DOCUMENTO CEDE 2002-18
ISSN 1657-7191 (Edición electrónica)
NOVIEMBRE DE 2002

CEDE

Monetary Policy Rules in Colombia *

Raquel Bernal†

November 2002

Abstract

Este estudio reporta estimaciones de una función de reacción de política monetaria para Colombia durante el período 1991 a 1999. Los resultados indican que durante este período el Banco Central adoptó una regla implicita cuyo objetivo era la tasa de inflación. La evidencia tambien sugiere que el Banco Central respondió a la inflación anticipada en contraposición a la inflación rezagada. De acuerdo con los resultados, aún bajo la existencia de una banda cambiaria cuyo objetivo era servir de ancla nominal para la política monetaria, el Banco Central tuvo espacio para movimientos independientes de la tasa de interés siempre y cuando la tasa de cambio no se encontrara en alguno de los dos extremos de la banda.

Clasificación JEL: E0, E4, E5.

Palabras clave: Función de reacción de política monetaria, tasa de inflación, tasa de interés, regla de Taylor.

*I want to acknowledge helpful comments from Kenneth Kuttner, Mark Gertler, Sergio Clavijo and Arturo Galindo.

†New York University. Department of Economics (e-mail: rb459@nyu.edu). This version of the paper: February 2000.

1. Introduction

This paper characterizes empirically how the Central Bank of Colombia has conducted monetary policy since 1991 when the new political constitution declared complete autonomy of the Bank in policy management with the sole objective of controlling the growth of prices in the economy. The announcement of inflation objectives began in Colombia in the early 1990s. In 1991, the new constitution established the independence of the Banco de la República and mandated that the design and execution of monetary, exchange rate and credit policies was the exclusive responsibility of its Board of Directors. It also stated that the Central Bank needed to "preserve the purchasing power of the currency" (article 373), and in 1992 a new law (Law No. 32) mandated that the Board of Directors announced a quantitative inflation objective each year[1].

There are two main issues that motivate this research. First, after more than a decade of high and persistent inflation (an average of 24.9% between 1975 and 1992), Colombia has experienced a considerable decline in price growth during the past eight years when inflation has finally decreased below 20% and has even reached single digit numbers in 1999. This period coincides with that for which the Central Bank has been independent with the sole concern of reducing price growth. It is worthwhile then to assess the performance of the Central Bank during this period and bring forward some of the most important lessons of this experience for future policy-making in Colombia.

Second, given that for most of the period under analysis the country used an exchange rate band, it can be interesting to think of the monetary policy during the last years as one in which the interest rate is an operating instrument while the exchange rate is an intermediate target. The estimation of a policy reaction function can be useful to evaluate whether the Central Bank still had space for independent movements in the target interest rate, so long as the exchange rate was not exactly at either edge of the band.

In this paper, I estimate a monetary policy reaction function for Colombia during the period between September 1991 and October 1999.

Section 2 below presents an estimable policy reaction function. The baseline specification has a central bank adjusting the nominal short term interest rate in response to the gaps between expected inflation and output and their respective targets. The model corresponds to the kind presented by Clarida, Gali and Gertler (1997) and employed in their study of monetary policy in several countries

[1] See Uribe D. et al., 1999.

including the U.S., Germany and Japan. It is essentially a forward looking version of the simple backward looking reaction function popularized by Taylor (1993).

Additionally, I present several alternatives to the baseline specification in which the central bank responds to variables other than inflation and output. This can be particularly relevant given that the country faced external constraints on monetary policy imposed primarily by the target zone. One of these alternatives allows to test the forward looking versus the backward looking specifications of the reaction functions.

Section 3 presents the results of the analysis for Colombia. Overall, the baseline specification of the reaction function does a good job in characterizing monetary policy for the country after 1991. The kind of rule that emerges is what one might call "soft-hearted" inflation targeting: In response to a rise in expected inflation relative to target, the Central Bank raises nominal rates sufficiently to push up real rates. The estimated rule thus implies a clear focus on controlling inflation. At the same time, there is a modest pure stabilization component: holding constant expected inflation, the Central Bank adjusts rates in response to the state of output.

Concluding remarks are in section 4.

2. Specification of a Monetary Policy Reaction Function

The basic framework pertains to a central bank that has at least some degree of autonomy over its monetary policy. The starting point is the observation that, for most central banks, the main operating instrument of monetary policy is a short term interest rate. Typically, the instrument is an interbank lending rate for overnight loans. The empirical policy reaction function developed by Clarida, Gali and Gertler (1997) characterizes how central banks choose the level of the short term rate from period to period.

To make sense of this class of policy reaction functions, the analysis appeals to existence of temporary nominal wage and price rigidities. With nominal rigidities, monetary policy affects real activity in the short run. By varying the nominal rate, a central bank can effectively vary the real interest rate and the real exchange rate. The process of imperfect wage and price adjustment gives rise to a positive short run relationship between output and inflation. This implies, for example, that reducing inflation may require a period of output reduction, depending on the degree of nominal stickiness. In this kind of setup, is possible to envision a central bank choosing the course of short term interest rates.

Assume that each period the central bank has a target for the nominal short term interest rate r_t^* . In the baseline case, the target will depend on both expected inflation and output:

$$r_t^* = \overline{r} + \beta \left[E(\pi_{t+n}|\Omega_t) - \pi^* \right] + \gamma \left[E(y_t|\Omega_t) - y_t^* \right] \tag{2.1}$$

where $\overline{r}$ is the long run equilibrium nominal rate, π_{t+n} is the rate of inflation between periods t and $t + n$, y_t is real output, and π^* and y_t^* are respective bliss points for inflation and output. y_t^* is given by potential output, defined as the level that would arise if wages and prices were perfectly flexible. E is the expectation operator and Ω_t is the information available to the central bank at the time it sets interest rates. Equation (2.1) implies that the short term interest rate adjusts in response to deviations of inflation from target, as well as in response to deviations of output from the flexible price level of output.

The nominal interest rate equilibrium level is defined as:

$$\overline{r} = \overline{rr} + \pi^* \tag{2.2}$$

and

$$rr_t = r_t - E(\pi_{t+n}|\Omega_t)$$

where rr_t is the real interest rate. If we combine these equations we obtain:

$$rr_t^* = \overline{rr} + (\beta - 1) \left[E(\pi_{t+n}|\Omega_t) - \pi^* \right] + \gamma \left[E(y_t|\Omega_t) - y_t^* \right] \tag{2.3}$$

where $\overline{rr}$ is the long run equilibrium real rate of interest. According to equation (2.3), the target real rate adjusts relative to its natural rate in response to departures of either expected inflation or output from their respective targets. The magnitude of the parameter β is key to this analysis. If $\beta > 1$ the target real rate adjusts to stabilize inflation. With $\beta < 1$, the monetary policy will instead accommodate changes in inflation: even if the central bank raises the nominal rate in response to an expected rise in inflation, for example, it does not increase it sufficiently to keep the real rate from declining. The estimated magnitude of the parameter β provides an important yardstick for evaluating a central bank's policy rule.

This target policy is a generalization of the type of the simple interest rate rule proposed by Taylor (1993) and Henderson and McKibbon (1993) among others. This rule, has the central bank respond to lagged inflation as opposed to

expected future inflation. The specification in Clarida, Gali and Gertler (1997) however, nests the "Taylor" rule: if either lagged inflation or a linear combination of lagged inflation and the output gap provides a sufficient statistic for inflation, then the specification reduces to the simple Taylor rule. The general specification has several virtues: (i) by explicitly incorporating expected inflation makes it easier to disentangle the link between the estimated coefficients and central bank objectives and (ii) by having the central bank respond to forecasts of inflation and output, this general specification incorporates a realistic feature of policy-making according to which central banks consider a broad array of information.
A simple equation like (2.1), however, does not capture the tendency of central banks to smooth changes in interest rates[2]. In order to capture these factors, it is simply assumed that the actual rate partially adjusts to the target as follows:

$$r_t = (1-\rho)r_t^* + \rho r_{t-1} + \nu_t \tag{2.4}$$

where the parameter $\rho \in [0,1]$ captures the degree of interest rate smoothing, and ν_t is assumed to be serially uncorrelated. ν_t could reflect a pure random component to policy, or could arise because the central bank imperfectly forecasts idiosyncratic reserve demand, and for some reason, does not instantly supply reserves to offset the shock.

We can rewrite equation (2.1) in the following way:

$$r_t^* = \alpha + \beta E(\pi_{t+n}|\Omega_t) + \gamma E(x_t|\Omega_t) \tag{2.5}$$

$$\alpha \equiv \overline{r} - \beta\pi^*$$

$$x_t = y_t - y_t^*$$

Further, we can combine equations (2.4) and (2.5) to obtain:

$$r_t = (1-\rho)\left\{\alpha + \beta E(\pi_{t+n}|\Omega_t) + \gamma E(x_t|\Omega_t)\right\} + \rho r_{t-1} + \nu_t \tag{2.6}$$

Finally, we eliminate the unobserved forecast variables from this expression by rewriting the policy rule in terms of realized variables as follows:

$$r_t = (1-\rho)\alpha + (1-\rho)\beta\pi_{t+n} + (1-\rho)\gamma x_t + \rho r_{t-1} + \varepsilon_t \tag{2.7}$$

[2] See e.g. Goodfriend (1991).

where the error term ε_t depends on ν_t and the forecast errors of inflation and output gap:

$$\varepsilon_t = -(1-\rho)\left\{\beta\left[\pi_{t+n} - E(\pi_{t+n}|\Omega_t)\right] + \gamma\left[x_t - E(x_t|\Omega_t)\right]\right\} + \nu_t \tag{2.8}$$

Given that we assume rational expectations, we know that the forecast errors will be uncorrelated with any information at time t. Hence we can define u_t as a collection of variables observable to the central bank at t, but orthogonal to ν_t[3]. Possible elements of u_t include any lagged variables that help forecast inflation and output, as well as any contemporaneous variables that are uncorrelated with the current interest rate shock ν_t.Then, since $E(\varepsilon_t|u_t) = 0$, equation (2.7) implies the following set of orthogonality conditions that will be used for estimation:

$$E\left[r_t - (1-\rho)\alpha - (1-\rho)\beta\pi_{t+n} - (1-\rho)\gamma x_t - \rho r_{t-1}|u_t\right] = 0 \tag{2.9}$$

To estimate the parameter vector $[\beta, \gamma, \rho, \alpha]$ I use generalized method of moments[4]. In the baseline case the instrument set u_t includes lagged values of output, inflation, interest rates, and the change of the log of the real exchange rate. Each of these variables is potentially useful for forecasting inflation and output and is exogenous with respect to the interest rate shock, given our identifying assumptions. Since the potential instrument set, and hence the number of orthogonality conditions, exceeds the parameter vector, the model is overidentified, in which case it is straightforward to test the over-identifying restrictrions (Hansen (1982)). Under the null hypothesis of this test, the central bank adjusts the interest rate each period so that (2.6) holds, with the expectations on the right hand side based on all the relevant information available to policymakers at that time. Under the assumptions of the model, this implies the existence of values for $[\beta, \gamma, \rho, \alpha]$ such that the implied residual ε_t is orthogonal to the variables in the information set

[3] The econometric approach relies on the assumption that, within the short sample, short term interest rates and inflation are I(0). Standard Dickey-Fuller and Phillips-Perron tests of the null that the short term interest rate is I(1) are rejected in favor of the alternative of stationarity. In the case of the inflation rate there is less evidence against the null that this series is I(1). However, we know that the Dickey-Fuller test has low power against the alternative of stationarity for short samples, which is our case.

[4] The composite disturbance term of the model has an MA(n-1) structure (Hansen and Hodrick (1980)). In this case the GMM estimator of the parameter vector is a two-step nonlinear two-stage least squares estimator (Hansen (1982)) when the model is overidentified. In the first step, we use traditional non-linear two-stage least squares to obtain an initial estimate of the parameters. Then these initial parameter estimates are used to construct an optimal weighting matrix.

Ω_t. Under the alternative, however, the central bank adjusts the interest rate in response to changes in some current and/or lagged variables, but not necessarily in connection with the information that those changes contain about future inflation and output. In this case, some relevant "explanatory variables" might have been omitted from the interest rate equation (2.7). To the extent that some of those variables are correlated with u_t, the set of orthogonality conditions will be violated, which would lead to a statistical rejection of the model.

Using the parameter estimates of α and β, it is possible to recover an estimate of the central bank's target inflation rate π^*. While we cannot separately identify π^* and $\overline{rr}$, the model provides a relation between the two variables that is conditional on α and β. Given that $\alpha \equiv \overline{r} - \beta\pi^*$ and $\overline{r} = \overline{rr} + \pi^*$, $\alpha \equiv \overline{rr} + (1-\beta)\pi^*$ which implies:

$$\pi^* = \frac{\overline{rr} - \alpha}{\beta - 1} \tag{2.10}$$

The sample average real rate can be used to provide an estimate of $\overline{rr}$. Then it is possible to construct an estimate of π^* .

For the Central Bank of Colombia I estimate the baseline specification for the period for which there was at least some degree of autonomy over domestic monetary policy. It is possible that there may be other important factors that influence interest rate setting besides those captured in the baseline model as I discussed in the introduction. In this case, while the Central Bank did not completely sacrifice monetary control, it may have pursued policies to maintain exchange rates within reasonable bounds. Exchange rates may thus have influenced policy, independently of the information they contain about inflation and output. In addition, it is possible that the Central Bank could have paid attention to monetary aggregates. To account for these possibilities I consider a number of simple alternatives to the baseline policy. Let z_t denote a variable besides inflation and output that may potentially influence rate setting (independently of its use for forecasting). For each alternative specification, we then replace the relation for the target given by equation (2.5) with the following

$$r_t^* = \alpha + \beta E(\pi_{t+n}|\Omega_t) + \gamma E(x_t|\Omega_t) + \xi E[z_t|\Omega_t] \tag{2.11}$$

The alternative specification is estimated in the same fashion as the baseline, except that the parameter vector is expanded to include the coefficient ξ on the additional variable z_t, and expand our instrument list to include lagged values of that variable. After doing so, it is straightforward to evaluate the quantitative importance of z_t on policy. The variables I consider include: real exchange rate, money supply and lagged inflation. By including the latter I obtain a direct test of the forward looking specification of the policy rule versus the "backward looking" specification of the Taylor rule.

In estimating (2.9) or alternatively the set of orthogonality conditions implied by (2.11) I consider the horizon of the inflation forecast that enters the reaction function as being one year, i.e. $n = 12$. According to Clarida, Gali and Gertler (1997), it is reasonable to believe that policy-makers are unconcerned about the month to month variation in inflation and instead are more concerned about medium and longer term trends. Hence, a year ahead forecast seems to be a good indicator of a medium term trend in inflation.

3. Monetary Policy Rules for Colombia after 1991

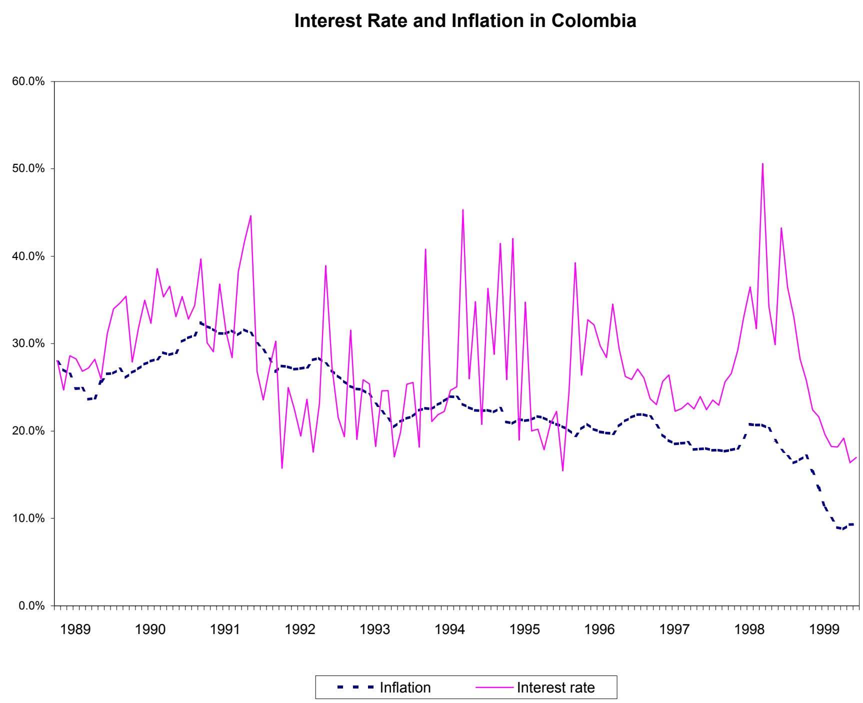
I now proceed to estimate a monetary policy reaction function for the Central Bank of Colombia. The bank has been virtually autonomous over its domestic monetary policy since 1991 when the new political constitution declared complete autonomy of the Central Bank and gave them the unique objective of controlling inflation. Given that the country used an exchange rate band during most of this period, the baseline specification according to which policy responds purely to domestic macroeconomic conditions has to be interpreted with caution. Furthermore, an alternative specification that includes the real exchange rate as an additional determinant of the short term interest rate might be more relevant to a country that faced this type of external constraints[5].

Figure 1 plots the rate of consumer price inflation and the short term interest rate (the inter-bank lending rate) for the period between 1989 and 1999. Note first the high and persistent rate of inflation for the first part of the period, with rates even above 30% at the end of 1990 and beginning of 1991. In 1992 we can observe a clear pattern of disinflation up to 1999 when the inflation rate was around 9.2%.

On the other hand, we can observe a change in the pattern of behavior of short term interest rate that occurs roughly around 1993. Prior to this date, the central bank kept short term interest rate at or below the rate of inflation. Real short term

[5] Clavijo (2002) mentions that the inclusion of the real exchange rate in a Taylor rule is not the best approach to follow given the problems associated to the uncertainty of the long-term purchasing power parity. Instead, he uses the (unconvered) interest rate parity condition and argues that its effect on net international reserves translates into changes in the relation between monetary aggregates and domestic interest rates.

rates accordingly hovered around zero and below. During 1992 and 1993 however, real as well as nominal short term rates moved up significantly. What can be key is not exactly the secular behavior of short term rates, but rather a sort of co-movement with inflation that we can observe during this period. One possible explanation that can arise is that the Central Bank shifted the monetary policy to raise short term real rates to offset inflationary pressures. This conjecture is investigated formally by estimating the policy reaction function described in section 2.



The starting date for the estimations is September 1991. In July 7^{th} 1991 the new political constitution was signed. Since that day, the Central Bank has been autonomous to conduct monetary policy in the country. Nevertheless I allow for a two-month adjustment in which the institutions restructured according to their new functions and objectives. For this reason the sample starts in September 1991 and ends in August 1999 which is the last available data. I use the consumer price index to measure inflation and an index of industrial production to measure output. To obtain a measure of the output gap, I detrend the log of industrial production using a quadratic trend. The interest rate is the interbank lending rate[6].

I first estimate the baseline specification for policy, given by equation (2.6). The instrument set includes 1-6, 9, 12 lagged values of: the output gap y_t, inflation π_t, the interbank lending rate r_t and the log difference of the real exchange rate, q_t.

The top line of Table 1 reports the results for the baseline specification. The key result is the estimate of the coefficient on the inflation gap, β : 1.34 with a standard error of 0.18. A rise in expected annual inflation of one percent induces the Central Bank to raise real rates by 34 basis points. Because β is significantly greater than one, the prediction that the Central Bank raises real rates in response to inflationary pressures is statistically significant.

Another interesting result is that the estimate of the coefficient on the output gap is positive and also statistically significant: 0.19 with a standard error of 0.06. Thus, holding constant expected inflation, a one percent rise in the output gap induces the Central Bank to increase nominal (and thus real) rates by 19 basis points. The GMM estimation procedure yields (asymptotically) correct standard errors, and thus allows to confirm the statistical significance results. Finally, the J-statistic implies that we do not reject the overidentifying restrictions of the baseline model. These results are in clear contrast with those reported by Clavijo (2002). According to the author, estimates of the Taylor rule are not satisfactory with both, monetary and output gaps, turning out insignificant and with unexpected signs. Only the interest rate parity condition appears to be significant. These results, however, must be interpreted carefully given that as can be observed from equation (2.7), the error term ε_t depends on ν_t (interest rate shock) and the forecast errors of inflation and output gap. This means that ordinary least squares estimates of the Taylor equation are inconsistent.

The sample average real rate -which I take as the estimate of the long run real rate- is 4.55. Using this estimate, I obtain an estimate of the long run inflation target, π^* of 11.4 which roughly corresponds to the average of annual objectives set by the Central Bank since the date in which it is considered independent which equals approximately 13%.

Next, I consider alternatives to the baseline specification. First, I allow lagged inflation to enter the reaction function, along with expected inflation and output.

[6]It is worth mentioning, however, that starting in 1995 the repo-rate was instituted as one of the main instruments of monetary policy.

Central Bank Reaction Functions

	ß	γ	ρ	α	ξ
Baseline	1.34	0.19	0.10	0.59	---
	(0.18)	(0.06)	(0.06)	(0.07)	
Adding:					
Lagged Inflation[1]	1.14	0.08	0.005	-0.41	-0.32
	(0.23)	(0.04)	(0.02)	(0.04)	(0.27)
Money Supply[2]	1.24	0.10	0.06	-0.53	-0.35
	(0.15)	(0.04)	(0.05)	(0.06)	(0.18)
Real Exchange Rate[3]	1.44	0.24	0.11	-0.34	0.002
	(0.17)	(0.03)	(0.05)	(0.04)	(0.00)

Test of Overidentifying Restrictions for:

Baseline Specification	J = 23.1 with p-value = 0.844
Specification 1	J = 24.2 with p-value = 0.933
Specification 2	J = 27.3 with p-value = 0.949
Specification 3	J = 27.2 with p-value = 0.921

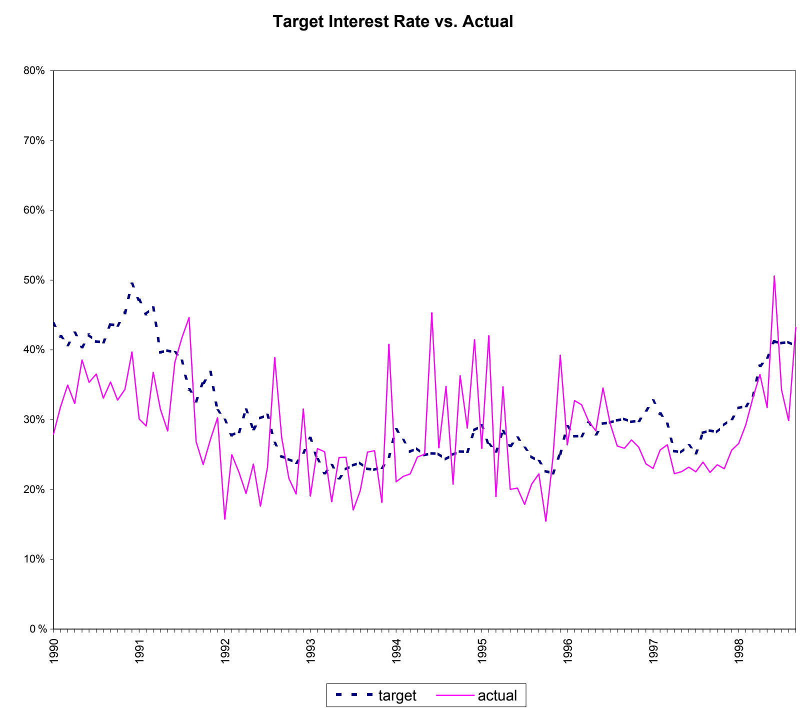
The sample is 1991:9 - 1999:8.The instruments are $y_{t-1} \ldots y_{t-6}, y_{t-9}, y_{t-12}, p_{t-1} \ldots p_{t-6}, p_{t-9}, p_{t-12}, r_{t-1} \ldots r_{t-6}, r_{t-9}, r_{t-12}, z_{t-1} \ldots z_{t-6}, z_{t-9}, z_{t-12}, q_{t-1} \ldots q_{t-6}, q_{t-9}, q_{t-12}$ where q is the change in the log of the real exchange rate. Estimates are obtained by GMM with correction for MA(12) auto-correlation. Optimal weighting matrix obtained from first step two-stage least squares parameter estimates.

1. p_{t-12}
2. *M1* money growth over last 3 months.
3. Lagged levels of real exchange rate also included in instrument list.

Lagged inflation is not statistically significant and the point estimate for the associated coefficient has the wrong sign. Furthermore, this alternative specification does not perceptibly change the estimate of the coefficient β although the estimate of γ is reduced to half. Taken together, the results suggest that the backward-looking specification can be rejected in favor of the forward -looking one.

The money supply is also unimportant. In this case, I include an average of the past three months money (M1) growth in the reaction function. The variable is not significant at the 5 percent level. The other key coefficients in the reaction function are virtually unchanged.

Finally I consider the level of the real exchange rate as an external constraint to monetary policy. Each variable does enter significantly and with the right sign, but the quantitative effect of the real exchange rate is considerably small. Once again, the estimates of the slope coefficients are virtually the same as in the baseline case. The results indicate that a 10 percent real depreciation induces a 2 basis point increase in the short term interest rate.



To gain some feel of how well does the baseline specification in explaining the behavior of the Central Bank, I plot the implied target rate versus the actual rate. I include 1990 in the sample just for comparison purposes. This means, that I compare the implied target using the post-1991 rule to the pre-1991 data as well as to the post-1991 data. This might give an idea of the policy shift after independence was granted to the bank. Figure 2 shows these results.[7] We can observe, that starting in 1992 the target rate implied by the estimated model nicely tracks the behavior of actual rates in Colombia. We can observe, still, temporary deviations. Note for example that for most of 1997 the target rate is above the actual. During this year the exchange rate remained for most of the time at the bottom of the band, hence it is possible that the Central Bank did not need to be as tight. The comparison with pre-1991 is clear. The post-1991 rule implies a target rate much higher than the actual rate.

4. Concluding Remarks

The results presented above show that since 1991 the Colombian Central Bank has pursued what can be called a "soft-hearted" inflation targeting: In response to a rise in expected inflation relative to target, the Central Bank raises nominal rates sufficiently to push up real rates. This behavior is statistically significant and quantitatively important. However, there is a modest pure stabilization component to the rule, holding constant expected inflation, the Central Bank adjusts rates in response to the position of output relative to trend, but not by a significant amount. The primary focus of monetary policy appears to be on inflation. When including the real exchange rate in the specification, the coefficient turns out to be significant but quantitatively small. The inclusion of this variable, does not change the other slopes considerably.

This kind of simple rule appears to set the economy on a course for stable long term inflation using relatively little knowledge about the economy. Because the rule is simple for the private sector, it is conducive to building and maintaining credibility.

On the other hand, even with the existence of the exchange rate band, it can be said that the Central Bank still had scope for independent movements in the target interest rate, so long as the exchange rate was not right at either edge of the band. In the cases in which the exchange rate was at the bottom edge of the band, the bank could loosen its policy temporarily.

[7] Note that I use the target rate as opposed to the fitted rate (which would include the lagged interest rate).

References

[1] Ball, L., "Efficient Rules for Monetary Stability", NBER W.P. #5952, March, 1997.

[2] Clarida, Richard, Jordi Gali and Mark Gertler, forthcoming, "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory", *Quarterly Journal of Economics.*

[3] Clarida, Richard, Jordi Gali and Mark Gertler, 1998, "Monetary Policy Rules in Practice: Some International Evidence", *European Economic Review*, June.

[4] Clavijo, S., 2002, "Monetary and Exchange Rate Policies in Colombia: Progress and Challenges (1991-2002)", Manuscript, Banco de la República, Bogotá, Colombia.

[5] Goodfriend, M. "Interest Rate Smoothing and the Conduct of Monetary Policy", Carnegie-Rochester Conference on Public Policy, Spring 1991, pp. 7-30.

[6] Hansen, L., "Large Sample Properties of Generalized Method of Moments Estimators", *Econometrica*, 50, 1982, 1029-1054.

[7] Hansen, L. and R. Hodrick, "Forward Exhange Rates as Optimal Predictors of Future Spot Rates", *Journal of Political Economy* 88, October 1980, pp.829-853.

[8] Henderson D. and W. McKibbon, "An Assessment of Some Basic Monetary Policy Regime Pairs", Chapter 2 in Evaluating Policy Regimes: New Research in Macroeconomics, R. Bryant, ed. Washington: Brookings, 1993.

[9] King, M, "How Should Central Banks Reduce Inflation? Conceptual Issues", in Achieving Price Stability, Kansas City: Federal Bank of Cansas City, 1996.

[10] Obstfeld M. and K. Rogoff, "The Mirage of Fixed Exchange Rates", Journal of Economic Perspectives, (4) Fall 1995, 75-96.

[11] Svensson, L., "Inflation Forecast Targeting: Implementing and Monitoring Inflation Tragets", NBER W.P.#5797, October 1996.

[12] Taylor, J., "Discretion Versus Policy Rules in Practice", Carnegie-Rochester Conference on Public Policy, 1993, 39, 195-214.

[13] Uribe, J., J. Gómez and H. Vargas, 1999, "Strategic and Operational Issues in Adopting Inflation Targeting in Colombia", Manuscript, Banco de la República, Bogotá, Colombia.