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

## Mauricio Nunes
Department of Economics
Federal University of Rio Grande Do Sul
70910900 Porto Alegre RS
Brazil
*E-mail address*: simianonunes@bol.com.br


## Sergio Da Silva
Department of Economics
Federal University of Santa Catarina
88049970 Florianopolis SC
Brazil
Corresponding author
*E-mail address*: professorsergiodasilva@gmail.com
Tel.: +55 48 8804 7489
Fax: +55 48 3721 9901

### Abstract

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.

**JEL classification**: F31, F41

**Keywords**: central bank independence, foreign exchange intervention, Latin America

# 1. Introduction

Central bank independence to conduct monetary policy has been related to low inflation rates with no consequences to economic growth (Grilli *et al.*, 1991; Alesina and Summers, 1993; Cukierman, 1992; 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).) So the relationship between foreign exchange intervention and central bank independence will be our concern in this paper. We will taka 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. For instance, if the currency of a country depreciates, this will automatically increase the relative value of any foreign exchange holdings in a central bank's portfolio. In such a situation the positive correlation between intervention (proxied by reserve changes) and lack of central bank independence could be explained by the fact that countries with lesser independent central banks have more expansionary (and variable) monetary policy, which in turn leads to a more depreciating (and volatile) exchange rate, and therefore to larger (and more variable) foreign reserves.

Rather than relying on net foreign reserves, here we will take the policy rule

$$\ln\left(i_t^T\right) = \phi \ln\left(R_t - 1\right) \tag{1}$$

to track intervention. In equation (1), $i^T$ 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 concern in intervention activity is to counteract speculative nominal exchange rate changes.

The rest of the paper is organized as follows. Section 2 will present data. Section 3 will analyze the data. Section 4 will conclude.

## 2. 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–December 2003 (the only available) from 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.

## 3. 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 preventing spourious 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).

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 1990–2003. 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 standard errors, 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 10 percent. 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 percent of the changes occurring in the intervention coefficient can be explained solely by the independence and structural reform indices.

### 4. 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.

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 |  |

Note
Reform countries are indicated with either "0"
(pre-reform subperiod) or "1" (post-reform
subperiod)
CBII is the central bank independence index
Source: Jacome and Vasquez (2005)

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

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

Note
* means significance at 5 percent, figures in brackets show the *t*-statistic, and *D* is the deviation of the real exchange rate from the PPP value of one

Table 3. Panel regressions using feasible generalized least squares

| Regression | [1] | [2] | [3] | [4] |
|---|---|---|---|---|
| Constant | 0.0008* | 0.000* | 0.0008* | 0.0008* |
| | (66.82) | (67.07) | (58.03) | (51.39) |
| Central Bank Independence Index | −0.199* | −0.176* | −20.05* | −20.06* |
| | (−2.53) | (−2.03) | (−2.49) | (−2.48) |
| Structural Reform Index | | $-2.20\text{E}^{-0.7}$** | | −0.02** |
| | | (−1.76) | | (−2.52) |
| Dummy for Banking Crisis | | | −0.03 | −0.03 |
| | | | (−0.75) | (−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 |
| $P$ | 0.98 | 0.98 | 0.98 | 0.98 |

Note

* means significance at 5 percent, ** means significance at 10 percent, and figures in brackets show the *t*-statistic

# References

Alesina, A. and L. H. Summers (1993) Central bank independence and macroeconomic performance: Some comparative evidence, *Journal of Money, Credit, and Banking*, **25**, 151–62.

Almekinders, G. J. (1995) *Foreign Exchange Intervention: Theory and Evidence*, Edward Elgar, Hants.

Cukierman, A. (1992) *Central Bank Strategy, Credibility, and Independence: Theory and Evidence*, The MIT Press, Cambridge.

Eijffinger, S. C. W. and J. Haan (1996) The political economy of central banking, Princeton Special Papers in International Economics, 19.

Eijffinger, S. C. W. and E. Schaling (1993) Central bank independence in twelve industrial countries, *Banca Nazionale del Lavoro Quarterly Review*, **184**, 1–41.

Grilli, V., D. Masciandaro and G. Tabellini (1991) Political and monetary institutions and public finance policies in the industrial countries, *Economic Policy*, **13**, 341–92.

Jacome, L. I. (2001) Legal central bank independence and inflation in Latin America during the 1990s, IMF Working Papers, 212.

Jacome, L. I. and F. Vasquez (2005) Any link between legal central bank independence and inflation? Evidence from Latin America and the Caribbean, IMF Working Papers, 75.

Lora, E. (2001) Structural reforms in Latin America: What has been reformed and how to measure it, Inter-American Development Bank Working Paper, 466.

Lora, E. and U. Panizza (2002) Structural reforms in Latin America under scrutiny, Inter-American Development Bank Working Papers, 470.

Sarno, L. and M. P. Taylor (2001) Official intervention in the foreign exchange market: Is it effective and, if so, how does it work? *Journal of Economic Literature*, **39**, 839–68.

Taylor, M. P. (2004) Is official exchange rate intervention effective? *Economica*, **71**, 1–11.