

# Capital Flows and Destabilizing Policy in Latin America<sup>o</sup>

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## Sumário

Usando a excessiva volatilidade macroeconômica em países da América Latina e a possível contribuição das políticas monetária e fiscal para tal volatilidade como motivação, este trabalho examina a hipótese de estes países praticarem políticas fiscal e monetária pro-cíclica. Em contraste com a literatura anterior considera-se aqui a possibilidade de determinação simultânea entre política macroeconômica e crescimento do PIB, utilizando estimações de métodos de momento generalizados e VARs. Adicionalmente, explora-se o impacto direto que fluxos de capital internacional pode ter na adoção destas políticas. A evidência sugere que, para o grupo de países examinados e no período de análise, a maioria praticou políticas desestabilizadoras, e que o fluxo de capital externo influenciou consistentemente as políticas na direção pro-cíclica.

Palavras Chave: Política Fiscal e Monetária, Fluxos de Capital, América Latina

Classificação JEL: E59, E62, F39

## Abstract

Using the excessive macroeconomic volatility experienced in Latin America, and the possible contribution of monetary and fiscal policies to this outcome, as motivation, this paper examines whether procyclical fiscal or monetary policy is practiced in four Latin American countries. In contrast with previous literature, this paper considers the possible simultaneity between policy and GDP growth by using GMM econometric techniques. Additionally, this paper explores the direct impact international capital inflows have on these policies. Our evidence suggests that for this group of countries, most practice destabilizing fiscal and monetary policy and that capital inflows consistently influence policy in a procyclical direction.

Keywords: Fiscal and Monetary Policies; Capital Flows; Latin America

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## I. Introduction

Do Latin American countries engage in destabilizing fiscal and monetary policy? Do international capital flows influence this policy choice? At first pass, it is hard to imagine that policy makers would engage in actions which exacerbate recessions and make for a tougher economic climate for their citizens and themselves. Literature on this notion is fairly recent however it is suggestive that governments in these countries are attempting to maximize their interest when engaging in this sort of policy. This is especially the case with fiscal policy. When faced with financial constraints or incomplete financial markets, often a developing country's best option is to spend according to their revenue. While developing country governments might like to use fiscal policy to counteract temporary reductions in GDP, they are simply unable to find the needed finance.

The literature also suggests that developing countries, especially Latin American, experience far more macroeconomic volatility than developed economies, and that economic fluctuations in developing countries impose a significant welfare loss to these nations. Important for our purposes, the literature also suggests that the reaction of fiscal and monetary policies to these shocks may exacerbate this volatility.

We identify two problems in this literature and focus on addressing them in this paper. First, the empirical literature on procyclical fiscal and monetary policy is mainly descriptive, and so additional empirical work such as ours serves to expand this literature. Secondly, the small number of empirical papers typically use ordinary least squares for their estimations.<sup>1</sup> However procyclical behavior implies that fiscal and monetary policies also affect economic growth, creating the problem of endogenous regressors. While the literature has identified procyclical policy, there exists the possibility endogenous regressors may have created biases in existing conclusions.

We attempt to deal with the problem of endogenous regressors by trying to identify exogenous variation in growth using a "sophisticated" post hoc principle. More specifically we use generalized method of moments (GMM) with instrumental variables (IV) to investigate the contemporaneous correlation, and Vector Autoregression models (VAR) to deal with the dynamic relationship, between policy and economic growth in four Latin American countries. Using these approaches, we avoid the problem of simultaneous determination of right and left hand side variables. In order to contrast our Latin American results we also engage in a "control group" exercise of sorts by empirically testing for procyclical fiscal and monetary policy in two developed countries (the US and UK).

Our results indicate that most of the developing countries studied engage in procyclical fiscal and monetary policy, even when controlling for endogenous regressors. This is in line with results in the earlier literature. We find, however, that in contrast with this previous literature, our evidence suggests Chile implements countercyclical fiscal policy. Interestingly we also find both the US and UK follow countercyclical fiscal policy while the latter engages in countercyclical monetary policy as well.

A second issue with previous research on this topic concerns the main cause of procyclical policy. Even though the theoretical literature generally considers financial constraints as the basis for procyclical fiscal policy, part of this literature indicates that volatility in international capital flows is the primary reason for destabilizing fiscal policy. Furthermore others suggest that procyclical fiscal policy is a result of misallocation of

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<sup>1</sup> Calderon and Schmidt-Hebbel (2003) is an exception.

resources, where developing country governments fail to generate enough surpluses during good times to be used during downturns.

To investigate the role of capital flows on policy decisions, we estimate the direct impact capital flows have on fiscal and monetary policy decisions. Once policy behaves in a procyclical way, the relation between capital flows and policy decisions however may not be unidirectional. Therefore, in order to avoid the problem of endogenous regressors, we again employ GMM estimation as well as VAR models. Our results indicate that with few exceptions, international capital flows have a direct impact on policy decisions in a way that leads to procyclical policy.

This remainder of this paper proceeds as follows. Section II provides a survey of the literature on procyclical capital flows and procyclical fiscal and monetary policy. Section III details the econometric methodology and empirical results, while section IV concludes and provides some discussion on policy implications.

## **II. Literature Review**

### *Procyclical Capital Flows*

The literature on procyclical fiscal policy is well developed and encompassing, while the literature on procyclical monetary policy is at an earlier stage (but growing quickly). What follows provides a brief overview of the literature as well as intuition for why policy might be procyclical.

We begin however with a quick summary of the literature on procyclical capital flows. A number of recent papers investigate the issue of capital flows and the stage of the business cycle in developing countries. Research in this area includes Aghion, Bacchetta, and Banerjee (1999a, 1999b), Calvo and Reinhart (1999), Caballero (2000, 2002), Gourinchas, Valdes, and Landerretche (2001), Fernandez-Arias and Panizza (2001), Ocampo (2002, 2003), Eichengreen (2003), Ffrench-Davis (2003), and Calderon and Schmidt-Hebbel (2003).

While differences certainly emerge from these papers in terms of the underlying causes, the basic story ties international capital flows to the business cycle, where international capital flows influence, and are influenced by, the business cycle in developing countries. In general, capital tends to flow towards countries experiencing strong economic growth, thus reinforcing the existing expansion. However, once the economy starts to slow down, so too does capital, thus assisting in the economy's decline. Therefore when times are good, international capital is widely available, but when times are bad, access to capital is essentially shut off.

A response might be, what about the role of domestic capital? For developing countries of the sort affected by procyclical capital flows, the problem often exists of underdeveloped domestic financial markets, and thus a reliance on external finance. Therefore we see these countries are reliant on foreign capital flows, but can only count on these flows during strong economic times. As well we see that while the stage of the business cycle certainly impacts the availability of international capital, the availability of international capital also seems to play an important role in the economy's ups and downs.

### *Procyclical Fiscal Policy*

The literature on procyclical fiscal policy is extensive, and most attention has focused on the role of financial constraints in promoting procyclical fiscal policy. Papers in this area include Aizenman, Gavin and Hausman (1996), Gavin and Perroti (1997), Catao and Sutton (2002), Riascos and Vegh (2003), and Kaminski, Reinhart, and Vegh (2004). The basic premise is that during bad economic times, many developing countries no longer have access to international capital and thus are unable to run deficits to engage in countercyclical fiscal policy. During good times, developing country governments can borrow more easily as international capital markets now become accessible, and so governments increase spending while they have the opportunity.

While the financial constraint explanation for procyclical fiscal policy is intuitively appealing, it does beg a few questions. As Alesina and Tabellini (2005) point out, why do countries not simply accumulate reserves during good times when capital markets are open to them, for use when bad times hit and capital markets are essentially closed? Secondly, why would international lenders not lend to developing countries during recessions when they know having access to capital during these periods would help reduce their business cycle fluctuations (Alesina and Tabellini, 2005, pp. 3-4)? It is questions like these which have led the literature to consider alternative explanations.

One alternative explanation focuses on the role of government misconduct or weak institutions in developing countries. Papers such as Talvi and Vegh (2000) and Calderon and Schmidt-Hebbel (2003) raise this possibility. Another more recently developed alternative emerges from Alesina and Tebellini (2005) who argue that procyclical fiscal policy is due to the incentives faced by voters and less than benevolent governments. More specifically, they argue that with corrupt governments, voters are concerned that government will extract “rents” during good times through unproductive spending. As a result voters demand government tax cuts and increased productive spending during these good times in order to help prevent this government expropriation of rents. This therefore leads to the sort of procyclical fiscal policy exhibited across many developing countries.

### *Procyclical Monetary Policy*

The literature on procyclical monetary policy in developing countries is less developed than the procyclical fiscal policy literature. Papers in this area include Calvo and Reinhart (2000), Carvalho (2000), Gomez (2001), and Calderon and Schmidt-Hebbel (2003). Two main explanations emerge regarding why developing countries may exhibit procyclical monetary policy. The first focuses on the role of exchange rates in determining monetary policy. As discussed by Calvo and Reinhart (2000), countries fear floating exchange rates due to their effects on inflation, and therefore employ a managed float which makes monetary policy a function of capital movements. During times when international capital is attracted to the domestic economy, countries are forced to lower interest rates to offset the effect of this inflow on the exchange rate, and during times when international capital leaves the economy, countries are forced to raise interest rates in order to defend the value of the currency. This therefore induces procyclicality in monetary policy.

The other explanation considers inflation targeting. Under this explanation, we see procyclical monetary policy as an increase in capital inflow appreciates the exchange rate, eases pressure on prices, and consequently leads to a reduction in the domestic interest rate. Similarly, capital outflow would depreciate the exchange rate, causing pressure on prices and subsequently forcing policy makers to increase domestic interest rates.

### III. Empirical Approach

#### *Do Countries Engage in Procyclical Fiscal and Monetary Policy?*

This paper addresses two questions. The first is whether developing countries practice procyclical fiscal and monetary policies. Clearly endogeneity is an important issue when investigating the relationship between policy and growth. While we are interested in determining whether economies practice procyclical fiscal and monetary policy, we need to be aware of possible endogeneity arising from the fact that there may be a positive correlation due to short-run effects of policy on growth. We address this problem of endogeneity using two econometric approaches: generalized methods of moments – instrumental variable (GMM-IV), which allows us to analyze the contemporaneous relationship between policy and economic growth; and Vector Autoregression (VAR) estimation, an approach which allows us to deal with the dynamics in macroeconomic time series.

In the case of testing fiscal policy, we use a GMM-IV version of the equation estimated by Gavin and Perotti (1997), where we use a lag of GDP growth to instrument for the endogenous regressor in the following structural equation:

$$Policy_t = \alpha_0 + \alpha_1 \Delta GDP_t + \alpha_2 Policy_{t-1} + \alpha_3 X_t + \varepsilon_t \quad (1)$$

where  $policy_t$  is fiscal policy at time  $t$  as measured by the primary surplus, defined as budget surplus minus nominal interest paid as percentage of GDP, and  $X_t$  represents a vector of control variables.<sup>2</sup>

With this identification strategy we are solving the endogeneity problem by instrumenting based on timing. Equation (1) imposes a structural relationship between growth and policy, and through our choice of instrument, we are essentially assuming lagged growth is exogenous with respect to current policy. Given the use of annual data this is a fairly reasonable assumption.

When testing monetary policy procyclicality we again employ equation (1), however  $policy$  is now monetary policy and is measured by the real money market interest rate or short-term treasury rate deflated by consumer price inflation.<sup>3</sup> Central banks can easily access and influence the money market interest rate and as a result this rate better reflects the intention of the monetary authority. We do not use other financial market rates, like lending and deposit rates as proxies, as previous analysis shows that lending and deposit rates do not necessarily follow monetary policy decisions.

Equation (1) is estimated both with and without control variables. Our control variables include the change in oil prices in order to control for productivity shocks as well as the change in inflation as in Gavin and Perotti (1997).<sup>4</sup>

If governments in developing countries are using procyclical fiscal policy, we would expect  $\alpha_1 < 0$ , which can be interpreted as a reduction in GDP growth leads to an increase

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<sup>2</sup> We also estimated fiscal policy using the growth of government consumption. The results are generally consistent with those using the primary surplus.

<sup>3</sup> Governments do not decide real interest rates, the decision variable is nominal interest rates. However real rates are a better measure, and we follow Calderon and Schmidt-Hebel on this choice. It is worth noting though that this selection potentially contains an identification problem. Procyclical policy corresponds to a response to expected inflation that is greater than one (i.e. the Taylor principle), however inflation might end up being larger than expected and therefore ex-post real rates could fall rather than rise as the policy intended.

<sup>4</sup> Results are robust in both cases, and so we comment only on the results with controls.

in the government primary surplus. Similarly, if governments are using procyclical monetary policy, we would expect  $\alpha_1 < 0$ , which can be interpreted as a reduction in growth leads to an increase in real interest rates.

Following Gavin and Perotti (1997), we also estimate equation (1) with special attention to the state of the economy to investigate whether there is asymmetry in policy decisions depending on the state of the economy. We have defined the state of the economy based on whether or not GDP growth is above or below a linear time trend.<sup>5</sup> The resulting equation is as follows:

$$Policy_t = \alpha_0 + \alpha_1(\Delta GDP_t * D_{good}) + \alpha_2(\Delta GDP_t * D_{bad}) + \alpha_3 Policy_{t-1} + \alpha_4 X_t + \varepsilon_t \quad (2)$$

Where  $D_{good}$  captures growth above the linear time trend, and  $D_{bad}$  captures growth below the linear time trend. Our second method employed, to capture dynamics, is the Vector Autoregression model, which is as follows:

$$\begin{aligned} Policy_t &= \alpha_{11} + \sum_{p=1}^{\rho} \alpha_{12p} \Delta GDP_{t-p} + \sum_{p=1}^{\rho} \alpha_{13p} Policy_{t-p} + \alpha_{14} X_t + \varepsilon_{1t} \\ \Delta GDP_t &= \alpha_{21} + \sum_{p=1}^{\rho} \alpha_{22p} \Delta GDP_{t-p} + \sum_{p=1}^{\rho} \alpha_{23p} Policy_{t-p} + \alpha_{24} X_t + \varepsilon_{2t} \end{aligned} \quad (3)$$

where policy and controls variables are the same as in our GMM estimations. We expect the signs in the first equation of our VAR to be similar to those explained for the GMM estimation, while the second equation gives us an idea of the economic and statistical significance that the feedback of policy would have on economic growth in the next period. The VAR approach is less structural than the IV approach, but by being more general in terms of timing (lags of growth can affect policy), it shows the robustness of the IV results. To check whether policy depends on the state of the economy, we also estimate equation (3) based on growth above and below a linear time trend as discussed for equation (2).

#### Do Capital Flows Impact Policy Decisions?

The second question we address is whether capital flows have a direct impact on policy decisions. Here, we consider that policy is affected by movements in capital flows, but also can give feedback to capital flows. Our concern with endogenous regressors is the same as in our investigation of procyclical policy, and therefore we use the same approach discussed over the previous pages. We use GMM-IV estimators for the contemporaneous correlation and VAR to investigate the dynamic relationship between policy and capital flows. This is summarized in equation (4) below

$$Policy_t = \alpha_0 + \alpha_1 Capital\ Flows_t + \alpha_2 Policy_{t-1} + \alpha_3 X_t + \varepsilon_t \quad (4)$$

where capital flow<sub>t-1</sub> is used to instrument for capital flow<sub>t</sub>, and our controls variables are the change in inflation and oil prices.

Again, with this sort of identification strategy, we are assuming that lagged capital flows are exogenous with respect to current policy. Essentially we are assuming that financial agents are not anticipating future policy in making their current economic decisions. In

<sup>5</sup> It is worth noting our definition of good and bad states based on a time trend proved to be generally in line with that using the Hodrik Prescott filter. For sensitivity purposes, we also used the dummy definition employed by Gavin and Perotti (1997) and found similar results to our time trend results.

fact with the inclusion of lagged policy in the regression, it is future policy that is different from current policy that agents are not anticipating. Given the use of annual data again this is a reasonable assumption.

Further, our VAR model is as follows

$$\begin{aligned} Policy_t &= \alpha_{10} + \sum_{p=1}^{\rho} \alpha_{11p} Capital\ Flow_{t-p} + \sum_{p=1}^{\rho} \alpha_{12p} Policy_{t-p} + \alpha_{13} X_t + \varepsilon_{1t} \\ Capital\ Flow_t &= \alpha_{20} + \sum_{p=1}^{\rho} \alpha_{21p} Capital\ Flow_{t-p} + \sum_{p=1}^{\rho} \alpha_{22p} Policy_{t-p} + \alpha_{23} X_t + \varepsilon_{2t} \end{aligned} \quad (5)$$

with the same controls  $X_t$  as in GMM-IV estimation.

The expected signs are similar to those detailed in our procyclical policy tests.<sup>6</sup> A negative parameter on capital flows would suggest that capital inflows have a “procyclical” impact on fiscal policy.<sup>7</sup> In the case of monetary policy, a negative parameter would indicate that an increase in capital inflow reduces real interest rates, characterizing a procyclical impact. To address whether capital flows impact policy differently according to the state of the economy, we also apply to equations (4) and (5) the same transformation seen in equation (2).

It is worth noting that our IV approach and VAR approach discussed over the previous pages are quite related and both correspond to a Granger-causality type test. Assuming that current growth (capital flows) is positively related to lagged growth (capital flows), then a test of the sign of the lags in the VAR is the same as the IV test. That is, IV using the lag is essentially like regressing policy on lagged growth (capital flows) with the relationship between current and past growth taken into account as is done in a VAR set-up.

#### IV. Data and Empirical Evidence

##### The Data

As in previous work in this literature we use annual data to test for procyclical policy in Latin America. The countries considered are Argentina, Brazil, Chile, and Mexico. In order to contrast these results with developed country results we also investigate fiscal and monetary policy for the United States as well as the United Kingdom.

Our dataset spans from 1970 to 2000, and is based on data from the World Bank’s Global Development Finance 2003 CD-ROM and World Development Indicators 2002 CD-ROM as well as the IMF’s International Financial Statistics and Government Financial Statistics Yearbook.<sup>8</sup>

The primary surplus is generally measured by subtracting nominal interest paid from the overall budget of the central government. In the case of Brazil we use general government that includes state enterprises and local governments. Our measure of monetary policy is measured as the real money market interest rate (or short term treasury rate) deflated by CPI. Lastly, our aggregate measure of net capital flow is created by adding net transfer on debt (all flows minus interest payments), net flow on foreign direct investment and on portfolio investment, and subtracting profit remittances.<sup>9</sup> We also use a measure of private

<sup>6</sup> Once capital flows are procyclical, an increase in capital flows is positively correlated with GDP growth.

<sup>7</sup> This means an increase in capital inflows leads to a loose policy.

<sup>8</sup> When necessary, data was also collected from the respective country’s central bank or Finance Ministry.

<sup>9</sup> These data are not available for the US and UK in the *Global Development Finance* dataset. Therefore we measure net capital flow as the sum of the current account deficit with changes in international reserves.

net transfers from the World Bank (excluding official loans and short term debt) to check for robustness. Both measures of net capital flow provide similar results, though with different levels of statistical significance. We use the first measure (normalized by exports) for the analysis detailed in this paper.

## Econometric Considerations

Given the use of time series analysis, stationarity of the series is checked using the Augmented Dickey-Fuller (ADF) test with a maximum lag length of four. We use the 10% level of significance to reject the unit root. We also use the 10% level of significance in order to reject the null hypothesis that a parameter equals zero (no relationship) in our estimations.

For the VAR estimations we use the Schwarz information criterion to choose the lag length. This criterion tends to indicate the lowest-lag Vector Autoregression, which is preferable when dealing with a short span of data such as ours. We also use White's heteroskedasticity-consistent covariance matrix, making heteroskedasticity the general case.

## Empirical Results

### Argentina

#### Fiscal Policy

The fiscal policy results which follow for Argentina as well as the other countries under consideration are based on the fiscal policy variable in first differences. However in order to bring as much evidence to bear on this question, estimates using the fiscal policy measure in levels (where stationary) are also available. These results can be found in the appendix.

On the basic question of the cyclicity of fiscal policy, the results in the second column of Table 1 indicate that for both the non-state dependent GMM and non-state dependent VAR results there is no statistical evidence that GDP growth affects Argentina's primary surplus.<sup>10</sup> Allowing for different states, there is VAR evidence of procyclical fiscal policy during recessions.

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<sup>10</sup> It is possible that privatizations implemented during the 1990's in Argentina are influencing our results via their impact on the primary surplus. The financial gains from privatization are not considered fiscal revenue in the calculation of the fiscal deficit. With Argentina's broad privatization process, it is possible that the income generated from this process isolated the fiscal policy from behaving in a procyclical way and from depending on external funds (even though part of the privatization funds came from foreign direct investment and so are counted in the capital inflow measure).



Table 1: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: Argentina

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	0.000	Non-state dependent	-0.029**
State dependent (good)	1.786	State dependent (good)	-0.035**
State dependent (bad)	-2.374	State dependent (bad)	-0.020
VAR		VAR	
Non-state dependent	0.000	Non-state dependent	-0.015*
State dependent (good)	0.059	State dependent (good)	-0.016*
State dependent (bad)	-0.188*	State dependent (bad)	-0.010

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

Concerning capital flows and fiscal policy, both GMM and VAR non-state dependent results suggest international capital influences the primary surplus in a procyclical direction. The state dependent results also suggest that capital flows impact fiscal policy (though with the caveat of significance only during the good state).

### *Monetary Policy*

Table 2: Testing for Procyclical Monetary Policy and the Influence of Capital Flows: Argentina

Monetary Policy		Monetary Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	-7.168**	Non-state dependent	-0.6826*
State dependent (good)	293.51	State dependent (good)	-0.684*
State dependent (bad)	-574.92	State dependent (bad)	-0.680**
VAR		VAR	
Non-state dependent	-2.814**	Non-state dependent	-0.329*
State dependent (good)	-2.382*	State dependent (good)	-0.278*
State dependent (bad)	-4.074	State dependent (bad)	-0.700*

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

Turning to monetary policy, the GMM and VAR results of Table 2 indicate procyclical monetary policy for Argentina. For the non-state dependent results, the negative sign on GDP growth points toward an increase in the real interest rate when there is a reduction in GDP growth and vice-versa. When examining policy in different states of the economy, we do not identify any statistically significant relation in the GMM results, while the VAR results indicate procyclical monetary policy during good times. The investigation of the direct effect of capital flows on monetary policy presents the expected negative sign (higher capital inflow lowers interest rate) in both GMM and VAR estimations. The results based on different states of the economy also suggest that capital inflow always impact monetary policy in a procyclical direction.

## Brazil

### Fiscal Policy

The results of equation (1) using the primary surplus in levels show statistically weak evidence of procyclical policy, even though signs are in the expected direction.<sup>11</sup> However, for first differences (where the effect of GDP growth is on the change of fiscal policy), there is strong and consistent evidence that the primary surplus moves in a procyclical manner as seen in Table 3.

Table 3: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: Brazil

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	-0.597**	Non-state dependent	0.848
State dependent (good)	-0.468*	State dependent (good)	-1.566
State dependent (bad)	-1.022*	State dependent (bad)	2.988
VAR		VAR	
Non-state dependent	-0.435**	Non-state dependent	0.680
State dependent (good)	-0.587*	State dependent (good)	-1.002
State dependent (bad)	-0.266	State dependent (bad)	2.168

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

The non-state dependent GMM and VAR results both point to procyclical fiscal policy. For different states of the economy, the GMM results suggest that fiscal policy is always procyclical, while the VAR results indicate support for procyclical policy only during good times. In the case of the effect of capital flows on fiscal policy, there does not appear to be any statistically significant support for capital flows influencing Brazilian fiscal policy.

### Monetary Policy

Table 4: Testing for Procyclical Monetary Policy and the Influence of Capital Flows: Brazil

Monetary Policy		Monetary Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	-2.987**	Non-state dependent	-19.392**
State dependent (good)	-1.833*	State dependent (good)	-17.775*
State dependent (bad)	-14.808	State dependent (bad)	-42.201*
VAR		VAR	
Non-state dependent	-1.432*	Non-state dependent	-17.037***
State dependent (good)	-1.215*	State dependent (good)	-15.803*
State dependent (bad)	-1.824*	State dependent (bad)	-32.297

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

<sup>11</sup> See the appendix for these results. Also recall that for the case of Brazil we use a measure of general government for the Brazilian primary surplus using data from the IMF and Central Bank of Brazil.

In the case of Brazilian monetary policy, the non-state dependent GMM as well as VAR results support the notion of procyclical monetary policy, in which the real interest rate increases when the country faces a reduction on growth. Allowing for different states of the economy, again, the evidence is supportive of procyclical monetary policy. The results for different states show that monetary policy is procyclical regardless of whether the country is in a good or in a bad state. The results for equations (5) and (6) provide evidence that capital flows directly affect real interest rates in Brazil. Both the GMM and the VAR estimations indicate that an increase in capital inflows leads to a decrease in real interest rates and vice-versa. The data show that this impact is for the most part statistically significant in good and bad states as well.

## Chile

### *Fiscal Policy*<sup>12</sup>

The GMM results of Table 5 fail to find any significant relation between GDP growth and Chilean fiscal policy, as is the case for the VAR results, regardless of whether we consider the non-state dependent or state-dependent cases. However the VAR results using levels for the fiscal policy measure do provide strong support for countercyclical fiscal policy.<sup>13</sup>

Table 5: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: Chile

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	-0.015	Non-state dependent	-0.090**
State dependent (good)	0.070	State dependent (good)	-0.065***
State dependent (bad)	-0.228	State dependent (bad)	-0.116
VAR		VAR	
Non-state dependent	-0.005	Non-state dependent	-0.043*
State dependent (good)	0.021	State dependent (good)	-0.040
State dependent (bad)	-0.067	State dependent (bad)	-0.046**

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

It is possible that the fund for the stabilization of copper prices may explain the ability of Chile to implement the countercyclical fiscal policy identified in the levels results in this study. This fund, created in 1985, saves resources when the price of copper is above a threshold, which are then used when copper prices are below the threshold. Even though the relative importance of copper revenue has declined in the Chilean public budget throughout the 1990s, it accounted for almost 30% of all fiscal revenue during the late 1980s. The capital controls implemented by Chile during this period may also be influencing our findings.<sup>14</sup>

It is interesting to note, however, that even though there is no evidence that Chile follows procyclical fiscal policy, the data indicates that net capital flows have a direct impact on policy. An increase in capital inflows helps predict a loosening of fiscal policy. This evidence is captured by both approaches. This says that fiscal policy in Chile reacts to

<sup>12</sup> Due to the short sample available for Chilean interest rates, we investigate only fiscal policy for Chile.

<sup>13</sup> This is the case for non-state and state dependent results. See the appendix for more on these results.

<sup>14</sup> Kaminsky, Reinhart, and Vegh (2004, pp. 31-32) suggest the adoption of fiscal rules designed to promote public saving in good times may have contributed to these type of findings.

capital inflows in the direction the recent literature suggest, but this behavior is not sufficient to make policy procyclical.

### *Mexico*

#### *Fiscal Policy*

The non-state dependent GMM and the VAR results of Table 6 indicate that Mexico practices procyclical fiscal policy. The results based on good and bad states also show signs that Mexico follows procyclical policy in both states, however we find statistically significant evidence of procyclical policy only from our VAR results during low-growth periods.

Table 6: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: Mexico

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	-0.743*	Non-state dependent	-0.093**
State dependent (good)	-0.052	State dependent (good)	-0.004
State dependent (bad)	-7.133	State dependent (bad)	-0.178***
VAR		VAR	
Non-state dependent	-0.272***	Non-state dependent	-0.060**
State dependent (good)	-0.220	State dependent (good)	-0.040
State dependent (bad)	-0.483**	State dependent (bad)	-0.085*

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

Investigating the impact of capital inflows on fiscal policy, we find that the non-state dependent GMM and VAR results provide support that capital flows affect the primary surplus in a procyclical direction. The results for different states of the economy indicate a statistically significant procyclical impact of capital flows when economic growth is below average.

#### *Monetary Policy*

In Table 7, we find little evidence of procyclical monetary policy for Mexico. Both the GMM and VAR results have mostly countercyclical signs, although they are not statistically significant. The results concerning policy in different states have countercyclical signs in periods of high growth and procyclical signs in periods of low growth but, again, they are not statistically significant. The effect of capital inflows on real interest rates is also not statistically significant, although the parameters are consistently negative for all estimates. Examining policy in different states, we find evidence that capital inflows impact monetary policy in a procyclical direction during bad times.

Table 7: Testing for Procyclical Monetary Policy and the Influence of Capital Flows: Mexico

Monetary Policy		Monetary Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	0.489	Non-state dependent	-0.024
State dependent (good)	0.520	State dependent (good)	0.113
State dependent (bad)	-1.741	State dependent (bad)	-0.375
VAR		VAR	
Non-state dependent	0.152	Non-state dependent	-0.014
State dependent (good)	0.215	State dependent (good)	0.054
State dependent (bad)	-0.047	State dependent (bad)	-0.134**

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

Mexico may be a case where the authorities act to increase interest rates during bad times to fight capital outflows, but it is possible that the increase in inflation ends up being larger than the increase in nominal interest rates, resulting in an ex-post decrease in real interest rates. In fact, having taken a look at nominal interest rates, it appears Mexico has increased nominal interest rate during particularly bad times (particularly during the 1982 and 1995 crises).

## USA

### Fiscal Policy

For comparison sake, we also provide results for two developed countries, the US and United Kingdom. The US non-state dependent GMM results of Table 8 do not show statistically significant evidence of a relationship between fiscal policy and economic growth, though the non-state dependent VAR results do provide evidence of countercyclical policy. The results (both GMM and VAR) based on different states show statistically significant evidence that the US implements countercyclical fiscal policy during good times.

Table 8: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: USA

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	1.039	Non-state dependent	1.519
State dependent (good)	0.512**	State dependent (good)	2.566**
State dependent (bad)	-3.256	State dependent (bad)	-8.379**
VAR		VAR	
Non-state dependent	0.300*	Non-state dependent	1.363
State dependent (good)	0.288**	State dependent (good)	2.039**
State dependent (bad)	0.84	State dependent (bad)	-3.907*

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

Concerning the influence of capital flows on fiscal policy, both GMM and VAR non-state dependent results show signs that capital flows impact fiscal policy in a countercyclical direction, but this is not statistically significant. Looking at the asymmetric impact, we

find that capital flows affect policy in a countercyclical direction during good times and in a procyclical direction during bad times.

### *Monetary Policy*

We find no statistically significant relation between monetary policy and economic growth in the US. Both the non-state dependent GMM and VAR results have countercyclical signs, but are not statistically significant. The results concerning policy in different states have a countercyclical sign in periods of high growth and a procyclical sign in periods of low growth but again, none of these are statistically significant.

The non-state dependent results for the effect of capital inflows on real interest rates do not provide statistically significant results, although the parameter estimates do indicate a countercyclical direction. With different states, capital flows appear to impact monetary policy in a countercyclical direction in the good state based on our VAR estimates.

Table 9: Testing for Procyclical Monetary Policy and the Influence of Capital Flows: USA

Monetary Policy		Monetary Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	0.984	Non-state dependent	3.246
State dependent (good)	0.404	State dependent (good)	3.331
State dependent (bad)	-2.351	State dependent (bad)	-3.567
VAR		VAR	
Non-state dependent	0.182	Non-state dependent	2.330
State dependent (good)	0.193	State dependent (good)	2.795***
State dependent (bad)	-0.014	State dependent (bad)	-2.176

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

### *United Kingdom*

#### *Fiscal Policy*

In Table 10, both non-state dependent GMM and VAR results prove to be statistically insignificant though possess the correct sign for countercyclical fiscal policy in the UK.<sup>15</sup> When considering good and bad states of the economy, the evidence is statistically significant for the good state. Investigating the direct impact of capital inflow on fiscal policy we find evidence which support a procyclical influence particularly during bad times.

<sup>15</sup> Levels evidence provides statistically significant support for countercyclical fiscal policy beyond that in table 10.

Table 10: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: UK

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	0.431	Non-state dependent	-17.855
State dependent (good)	0.427***	State dependent (good)	2.654
State dependent (bad)	-0.540	State dependent (bad)	-17.840*
VAR		VAR	
Non-state dependent	0.240	Non-state dependent	-6.238**
State dependent (good)	0.345***	State dependent (good)	-1.645
State dependent (bad)	0.131	State dependent (bad)	-13.945*

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

### *Monetary Policy*

Finally, in the case of UK monetary policy, the evidence suggests the UK follows countercyclical monetary policy. This evidence is supported by both GMM and VAR estimations. The GMM results for different states of the economy show evidence of countercyclical monetary policy during good times, but the VAR estimations suggest that it is valid in both states. We find no statistically significant evidence of any relationship between capital flows and monetary policy in the UK

Table 11: Testing for Procyclical Monetary Policy and the Influence of Capital Flows: UK

Monetary Policy		Monetary Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	0.687*	Non-state dependent	-0.434
State dependent (good)	0.595*	State dependent (good)	7.319
State dependent (bad)	-0.960	State dependent (bad)	-3.347
VAR		VAR	
Non-state dependent	0.328*	Non-state dependent	-0.155
State dependent (good)	0.470*	State dependent (good)	2.043
State dependent (bad)	0.148***	State dependent (bad)	-3.683

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

## **V. Concluding Comments**

This paper addresses two questions. First is there empirical evidence that developing countries practice procyclical fiscal and monetary policy? Second, do capital flows impact policy decisions in these countries? Using a sample of four Latin American countries, we find evidence suggesting yes to both questions, though not unequivocally. For our first question, we find they do practice procyclical fiscal and monetary policy, though Chile is an exception when it comes to fiscal policy, where it is countercyclical, and Mexico is the exception for monetary policy. For the second question we find that capital flows generally have a procyclical impact on policy decisions in these countries. Our results suggest capital inflows impact fiscal policy for three of our four countries. We also find

some evidence that monetary policy is directly influenced by capital inflows for all developing countries studied.

Comparing these results to the developed country benchmark, we find the evidence suggests both the US and UK follow countercyclical fiscal policy and that the latter engages in countercyclical monetary policy. Taken with our Latin American finding, this suggests developing countries adopt procyclical monetary and fiscal policy in contrast with what we see in developed nations. This is in line with what has been suggested by the earlier literature. This study also suggests that capital flows have a strong influence on the policy direction.

An immediate conclusion we draw is the fact that Chile appears to follow countercyclical policy may be evidence of the efficiency of some kind of fiscal saving mechanism during good times, which enables Chile to implement countercyclical policy. Regarding the impact of capital flows, a possible conclusion of these findings is that some prudential regulation in capital mobility may help reduce the destabilizing effect of fiscal and monetary policy and so reduce macroeconomic volatility in these countries over the short run. Others in the literature have advocated this solution, as seen in Espinosa-Vega et al. (2000), Carvalho (2000), and Ocampo (2003). Over the longer run, the solution may require measures that help develop the domestic financial system, reducing the existence of credit constraints, as detailed by Ferreira da Silva (2002).

These findings suggest the robustness of many of the literature's earlier results for fiscal policy, as taking the GMM approach to deal with the problem of endogenous regressors has yielded results largely consistent with earlier findings. As well, they provide additional empirical support for the procyclical monetary policy literature. We suggest for further research more could be done to incorporate more developing countries and compare regional policy responses to movements in capital flows.



## Appendix: Results for Levels Fiscal Policy Measure

Table 12: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: Brazil

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	-0.902	Non-state dependent	-2.764
State dependent (good)	-0.781	State dependent (good)	-9.840
State dependent (bad)	-1.458	State dependent (bad)	4.383
VAR		VAR	
Non-state dependent	-0.225**	Non-state dependent	5.850
State dependent (good)	-0.275	State dependent (good)	-6.391
State dependent (bad)	-0.160	State dependent (bad)	2.784

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

Table 13: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: Chile

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	1.151	Non-state dependent	-0.10
State dependent (good)	2.216	State dependent (good)	-0.009
State dependent (bad)	6.843	State dependent (bad)	-0.139
VAR		VAR	
Non-state dependent	0.157*; 0.132*	Non-state dependent	-0.005; -0.034*
State dependent (good)	0.182*	State dependent (good)	0.005
State dependent (bad)	0.065	State dependent (bad)	-0.060*

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

Note: the inclusion of more than one coefficient is indicative of more than 1 lag.

Table 14: Testing for Procyclical Fiscal Policy and the Influence of Capital Flows: UK

Fiscal Policy		Fiscal Policy	
GMM	Effect of Growth	GMM	Effect of Capital Flows
Non-state dependent	0.799**	Non-state dependent	-11.855
State dependent (good)	0.674*	State dependent (good)	-3.627
State dependent (bad)	-1.146	State dependent (bad)	-20.690*
VAR		VAR	
Non-state dependent	0.412*	Non-state dependent	-3.025
State dependent (good)	0.535*	State dependent (good)	1.227
State dependent (bad)	0.214	State dependent (bad)	-9.973***

\*, \*\*, \*\*\* indicates 90%, 95%, 99% significance

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