BANCO DE ESPAÑA
Dirección General de Asuntos Internacionales

1.9.2005

Very preliminary. Do not quote, please

DEBT SUSTAINABILITY AND PROCYCLICAL FISCAL POLICIES IN LATIN AMERICA

Enrique Alberola y José Manuel Montero
Banco de España[1]

Abstract. The computation of structural primary balances for the nine main Latin American countries and the comparison of their respective changes with their cyclical position allows to show that fiscal policy has been and continues to be procyclical in the region. From this evidence, the paper shows that the fiscal behaviour is closely linked to debt sustainability concerns. The current threshold balance, defined as the primary balance which would render the debt sustainable under the existing economic and financial conditions, is used as our gauge of fiscal sustainability. The empirical analysis reveals that the fiscal stance tightens when the threshold increases, and that the adjustment is stronger the less sustainable debt, that is the higher the difference between the threshold and the actual primary balance in the previous period. The results are robust to different specifications and estimation methods.

Keywords: fiscal policy, debt sustainability
JEL Classification: H6, E6, F3

[1] Luis Molina crucially helped in the construction of the data base. The opinions expressed in this documents are solely responsibility of the authors and do not represent the views of the Banco de España. Contact authors: alberola@bde.es , jmontero@bde.es

1 Introduction

Fiscal policy is bound to play an important stabilizing role in the economy. When the economy is accelerating the fiscal authorities should be able to moderate activity by restraining the fiscal stance, and, vice versa, in downturns fiscal policy can help reviving the economy. Therefore, under normal circumstances, fiscal policy is expected to behave countercyclically. However, the empirical evidence has repeatedly shown that fiscal policy has been procyclical[1] in Latin America.

This is a rather unfortunate feature of the region, since it introduces an additional source of volatility to the economy. The reasons put forward for this feature have mostly revolved around the financial vulnerability of the public accounts. In particular, Gavin et al. (1996) point out that the creditworthiness of the country is an important determinant of the fiscal stance. Alberola and Molina (2003) show that in emerging markets fiscal balances are determined by the financing costs and that they are closely related to the cycle.

Notwithstanding this conventional wisdom, the empirical approaches to the question have been scant and rather unsystematic. The main reason is the difficulty to derive adequate gauges for the fiscal stance in Latin America, due to lack or inadequacy of data and to the extreme volatility of the activity in the region. These factors have hindered the computation of structural fiscal balances, which is the most common indicator to assess the fiscal stance in OECD countries.

In this paper we aim at overcoming these problems in order to analyse the cyclical behaviour of fiscal policy in Latin America and its determinants. On the one hand, we compute the structural balance for nine countries of the region for the period 1981-2004, taking advantage of the recent advances in filtering techniques to derive the output gap. The changes in the structural primary balances define the fiscal stance which is compared to the cyclical position of the economy: an increase in the structural balance at a time of economic upturn would signal a countercyclical and, thus, stabilising role for fiscal policy. On the other hand, we derive an indicator of debt sustainability along the lines of Blanchard (1990) and Talvi and Végh (1998). In particular, we define the current threshold balance as the primary balance which renders debt stable at each point in time. Primary balances above such threshold would imply that the debt is sustainable. This indicator will be used to uncover the relation between the fiscal stance and debt sustainability.

---

[1] See Gavin and Perotti (1997), Gavin et al. (1996), Alberola and Molina (2003).

The panel data analysis show a strong and significant negative correlation between the changes in the structural balance and the output gap, so that they confirm that fiscal policy is procyclical in Latin America. After having stated this, we move on to show how debt sustainability issues affect the fiscal behaviour. The empirical evidence show that a deterioration of the current threshold balance induce a fiscal tightening and that this fiscal tightening tends to be stronger the worse the debt sustainability position is.

These results can be taken as strong evidence that debt sustainability concerns play a determinant role to explain the fiscal behaviour in Latin America and the procyclical bias of fiscal policy. As a matter of fact, it is shown that for most of the specifications debt sustainability concerns account, from an statistical point of view, for the procyclicality of fiscal policy in Latin America.

Note that these results do not necessarily point to the fiscal indiscipline of the fiscal authorities. It could be argued, on the contrary, that fiscal policy is forced to adjust to financial circumstances, some of which fall beyond the control of the policymakers as we know. Thus, the question of the virtuous management of fiscal policy remains open for future work, but we aim to approach these issues under the same framework.

2 The procyclicality of fiscal policy

The specification of structural or cyclically adjusted balances has centered a great deal of effort to come up with a universally accepted methodology to separate the budget balance into its structural and cyclical components. All the available methods involve two main steps. First, the cyclical fluctuations (output gaps) are derived by subtracting the potential or trend output from actual output and expressing the difference as a percentage of the former. Second, the cyclical component of the budgetary balance is estimated through the application of fiscal elasticities to GDP and, for some cases, commodity prices. Finally, this cyclical component is deducted from the actual budget balance to derive the structural (cyclically-adjusted) component. This is the approach used by most of the international organizations and national authorities. The main difference among methodologies involves the calculation of the output gap, which is estimated via a smoothing technique (Hodrick-Prescott) or through a production function (Giorno *et al*. (1995)).

Structural balances is a widely used tool to assess the fiscal stance in industrialized countries, where the availability of long term statistics and the relative stability of the economic environment has allowed to develop increasingly improved techniques to filter out the cyclical balances. In fact, in the last years a preference has been observed towards the second

method (which was already used by OECD and IMF), after the shift of the EC towards it. Estimates of the cycle based on this method require the availability of reliable data on use of labour and capital stocks.

In Latin America, the computation of structural balances has traditionally been hindered by the lack of long series of data, the extreme volatility of the macroeconomic variables and the noise in the fiscal data derived from dramatic structural changes and/or composition of revenues and expenditure. Furthermore the volatility of revenues is closely associated to the evolution of commodity prices and exports which in several countries are an important source of fiscal financing. Given these obstacles, and in spite of the recent efforts made in some countries like Chile, the estimates of structural balances for the countries in the region are scant and a joint estimation of these balances for the whole region is, to our knowledge, non-existent[1]. Here, as a starting point to our empirical analysis we aim at filling this gap, by estimating the primary structural balances for the nine main countries of Latin America.

The methodology we will use to derive the trend output is smoothing through the Hodrick-Prescott (1997) filter. Since it is being abandoned in OECD countries some motivation for this option is in order. First, lack of data availability and homogeneity. It is well known that labour statistics in Latin America are unreliable due to the importance of the informal economy and that capital stocks are difficult to measure in general, and more prominently in these countries; second, given the recurrence of economic crises, the concept of potential output that underlies the full capacity of use of production factors loses some clarity. In particular, if we think of the disruptions that economic crises provoke in these economies, the cyclical position is clearly not the only element which drives a wedge between potential and actual output. Finally, the refinement of filtering techniques allow for a more precise estimation of the cycle, also in the case of large variability like in the Latin American case.

2.1.1 Estimation of the trend output and the primary structural balances

The trend output is calculated by applying the Hodrick-Prescott filter to the real GDP series. Let y denote the logarithm of actual real GDP and y^* the logarithm of real trend GDP. Then, the estimate of the output gap (*GAP*) is obtained taking the quotient of the difference between GDP and trend output, and this latter variable:

$$GAP = \frac{Y - Y^*}{Y^*} \qquad (1)$$

[1] A notable exception is "Sostenibilidad fiscal en la región andina. Políticas e instituciones", Corporación Andina de Fomento (2004).

In practice, we proceed along the lines set forth by Kaiser and Maravall (1999) to improve on the performance of the Hodrick-Prescott filter. Given the high volatility of Latin American output, we pre-adjusted the series by identifying outliers and then extracting them from the original series. Also, to overcome accuracy problems in both ends of the series, we added forecasts and backcasts for further periods[1]. At this stage, we used actual data for the beginning of the series and forecasts from Consensus Forecasts for the end of the sample[2] instead of the model based method suggested by Kaiser and Maravall (1999).

Calculating cyclically-adjusted balances once the output gap measure has been estimated involves to single out the budgetary items which are assumed to display a cyclical pattern. In developed countries, such items usually involve different types of revenues and some cycle-sensitive expenditures, such as unemployment benefits. However, for Latin America, data consideration and the lack of generalized unemployment subsidies advises for a simplified scheme, where only revenues, taken as a whole, *T*, are considered as cyclically sensitive. In order to filter out the cyclical part of revenues, the elasticity of *T* to activity is computed from the following regression.

$$\log T_t = \alpha + \beta \log Y_t + \varepsilon_t \tag{2}$$

so that the cyclically adjusted revenues T^S are estimated as[3]

$$T_t^S = T_t \left(\frac{Y^*_t}{Y_t} \right)^{\beta} \tag{3}$$

Moreover, for an important number of Latin American countries, the revenues are heavily influenced by commodity-related taxes or excises, which also have a bearing with the level of activity and whose prices tend to be rather volatile, affecting the cyclical profile of revenues. Therefore, it is customary to address the estimation of structural primary balances in these countries taking into account the evolution of commodities revenues. In our sample, Mexico, Venezuela, Ecuador, Colombia –all of them oil exporters- and Chile (copper), where the share fiscal revenues from commodities is substantial, the computation of structural revenues and balance is accordingly modified:

---

[1] Part of the computations were carried out with Tramo/Seats program developed by Gómez and Maravall (1996).

[2] Where there were no forecasts available we employed estimates from the IMF's Article IV reviews (Ecuador and Uruguay).

[3] The fact that elasticity is computed on overall revenues tends to exact too much cyclicality from the revenues. This is why it is also convenient to impose a unitary elasticity in the analysis as we will do in the next section.

$$T_t^S = T_t\left(\frac{Y^*_t}{Y_t}\right)^{\beta}\left(\frac{p^*_t}{p_t^{comm}}\right)^{\phi} \quad (4)$$

where p^{comm} and p^* are, respectively, the real prices of commodities and the notional real equilibrium price of the commodity, and the elasticities are estimated through the following regression:

$$\log T_t = \alpha + \beta \log Y_t + \phi \log p_t^{comm} \varepsilon_t \quad (5)$$

The trend real commodity price (p^*) is calculated by applying the Hodrick-Prescott filter to the real price series. This method provides a desired degree of homogeneity, but at a cost in terms of precision. The structural balance is computed by just substracting from the cyclically adjusted revenues the overall expenditures (G_t). However, in order to define more properly the fiscal stance it is pertinent, even more in Latin America, to deduce from the expenditures the interest payments on public debt (IP_t), since this is a volatile source of expenditure which is clearly out of the discretion of the authorities. In this way, we obtain the primary structural balance (SPB_t), according to the following expression, where it is important to note that all variables are expressed in terms of the GDP

$$SPB_t = T_t^S - (G_t - IP_t) \quad (6)$$

The fiscal stance will be given by the changes in the structural primary balance (ΔSPB_t). An increase (decrease) in the structural primary balance signals a contractionary (expansionary) fiscal stance.

2.2 Fiscal stance and the cycle

Our sample covers nine Latin American countries for the period 1980 to 2004[1]. The output gap has been computed making use of two different λ in the Hodrick-Prescott filter: $\lambda=6.7$ as recommended by Maravall and del Rio (2001) and $\lambda=100$, which is the usual figure and that delivers wider cycles. The fiscal stance has required the computation of the revenue elasticities with respect to GDP for each country and also for commodities revenues for the

[1] These countries are Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay and Venezuela. Our basic sources for the fiscal variables are the IMF Government Finance Statistics and International Financial Statistics (IFS), which have been complemented, when necessary, with national statistics. Due to data limitations fiscal variables have been computed for the central government. GDP data come from the IFS.

mentioned countries (see table 1[1]). Note that the elasticities are clustered around values higher than 1,5, for most countries and are strongly significant for all countries but Venezuela[2].

The figures in graph 1 present the output gap and the changes in the structural balance –our gauge for fiscal stance- of each country for λ=6,7. In the figures it can be seen in many cases that the fiscal stance is contractionary – *SPB* increases- when the output gap is negative, suggesting that the fiscal policy has been procyclical.

A proper statistical analysis of this hint appears in table 2A, where the correlation between ΔSPB_t and the output gap is negative for both λs, except in Chile and, for λ=6.7, Ecuador. By regressing both variables, it can be observed analogously that the slope coefficient is significantly negative –with 90% probability- in one third of the cases, and inequivocally so in Peru and Uruguay. In the second part of the table, which uses the value 100 for λ, Argentina and Brazil are also significant. Therefore, Chile seems to be the only country where the fiscal stance has been somehow procyclical (a positive, though not significant, relationship between the output gap and the changes in SPB). For the sake of completeness, table 2B performs the same computations but instead of using the estimated elasticities, these are set to one, as it is done sometimes in order to estimate the fiscal impulse by the IMF[3].

A preliminary aggregate picture for the region can be obtained by looking at the scatter plot in graph 2. The output gaps and changes in structural balances are plotted against each other. The evident negative slope of the regression line confirms, at a glance, the apparent procyclicality of fiscal policy in Latin America. For the sake of comparison, we have also plotted the same relationship for the US, where it is apparent that a positive correlation exists in this case –which as it turns out is statistically significant- denoting the expected countercyclicality of fiscal policy. It is important to note, however, that the same analysis carried out for all OECD countries shows that in some of them fiscal policy –according to this

[1] The elasticities have been estimated by Dynamic OLS (see Stock and Watson, 1993). All the series have been pre-adjusted with TRAMO/SEATS in order to remove outliers that might bias the estimation.

[2] The case of Chile merits a comment. Estimates for equation (5) yielded a negative elasticity for the real copper price, which is puzzling. Therefore, we decided to employ the GDP elasticities obtained by Marcel et al. (2001) and a unit elasticity for the real copper price, which would be approximately equivalent to their method. Results are not modified for copper-price elasticities around the unity. In the case of the GDP elasticity, we present the results for the lower range of their estimates (which is between 0.7 and 1.25), though the results are not sensitive to this choice.

[3] The fiscal impulse also implies computing the structural expenditures as a function of the potential output, with elasticity one, which is, after all, very similar to just taking expenditure as given. Another reason to look at this alternative measure is the filtering out of revenues when elasticities are explicitly estimated and, besides, this is done on the overall revenues, like in this case, tends to extract, by construction, all the cyclicality from the revenues, not only that associated to the automatic stabilizers.

criterion- has been procyclical, even significantly, at least for some parts of the period considered. This implies that the criterion is rather strict and that the procyclicality of fiscal policies is not an exclusive feature of Latin American economies, although here it has been more intense and protracted.

The econometric counterpart of this scatter plot is the panel data analysis which appears in table 3 for the two considered λs[1]. A panel regression of the fiscal stance on the output gap, with both fixed and random effects, is presented. The estimated coefficient is always negative and strongly significant, which yields a very strong and robust evidence of the procyclicality of the fiscal stance in Latin America. The two final columns of the table divide the sample into two parts, comparing the 80s with the 90s. It turns out that the negative sign is not significant for the first part of the sample, although the point estimates are quite similar. In graph 3 the notion of time stability of the parameters is further explored. The upper chart displays the slope parameter of the previous regression in a recursive estimation, starting with the period 1981-87 and adding one observation at a time. The parameter moves in a very narrow range between -0.1 and –0.15, and it is significant after year 1997 is included and it is very stable. The lower chart is, alternatively, a rolling regression, starting as before in the seven-year window 1981-87 but deleting and adding one observation at a time to keep the size of the window. Here, as expected, it is observed a higher variability but again it is relatively stable. Furthermore, in this chart it can be observed that through time, and mainly in the second half of the nineties, the fiscal policy tended to become more procyclical. Only the recent recovery period seems to have bucked that trend.

3 Debt sustainability and the fiscal stance

The results so far have robustly confirmed that far from playing its expected stabilizing role, fiscal policy has been procyclical in Latin America: economic expansions have tended to be accompanied by expansionary fiscal policies, while the downturns of the cycle were worsened by a contractionary fiscal stance The rest of the paper is devoted to explain this puzzling result. Our main suspect is the influence that the concerns on the sustainability of debt has on the fiscal behaviour through the cycle.

Obviously, the level of debt is a central element in this assessment and a fundamental constraint for fiscal policy, but it will only be expected to be effectively binding throughout the cycle when two circumstances concur: it is high enough to influence fiscal policy in the short

[1] The results are very similar when using unit elasticity for revenues.

run, and the financing conditions and/or cost of debt are volatile and closely related to the cycle.

In Latin America both conditions seem to hold for many countries. While the level of debt to GDP when compared to other developed countries like some EU states or Japan is not too large, Latin America suffers from debt intolerance, as Rogoff and Reinhart (2002) have labelled it, due to the higher financing costs that burden these countries and to the dramatic swings in the financing conditions which may even cut off the access to the international financial markets. Under these circumstances, the critical debt thresholds are much lower than in the OECD countries and the financing conditions display a high volatility[1]. Furthermore, the dependence of Latin America on external financing flows also imply that when in the turbulence periods the financing conditions worsen and the access to foreign markets is closed or limited, a drastic real adjustment follows in order to reverse the traditional negative sign of the balance of payments.

3.1 An indicator of fiscal sustainability. The current threshold balance

This section is thus focused on developing a feasible indicator to explore the links between the fiscal stance and the sustainability concerns. The instrument we use is based on a simplified version of the debt sustainability analysis[2]. According to the conventional definition, debt will be sustainable at any point of time when the value of current debt is lower than the net present value of future primary balances, that is, the fiscal balance once the interest payments on debt are deducted. This definition, simple as it is, faces the problem of not being operative, since it is quite difficult to derive the series of future fiscal balances or to impose a particular rate of discount on the future.

A more pragmatic approach is to determine the dynamics of debt, which evolves according to a limited number of parameters. Through several simplifications –some of which are rather strong- it will be possible to derive an indicator of fiscal sustainability which can be used for our purposes.

[1] Debt intolerance can be in turned explained by the history of debt defaults, economic instability and weak institutions which determine not only a higher cost of financing but a debt structure biased towards the foreign currency and short maturity.

[2] See Blanchard (1990).This sort of analysis has gained preeminence in the last years in the framework of financing programs by international financial institutions, since debt sustainability is becoming an increasingly recognized condition for lending. As a consequence, the toolkit for deriving debt sustainability paths is blossoming and becoming increasingly sophisticated.

The starting point is the fiscal budget constraint of the government, which can be expressed, after some algebra, as:

$$\Delta D_t = -PB_t + \frac{(i_t - \pi_t - g_t)}{(1+g_t)}\alpha D_{t-1} + \frac{(i^*_t + \Delta e_t - \pi_t - g_t)}{(1+g_t)}\beta D_{t-1} \quad (7)$$

where PB_t is the primary balance, and D_t is the stock of public debt at the end of time *t,* both expressed as a ratio of GDP. There are two different types of debt to be considered: domestic debt and external debt, which appears with an asterisk. They have, respectively, a share α and β in the stock of debt, and their nominal interest rates are i_t and i^*_t . Δe_t are the changes in the nominal exchange rate –where an increase in *e* represents an exchange rate depreciation, π_t is the inflation rate and g_t is the rate of growth[1].

Primary surpluses, which reflect the excess resources of the government, reduce the debt stock, which is an increasing function of the level of the domestic and foreign real interest rates (i_t -π_t and i^*_t-π_t, respectively) and the exchange rate depreciation, and a negative function of inflation and growth..

From expression (7) a useful indicator of fiscal sustainability can be simply derived. By just setting $\Delta D_t=0$, the threshold value for the primary balance which would render the debt stable, is obtained[2]. Above that threshold debt will be sustainable. An important question is which horizon to use to derive the values of the right hand side variable. Note that our hypothesis invites us to focus on the short run determinants of debt, since they are more prone to influence the fiscal behaviour through the cycle. Therefore, in the empirical analysis we should use simply the current conditions. All in all, we can obtain a threshold for the fiscal primary balance under the current economic conditions such that the ratio of debt to *GDP* remains stable. We will denote this value as the current threshold (primary) balance (CTB_t):

$$CTB_t = PB_t \mid \Delta D_t = 0;$$
$$CTB_t = \frac{(i_t - \pi_t - g_t)}{(1+g_t)}\alpha D_{t-1} + \frac{(i^*_t + \Delta e_t - \pi_t - g_t)}{(1+g_t)}\beta D_{t-1} \quad (8)$$

3.2 The influence of the current threshold balance on the fiscal stance

[1] This expression implies a first set of simplifications which are relevant in Latin America. First, contingent liabilities are not included, but they constitute an important consideration for fiscal sustainability; second, on the opposite direction privatization receipts can be used to reduce debt and this is also relevant in the region. Third, another type of debt, indexed debt, is also relevant in most countries. The debt, usually domestic, can be indexed to the exchange rate, the interest rate and, as more recently, to the inflation rate. Indexation implies neutralizing the effects of the variable to which the debt is indexed in the above expression.

[2] This indicator is based on Blanchard (1990) which derived a similar indicator for fiscal sustainability, based on the expected mean values of the variables.

The data for computing the current threshold balance may not seem too demanding: interest rates on domestic and foreign debt, inflation, growth and the stock of foreign and domestic debt. However, data on domestic and foreign debt and their real interest rates are not readily available when we look backwards[1]. Therefore, we are forced to make one rather strong assumption, which is that the cost of financing domestic and foreign debt are the same. This is equivalent, as it is immediate from equation (8), to assume that the uncovered interest parity continuously hold (with perfect foresight), which is in practice an strong assumption. Note that if the UIP holds, $i_t = i^*_t + \Delta e_t$ then there is just one interest rate to consider and exchange rate variations can be dismissed. In this case there is no difference among debts and the equation simplifies to:

$$CTB_t = \frac{(i_t - \pi_t - g_t)}{(1+g_t)} D_{t-1} \tag{9}$$

The computation of the current threshold balance still faces some difficulties. First, even when considering both domestic and foreign debt as equivalent, the interest rate on domestic (or foreign) debt is not directly available for all countries. Furthermore, even if it were available there would be the question of which inflation rate to use and the impact of inflation on the real interest rate. The large volatility of inflation, mostly in the eighties, would imply a extreme variability in the real interest rates, which is not consistent with the concept of debt sustainability. Therefore, we compute the average cost on debt by dividing the total interest payments on public debt on the stock of debt[2].

Figure 4 plots the current threshold balance (*CTB*), country by country, along with the changes in the primary balances (*PB)* and the changes in the stock of debt. As expected, in most of the cases, it can be observed that when CTB is higher than the primary balance, the stock of public debt increases, and vice versa. The magnitude of the changes in the stock of debt do not correspond to the gap between CTB and PB, due mainly to valuation effects but also to the fact that the available data for debt usually refer to the whole public sector, including central government, public enterprises, regional government, etc, while the data on fiscal balances refer just to the central government in most of cases. This implies a certain inconsistency between debt and the deficit to which this debt is compared. A persistent positive gap between the current threshold balance and the primary balance would deliver an unsustainable fiscal position, since debt would be continuously increasing. It is important to underscore that the graph compares fiscal outcomes with contemporaneous economic and

[1] As in the previous section, the main sources for the debt ratios and interest payments are the GFS and IFS, complemented with national statistics. In this case, the definition of government used is the consolidated public sector.

[2] An alternative gauge of current conditions could be the marginal cost of financing. Since, by assumption the cost of domestic debt is equal to the cost of foreign debt the sovereign spread plus the US long-term interest rate can be an adequate proxy (plus the exchange rate changes). Note, however that the marginal interest rate is not the right notion to use in the expression for debt sustainability.

financial conditions, so some caution is required when making assessment on the medium-term sustainability of debt from this comparison.

In any case, this seems an adequate framework to measure the impact of sustainability concerns on the fiscal stance[1]. More precisely, since we are particularly concerned with the dynamics of fiscal adjustment through the cycle, we focus on the relationship between changes in CTB and the changes in the structural primary balance (*SPB*), which we would expect to be positive. Note that this is slightly different from the rationale linking the *CTB* to fiscal policy, since the current threshold is linked above to the primary balance (*PB*) rather than to *SPB.* There are two reasons to proceed as we do. First, the *SPB* by definition filter out the cyclical conditions and therefore gives a more accurate view of the pro-active adjustment (call it discretion although this is not completely precise) that fiscal authorities have to do when sustainability concerns arise. Second, if *PB* is used, given that a cyclical downturn as represented by a fall in *g* implies a higher *CTB* and a lower primary balance*,* the expected positive correlation between *CTB* and *PB* would be blurred. In any case, we think that looking at this alternative can deliver interesting insights to the analysis, so we will present the results for both variables, *PB* and *SPB.* The scatter plot in graph 5 is a first approximation to this intuition, which now we intend to test in a more formal framework.

3.3 Empirical specification and econometric issues

The empirical analysis is framed within the following regression:

$$\Delta SPB_{It} = \delta_0 + \delta_{1i} + \delta_2 \Delta CTB_{it} + \delta_3 (PB_{it} - CTB_{it-1}) + \delta_4 CONTROLS_{it} + u_{it} \quad (10)$$

where *i* denotes country and *t* year. The coefficient δ_{1i} absorbs country fixed-effects, which may reflect differing fiscal institutions across countries, as well as measurement errors and other unobservable heterogeneity due to country characteristics. The impact of sustainability concerns on the fiscal stance can be assessed by regressing the changes of the structural primary balance (ΔSPB_t) on the changes in the current threshold balance (ΔCTB_t). A positive sign should be expected for δ_2 in (10).

The simple relationship sketched here does not take into account an important consideration: the reaction of fiscal policy to the deterioration of the sustainability conditions is expected to be commensurate to the effective debt sustainability position, that is, not only depends on the

[1] Certain outliers in figure 4 are related to specific situations which may distort the results, as the default in Argentina –which implied a great fall in interest payments- so this advises for taking such outliers out of the sample.

changes in sustainability, but also on the existence and magnitude of a debt sustainability problem. Indeed, this is the gist of our argument. As suggested above, if there were no foreseeable sustainability problems there is no reason to restrain fiscal policy when the financing conditions –and the cycle, deteriorate. In such a case, fiscal policy is supposed to have a stabilizing role (reflected in a countercyclical fiscal stance). As explained above, the gauge for sustainability is the difference between the level of the primary balance and the current threshold balance, which can be denoted as sustainability gap. Therefore, we introduce this term $[PB_{it-1} - CTB_{it-1}]$, with a lag, in the regression, as a kind of error correction mechanism: in order to trim eventual sustainability problems, the structural balance will have to increase when the gap is negative, delivering an expected negative sign ($\delta_3 < 0$[1]). More importantly, the second expected impact is to increase the value of δ_2, since the fiscal stance is expected to react less when there exists no problems of sustainability.

Finally, it is convenient to consider other variables in the regression, as controls, in order to obtain a cleaner picture of the actual impact of the financing conditions on the fiscal stance. These include prominently the change in the inflation rate, to account for shocks to seignorage and possible Patinkin/Olivera-Tanzi[2] effects, the log change in the terms of trade index, to control for the impact of commodity-price shocks on the public accounts[3], and the output gap, in order to check to what extent the procyclicality of fiscal policy is maintained when the financing conditions are accounted for. We also include two dummy variables for the years in which a country's public debt securities were in default or its bank loans were in default (the Brady Plan years).

As regards econometric issues, we assume that disturbances u_{it} are independent across countries, but arbitrary forms of heteroskedasticity across countries and time are allowed. The set of regressors used here could potentially include endogenous variables (correlated with the error term). The first obvious candidate is *CTB*, since a fiscal shock to *SPB* is bound to affect the estimate of *CTB* through both the real interest rate paid and the growth rate. Also, the variable (PB_{it-1}-CTB_{it-1}) can be regarded as predetermined, since it is expected to be correlated with past fiscal shocks on the *SPB*. Another potential endogenous variable might be the change in the inflation rate, since it is quite agreed that in the 80s the Latin American inflation process had predominantly a fiscal motivation.

[1] It would be more precise to use SPB instead of PB for this expression to qualify as error correction term. Actually, the results –presented below-are very similar with both specifications

[2] The Patinkin effect implies a positive effect of the inflation rate on the primary balance through the negative impact of inflation on public spending, while the Olivera-Tanzi effect acts the other way round, through a decline in real tax revenues as inflation rises.

[3] Note that this variable should be non-significant, since we have filtered out from the public revenues the commodity price component.

To address the problem of possible omitted variable bias induced by the presence of country fixed effects, we will rely on equation differencing, except when the fixed effects estimator is used. Also, to address the problem of endogeneity, IV estimation methods will be used, where suitably lagged values of the original independent variables, including lagged values of the dependent variable, might be used as instruments for the right hand side variables of the differenced equation. In this context, since we are working with a short sample, we have to be very careful when deciding the estimation method used. One possibility is to employ GMM estimators, but as it is well known, these estimators can be subject to potentially severe overfitting biases in small samples when based on too many moment conditions (Bond, 2002), and to a problem of weak instruments, since deep lags of the variables might be poor instruments.

Moreover, we are in a context in which N, the number of countries, is small relative to T, the length of the sample period, so these estimators are not as robust as in the case where N is large and T fixed. In our context the fixed effects estimator would be consistent, but only under the strict exogeneity of the regressors, which as argued before, it is not the case.

Therefore, we will carry out our estimation exercise using two IV methods, besides the fixed effects estimator, in order to check the robustness of our results to the estimation method. First, we will use the GMM estimator in first differences (see Arellano and Bond, 1991) with a highly restricted set of instruments, which in fact will be quite like the Anderson and Hsiao (1981, 82) estimator. This estimator is consistent in large T panels, but it is inefficient, since it does not account for the moving average process induced in the error term by first differencing. For this reason a GMM estimator à la Arellano-Bond with a highly restricted instrument set will be used. Second, given the high risk of overfitting in the GMM estimator, we will employ an IV estimator with just about 5 instruments, which will be suitable lags of the variables under consideration.

3.4 Results

Tables 4A-4C present the baseline results of the estimation exercise for the whole sample, and the different specifications and econometric techniques, using the changes in the structural primary balance (ΔSPB_t) as dependent variable. The values of the structural balance and the output gap correspond to those obtained with $\lambda=6.7$ in the H-P filter and with the estimated revenue elasticities. In general, the outcome of the analysis is strongly supportive of our hypothesis and it is robust to the choices of other λ revenues elasticities.

Column (1) of each table shows the results of the simplest model in which only the changes in the current threshold balance are included. As sustained in the previous section, this variable positively, and significantly, affects the structural primary balance. Besides, when the sustainability conditions, embodied by the sustainability gap, are included in the regression (column (2)), the coefficient associated to changes in *CTB* increases its point estimate and becomes somehow more significant and the error correction coefficient is negative and highly significant. This can be taken as a strong evidence that countries adjust their fiscal stance to changes in the sustainability conditions, but to a greater extent when the degree of sustainability of debt becomes a genuine concern. Also, the significance of the parameter in column (1)- when the error correction term is not introduced- is probably due to the existence of sustainability concerns in most of the sample (most countries and most periods as observed in graph 4).

Including the output gap in column (3) allows to determine whether the results in the previous sections, which strongly backed the procyclicality of the fiscal stance in Latin America, are maintained when controlling for debt sustainability. The parameter obtained in table 3 for the equivalent regression was *-0,14* and it was highly significant. The parameter associated to the output gap in column (3) of table 4A has decreased to *-0.11* but it is still significant. The interpretation for this result would be that, from an econometric perspective, the procyclicality of the fiscal stance could not be completely explained by the debt sustainability considerations. However, since the fixed effects estimator does not account for regressor endogeneity, this estimate is biased. When proper estimation methods are employed (see column (3) of tables 4B and 4C), the output gap coefficient is no longer significant (although it retains its negative sign), lending support to the hypothesis that the sustainability concern is the main factor driving the behaviour of fiscal policy in Latin America.

The last column in tables 4A-4C includes estimates of the more general model where the changes in inflation and the terms of trade are used as controls, which, in short, confirm the results previously obtained. The degree of significance of the change in the *CTB* and the sustainability gap term are marginally reduced, while neither the inflation rate nor the terms of trade turned out to be statistically significant. In the case of the latter variable this should be no surprise, since we have filtered out the impact of commodity prices on the structural primary balance and the terms of trade in the region are mainly driven by these prices. The positive, though non-significant, sign of the inflation rate coefficient would favour either the relevance of seignorage shocks or the Patinkin effect of inflation on public finances.

Tables 5A-5C and 6A-6C can be seen as robustness tests. Tables 5A-5C display the results using as dependent variable the overall primary balance, instead of the structural primary balance. It is remarkable –see column (1)- that the relation between *ΔCTB* and *ΔPB* is not

significant and besides with an unstable sign, which changes across specifications. This means that when the cycle is taken into account in the fiscal figures, the significance of *CTB* disappears. The reason for this is precisely that at times of *ΔCTB* deterioration the primary balance is reduced due to the fall in activity[1]. This effect is enough to drive a wedge between the results of the primary balance and the structural primary balance. Notwithstanding this, when the error correction term is introduced, in column (2), the results are similar to those of tables 4A-4C, although with a lower degree of significance. Another interesting result is that in this case the change in the terms of trade is positive and statistically significant, as one would expect, since the overall primary balance has not been filtered out for the effects of commodity prices. Moreover, the coefficient for the inflation rate is positive and highly statistically significant, lending support to the hypothesis that inflation has a positive impact on the public accounts.

Finally, it is interesting to repeat the exercise of tables 4A-4C for the most recent period, from 1991 to 2004 (see tables 6A-6C). The higher reliance on domestic and international debt markets and the more ordered fiscal accounts would suggest an structural change which would tend to enhance the importance of the sustainability concerns on fiscal policy. Overall, the degree of significance tends to decrease, which may probably be due to the fact that the degrees of freedom are reduced. However, the results are generally in line with those for the whole sample and, if anything, the parameters are a bit lower than those estimated in tables 4A-4C, so we are not able to unveil the expected structural change in the nineties and early 2000s. Another interesting point of the comparison is that in the nineties the change in the inflation rate tends to be positive and significant under any specification. Therefore, it seems that the inflation rate has been used to adjust the fiscal balance.

4 Conclusions

The procyclicality of Latin American countries fiscal policy is another unfortunate feature of the region to exert an destabilizing effect on activity. The robust evidence presented in this paper, both on the procyclicality of fiscal policy and its close link with debt sustainability concerns, underscores the deep relationship of this feature with the general financial problems of the regions. Indeed, financial vulnerability in Latin America is not only related to the level of debt but to the volatility of financing conditions and the impact that this volatiliy has on the financing ability of fiscal authorities. Therefore, key words in the economic tribulations of the region in the last decades like original sin or debt intolerance exert also a durable influence on the behaviour of fiscal policy, as we have shown.

Looking ahead, the improvement in the financing conditions and the improvement of vulnerability indicators in the last years would suggest that fiscal policy may achieve a

[1] The correlation between ΔCTB and the output gap is negative and strongly significant

stabilizing role in the next cycles. However, the evidence for the recent years does not back this presumption. As a matter of fact, after a severe fiscal adjustment in the previous downturn (years 2001-2002) the current recovery has also implied a recovery of the fiscal accounts in terms of revenues and expenditure. It must be stressed though that fiscal discipline, and the commitment to it by fiscal authorities is perceived to be higher. This bodes well for the future, but it cannot be discarded that a future downturn if accompanied by a financial crunch will, again, drive the fiscal policy into a restrictive stance.

REFERENCES

Alberola, E. and L. Molina (2003), "What does really discipline fiscal policy in emerging markets?: The role and dynamics of exchange rate regimes", *Money Affairs*, Vol XVI, no. 2, p.165-92

Arellano, M. and S.R. Bond (1991), "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *Review of Economic Studies*, 58, p. 277-297

Anderson, T.W. and C. Hsiao (1981) "Estimation of dynamic models with error components", *Journal of the American Statistical Association*, 76, 598-606

Anderson, T.W. and C. Hsiao (1982) "Formulation and estimation of dynamic models using panel data", *Journal of Econometrics*, 18, 47-82

Barro, R.J. (1979), "On the determination of the public debt", *Journal of Political Economy*, 64, 93-110

Blanchard, O. (1990), "Suggestions for a new set of fiscal indicators", OECD, Economic Department, Working Paper 79

Bond S. (2002) "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice", CEMMAP Working Paper CWP09/02

Cardoso, E. (1998) "Virtual deficits and the Patinkin effect", *IMF Staff Papers*, Vol. 45 (Dec.), 619-46

Gavin, M., R. Hausmann, R. Perotti and E. Talvi (1996), "Managing fiscal policy in Latin America and the Caribbean: volatility, procyclicality and limited creditworthiness", Inter-American Development Bank, Working Paper 326

Gavin, M. and R. Perotti (1997), "Fiscal policy in Latin America", *NBER Macroeconomics Annual* (Cambridge, Mass., Mit Press, 1997)

Giorno, C., P. Richardson, D. Roseveare and P. Va den Noord (1995), "Estimating potencial output, output gaps and structural budget balances", OECD, Economic Department, Working Paper 152

Gómez, V. and A. Maravall (1996), "Programs TRAMO (Time Series Regression with Arima noise, Missing observations and Outliers) and SEATS (Signal Extraction in Arima Time Series). Instructions for the user", Banco de España, Working Paper 9628

Hodrick, R. and E.C. Prescott (1997), "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit, and Banking*, 29, 1-16

Kaiser, R. and A. Maravall (1999), "Estimation of the Business Cycle: A Modified Hodrick-Prescott Filter", *Spanish Economic Review* 1, 175-206

Marcel, M., M. Tokman, R. Valdés and P. Benavides (2001) “Balance estructural del gobierno central: metodología y estimaciones para Chile 1987-2000”, Estudios de Finanzas Públicas, Ministerio de Hacienda de Chile

Maravall, A. and A. del Río (2001), “Time aggregation and the Hodrick-Prescott filter”, Banco de España, Working Paper 0108

Reinhart, C.M., K.S. Rogoff and M. Savastano (2002) “Debt intolerance”, NBER, Working Paper 9908

Stock, J.H. and M.W. Watson (1993), “A simple estimator of cointegrating vectors in higher order integrated systems”, *Econometrica*, 61, 783-820

Talvi, E. and C. Végh (1998), “Fiscal policy sustainability: A basic framework”, Inter-American Development Bank, OCE Research Network Working Paper Series

Tanzi, V. (1978) “Inflation, Real Tax Revenue, and the Case for Inflationary Finance: Theory with an Application to Argentina,” *IMF Staff Papers*, Vol. 25 (Sep.), 417–51

TABLES

Table 1: Elasticities of fiscal revenues with respect to real GDP and commodity price

	GDP	Commodity		GDP	Commodity
Argentina	1.538		Mexico	0.647	0.109
	[0.256]***			[0.116]***	[0.042]**
Brazil	1.723		Peru	1.595	
	[0.228]***			[0.208]***	
Chile (a)	0.7	1	Uruguay	1.510	
				[0.067]***	
Colombia	1.833	0.195	Venezuela	0.153	0.134
	[0.080]***	[0.039]***		[0.199]	[0.064]*
Ecuador	0.522	0.077			
	[0.296]*	[0.029]**			

Note: Estimated by Dynamic OLS through 1980-2004 with annual real data. Revenues adjusted by outliers.

*, **, *** denote statistical significance at 10%, 5% and 1% respectively.

(a) Estimates from Marcel et al. (2001). See footnote 2, page 7.

Table 2A: Slope coefficients of change in SPB on output gap

SPB calculated using the estimated elasticity of government revenues to GDP

	lambda=6.7		lambda=100	
	Correlation	OLS	Correlation	OLS
Argentina	-0.216	-0.090	-0.268	-0.077**
Brazil	-0.153	-0.259	-0.186	-0.235*
Chile	0.214	0.259	0.290	0.243
Colombia	-0.123	-0.122	-0.193	-0.095
Ecuador	0.008	0.003	-0.109	-0.062
Mexico	-0.140	-0.090	-0.017	0.008
Peru	-0.386	-0.248***	-0.410	-0.194***
Uruguay	-0.531	-0.327***	-0.517	-0.212***
Venezuela	-0.302	-0.231	-0.283	-0.177

OLS estimation, robust standard errors. Pairwise correlations.

*, **, *** denote statistical significance at 10%, 5% and 1%, respectively, for OLS estimates

Table 2B: Slope coefficients of change in SPB on output gap

SPB calculated using a unit elasticity of government revenues to GDP

	lambda=6.7		**lambda=100**	
	Correlation	OLS	Correlation	OLS
Argentina	-0.132	-0.052	-0.206	-0.054*
Brazil	-0.107	-0.180	-0.145	-0.180
Chile	0.252	0.334	0.251	0.209
Colombia	-0.049	-0.047	-0.155	-0.074
Ecuador	-0.047	-0.031	-0.161	-0.096
Mexico	-0.133	-0.090	-0.010	-0.005
Peru	-0.339	-0.211**	-0.374	-0.169**
Uruguay	-0.462	-0.274***	-0.480	-0.182***
Venezuela	-0.397	-0.352**	-0.381	-0.280**

OLS estimation, robust standard errors. Pairwise correlations.

*, **, *** denote statistical significance at 10%, 5% and 1%, respectively, for OLS estimates

Table 3: Panel data estimation of procyclicality of fiscal policy in LA

Dependent variable: change in structural primary balance				
Lambda=6.7 and SPB calculated with the estimated revenue elasticity to GDP				
	FE	RE	FE	FE
	1981-2004	1981-1989	1981-1990	1991-204
constant	0.0007	0.0007	0.004	-0.001
	[0.002]	[0.002]	[0.004]	[0.002]
output gap	-0.143	-0.141	-0.107	-0.181
	[0.053]***	[0.051]***	[0.094]	[0.059]***
R2	0.035	0.035	0.018	0.073
Observations	209	209	84	125
No. Of countries	9	9	9	9
Lambda=100 and SPB calculated with the estimated revenue elasticity to GDP				
	FE	RE	FE	FE
	1981-2004	1981-2004	1981-1990	1991-204
constant	0.0010	0.001	0.004	-0.001
	[0.002]	[0.002]	[0.005]	[0.002]
output gap	-0.088	-0.087	-0.076	-0.096
	[0.039]**	[0.038]***	[0.081]	[0.038]**
R2	0.025	0.025	0.011	0.049
Observations	207	207	82	125
No. Of countries	9	9	9	9

Standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectivel
FE: fixed-effects estimator; RE: random effects estimator

Table 4A: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(SPB)** =change in structural primary balance				
Sample:1981-2004	**Panel regression, Fixed Effects estimator**			
	(1)	(2)	(3)	(4)
D(CTB)	0.181	0.295	0.276	0.269
	[0.055]***	[0.051]***	[0.052]***	[0.054]***
PB(-1)-CTB(-1)		-0.319	-0.278	-0.276
		[0.047]***	[0.051]***	[0.053]***
GAP			-0.109	-0.112
			[0.052]**	[0.052]**
D(inflation)				0.0004
				[0.0003]
Dlog(TOT)				0.010
				[0.014]
constant	0.0009	-0.003	-0.003	-0.002
	[0.002]	[0.002]	[0.002]*	[0.002]
R2	0.063	0.220	0.250	0.263
Observations	170	170	170	170
No. Of countries	9	9	9	9

Standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 4B: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(SPB)** =change in structural primary balance				
Sample:1981-2004	**Panel regression, GMM difference estimator**			
	(1)	(2)	(3)	(4)
D(CTB)	0.239	0.442	0.434	0.450
	[0.108]*	[0.143]**	[0.134]**	[0.171]**
PB(-1)-CTB(-1)		-0.416	-0.385	-0.368
		[0.102]***	[0.109]***	[0.114]**
GAP			-0.094	-0.089
			[0.074]	[0.073]
D(inflation)				0.0004
				[0.0002]*
Dlog(TOT)				0.016
				[0.024]
Observations	158	158	158	158
No. Of countries	9	9	9	9
AR(1) (p-value)	0.03	0.02	0.02	0.02
AR(2) (p-value)	0.21	0.07	0.07	0.19
Sargan-Hansen Test (p-value)	0.99	0.99	0.99	1.00

Standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
GMM: GMM difference estimator (See Arellano and Bond, 1991). PB(-2)-CTB(-2) used as only instrument.
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 4C: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(SPB)** =change in structural primary balance				
Sample:1981-2004	**Panel regression, IV estimation**			
	(1)	(2)	(3)	(4)
D(CTB)	0.370	0.536	0.510	0.504
	[0.131]***	[0.129]***	[0.181]***	[0.185]***
PB(-1)-CTB(-1)		-0.408	-0.397	-0.359
		[0.140]***	[0.185]**	[0.195]*
GAP			-0.067	-0.080
			[0.125]	[0.120]
D(inflation)				0.0005
				[0.0003]
Dlog(TOT)				0.017
				[0.016]
Observations	158	158	158	158
No. Of countries	9	9	9	9
Sargan-Hansen Test (p-value)	0.20	0.50	0.23	0.36

Robust standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
IV: IV estimator for the differenced equation. D(CTB) and PB(-1)-CTB(-1) instrumented with SPB(-2), CTB(-2), PB(-2)-CTB(-2) and GAP(-1). Sargan-Hansen Tests of overidentification restrictions.
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 5A: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(PB)** =change in primary balance				
Sample:1981-2004	**Panel regression, Fixed Effects estimator**			
	(1)	(2)	(3)	(4)
D(CTB)	0.023	0.120	0.112	0.106
	[0.049]	[0.047]**	[0.047]**	[0.048]**
PB(-1)-CTB(-1)		-0.272	-0.254	-0.248
		[0.043]***	[0.047]***	[0.048]***
GAP			-0.046	-0.040
			[0.047]	[0.047]
D(inflation)				0.0004
				[0.0003]
Dlog(TOT)				0.029
				[0.013]**
constant	0.0004	-0.003	-0.003	-0.002
	[0.002]	[0.002]*	[0.002]*	[0.002]
R2	0.001	0.153	0.163	0.205
Observations	170	170	170	170
No. Of countries	9	9	9	9

Standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 5B: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(PB)** =change in primary balance				
Sample:1981-2004	**Panel regression, GMM difference estimator**			
	(1)	(2)	(3)	(4)
D(CTB)	-0.007	0.218	0.205	0.218
	[0.110]	[0.127]	[0.108]*	[0.139]
PB(-1)-CTB(-1)		-0.301	-0.286	-0.248
		[0.108]**	[0.108]**	[0.094]**
GAP			-0.034	-0.012
			[0.083]	[0.066]
D(inflation)				0.0006
				[0.0002]***
Dlog(TOT)				0.031
				[0.011]**
Observations	158	158	158	158
No. Of countries	9	9	9	9
AR(1) (p-value)	0.06	0.04	0.04	0.04
AR(2) (p-value)	0.39	0.25	0.24	0.55
Sargan-Hansen Test (p-value)	0.99	0.99	0.99	1.00

Standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
GMM: GMM difference estimator (See Arellano and Bond, 1991). PB(-2)-CTB(-2) used as only instrument.
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 5C: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(PB)** =change in primary balance				
Sample:1981-2004	**Panel regression, IV estimation**			
	(1)	(2)	(3)	(4)
D(CTB)	0.065	0.186	0.203	0.227
	[0.125]	[0.136]	[0.170]	[0.140]*
PB(-1)-CTB(-1)		-0.280	-0.294	-0.352
		[0.132]**	[0.179]*	[0.144]**
GAP			-0.015	0.039
			[0.131]	[0.107]
D(inflation)				0.0006
				[0.0003]**
Dlog(TOT)				0.033
				[0.011]***
Observations	146	146	146	146
No. Of countries	9	9	9	9
Sargan-Hansen Test (p-value)	0.48	0.43	0.38	0.39

Robust standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
IV: IV estimator for the differenced equation. D(CTB) and PB(-1)-CTB(-1) instrumented with DCTB(-2), PB(-2)-CTB(-2), PB(-3)-CTB(-3), Dinflation(-1), GAP(-1) and GAP(-2). Sargan-Hansen Tests of overidentification restrictions.
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 6A: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(SPB)** =change in structural primary balance				
Sample:1991-2004	**Panel regression, Fixed Effects estimator**			
	(1)	(2)	(3)	(4)
D(CTB)	0.187	0.312	0.295	0.256
	[0.065]***	[0.061]***	[0.062]***	[0.062]***
PB(-1)-CTB(-1)		-0.351	-0.307	-0.301
		[0.059]***	[0.065]***	[0.065]***
GAP			-0.093	-0.115
			[0.060]	[0.059]*
D(inflation)				0.0007
				[0.0003]**
Dlog(TOT)				-0.038
				[0.018]**
constant	0.0003	-0.001	-0.002	-0.001
	[0.002]	[0.002]	[0.002]	[0.002]
R2	0.063	0.210	0.235	0.314
Observations	127	127	127	127
No. Of countries	9	9	9	9

Standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 6B: Panel data estimation of financial restrictions effects on fiscal policy in LA

Dependent variable: **D(SPB)** =change in structural primary balance

Sample:1991-2004	**Panel regression, GMM difference estimator**			
	(1)	(2)	(3)	(4)
D(CTB)	0.238	0.407	0.389	0.375
	[0.108]*	[0.157]**	[0.148]**	[0.179]*
PB(-1)-CTB(-1)		-0.361	-0.330	-0.259
		[0.122]**	[0.129]**	[0.140]*
GAP			-0.086	-0.130
			[0.052]	[0.071]*
D(inflation)				0.0007
				[0.0003]**
Dlog(TOT)				-0.023
				[0.035]
Observations	123	123	123	123
No. Of countries	9	9	9	9
AR(1) (p-value)	0.04	0.02	0.02	0.01
AR(2) (p-value)	0.96	0.65	0.64	0.73
Sargan-Hansen Test (p-value)	0.89	0.81	0.89	1.00

Standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
GMM: GMM difference estimator (See Arellano and Bond, 1991). PB(-2)-CTB(-2) used as only instrument.
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

Table 6C: Panel data estimation of financial restrictions effects on fiscal policy in LA

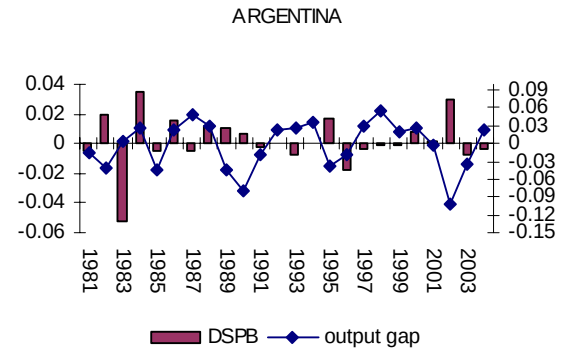
Dependent variable: **D(SPB)** =change in structural primary balance

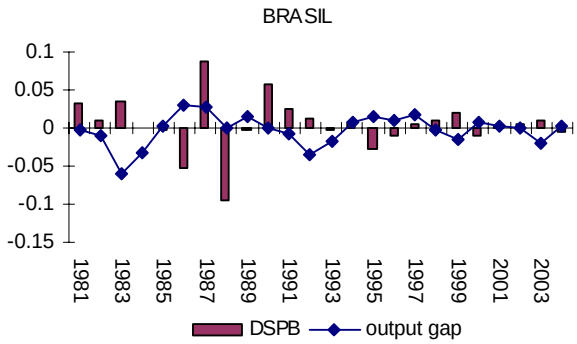
Sample:1991-2004	**Panel regression, IV estimation**			
	(1)	(2)	(3)	(4)
D(CTB)	0.355	0.507	0.466	0.396
	[0.123]***	[0.147]***	[0.216]**	[0.234]*
PB(-1)-CTB(-1)		-0.345	-0.317	-0.227
		[0.169]**	[0.232]	[0.248]
GAP			-0.082	-0.159
			[0.160]	[0.169]
D(inflation)				0.0007
				[0.0004]*
Dlog(TOT)				-0.018
				[0.025]
Observations	123	123	123	123
No. Of countries	9	9	9	9
Sargan-Hansen Test (p-value)	0.53	0.82	0.57	0.84

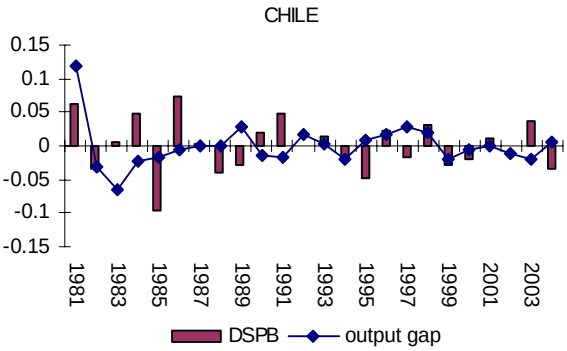
Robust standard errors in brackets. *, **, *** denote statistical significance at 10%, 5% and 1% respectively
IV: IV estimator for the differenced equation. D(CTB) and PB(-1)-CTB(-1) instrumented with SPB(-2), CTB(-2), PB(-2)-CTB(-2) and GAP(-1). Sargan-Hansen Tests of overidentification restrictions.
All regressions include dummies that account for the periods in which any country was declared to be in default by Standard and Poor's. These dummies turned out to be negative, though non-significant.

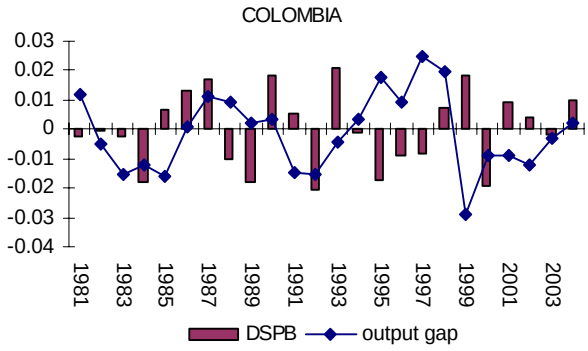
GRAPHS

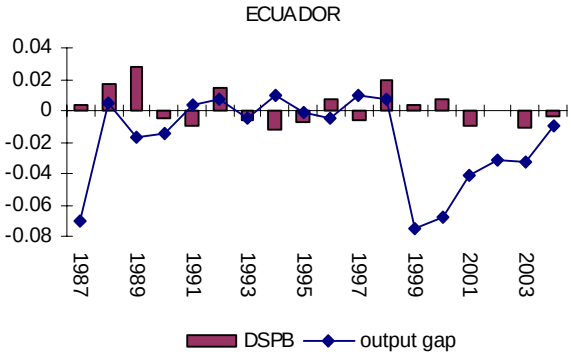
Graph 1. Change in the structural primary balance and output gap: cross country comparisons.

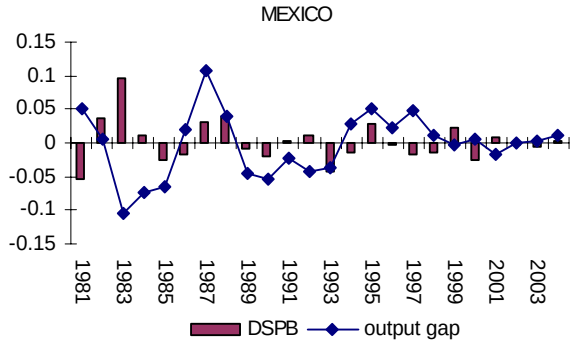


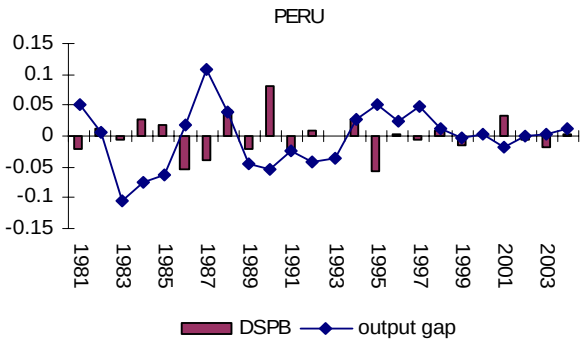


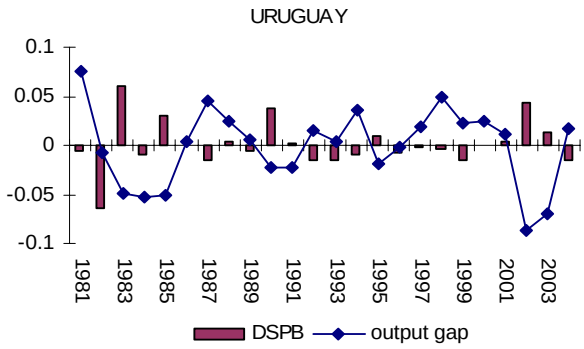


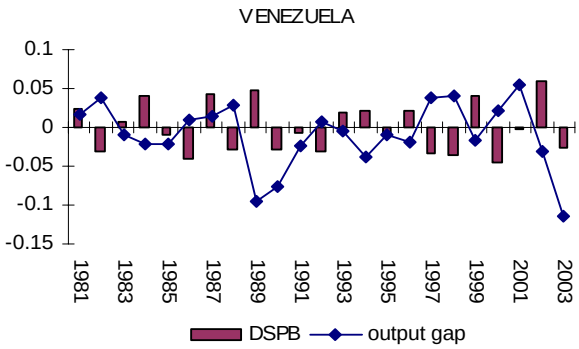




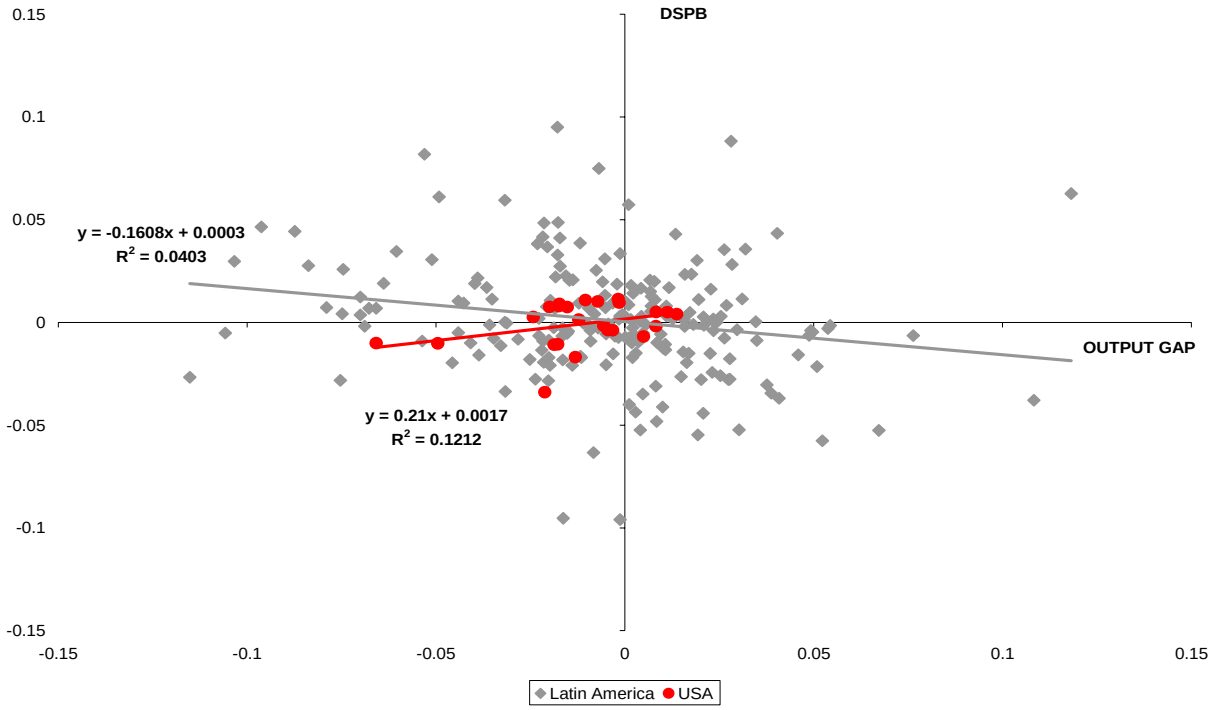



PERU
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
DSPB
output gap

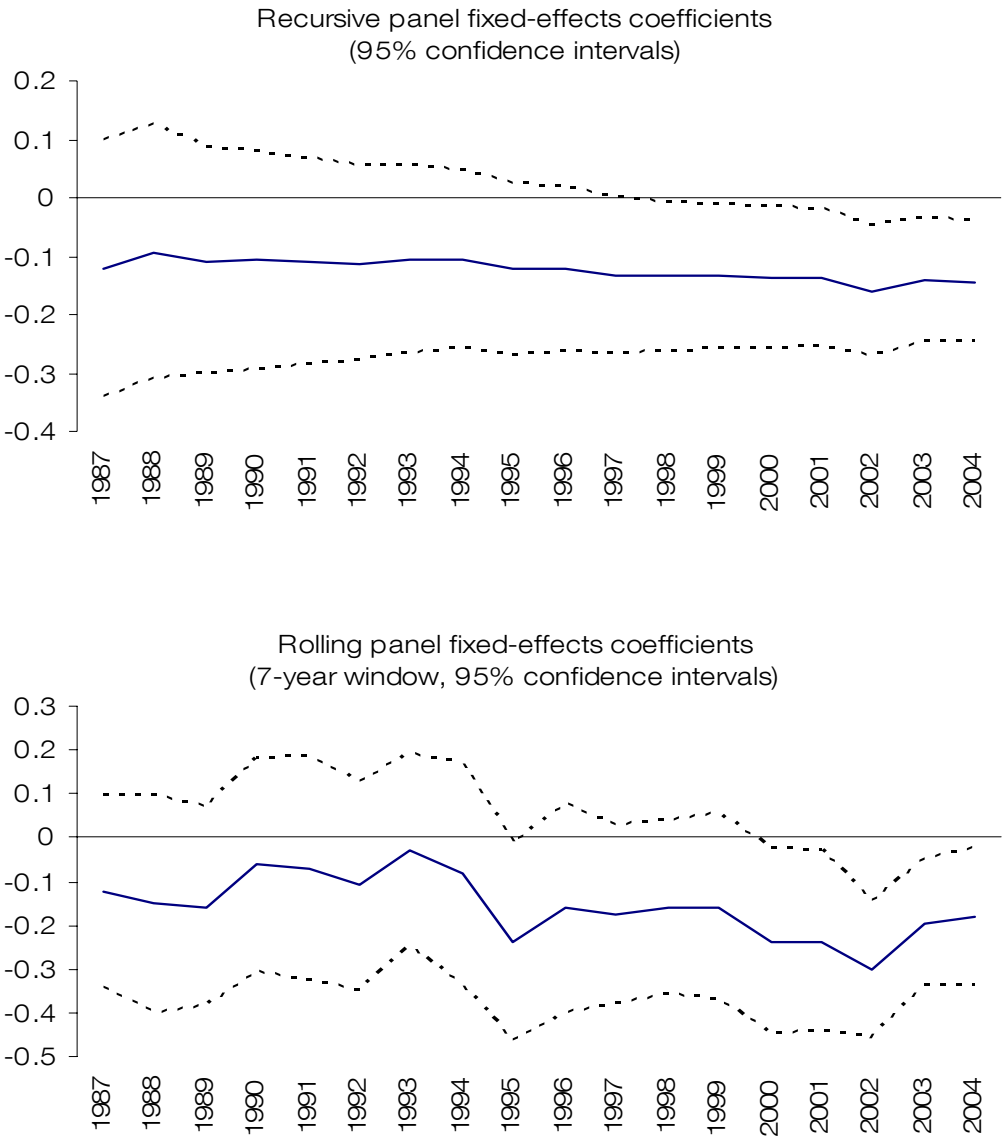

URUGUAY
0.1
0.05
0
-0.05
-0.1
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
DSPB
output gap


VENEZUELA
0.1
0.05
0
-0.05
-0.1
-0.15
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
DSPB
output gap

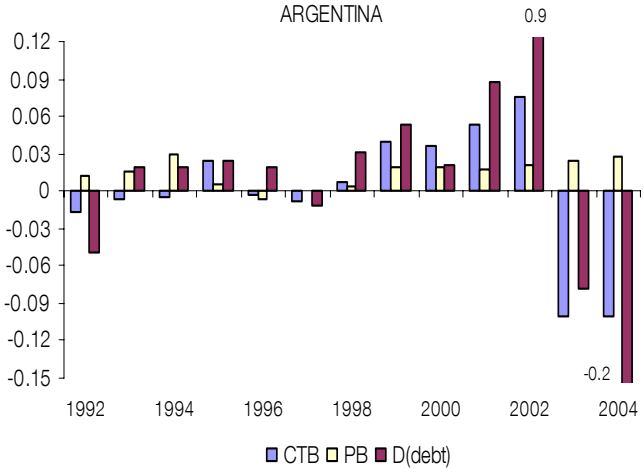
Graph 2. Change in the structural primary balance against the output gap: panel scatter plot.

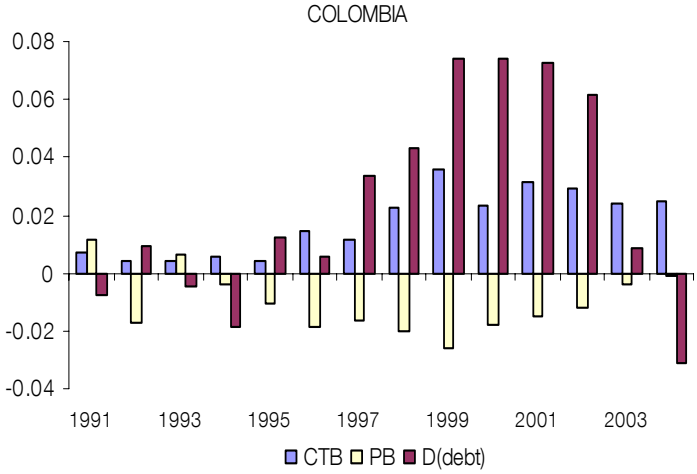


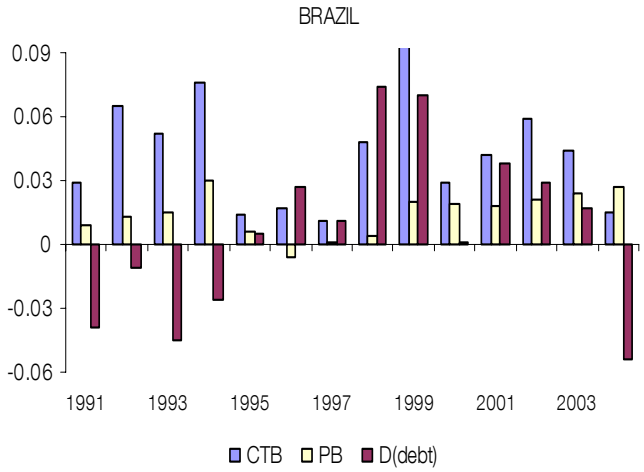
Graph 3. Recursive and rolling regressions of change in SPB on the output gap.

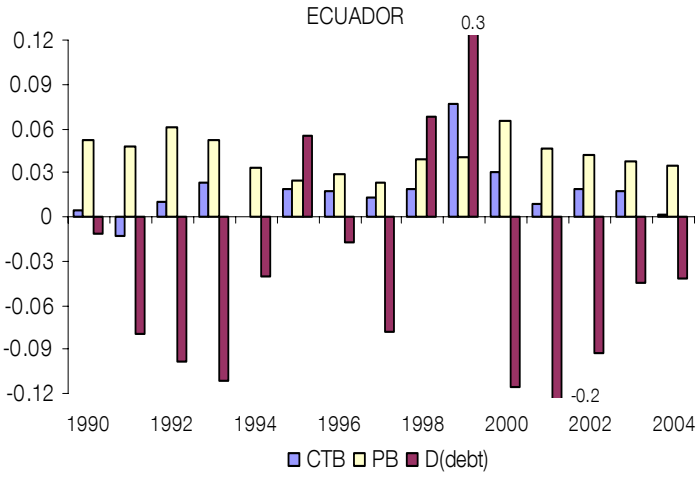


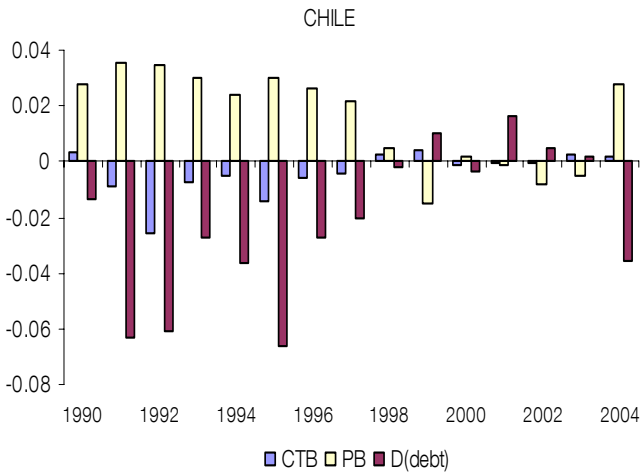
Graph 4. Change in the primary balance, structural primary balance and current threshold balance: cross country comparisons

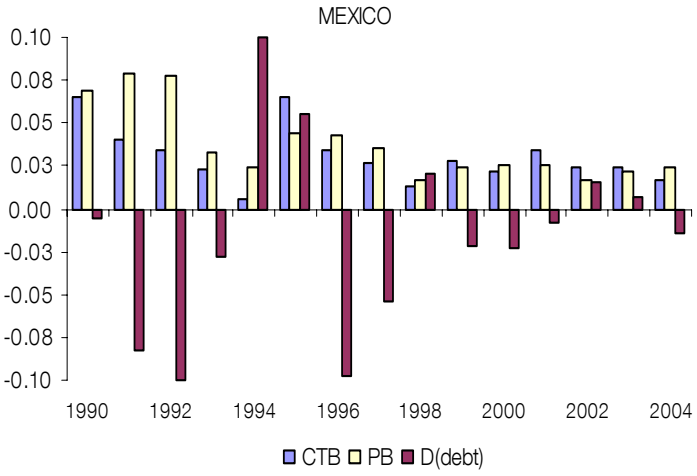


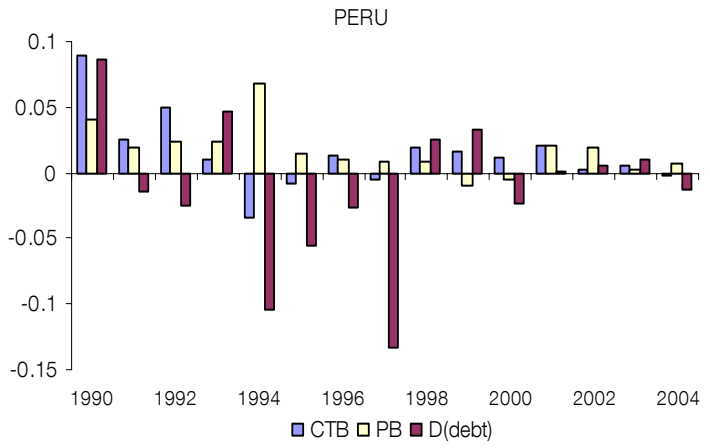


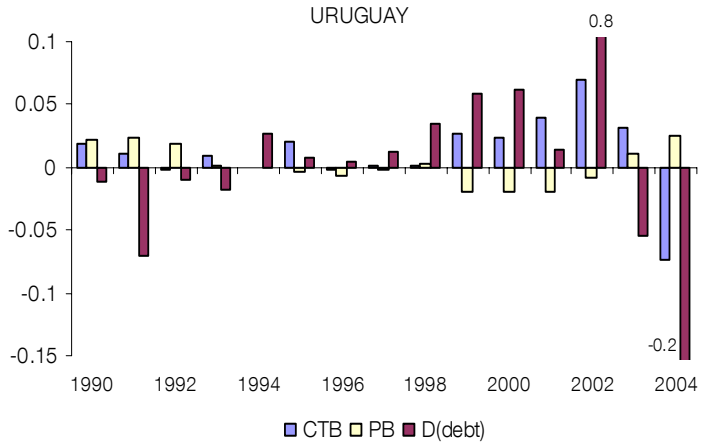


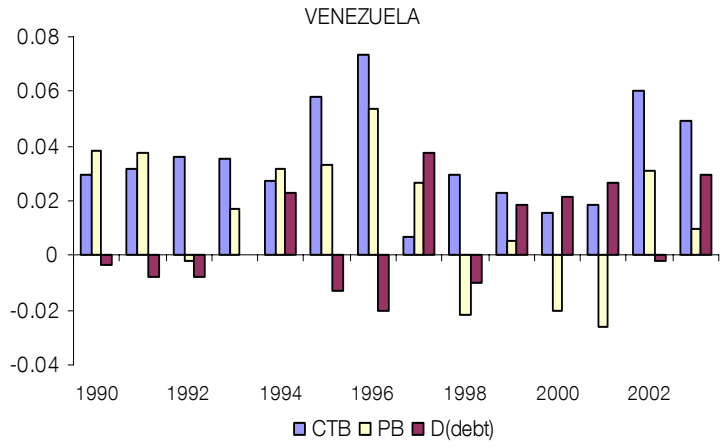







PERU
0.1
0.05
0
-0.05
-0.1
-0.15
1990
1992
1994
1996
1998
2000
2002
2004
CTB
PB
D(debt)


URUGUAY
0.8
-0.2
0.1
0.05
0
-0.05
-0.1
-0.15
1990
1992
1994
1996
1998
2000
2002
2004
CTB
PB
D(debt)


VENEZUELA
0.08
0.06
0.04
0.02
0
-0.02
-0.04
1990
1992
1994
1996
1998
2000
2002
CTB
PB
D(debt)

Graph 5. Scatter plot of the change in the structural primary balance on the change in the current threshold balance