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# Foreign exchange intervention and central bank independence: the Latin American experience

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Employing data from 13 Latin American countries, we find that greater central bank independence is associated with lesser intervention in the foreign exchange market, and also with leaning-against-the-wind intervention. We also find that the structural reforms that occurred in Latin America mostly in the 1990s helped to reduce the need for foreign exchange intervention.

## I. Introduction

Central bank independence to conduct monetary policy has been related to low inflation rates with no consequences for economic growth (Grilli *et al.*, 1991; Cukierman, 1992; Alesina and Summers, 1993; Eijffinger and Haan, 1996; Jacome, 2001; Jacome and Vasquez, 2005). Heightened independence can also be associated with lesser intervention in the foreign exchange market. Indeed a negative relationship between foreign exchange intervention and central bank independence has been found for 20 industrialized countries (Almekinders, 1995) in a study that employed both changes in currency reserves as proxies for intervention and the central bank independence index of Eijffinger and Schaling (1993). The negative relationship also holds for the variability of intervention and independence. (Foreign exchange intervention surveys include Sarno and Taylor (2001) and Taylor (2004)).

The relationship between foreign exchange intervention and central bank independence will be our concern in this article. We will take data from Latin American countries and put forward an alternative methodology.

The usage of changes in reserves to proxy for intervention activity can be criticized on the basis that they are too noisy and that reserves can change for reasons having nothing to do with intervention. Rather than relying on net foreign reserves, here we will take the policy rule to track intervention.

$$\ln(i_t^T) = \phi \ln(R_t - 1) \quad (1)$$

Here  $i^T$  is the target to the nominal interest rate. Departures of the nominal exchange rate from its target are captured by the deviations of real exchange rate  $R$  from its PPP value of one. Equation 1 can be justified on the basis that a central bank's main

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concern in intervention activity is to counteract speculative nominal exchange rate changes.

The rest of the article is organized as follows. Section II will present data. Section III will analyse the data. Section IV will conclude.

## II. Data

We consider 13 countries, namely Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Guatemala, Mexico, Paraguay, Peru, Uruguay and Venezuela, and take monthly data on nominal interest rates, nominal exchange rates and price levels over the period January 1990 to December 2003 (the only available) from the IMF's *International Financial Statistics*. The central bank (legal) independence index employed is that of Jacome and Vasquez (2005). This index takes into account not only economic and political sovereignty (as in Cukierman, 1992) but also financial sovereignty, responsibility, transparency and the role of the central bank as a lender in the last resort.

**Table 1. Latin American central bank independence and reform**

	Time period	CBII
Group 1		0.84
ARG-1	1993-2003	
BOL-1	1996-2003	
CHI	1990-2002	
COL-1	1993-2003	
MEX-1	1994-2003	
PER-1	1994-2003	
Group 2		0.70
CRC-1	1996-2003	
PAR-1	1996-2003	
URU-1	1996-2003	
VEN-1	1993-2003	
Group 3		0.44
ARG-0	1990-1992	
BOL-0	1990-1995	
BRA	1990-2003	
COL-0	1990-1992	
CRC-0	1990-1995	
GUA	1990-2003	
DOM	1990-2003	
MEX-0	1990-1993	
PAR-0	1990-1995	
PER-0	1990-1993	
URU-0	1990-1995	
VEN-0	1990-1992	

Source: Jacome and Vasquez (2005).

Notes: Reform countries are indicated with either '0' (pre-reform subperiod) or '1' (post-reform subperiod). CBII is the central bank independence index.

## III. Analysis

Latin American countries recently pursued more central bank independence through major reforms, most noticeably in Argentina (1992 and 2002), Bolivia (1995), Chile (1989), Colombia (1992), Costa Rica (1995), Mexico (1993), Paraguay (1995), Peru (1993), Uruguay (1995) and Venezuela (1992 and 2001). Table 1 shows the countries' central bank intervention index taking into account those reforms. Reform countries are indicated with either '0' (pre-reform subperiod) or '1' (post-reform subperiod). We assessed the relationship between central bank independence and intervention employing both individual country estimation (Table 2) and cross-country estimation through panel data (Table 3).

Policy rule (1) was used to proxy for intervention in individual country estimation. The intervention coefficients employed were obtained by individually estimating (via OLS) Equation 1 for every country (Table 2). In Table 2,  $\Delta$  is a series' first differences in natural logs and  $D$  is the deviation of the real exchange rate from the PPP value of one. Estimates in the regressions of Table 2 were backed by standard econometric treatment. To prevent spurious regressions, ADF and Phillips-Perron tests were employed in order to check for stationarity. We also run a CUSUM test to check for parameter stability. Moreover, whenever autocorrelation and heteroscedasticity in residuals were detected, they were fixed through Newey-West correction.

That leaning against the wind is the usual type of intervention can be seen in the negative sign of the deviations of the real exchange rate from its PPP value of one in the regressions for Argentina (1), Bolivia (1), Brazil, Chile, Colombia (0 and 1), Paraguay (1), Peru and Venezuela (0 and 1) (Table 2). The positive sign of the regressions in Table 2 refers to the countries with leaning-with-the-wind intervention.

Countries experiencing crises over the period were Argentina (2002), Colombia (1998-1999), Dominican Republic (2002-2003), Mexico (1995), Uruguay (2002) and Venezuela (1994-1995). For these countries, we considered banking crisis dummies. But these alone can lead to an omitted variable bias because the central bank reforms after the crises were usually part of broader structural reforms that included privatizations, trade reform and other structural macro policies (Jacome and Vasquez, 2005). To circumvent this bias, we considered the index of structural reform of the Inter-American Development Bank as an extra control variable (Lora, 2001; Lora and Panizza, 2002).

**Table 2. Individual country regressions using policy rule (1)**

$\Delta i^T = 1.3621^* \Delta D$ (8.75)	Adjusted $R^2 = 0.45$	(ARG-0)
$\ln i^T = -0.18^* \ln D$ (-3.65)	Adjusted $R^2 = 0.03$	(ARG-1)
$\ln i^T = 0.006^* + 0.805^* \ln D$ (2.45) (2.58)	Adjusted $R^2 = 0.24$	(BOL-0)
$\ln i^T = -0.050^* \ln D$ (-3.50)	Adjusted $R^2 = 0.02$	(BOL-1)
$\ln i^T = 1.336^* - 0.0512^* \ln D$ (7.54) (-2.73)	Adjusted $R^2 = 0.03$	(BRA)
$\ln i^T = 1.456^* - 0.216^* \ln D$ (11.24) (-10.6)	Adjusted $R^2 = 0.33$	(CHI)
$\Delta i^T = 0.02^* + 0.048^* \Delta D$ (2.72) (2.29)	Adjusted $R^2 = 0.14$	(COL-0)
$\ln i^T = 0.404^* - 0.238^* \ln D$ (26.03) (-13.42)	Adjusted $R^2 = 0.77$	(COL-1)
$\Delta i^T = 0.51^* \Delta D$ (2.43)	Adjusted $R^2 = 0.17$	(CRC-0)
$\ln i^T = -0.05^* \ln D$ (-4.18)	Adjusted $R^2 = 0.13$	(CRC-1)
$\Delta i^T = -0.38^* + 0.155^* \Delta D$ (-6.43) (9.12)	Adjusted $R^2 = 0.46$	(DOM)
$\Delta i^T = 0.116^* \Delta D$ (6.52)	Adjusted $R^2 = 0.06$	(GUA)
$\ln i^T = -1.44^* + 0.675^* \ln D$ (-3.35) (3.84)	Adjusted $R^2 = 0.65$	(MEX-0)
$\ln i^T = -1.22^* + 0.599^* \ln D$ (-8.62) (9.78)	Adjusted $R^2 = 0.71$	(MEX-1)
$\ln i^T = 0.019^* \ln D$ (12.3)	Adjusted $R^2 = 0.005$	(PAR-0)
$\ln i^T = -1.33^* \Delta D$ (-3.54)	Adjusted $R^2 = 0.71$	(PAR-1)
$\ln i^T = 0.807^* \ln D$ (3.67)	Adjusted $R^2 = 0.003$	(PER-0)
$\ln i^T = 0.435^* - 0.265^* \ln D$ (4.75) (-3.10)	Adjusted $R^2 = 0.19$	(PER-1)
$\Delta i^T = 1.443^* \Delta D$ (6.80)	Adjusted $R^2 = 0.41$	(URU-0)
$\Delta i^T = 0.369^* \Delta D$ (3.43)	Adjusted $R^2 = 0.03$	(URU-1)
$\ln i^T = 2.43^* - 0.271^* \ln D$ (-2.04) (2.37)	Adjusted $R^2 = 0.28$	(VEN-0)
$\ln i^T = -0.049^* \ln D$ (-26.52)	Adjusted $R^2 = 0.07$	(VEN-1)

Notes: Figures in brackets show the  $t$ -statistic and  $D$  is the deviation of the real exchange rate from the PPP value of one.  
\*Means significance at 5%.

**Table 3. Panel regressions using FGLS**

Regression	[1]	[2]	[3]	[4]
Constant	0.0008* (66.82)	0.000* (67.07)	0.0008* (58.03)	0.0008* (51.39)
Central bank independence index	-0.199* (-2.53)	-0.176* (-2.03)	-20.05* (-2.49)	-20.06* (-2.48)
Structural reform index		2.20E <sup>-0.7**</sup> (-1.76)		0.02** (-2.52)
Dummy for banking crisis			0.03 (-0.75)	0.03 (-0.75)
$R^2$	0.033	0.79	0.032	0.030
Observations	2.184	2.184	2.184	2.184
Number of countries	13	13	13	13
$\rho$	0.98	0.98	0.98	0.98

Notes: Figures in brackets show the  $t$ -statistic.  
\*Means significance at 5% and \*\*means significance at 10%.

The four panels in Table 3 show a negative relationship between the foreign exchange intervention coefficient and the central bank independence index over the period 1990 to 2003. The coefficients

were estimated by feasible generalized least squares (FGLS) and robust coefficient covariances (White robust covariances), allowing for heteroscedasticity across countries and computing White-type robust

SEs, together with an AR(1) autocorrelation structure and with a  $\rho$  coefficient common to all countries.

Regression [1] considered only the central bank index, regression [2] added the structural reform index and regression [3] added the banking crisis dummy. Regression [4] took all those into account. Apart from the dummy for banking crisis, Table 3 shows that the variables were related at a significance level of up to 10%. Thus, the proposition that increased central bank independence can be associated with lesser intervention in foreign exchange markets holds for Latin America. Also, the structural reforms helped to reduce the need for foreign exchange intervention. The banking crises did not matter for intervention, however. Indeed the  $R^2$  in regression [3] suggests that nearly 79% of the changes occurring in the intervention coefficient can be explained solely by the independence and structural reform indices.

#### IV. Conclusion

The experience of 13 Latin American countries suggests that greater central bank independence can be associated with both (1) lesser intervention in the foreign exchange market and (2) leaning-against-the-wind intervention. These findings are in accordance with previous ones for industrialized countries. However, such studies relied on OLS cross-country regressions and foreign reserves as a proxy for intervention. Rather than using reserves, we assessed the relationship between central bank independence and intervention employing both individual-country estimation (via a policy rule) and cross-country estimation through panel data. Incidentally, we also found that the structural reforms that occurred in Latin America helped to reduce the need for foreign exchange intervention.

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