



UNIVERSIDAD DE SAN ANDRES

Seminario del Departamento de Economía

**“Why is Fiscal Policy in Latin America
Procyclical?”**

Miguel Braun
(Harvard University)

Martes 9 de junio de 1998

9:00 hrs

Aula Chica de Planta Baja

Sem.
Eco.
98/8

Why is Fiscal Policy in Latin America Procyclical?

Miguel Braun*
Department of Economics
Harvard University

May 1998

Abstract

QUAERERE VERUM

Recent studies argue that fiscal policy has been procyclical in Latin America in the period 1970-1994. In this paper I study this claim in more detail. The main results are first, that fiscal policy was actually countercyclical in the 1970s and only became procyclical after the debt crisis in the 1980s. Second, that fiscal policy was more procyclical in countries that suffered a hyperinflation. Third, that inflation crises, which usually occur during bad times, are followed by fiscal adjustments, thus contributing to procyclicity. High inflation appears to be an important transmission mechanism from limited creditworthiness to procyclicity.

* I thank Alberto Alesina, Nicolás Ducoté, Juan Carlos Hallak, Alejandro Micco, Ted Miguel, Francisco Perez Gonzalez, Janice Seinfeld, Tomás Serebrisky, and Aaron Tornell for very helpful comments and discussions. All remaining errors are mine.

INTRODUCTION

Recent empirical studies (Gavin and Perotti (1997a and 1997b, Gavin et al (1996)) have found that fiscal policy in Latin America was procyclical in the period 1970-1994. This result is surprising if we take theory and international experience as a benchmark. Gavin and Perotti find that fiscal policy was countercyclical in OECD countries for the same period. Furthermore, most theories of fiscal policy advocate running a countercyclical fiscal policy. From a Keynesian point of view, the government surplus should be used to smooth the cycle. This is achieved by running deficits during recessions and surpluses during booms. Neoclassical theories point out the advantage of tax smoothing to minimize distortions. A constant tax rate implies that in a boom, tax revenues increase, thus reducing the deficit. The opposite is true in a recession.

These arguments imply either that fiscal policy in Latin America has been suboptimal or that there are other underlying characteristics of Latin American economies that make procyclical fiscal policy optimal.¹ In both cases, it is necessary to disentangle the reasons behind this behavior.

The main result of this paper is that fiscal policy was actually countercyclical in the 1970s and became procyclical only after the debt crisis of the early 1980s. Furthermore, fiscal policy was more procyclical in countries that suffered a hyperinflation. Finally, inflation crises, defined as the final year of a sequence in which inflation was at least 40% and jumped by at least 100%, are associated with fiscal adjustments.²

¹ For an example of this idea, see Talvi and Vegh (1996)

² This definition of inflation crisis is taken from Tornell (1998)

These results suggest the following interpretation. In the aftermath of the debt crisis and the tightening of monetary policy in the industrialized countries, international credit to Latin America fell drastically. This forced governments either to adjust their deficits or to print money to cover the fiscal imbalance. Many chose the latter. Inflation rose dramatically in the 1980s, and several countries experienced inflation crises.

It is clear that high inflation negatively affects growth by increasing allocative inefficiencies and hurting investment (see, for example, Heymann and Leijonhufvud (1995) and Tommasi (1994)). At the same time, it provides incentives and opportunity for policy-makers to adjust the deficit as part of an inflation reduction program. For example, Tornell (1998) presents a model in which crises produce conflict among powerful groups that have a common access to fiscal resources. This conflict results in reform. Drazen and Grilli (1993) show that in the context of the Alesina-Drazen model³, an increase in the cost of inflation makes reform occur sooner.

Thus, high inflation contributes to recession, and at the same time to fiscal adjustment. This means that inflation crises help explain the increased procyclicality of fiscal policy in Latin America during the 1980s.

Gavin and Perotti (1997a) argue that fiscal policy in Latin America is procyclical because of "limited creditworthiness." In bad times, the argument goes, financial markets reduce lending to Latin America. Therefore, governments are forced to adjust their deficits during recessions, making fiscal policy procyclical. If we interpret the debt crisis as an extreme case of limited creditworthiness, then high inflation appears to be an important transmission mechanism between limited creditworthiness and procyclicality.

In summary, the debt crisis forced some governments to resort to inflationary finance to cover their deficits. This in turn led to inflation crises, which contribute to recession and fiscal adjustment. Thus, we observe fiscal adjustment during bad times. High inflation appears as an important transmission mechanism from limited creditworthiness to procyclicality.

Section 1 presents a review of the recent literature on the cyclical behavior of fiscal policy in Latin America. Section 2 presents some stylized facts and case studies. Section 3 outlines the main statistical results and section 4 concludes.



Universidad de
San Andrés

³ Alesina and Drazen (1991)

SECTION 1: LITERATURE REVIEW

THE EVIDENCE: FISCAL POLICY IN LATIN AMERICA IS PROCYCLICAL

Several recent studies document the procyclicality of fiscal policy in Latin America. Using fiscal data for the consolidated central government from the IMF's *Government Finance Statistics* for the period 1970-1994, Gavin and Perotti (1997a) find that increases in fiscal surplus are not significantly correlated with GDP growth. This differs from OECD countries, in which the correlation is positive, indicating that fiscal policy is countercyclical. They find that this difference is explained by the different behavior of expenditure in Latin America and the industrial countries: transfers and government purchases are highly procyclical in Latin America, whereas the opposite is true in industrial economies. A positive Keynesian balanced-budget multiplier would imply that the macroeconomic impact of fiscal policy is actually procyclical in Latin America. They also find that fiscal policy is particularly procyclical in "bad times."⁴ This means that on average, fiscal adjustments occur at the same time as recessions in Latin America.

During recessions, the tax base is eroded and "automatic stabilizers" such as unemployment insurance increase expenditure. Therefore, the endogenous response of fiscal policy should be countercyclical. This implies that discretionary fiscal policy decisions are particularly procyclical in Latin America: governments decide (or are forced to) adjust in bad times.

Gavin and Perotti also show that imbalances are corrected faster in Latin America than in the industrial countries. A further finding is that the inflation tax rate is negatively correlated

with output growth and positively correlated with the lagged fiscal deficit, which they interpret as evidence that inflation is a fiscal phenomenon in Latin America.

In another paper,⁵ the same authors confirm the previous stylized facts using fiscal data for the consolidated public sector, including local governments and non-financial public enterprises.

Gavin et al (1996) also find that fiscal policy is procyclical in Latin America. Lane and Tornell (1997) find that savings are procyclical in Latin America. To the extent that public savings increase national savings, this result is in line with the previous papers.

Stein et al (1997) find that countries with larger electoral districts (and therefore more proportional representation) have more procyclical fiscal policy. They do not find a statistically significant relation between budget institutions and procyclicality.

INTERPRETATION: EXPLANATIONS FOR PROCYCLICALITY¹

A classical Keynesian explanation for the observed procyclicality is that causation goes from fiscal policy to output. Fiscal expansions boost the economy, whereas fiscal adjustments cause recessions. Gavin and Perotti argue that this explanation misses much of the action. They argue that the experience of Mexico in 1995 after the Peso crisis is a clear counterexample: fiscal adjustment clearly came after, and as a consequence of, the financial crisis.

Another explanation, that can be termed "voracity effects," argues that procyclical fiscal policy is the result of politico-economic interactions between powerful groups. Velasco (1994), Lane and Tornell (1997) and Talvi and Vegh (1996) are examples of this literature. Weak

⁴ defined as years in which a country's real output growth is at least one standard deviation below the average rate of growth over the 1970-1994 period.

⁵ Gavin and Perotti (1997b)

institutions and property rights in Latin America create a common pool problem with fiscal policy. Powerful groups jointly extract resources from the "fiscal commons." In good times, when credit is available, these groups find it individually rational to increase their claims, and the result is overspending. Recessions create conflict between these groups and eventually lead to reform. Therefore, crises cause recessions and fiscal adjustments, whereas booms are accompanied by fiscal expansions.

A third interpretation of the evidence given in the literature is favored by Gavin and Perotti (1997a and 1997b) and Gavin et al (1996). Gavin and Perotti (1997a) state that "procyclicality results from the fact that during bad times the public sector loses the access to financing that would be required to pursue a countercyclical policy."

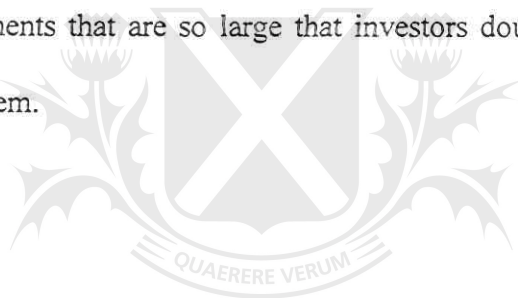
The stylized story they present is the following. During recessions, credit to Latin America dries up, because investors question the governments' ability to repay new loans. This lack of credit forces governments into a fiscal adjustment, because they are unable to finance the deficit. They mention the case of Mexico in 1995 after the Peso crisis as a typical case. As the recession became evident, credit dried up, forcing the government to adjust the deficit, and probably deepening the recession.

They interpret the finding regarding the increase of the inflation tax during bad times as supporting their hypothesis. "The idea that Latin American fiscal policy has been shaped to an important degree by tightly binding borrowing constraints during bad times is supported by the behavior of the inflation tax, a fiscal resource of last, desperate resort." The causality goes from a credit crunch to the need for inflationary finance and fiscal adjustment.

⁶ This section draws heavily from Gavin and Perotti (1997b)

Gavin et al (1996) summarize this view in three points:

- The volatility of macroeconomic outcomes in Latin America is increased by the procyclicality of fiscal policy
- Fiscal response is more procyclical in recessions because the region's ability to access international financial markets disappears at these times, forcing a fiscal contraction.
- Limited creditworthiness is due to volatility, which creates a need for fiscal adjustments that are so large that investors doubt that governments will implement them.



Universidad de
San Andrés

SECTION 2: SOME STYLIZED FACTS ON FISCAL POLICY, INFLATION AND ADJUSTMENT

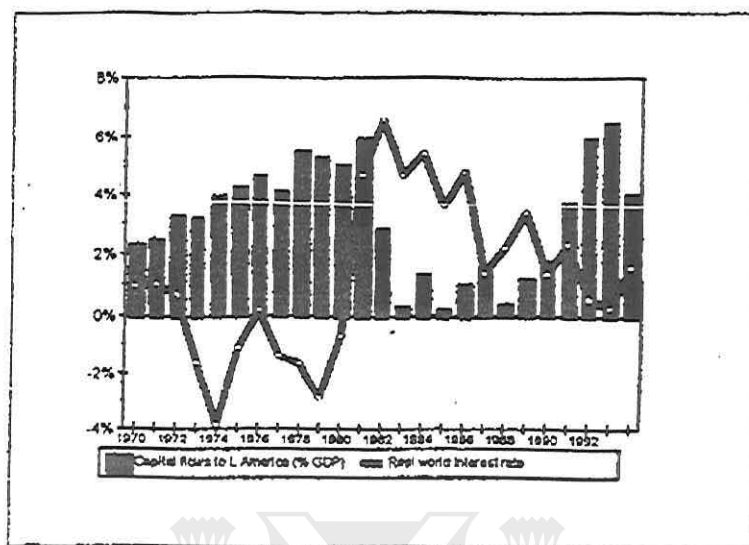
The debt crisis of the early '80s had a profound impact on Latin American economies and government finances. Furthermore, we observe heterogeneous experiences with inflation, crisis and reform. This section documents these facts and motivates the econometric analysis of the next section.

During the 1970s, Latin American countries ran budget deficits and accumulated external debt. The average debt/GDP ratio increased from 21% in 1971 to 41% in 1982⁷. However, following monetary tightening in the US, international credit to the region began to dry up. Furthermore, credit practically disappeared after the Mexican government announced in September 1982 that it would suspend all principal payments on the foreign debt until the end of 1984. Figure 1, taken from Gavin et al (1996), shows the impact of the debt crisis on lending to the region.

Universidad de
San Andrés

⁷ Throughout the rest of the paper, results refer to a sample of 14 Latin American countries for the period 1970-1994 unless otherwise stated. The countries are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela.

Figure 1
Capital Flows to Latin America



Latin American governments found that they were unable to finance the deficits of the previous decade. When credit is unavailable, the only remaining options in the face of large budget deficits are to adjust or to monetize the deficit. Many governments chose the latter. This decision can be understood as a temporary measure to avoid the costs of adjustment. The classic reference that provides an explanation of why stabilizations may be delayed is Alesina and Drazen (1991).

Monetization led to a large increase in inflation during the '80s, without a reduction in fiscal deficits. Table 1 documents this well-known fact.

	1970-1993	1970-1979	1980-1989
MEAN	154.70%	42.08%	241.20%
MEDIAN	21.79%	14.50%	27.93%

Source: IMF International Finance Statistics

Note: Some country-years are missing. Values are simple averages.

Fiscal policy also became more volatile after the debt crisis (see Table 2). In part, this reflects the fact that the '80s were characterized by increased deficits followed by structural adjustment programs.

	1970-1993	1970-79	1980-89	1990-93
AVERAGE SURPLUS	-2.90%	-2.71%	-4.30%	-0.05%
MEDIAN SURPLUS	-2.02%	-2.39%	-2.56%	0.35%
ST. DEVIATION	5.03%	3.25%	6.55%	2.86%

Source: IMF International Financial Statistics

Note: Some country-years are missing. Values are simple averages

Table 3 shows that of the 15 largest fiscal adjustments (measured as an increase in fiscal surplus as a percentage of GDP) in Latin America, 10 took place after an inflation crisis.⁸ Furthermore, there were only five adjustments and three inflation crises in the '70s. This confirms that the '80s were a more turbulent period.

⁸ An inflation crisis is defined as a country-year for which inflation was above 40% and increased more than 100%.

COUNTRY	INFLATION CRISIS ¹	FISCAL ADJUSTMENT ²	SACHS-WARNER ³	EDWARDS ⁴
ARGENTINA	1975-76	1977	-	-
	1983	1984	-	-
	1988-89	-	1991	1990-91
BOLIVIA	1980-85	1983 AND 1986	1985	1985
BRAZIL	1988-1989	1990-1991	1991	1991
CHILE	1972-73	1973-1975 AND 1979	1976	1975
COLOMBIA	-	-	1986	1990-91
COSTA RICA	1982	1981	-	-
DOMINICAN REP.	1985 AND 1988	-	-	-
ECUADOR	1983	-	1991	-
MEXICO	1982	1983 AND 1988-89	1986	1985-86
PARAGUAY	-	-	1989	1991-92
PERU	1988-90	1979, 1991	1991	1991
URUGUAY	1972	-	-	-
	1983	1983	1990	1987-88
VENEZUELA	1989	1979, 1989	1989	1989
1: An inflation crisis is defined as a country-year with inflation higher than 40% and an increase in inflation of more than 100%				
2: Fiscal adjustment is measured using the change in fiscal surplus as a % of GDP according to the IMF-IFS. Reported are fiscal adjustments larger than one standard deviation above the mean.				
3: Refers to last date of opening in the period 1970-1993 according to Sachs and Warner (1995)				
4: Refers to date of reform according to Edwards (1994)				

Table 3 also shows that most of the structural reforms in Latin America (as defined by Sachs and Warner (1995) and Edwards (1994)) took place after an inflation crisis and included fiscal adjustment as one of the policies. This supports the hypothesis put forth by Tornell (1998) that a crisis acts as a catalyst for structural reform.

A good example of crisis and adjustment in the '80s is Bolivia in 1986. (for a detailed account, see Sachs (1987)) The debt crisis drastically reduced the availability of foreign borrowing for the Bolivian government. This forced it to resort to inflationary finance. After an unsuccessful attempt at stabilization in 1983, hyperinflation erupted, bringing in a deep recession. The government adopted orthodox, anti-inflationary measures – including fiscal adjustment via an increase in public utility prices and a tax system overhaul to increase the tax

base and boost revenues – in 1986. Table 4 shows that adjustment took place during the deepest part of the recession.

	BEFORE	DURING	AFTER
INFLATION	6515.49%	276.34%	15.29%
GROWTH	-0.78%	-2.49%	2.78%
BUDGET SURPLUS	-38.94%	-1.41%	-0.37%

Notes: BEFORE refers to the average of the two years before the adjustment. DURING refers to the adjustment period. AFTER refers to the two years after the adjustment.
Source: IMF International Finance Statistics

The example of Bolivia illustrates how the dynamics of hyperinflation and stabilization contribute to fiscal adjustment during recessions and thus to procyclicality. Of course, causality is a difficult issue here. It is possible that fiscal adjustment causes the recession.⁹ However, it is clear that hyperinflation plays an important part.

The hyperinflations suffered by Argentina in 1989, Brazil in 1990 and 1993 and Peru in 1989 are also well documented.¹⁰ They followed a similar pattern, in that fiscal adjustment was implemented at a time of crisis so as to stop hyperinflation.

To stress the point that high inflation is in part responsible for fiscal adjustment in bad times, it is interesting to note the case of Israel. Bruno and Piterman (1988) describe the Israeli experience with inflation and adjustment of 1983-87. Inflation jumped from 145.7% in 1983 to 373.8% in 1984. Between November 1984 and July 1985, the government put in place a stabilization package that included a large fiscal adjustment which reduced the budget deficit by

⁹ Note however, that fiscal adjustments can also be expansionary due to wealth and expectations effects. See Alesina and Perotti (1997) and Alesina, Perotti and Tavares (1998) for this argument.

¹⁰ See, for example, Edwards (1994) and references therein.

around 10% of GDP. This fiscal adjustment took place during a period of recession: consumption and investment fell by 7.3% and 7.5% respectively in 1984.¹¹

Another interesting fact is that the big fiscal adjustments that took place in the '70s in Argentina and Chile were done following expansionary populist experiments. These cases are well documented in Larraín and Meller (1991) and Sturzenegger (1991). The populist governments of Allende in Chile and Perón in Argentina embarked on programs of highly expansionary fiscal policy. After a short initial period of successful outcomes, inflation spiraled and was followed by a deep recession. Both governments ended in violent *coups*, and the entering military governments implemented fiscal adjustment in a time of recession and political turbulence.

These observations provide the basis for the hypothesis that high inflation was an important transmission mechanism from limited creditworthiness to procyclicality of fiscal policy in Latin America.

Persistent fiscal deficits and growing debt characterized the 1970s. The debt crisis forced governments either to adjust or to finance their deficits via seignorage. Many countries chose inflationary finance, which led to inflation crises, and in some cases, hyperinflation. These crises jointly explain recessions and fiscal adjustments.

Although economists disagree about the costs of moderate inflation, clearly high inflation has important negative effects on output (see, for example, Tommasi (1994), and Heymann and Leijonhufvud (1995)). Allocative inefficiencies become huge, as citizens and businesspeople dedicate a large amount of time to cash management rather than production. Furthermore, relative prices increasingly lose their informativeness regarding relative scarcities

¹¹ However, GDP grew by 1.8% due to a large increase in exports of 13.9%

as search costs become prohibitive. Investment and tax collection also suffer. In the extreme case of hyperinflation, money loses its basic role as store of value, unit of account and medium of exchange. Bruno and Easterly (1998) find that growth falls sharply during discrete high inflation crises. Although they do not address causality in a formal way, they argue that it is implausible that, say, negative supply shocks jointly explain all observed episodes of high inflation and recession. Therefore, to a certain extent high inflations cause recessions.

High inflation is also a catalyst for reform and adjustment. Bruno and Easterly (1996) show that countries that suffered high inflation were more likely to reform. Tornell (1998) gives an explanation and further evidence for this. He presents a model of endogenous institutional change in which reform is a result of conflict between powerful groups which arises in times of crisis. Tommasi and Velasco (1995) survey several papers that argue that crises cause reforms. For example, Drazen and Grilli (1993) show that in the context of the Alesina-Drazen model, an exogenous increase in the cost of inflation makes delay more costly and therefore speeds up reform. Tommasi and Velasco also argue that crises can produce a Bayesian updating about the mapping from policies to outcomes that increases support for reform and fiscal adjustment. Furthermore, ending a hyperinflation can make a politician extremely popular. The cases of Menem in Argentina, Cardoso in Brazil and Fujimori in Peru are clear examples. Inflation crises increase the political incentives to adjust.¹²

To summarize, high inflation reduces output, and at the same time, acts as a catalyst for reform. Therefore, high inflation helps explain why we observe fiscal adjustments during bad

¹² Another important point is that when inflation is successfully stopped, fiscal revenues tend to grow due to the Olivera-Tanzi effect working in reverse. This can further explain why inflation crises are followed by increases in the fiscal surplus.

times, and is thus an important transmission mechanism from limited creditworthiness to procyclicality.



Universidad de
San Andrés

SECTION 3: REGRESSION RESULTS

The sample is a panel of 14 Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela) spanning the years 1970-1994. Fiscal and National Accounts data are from the IMF International Finance Statistics CD-Rom. Data on terms of trade and debt are from the World Bank.

The dataset has several limitations, many of which are discussed in Gavin and Perotti (1997b). Fiscal data do not include the operations of non-financial public enterprises, which have played an important role in government policy in many Latin American countries. Furthermore, they exclude the operations of local governments, which are important in large federal countries such as Brazil and Argentina. Finally, quasi-fiscal deficits are also excluded from coverage. Easterly et al (1994) show that these have been significant in high inflation countries. These problems make an interpretation of the magnitude of coefficients difficult. However, we can probably safely interpret the signs as going in the right direction. The definition of government also varies across countries. This should be controlled for by the country dummies.

For some countries, there is a break in analytical comparability of the data due to changes in the definition of the government. Results were robust to dropping data before or after the change and to the inclusion of dummies for before or after. Furthermore, results were also robust to dropping countries one at a time, and to running the regressions with only country dummies and not year dummies.

Inflation poses another problem; especially hyperinflation. The quality and reliability of fiscal data falls substantially in years of high inflation.¹³ Results were robust (and in fact became more significant) when I re-estimated the regressions dropping years of high inflation (greater than 100%).

Gavin and Perotti (1997a) specify the following model to test for the cyclical behavior of fiscal policy.

$$S_{i,t} - S_{i,t-1} = a_0 + a_1 g_{i,t} + a_2 \tau_{i,t} + a_3 S_{i,t-1} + \epsilon_{i,t}$$

Where i is a country subscript, t is a time subscript, S is fiscal surplus, g is GDP growth and τ is the percentage change in terms of trade. They include country and time dummies in all their regressions. I replicated this regression for Latin America in the period 1970-1994. Columns 1 and 2 present the results. They are very similar to those obtained by Gavin and Perotti, presented in columns 3 and 4, even though some of their data sources are different.¹⁴

¹³ See Blejer and Cheasty (1991) for a comprehensive survey of analytical and methodological issues concerning the measurement of fiscal deficits.

¹⁴ Fiscal and national accounts data are from IMF International Finance Statistics, terms of trade data are from the World Bank. Gavin and Perotti use fiscal data from IMF Government Finance Statistics and national accounts data from the IDB. Most of the fiscal data in the IMF-IFS is taken from IMF-GFS, and should thus be pretty similar. Differences could arise in the data on growth between the IMF and the IDB, although I do not have access to the full IDB series so as to compare them.

TABLE 5: The Cyclical Behavior of Fiscal Policy in Latin America (1970-1994)
 Dependent Variable: Change in fiscal surplus

	1	2	3	4
GDP growth	0.0474 <i>0.907</i>		0.0489 <i>1.15</i>	
GDP growth, good times		0.1031 <i>1.453</i>		0.0931 <i>1.46</i>
GDP growth, bad times		-0.0641 <i>-0.059</i>		-0.0114 <i>-0.15</i>
Terms of Trade (% change)	0.0184 <i>1.332</i>	0.0192 <i>1.388</i>	0.0178 <i>1.6</i>	0.0186 <i>1.66</i>
Lagged fiscal surplus (% of GDP)	-0.3843 -7.661	-0.3903 -7.744	-0.4118 -7.36	-0.4182 -7.42
Adjusted R-squared	0.1544	0.1555	0.1792	0.1725
Degrees of freedom	300	300	258	257

All regressions include time and country dummies
 t-statistics in italics
 1% significance in bold
 Fiscal and national accounts data are from IMF-IFS. Terms of trade data
 are from the World Bank

The coefficients on GDP growth and changes in the terms of trade are not significantly different from zero, meaning that the fiscal surplus is roughly acyclical. If one believes that the Keynesian balanced-budget multiplier is positive, this finding implies that fiscal policy is actually procyclical in Latin America. This result differs from the industrial country experience studied by Gavin and Perotti (1997a). They find a coefficient on GDP growth for these countries of 0.195, significant at the 1% confidence level.

The lagged fiscal surplus has a large and highly significant coefficient. Gavin and Perotti interpret this finding as evidence that fiscal imbalances are eliminated very fast in Latin America - faster than in the industrial countries.

Note that this specification can be re-written as

$$S_{i,t} = a_0 + a_1 g_{i,t} + a_2 \tau_{i,t} + (1 + a_3) S_{i,t-1} + \varepsilon_{i,t}$$

This rearrangement of the specification of the model leads to a reinterpretation of the coefficients on GDP growth and terms of trade. Rather than reflecting the impact of growth on fiscal *impulse*, they reflect the impact on fiscal *surplus*. This means that if we find a positive coefficient a_1 , it would imply that in years of high growth, the fiscal surplus is higher, but not necessarily that the *increase* in fiscal surplus is higher.¹⁵ With this in mind, the definition of cyclical behavior that we are testing is how the fiscal surplus is affected by growth, but not how changes in the fiscal surplus are affected by growth.

We have already noted several data problems above. A further note of caution on the interpretation of the coefficients is in order: the possibility of endogeneity. It may well be that fiscal adjustments cause recessions and fiscal expansions cause booms. Therefore, the coefficient on GDP growth should simply be interpreted as a partial correlation in the data, not as the amount by which the fiscal surplus increases when growth increases. A positive coefficient would imply that times of high growth are associated with times of higher fiscal surplus in Latin America.

Table 6 presents the results of tests for the impact of inflation crises on the cyclical behavior of fiscal policy in Latin America. I divided the sample into countries that suffered a hyperinflation and those that didn't. Fiscal policy was more procyclical in countries that suffered a hyperinflation, (Argentina, Bolivia, Brazil and Peru) and was actually countercyclical in countries which never suffered an inflation crisis, defined as a country-year in which inflation was more than 40% and increased more than 100%. (Colombia, Paraguay and Panama).

¹⁵ In his comment to Gavin and Perotti (1997a), Guillermo Perry notes that to properly measure the impact on fiscal impulse, it would be necessary to specify an error-correction model.

TABLE 6: High Inflation and Cyclical Behavior of Fiscal Policy

Dependent variable: change in fiscal surplus				
	1	2	3	4
	Full sample	Hyperinflation	No hyperinflation	Never crisis
GDP growth	0.5443	-0.1163	0.0621	0.1653 ***
	<i>1.035</i>	<i>-0.615</i>	<i>1.555</i>	<i>1.993</i>
Terms of trade (% change)	0.0218	0.007	0.0234 **	-0.0262
	<i>1.594</i>	<i>0.118</i>	<i>2.457</i>	<i>-0.909</i>
Lagged fiscal surplus (% of GDP)	-0.4097 *	-0.3962 *	-0.3724	-0.3086 **
	<i>-7.951</i>	<i>-3.319</i>	<i>-6.554</i>	<i>-2.457</i>
Lagged inflation crisis	0.0325 *			
	<i>3.5</i>			
Adjusted R-squared	0.2168	0.0872	0.2266	0.2214
Degrees of freedom	287	80	219	63

All regressions include time and country dummies

Lagged inflation crisis is a dummy variable that takes the value of 1 if the previous year was the last year of an inflation crisis, defined as a sequence of country-year in which inflation was above 40% and increased by more than 100%

Full sample refers to Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay, Venezuela

Hyperinflation refers to Argentina, Bolivia, Brazil and Peru

Never crisis refers to countries which never had an inflation crisis: Colombia, Paraguay and Panama

t-statistics in italics

* means 1% significance, ** means 5% and *** means 10%

Fiscal and national accounts data are from the IMF-IFS. Terms of trade data are from the World Bank

In columns 2, 3 and 4, we can see that for countries that never suffered a hyperinflation, fiscal policy was slightly countercyclical – the coefficient is positive and significant at the 12% confidence level, and furthermore, the surplus increases with positive terms of trade shocks. On the other hand, for countries that suffered a hyperinflation, neither coefficient was significantly different from zero. The experience of countries that suffered a hyperinflation contrasts sharply with that of countries that never suffered an inflation crisis. For these countries, fiscal policy was significantly countercyclical, and not very different in magnitude than that of industrial economies reported by Gavin and Perotti.

I present further evidence that inflation crises account for fiscal adjustments in bad times in column 1. I included a dummy variable for lagged inflation crises to the full sample

regression, and found that lagged inflation crises are significantly associated with higher fiscal surpluses.

When we divide the sample between the 1970s and 1980s, we find that fiscal policy was countercyclical in the 1970s and became procyclical in the 1980s. Table 7, columns 1 and 2 present the results. The coefficient on GDP growth for the 1970s is positive and significant at the 13% level, whereas it is not significantly different from zero for the 1980s. In columns 4 and 5 we can see results for the same regressions but dropping the country-years in which inflation was higher than 100%. In this case, the results are stark. Fiscal policy was significantly countercyclical during the '70s, and became procyclical in the '80s.

TABLE 7: The Cyclical Behavior of Fiscal Policy in the '70s, '80s and '90s

Dependent variable: Change in fiscal surplus	1	2	3	4	5
	1970-81	1982-90	1991-94	1970-81	1982-90
GDP growth	0.087 <i>1.51</i>	0.0109 <i>0.099</i>	0.309 * <i>2.923</i>	0.175 * <i>2.835</i>	0.0378 <i>0.692</i>
Terms of trade (% change)	0.024 ** <i>2.244</i>	0.0118 <i>0.267</i>	-0.0089 <i>0.0476</i>	0.023 ** <i>2.312</i>	.0464 ** <i>2.375</i>
Lagged fiscal surplus (% of GDP)	-0.521 * <i>-6.385</i>	-0.5849 * <i>-5.573</i>	-1.129 * <i>-6.878</i>	-0.52 * <i>-5.722</i>	-0.6206 * <i>-4.32</i>
Adjusted R-squared	0.1853	0.168	0.566	0.2638	0.3639
Degrees of freedom	147	106	42	136	77
Excl. high inflation observations	no	no	no	yes	yes

All regressions include time and country dummies

t-statistics in italics

* means 1% significance level, ** means 5% and *** means 10%

Fiscal and national accounts data are from IMF-IFS. Terms of trade data are from the World Bank

To support the idea that the parameters of the model changed after the debt crisis, I performed an F-test for structural change for the periods 1970-1981 vs. 1982-1990. The null hypothesis that α_1 , the coefficient on GDP growth, is equal in both periods can be rejected at the

99% confidence level dropping high inflation years and at the 90% confidence level including the full sample.

An interesting fact is presented in column 3. If we exclude Brazil from the regression, fiscal policy became significantly countercyclical again in the '90s. This probably reflects the fact that growth was strong in this period, whereas fiscal deficits were held under control following structural adjustment programs.

In summary, these results support the stylized picture presented in the previous section. Procyclicality was stronger in countries that suffered a hyperinflation, and it was stronger after the debt crisis. Furthermore, lagged inflation crises are correlated with fiscal adjustments.

To further strengthen this conclusion, I repeated the regressions including the inflation tax rate¹⁶ as an independent variable. Table 8 presents the results for the whole sample, for the '70s and the '80s. It turns out that inflation is a relevant omitted variable: its coefficient is significantly different from zero and the fit of the regressions improves. We can once again see that fiscal policy was countercyclical in the '70s and became procyclical in the '80s.

¹⁶ Defined as the inflation rate divided by one plus the inflation rate

TABLE 8: The Inflation Tax Rate is a Significant Variable

Dependent variable: Change in fiscal surplus

	1	2	3
	1970-81	1982-90	Full Sample
GDP growth	0.1362 **	-0.1646	-0.0162
	<i>2.159</i>	<i>-1.559</i>	<i>-0.284</i>
Terms of trade (% change)	0.0232 **	0.0118	0.0193
	<i>2.192</i>	<i>0.299</i>	<i>1.398</i>
Lagged fiscal surplus (% of GDP)	-0.4081 *	-0.9062 *	-0.4998 *
	<i>-4.496</i>	<i>-7.753</i>	<i>-8.51</i>
Inflation Tax Rate	0.0663 *	-0.1914 *	-0.465 *
	<i>2.916</i>	<i>-4.382</i>	<i>-2.703</i>
Adjusted R-squared	0.2357	0.3389	0.2015
Degrees of freedom	136	105	287

All regressions include time and country dummies

t-statistics in italics

* means 1% significance level, ** means 5% and *** means 10%

Fiscal and national accounts data are from IMF-IFS. Terms of trade data are from the World Bank

Notice that in the '70s, the inflation tax rate is positively related with the fiscal surplus, whereas it becomes very negatively related in the '80s. This is consistent with the idea that in the '80s, inflationary finance became a measure of last resort, used in times of fiscal deficits. Furthermore, in the '80s, the coefficient on lagged fiscal deficits becomes almost equal to minus one, meaning that deficits became much less persistent. This is consistent with the fact that fiscal deficits became much more volatile in the '80s.

SECTION 4: CONCLUSIONS

I have shown that fiscal policy was countercyclical in Latin America in the '70s, and it became procyclical in the '80s, following the debt crisis. Furthermore, fiscal policy was more procyclical in countries that suffered hyperinflations. Finally, lagged inflation crises are positively correlated with fiscal surplus.

These results, together with the cases presented in section 2, describing in more detail the experience of countries with hyperinflation, support the interpretation that high inflation was an important transmission mechanism from limited creditworthiness to procyclicality. High inflation has negative real effects, and at the same time provides an incentive to adjust the deficit. In Latin America, several countries suffered high inflations in the '80s, and also embarked on structural adjustment programs. These events of recession together with adjustment seem to drive the results of procyclicality found by other authors for the period 1970-1994.

An important message of this paper is that Latin American countries have had very different cyclical behaviors of fiscal policy. Countries that suffered hyperinflations were more procyclical than countries that never suffered an inflation crisis. Further research is needed to shed light on whether there are underlying characteristics of these economies that can explain the differences.

This paper also raises the question of the extent to which limited creditworthiness can be interpreted as foreign investors limiting credit to Latin America in bad times. The debt crisis has been studied extensively in the literature (See, for example, Sachs (1989)), and there is a consensus that external factors such as the rise in world interest rates were an important cause.

Clearly when credit stopped flowing to Latin America, the recession became much larger. Therefore, an alternative explanation is that the small economies of Latin America are subject to external shocks produced by financial decisions taken by industrial economies (such as the disinflation of the early '80s). Rather than recession in Latin America causing a reduction in capital flows to the region, these external shocks create recessions and force fiscal adjustments. Therefore we observe procyclicality, especially in bad times.



Universidad de
San Andrés

REFERENCES

- Alesina, Alberto and Allan Drazen (1991), "Why Are Stabilizations Delayed?" *American Economic Review* 81 (5); 1170-88
- Alesina, Alberto and Roberto Perotti (1997), "Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects" *IMF Staff Papers* 44 (2), June; 210-248
- Alesina, Alberto, Roberto Perotti and Jose Tavares (1998), "The Political Economy of Fiscal Adjustments" *Brookings Papers on Economic Activity*, Forthcoming
- Blejer, Mario and Adrienne Cheasty (1991), "The Measurement of Fiscal Deficits: Analytical and Methodological Issues," *Journal of Economic Literature*, Vol. XXIX, December; 1644-1678
- Bruno, Michael and William Easterly (1996), "Inflation's Children: Tales of Crises that Beget Reforms" *AEA Papers and Proceedings*, May 1996
- Bruno, Michael and William Easterly (1998), "Inflation Crises and Long-Run Growth," *Journal of Monetary Economics*, February; 3-26
- Bruno, Michael and Sylvia Piterman (1988), "Israel's Stabilization: A Two-Year Review," in *Inflation Stabilization*, Bruno, Di Tella, Dornbusch and Fischer (Eds.) MIT Press
- Drazen, Allan and Vittorio Grilli (1993), "The Benefits of Crises for Economic Reforms," *American Economic Review*, Vol. 83, June; 598-607
- Easterly, William, Carlos Rodriguez and Klaus Schmidt-Hebbel (eds.) (1994), *Public Sector Deficits and Macroeconomic Performance*, Oxford University Press for the World Bank

Edwards, Sebastian (1995), "Crisis and Reform in Latin America: From Despair to Hope"

Published for the World Bank by Oxford University Press

Gavin, Michael, Ricardo Hausmann, Roberto Perotti and Ernesto Talvi (1996), "Managing Fiscal Policy in Latin America and the Caribbean: Volatility,

Procyclicality and Limited Creditworthiness" Inter-American Development Bank, Office of the Chief Economist, Working Paper 326

Gavin, Michael and Roberto Perotti (1997a), "Fiscal Policy and Private Saving in Good Times and Bad" in Ricardo Hausmann and Helmut Riesen (eds.) *Promoting Savings in Latin America*

Gavin, Michael and Roberto Perotti (1997b), "Fiscal Policy in Latin America" *NBER Macroeconomics Annual 1997*

Heymann, Daniel and Axel Leijonhufvud (1995), *High Inflation*, Arne Ryde Memorial Lectures, Oxford University Press

Lane and Tornell (1997), "Why Aren't Savings Rates in Latin America Procyclical?" mimeo, Harvard University

Larraín, Felipe and Patricio Meller (1991), "The Socialist-Populist Chilean Experience, 1970-73" in Rudiger Dornbusch and Sebastian Edwards (eds.) *The Macroeconomics of Populism in Latin America*, University of Chicago Press

Sachs, Jeffrey (1987), "The Bolivian Hyperinflation and Stabilization" *American Economic Review*, Vol. 77, May; 279-83

Sachs, Jeffrey (ed.) (1989), *Developing Country Debt and the World Economy*, NBER Research Project Report Series, University of Chicago Press.

- Sachs, Jeffrey and Andrew Warner (1995), "Economic Reform and the Process of Global Integration" *Brookings Papers on Economic Activity*, pp 1-118
- Stein, Ernesto, Ernesto Talvi and Alejandro Grisanti (1997), "Institutional Arrangements and Fiscal Performance: The Latin American Experience" mimeo, IDB
- Sturzenegger, Federico (1991), "Description of a Populist Experience: Argentina 1973-76" in Rudiger Dornbusch and Sebastian Edwards (eds.) *The Macroeconomics of Populism in Latin America*, University of Chicago Press
- Talvi, Ernesto and Carlos Vegh (1996), "Can Optimal Fiscal Policy be Procyclical?" mimeo, IDB
- Tommasi (1994), "Consequences of Price Instability in Search Markets: Toward Understanding the Effects of Inflation" *American Economic Review* Vol. 84; 1385-96
- Tommasi, Mariano and Andres Velasco (1995), "Where are we in the Political Economy of Reform?" *UCLA Dept. of Economics Working Papers* #52
- Tornell, Aaron (1998), "Reform From Within" mimeo, Harvard University
- Velasco, Andrés (1994), "A Model of Endogenous Fiscal Deficits and Delayed Fiscal Adjustment" mimeo, New York University