The Road to Redemption: Policy Response to Crises in Latin America

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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 reponses in the sense that they have been able to switch from procyclical to counteryclical policy responses (with Brazil and Chile being prime examples). We further argue that such countercyclical policy response has 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 it shares some of the features of the "old" Latin America; in particular, procyclical fiscal policy that has aggravate 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, time and time again, good times – often driven in emerging markets by booms in commodity prices and/or surges in capital inflows – have 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-crises 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), in 2001-2002 (Argentina's default and exit from a 10 year fixed peg to the dollar), and 2008-2009 (with the short-lived effects, as far as Latin America is concerned, of the global financial crisis.   We can then count 8 major continental crisis in 200 years of history plus a myriad of lesser and/or more localized crises.

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[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 aggravate) 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 some 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?[3] 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

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[2]In addition to Marichal (1989), see Calvo (1986), Calvo and Vegh, 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]This is, of course, related to our recent work on graduation from fiscal and monetary procyclicality in developing countries (see Frankel, Vegh, and Vuletin (2012) and Vegh and Vuletin (2013)) but 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.

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?).[4]

The paper proceeds as follows. Section 2 lays the groundwork by providing an operational definition of "crisis" for a sample of eight Latin American countries for various sample periods starting as early as 1970:1.[5] 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 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 response to crises. We show that, *on average*, Latin America's fiscal and monetary policy responses to crises has shifted from being procyclical before 1998 to being 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 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 clearly 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

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[4]We should note that we will focus only on fiscal and monetary policy. We are therefore abstracting from other, potentially important, policy tools such as reserve requirments. 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.

[5]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.

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 provide evidence for our main storyline: monetary and fiscal policy have been true response to crises (as opposed to causing them) and hence the countercyclicality of such policy responses have indeed lessen 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 the very high synchronicity of crises in our sample (i.e., simultaneous occurrence) and its very high correlation with external factors such as the Federal Funds rate (as an indicator of global liquidity) and commodity prices suggest that crises have been exogenous to the policy responses. In Section 5, 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, and Italy have been pursuing procyclical (i.e., contractionary) fiscal policy, as Latin American countries used to do (and still do to some extent). 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.

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 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).[6]

If we take 1998 as our before-after date, how has the frequency and duration of crises change?[7] Panel A in Figure 1 shows the frequency of crises before and after 1998 for each of our 8 Latin American countries. On average, we seem to observe higher frequencies before than after 1998. This visual impression is confirmed by Figure 2, Panel A, where we can see that the average frequency of crises fell from 0.42 before 1998 to 0.29 afterwards.

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[6]As Table A1 in the appendix details, Uruguay has had only 3 crises since 1980 but the first two (the crisis following the Tablita stabilization program and the one associated with the Argentinean crisis) lasted 23 and 28 quarters, respectively, with an intensity of 20.6 and 22 percent, respectively.

[7]While admittedly arbitrary, the choice of 1998 seemed a natural one. First – and as discussed in Frankel, Vegh, and Vuletin (2013) – the late 1990's 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.

As an additional datapoint, the figure also shows that the frequency of crises after 2008 has been 0.23.

Panel B in Figure 1 shows the average duration of crises for our 8 Latin American countries before and after 1998. Once again, the visual impression appears to suggest that the average duration has fallen after 1998. This impression is confirmed in Figure 2, Panel B, where we see that the overall average duration of crises before 1998 (14 quarters) falls to 8 quarters after 1998.

Finally, Panel C in Figure 1 shows the average intensity of crises for our 8 Latin American countries. As was the case with frequency and duration, the visual impression conveyed by the plot is that the intensity has diminished after 1998. This is confirmed by 2, Panel B, where we can see that the overall average fall in GDP before 1998 was 11 percent from the start of the crisis to its trough, compared to just 7 percent after 1998.

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.[8] We begin by looking at the fiscal policy response. Figure 3, Panel A, shows for each of the 8 countries in the sample the average correlation during crises periods between the cyclical component of government spending and GDP before and

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[8]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.

after 1998.[9] The figure is very telling, as it pinpoints three countries (Brazil, Chile, and Mexico) that 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.[10] The other five countries show procyclical fiscal response after 1998.[11] In particular, Argentina, Peru, Uruguay, and Venezuela all show particularly pronounced procyclical responses.

Figure 3, Panel B shows the monetary policy response by plotting the average correlation during crises between the cyclical component of a policy rate and/or short-term market rate and real GDP.[12] [13] The four countries that exhibit countercyclical monetary policy response after 1998 are Brazil, Chile, Colombia, and Peru. As illustrated in Figure 4, 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.[14] These are, of course, the same four countries that have shown countercyclical monetary policy in the post-1998 period. In contrast, Panel A shows that in Argentina, Venezuela, and Uruguay, policy rates actually increased during the global crisis.

In sum, only Chile and Brazil have pursued both countercyclical fiscal and

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[9]Notice that a positive (negative) correlation implies procyclical (countercyclical) fiscal policy.

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

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

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

[13]We take short-term interest rates as a proxy for the stance of monetary policy. In some cases, we have data for overnight 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. 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 of the overall macroeoconomic policy framework, as emphasized in may pieces by Stan Fischer himself (see, for instance, his 1986 and 2001 contributions).

[14]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.

monetary policy response in the post-1998 period. In contrast, countries like Argentina and Uruguay have consistently shown both procyclical monetary and fiscal policy responses throughout the sample.

Figure 5 shows the average policy response for our 8 Latin American countries before and after 1998 and also after 2008. We can clearly see that, *on average*, Latin America has graduated in terms of fiscal policy response. In the period before 1998, the fiscal policy response was clearly procyclical (with a correlation coefficient of 0.37); it became essentially acyclical (the correlation is 0.01) in the post 1998 period, and has actually been counter-cyclical (with an average correlation of -0.26) after 2008.

In terms of monetary 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 0.29 in the post-1998 period). In fact, monetary policy has been even more countercyclical after 2008 (0.46).

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 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 switch 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 and countries 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.

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 in 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 counter-

cyclical.[15] 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 (2007) 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. 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.

Panel A in Figure 6 show the relation between the cyclicality of fiscal 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 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 fiscal policy, the lower the fall in GDP from start to trough.[16]

In turn, Panels C and D in Figure 6 show the relation between the cyclicality of monetary policy and the duration and intensity of crises. While

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[15]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.

[16]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 (2013) 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.

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), the relationship is significant (at the 10 percent level) for the duration but not significant for the intensity.

In sum – and leaving aside for the moment potential endogeneity problems – the evidence strongly suggests that countercyclical fiscal policy has clearly contributed to lessen both the duration and intensity of crises in Latin America. While the evidence is weaker for monetary policy, there is some evidence that it has contributed to reducing the duration of crisis. In this light, we would interpret Panel B in Figure 2 (which shows how 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 7 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 one exists 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 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 7) is that, contrary to the direction in the flow chart, changes in policy could cause a GDP crisis. In other words, "exogenous changes" in fiscal/monetary policy could be causing a GDP crisis. The second (labeled R2 in Figure 7) is that, contrary to he 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 feel the need 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 expands (contracts) in response to higher (lower) output.[17] 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.[18] While this is the route 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 will make a simple, but quite convincing our view, argument to the effect that most crises in our sample were, to a large extent, caused by external factors. If this is true, it then follows immediately that the policy responses that we have highlighted have been mostly endogenous to GDP. To this effect, we look at the "synchronicity" of the 34 crises in our sample and relate them to external factors such as the Federal Funds rate (as a proxy for global liquidity) and commodity prices.

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 (i.e., independent) reasons is clearly a very low probability event.[19] If,

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[17]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.

[18]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.

[19]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

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in addition, we can establish a significant correlation between our synchronicity index and some global factor, we then have an explanation as to what is causing these simultaneous crises.

Panel A in Figure 8 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 our conventional wisdom on major regional crises:

1. The period 1982-1985, during which the synchronicity index is above 80 percent (that is, more than 80 percent of our countries are in crisis). This is, of course, the beginning of the infamous "lost decade" that "officially" began with Mexico's default on August 12, 1982.[20] This is roughly the period analyzed in Diaz-Alejandro's 1982 celebrated paper, covering the crises in six (Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela) of our eight countries. While acknowledging the relevance of some recognizing 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") played a critical role in turning "a serious but manageable recession into a crisis unprecedented since the early 1930s." In fact, we see in Figure 8, Panel A how as the 1980s and early 1990s progress, fewer countries are in crisis until our synchronicity index reaches a minimum of 14.3 percent in 1993:3.

2. 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 Mexico 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).[21]

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events), the probability that all eight countries would be in crisis simultaneously is 0.4 percent (i.e., less than one percent).

[20]The 1980's debt crisis is arguably 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.

[21]For a fascinating insider's account of Mexico's December 20, 2004, devaluation and Stan Fischer's role, see Boughton (2012), Chapter 5. Two days after, the Mexican

3. 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 floating of the Thai baht in July 1997 and quickly spread to Indonesia, Korea, Malaysia, and Indonesia. In August 1998, Russia defaults on its domestic bond debt. In February 2001, Turkey devalued and floated the lira. Finally, in December 2001, Argentina announced the intention to default.

4. First quarter of 2009 when, in the aftermath of Lehman's fall and the subsequent global financial crisis, our synchronicity index reaches 100 percent implying that all of our 8 countries were undergoing a GDP crisis.

Panel A in Figure 8 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).[22] Given that both the Federal Funds rate and the index of commodity prices are exogenous to the region, we conclude that external factors have played a major role in most of the region's crises during the last 30 years.[23]

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authorities had no choice but to let the currency float. See Fischer (1995) for an analysis of the Mexican crisis and, in particular, of the IMF's financial assistance. As Fischer notes, the Mexican crisis was called at the time "the first financial crisis of the twenty-first century."

[22]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. See, for example, Calvo, Leiderman, and Reinhart (1993) and Izquierdo, Romero, and Talvi (2008), both of whom conclude that around 50 percent of the flows can be accounted for by external factors.

[23]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.

6 Endogeneity problem II: The readiness index

As illustrated in Figure 7, 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, 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 in 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 will not directly cause today's GDP).[24]

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

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[24]In other words, there is no reason to expect a variable such as, say, the current account deficit in time $t - 1$ to have a direct effect on GDP at time t. A counter-argument is the possibility of anticipatory effects. For instance, in theory, a component of the readiness index such as credit ratings might reflect future expectations about the economy and might affect investment in $t - 1$ which could, in turn, affect GDP in time t. In practice, however, credit ratings are typically backwood-looking. But, more generally, then, the best variables to include in our readiness index are backward-looking variables.

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 comprised of 3 components, each normalized between 0 and 10, which implies that the index may range between 0 (lowest fiscal readiness) and 30 (highest fiscal readiness).[25] The three components are: (i) sovereign credit ratings, (ii) fiscal deficit as percentage of GDP, and (iii) total (public plus private) external debt as percentage of GDP.[26]

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 in Vegh and Vuletin (2013), many developing countries have typically used policy interest rates to defend the domestic currency, as opposed to stabilizing output fluctuations. Since bad (good) times are usually associated with massive capital outflows (inflows), central banks have historically responded by increasing (decreasing) policy rates thus magnifying busts (booms).[27] [28]

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[25] 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.

[26] See the appendix for details on the construction of this index and the monetary index.

[27] The authors coin the terms "fear of free falling" and "fear of capital inflows" to describe this typical monetary policy behavior in bad and good times, respectively.

[28] 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."

The monetary readiness index is comprised of three components, each normalized between 0 and 10. The index thus ranges between 0 (lowest monetary readiness) and 30 (highest monetary readiness). As in the case of the fiscal readiness index, the monetary components are measured over the 8 quarters (or two calendar years) prior to a GDP crisis. The components are: (i) percentage change in nominal exchange rate, (ii) foreign reserves as percentage of GDP, and (iii) current account deficit as percentage of GDP.

Since each subindex has a maximum of 30, the overall readiness index, which simply adds them up, can take a maximum value of 60.

Figure 9, Panel A shows the fiscal readiness index for each of our eight countries for the pre- and post-1998 periods and for the last three years. 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 12 to 15 and is 17 over the last three years. The best prepared countries from a fiscal point of view are Brazil, Chile, Colombia, Mexico, and Peru.

Figure 9, Panel B shows the same picture for the monetary readiness index. In this case, all six countries with pre- and post-1998 data have increased their readiness (with Chile keeping the same score). On average, the monetary readiness index increased from 15 in the pre-1998 period to 20 in the post-1998 period and remains at 20 for the last three years.

Figure 10 illustrates each of our eight countries's overall readiness index in the pre- and post-1998 periods and in the last years. Several 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 Brazil, Mexico, and Peru stand out); (ii) on average, the readiness index rose from 27 in the pre-1998 period to 35 in the post-1998, with a corresponding reduction in the standard deviation as well; and (iii) the average index for the last three years (at a value of 38) is even higher than the post-1998 one, showing that, on average, the region is better prepared than ever before to withstand a new wave of global headwinds (like tapering in the U.S. and the resulting outflow of capital from developing countries).

In Figure 11, we correlate the fiscal and monetary readiness indices with the cyclicality of, respectively, fiscal and monetary policy to assess whether

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they may be good instruments. Panel A shows a highly significant correlation (and with the expected sign) between the cyclicality of fiscal policy and the fiscal readiness index. The relationship is as expected but not significant for the case of monetary policy (Panel B). Given that the fiscal readiness index is a valid instrument for the fiscal policy, Figure 12 shows the relation between the instrumented variable and duration (Panel A) and intensity (Panel B). In both cases – and in spite of the small sample – the coefficients have the expected sign and are significant at the 15 percent level.

In sum, our evidence strongly suggests a causal relationship from a more countercyclical fiscal policy response to lower duration and intensity of the crisis. It has proved harder to find a valid instrument for monetary policy so, to that extent, the issue of causality remains open.

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.[29]

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. Figure 13 shows the duration and intensity of the current crisis for 10 Eurozone countries.[30] 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 (Panel A). Panel B 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

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

[30] The countries are Austria, Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain. Data sources consist mainly of WEO as well as Global Financial Database.

shown in Figure 14. 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. Figure 15 shows the correlation between government spending and real GDP for each of our 10 Eurozone countries. We can see that three countries (Greece, Ireland, and Italy) have exhibited a positive correlation (i.e., have been procyclical) with Greece, not surprisingly, the most procyclical of all. To what extent is procyclical fiscal policy aggravating the duration and intensity of the crises? Figure 16 shows that there is a positive and significant relationship between fiscal procyclicality and duration (Panel A) and intensity (Panel B).

But could Figure 16 reflect reverse causality? To address this issue – and as we did for Latin America countries above – we compute the fiscal readiness index for our 10 Eurozone countries (Figure 17). In Figure 18, 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 19 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 crisis has contributed to make the current crisis longer and more severe.

8   Conclusions

This paper has focused on how the monetary/fiscal policy response to crises in Latin America has evolved over the last 4 decades. We have shown that there are several countries (Chile and Brazil) that have graduated in terms of their policy response, in the sense that they have switched from a procyclical to a countercyclical response. And, on average, the region is much better prepared than in the old days to deal with any new global headwinds such as the imminent tapering by the Federal Reserve. We then took a brief look the current crises in the Eurozone through the same lenses. We concluded that some Eurozone countries have responded procyclically in terms of their fiscal policy and thus aggravated the underlying recession.

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9 Appendices

9.1 Chronology of crises

[TO BE ADDED.]

9.2 Computation of readiness indices

This appendix describes the computation of the fiscal and monetary readiness indices introduced in the text in Section 6.

9.2.1 Fiscal readiness index

The three components are: (i) sovereign credit ratings, (ii) fiscal deficit as a percentage of GDP, and (iii) total (public plus private) external debt as a percentage of GDP.

Sovereign credit ratings contribute to the index by providing markets' perception about the risk associated with government debt. We use Moody's quarterly data ratings for long-term debt in foreign currency. High numerical values of this component are associated with high ratings (such as Aaa), whereas low numerical scores are associated with low debt ratings such as C. For these purposes, we group Moody's ratings into 9 categories: prime rating (Aaa), high grade (Aa1, Aa2, Aa3), upper medium grade (A1, A2, A3), lower medium grade (Baa1, Baa2, Baa3), non-investment grade speculative (Ba1, Ba2, Ba3), non-investment grade highly speculative (B1, B2, B3), non-investment grade substantial risk (Caa1, Caa2, Caa3), non-investment grade extremely speculative (Ca1, Ca2, Ca3), and in default (C1, C2, C3).

Fiscal deficit as a percentage of GDP aims at capturing short-run fiscal limitations and current debt build up. The data source is primarily WEO.

Total (public plus private) external debt as a percentage of GDP contributes to the index by providing a measure of the economy's total debt (public plus private), which proxies not only for public default risk but also for the possibility of bailouts of the financial sector. The data source is primarily WEO.

9.2.2 Monetary readiness index

The three components are: (i) percentage change in nominal exchange rate, (ii) foreign reserves as percentage of GDP, and (iii) current account deficit as a percentage of GDP. The data source is mainly WEO.

The percentage change in the nominal exchange rate (in local currency units per dollar) proxies for the presence of currency depreciation pressures in the recent past. High depreciations are associated with low values of this component.

Foreign reserves as a percentage of GDP is meant to capture the build-up of international reserves at central banks as a way of dealing (by way of precautionary savings) with sudden and potentially large changes in capital flows. In the absence of a large cushion of foreign reserves, sudden stop episodes could put pressure on the domestic currency, thus forcing policymakers to raise policy rates to defend the currency rather than lowering them to stabilize output. Therefore, high (low) foreign reserves relative to GDP are associated with high (low) values of this component.

Current account deficit as a percentage of GDP is also meant to identify potential vulnerabilities to changes in capital flows. Capital outflows (which typically occur in bad times) increase the pressure on the domestic currency. If policymakers view with concern such depreciation (for example, because of a significant presence of liability dollarization or the fear of inflationary pressures), they will need to raise policy rates to defend the domestic currency. Therefore, high (low) current account deficits to GDP is associated with low (high) values of this component.

Table 1. GDP crises: Basic stylized facts

Country	Sample period	Main stylized facts of GDP crisis			
		Number	Frequence	Av. Duration (in quarters)	Av. Intensity (in percentage)
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 †*

Figure 1. Frequency and average duration and intensity of GDP crisis

Panel A. Frequency of crisis
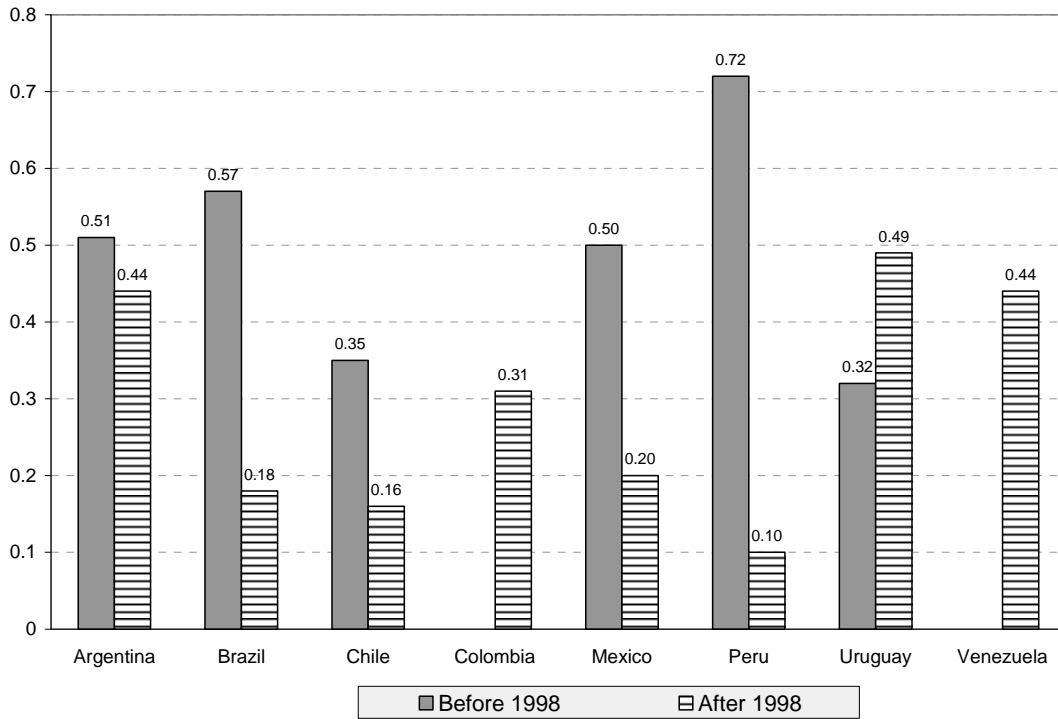
Panel B. Duration of GDP crisis (in quarters)
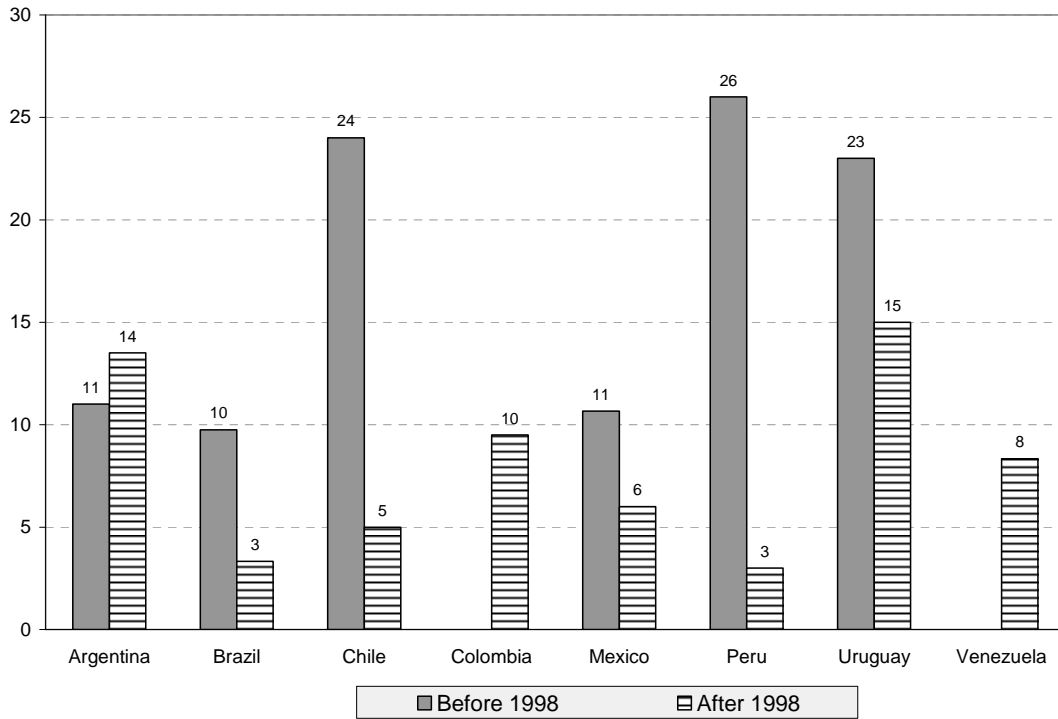
Figure 1. Frequency and average duration and intensity of GDP crisis (cont.)

Panel C. Intensity of GDP crisis (GDP reduction from start to trough)
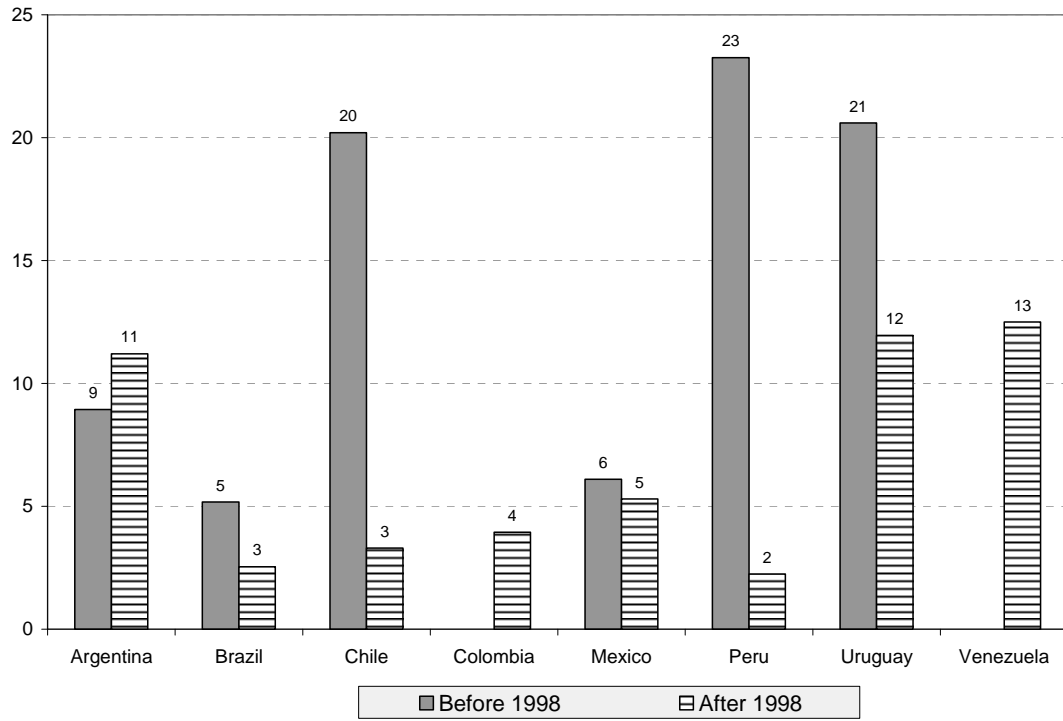
Figure 2. LA Frequency, average duration and intensity of GDP crisis

Panel A. Frequency of GDP crisis
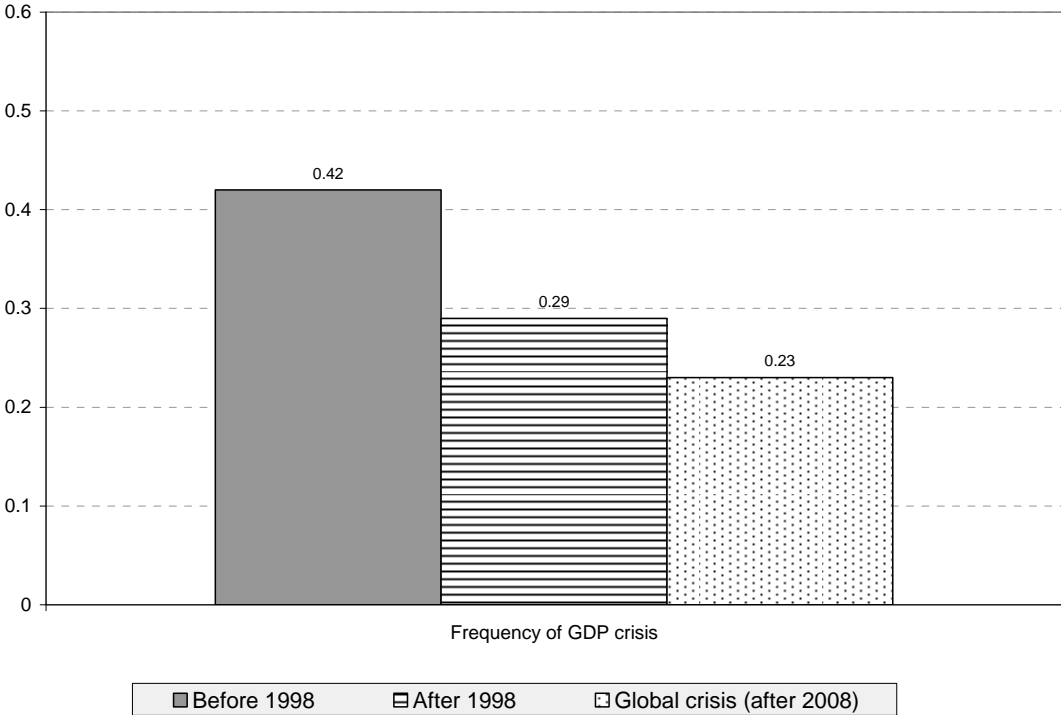
Panel B. Average duration and intensity of GDP crisis
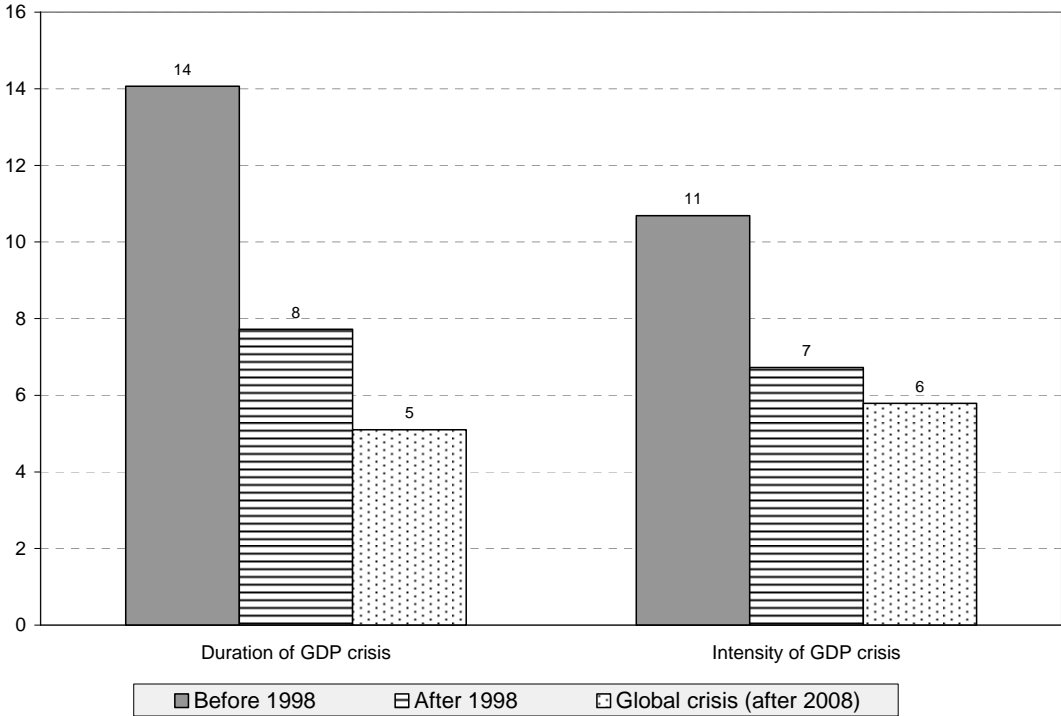
Figure 3. Country cyclicality of fiscal and monetary policies during GDP crisis

Panel A. Fiscal policy
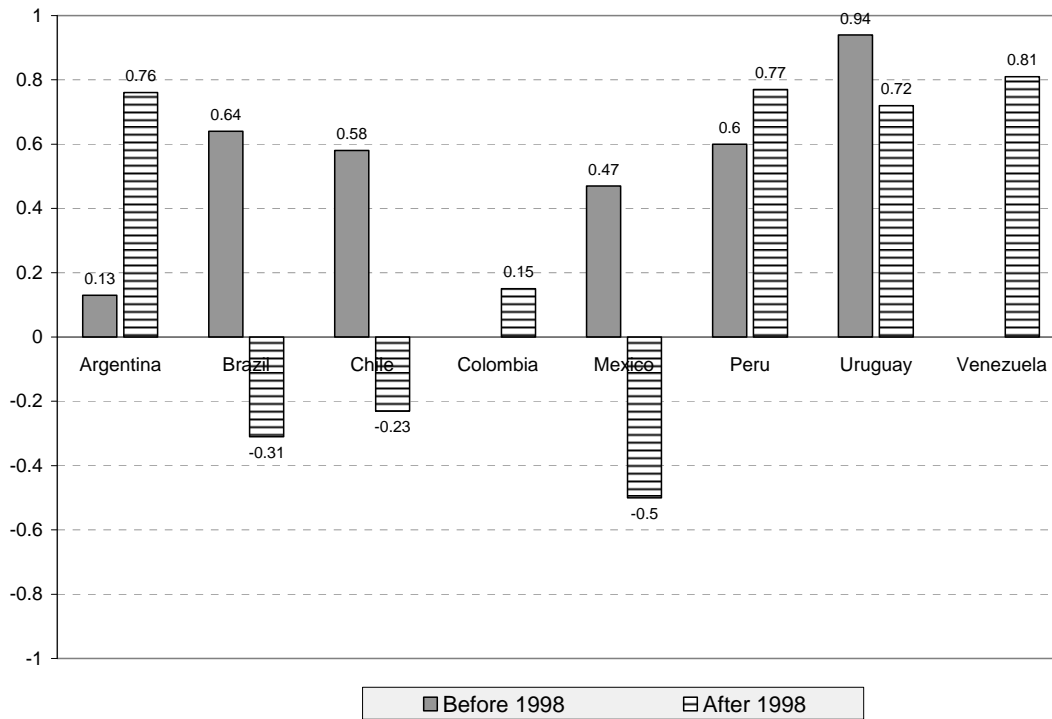
Panel B. Monetary policy
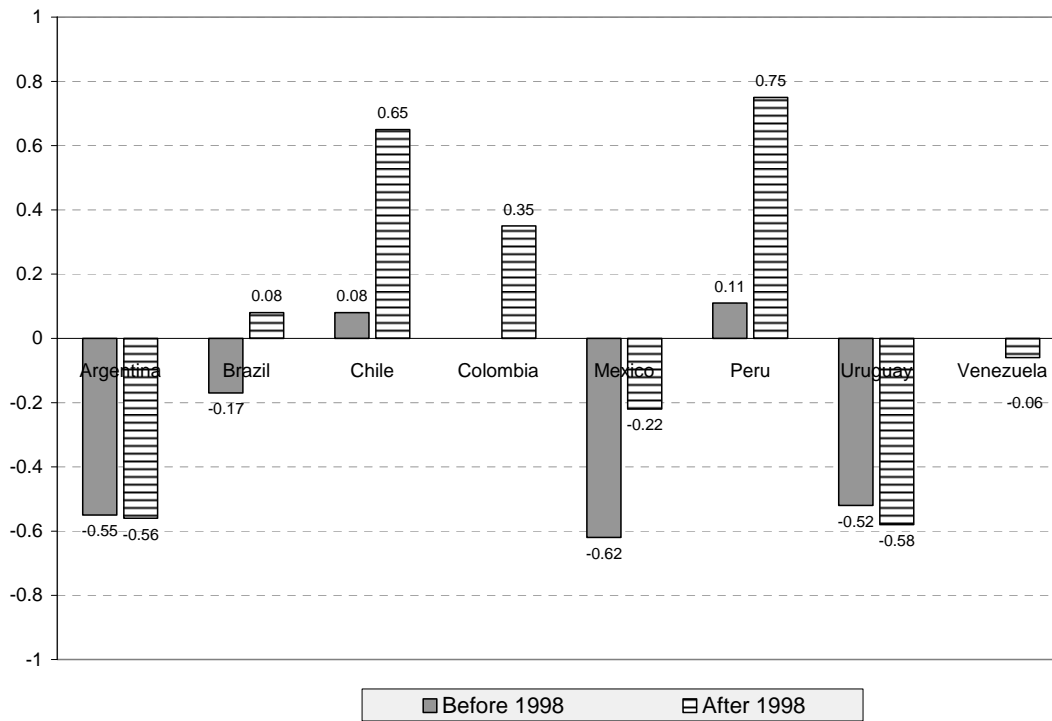
Figure 4. Evolution of policy interest rates

Panel A. Argentina, Mexico, Uruguay, Venezuela
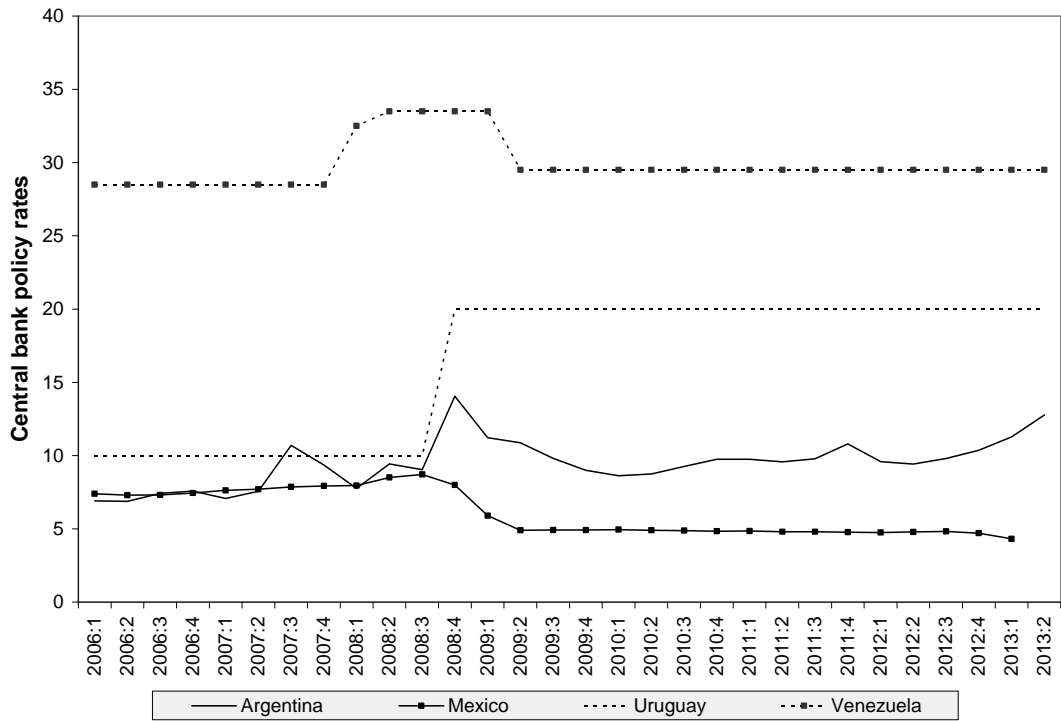
Panel B. Brazil, Chile, Colombia, Peru
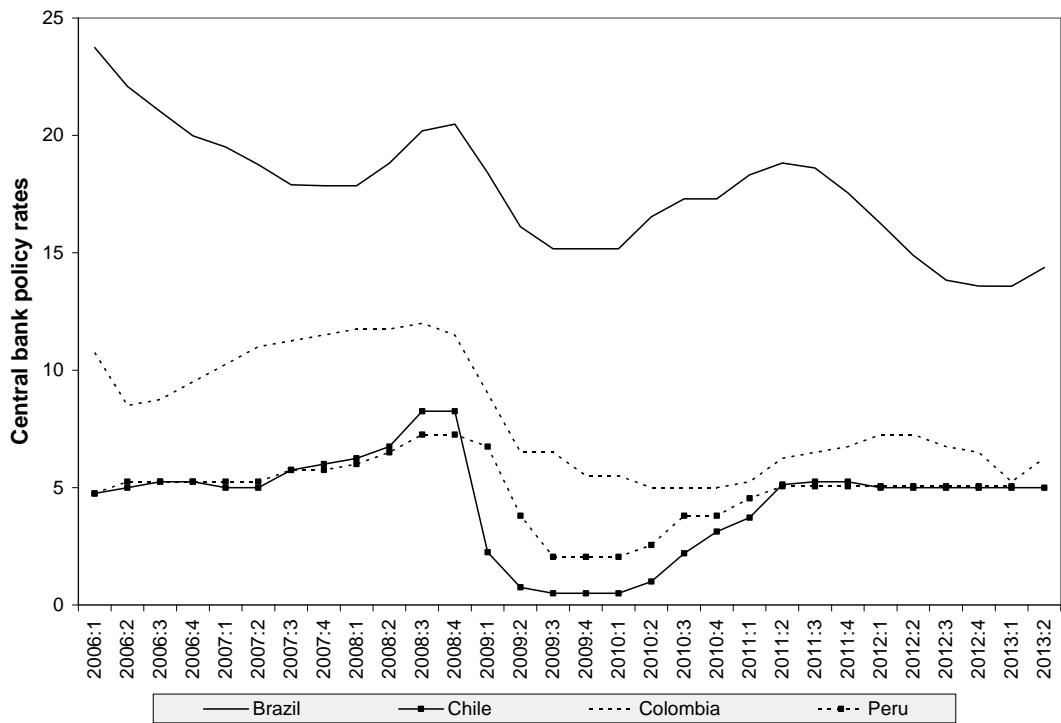
Figure 5. LA cyclicality of fiscal and monetary policies during GDP crisis

Before 1998   After 1998   Global crisis (after 2008)
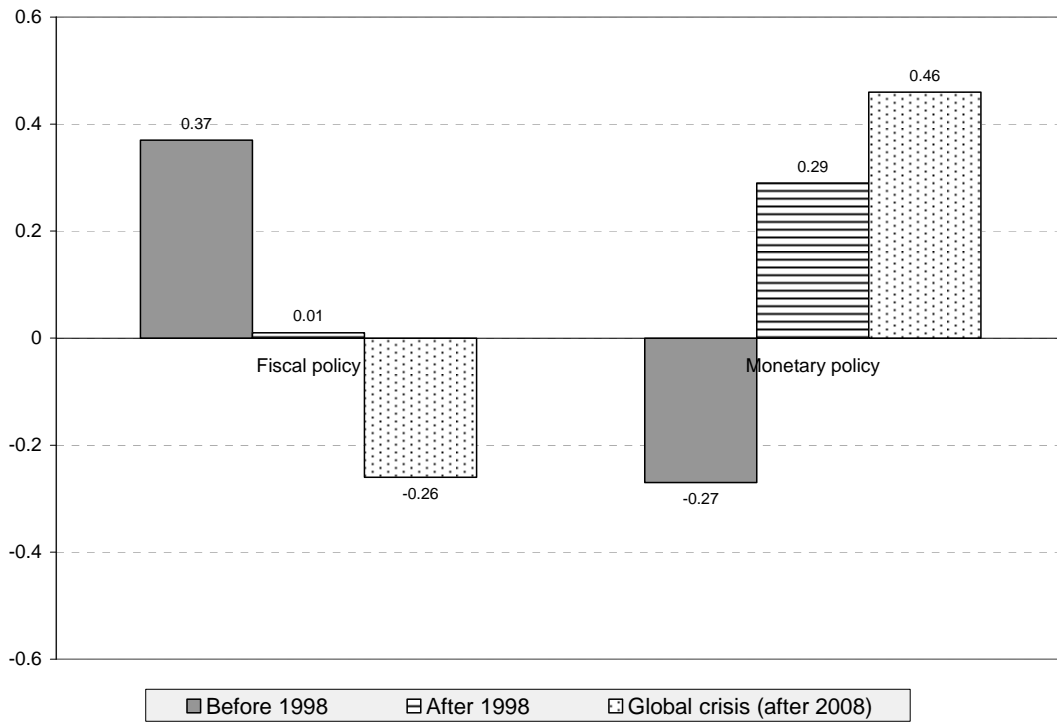
Figure 6. Cyclicality of fiscal and monetary policies and duration and intensity of GDP crisis

Panel A. Cyclicality of fiscal policy during GDP crisis
and duration of GDP crisis (in quarters)
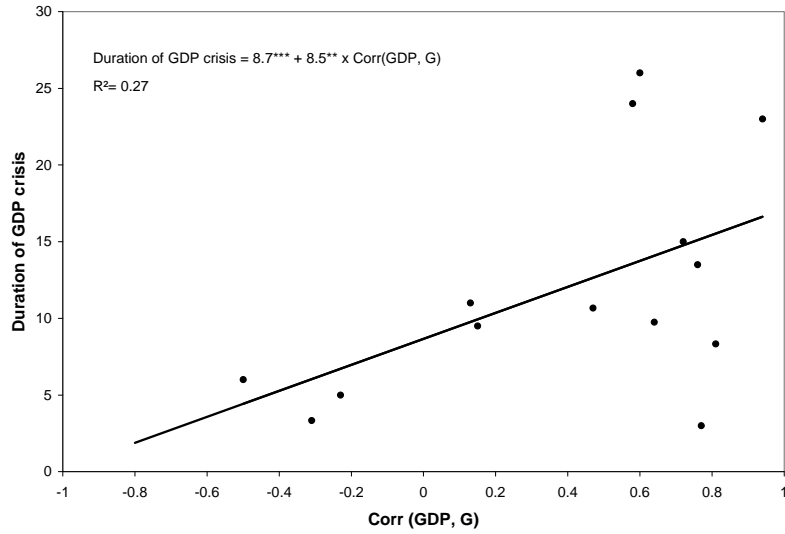
Panel B. Cyclicality of fiscal policy during GDP crisis
and intensity of GDP crisis (GDP reduction from start to trough)
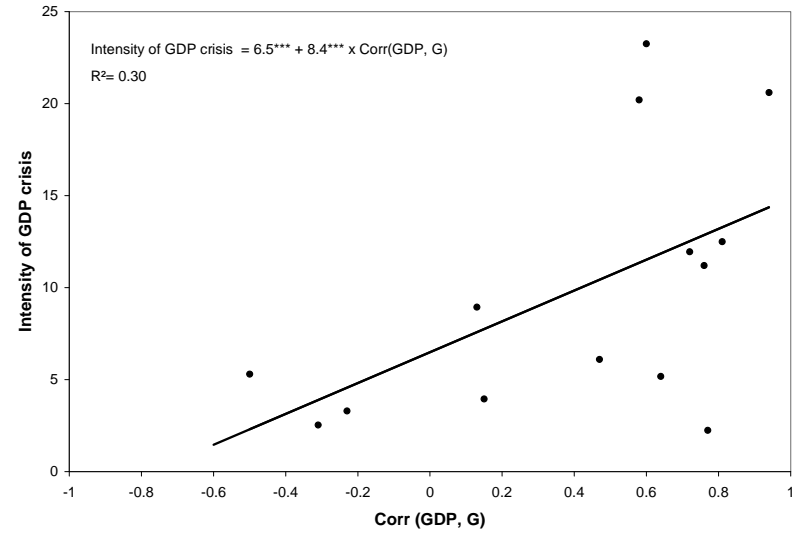
Panel C. Cyclicality of monetary policy during GDP crisis
and duration of GDP crisis (in quarters)
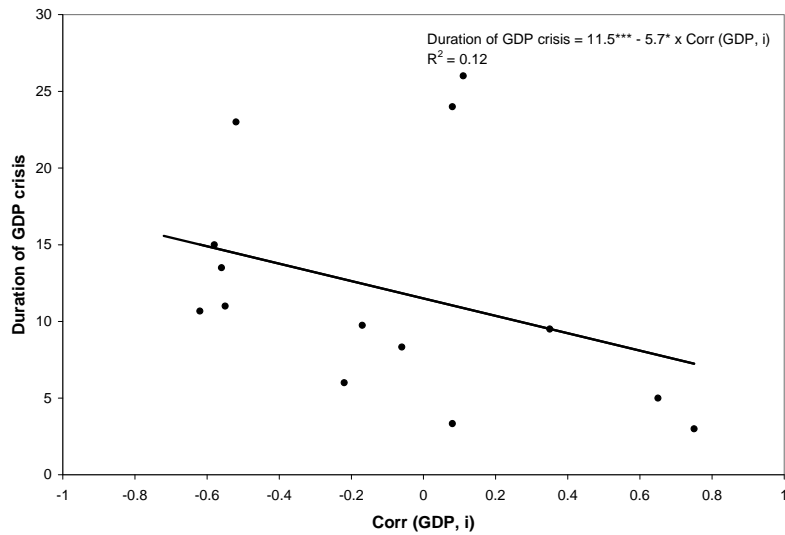
Panel D. Cyclicality of monetary policy during GDP crisis
and intensity of GDP crisis (GDP reduction from start to trough)
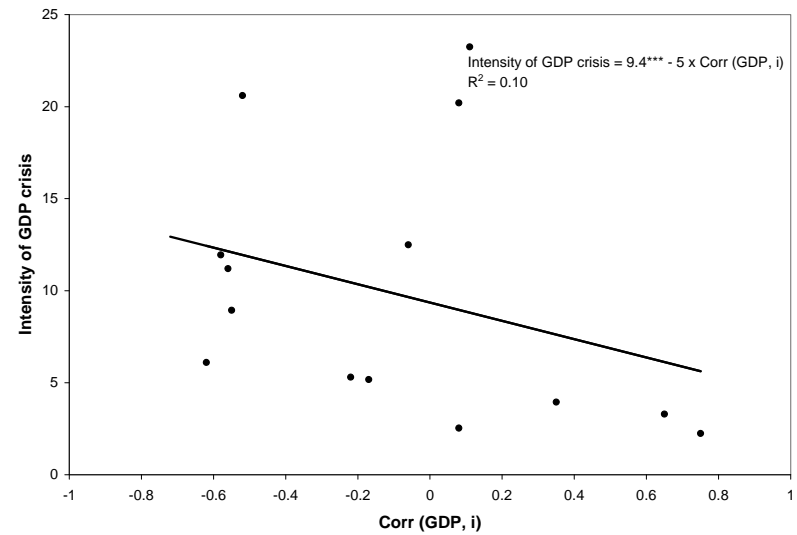
Figure 7. Causality chart

| External shock | → | GDP crisis | → | Policy response |

R1

GDP crisis ↓ Duration & Intensity

R2
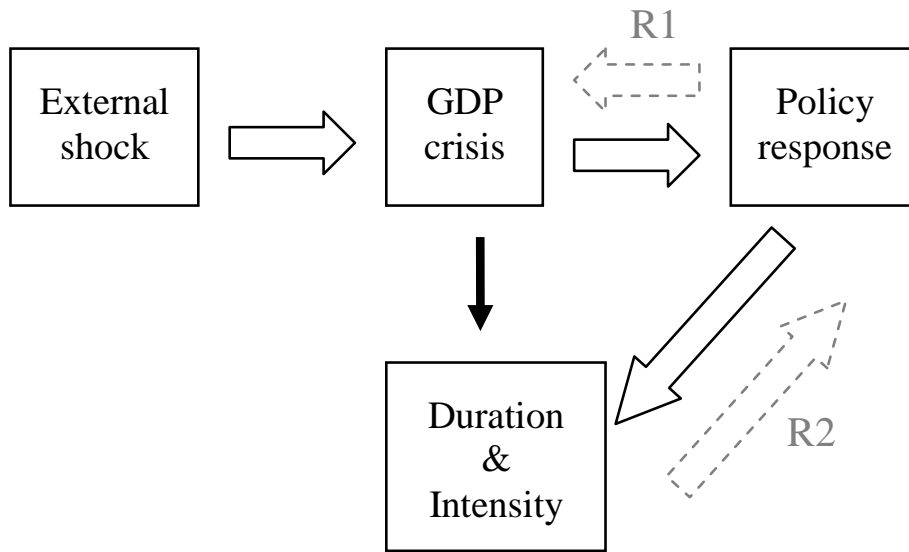
Figure 8. Synchronization of GDP crisis and external factors

Panel A. Federal funds rate

Share = 18.9*** + 3.9 *** x Fed funds rate
R² = 0.20

Panel B. Commodity index

Share = 61.9*** - 0.27 *** x commodity index
R² = 0.28
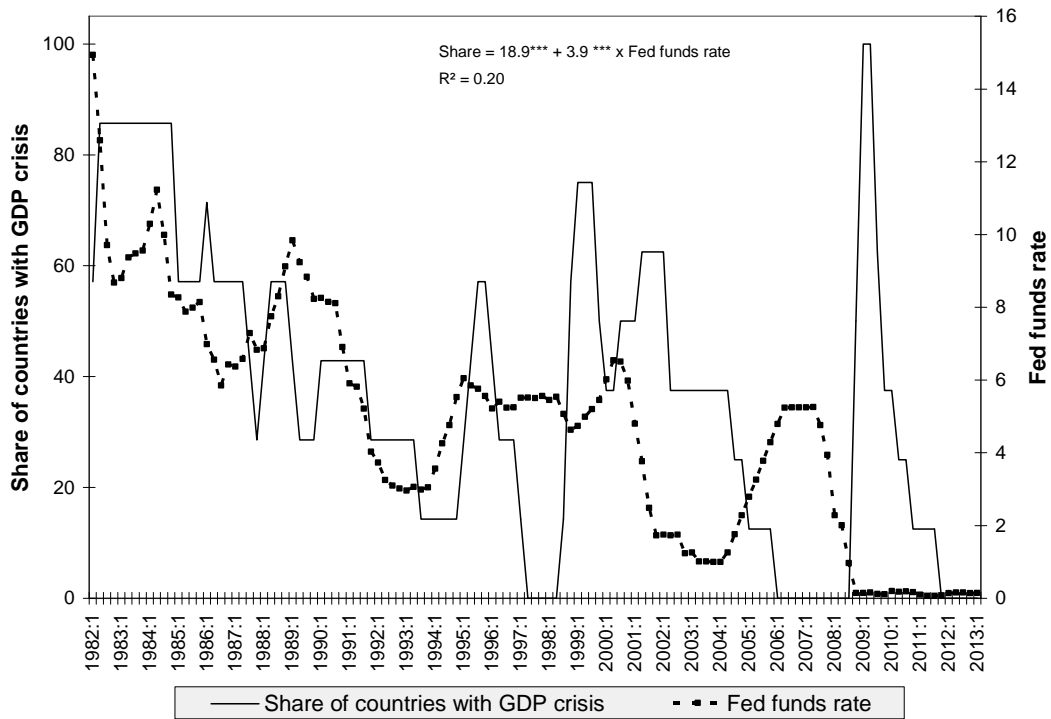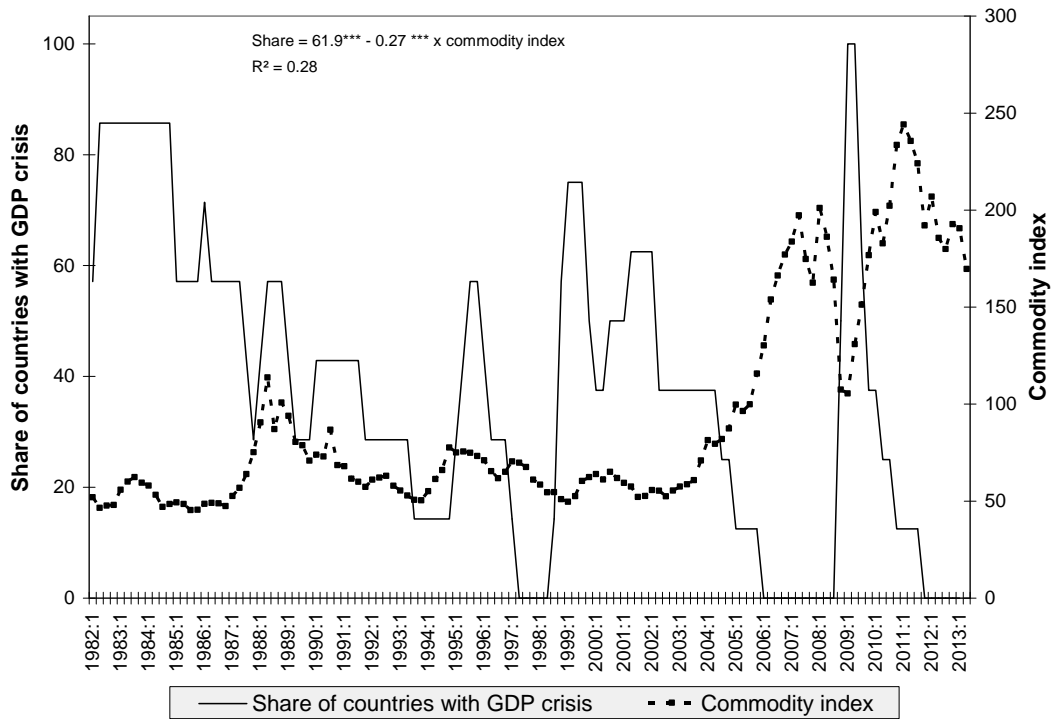
Note: If we include both determinants the R² increase to 0.32. Moreover of we allowed them to interact the R² increase to 0.42

Figure 9. Components of readiness index by country

Panel A. Fiscal readiness index (maximum value 30)

av. before 1998 = 12   av. after 1998 = 15   last 3 years = 17
sd before 1998 = 3.2   sd after 1998 = 3.4   sd after 1998 = 3.2

■ Before 1998   ▤ After 1998   ▦ Last 3 years
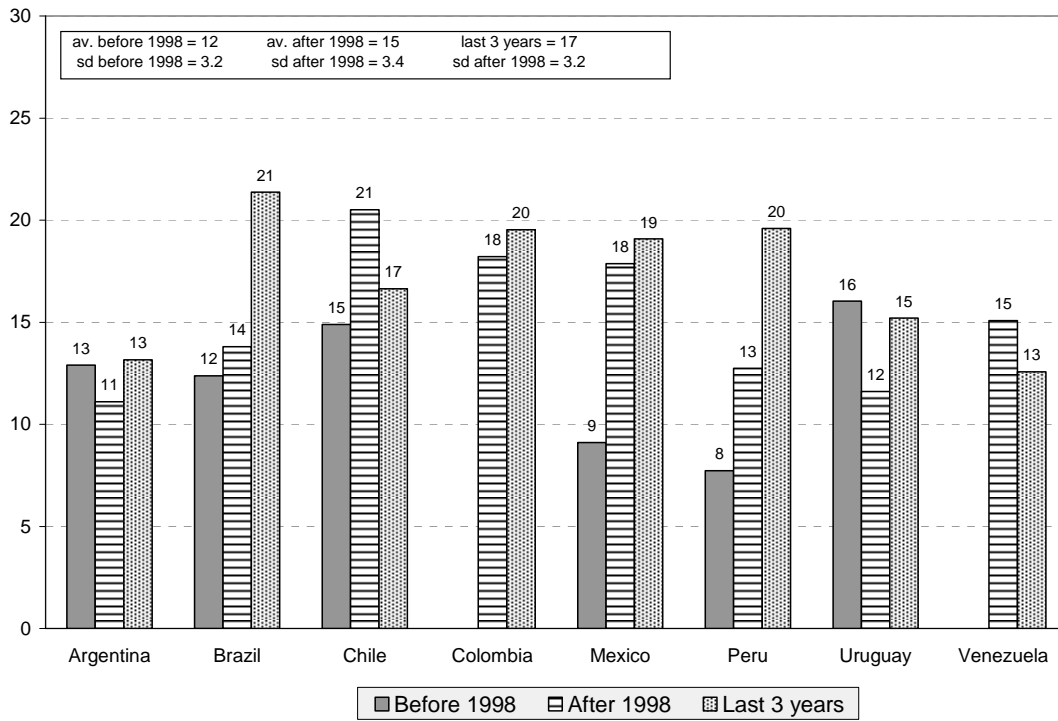
Panel B. Monetary readiness index (maximum value 30)

av. before 1998 = 15   av. after 1998 = 20   last 3 years = 20
sd before 1998 = 4.8   sd after 1998 = 2.3   last 3 years = 2.3

■ Before 1998   ▤ After 1998   ▦ Last 3 years
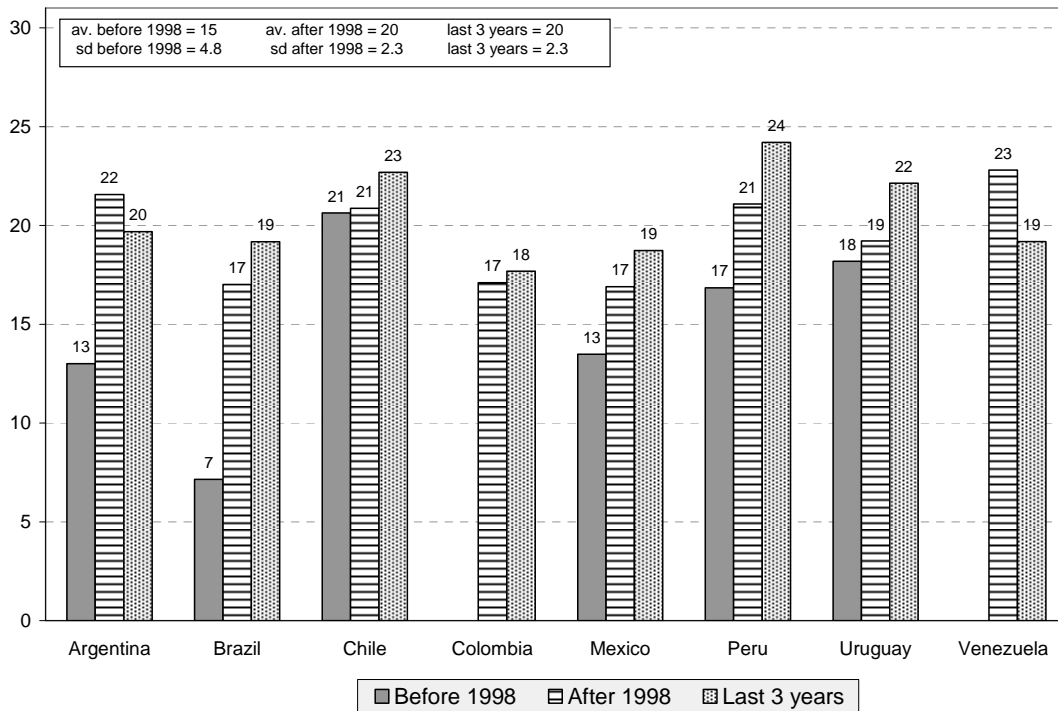
Figure 10. Readiness index by country (maximum value 60)

av. before 1998 = 27   av. after 1998 = 35   av. last 3 years = 38
sd before 1998 = 6.4   sd after 1998 = 3.6   sd last 3 years = 3.9

Country	Before 1998	After 1998	Last 3 years
Argentina	26	33	33
Brazil	20	31	41
Chile	36	41	39
Colombia		35	37
Mexico	23	35	38
Peru	25	34	44
Uruguay	34	31	37
Venezuela		38	32

■ Before 1998   ⊟ After 1998   ▨ Last 3 years
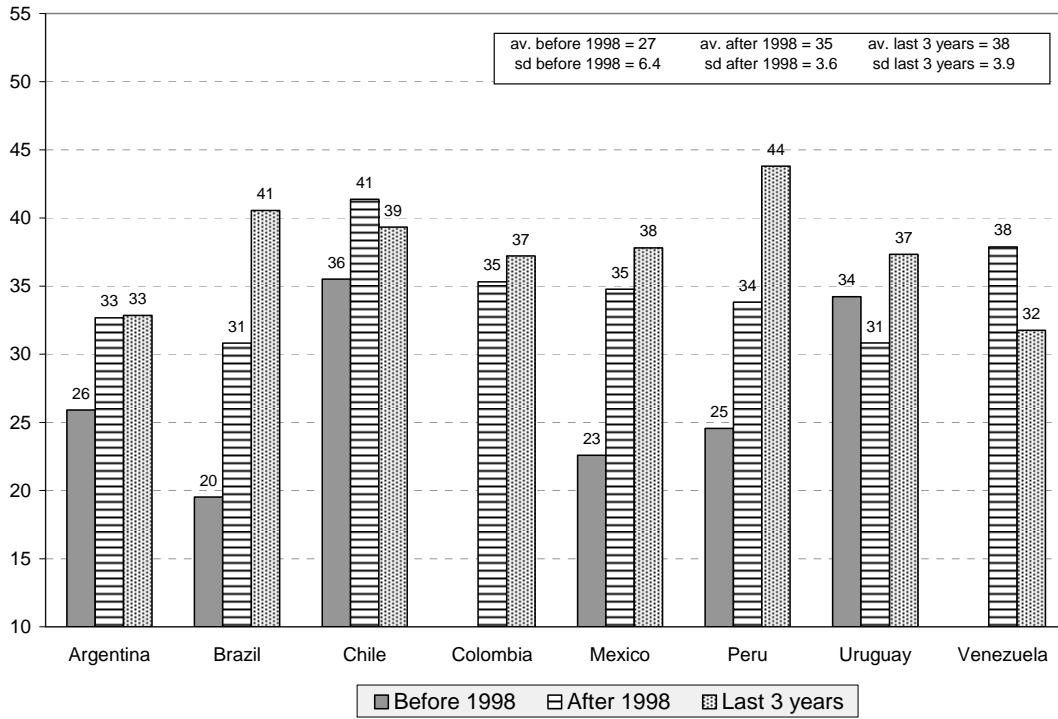
Figure 11. Cyclicality of policies and readiness indices

Panel A. Cyclicality of fiscal policy and fiscal readiness index

Corr(GDP, G) = 1.3*** - 0.07** x Fiscal readiness index
$R^2 = 0.25$

Fiscal readiness index

Corr (GDP, G)
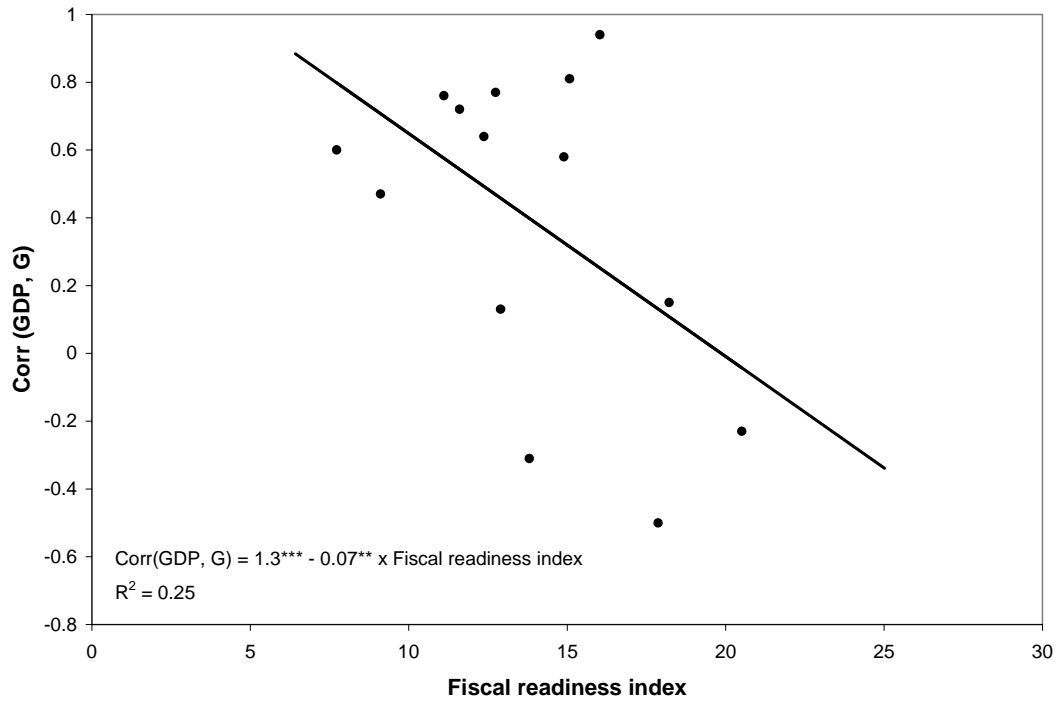
Panel B. Cyclicality of monetary policy and monetary readiness index

Corr(GDP, i) = -0.7 + 0.3 x Monetary readiness index
$R^2 = 0.10$

Monetary readiness index

Corr (GDP, i)
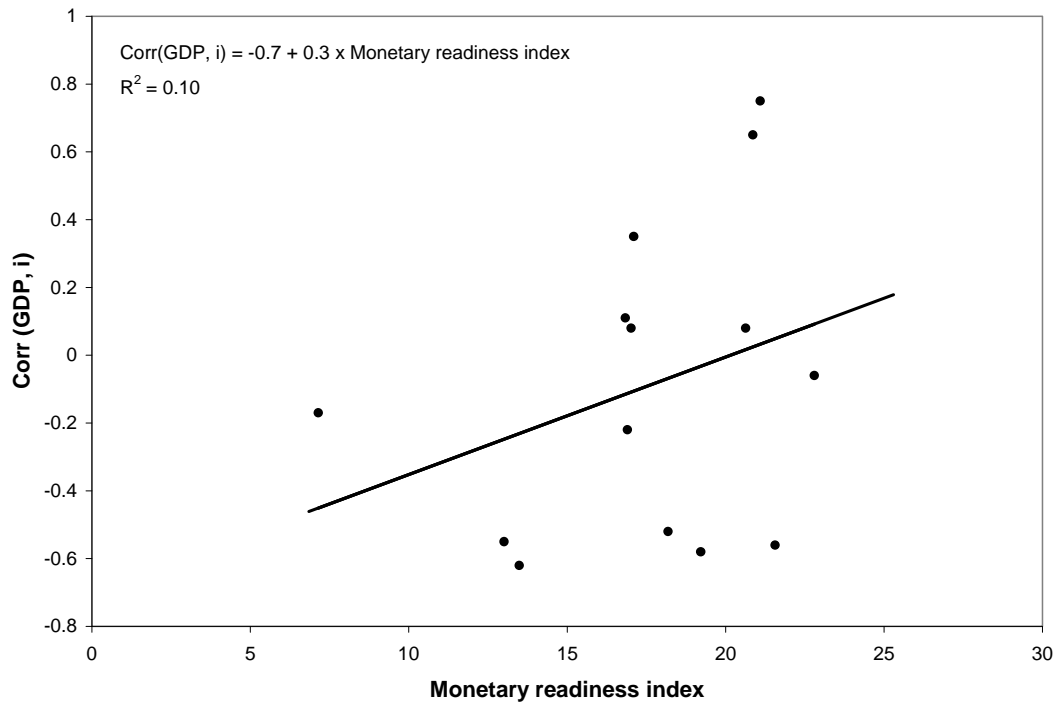
Figure 12. Predicted cyclicality of fiscal policy and duration and intensity of GDP crisis

Panel A. Predicted cyclicality of fiscal policy during GDP crisis
and duration of GDP crisis (in quarters)
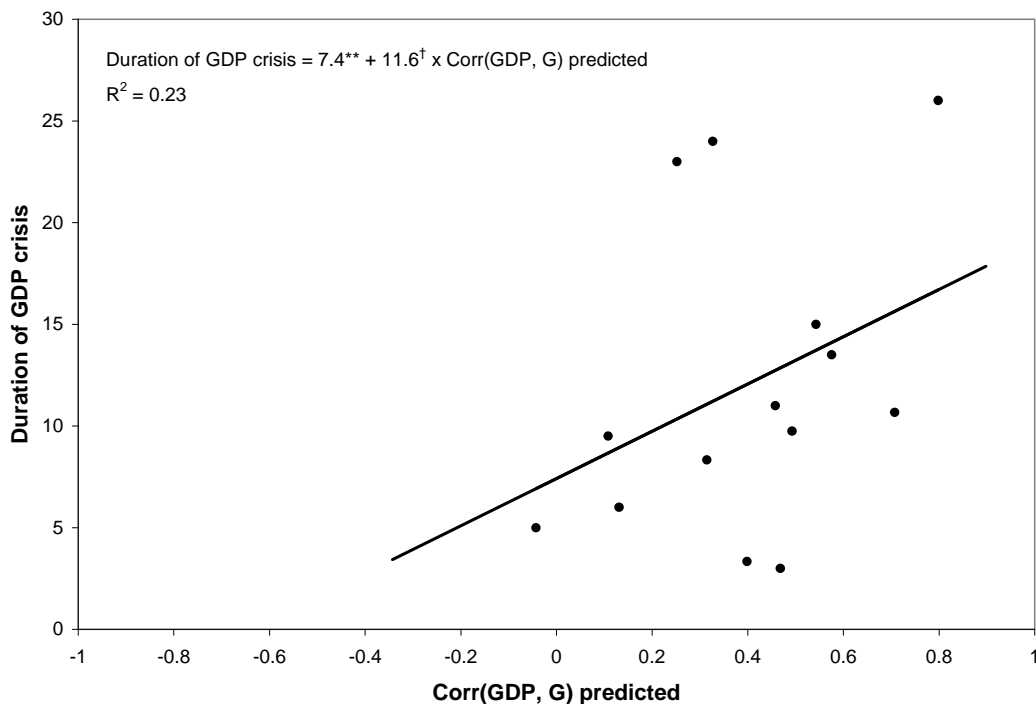
Panel B. Predicted cyclicality of fiscal policy during GDP crisis
and intensity of GDP crisis (GDP reduction from start to trough)

Note: The regression and R^2 shown in panel A (panel B) refer to second stage IV regression using 2SLS where the dependent variable is duration (intensity) of GDP crisis, the independent variable is the correlation between the cyclical components of real GDP and real government spending -i.e., Corr(GDP, G)- and the instrument used is the fiscal readiness index. † means that the coefficient is different from zero at 15% significance.

Figure 13. Eurozone duration and intensity of GDP crisis.

Panel A. Duration of GDP crisis (in quarters)
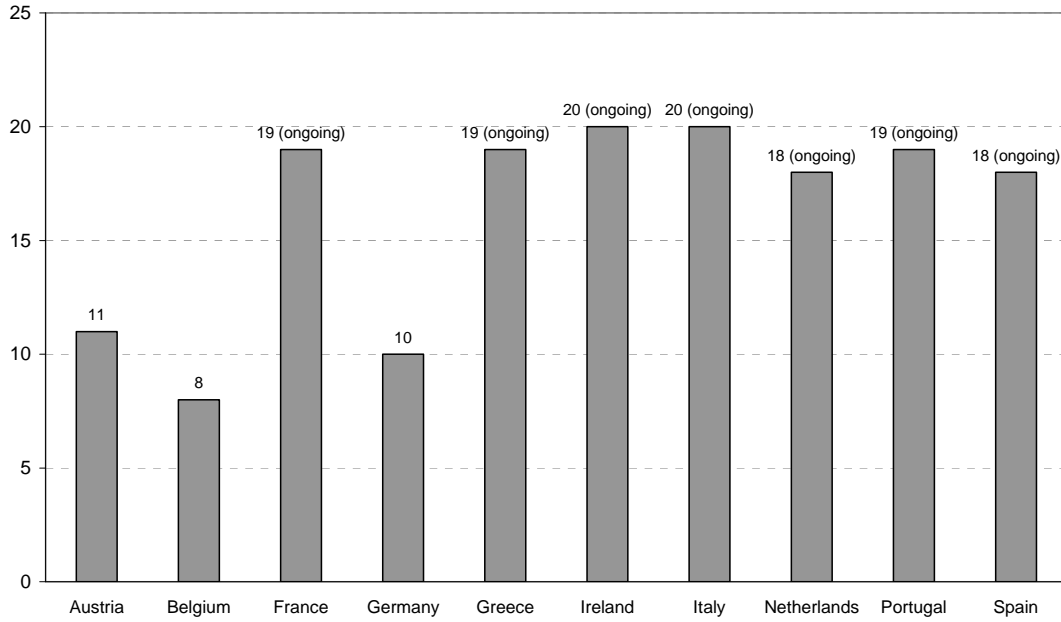
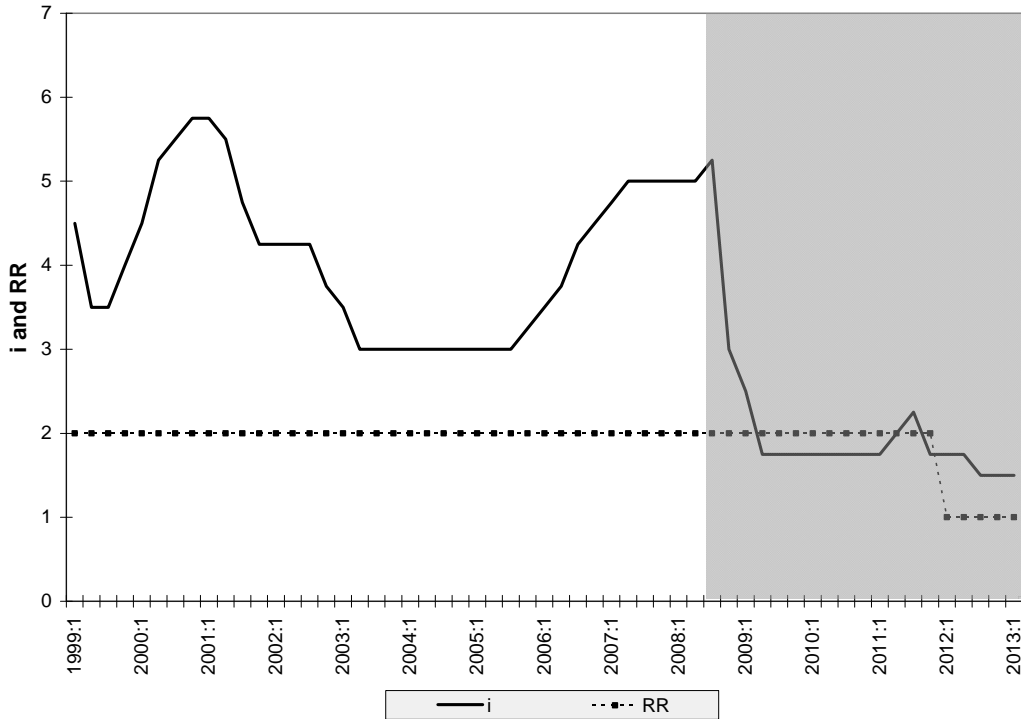## Panel B. Intensity of GDP crisis (GDP reduction from start to trough)
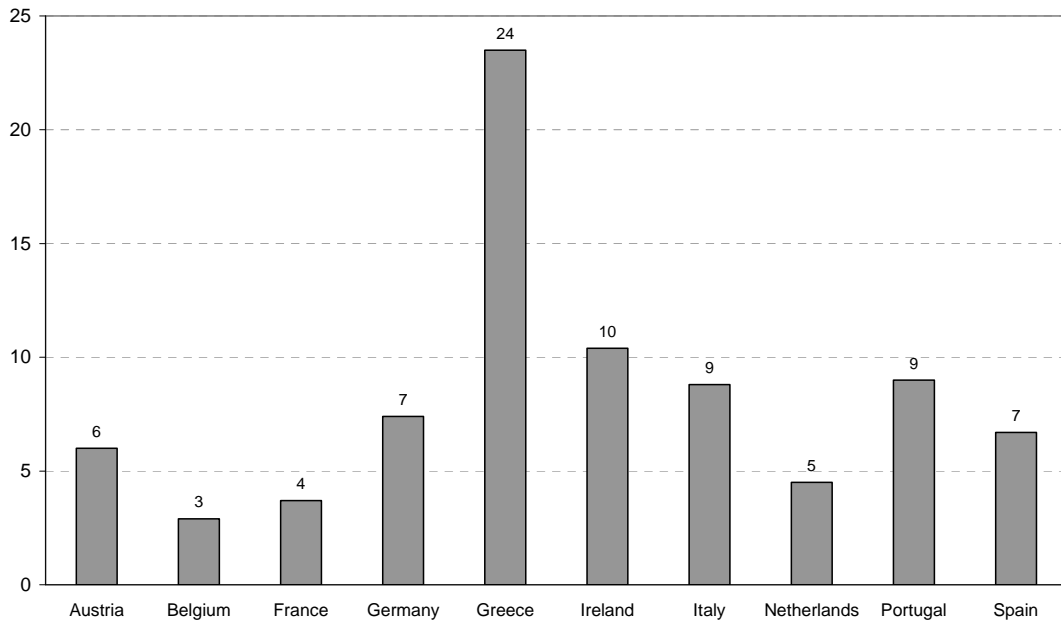
Figure 14. Eurozone use of monetary and reserve requirement policies

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

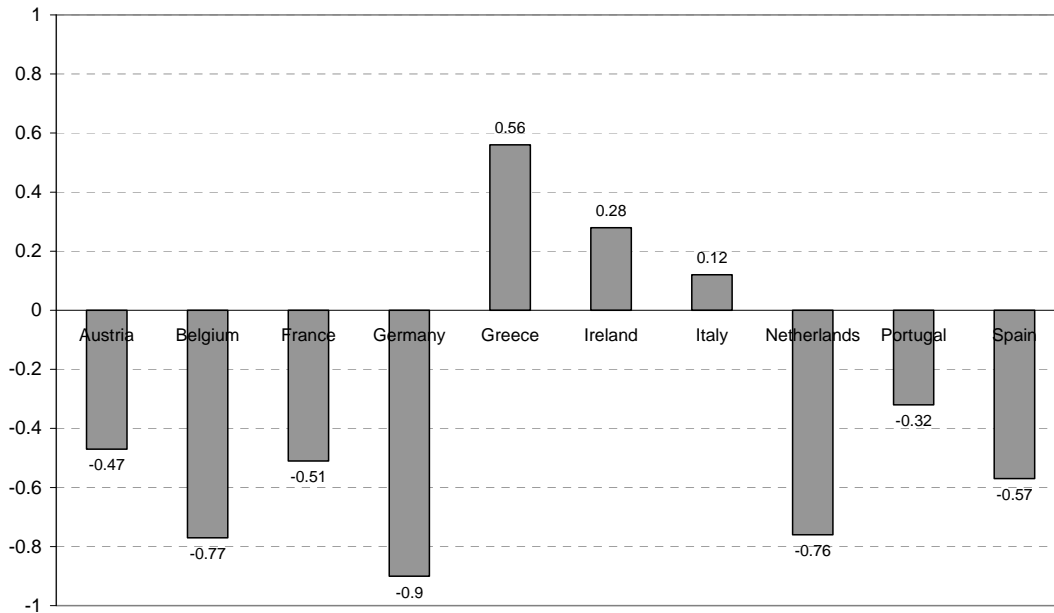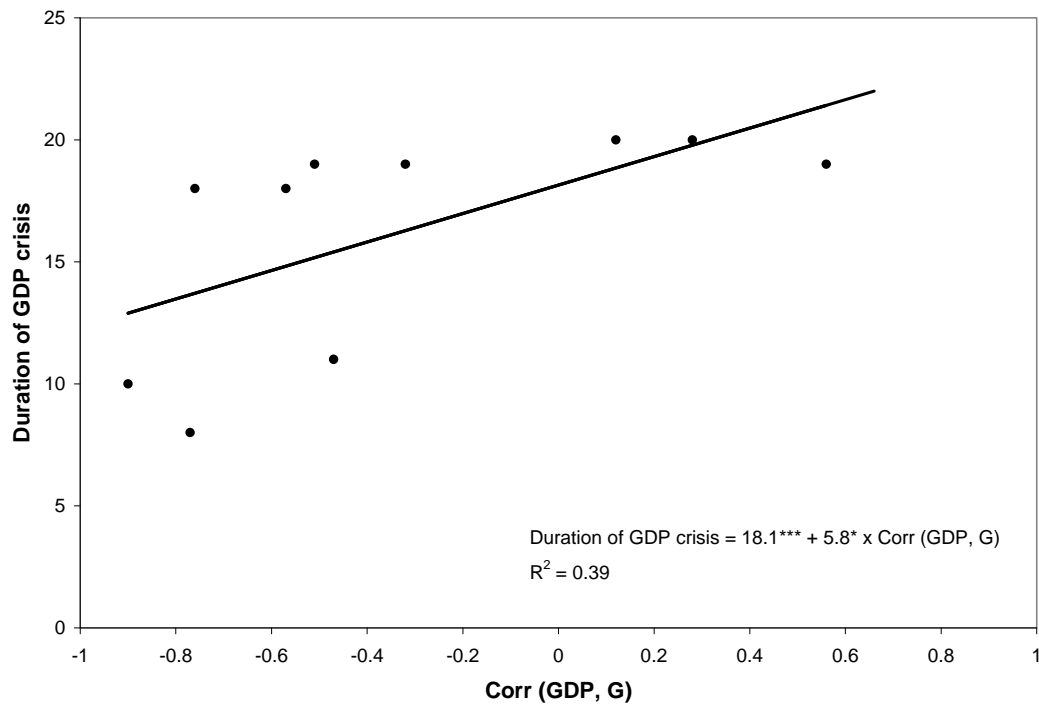## Figure 15. Eurozone country cyclicality of fiscal policy during GDP crisis

Figure 16. Eurozone relationship between fiscal cyclicality and duration and intensity
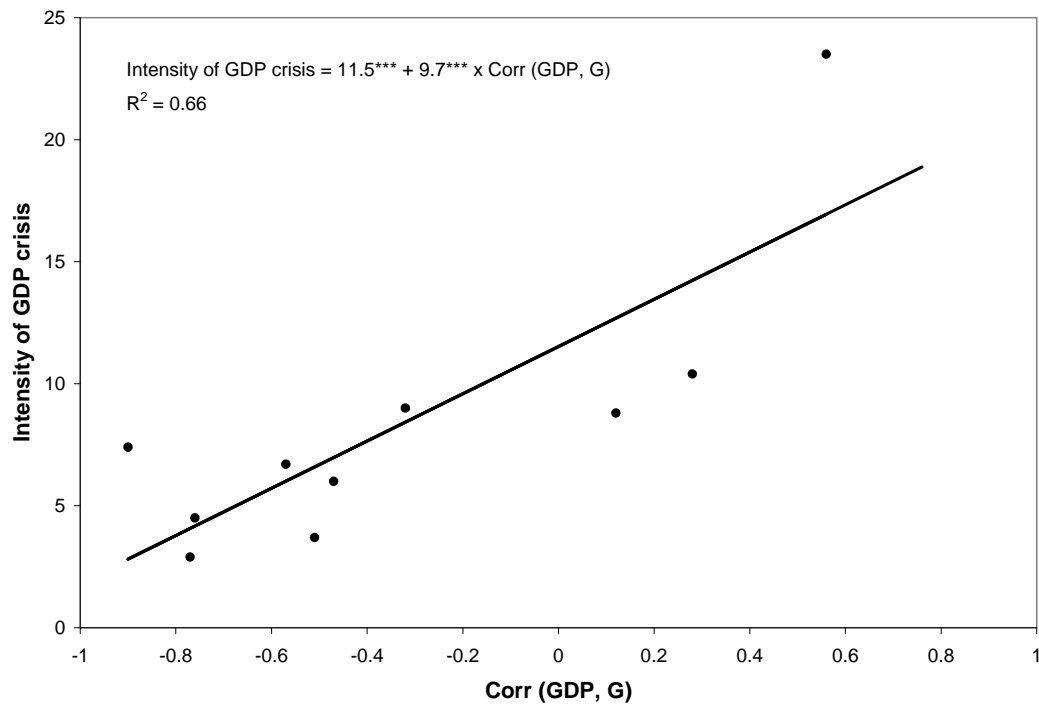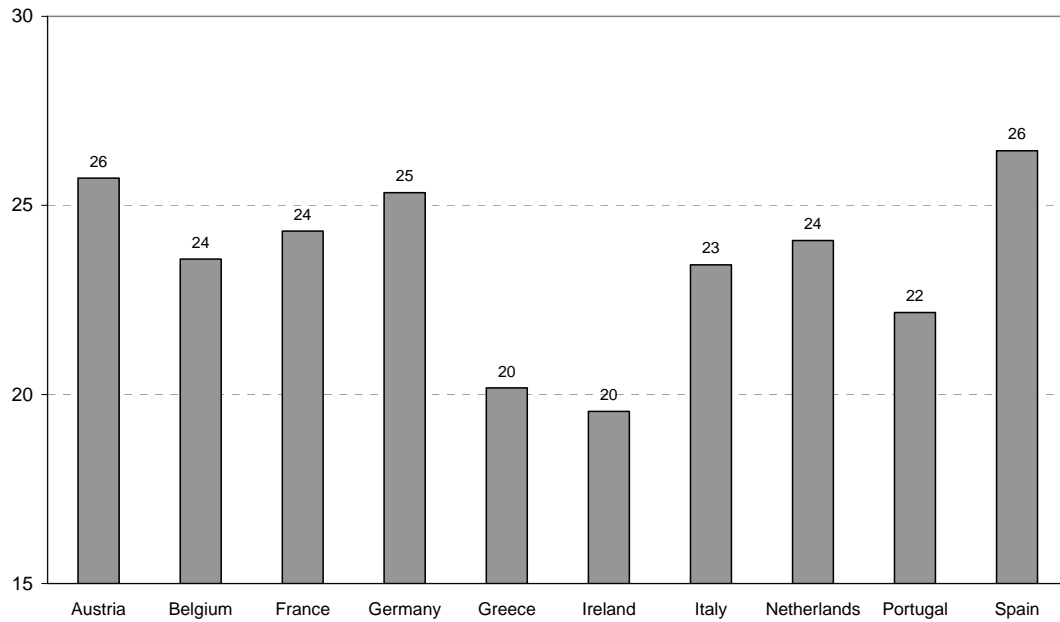
Panel A. Duration and fiscal policy

Duration of GDP crisis = 18.1*** + 5.8* x Corr (GDP, G)

R^2 = 0.39

Panel B. Intensity and fiscal policy

Intensity of GDP crisis = 11.5*** + 9.7*** x Corr (GDP, G)

R^2 = 0.66

Figure 17. Eurozone fiscal readiness index

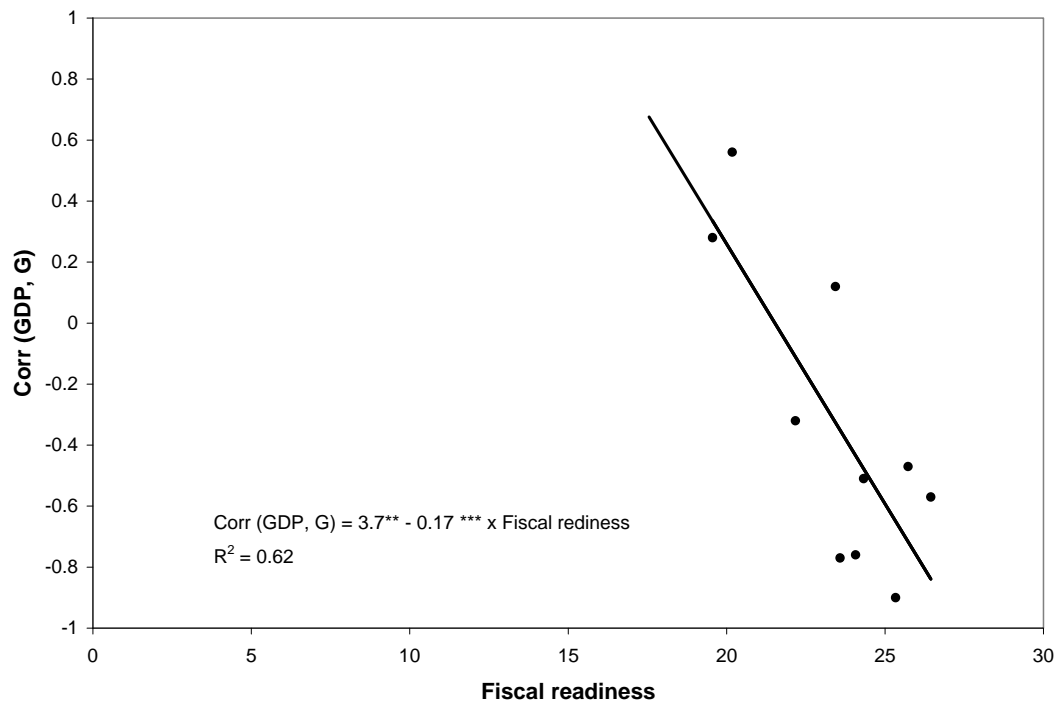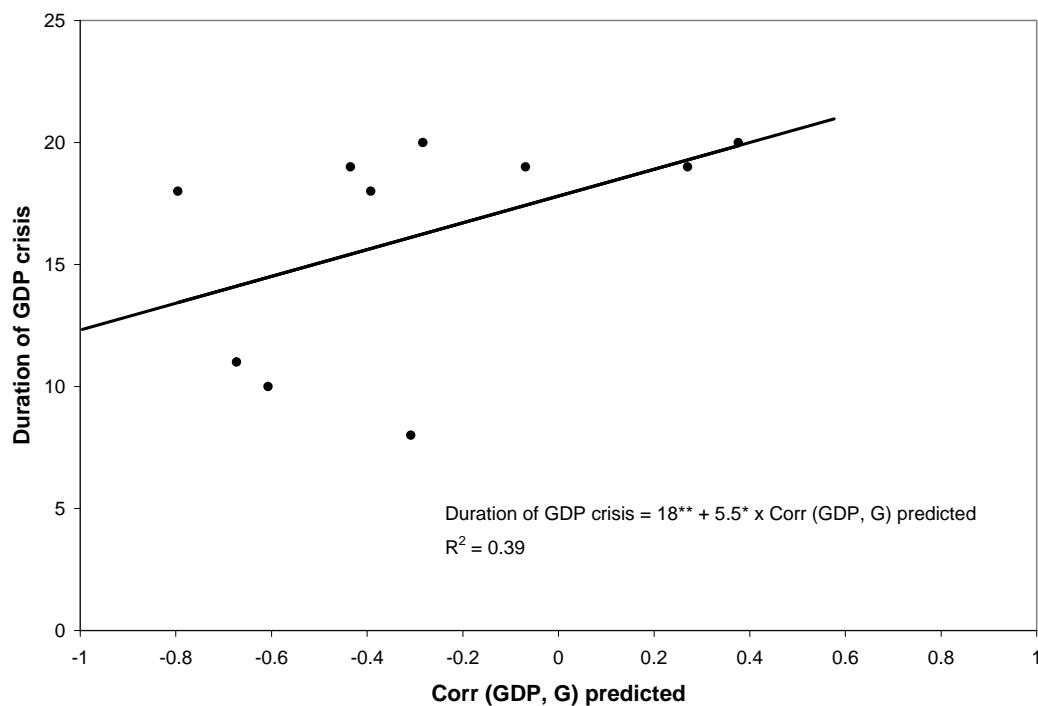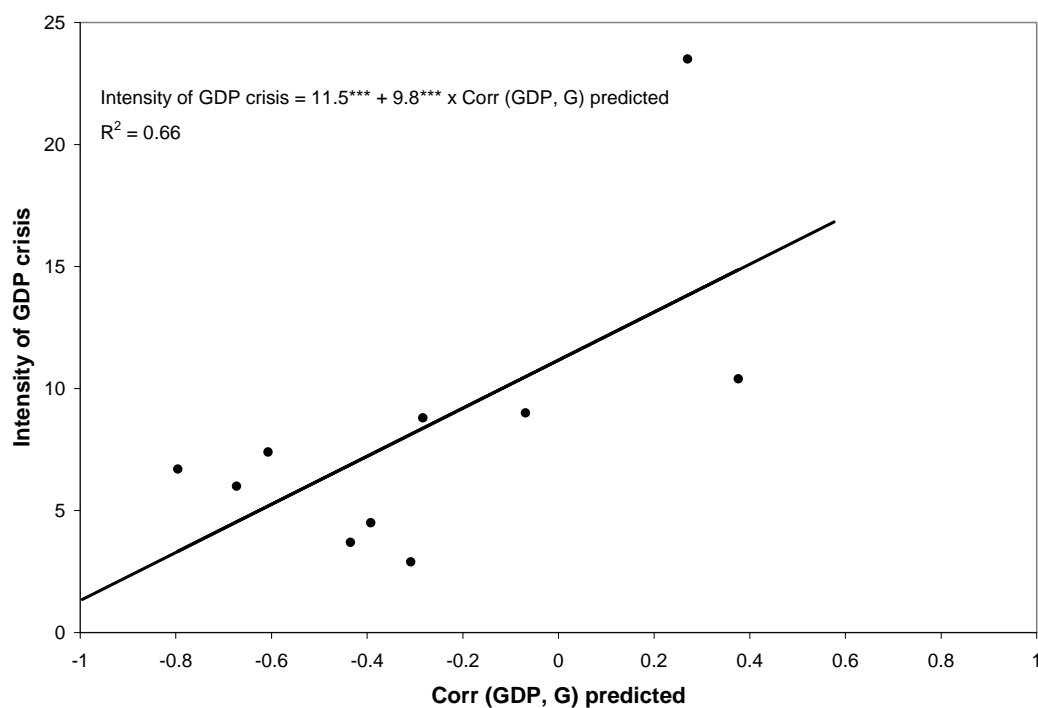**Figure 18. Eurozone relationship between fiscal cyclicality and fiscal readiness index**

Figure 19. Eurozone relationship between duration and intensity and predicted policy

Panel A. Duration and fiscal policy predicted

Duration of GDP crisis = 18** + 5.5* x Corr (GDP, G) predicted

$R^2 = 0.39$

Panel B. Intensity and fiscal policy predicted

Intensity of GDP crisis = 11.5*** + 9.8*** x Corr (GDP, G) predicted

$R^2 = 0.66$

Note: The regression and R^2 shown in panel A (panel B) refer to second stage IV regression using 2SLS where the dependent variable is duration (intensity) of GDP crisis, the independent variable is the correlation between the cyclical components of real GDP and real government spending -i.e., Corr(GDP, G)- and the instrument used is the fiscal readiness index. † means that the coefficient is different from zero at 15% significance.