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Debt Sustainability and Procyclical Fiscal Policies in Latin America

Fiscal policy is expected to play an important stabilizing role over the business cycle. When the economy is accelerating, the fiscal authorities should be able to moderate activity by restraining the fiscal stance; in downturns, they should use fiscal policy to help stimulate the economy. Fiscal policy should thus behave countercyclically. The empirical evidence, however, has repeatedly shown that fiscal policy is procyclical in many countries, especially in Latin America.[1] This situation hurts social policy, and it introduces an additional source of volatility to the economy: when the economy expands, it reinforces the expansion; when it contracts, it deepens the slowdown. Also, according to Servén, the increase in volatility, in turn, reduces investment and growth.[2]

The neoclassical theory of fiscal policy identifies tax smoothing as a mechanism for accommodating transitory shocks to activity, as long as the intertemporal budget constraint is fulfilled.[3] Under those circumstances, public debt fluctuations act as a buffer stock for shocks to activity and enable fiscal policy to play its countercyclical role. The question is what happens when (negative) economic shocks strongly impinge on the level of debt, raising concerns about the fulfillment of the intertemporal budget constraint or, in other words, the sustainability of debt. In those cases the mechanism is short-circuited, and this can jeopardize the stabilizing role of fiscal policy.

This seems to be the case in Latin America. Gavin and Perotti observe that concerns about creditworthiness and sustainability are central to determining fiscal policy stances.[4] This situation stems from the dependence of

Alberola and Montero are with the Bank of Spain.

1. See, for example, Gavin and others (1996); Gavin and Perotti (1997); Alberola and Molina (2003); Kaminsky, Reinhart, and Végh (2005); Talvi and Végh (2005); Manasse (2006).
2. Servén (1998).
3. Barro. (1979).
4. Gavin and Perotti (1997).

Latin American finances on external credit sources and the periodic recurrence of sudden stops—that is, the abrupt loss of access to external credit and the volatility of financial indicators, as reflected in volatility in the debt stock and service. Furthermore, periods of difficult access to international capital markets tend to induce restrictive macroeconomic policies, but they also translate into large current account reversals, which are triggered by economic downturns, among other channels. The slowdown in economic activity aggravates fiscal solvency, which, in turn, calls for additional tightening. The capital flow cycle and the macroeconomic policy cycle thus tend to reinforce each other, or, as Kaminsky, Reinhart, and Végh put it, when it rains, it pours in these economies.[5]

This view on the determinants of procyclicality in fiscal policy implies that the authorities' behavior depends on the impact of fiscal shocks, which prevents them from adopting the right response to the cycle position. An alternative rationale is that the fiscal authority's policy reaction function diverges from expected behavior for institutional or political economy reasons. This approach is best represented by the voracity effects.[6] According to this view, the ability to run large budget surpluses in good times is severely hampered by political pressures, which are always present but which are exacerbated in times of plenty. Fiscal resources are wasted in favor of rent-seeking groups, rather than being saved for bad times.[7] Lane provides empirical support for political economy factors as determinants of the fiscal policy stance in member countries of the Organization for Economic Cooperation and Development (OECD).[8] He recognizes, however, that government debt constraints can seriously limit the room for maneuver for fiscal policy in emerging markets.

Our goal in this paper is twofold: first, to provide an adequate framework for analyzing fiscal policy in Latin America and measuring its procyclicality; and, second, to uncover the underlying reasons for this behavior and thus to ascertain whether the differential fiscal behavior relative to other developed

5. Kaminsky, Reinhart, and Végh (2005).

6. Tornell and Lane (1999). See also Alesina and Tabellini (2005).

7. The theory behind this argument is that interest groups view fiscal resources as a common pool, and they compete for a share of that pool. Each group is unwilling to reduce its claim on an increase in fiscal resources, knowing that the benefits of this moderation would accrue to other interest groups. Deviations from a countercyclical policy may be an indirect way of fending off spending pressure through, for instance, tax cuts when the economy is in expansion. It is not optimal, however, to resist all spending pressures, so government spending is also expected to increase.

8. Lane (2003).

economies is due to differences in the shocks or constraints affecting these economies or to a different policy reaction function.[9] With regard to the first goal, the empirical approaches for rigorously testing and explaining the issue are scant, despite the conventional wisdom that fiscal policy is procyclical in Latin America. The main reason is probably the difficulty of deriving adequate gauges for the fiscal stance in Latin America, stemming from the lack or inadequacy of the data and to the extreme volatility of macroeconomic and financial variables in the region. These factors hinder the computation of structural fiscal balances, which is the most common indicator for assessing the fiscal stance in OECD countries.[10] We attempt to overcome these difficulties by taking advantage of recent improvements in filtering techniques to derive the output gap and compute the structural primary balance for nine countries in the region for the period 1981–2004. The changes in the structural primary balance define the fiscal stance, which we compare with the cyclical position of the economy: an increase in the structural balance at a time of economic upturn would signal a countercyclical—and thus stabilizing—role for fiscal policy.

To address our second goal of explaining the fiscal stance, we focus on the perceived creditworthiness of the country, which simultaneously influences and is influenced by the access to external credit. Creditworthiness is closely related to the country's indebtedness position. Although the level of debt to gross domestic product (GDP) is not too large, especially in comparison with other developed countries like some members of the European Union or Japan, Latin America suffers from debt intolerance.[11] This intolerance can be explained by the region's history of debt defaults, economic instability, and weak institutions, which not only raises financing costs, but also biases the debt structure toward foreign currency and short maturities. These features, combined with the tendency to suffer dramatic swings in financing conditions, affect the market's perception of the region's creditworthiness and may even limit their access to international financial markets. Consequently, the critical debt thresholds in the region are much lower than in OECD countries, and financing conditions are more volatile.

We therefore use an indicator of debt sustainability to assess fiscal creditworthiness, building on previous findings by Alberola and Molina, who show that in emerging markets fiscal balances are determined by financing

9. See Rigobon (2005).

10. For a thorough discussion of the problems posed by this methodology, see Kaminsky, Reinhart, and Végh (2005).

11. The term debt intolerance is from Reinhart, Rogoff, and Savastano (2002).

costs and are closely related to the cycle.[12] The fact that debt dynamics are very sensitive to financing conditions means that the assessment of creditworthiness can be quite volatile and also self-reinforcing, as long as the perception of vulnerability affects the evolution of financial variables. We depart from previous contributions, such as the work of Blanchard, by stressing the role of current financing conditions in determining public debt sustainability.[13] More precisely, we define the current threshold balance as the primary balance that renders public debt stable at each point in time. Primary balances above this threshold imply that the debt is sustainable. We use this indicator to uncover the relation between the fiscal stance and public debt sustainability.

We find strong empirical backing for our hypothesis. First, the panel data analysis shows a strong and significant negative correlation between changes in the structural primary balance and the output gap, thus confirming that fiscal policy is procyclical in Latin America. We then explore how debt sustainability issues affect fiscal behavior. The empirical evidence indicates that a deterioration of the current threshold balance induces a fiscal tightening and that this tightening tends to be stronger the worse the initial debt sustainability position.[14] These results represent strong evidence that concerns for debt sustainability play a determinant role in explaining Latin America's fiscal behavior and the procyclical bias of fiscal policy, and they are robust after we control for endogeneity and other specifications. In fact, for most of the specifications, public debt sustainability concerns seem to account entirely, from a statistical perspective, for the procyclicality of fiscal policy in Latin America, since the coefficient associated with the cyclical position becomes insignificant and even changes its sign under some specifications. These results provide strong support not only for the view that fiscal policy is indeed procyclical in Latin America, but also for our claim that this procyclicality is rooted in the perception of debt sustainability—that is, in the existence of financial shocks or constraints correlated with the cycle—rather than in a different reaction function by the authorities.

12. Alberola and Molina (2003).

13. Blanchard (1990).

14. This approach is related to the empirical literature on fiscal rules and fiscal policy sustainability (see Bohn, 1998). This literature focuses on whether governments react to debt accumulation by increasing primary balances, such that their fiscal behavior is consistent with the intertemporal budget constraint. A positive response of the primary balance to public debt ensures that any upward movement in the debt-to-GDP ratio in response to negative shocks (such as low growth, wars, or interest rate hikes) would eventually be reversed through primary surpluses.

The rest of the paper is organized as follows. The next section describes the method employed to compute structural primary balances and assesses whether fiscal policy is procyclical. We then explain how we constructed our indicator of fiscal sustainability and analyze whether the fiscal stance is related to the sustainability of public debt. The final section contains some concluding remarks.

The Procyclicality of Fiscal Policy

A central challenge in the specification of structural or cyclically adjusted balances lies in developing a universally accepted methodology for separating 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 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 by applying fiscal elasticities to GDP and, in some cases, commodity prices. Finally, this cyclical component is deducted from the actual budget balance to derive the structural (cyclically adjusted) component. Most of the international organizations and national authorities use this approach. The main difference among methodologies involves the calculation of the output gap, which is estimated through either a smoothing technique (usually a Hodrick-Prescott filter) or a production function.[15]

Structural balances are widely used 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 researchers to improve techniques for filtering out the cyclical balances. The production function method has become increasingly prevalent in recent years, and it is currently used by the OECD, the International Monetary Fund (IMF), and the European Union. Estimates of the cycle based on this method require the availability of reliable data on the use of labor and capital stocks.

In Latin America, the computation of structural balances has traditionally been hindered by the lack of long data series, the extreme volatility of macroeconomic variables, and the noise in the fiscal data derived from dramatic structural changes and from the composition of revenues and expenditure. Furthermore, the volatility of revenues is closely associated with the evolution

15. Giorno and others (1995).

of commodity prices and exports, which are an important source of fiscal financing in several countries. Given these obstacles, and despite the recent efforts of countries such as Chile, scant estimates of structural balances are available for the countries in the region, and a joint estimate for the region as a whole is nonexistent.[16] As a starting point to our empirical analysis, we aim to fill this gap by estimating the structural primary balances for nine major Latin American countries.[17]

We derive trend output by smoothing with a Hodrick-Prescott filter.[18] Although this methodology is being abandoned in OECD countries, it best suits our purposes for several reasons. First, data on the region are often unavailable and very heterogeneous. Labor statistics in Latin America are generally unreliable because of the importance of the informal economy, and capital stocks are particularly difficult to measure in these countries. Second, given the recurrence of economic crises, the concept of potential output that underlies the use of full capacity of production factors loses some clarity. Such crises provoke significant disruptions in these economies, so the cyclical position is clearly not the only element driving a wedge between potential and actual output. Finally, the recent refinement of filtering techniques supports a more precise estimation of the cycle in the case of variables that display wide irregularities, as in the Latin American case.

The Estimation of Trend Output and Structural Primary Balances

We calculate trend output by applying a Hodrick-Prescott filter to the real GDP series. Let Y denote actual real GDP and Y^* trend real GDP. We then estimate the output gap (GAP) by taking the quotient of the difference between GDP and trend output, that is,

$$\text{GAP} = \frac{Y - Y^*}{Y^*}. \tag{1}$$

We follow Kaiser and Maravall to improve the performance of the Hodrick-Prescott filter.[19] Given the high volatility of Latin American output, we

16. A notable exception is CAF (2004).

17. These countries are Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay, and Venezuela. Our basic sources for the fiscal variables are the IMF's *Government Finance Statistics* (GFS) and *International Financial Statistics* (IFS), which have been complemented with national statistics when necessary. Because of data limitations we computed fiscal variables for the central government. GDP data are from the IFS.

18. See Hodrick and Prescott (1997).

19. Kaiser and Maravall (1999).

preadjusted the series by identifying outliers and then extracting them from the original series. These outliers proved to be transitory, so they were assigned to the cyclical component of output. To overcome accuracy problems at both ends of the series, we added forecasts and backcasts to generate additional periods.[20] At this stage, we used actual data for the beginning of the series and forecasts from Consensus Forecasts for the end of the sample, instead of the model-based method suggested by Kaiser and Maravall.[21]

Calculating cyclically adjusted balances once the output gap measure has been estimated involves singling out the budgetary items that are assumed to display a cyclical pattern. In developed countries, such items usually include different types of revenues and some cycle-sensitive expenditures, such as unemployment benefits. In Latin America, however, the lack of generalized unemployment subsidies and the absence of appropriate data on this kind of subsidies necessitate using a simplified scheme, in which only revenues (T), taken as a whole, are considered cyclically sensitive. To filter out the cyclical part of revenues, we run the following regression to compute the elasticity of T to activity:

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

We then estimate cyclically adjusted revenues, T^S, as follows:[22]

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

Moreover, revenues are heavily influenced by commodity-related taxes or excises in an important number of Latin American countries. This not only has a bearing on the level of activity, but also affects the cyclical profile of public revenues, since commodity prices tend to be rather volatile. It is customary to take the evolution of commodities revenues into account when estimating structural primary balances in these countries. In our sample, the share of fiscal revenues from commodities is substantial in Ecuador, Colombia, Mexico, and Venezuela, which are oil exporters, and in Chile, which has

20. We used the TRAMO/SEATS program developed by Gómez and Maravall (1996) for some of the computations.

21. When no forecasts were available, we employed estimates from the IMF's Article IV reviews (namely, for Ecuador and Uruguay).

22. Computing the elasticity on overall revenues tends to exact too much cyclicality from the revenues. We therefore impose a unitary elasticity in the analysis as a robustness check.

a strong copper industry. We therefore modify the computation of structural revenues and balances in these countries accordingly:

$$T_t^S = T_t \left(\frac{Y_t^*}{Y_t} \right)^{\beta} \left(\frac{p_t^*}{p_t^{com}} \right)^{\phi}, \tag{4}$$

where p^{com} and p^* are the real commodity price and the notional real equilibrium commodity price, respectively. The elasticities are estimated through the following regression:

$$\log T_t = \alpha + \beta \log Y_t + \phi \log p_t^{com} + \varepsilon_t. \tag{5}$$

We calculate the trend real commodity price (p^*) by applying a Hodrick-Prescott filter to the real price series. This method provides a desired degree of homogeneity, but at a cost in terms of precision. We compute the structural balance by subtracting overall public expenditures (G_t) from cyclically adjusted revenues. To define the fiscal stance properly, however, we need to deduce from expenditures the interest payments on public debt (IP_t), since this is a volatile source of expenditure that is clearly outside the authorities' discretion. We thus obtain the structural primary balance (SPB_t) according to the following expression:

$$SPB_t = T_t^S - \left(G_t - IP_t \right), \tag{6}$$

where all variables are expressed in terms of GDP. 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.

The Fiscal Stance and the Cycle

Our sample covers nine Latin American countries from 1981 to 2004. We computed the output gap using two different values for λ in the Hodrick-Prescott filter: $\lambda = 6.7$, as recommended by Maravall and del Rio, and $\lambda = 100$, which is the usual figure and which delivers wider cycles.[23] The fiscal stance required the computation of the revenue elasticities with respect to GDP for each country and also for commodity revenues for Chile, Ecuador, Colombia, Mex-

23. See Maravall and del Rio (2001) on using $\lambda = 6.7$.

TABLE 1. Elasticities of Fiscal Revenues Relative to Real GDP and Commodity Price[a]

Country	*Real GDP*	*Commodity price*
Argentina	1.538***	
	(0.256)	
Brazil	1.723***	
	(0.228)	
Chile[b]	0.7	1.0
Colombia	1.833***	0.195***
	(0.080)	(0.039)
Ecuador	0.522*	0.077**
	(0.296)	(0.029)
Mexico	0.647***	0.109**
	(0.116)	(0.042)
Peru	1.595***	
	(0.208)	
Uruguay	1.510***	
	(0.067)	
Venezuela	0.153	0.134*
	(0.199)	(0.064)

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. Estimated using dynamic ordinary least squares (OLS) for the period 1980–2004, with real annual data. Revenues adjusted for outliers.

ico, and Venezuela (see table 1).[24] The elasticities are clustered around values higher than 1.5 for most countries, and they are strongly significant for all countries but Venezuela.[25]

A cross-country comparison of the output gap and changes in the structural balance—our gauge of the fiscal stance—suggests that the fiscal stance is contractionary (that is, that the structural primary balance increases) when the output gap is negative. Fiscal policy is thus procyclical. Table 2 presents our statistical analysis. The correlation between ΔSPB_t and the output gap is negative for both values of λ, except in Chile for both values and in Ecuador for $\lambda = 6.7$. When we regress both variables, the slope coefficient is signifi-

24. We used dynamic ordinary least squares (OLS) to estimate the elasticities (see Stock and Watson, 1993). All the series have been preadjusted with TRAMO/SEATS to remove outliers that might bias the estimation.

25. The case of Chile deserves particular attention. Estimates of equation 5 yielded a negative elasticity for the real copper price, which is puzzling. We therefore used the GDP elasticities obtained by Marcel and others (2001) and a unit elasticity for the real copper price, which would be approximately equivalent to the elasticity implied by their method. Results did not change for copper-price elasticities around unity. In the case of GDP elasticity, we present the results for the lower range of their estimates (which is between 0.7 and 1.25), although the results are not sensitive to this choice.

TABLE 2. Slope Coefficients of Change in Structural Primary Balance on Output Gap[a]

	Lambda = 6.7		*Lambda = 100*	
Country	*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

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. The table reports OLS estimations with robust standard errors and pairwise correlations. The structural primary balance is calculated using the estimated elasticity of government revenues to GDP.

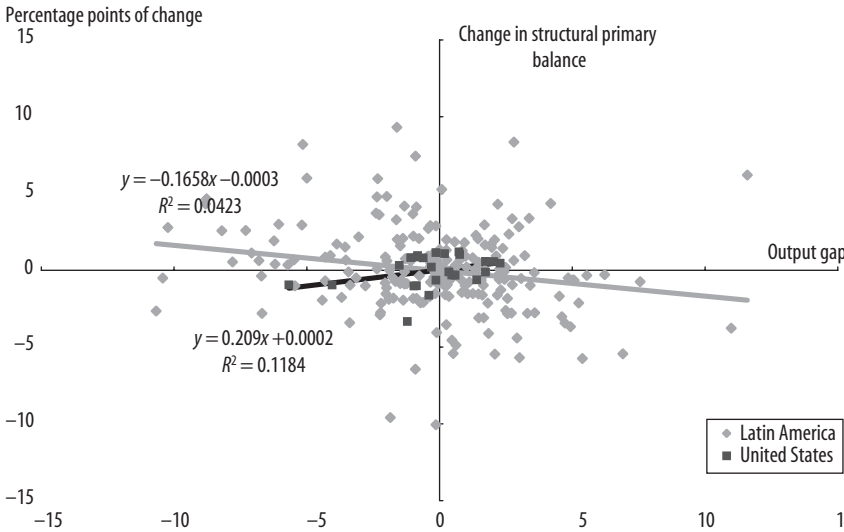
cantly negative, with 90 percent probability, in one-third of the cases—and unequivocally so in Peru and Uruguay. With $\lambda = 100$, Argentina and Brazil are also significant. Chile thus seems to be the only country where the fiscal stance has been countercyclical (generating a positive, though insignificant, relation between the output gap and the changes in the structural primary balance). We also performed the same computations with the elasticities set to one, as the IMF sometimes does to estimate the fiscal impulse; the results did not change significantly.[26]

A preliminary aggregate picture for the region is presented as a scatter plot in figure 1, in which the de-meaned output gaps and changes in structural balances are plotted against each other. The evident negative slope of the regression line confirms the apparent procyclicality of fiscal policy in Latin America. For the sake of comparison, we plotted the same relation for the United States, revealing a positive, statistically significant correlation in line with the expected countercyclicality of fiscal policy.[27] When we carried

26. Results are available on request and can be checked in the working paper version (Alberola and Montero, 2006). The fiscal impulse also implies computing the structural public expenditures as a function of potential output, with a unit elasticity, which is very similar to just taking expenditures as given. Another reason to look at this alternative measure is that filtering out overall public revenues with estimated elasticities tends to extract, by construction, all the cyclicality from revenues, not only that associated with the automatic stabilizers.

27. The U.S. output gap and structural primary balance are from the OECD statistics database.

FIGURE 1. Changes in the Structural Primary Balance Plotted Against the Output Gap[a]



a. Variables are de-meaned; *x*-axis: percentage points of GDP.

out the same analysis for all OECD countries, however, we found that fiscal policy is procyclical—according to this criterion—for some of the countries at some points in 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 it has been particularly intense and protracted in the region.

The econometric counterpart of this scatter plot is the panel data analysis that appears in table 3 for $\lambda = 6.7$.[28] A panel regression of the fiscal stance on the output gap with the fixed-effects estimator is presented with an instrumental variables estimator. The estimated coefficient for the fixed-effects estimator is always negative and highly significant, which provides very strong and robust evidence of procyclical fiscal policy in Latin America. Columns 3 and 5 of the table split the sample into two periods, comparing the 1980s with the 1990s and early 2000s. The negative sign is not significant for the first part of the sample, although the point estimates are quite similar. A possible reason for

28. The results are very similar when we use a λ=100 or a unit elasticity for public revenues. These results are available on request.

TABLE 3. Panel Data Estimation of Procyclicality of Fiscal Policy in Latin America[a]

Explanatory variable	*FE 1981–2004 (1)*	*IV 1982–2004 (2)*	*FE 1981–1990 (3)*	*IV 1982–1990 (4)*	*FE 1991–2004 (5)*	*IV 1991–2004 (6)*
Constant	0.0007		0.004		−0.001	
	(0.002)		(0.004)		(0.002)	
Output gap	−0.143***	−0.320*	−0.107	−0.173	−0.181***	−0.519***
	(0.053)	(0.186)	(0.094)	(0.286)	(0.059)	(0.121)
Summary statistics						
R^2	0.035	0.006	0.018	0.000	0.073	0.010
No. observations	209	200	84	75	125	125
No. countries	9	9	9	9	9	9
Anderson's IV relevance test (*p* value)		0.00		0.00		0.00
Hansen *J* statistic (*p* value)		0.75		0.69		0.41

* Statistically significant at the 10 percent level.

*** Statistically significant at the 1 percent level.

a. The dependent viable is the change in the structural primary balance. Regressions are estimated using a fixed-effects estimator (FE) or a first-differenced estimator with the lagged output gap and the output gap of the main trade partners as instrumental variables (IV). Lambda equals 6.7; the structural primary balance is calculated with the estimated revenue elasticity to GDP.

the weaker result in the 1980s is that monetary financing of the deficit is introducing some noise in the data, since inflation enabled fiscal authorities to mask the actual deficit figures.[29]

Although the fixed-effects regressions provide a useful descriptive statistic of the cyclical relation between the fiscal stance and economic activity, this type of estimates is likely to be biased.[30] Changes in the fiscal stance may cause contemporaneous changes in the output gap, which could cause the error term to be correlated with the output gap. To address this possible problem of endogeneity of the output gap, we employ an instrumental variables (IV) technique, in which we use the lagged output gap, the terms of trade, and the output gap of the main trade partners as instruments.[31] As shown in columns 2, 4, and 6 of table 3, our finding of a statistically significant negative relation between the change in the

29. These results may also be driven by the presence of Chile, which is the only country with some evidence of countercyclicality of fiscal policy. In fact, when this country is excluded from the sample, the negative sign recovers its statistical significance for the decade of the 80s. For a more detailed analysis of the impact of inflation on public finances, see Alberola and Molina (2003).

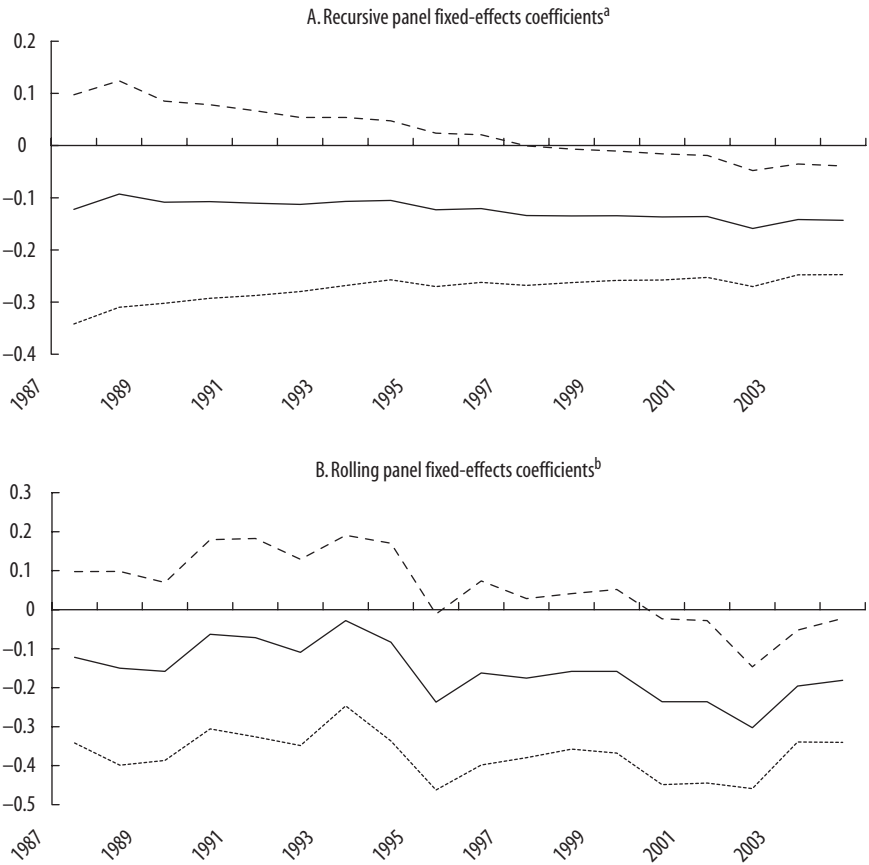
30. This point is raised by Galí and Perotti (2003) and Rigobon (2005), among others.

31. This is the best combination of instruments in terms of passing a test of instrument relevance (namely, Anderson's canonical correlations likelihood ratio test). That is, $E(X' \mathbf{Z}) \neq 0$, where X is the output gap and $\mathbf{Z}$ the instrument matrix. Galí and Perotti (2003) use these instruments in their analysis of European fiscal policy after the European Economic and Monetary Union.

structural primary balance and the output gap holds, and the estimated coefficient becomes even more negative, though less significant. These results support the claim that fiscal policy has been procyclical in Latin America.

Figure 2 explores the notion of time stability of the parameters further. Panel A displays the slope parameter of the fixed-effects regression in a recursive estimation, starting with the period 1981–87 and adding one observation at a time. The parameter is very stable: it moves in a very narrow range between –0.10 and –0.15, and it is significant after 1997 is included. Panel B

FIGURE 2. Recursive and Rolling Regressions of Changes in the Structural Primary Balance on the Output Gap



a. Ninety-five percent confidence intervals.
b. Seven-year window; 95 percent confidence intervals.

represents a rolling fixed-effects regression, starting as before with the seven-year window 1981–87 but deleting and adding one observation at a time to keep the size of the window unchanged. Variability is higher under this specification than under the recursive estimation, but again it is relatively stable. Furthermore, fiscal policy tended to become more procyclical over time, mainly in the second half of the 1990s.[32] Only the recent recovery period seems to have bucked that trend.

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 explaining this result. Our main focus is the influence that the concerns about the sustainability of public debt have on the fiscal policy stance through the cycle. The level of debt is a central element in this assessment and a fundamental constraint for fiscal policy, but we only expect it to be effectively binding throughout the cycle when two circumstances concur: first, debt must be high enough to influence fiscal policy in the short run, and second, its financing conditions, including the cost, must be closely related to the cycle. As suggested in the introduction, both conditions may hold for many Latin American countries.

An Indicator of Fiscal Sustainability: The Current Threshold Balance

This section focuses on developing a feasible indicator for exploring the links between the fiscal stance and debt sustainability concerns. Our indicator is adapted from a simplified, static version of the debt sustainability analysis used by Blanchard.[33] According to the conventional definition, debt will be sustainable at any point in time when the value of current debt is lower than the net present value of future primary balances, that is, the fiscal balance after interest payments on debt are deducted. This definition, simple as it is,

32. These results are reinforced if we remove Chile from the analysis.

33. Blanchard (1990). This type of analysis has become widespread in recent years in the framework of the international financial institutions' financing programs, since debt sustainability is increasingly a precondition for lending. As a consequence, the toolkit for deriving debt sustainability paths is becoming more sophisticated.

is not operative, since it is quite difficult to derive the series of future fiscal balances or to impose a particular discount rate on the future.

A more pragmatic approach is to determine the debt dynamics, which evolve according to a limited number of parameters. We can then derive a useful indicator of fiscal sustainability. The starting point is the government's fiscal budget constraint, which can be expressed, after some algebra, as follows:

$$\Delta D_t = -\mathrm{PB}_t + \frac{\left(r_t - g_t\right)}{\left(1+g_t\right)}\alpha D_{t-1} + \frac{\left(r_t^* - \Delta e_t - g_t\right)}{\left(1+g_t\right)}\left(1-\alpha\right)D_{t-1}, \tag{7}$$

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. Debt breaks down into domestic and external debt, which have, respectively, a share of α and $1 - \alpha$ in the total stock of debt and real interest rates of r_t and r_t^*. Finally, Δe_t is the change in the nominal exchange rate, where an increase in e represents an exchange rate depreciation, and g_t is the real growth rate.[34]

Primary surpluses, which reflect excess government resources over expenditures, reduce the debt stock. The debt stock, in turn, is an increasing function of domestic and foreign real interest rates and exchange rate depreciation and a negative function of growth.

From expression 7, we can derive a useful indicator of fiscal sustainability fairly simply. By setting $\Delta D_t = 0$, we obtain the threshold value for the primary balance that would render the debt stable.[35] Public debt is sustainable above that threshold. We denote this value as the current threshold (primary) balance (CTB_t): $\mathrm{CTB}_t = \mathrm{PB}_t$, such that $\Delta D_t = 0$. That is,

$$\mathrm{CTB}_t = \frac{\left(r_t - g_t\right)}{\left(1+g_t\right)}\alpha D_{t-1} + \frac{\left(r_t^* - \Delta e_t - g_t\right)}{\left(1+g_t\right)}\left(1-\alpha\right)D_{t-1}. \tag{8}$$

34. This expression implies a set of simplifications that are relevant for Latin America. First, we do not include contingent liabilities, although they constitute an important consideration for fiscal sustainability. Second, privatization receipts can be used to reduce debt; this is particularly relevant in the region in the 1990s. Third, most countries in the region index debt (usually domestic) to the exchange rate, the interest rate, or, more recently, the inflation rate; indexation neutralizes the effects of the variable to which the debt is indexed in the above expression.

35. This indicator is based on Blanchard (1990), who derives a similar indicator for fiscal sustainability based on the expected mean values of the variables over a fixed finite horizon.

An important question is which horizon to use to derive the values of the right-hand-side variables. Since we have a particular interest in the evolving perception of debt sustainability and creditworthiness, we use the observed parameters, rather than the long-run equilibrium or trend forecasts. This represents a further departure from other approaches for assessing debt sustainability.[36]

Our objective is to obtain a threshold for the fiscal primary balance under the current economic conditions such that the ratio of debt to GDP remains stable. 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, while there are data on total interest payments (IP), data on domestic and foreign debt and their real interest rates are not readily available.[37] We therefore need to develop a reduced version of equation 8 to derive a computable empirical counterpart. We proceed by rearranging equation 8 as follows:

$$\text{CTB}_t = \left\{\left[r_t\alpha + \left(r_t^* + \Delta e_t\right)\left(1-\alpha\right)\right] - g_t\right\}\frac{D_{t-1}}{\left(1+g_t\right)}. \tag{9}$$

Then,

$$\text{IP}_t = \left[\alpha r_t + \left(1-\alpha\right)\left(r_t^* + \Delta e_t\right)\right]D_{t-1} \equiv \rho_t, D_{t-1}, \tag{10}$$

where ρ denotes the average cost of debt. We derive ρ implicitly by dividing the observed interest payments over the debt stock (IP_t/D_{t-1}). The current threshold balance can thus be computed as:

$$\text{CTB}_t = \frac{\left(\rho_t - g_t\right)}{\left(1+g_t\right)}D_{t-1}. \tag{11}$$

Hence, employing the implicit real interest rate provides a simple method to account for all types of debt instruments used by each government. This measure also includes movements in domestic and foreign interest rates, as well as fluctuations in nominal exchange rates. These variables help us capture changes in concerns about public solvency.

36. The IMF, for instance, uses forecasts for the variables of interest.

37. As in the previous section, our main sources for debt ratios and interest payments are the GFS and IFS, complemented with national statistics. In this case, we define the government as the consolidated public sector.

The Influence of the Current Threshold Balance on the Fiscal Stance

Figure 3 plots the current threshold balance, country by country, along with changes in the primary balance and changes in the debt stock. As expected, when the current threshold balance is higher than the primary balance, the stock of public debt generally increases, and vice versa. The magnitude of the changes in the debt stock does not correspond to the gap between the current threshold balance and the primary balance, mainly as a result of valuation effects, but also because the available data on debt usually refer to the whole public sector (including the central government, public enterprises, regional government, and so forth), while the data on fiscal balances mostly refer just to the central government. This implies a certain inconsistency between public debt and the public 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. The figure compares fiscal outcomes with contemporaneous economic and financial conditions, so some caution is required when assessing the medium-term sustainability of debt based on this comparison.

In any case, we consider this an adequate framework for measuring the impact of sustainability concerns on the fiscal stance.[38] Since we are particularly concerned with the dynamics of fiscal adjustment through the cycle, we focus on the relation between changes in the current threshold balance and changes in the structural primary balance. We would expect this relation to be positive: a worsening of the perceived sustainability of public debt should be followed by fiscal tightening. This is slightly different from the rationale linking the current threshold balance to fiscal policy, since the current threshold is linked above to the primary balance rather than to the structural primary balance. We have two reasons for proceeding in this manner. First, the structural primary balance, by definition, filters out cyclical conditions and therefore gives a more accurate view of the pro-active adjustment that fiscal authorities must undertake when sustainability concerns arise. Second, if we used the primary balance, the expected positive correlation between the current threshold balance and the primary balance would be blurred, since a cyclical downturn, represented by a fall in *g,* implies a higher current threshold balance and a lower primary balance. In any case, the primary balance and the structural primary balance converge in the long run. Looking at this

38. Certain outliers in figure 3 are related to specific situations that may distort the results, such as the default in Argentina, which implied a large fall in interest payments. The outliers should therefore be removed from the sample.

FIGURE 3A. Changes in the Primary Balance, Public Debt, and Current Threshold Balance: Cross-Country Comparisons

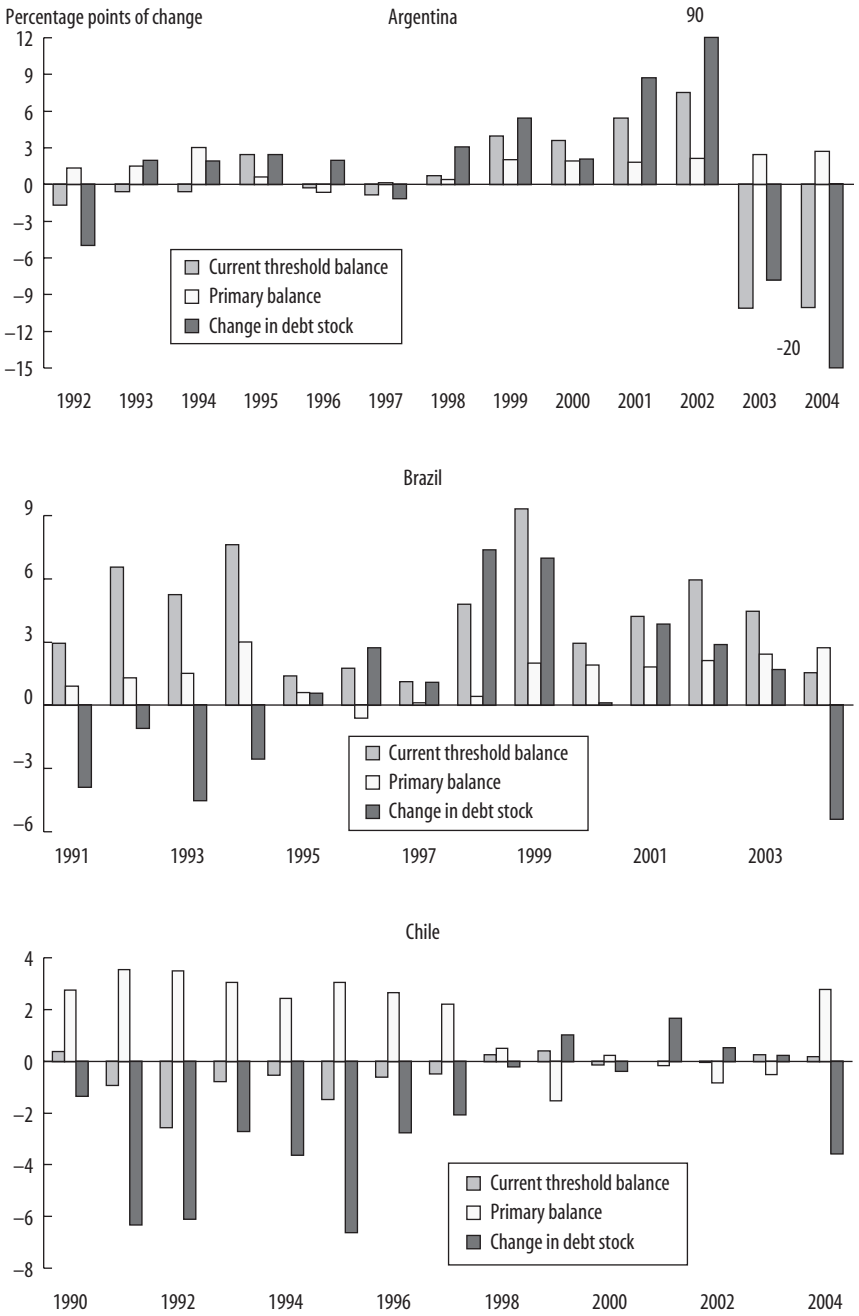
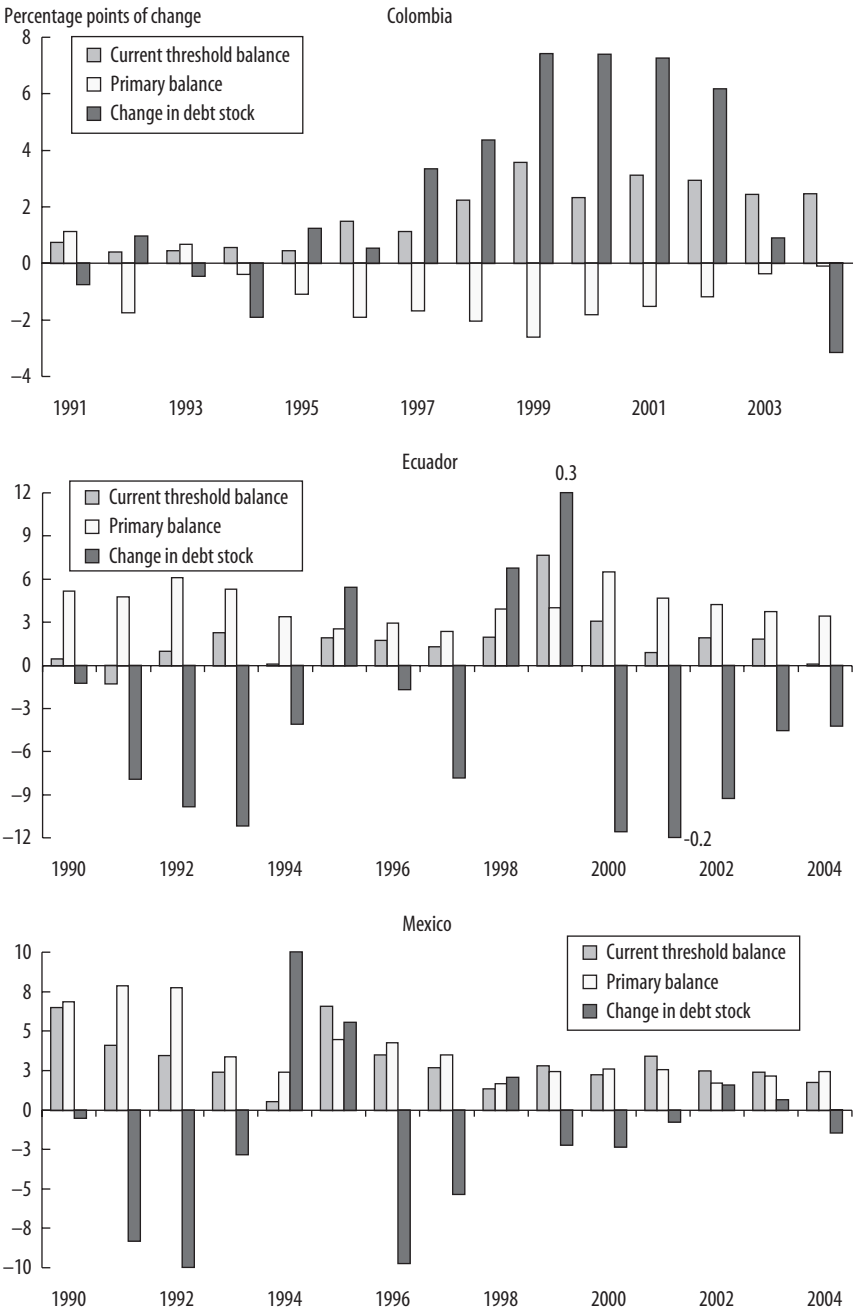
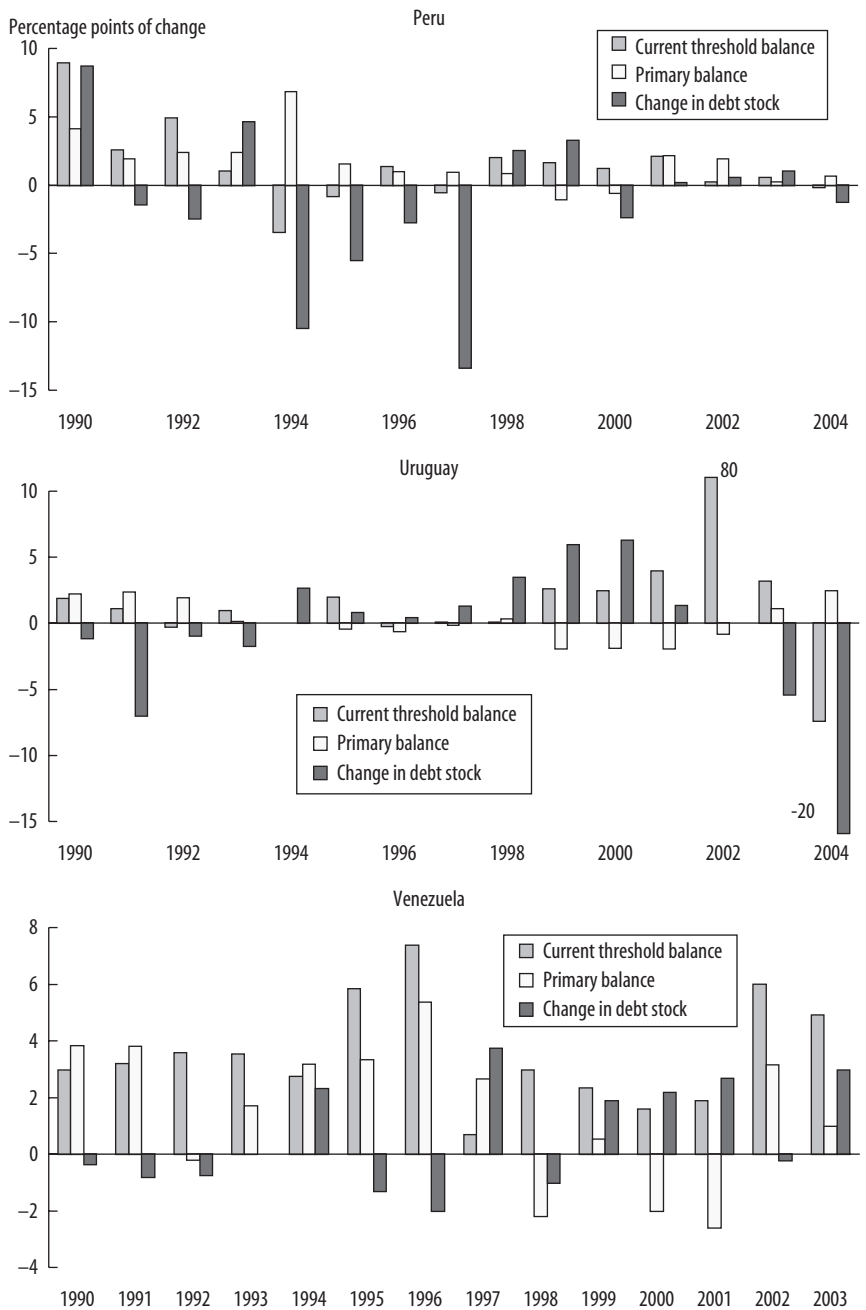


FIGURE 3B. Changes in the Primary Balance, Public Debt, and Current Threshold Balance: Cross-Country Comparisons (*continued*)



(*continued*)

FIGURE 3C. Changes in the Primary Balance, Public Debt, and Current Threshold Balance: Cross-Country Comparisons (*continued*)



alternative should add interesting insights to the analysis, so we will present the results for both variables.

Empirical Specification

The empirical analysis is framed within the following regression:

$$\Delta SPB_{it} = \delta_0 + \delta_{1t} + \delta_2 \Delta CTB_{it} + \delta_3 \left(PB_{it} - CTB_{it-1} \right) + \delta_4 CONTROLS_{it} + u_{it}, \quad (12)$$

where i denotes country and t year. The coefficient δ_{1i} absorbs country fixed effects, which may reflect differing fiscal institutions across countries, measurement errors, and other unobservable heterogeneity stemming from 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 changes in the current threshold balance (ΔCTB_t). We would expect a positive sign for δ_2 in equation 12.

The simple relation sketched here does not take into account the reaction of fiscal policy to the deterioration of sustainability conditions, which we expect should be commensurate with the effective debt sustainability position—that is, it depends not only on changes in sustainability, but also on the existence and magnitude of a debt sustainability problem. Indeed, this is the gist of our argument. If there were no foreseeable sustainability problems, there would be no reason to restrain fiscal policy when financing conditions—and the cycle—deteriorate. In such a case, fiscal policy is supposed to play a stabilizing role, as reflected in a countercyclical fiscal stance. The gauge for sustainability is the difference between the level of the primary balance and the current threshold balance, which we call the sustainability gap. We thus introduce the term ($PB_{it-1} - CTB_{it-1}$) into the regression, with a lag, as a kind of error correction mechanism: to reduce eventual sustainability problems, the structural balance must increase when the gap is negative, delivering an expected negative sign ($\delta_3 < 0$).[39] The second expected impact is an increase in value of δ_2, since the fiscal stance is expected to react less in the absence of sustainability problems.[40]

39. It would be more precise to use the structural primary balance instead of the primary balance for this expression to qualify as an error correction term, but the results are very similar under the two specifications.

40. An alternative specification for conveying both the level of and changes in perceived sustainability is to interact both variables in a multiplicative term. We attempted this exercise empirically, but the results were counterintuitive and very sensitive to specification changes, probably because the multiplicative term had a highly nonnormal distribution.

Finally, we consider other variables in the regression as controls, to obtain a cleaner picture of the actual impact of financing conditions on the fiscal stance. These include the output gap, since we want to check the extent to which the procyclicality of fiscal policy is maintained when we account for financing conditions. In other words, we want to explain the observed pattern of correlations between the structural primary balance and output as a consequence of dissimilar shocks hitting these economies, especially fiscal solvency shocks, rather than in terms of different endogenous responses of fiscal policy to output shocks owing to political economy issues. We also explore changes in the inflation rate to account for shocks to seigniorage and possible Patinkin or Olivera-Tanzi effects.[41] We use the log change in the terms-of-trade index to control for the impact of commodity-price shocks on the public accounts, and we include two dummy variables for the years in which a country's public debt securities or bank loans were in default (the Brady Plan years).[42]

Endogeneity Issues and Robustness Checks

The set of regressors used here could potentially include endogenous variables (correlated with the error term), which might generate estimation biases. The first obvious candidate is the current threshold balance, since a fiscal shock to the structural primary balance is bound to affect the estimate of the current threshold balance through both the real interest rate paid and the growth rate. The variable ($PB_{it-1} - CTB_{it-1}$) similarly cannot be regarded as exogenous, since we expect it to be correlated with past fiscal shocks on the structural primary balance (that is, it is predetermined). The output gap might be endogenous as well, since the economy's cyclical position is likely to be affected by fiscal shocks. Finally, another potential endogenous variable is the change in the inflation rate, since the Latin American inflation process had a predominantly fiscal motivation in the 1980s.

To address the problem of endogeneity, we use instrumental variables (IV) and generalized method of moments (GMM). Since we are working with a short sample, the choice of estimation method is crucial. First, we use an IV

41. The Patinkin effect implies that the inflation rate has a positive effect on the primary balance through the negative impact of inflation on public spending, while the Olivera-Tanzi effect acts the other way around, through a decline in real tax revenues as inflation rises. See Cardoso (1998) and Tanzi (1978).

42. The log change in the terms-of-trade index should be insignificant, since we have filtered the commodity price component out of public revenues.

estimator in which both external instruments—such as the output gap of the main trade partners and 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. The instruments used for each variable are listed in the notes to the tables presented in the results section, below. Second, we use a GMM estimator in first differences to check the robustness of our results to the estimation method.[43] However, these estimators can be subject to potentially severe overfitting biases in small samples when based on too many moment conditions.[44] They can also suffer from a problem of weak instruments, since deep lags of the variables might be poor instruments. We therefore carry out the GMM estimation exercise with a highly restricted set of instruments. Finally, we repeat the whole estimation exercise using an alternative definition of the fiscal stance—namely, the change in the overall primary balance. Although this is not a good measure of the fiscal stance, it provides an interesting comparison with our baseline results.

As a robustness check, we control for common aggregate shocks through several means: we include five-year fixed effects (a dummy that takes the value of one for five years and zero otherwise), the U.S. output gap, and U.S. GDP growth. It is not advisable to include year fixed effects, since we have few degrees of freedom; otherwise, we would incur severe overfitting biases.

A final check consists in including the debt stock in some regressions. We implicitly take it into account, however, in our variable CTB (the current threshold balance), which is a function of the lagged debt-to-GDP ratio (see equation 11). The literature on fiscal rules favors using the debt ratio to control for the fact that the government may take debt sustainability considerations into account when deciding its fiscal policy stance. We address this issue by including the sustainability gap, in which the key factor for debt sustainability is the distance of the overall primary balance from the current threshold balance.[45]

Results

Tables 4, 5, and 6 present the baseline results of the estimation exercises for the whole sample, based on different specifications and econometric techniques and using the changes in the structural primary balance (ΔSPB_t) as the

43. See Arellano and Bond (1991).
44. Bond (2002).
45. As described earlier, the current threshold balance is the debt-stabilizing primary balance.

TABLE 4. Panel Data Estimation of the Effects of Financial Restrictions on Fiscal Policy in Latin America: Fixed Effects Estimator [a]

Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*
ΔCTB	0.181***	0.295***	0.2760***	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)
Δ(Inflation)				0.0004
				(0.0003)
Δlog(TOT)				0.010
				(0.014)
Constant	0.0009	−0.003	−0.003*	−0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Summary statistics				
R^2	0.063	0.220	0.250	0.263
No. observations	170	170	170	170
No. countries	9	9	9	9

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.

a. The dependent variable is the change in structural primary balance, ΔSPB. All regressions include dummies that account for periods in which any country was declared to be in default by Standard and Poor's; these dummies turned out to be negative, though insignificant. The sample period is 1981–2004. Standard errors are in parentheses.

dependent variable. The values of the structural balance and the output gap correspond to those obtained with $\lambda = 6.7$ in the Hodrick-Prescott filter and with the estimated revenue elasticities. In general, the outcome of the analysis strongly supports our hypothesis and is robust to the choice of other values for λ and other public revenue elasticities.

Column 1 of each table shows the results of the simplest model, which includes only the changes in the current threshold balance. This variable, which captures the financial markets' perception of government solvency, positively and significantly affects the structural primary balance. When the regression includes sustainability conditions, as embodied in the sustainability gap, the coefficient associated with changes in the current threshold balance increases its point estimate and retains its high significance across all specifications, while the error correction coefficient is negative and highly significant (see column 2 of each table). This serves as strong evidence that countries adjust their fiscal stance to changes in sustainability conditions and that this reaction is heightened when the degree of debt sustainability becomes a genuine concern. The significance of the parameter in column 1—when the

TABLE 5. Panel Data Estimation of the Effects of Financial Restrictions on Fiscal Policy in Latin America: IV Estimation [a]

Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*
ΔCTB	0.374***	0.538***	0.675***	0.668***
	(0.129)	(0.128)	(0.228)	(0.252)
PB(−1)−CTB(−1)		−0.409***	−0.538**	−0.499**
		(0.139)	(0.209)	(0.237)
GAP			0.195	0.163
			(0.227)	(0.249)
Δ(Inflation)				0.0004
				(0.0004)
Δlog(TOT)				0.022
				(0.016)
Summary statistics				
No. observations	158	158	158	158
No. countries	9	9	9	9
Anderson's IV relevance test (*p* value)	0.00	0.00	0.00	0.00
Hansen *J* statistic (*p* value)	0.32	0.70	0.77	0.82

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

a. The dependent variable is the change in structural primary balance, ΔSPB. In the IV estimator for the differenced equation, ΔCTB, PB(−1)−CTB(−1), and the output gap are instrumented with SPB(−2), CTB(−2), PB(−2)−CTB(−2), GAP of trade partners, and GAP(−1). We use Anderson's canonical correlations LR statistic for IV relevance test and Sargan-Hansen tests of overidentification restrictions. Column 4 includes dummies that account for periods in which any country was declared to be in default by Standard and Poor's; these dummies turned out to be negative, though insignificant. The sample period is 1982–2004. Standard errors are in parentheses.

error correction term is not introduced—probably reflects the existence of sustainability concerns in most of the sample (that is, in most countries and most periods, as observed in figure 3).

Including the output gap allows us to reassess the procyclicality of fiscal policy once we account for debt sustainability perceptions (see column 3). This exercise is aimed at determining whether fiscal procyclicality is explained by the government's limited creditworthiness. The parameter associated with the output gap in column 3 of table 4 is very close to that in table 3, although it loses some degree of significance. When we account for endogeneity, however, as in the IV estimation, the parameter moves from negative and significant in table 3 (–0.3) to positive and insignificant in table 5 (0.2). In table 6, the parameter is both positive and significant. These results strengthen the hypothesis that public debt sustainability concerns are the main factor driving the behavior of fiscal policy in Latin America. In other words, once we account for the limited creditworthiness of the public sector, the fiscal authorities' behavior with respect to the cycle would have been neutral or, under some specifications, countercyclical.

TABLE 6. Panel Data Estimation of the Effects of Financial Restrictions on Fiscal Policy in Latin America: GMM Difference Estimator[a]

Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*
ΔCTB)	0.187***	0.409***	0.378**	0.305
	(0.057)	(0.086)	(0.123)	(0.222)
PB(−1)−CTB(−1)		−0.362***	−0.475***	−0.453***
		(0.092)	(0.108)	(0.115)
GAP			0.279***	0.279**
			(0.076)	(0.104)
Δ (Inflation)				0.0007**
				(0.0003)
Δlog(TOT)				0.024
				(0.030)
Summary statistics				
No. observations	158	158	158	158
No. countries	9	9	9	9
AR(1) (*p*-value)	0.03	0.04	0.06	0.05
AR(2) (*p*-value)	0.23	0.12	0.21	0.33
Sargan-Hansen Test (*p* value)	0.99	0.99	0.99	1.00

** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.

a. The dependent variable is the change in structural primary balance, ΔSPB. On the GMM difference estimator, see Arellano and Bond (1991). We use SPB(−2) as only instrument. Column 4 includes include dummies that account for periods in which any country was declared to be in default by Standard and Poor's; these dummies turned out to be negative, though insignificant. The sample period is 1981–2004. Standard errors are in parentheses.

The last column in tables 4, 5, and 6 includes estimates of the more general model, which uses changes in the inflation rate and in the terms of trade as controls. These estimates confirm the results previously obtained. The degree of significance and the sign of the parameters associated with the change in the current threshold balance, the sustainability gap, and output are not altered, while neither the inflation rate nor the terms of trade are statistically significant. This is to be expected in the case of the terms of trade, since we have filtered out the impact of commodity prices on the structural primary balance, and the region's terms of trade are mainly driven by these prices. The positive, though generally insignificant, sign of the inflation rate coefficient favors the relevance of either seigniorage shocks or the Patinkin effect of inflation on public finances.

We performed several robustness tests using an alternative definition of the fiscal stance: namely, the overall primary balance, instead of the structural primary balance.[46] The relation between ΔCTB and ΔPB is not signifi-

46. Tables for the robustness tests are available on request.

cant, though it has a positive sign, across specifications. This means that the significance of the current threshold balance disappears when we take the cycle into account in the fiscal figures. The reason for this is that a deterioration in the current threshold balance causes a drop in the primary balance as a result of the fall in activity.[47] This result effectively drives a wedge between the results of the primary balance and those of the structural primary balance. When the error correction term is introduced, however, the results are similar to those of tables 4, 5, and 6, although with a lower degree of significance. The sign of the coefficient linked to the output gap is positive and sometimes significant across the IV specifications, which supports our hypothesis about the importance of debt sustainability issues for fiscal policy implementation. In this case, the change in the terms of trade is positive and statistically significant, as expected, since we have not filtered the effects of commodities prices out of the overall primary balance. Moreover, the coefficient for the inflation rate is positive and highly significant, lending support to the hypothesis that inflation has a positive impact on the public accounts.

We also controlled for common aggregate shocks and included the lagged public debt ratio.[48] The results did not change meaningfully: the debt stock entered with a positive sign as expected (since an increase in the previous debt ratio would induce a tightening of current fiscal policy), but it was not significant.

Conclusions

The procyclicality of Latin American countries' fiscal policy is another unfortunate feature of the region that exerts a 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 relation between this feature and the general financial problems of the region. Financial vulnerability in Latin America is related not only to the level of debt, but to the volatility of financing conditions and its impact on the financing ability of fiscal authorities. Key words used to describe the region's economic tribulations of the last two or three decades, like original sin or debt intolerance, exert a durable influence on the behavior of fiscal policy.

47. The correlation between ΔCTB and the output gap is negative and strongly significant.
48. These results are available on request.

Recent improvements in financing conditions and vulnerability indicators suggest that fiscal policy may achieve a stabilizing role in the coming cycles. The evidence of recent years does not back this presumption, however. The last downturn (2001–02) saw a severe fiscal adjustment, while the current economic recovery phase has registered a marked improvement in the fiscal accounts in terms of revenues and expenditures, even after controlling for the cycle. Fiscal discipline, and the fiscal authorities' commitment to it, is perceived by the markets to have sharpened. This bodes well for the future, but a future downturn could easily drive fiscal policy into a restrictive stance, particularly if the downturn is accompanied by a financial crunch.

The bottom line of this paper—specifically, that debt sustainability concerns impinge on the fiscal stance over the cycle—does not always or necessarily point to a lack of fiscal discipline on the part of the fiscal authorities or to irresponsible policy reaction to economic conditions. The evidence presented here supports the view that financial shocks and constraints correlated with the cyclical evolution determine fiscal policy, but this does not exclude other explanations. It also raises issues such as why countries do not self-insure by saving in good times.[49] The answer probably lies in political economy arguments, including Tornell and Lane's voracity effect, which may represent a complementary hypothesis.[50] All in all, the more sustained and decisive is the fiscal discipline effort, the less debt sustainability concerns will play a role in determining fiscal policy, since countries will reduce their fiscal vulnerability and enhance their creditworthiness—the factor we have identified as the driving force of fiscal policy in Latin America.

49. Recent experience in Latin America seems to point in that direction, in that fiscal authorities in most countries are saving part of the windfall from high commodities prices and economic growth.

50. Tornell and Lane (1999).