisis through the lenses that we used above to analyze 40 years of policy responses to crises in Latin America. Table 5 shows the duration and intensity of the current crisis for 10 Eurozone countries.[39] As of the first quarter of 2013 (the last quarter for GDP in our sample), the crisis is ongoing for 7 of the 10 countries and is at least 18 quarters old. Table 5 also shows the intensity, with Greece having lost 24 percent of GDP from the start of the crisis to the trough (last quarter in the sample). The average intensity for the current Eurozone crises is 8.4 percent, which roughly coincides with the average duration of crises in Latin America (8.6 percent, from Table 1).

Of course, due to the common currency, the Eurozone has a single monetary policy conducted by the ECB, which has been clearly countercyclical, as shown in Figure 7. The ECB also reduced reserve requirements on deposits from 2 to 1 percent in January 2012.

But fiscal policy is, of course, another story altogether because it is carried out at the national level. Table 5 shows the correlation between government

[36] One may also argue that the external shocks hitting Latin America were more temporary in the post-1998 period, which enabled countercyclical responses. This concern, however, does not seem to be borne by the data because the inertia (as measured by the coefficient of an AR1 process) observed in the Federal funds rate and the commodity index used in Section 5 is statistically the same in the pre and post 1998 periods.

[37] See Cotarelli (2012) and Frankel (2012) on the debate of "austerity versus growth" which, in our view, is better thought of as a debate on fiscal procyclicality versus countercyclicality.

[38] The reader is referred to Cavallo, Fernandez-Arias, and Powell (2014) for a much broader discussion of the relevance of Latin American's past crises for today's situation in Eurozone countries. We instead limit our focus to the role of procyclical/countercyclical fiscal policy.

[39] The countries are Austria, Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain.

spending and real GDP for each of our 10 Eurozone countries.[40] We can see that four countries (Greece, Ireland, Italy, and Portugal) have exhibited a positive correlation (i.e., have been procyclical) with Greece, not surprisingly, the most procyclical of all.[41] To what extent is procyclical fiscal policy aggravating the duration and intensity of the crises? Figure 8 shows that there is a positive and significant relationship between fiscal procyclicality and duration (Panel A) and intensity (Panel B).

But could Figure 8 reflect reverse causality? To address this concern – and following what we did for Latin American countries above – we compute the fiscal readiness index for our 10 Eurozone countries (Table 5). We should emphasize that since the global financial crisis originated in the industrial countries, the endogeneity concern discussed in Section 5 may be of particularly relevance in this case. (Although, on the other hand, one could argue that the epicenter was the United States and not the Eurozone.) This concern might be compounded by the fact that policy responses may be correlated across European countries. Therefore, one should take the findings for Europe with a grain of salt relative to the case of Latin America.

In Figure 9, we then show a highly significant correlation between the fiscal readiness index and fiscal policy, as captured by the correlation between the cyclical component of government spending and real GDP. This is tantamount to saying that we have a valid instrument. Finally, in Figure 10 we show a significant relation between our instrument for fiscal readiness and the duration (Panel A) and intensity (Panel B) of crises. We thus conclude that, indeed, procyclical fiscal policy in some Eurozone countries seems to have contributed to making the current crisis longer and more severe.

[40] Given the short time span and, more importantly, the infrequent changes in tax rates we are unable to construct meaningful correlations between the cyclical components of tax policy and real GDP.

[41] In the terminology used in Frankel, Vegh, and Vuletin (2013), these would be "back to school" cases; that is, cases of "reverse graduation." In that paper, we also show that, historically, industrial countries have been countercyclical, so this represents a policy shift. The reason behind this policy shift is not easy to ascertain but likely reflects the presumption that long-term gains in terms of fiscal reforms and policy credibility would outweight the short-term costs of fiscal austerity. But, as is well-known, these policy choices (and their effectiveness so far) continue to be highly controversial even in leading Eurzone countries such as France, and a deeper analysis will need to await the passage of time.

8 Conclusions

This paper has focused on how the monetary/fiscal policy response to crises in Latin America has evolved over the last four decades. We have shown that there are several countries (Chile and Brazil and, to some extent, Mexico) that have graduated in terms of their policy response, in the sense that they have switched from a procyclical to a countercyclical response. Further, such countercyclical policy responses have been effective in reducing the duration and intensity of GDP-crises. On the other hand, other countries such as Argentina, Uruguay, and Venezuela have continued to be procyclical.

We then related our discussion to the current crises in the Eurozone and show that, much in Latin American style, several Eurozone countries have responded procyclically in terms of their fiscal policy and thus increased the duration and intensity of the underlying recession.

References

[1] Alvarez, Cesar J. and Stephanie Hanson, "Venezuela's oil-based economy," Council on Foreign Relations (2009).

[2] Alvarez, Roberto, and Jose De Gregorio, "Why did Latin America and developing countries perform better in the global financial crisis than in the Asian crisis?" paper presented at the 14th Jacques Polak Annual Research Conference in honor of Stanley Fischer (IMF, 2014).

[3] Auerbach, Alan, and Yuriy Gorodnichenko, "Fiscal multipliers in recession and expansion," NBER Working Paper No. 17447 (2011).

[4] Calomiris, Charles, "Lessons from the Tequila crisis for successful financial liberalization," *Journal of Banking and Finance* (1999).

[5] Calvo, Guillermo A., "Fractured liberalism: Argentina under Martinez de Hoz," *Economic Development and Cultural Change*, Vol. 34 (1986), pp. 511-533.

[6] Calvo, Guillermo A., and Enrique Mendoza, "Mexico's balance-of-payments crisis: A chronicle of a death foretold," *Journal of International Economics*, Vol. 41 (1996), pp. 235-264.

[7] Calvo, Guillermo A., Leonardo Leiderman, and Carmen M. Reinhart, "Capital inflows and real exchange rate appreciation in Latin America: The role of external factors," *IMF Staff Papers*, Vol. 40 (1993).

[8] Calvo, Guillermo A., and Carlos A. Vegh, "Inflation stabilization and BOP crises in developing countries" in John Taylor and Michael Woodford, eds., *Handbook of Macroeconomics* (Volume C; North Holland, 1999), pp. 1531-1614.

[9] Cavallo, Eduardo, Eduardo Fernandez-Arias, and Andrew Powell, "Is the Eurozone on the mend?" IDB Working Paper Series No. 525 (2014).

[10] Christiano, Lawrence, Martin Eichenbaum, and Sergio Rebelo, "When is the government spending multiplier large?" *Journal of Political Economy*, Vol. 119, pp. 78-121.

[11] Corbo, Vittorio, and Jaime de Melo, "Lessons from the Southern Cone policy reforms," *World Bank Research Observer,* Vol. 2 (1987), pp. 111-142.

[12] Corbo, Vittorio and Klaus Schmidt-Hebbel, "The international crisis in Latin America," *Monetaria* (2013), pp. 37-62.

[13] Corbo, Vittorio, Jaime de Melo, and James Tybout, "What went wrong with the recent reforms in the Southern Cone?" *Economic Development and Cultural Change*, Vol. 34 (1986), pp. 607-740.

[14] Cottarelli, Carlo, "Fiscal adjustment: Too much of a good thing?" VoxEU.org (2012).

[15] De Carvaho, Fernando J. Cardim, and Francisco E. Pirez de Souza, "Brazil in the 2000's: Financial regulation and macroeconomic stability," unpublished manuscript (Universidad Federal de Rio de Janeiro, 2011).

[16] De la Plaza, Luis and Sophie Sirtaine, "An analysis of the 2002 Uruguayan banking crisis," World Bank Policy Research Working Paper 3780 (2005).

[17] Diaz-Alejandro, Carlos F., "Latin American debt: I don't think we are in Kansas anymore," *Brookings Papers on Economic Activity* (1984), pp. 335-403.

[18] Diaz-Alejandro, Carlos F., "Good-bye financial repression, hello financial crash," *Journal of Development Economics*, Vol. 19 (1985), pp. 1-24.

[19] Didier, Tatiana, Constantino Hevia, and Sergio Schmukler, "How resilient and countercyclical were emerging economies to the global crisis?" *Journal of International, Money and Finance*, Vol. 31 (2012), pp. 2052-2077.

[20] Dooley, Michael and Michael Hutchison, "Transmission of the U.S. subprime crisis to emerging markets: Evidence on the decoupling-recoupling hypothesis," *Journal of International, Money and Finance*, Vol. 28 (2009), 1331-1349.

[21] Dornbusch, Rudiger, and Sebastian Edwards, *The macroeconomics of populism in Latin America* (University of Chicago Press, 1991).

[22] Federal Reserve Bank of Dallas, "Brazil: The first financial crisis of 1999," *Southwest Economy* (March/April 1999), pp. 13-14.

[23] Federico, Pablo, Carlos A. Vegh, and Guillermo Vuletin, "Macroprudential policy over the business cycle" (World Bank, 2012).

[24] Fischer, Stanley, "Exchange rate versus money targets in disinflation," Chapter 8 in *Indexing, inflation, and economic policy* (MIT Press, 1986).

[25] Fischer, Stanley, "The IMF after fifty years and the Mexican crisis," unpublished speech (1995).

[26] Fischer, Stanley, "Applied economics in action: IMF programs," *American Economic Review*, Papers and Proceedings (1997), pp. 23-27.

[27] Fischer, Stanley, "The IMF and the Asian crisis," UCLA Forum Funds Lecture (1998).

[28] Fischer, Stanley, "Exchange rate regimes: Is the bipolar view correct?" *Journal of Economic Perspectives*, Vol. 15 (2001), pp. 3-24.

[29] Flood, Robert and Olivier Jeanne, "An interest rate defense of a fixed exchange rate?" *Journal of International Economics*, Vol. 66 (2005), pp. 471-484.

[30] Forbes, Kristin J. and Michael W. Klein, "Pick you poison: The choices and consequences of policy responses to crises," paper presented at the 14th Jacques Polak Annual Research Conference in honor of Stanley Fischer (IMF, 2014).

[31] Frankel, Jeffrey, "The procyclicalists: Fiscal austerity vs. stimulus," VoxEU.org (2012)

[32] Frankel, Jeffrey, Carlos A. Vegh, and Guillermo Vuletin, "On graduation from fiscal procyclicality," *Journal of Development Economics*, Vol. 100 (January 2013), 32-47.

[33] Galiani, Sebastian, Daniel Heymann, and Mariano Tommasi, "Missed expectations: The Argentine convertibility," William Davidson Working Paper No. 515 (University of Michigan, 2002).

[34] Hanson, James and Jaime de Melo, "The Uruguayan experience with liberalization and stabilization, 1974-1981," *Journal of Interamerican Studies and World Affairs*, Vol. 25 (1983), pp. 477-508.

[35] Ilzetzki, Ethan, and Carlos A. Vegh, "Procyclical fiscal policy in developing countries: Truth or fiction?" NBER Working Paper No. 14191 (2008).

[36] Izquierdo, Alejandro, Randall Romero, and Ernesto Talvi, "Booms and busts in Latin America: The role of external factors," IDB Working Paper No 631 (2008).

[37] Jaimovich, Dany, and Ugo Panizza (2007). "Procyclicality or Reverse Causality?" *RES Working Papers* 1029. Inter-American Development Bank, Research Department.

[38] Kaminsky, Graciela, and Carmen M. Reinhart, "On crises, contagion, and confusion," *Journal of International Economics*, Vol. 51 (2000), pp. 145-168.

[39] Lahiri, Amartya and Carlos A. Vegh, "Delaying the inevitable: Interest rate defense and BOP crises," *Journal of Political Economy*, Vol. 111 (2003), pp. 404-24.

[40] Marichal, Carlos, *A century of debt crises in Latin America* (Princeton University Press, 1989).

[41] Mussa, Michael, *Argentina and the Fund: From triumph to tragedy* (Institute for International Economics, 2002).

[42] Nakata, Taisuke, "Optimal fiscal and monetary policy with occasionally binding zero bound constraints" FEDS Working Paper No. 2013-40 (Federal Reserve Board, 2013).

[43] Ocampo, Jose Antonio, "The Latin American debt crisis in historical perspective," unpublished manuscript (Columbia University, 2013).

[44] Ortiz, Alberto, Pablo Ottonello, Federico Sturzenegger, and Ernesto Talvi, "Monetary and fiscal policies in a sudden stop: Is tighter brighter?" IDB Working Paper (2009).

[45] Ostry, Jonathan D., Atish R. Ghosh, Jun I. Kim, and Mahvash S. Qureshi, Fiscal Space," IMF Staff Position Note SPN/10/11 (2010).

[46] Reinhart, Carmen M., and Kenneth Rogoff, *This time is different: Eight centuries of financial folly*, Princeton University Press (2009).

[47] Riera-Crichton, Daniel, Carlos A. Vegh and Guillermo Vuletin. "Procyclical and countercyclical fiscal multipliers: Evidence from OECD countries." Forthcoming in *Journal of International Money and Finance* (2014).

[48] Rigobon, Roberto, discussion on "When it rains it pours: Procyclical capital flows and macroeconomic policies." in *NBER Macroeconomics Annual*, edited by Mark Gertler and Kenneth Rogoff, Cambridge, MA: MIT Press (2004).

[49] Vegh, Carlos A., and Guillermo Vuletin, "How is tax policy conducted over the business cycle?" NBER Working Paper No. 17753 (2012). Forthcoming in *American Economic Journal: Economic Policy.*

[50] Vegh, Carlos A., and Guillermo Vuletin, "Overcoming the fear of free falling: Monetary policy graduation in emerging markets," NBER Working Paper No. 17753 (2013), forthcoming in *The role of Central Banks in financial stability: How has it changed?* (Federal Reserve Bank of Chicago).

[51] Yakhin, Yossi, "Financial integration and cyclicality of monetary policy in small open economies," Discussion Paper No. 08-11 (Ben-Gurion University, 2008).

9 Appendices

9.1 Data definition and sources

Real GDP: Most data are from Global Financial Data, International Financial Statistics (IFS/IMF), OECD, Eurostat, and CEPAL. In some cases, we used local sources to complement our data: Argentina (Central Bank of Argentina), Brazil (Institute for Applied Economic Research), and Uruguay (Central Bank of Uruguay).

Interest rates: We take short-term interest rates as a proxy for the stance of monetary policy. In some cases, we have data for overnight interbank interest rates, such as the Federal Funds rate in the United States. In most cases, however, we rely on discount rates due to their longer availability. Source: Global Financial Data.

Government spending: In some cases, we have data for final consumption expenditure of general government. In most cases, however, we rely on total government expenditure of general government. Sources: Global Financial Data, IFS/IMF, OECD, and Eurostat.

Taxes: For tax policy we use the cyclical component of a tax index constructed by Vegh and Vuletin (2014). This index is based on VAT, personal, and corporate tax rates as opposed to revenue-based measures such as cyclically- adjusted revenues; see Vegh and Vuletin (2014) for details.

Fiscal deficit as percentage of GDP: WEO (IMF).

Total (public plus private) external debt as percentage of GDP: From Reinhart and Rogoff (2009).

Foreign reserves as percentage of GDP: WDI (World Bank).

Current account deficit as percentage of GDP: WEO (IMF).

9.2 Chronology of crises

Table A.1 presents a detailed characterization of each of our 34 crises, including background information on the relative importance of domestic versus external factors.

Appendix 9.2 Chronology of crises in Latin America

Argentina

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1975:3-1976:4	6	-3.4 %	***1973 oil shock - Rodrigazo.*** After more than ten years of steady growth, Argentina was strongly affected by the 1973 world oil shock and protectionist responses in major export markets in Europe. Isabel Peron's government faced a rising fiscal deficit (which reached 14% of GDP) and several speculative attacks that led to a 56% loss of foreign exchange reserves in spite of limited convertibility. In June 1975, Minister of Finance Celestino Rodriguez implemented an adjustment package, which included a devaluation of more than 100% and exchange and wage controls.	W-shaped	currency, inflation, stock market	floating
1977:4-1978:4	5	-7.4 %	***Aftermath of 1973 oil shock - Rodrigazo.***			
1981:1-1987:2	26	-13 %	***Argentina's debt crisis.*** During the early 1980s, Argentina was hit by the Latin American debt crisis (see text), which led to bank runs and a dearth of international credit. As a result of a growing fiscal deficit and low external financing costs due to the "petro-dollars" of the 1970s, Argentina's external debt doubled between 1976 and 1979 (from 10 to 20 billion dollars). Rising international interest rates in 1979-1981, unsustainable debt and current account dynamics, and the abandonment of the so-called tablita (an exchange-rate based inflation stabilization plan based on a pre-announced path of the nominal exchange rate) in February 1981 all contributed to capital flight, a collapse of the financial system, higher inflation, and negative per-capita growth in 1981, 1982, and 1985.	L-shaped	debt, currency, inflation, banking, stock market	floating
1988:2-1991:3	14	-15.9 %	***Argentina's hyperinflation.*** Argentina's inflation in the late 1980s was fueled by heavy external as well as domestic borrowing, severe fiscal imbalances (which were mostly monetized), and the failure of previous stabilization plans (Austral and Primavera). Inflation in 1989 was about 1900% and the exchange rate rose from 24.3 Australes per dollar in early 1989 to 1950 at the end of the year. The hyperinflation also increased social unrest as poverty rose from 25% in early 1989 to about 48% in October of the same year.	U-shaped	debt, currency, inflation, banking, stock market	floating
1995:2-1996:1	4	-4.9 %	***Tequila crisis (see text).*** The devaluation of the Mexican peso in December 20, 1994, triggered a sudden stop in Argentina (see text). Foreign currency deposits in domestic banks decreased by about 7 billion dollars (between December 20, 1994 and March 22, 1995. The resulting banking crisis led to the closure of 50 banks and 266 branches. Several measures were adopted to deal with heavy liquidity pressures in the financial system. The fall in economic activity reduced consumption as the government increased tax pressure and cut spending. The resulting lower current account deficit and improved fiscal position in turn made it easier to deal with the sharp fall in available external financing.	V-shaped	banking	currency board
1998:4-2004:4	25	-20.4 %	***Debt default and end of Convertibility plan.*** With the peso pegged to the dollar in the context of the Convertibility plan, Argentina fell into a severe recession in late 1998, triggered by a series of adverse external shocks, including low commodity prices and appreciation of the dollar -- which worsened the current account deficit -- the Russian crisis of 1998 (see text), and the Brazilian devaluation of January 1999 (see text). The lack of competitiveness (due to an overvalued peso) together with fiscal profligacy finally took their toll. The increased perception of currency risk also generated a massive withdrawal of bank deposits. The ensuing full-blown crisis led to a sovereign debt default in the last week of 2001 and the abandonment of the Convertibility plan in January 2002	L-shaped	debt, currency, inflation, banking, stock market	floating and crawling band
2009:1-2009:2	2	-2 %	***Global financial crisis*** **(see text)**	V-shaped	debt	crawling band

Brazil

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1981:1-1984:4	16	-8.5 %	***Brazil's debt crisis.*** In the early 1980s, Brazil was hit by the Latin American debt crisis (see text), which worsened Brazil's balance of payments and external debt problems. In response, the government implemented a series of measures aimed at reducing imports and increasing exports. The end of external financing, following the 1982 Mexican default, increased pressures for macroeconomic adjustment, and led to currency depreciation and inflation.	W-shaped	debt, currency, inflation	floating
1987:3-1989:1	7	-3.7 %	***Brazil's hyperinflation.*** As a result of the debt problem and the monetization of large part of its fiscal deficit, Brazil's annual inflation reached 225% in 1985. The government unleashed several attempts to bring inflation under control through three "heterodox" inflation stabilization plans: the Cruzado Plan (1986), the Bresser Plan (1987), and the Summer Plan (1989). All three programs, which were not accompanied by any serious fiscal reform, failed to permanently reduce inflation. Brazil then entered into a hyperinflationary phase, with annual inflation reaching about 2400% in 1990.		debt, currency, inflation	floating
1990:1-1993:2	14	-6.8 %	***Plan Collor.*** The administration of Collor de Mello (1990-92) implemented a new stabilization plan to control inflation (including a price freeze and removal of indexation) and reforms aimed at increasing competition among firms, privatizing state-owned enterprises, and boosting productivity. Few of the new administration's programs, however, were actually implemented due to lack of political support. It was not until the Plan Real of 1994 that inflation started to fall.		debt, currency, inflation, banking, stock market	floating
1995:3-1995:4	2	-1.7 %	***Tequila crisis (see text).*** Shortly after achieving price stability with the Real Plan, Brazil was hit by the dearth of capital inflows triggered by the Tequila crisis (see text). Together with a widening current account deficit, this forced the Central Bank to sharply raise interest rates to stop capital flight. High interest rates and the loss of inflation revenues contributed to the banking crisis of 1995, which resulted in the closing of three of the ten largest banks and the failure of a large number of medium and small financial institutions.	V-shaped	currency, inflation, banking	crawling band
1998:4-1999:3	4	-1.5 %	***Asian and Russian crises (see text).*** The lack of competitiveness (due to a long period of overvaluation) and persistent fiscal deficits increased the external debt. The Asian 1997 and Russian 1998 crises (see text) led to a capital account reversal that put pressure on the peg. In spite of a resolute defense of the currency by means of higher interest rates, the peg was abandoned in January 1999.	V-shaped	currency	floating
2001:3-2001:4	2	-0.7 %	***End of "dotcom" bubble in the United States and 2001 Argentinean crisis.*** Two external shocks, the bursting of the "dotcom" bubble in the United States (and accompanying recession in the United States and Europe) and the recession in Argentina that preceded the December 2001 crisis triggered a brief recession in Brazil.	V-shaped	currency, stock market	floating
2008:4-2009:3	4	-5.4 %	***Global financial crisis (see text).***	V-shaped		floating

Chile

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1981:4-1987:3	24	-20.2 %	***Chile's debt crisis.*** The 1982 crisis in Chile was the worst since the 1930s. Chile's reliance on external markets and high foreign debt (which increased from 3.5 billion dollars in 1973 to 17 in 1982) made it extremely vulnerable to the deteriorating international environment that preceded the Latin American debt crisis (see text). In 1982, Chile was hit particularly hard as foreign loans dried up and the terms of trade worsened. As a result, GDP fell sharply, unemployment reached 23.7%, and widespread social unrest took place. In June 1982, the government devalued the exchange rate by about 18% (putting an end to a fixed exchange rate in place since June 1979), intervened five banks, and closed other three. In early 1983, the financial sector was nationalized as a way to avoid a major banking crisis, and a number of subsidy schemes favoring debtors were enacted.	L-shaped	debt, currency, inflation, banking, stock market	floating
1998:4-1999:3	4	-3.9 %	***Asian and Russian crises (see text).*** The global downturn triggered by the Asian and Russian crises reduced demand for all commodities, with copper prices hitting a 12-year low. As a result, government revenues from copper (Chile's main export) plunged to 450 million dollar in 1998 from 1.7 billion in 1997. Annual real GDP growth, which averaged 8% during 1991-1997, was halved in 1998 and the current account deficit increased significantly. The central bank adopted a tight monetary policy to keep the current account deficit in check.	V-shaped		crawling band
2008:4-2010:1	6	-2.7 %	***Global financial crisis (see text)***	V-shaped		crawling band

Colombia

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1998:3-2002:1	15	-6.8 %	***Asian and Russian crises (see text).*** Between the early 1990s and 1997 there was a rapid increase in the fiscal and current account deficits in Colombia, which were mainly financed with capital inflows. This led, in turn, to a sharp increase in both private and public external debt as well as an overvaluation of the peso. The fall in global liquidity as a result of the Asian and Russian crises (see text) thus found Colombia in a very vulnerable position. In 1999, the country fell into its first recession since the Great Depression. The economy shrank by 4.5% with unemployment reaching more than 20%. The peso was devalued several times and finally let float. Colombia also received from the IMF a USD 2.7 bn guarantee (extended funds facility), in exchange for a government commitment to budget discipline and structural reforms.	V-shaped	banking, currency, stock market	crawling band
2008:4-2009:3	4	-1.1 %	***Global financial crisis (see text).***	V-shaped		crawling band

Mexico

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1982:2-1984:4	11	-4.3 %	***Mexican's debt crisis.*** Fueled by the oil booms of the 1970s, Mexican GDP increased by an annual rate of 7% between 1973 and 1981. During the same period, central government spending increased by 11% annually and the resulting fiscal deficit was financed by "petro-dollars." The GDP and spending booms came to a screeching halt in the early 1980s with Volcker's interest rate increases, the worldwide recession, and fall in the price of oil. At the same time, domestic commercial banks began to shorten repayment periods and increase lending rates. By mid-1982 Mexico found itself unable to service its spiraling external debt and defaulted on an 80 billion dollar debt. Other countries quickly followed suit. Ultimately, sixteen Latin American countries rescheduled their debts, as well as eleven emerging markets. As result, there was a sudden stop that plunged many Latin American countries into deep and long lasting recessions.	W-shaped	debt, currency, inflation, banking, stock market	floating
1986:1-1988:4	12	-4.2 %	***Aftermath of Mexican's debt crisis.***		debt, currency, inflation	floating
1995:1-1997:1	9	-9.8 %	***Tequila crisis (see text).***	V-shaped	currency, inflation, banking, stock market	floating
2001:2-2002:1	4	-2.7 %	***US recession.*** The United States experienced an economic slowdown in the early 2000s, with the annual growth rate falling from about 4.3% in the second half of the 1990s to 1.1% in 2001. Mexico's trade integration with the U.S. (at the time 82% of Mexican exports were destined to the U.S.) and the importance of remittances from the U.S. hurt Mexico's economic growth in 2001-2002.	V-shaped		floating
2008:4-2010:3	8	-7.9 %	***Global financial crisis (see text).***	V-shaped	currency, stock market	floating

Peru

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1982:2-1986:1	16	-12.2 %	***Peru's debt crisis.*** During the second (non-consecutive) term of President Belaúnde Terry (1980-1985), the country faced several serious economic problems: a fall in the price of metals (which represented about a third of Peru's GDP), economic dislocations inherited from the military "junta" that left power in 1980, the deteriorating international environment that preceded the Latin American debt crisis, and several natural disasters that devastated Peru's economy. The end of external financing following the 1982 Mexican default increased pressures for macroeconomic adjustment, and led to currency depreciation and inflation. Inflation increased from 59% in 1980, to 111% in 1983 and 163% in 1985.	W-shaped	debt, currency, inflation, banking, stock market	floating
1988:1-1996:4	36	-34.4 %	***Peru's hyperinflation***. Elected in 1985, President Alan Garcia promised economic reforms aimed at tackling high inflation, external imbalances, and the debt burden in the context of a heterodox economic program. In particular, he imposed price controls and announced that debt service would be limited to 10% of export earnings. While public spending was relatively contained, the primary fiscal deficit grew to 6.5 percent in 1987 due to a reduction in VAT rates from 13.8% in 1984 to 6% in 1987 in an attempt to boost private consumption. While the first two years of García's administration showed some signs of economic growth and reduced inflation, the fiscal and external front problems, coupled with severe price distortions, led to a collapse of the economy with annual inflation reaching 400% in 1990. President Fujimori, who took over in 1990, enacted wide-ranging reforms that stopped inflation and eventually led to a resumption of economic growth.	L-shaped	debt, currency, inflation, banking, stock market	Floating (until 1993) and crawling band (from 1994 to 1996)
2000:3-2001:2	4	-3.3 %	***Political instability***. The second round of general elections that finished in June 2001 put an end to two years of political uncertainty after Fujimori attempted to govern for a third term.	V-shaped		crawling band
2009:1-2009:2	2	-1.3 %	***Global financial crisis (see text).***	V-shaped		crawling band

Uruguay

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1981:4-1987:2	23	-20.6 %	***Uruguay's debt crisis and end of "tablita."*** In the early 1980s, Uruguay was hit by the Latin American debt crisis (see text), which worsened Uruguay's balance of payments and external debt problems. A large fiscal deficit coupled with a sudden loss of foreign reserves led to the abandonment of the so-called "tablita" in November 1982. The "tablita" (a pre-announced and declining path for the nominal interest rate) had been implemented in November 1978 as a mechanism to gradually reduce inflation.	L-shaped	debt, currency, inflation, banking, stock market	floating
1999:1-2005:4	28	-22 %	***Brazil's devaluation and Argentina's default.*** The Uruguayan economy was hit by the Brazilian devaluation in January 1999 (with Brazil accounting for about 30 percent of exports) and the Argentinean default in December 2001 (see text). The latter triggered a massive run on the domestic banking system. By the end of 2002, the Uruguayan banking system had lost 46 percent of total deposits. International reserves at the Central Bank had fallen by 80 percent by the end of July, which prompted the authorities to allow the peso to float freely. In May 2003, the government completed a 5.4 billion dollar rescheduling of foreign-currency denominated debt.	U-shaped	currency, banking, stock market	crawling band
2009:1-2009:2	2	-2 %	***Global financial crisis (see text).***	V-shaped		crawling band

Venezuela

Period	Duration of GDP crisis (in quarters)	Intensity of GDP crisis (GDP reduction from start to trough)	Background	GDP crisis shape	Reinhart and Rogoff crises	Exchange rate regime
1999:1-1999:4	4	-2.7 %	In 1999 the price of oil reached its lowest level in the last 22 years. By then, the production of oil represented about one-third of Venezuela's GDP, half of public revenues, and 75 percent of exports. This unfavorable external environment, was coupled with a reduction in the production of oil (in agreement with OPEC), a public spending contraction due to lack of fiscal financing, and the political uncertainty associated with the change of administration and the draft of a new constitution.	V-shaped	inflation, stock market	crawling band
2002:1-2004:2	10	-28.7 %	**Failed military coup and strike in PDVSA.** In 2002-2003, Venezuela's economy contracted significantly as a result of a failed military coup to overthrow Chavez and a two-month strike by the state-run oil company PDVSA, which resulted in the dismissal of seventeen thousand PDVSA employees. The economy recovered afterwards helped by rising oil prices (Alvarez and Hanson, 2009).	U-shaped	debt, currency, inflation	crawling band
2009:1-2011:3	11	-6.1 %	***Global financial crisis (see text).***	U-shaped	currency, inflation	peg

Notes: Reinhart and Rogoff crises and exchange rate regime are taken from Reinhart and Rogoff (2009). The GDP crisis shape is a classification carried out by the authors and based on visual inspection of the GDP profile during a GDP crisis. A V-shaped GDP crisis is one in which output declines sharply with a well-defined trough and vigorous recover. A U-shaped GDP crisis is longer than a V-shaped one and has a less well-defined trough. A W-shaped GDP crisis shows a "down up down up" pattern. An L-shaped GDP crisis shows output declining very sharply and then taking a long time (if ever) to return to its pre-crisis level.

Table 1. Latin American GDP crises: Basic stylized facts and sample periods

Country	Sample period	Number	Frequency	Duration (in quarters)	Intensity (GDP reduction from start to trough)
Argentina	1970:1 - 2013:1	7	0.49	12	9.6
Brazil	1980:1 - 2013:1	7	0.40	7	4.0
Chile	1980:1 - 2013:1	3	0.26	11	8.9
Colombia	1977:1 - 2013:1	2	0.13	10	4.0
Mexico	1981:1 - 2013:1	5	0.35	9	5.8
Peru	1979:1 - 2013:1	4	0.44	15	12.8
Uruguay	1979:1 - 2013:1	3	0.40	18	14.8
Venezuela	1998:1 - 2013:1	3	0.44	8	12.5
Region (total × or average †)		*34×*	*0.36 †*	*11 †*	*8.6 †*

Table 2. Latin America GDP crises: Basic stylized facts, before and after 1998

Country	Frequency		Duration (in quarters)		Intensity (GDP reduction from start to trough)	
	Before 1998	After 1998	Before 1998	After 1998	Before 1998	After 1998
Argentina	0.51	0.44	11	14	9	11
Brazil	0.57	0.18	10	3	5	3
Chile	0.35	0.16	24	5	20	3
Colombia	0	0.31		10		4
Mexico	0.50	0.20	11	6	6	5
Peru	0.72	0.10	26	3	23	2
Uruguay	0.32	0.49	23	15	21	12
Venezuela		0.44		8		13
Region average	*0.42*	*0.29*	*17.5*	*8*	*14*	*6.6*

Table 3. Latin America: Country cyclicality of fiscal and monetary policies during GDP crises, before and after 1998

Country	Cyclicality of spending policy		Cyclicality of tax policy		Cyclicality of monetary policy	
	Before 1998	After 1998	Before 1998	After 1998	Before 1998	After 1998
Argentina	0.13	0.76	0.65	0.40	-0.55	-0.56
Brazil	0.64	-0.31	0.01	-0.30	-0.17	0.08
Chile	0.58	-0.23	-0.06	0.21	0.08	0.65
Colombia		0.15		0.04		0.35
Mexico	0.47	-0.50	-0.80	0.10	-0.62	-0.22
Peru	0.60	0.77	-0.63	0.20	0.11	0.75
Uruguay	0.94	0.72	-0.77	-0.08	-0.52	-0.58
Venezuela		0.81				-0.06
Region average	*0.56*	*0.27*	*-0.27*	*0.08*	*-0.28*	*0.05*

Table 4. Latin America: Components of readiness index by country, before and after 1998

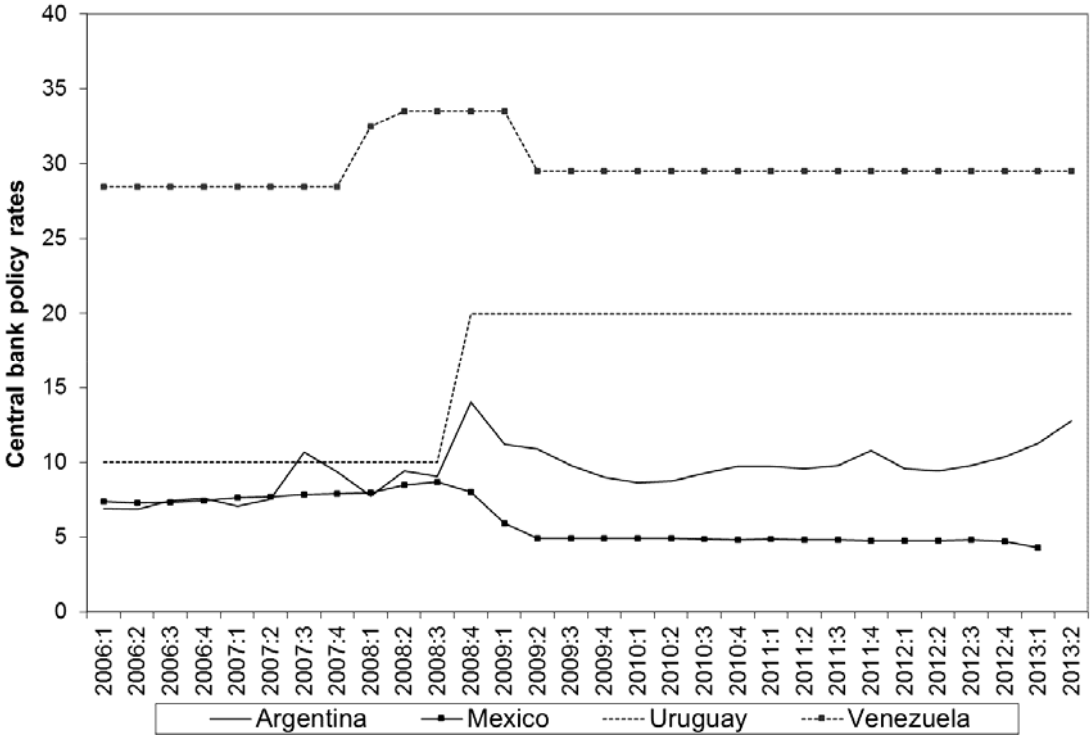
Country	Fiscal readiness index (maximum value 20)		Monetary readiness index (maximum value 20)		Readiness index (maximum value 40)	
	Before 1998	After 1998	Before 1998	After 1998	Before 1998	After 1998
Argentina	10.0	7.1	7.2	12.4	17.3	19.5
Brazil	9.7	10.7	7.1	7.9	16.9	18.6
Chile	9.4	13.9	11.3	11.7	20.7	25.6
Colombia		13.9		8.2		22.1
Mexico	5.1	12.7	6.3	7.6	11.4	20.2
Peru	5.3	8.8	9.9	11.9	15.2	20.7
Uruguay	12.1	8.6	9.7	10.2	21.8	18.8
Venezuela		12.6		13.7		26.3
Region average	*8.6*	*11.1*	*8.6*	*10.4*	*17.2*	*21.5*

Table 5. Eurozone GDP crisis: Basic stylized facts, cyclicality of fiscal policies, and fiscal readiness

Country	Duration (in quarters)	Intensity (GDP reduction from start to trough)	Cyclicality of spending policy	Fiscal readiness index (maximum value 20)
Austria	11	6	-0.47	15.7
Belgium	8	3	-0.77	15.1
France	19 (ongoing)	4	-0.29	14.3
Germany	10	7	-0.90	15.3
Greece	19 (ongoing)	24	0.74	13.1
Ireland	20 (ongoing)	10	0.28	9.6
Italy	20 (ongoing)	9	0.12	14.9
Nehterlands	18 (ongoing)	5	-0.76	14.1
Portugal	19 (ongoing)	9	0.42	13.7
Spain	18 (ongoing)	7	-0.40	16.4
Region average	*16.2*	*8.4*	*-0.20*	*14.22*

Figure 1. Latin America: Evolution of policy interest rates

Panel A. Argentina, Mexico, Uruguay, Venezuela



Panel B. Brazil, Chile, Colombia, Peru

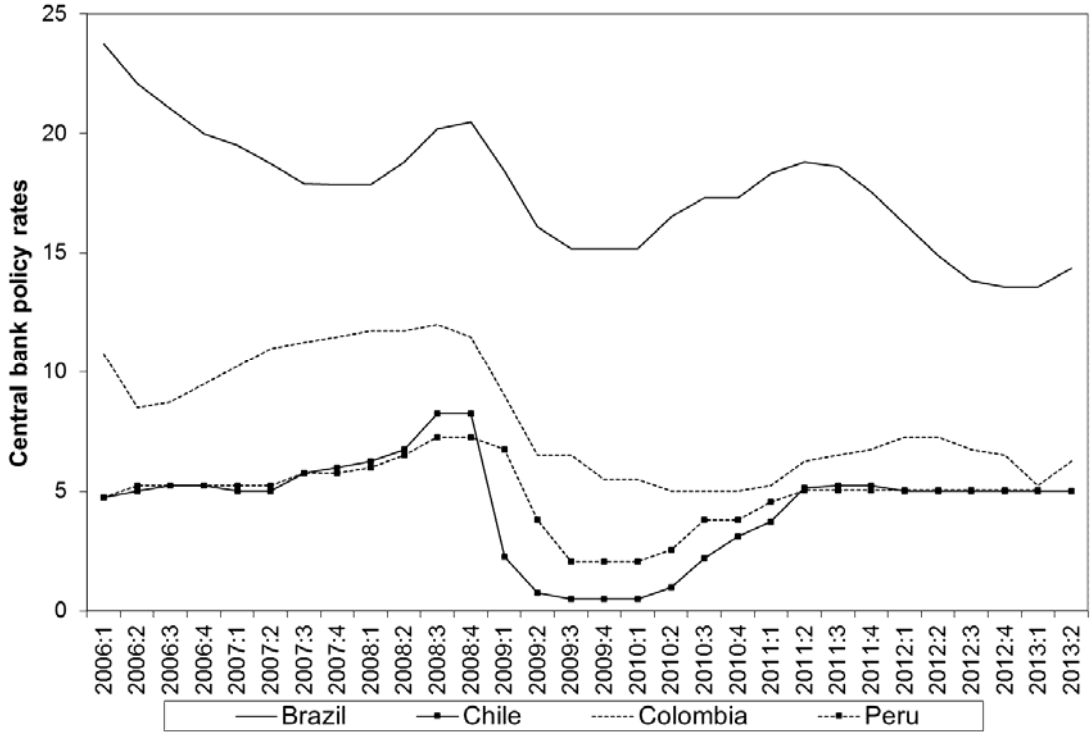
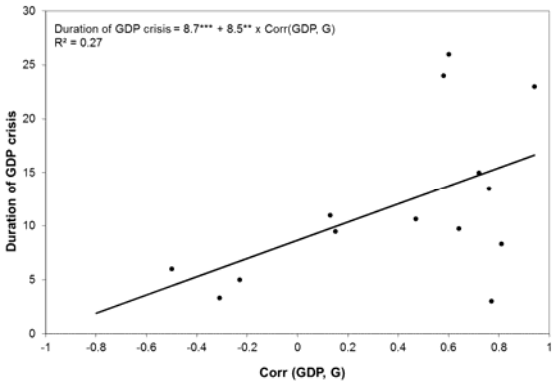
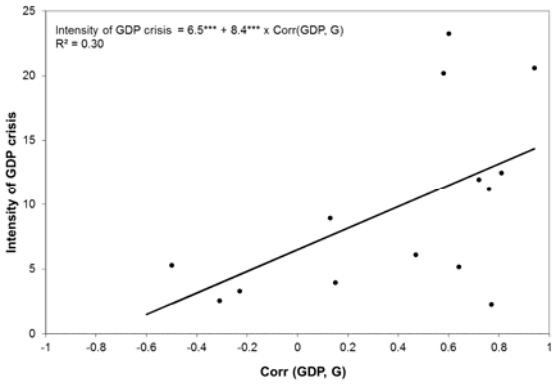


Figure 2. Latin America: Cyclicality of fiscal and monetary policies and duration and intensity of GDP crises

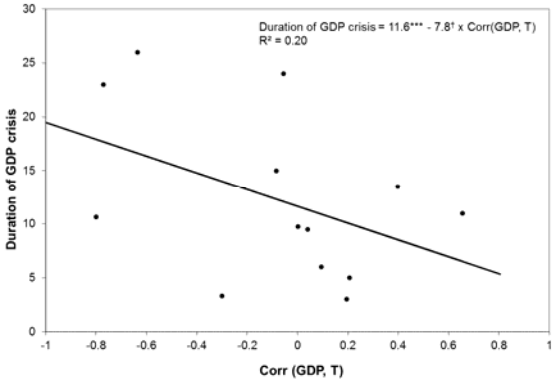
Panel A. Cyclicality of spending policy during GDP crises and duration of GDP crises (in quarters)



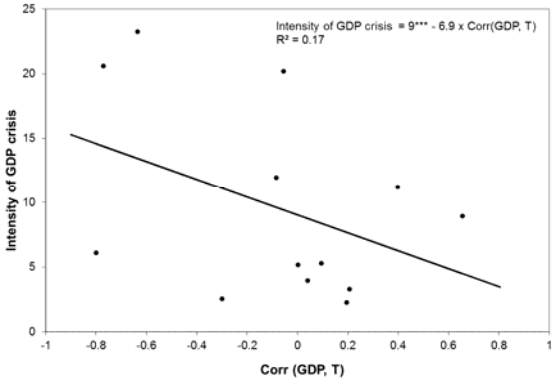
Panel B. Cyclicality of spending policy during GDP crises and intensity of GDP crises (GDP reduction from start to trough)



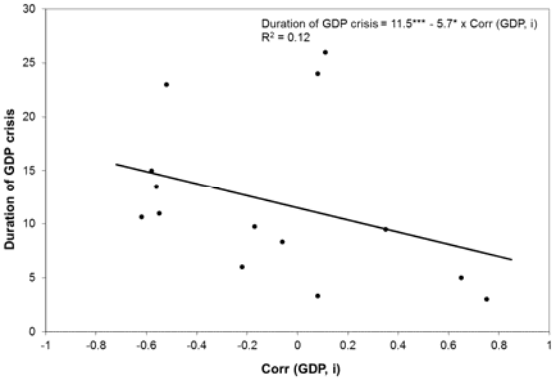
Panel C. Cyclicality of taxation policy during GDP crises and duration of GDP crises (in quarters)



Panel D. Cyclicality of taxation policy during GDP crises and intensity of GDP crises (GDP reduction from start to trough)



Panel E. Cyclicality of monetary policy during GDP crises and duration of GDP crises (in quarters)



Panel F. Cyclicality of monetary policy during GDP crises and intensity of GDP crises (GDP reduction from start to trough)

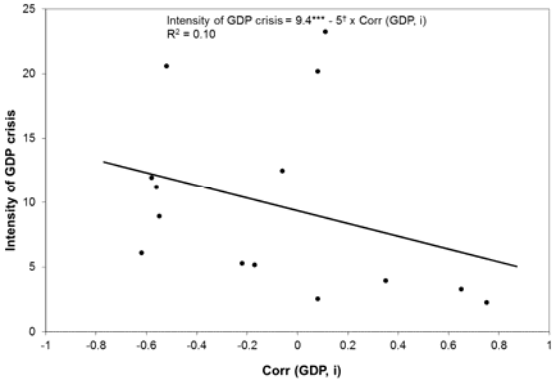


Figure 3. Causality chart

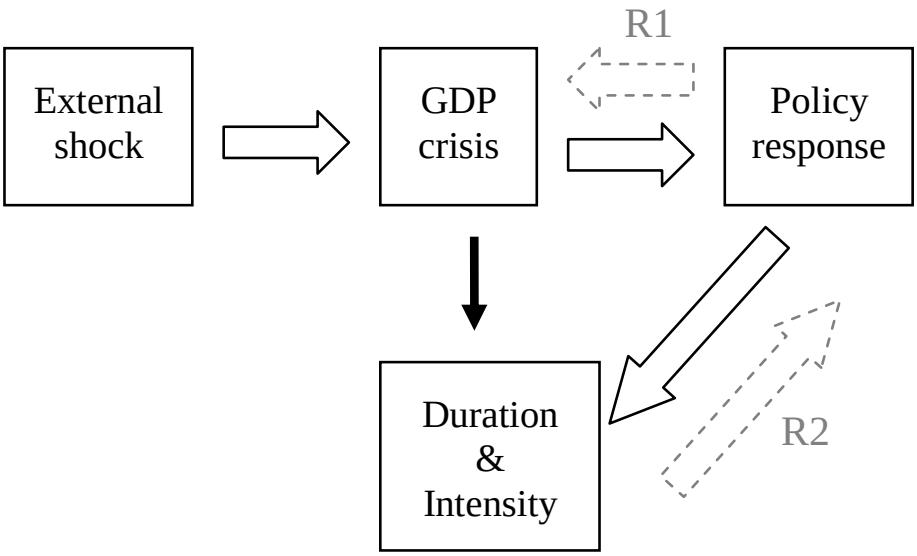
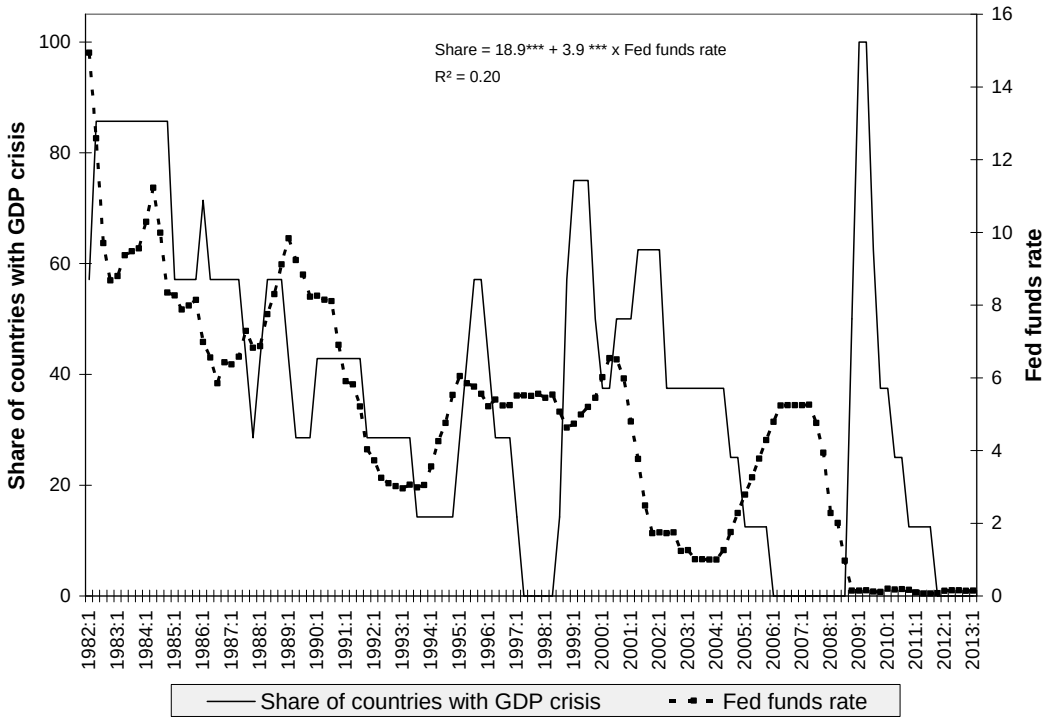
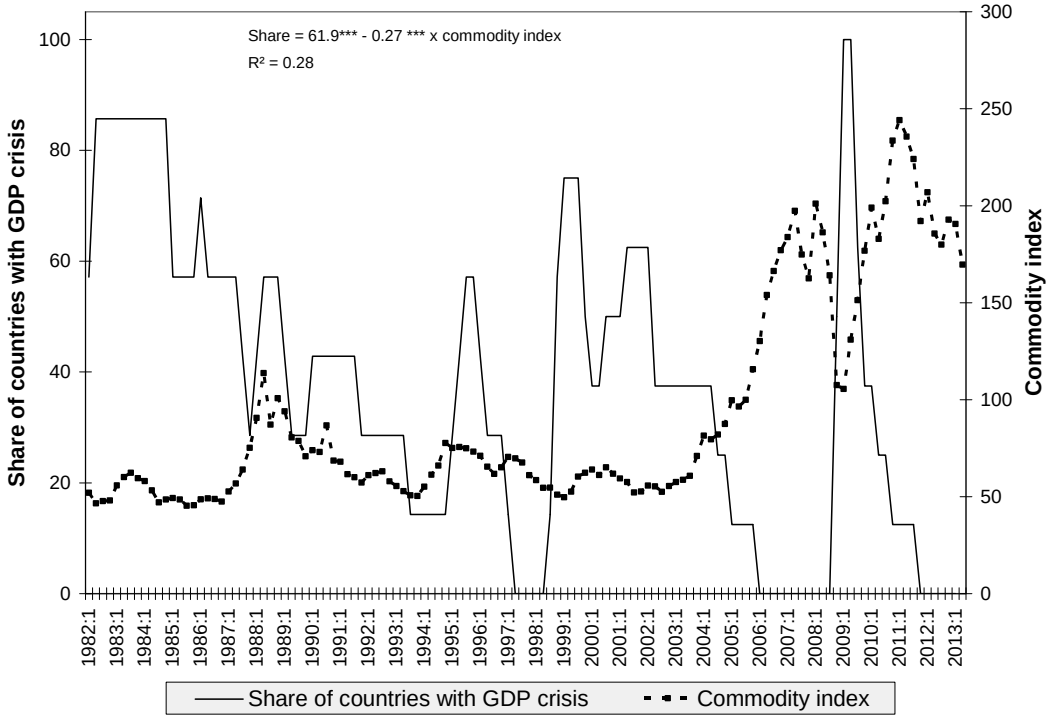


Figure 4. LA synchronization of GDP crisis and external factors

Panel A. Federal funds rate



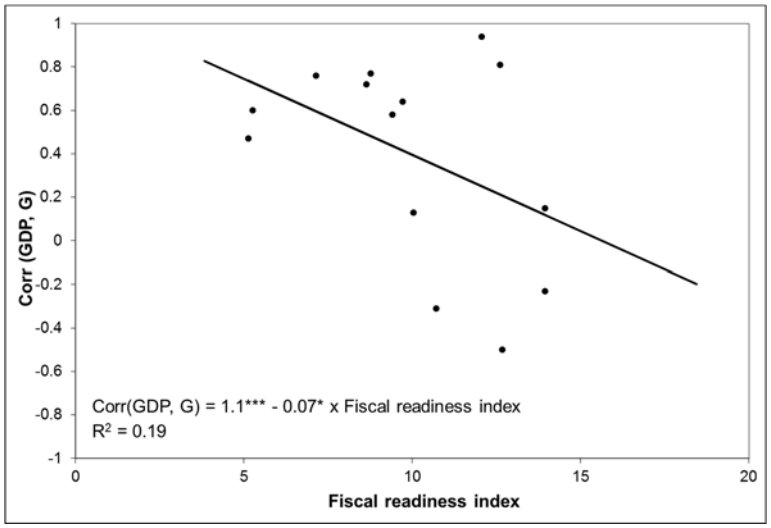
Panel B. Commodity index



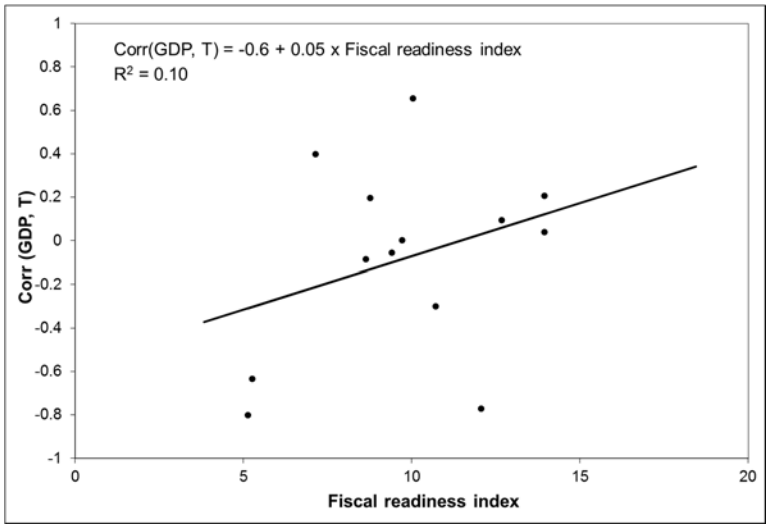
Note: If we include both determinants the R^2 increase to 0.32. Moreover of we allowed them to interact the R^2 increase to 0.42

Figure 5. Latin America: Cyclicality of policies and readiness indices

Panel A. Cyclicality of spending policy and fiscal readiness index



Panel B. Cyclicality of taxation policy and fiscal readiness index



Panel C. Cyclicality of monetary policy and monetary readiness index

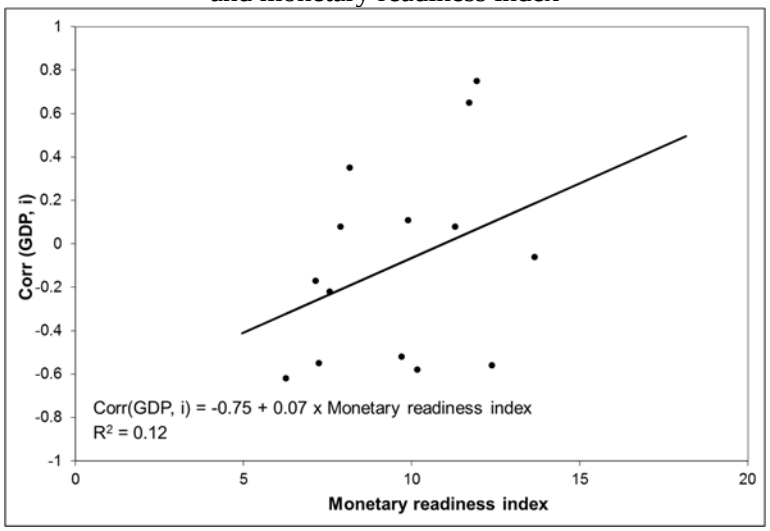
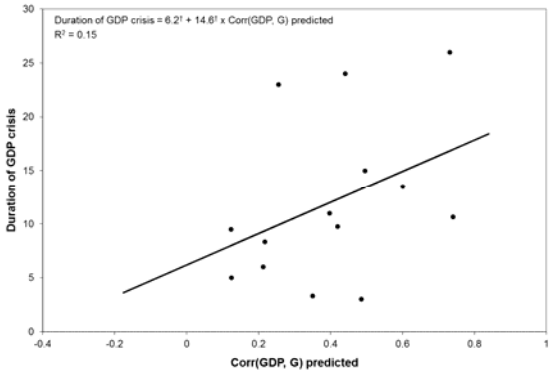
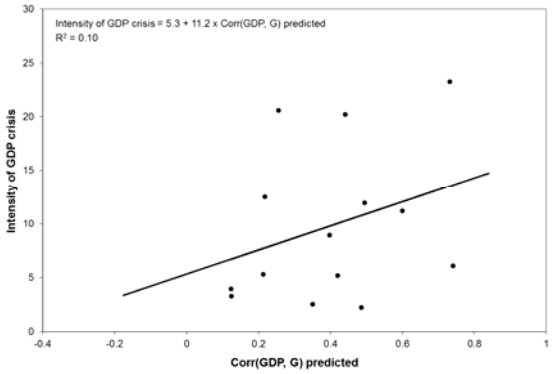


Figure 6. Latin America: Predicted cyclicality of fiscal and monetary policy and duration and intensity of GDP crises

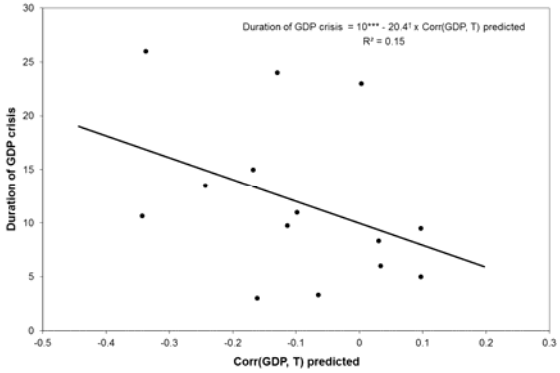
Panel A. Predicted cyclicality of spending policy during GDP crises and duration of GDP crises (in quarters)



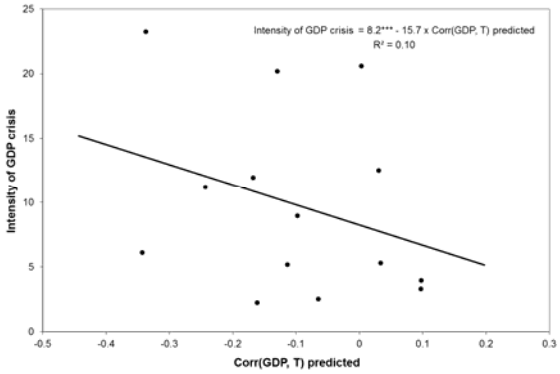
Panel B. Predicted cyclicality of spending policy during GDP crises and intensity of GDP crises (GDP reduction from start to trough)



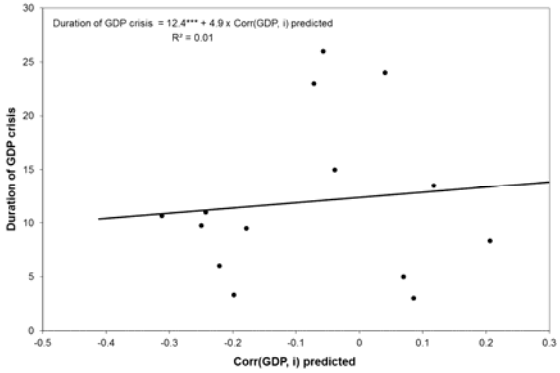
Panel C. Predicted cyclicality of taxation policy during GDP crises and duration of GDP crises (in quarters)



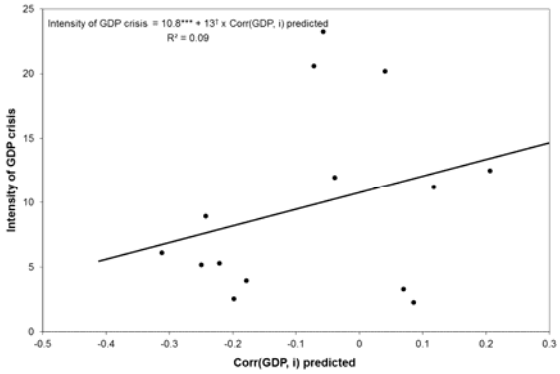
Panel D. Predicted cyclicality of taxation policy during GDP crises and intensity of GDP crises (GDP reduction from start to trough)



Panel E. Predicted cyclicality of monetary policy during GDP crises and duration of GDP crises (in quarters)

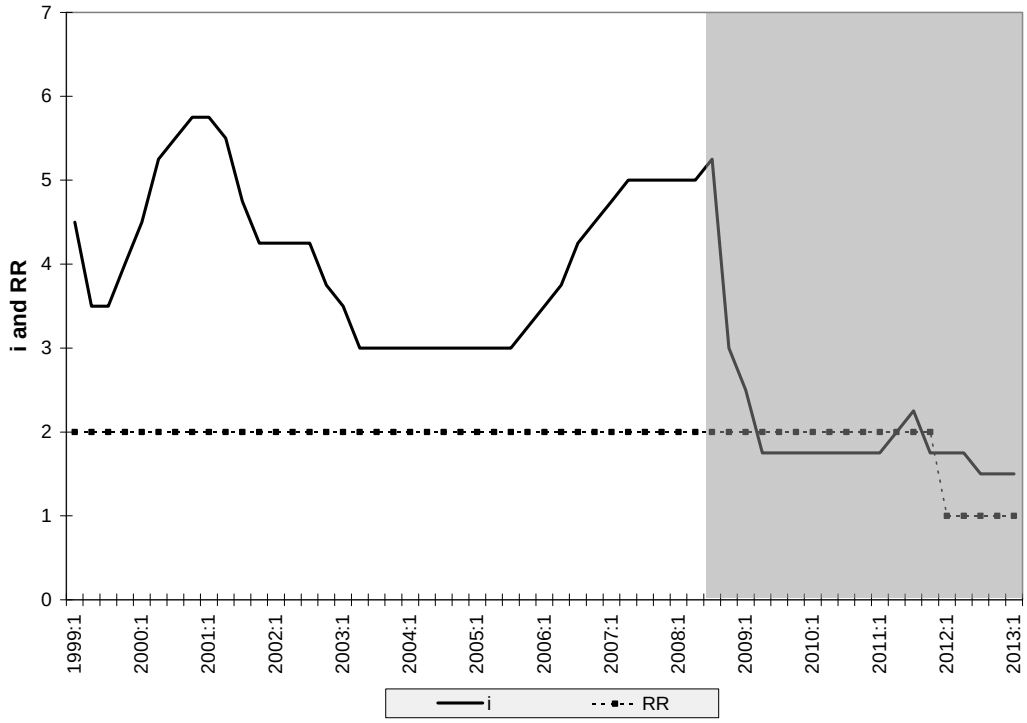


Panel F. Predicted cyclicality of monetary policy during GDP crises and intensity of GDP crises (GDP reduction from start to trough)



Note: † means that the coefficient is different from zero at 15% significance.

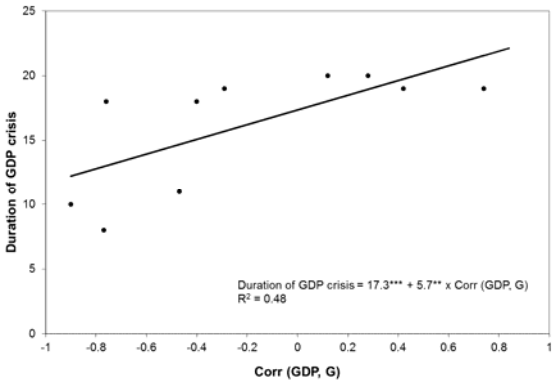
Figure 7. Eurozone: Use of monetary and reserve requirement policies



Note: Shaded area indicates GDP crisis for the majority of Euro countries analyzed.

Figure 8. Eurozone: Relationship between fiscal cyclicality and duration and intensity

Panel A. Cyclicality of spending policy during GDP crisis and duration of GDP crisis (in quarters)



Panel B. Cyclicality of spending policy during GDP crisis and intensity of GDP crisis (GDP reduction from start to trough)

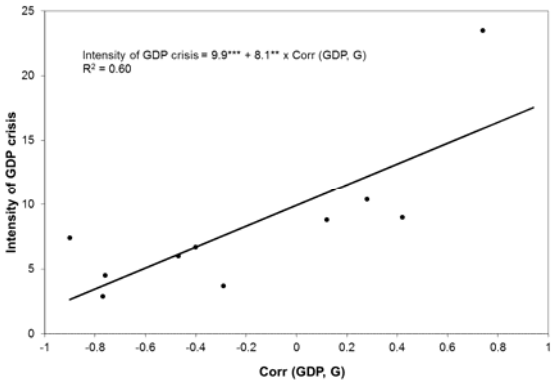


Figure 9. Eurozone: Relationship between spending cyclicality and fiscal readiness index

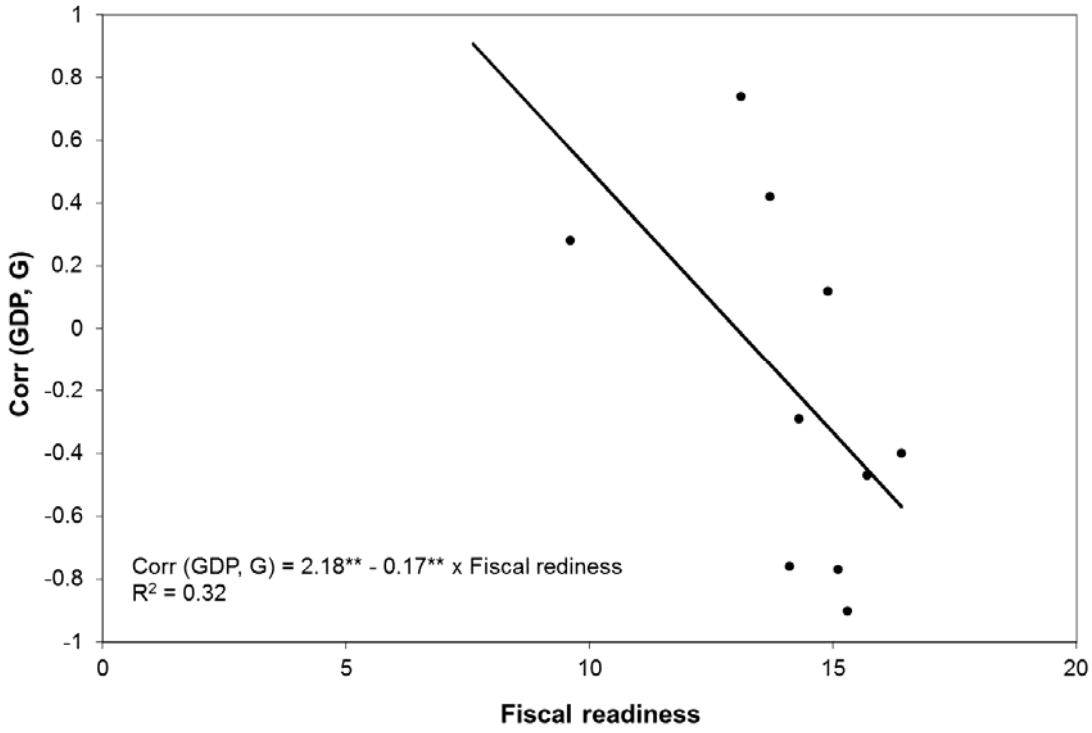
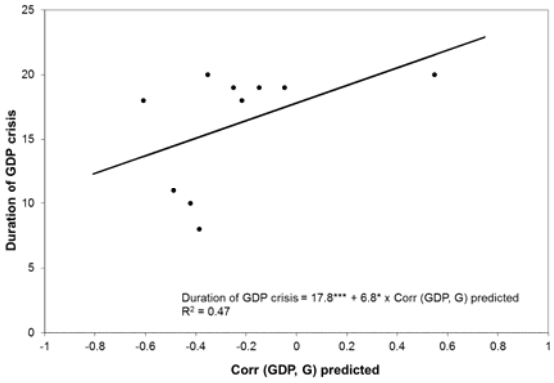


Figure 10. Eurozone: Relationship between duration and intensity and predicted spending policy

Panel A. Predicted cyclicality of spending policy during GDP crisis and duration of GDP crisis (in quarters)



Panel B. Predicted cyclicality of spending policy during GDP crisis and intensity of GDP crisis (GDP reduction from start to trough)