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Monetary and Exchange Rate Policies in
Colombia: Progress and Challenges

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Abstract

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This paper focuses on monetary and exchange rate policies in Colombia, with particular emphasis on the period 1999–2002, when flotation of the peso and inflation targeting were adopted. We argue, first, in favor of adopting "operational inflation target ranges" and, second, in favor of strengthening the current scheme of foreign exchange options. The impact of reductions in the reference rates of the Central Bank of Colombia is also assessed. We find that a lower central bank policy interest rate is likely to affect demand only if mortgage refinancing takes place. We present preliminary estimates of Taylor rules in an open-economy framework for Colombia.

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I. INTRODUCTION

Although macroeconomic performance in Colombia is not yet fully satisfactory (low inflation but high unemployment and slow growth), there was significant progress in the implementation of monetary and exchange rate policies over the years 1999–2002. The peso was floated in September 1999 as a result of the Asian, Russian, and Brazilian crises. Likewise, formal "inflation targeting" was announced in October 2000. Since then, the stance of monetary policy has been increasingly transmitted through the "central interest rate" (repo rate) of the Banco de la República (BR), managed by the Board of Directors, within a framework of "lombard rates."

These changes have permitted the consolidation of the trinity framework in which monetary policy can work well in the long run: (i) a flexible exchange rate; (ii) inflation targeting; and (iii) a monetary policy rule (Taylor, 2001, p. 263). To be sure, this framework has allowed annual inflation to stabilize at around 7 percent, completing four consecutive years of single-digit inflation in Colombia. This is certainly a remarkable performance for a country that had the most persistent moderate inflation over the previous three decades, when consumer price index (CPI) inflation averaged 22 percent a year (Dornbusch and Fischer, 1991). It should also be noted that the flexibility of the exchange rate allowed Colombia to overcome the external crises brought about by a marked deterioration of the terms of trade during 1998–99. The real exchange rate depreciated by about 15–20 percent in real effective terms over the period 1999–2002.

On the financial front, it is worth highlighting that the availability of "last-resort" money from the central bank helped avoid contagion of the financial system when the housing crisis exploded in 1998. However, it has been estimated that funding this financial crisis might demand 4–6 percent of GDP of quasi-fiscal resources over the period 1998–2007.

One striking feature of the new monetary policy being implemented in Colombia has to do with the overall assessment of the macro picture that takes place before a change in the monetary stance is considered. By contrast, during the 1980s and a good part of the 1990s, the prevailing outcome was dictated by the position of the monetary aggregates with respect to pre-determined monetary targets, sometimes applied to the monetary base and at other times to broader aggregates.

In fact, the constitutional mandate of the BR has a hierarchical character: to pursue low and stable inflation, but to do so in line with the government development plan, which obviously targets high growth and low unemployment. In this sense, this is a natural result of the central bank pursuing a more holistic approach to monetary and exchange rate policies. As I have argued (Clavijo, 2000a), the adoption of "inflation targeting" is consistent with such a mandate. Put differently, the BR has only instrumental independence, but it is committed to a strict rule of achieving disinflation over the medium term on the basis of sustainable real growth.

This disinflation has taken place while Colombia has faced prolonged international turbulence. In fact, during the 1998–2001 period, it faced two international crises: the Southeast Asian crises during 1997–98, with contagion effects affecting Russia and other emerging markets; and the world economic slowdown of 2001 and early 2002, including the terrorist attacks of September 11, 2001 and the implosion of the currency-board regime in Argentina.

Additional financial stress was generated in Colombia by the mismanagement of public banks and the asset-price inflation during 1993–97. An economic emergency was declared in November 1998 to permit the authorities to tackle these problems, resulting in the closure of some public banks and the adoption of a moderate financial-transaction tax (initially 0.2 percent, with an increase to 0.3 percent in January 2000). This tax has generated about 0.7 percent of GDP in public revenues but also has inhibited financial intermediation. Demand for cash has increased significantly as a way to avoid this tax, altering the monetary base's composition and the historical behavior of monetary aggregates. Partial tax exemptions have motivated additional financial innovations, which have all rendered monetary aggregates a poor guide for implementing monetary policy.

In this difficult context, the progress achieved by the BR in maintaining relative stability of the real exchange rate (while floating the peso against the dollar) and reducing inflation within the framework of "inflation targeting" is quite surprising. This paper is devoted to the analysis of monetary and exchange rate policies in Colombia, with particular emphasis on the period 1999–2002. It will argue, first, in favor of adopting "operational inflation target ranges," now that inflation has been brought down to single digits over the last four years, and, second, in favor of strengthening the current scheme of foreign exchange "options" as a way to better confront turbulence in the international capital markets. The impact of reductions in the reference rates of the Central Bank of Colombia is also assessed. I found that it will only be significant if household expenses rise as mortgages are refinanced at lower interest rates.

Section II provides a brief macroeconomic assessment in terms of inflation, unemployment, and growth, in which it will become evident that results have been far from satisfactory, since disinflation has occurred in an environment of low growth and high unemployment rates. The paper also presents the outcome of some macro variables in terms of the Extended Fund Facility (EFF) program that Colombia agreed with the IMF for the years 1999–2002. In early 2003, a new two-year IMF-Stand-By Arrangement was reached. Section III discusses monetary and exchange rate issues, and Section IV presents a comparison of the BR and the Federal Reserve System of the United States (Fed), in terms of institutions and operational issues. Section V will address the issue of Taylor rules in an open-economy framework, presenting preliminary estimates for Colombia. Section VI provides some concluding remarks.

II. MACROECONOMIC PERFORMANCE OF COLOMBIAN ECONOMY

A. Inflation, Growth, and Unemployment

Let us define "macroeconomic suffering" in terms of a simple index: (Inflation + Unemployment) – (Economic Growth), which is a variation of "Arthur Okun´s immiserising index" (Clavijo, 2000a). Table 1 shows that average annual inflation hovered around 22–24 percent over the years 1975–97, while falling to 10.6 percent during 1998–2002. Note that the later figure is similar to the average of 12 percent registered over the "golden years" of the Colombian economy (1967–74). Unfortunately, this rapid disinflation was produced by, first, a weakening of the domestic aggregate demand since 1997 and, secondly, by a structural deterioration of the Colombian economy due to high indebtedness and the aggravation of the internal conflict.

This situation exacerbated unemployment, which averaged 18 percent in urban areas in recent years (and 15 percent nation-wide). Different studies show that the nonaccelerating inflation rate of unemployment (NAIRU) for Colombia has been around 10 percent. Hence, as aggregate demand grew weaker, the unemployment rate escalated and produced what has been termed an "opportunistic disinflation" (Clavijo, 2000a). However, there have been several episodes of financial and wage disindexation in Colombia, which permit us to be relatively optimistic about being able to maintain one-digit-inflation whenever aggregate demand recovers in the near future. This was also the case of United Kingdom, Israel, and Ireland, among others (Haldane, 1999).

The sum of inflation and unemployment (Okun´s immiserising index) averaged 34 percent during 1975–97. In spite of the rapid disinflation, this sum only declined to 29 percent in the period 1998–2002. When adding the effect of economic growth, which on average was nil in recent years, we find that our "suffering index" has been stranded at 28–31 percent over the last three decades (see Table 1). Note that this figure is twice the average observed over 1967–74, when the economy experienced export-led growth.

Table 1. Inflation, Unemployment, and Growth in Colombia

Periods	Inflation (CPI-Average) (1)	Unemployment (Main Cities) (2)	Growth (Real-GDP) (3)	Index of Macroeconomic Suffering (4)=(1)+(2)-(3)
1967–1974	12.1	9.9	6.2	15.8
1975–1981	24.7	9.5	4.5	29.6
1982–1989	22.6	11.7	3.5	30.9
1990–1997	24.0	10.1	4.0	30.0
1998–2002	10.6	18.1	0.5	28.3

Source: Banco de la República.

In short, the aggregate macroeconomic performance of inflation, unemployment, and growth has been poor over the years 1998–2002. In spite of a rapid disinflation process, high unemployment and low growth account for a relatively high index of macroeconomic suffering. However, this episode of "opportunistic dis-inflation" should be taken as a chance for reducing financial and wage indexation, so that a recovery of aggregate demand could take place in an environment of stable and low inflation.

B. The EFF Program with the IMF, 1999–2002

Table 2 reports the main macrovariables under surveillance (some of them constituted performance-criteria) within the IMF program and their results. It can readily be seen that the consolidated fiscal deficit reported slight overperformance during the years 1999–2000 (in the amounts of 0.2–0.5 percent of GDP). There was also significant overperformance in the current account of the balance of payments (0.7–1.9 percent of GDP), due to the decline in local aggregate demand and improved terms of trade (with an increase of 20 percent over 1999–2000). Real growth, however, under performed (by 0.7 percent in 1999 and 0.3 percent in 2000).

Table 2. Targets and Results under the Extended Fund Facility Program with Colombia

	1999	2000	2001	2002
(In percent of GDP)				
Consolidated fiscal deficit (-)				
Target	-6.0	-3.6	-2.9	-2.6
Result	-5.5	-3.4	-3.2	-4.0
Overperformance (+)	+0.5	+0.2	-0.3	-1.4
External deficit (-)				
Target	-1.3	-2.4	-1.8	-3.2
Result	0.6	0.5	-1.9	-1.7
Overperformance (+)	+0.7	+1.9	-0.1	+1.5
(Annual percentage change)				
Real growth				
Target	-3.5	3.0	3.8	3.0
Result	-4.2	2.7	1.6	1.7
Overperformance (+)	-0.7	-0.3	-2.2	-1.3
Inflation				
Target	15.0	10.0	8.0	6.0
Result	9.2	8.8	7.7	7.0
Overperformance (+):	+5.8	+1.2	+0.3	-1.0

Sources: IMF (2002a,b); and Banco de la República.

With respect to inflation, the 1999 target of 15 percent was over performed in as much as 5.8 percentage points and the 2000 target of 10 percent by 1.2 percentage points. Then, the disinflation was faster than expected by almost 7 percentage points in two years or 47 percent of the original 1999 target.

As mentioned, this overperformance of 1999–2000 is explained mainly by the weaknesses in local aggregate demand. In fact, note that inflation was brought down by 1.1 percent during 2001 (from 8.8 percent down to 7.7 percent), while growth descended two-full percentage points from the expected value (from 3.8 percent down to 1.8 percent). During 2002 the 6 percent target was missed by a 1 percentage point due mainly to weather factors that increased crop-prices temporarily. Nevertheless, nonfood inflation closed at 5.3 percent, below the target for headline inflation.

Since single-digit inflation targets imply higher outcome uncertainty in presence of supply shocks, there now exists an advantage in moving from point-targets to range-targets. In fact, it had been agreed with the IMF that deviations of +/- 2 percent from the inflation target would be allowed to accommodate such shocks. BR had also set up a range target of 5–6 percent for 2003 and 3.5–5.5 percent for 2004, announced with the explicit purpose of anchoring inflation expectations. Adopting range targets will certainly have important policy implications, both at the level of the technical staff and at Board decisions.

Summarizing, the Board of Directors of the BR has moved from setting inflation point targets during the period 1991–2002 to setting range targets for the years 2003 and 2004. This is compatible with the framework of inflation targeting and the operational ranges that have allowed deviations of +/- 2 percent since 2001, within the IMF program. Furthermore, since uncertainty increases as inflation converges to the long-term value of 3 percent per-annum adopted by the BR, excessive disinflation, as occurred during 1999–2000, should be avoided.

III. THE NEW MONETARY POLICY AND EXCHANGE RATE FLEXIBILITY

A. Elements of the New Monetary Policy

Colombia's formal adoption of inflation targeting, since October 2000 (Banco de la República, 2000; Uribe, Gómez, and Vargas, 1999), has represented four main changes:

(a) Announcing multi-annual inflation targets, with the aim of leading expected inflation and expected nominal depreciation of the peso with respect to the dollar.

(b) Global assessment of the macroeconomic variables, with special attention being provided to the real sector and the solvency of the financial sector. In the former case, the credit transmission mechanism has been carefully assessed (through the repo rate) and in the latter case the liquidity access has been enhanced by linking the "lombard rates" with the "penalty rate" (in cases of requiring access to the discount window).

Put differently, new information besides monetary aggregates is being used extensively. In order to alter the monetary stance, the Board of the BR analyzes the output gap and assesses demand pressures. This information is used to forecast inflation 6, 12, and 18 months ahead. These results are further tested against possible trends of monetary aggregates, which are used as "lines of reference" for the monetary aggregates, not as intermediate targets. In my view, even these "lines of references" are of scant use for the BR watchers due to the continuous appearance of financial innovations, as occurred in the late 1980s (Clavijo, 1991). As a consequence, the exercise of forecasting monetary aggregates should be used only for internal purposes of the Central Bank and not as a tool for molding inflationary expectations.

(c) Signaling via interest rates. Since late 2000, the Board of the BR has also concentrated on transmitting the stance of the monetary policy through the central bank repo rate, which in turn guides the interbank rate.

The repo rate and the structure of lombard rates is now preferred as the instrument to communicate the desired stance of the monetary policy in Colombia. This procedure is very much in line with the current practice in the United States through the use of the Federal Funds Rate (FFR) and the discount window. In fact, starting in June 2000 the Fed ceased announcing any monetary aggregate forecast, due to the expiration of the Humphrey-Hawkins Act, dating from 1978 (Board of Governors (2000 p. 2) and Meyer (2001a p.7–9)). Likewise, the Central Bank of Chile now concentrates on signaling the stance of the monetary policy through their repo rate (now in nominal terms), especially after adopting inflation targeting in 2000 and floating the peso against the dollar (García, et al, 2002).

It should be clarified that sometimes the stance of monetary policy could be altered without moving the repo rate, whenever the net asset position of the central bank is switched. For example, at the end of the year the BR usually is a net provider of resources, so the relevant rate for the market is the repo rate. However, in January the BR needs to contract the monetary base, so the relevant rate for the market turns out to be the reverse repo rate. On these occasions, it is crucial to transmit the proper message to the BR watchers.

The BR also uses a system of a ceiling lombard rate to establish the cost of accessing unlimited resources from the Central Bank, whenever the financial system experiences a fall of deposits or a floor lombard rate, to establish the highest remuneration for excess deposits left at the Central Bank. This is an alternative system to the discount window mechanism run by the Federal, which tends to diminish stigma problems (Hakkio and Sellon, 2000). In fact, the Fed announced in October 2002 the transformation of its discount window into a liquidity support mechanism by allowing solvent institutions to access resources at a modest penalty rate of about 100–150 basis points above the Federal Funds Rate (FFR), beginning in 2003.

This emphasis on transmitting the stance of the monetary policy via interest rates has permitted the establishment of semi-automatic mechanisms to compensate for changes in the composition of the monetary base. In early 2001, the BR created an Internal Operational Committee to deal with issues, very much in line with the daily practices of the New York

Federal Reserve Bank, compensating, for instance, movements in Treasury accounts (Edwards, 1997 p. 863).

(d) Foreign Exchange Options: "put" to increase net international reserves (NIR) and "call" to decrease them. Since late 1999 the system of "put" options has permitted to increase NIR and to stabilize the permanent component of the monetary base. This mechanism has provided some discretion to monetary policy, making it more powerful in the short term. In 2001, the BR also announced the mechanism of "call" options in order to deal with eventual problems of excessive exchange rate depreciation that might spill over into inflation. Under such circumstances the Board would approve auctions in order to offer dollars to the financial system, with the aim of temporarily reducing the pace of nominal depreciation and maintaining the inflation target. The auction system adopted in Colombia comprises all public entities (including the Treasury). Finally, there exists a mechanism to control excessive volatility, set at +/- 4 percent of the 20-day moving average of the spot rate.

Table 3 illustrates the rules established under the option system. Under the "put" option modality, designed to increase NIR, the BR has offered to buy between US$30–200 million per month (about 1 to 5 percent of the market). These options are triggered when the spot exchange rate is more appreciated than the 20-day moving average of the spot rate. The cumulative amount exercised under these options was US$1,400 million over the period 1999–2002, representing 11 percent of the NIR at end-2002. Note that this value is lower than the 35 percent of the NIR accumulated in Mexico since 1995. Mexico suspended this mechanism back in August 2001, due to an apparent overaccumulation of NIR.

The "call" options system was first used in February of 2003, when the exchange rate was depreciating by nearly 30 percent annually, generating problems of pass-through that threatened the inflation target range of 5–6 percent for 2003. The simple announcement diminished the expected rate of nominal depreciation significantly. The amount offered for sale by the BR was US$200 million in the first month, out of a package of up to US$1 billion, consistent with the NIR targets established under the IMF-program. The options could be exercised when the spot exchange rate was more depreciated than the 20-day limit-moving around the spot rate.

The mechanism for controlling volatility was first used in 2001, but triggering conditions were not satisfied at that time. In 2002, the system was activated again, as volatility surpassed the 4 percent limit. On this occasion, the triggering conditions permitted the financial system to buy US$414 million from the BR (in several sessions) or about 3.8 percent of the NIR at end-2002.

Table 3. Foreign Exchange Options

(In millions of U.S. dollars; unless otherwise indicated)

I. "Put" Options to Buy Net International Reserves (NIR)

	Colombia (1999–2002)	Mexico (1995–2001)
Trigger rule	Spot < Spot(MA20Days)	Spot < Spot(MA20Days)
Amount offered per auction	30–200	250
Cumulative amount purchased	1,400	12,000
NIR	10,840	34,000
Amount purchased/NIR (percent)	11.3	35.0
NIR/amortization due (percent)	1.0	1.2

II. "Call" Options to Sell NIR

	Colombia (1999–2003)	Mexico (1995–2001)
Trigger rule	Spot > Spot(MA20Days)	--
Amount offered per auction	200 (or up to 1 billion)	--

III. Options to Control Volatility

	Colombia (1999–2002)	Mexico (1995–2001)
Trigger rule (percent)	Spot deviates by more than 4 percent from Spot(MA20Days)	Spot 2 percent more depreciated than Spot $_{t-1}$
Amount offered per auction	180	200
Cumulative amount purchased	414	1,950
Exercised options/NIR (percent)	3.8	5.7

Source: Author.

In spite of the gains in the efficacy of monetary policy in Colombia, there exists a high degree of fiscal dependency. With structural fiscal deficits running at 3 percent of GDP, the pressure to issue local public debt is high, driving up real domestic interest rates. Furthermore, the financial sector portfolio has increased mainly through more investments in

local treasury securities, which yielded 8 percent in real terms with no risk. Fortunately, during 2002 this condition began to change as financial credit grew in real terms for the first time in almost three years.

It is then crucial to break down this fiscal dependency to help credit flow to private investment. Otherwise, monetary policy will be facing serious impediments and growth will be hampered. The fiscal agenda has been well identified since the launch of the IMF program back in 1999, and luckily for Colombia great progress was made in late 2002 by approving the second generation of the pension reform, the labor reform, the state downsizing law, and a tax reform that imposed universal coverage for the VAT. The fiscal responsibility law was approved in 2003.

B. Central Bank's Signaling: From "Quantities" (1991–94) to "Prices" (1999–2002)

The operational practices of the BR in the early 1990s followed the model of the Bundesbank: monetary aggregates were set as intermediate targets with the aim of reaching a desired combination of inflation and growth, in line with the so-called "monetary nominalism" (Clavijo, 2000a).

By contrast, the Fed began to switch, as early as October of 1982, towards signaling the stance of monetary policy through their interest rate instruments, namely, the federal funds rate (FFR) and the discount window (DW) (Hafer (2001)). Furthermore, and in line with this practice, the Fed model has been correctly characterized as one that has evolved towards a "disguised inflation targeting" by the mid-1990s, disregarding almost completely the targeting of monetary aggregates (Mankiw, 2001 p. 51).

During the period 1995–99, the BR altered significantly its operational procedures and moved towards interest rates as the main instrument of monetary policy. Simultaneously, the exchange rate system was allowed more flexibility, by turning the "crawling peg" system into a "crawling band" system, ending finally with the flotation of the peso in September 1999. Turbulence and contagion stemming from the Asian, Russian, and Brazilian crises ended almost three decades of fixing the exchange rate in Colombia, generating a debate about the benefits of having moved at that speed towards flotation (Hernández and Florez, 2000; Clavijo, 2000a; Villar, 2001; Fernández, 2001).

The Board of the BR felt that most of the conditions for adopting inflation targeting were in place in late 2000 and moved accordingly. In my view, there has been a breakthrough in the way monetary policy is being conducted after floating the peso, not simply an enhancement of procedures (Hernández and Tolosa, 2001 p. 27). To be sure, the exogeneity of the monetary base has permitted not only to increase the permanent component of the base but to provide independence for the instrument of the interest rate. Now the task is to consolidate this trinity framework in which monetary policy can work well in the long run, under a: (i) a flexible exchange rate system; (ii) an inflation target scheme; and (iii) a monetary policy rule based on signaling the stance through the repo interest rate of the BR.

C. The Transmission Mechanism of Monetary Policy

Case of Colombia

It has been well documented that the central repo rate of the BR Granger-causes movements of market rates in Colombia, with particular strength since floating the peso (Julio, 2001). This is a necessary but not a sufficient condition for the BR to affect aggregate demand. We also need to establish the net position of households in order to gauge the impact of central bank's rates on their flow of funds. If such position is of net debtors, a reduction of the BR interest rate could increase the disposable income of households, as long as they also reduce mortgage rates. Most likely this, in turn, would propel consumption expenses and, consequently, real growth would increase in the short run.

But if households are net savers with respect to the financial system, a reduction of market rates, brought about by the BR, would reduce their financial income and then consumption and growth would decline. Most likely, countries with a relatively young age-structure would show that households are net debtors and mature economies would reveal households as net savers.

Gauging the net impact of a reduction of the BR rates in the case of Colombia requires the analysis of at least three elements:

(i) *The effect of a 1 percentage point reduction in the interest rate on the credit stock of the financial system.* Such stock amounted to nearly 26 percent of GDP by end-2002, where a 1 percent reduction in the average interest rate could represent about 0.27 percent of GDP. If this alleviation in servicing such debt could be translated into additional spending, real GDP growth could potentially experience an increase of the same magnitude. In fact, an estimate of the BR showed an impact of about this size, if the interest rate reduction included mortgages. This was the case over the period 1996–99 (Banco de la República, 2001).

(ii) *Assessing the effect of mortgage debt restructuring induced by BR interest rate reductions.* The above mentioned effect could only occur if mortgages were linked to floating rates. This was the case during the 1990s, when interest paid on mortgages was linked to a key nominal deposit interest rate plus a premium (which in Colombia fluctuated at around 8–10 percent). However, the new Housing Law 546 of 1999 ordered, following Constitutional Court mandates, to fix ex-ante the real interest rate for the life of the mortgage. As a result, the impact of a 1 percent reduction in market rates could not translate into a 0.27 percent boost for the GDP, but much less, depending on the extent of mortgage refinancing when interest rates decline. Under the current legislation, it is the responsibility of the market to encourage such refinancing at lower rates, but this would require more competition within the financial sector. Interestingly, pre-payments are now allowed without financial penalties and the recent creation of a securitization market should work in favor of recontracting. The development of a market for long-term public bonds (now extending to 7–10 years) should also help in building up a benchmark for recontracting mortgages, as currently occurs in the United States.

(iii) *Measuring the profitability of new investment projects, whenever interest rates are reduced.* Ex ante, it is quite difficult to gauge how many new projects would be undertaken if the central bank reduces interest rates. The credit mechanism, however, is crucial when assessing the marginal impact of easing the central bank's interest rates. Furthermore, this mechanism could also benefit public works, although in the case of Colombia the available room for increasing public investment is limited due to structural limitations in the budget.

Case of the United States

The classical mechanism for increasing aggregate demand in developed economies is through the liberalization of resources to spur consumption, while reducing mortgage obligations. During 2000–2002, the United States experienced a reduction in market rates of about 6 percent, induced by the 12 occasions on which the Fed reduced the Federal Funds Rate. It has been estimated that such reductions brought about a reduction in mortgage rates of about 2 percent in real terms, thanks to the broadest wave of pre-payments and refinancing in recent history (Bloomberg, 2001). In fact, the nominal interest rate of a typical 30-year mortgage credit was reduced from 8.7 percent down to 6.5 percent, while CPI inflation in the United States averaged 3 percent per annum.

These reductions in interest rates represented an increase in consumption of about US$150–200 per month for the average household. At the aggregate level it implied an increase of about 0.7 percent of GDP in two years. Note that this figure is of about the same magnitude as the one found for Colombia, before the Court ordered fixing the real interest rate in mortgage credits. It has been estimated that the United States economy grew at 2.4 percent in 2002, after growing only 1 percent in 2001. The monetary impulse, estimated at 0.7 percent of GDP, plus the fiscal impulse, in the range of 1–1.5 percent of GDP, certainly contributed to such a recovery.

Note that these figures do not take into account wealth effects stemming from higher housing prices. Recent local studies, however, revealed that a 10 percent increase in such prices over the years 1982–99 induced an increase in household consumption of about 0.6 percent of GDP or about double the traditional estimate of the wealth effect stemming from gains in stocks (Case, Quigley, and Shiller, 2001).

Lessons

In synthesis, we have argued that reductions in market interest rates brought about by actions of the central bank have important effects in spurring household consumption, especially when they also affect mortgage credits. For the United States, the mechanism is already embedded in the market by means of refinancing mortgages in a very dynamic market, while in the case of Colombia such a mechanism has been actually hampered by the Court decision that require mortgages to pay a fixed long-term real interest rate. The promotion of competition in the Colombian financial system so as to encourage mortgage recontracting is crucial. Otherwise, the average household would not benefit from real interest rate

reductions, brought about by actions from the central bank aiming at increasing private consumption in the short run.

IV. A BRIEF COMPARISON BETWEEN THE BANCO DE LA REPÚBLICA AND THE FED

To place in historical perspective the institutional and operational progress of these institutions, we now present a brief comparison. This exercise will allow us to further clarify why, in our view, the BR should evolve towards a system that, like that of the Fed, relies on the interest rates as the main instrument for transmitting the stance of the monetary policy.

A. Objectives of Monetary Policy

In the case of Colombia, the 1991 Constitution defined the central bank as an autonomous institution in charge of fighting inflation, but acting in conjunction with the agenda of the Executive Branch. Indirectly, then, the BR has to take into account the government's goals of promoting growth and generating employment. In this sense, the BR mandate is "hierarchical:" first, control inflation, but while taking into account the executive's goals of higher growth and employment (Table 4). Put differently, Colombia's central bank is not fully independent, but it is not subordinated to the government (Hernández, 1997 p. 87).

In the case of the Fed, the central bank's objectives are dual in terms of controlling inflation and promoting employment, especially after the 1946 and 1977 reforms (Meyer, 2001b). Furthermore, the Humphrey-Hawkins Act of 1978 included the promotion of economic growth as one of the objectives.

It is then clear that the BR and the Fed have only partial "political independence" (or so-called "instrument independence") but in neither case has the objective of controlling inflation been set aside from the events of the real sector (Grilli, Masciandaro, and Tobellini, 1991; Walsh, 1993). To this respect, it is useful to recall the statement of the New York Fed Chairman: "Central banks neither can nor should be fully independent of government, since it is governments—and not central banks—that hold final responsibility for the economic and financial policy of the country. Nevertheless, some degree of central bank independence is critical " (McDonough, 1999, p. 5).

Table 4. Banco de la República and Fed: A Brief Comparison

	Banco de la República (Colombia) BR	Federal Reserve Bank (U.S.A.) Fed
Objectives	Hierarchical: Inflation Control and Coordination with Government Macro Policies	Dual: Inflation Control and Generation of Employment
Board members	Seven (Including the Minister of Finance)	Twelve for the FOMC 1/ Seven for the "Discount Window"
Strategy	"Inflation Targeting" (Explicit)	"Inflation Targeting" (Implicit)
Monetary instruments Central: Reference rates Limiting rates	Repo and Reverse Repo Lombard Rates-Discount Window	Repo (Fed Funds Rate) Discount Window
Secondary: Aggregates	Monetary Corridors / Reference Lines (announced)	Banking Reserves (un-announced)
Support: Treasury	Semi-Automatic	Automatic
Exchange rates: Regime	Crawling Bands / Flotation	Flotation
Instruments	Options: "puts" and "calls"	Intervention thru Treasury
Operational procedures Board Meetings:	Weekly (Various Subjects) Monthly (Inflation)	Every Month and a half (Inflation; Eight Times a year)
Board announcements Board minutes: Transcriptions:	Immediate By Petition (referring to Resolutions) Confidential (for 3 years, if Resolutions)	Immediate Two Months (Excl. Sensitive Topics) Confidential (for 5 years)
Reports: To public To Congress	Monthly Per Term	Every Month and a half (Eight per year) Per Term
Role of staff	Active (recommends)	Passive (without recommendations)
Econometric models	Simple model of transmission mechanism	Integrated National / International model

Source: Banco de la República.

[1] FOMC denotes the Federal Open Market Committee.

B. Board Members

The issue of "one main objective" (fighting inflation), but mediated by the principle of "coordination" between the Minister of Finance and the Central Bank, ends up being consistent with the mixed structure of the Board of Directors of the BR, which includes seven members:

- The Minister of Finance (the chairman),
- Five full-time Directors, chosen by the President, of which two may be replaced every four years, with a maximum tenure of 12 years in the post, and
- The General Manager, who is elected by the Directors for periods of four years, up to a maximum of 12 years in the post.

Each member has one vote, with no veto power by the Chairman or tie-breaking vote by the General Manager. The Head of the Office of Bank Supervision, a governmental body with some autonomy, has voice but no vote in the Board meetings.

It has been claimed that the Minister of Finance has special power in that he chairs the Board (Alesina, Carrasquilla, and Steiner, 2001). In practice, his unique edge stems from the fact that the Board cannot be convened without his participation (or that of his Deputy, when the Minister cannot attend). However, there are clear provisions to avoid Board meeting delays for more than two weeks and any member of the Board can call for extraordinary meetings at any moment to address special issues. Board members decide the agenda and the staffs of the Central Banks and the Ministry work jointly on the technical issues (Clavijo, 2000b).

By contrast, decision making at the Fed has two areas. The first one deals with the Federal Funds Rate (FFR) at the level of the Federal Open Market Committee (FOMC), where votes are cast by the seven independent Governors (including the Chairman and the Vice-Chairman) and the five (out of 12) Presidents of the Federal Reserve Banks (where New York has a permanent seat). The second area is related to the discount window, which is usually set slightly below the FFR, by the seven Governors of the Fed. This will change slightly beginning in 2003 as the discount window transforms into a more agile mechanism for supplying liquidity into the system, although at a penalty rate with respect to the FFR.

C. Anti-Inflationary Policy

The BR gradually moved towards inflation targeting over the years 1997–99 and formally announced it in October 2000. Interestingly, the Fed has had a peculiar system since the early 1990s in which explicit targets are not announced. The Fed operates with a "disguised inflation target" of around 3 percent per year, making careful analysis about trends of "core inflation" (Mankiw, 2001). The Fed has no explicit commitments to the Executive Branch and the Budget does not present a guide for setting inflation targets. In general, there has been good communication between the Fed, the government, and Congress, although tension has built up on certain occasions (see Woodward, 2000).

D. Monetary and Exchange Rate Instruments

As mentioned, the BR and the Fed have "instrumental independence." The BR uses a system of a central repo rate to lead the interbank rate, where the lombard rates are used to control overflows of the financial system. The Fed uses the FFR and the discount window. In the case of BR there are semi-automatic mechanisms for compensating movements of the Treasury accounts, while in the Fed this occurs automatically on a daily basis.

Both central banks allow the flotation of their currencies, but in the case of Colombia the system is operated directly by the central bank's staff (including the system of "options," already explained), while in the case of the United States, the Treasury dictates the stance of the exchange rate policy, in conjunction with the Fed.

E.   Operational Issues

One important feature of inflation targeting is the dissemination of broad and prompt information to the markets to operate in a transparent environment (Debelle, et al 1998). Board meetings at the BR to analyze compliance with price targets and to decide on the stance of monetary policy take place once a month, while at the Fed these occur every month and a half. In both cases actions are announced immediately to the media (see Table 3).

However, minutes of the board are known only about two months later in the case of the Fed, excluding sensitive information. In Colombia, such minutes are provided only under certain conditions. Furthermore, transcriptions are provided on the relevant areas after three years in Colombia, while in the United States they remain confidential for up to five years. Both the BR and the Fed provide regular information about the state of the economy and report formally to Congress twice a year. (See Urrutia (2001) for details on Colombia and Lindsey (2000) for details on the United States.)

The possible effect of changes in the interest rates are analyzed by using econometric models. In the case of the BR they are based on the so-called model of the inflation transmission mechanism (Gómez and Julio, 2001; Charry and Gómez, 2001). This system is improved constantly to better capture the dynamics of international markets and the pass through of the exchange rate to prices. In the case of the Fed, they include sophisticated macro-models of both the local and the international markets. One important difference is the role of the staff: it is very active in the case of BR, with explicit recommendations on policy actions to the Board, while in the case of the Fed it has a passive attitude, avoiding a preference for a particular stance of monetary policy.

## V.   Reaction Functions and Taylor Rules

A.   Reading the Stance of Monetary Policy

The relationship between the nominal interest rate and the rate of growth of nominal GDP is sometimes used to decipher the stance of monetary policy. If the nominal interest rate exceeds the rate of growth of nominal GDP, one could infer that the position of the central bank is tight. In the case of Colombia, the years 1996 and again 1998–99 showed such a tight condition. However, during years 2001–2002 monetary policy was neutral, according to this measure.

Alternatively, one could judge the stance of monetary policy by directly computing the real cost of accessing resources from the Central Bank. Figure 1 illustrates the evolution of the

repo rate of the BR and the Federal Funds Rate (FFR), after discounting the effect of inflation. During the years 1995–98 the repo rate was reduced from 20 percent to 8 percent,

Figure 1. Real Interest Rates: Repo-Rate of the BR and Federal Funds Rate (FFR), 1995-2002
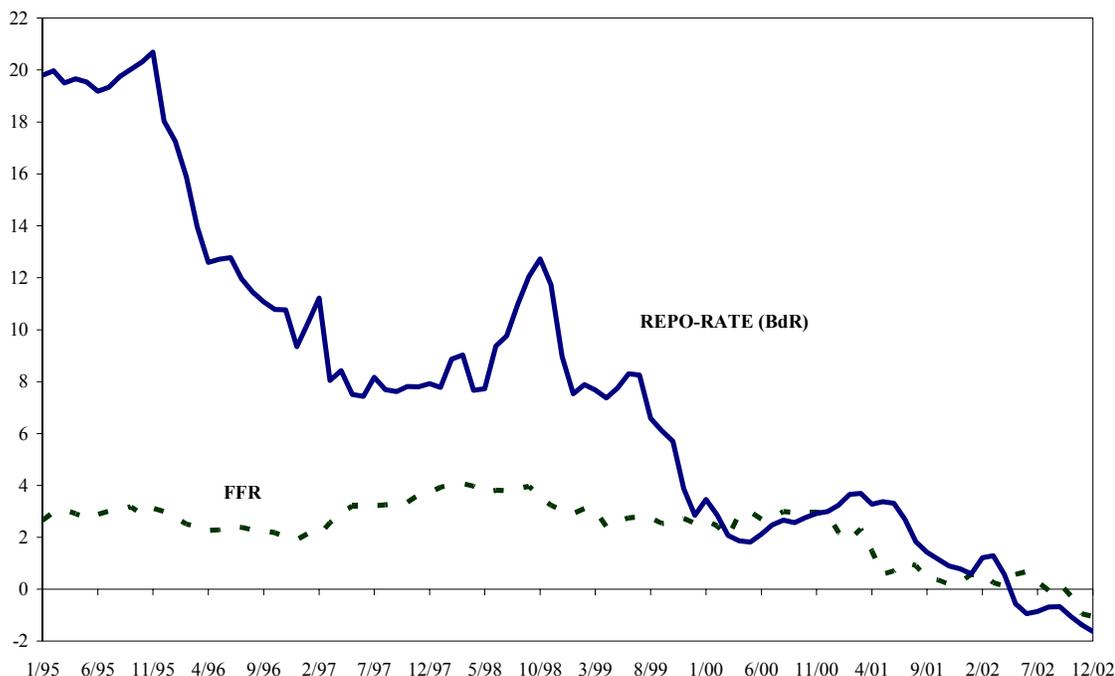
Source: Banco de la República.

showing clearly a relaxation of monetary conditions in Colombia. However, the contagion from the Asian-Brazilian crises forced the BR to increase it to 12 percent in mid-1998. After managing the crisis, by recurring to the flotation of the peso, the BR continued to relax monetary policy in light of clear weaknesses of the local aggregate demand. The real repo-rate has been close to zero since late 2001. In the case of the United States, the nominal FFR fluctuated between 4–6 percent and finally declined to 1.25 percent by end-2002. In real terms, the FFR hovered around 2–4 percent during 1998–2000, rapidly falling to negative figures since late 2001, when the impact of recession was evident, aggravated by the terrorist attacks of September 11.

B. Taylor Rules

Economic agents follow the actions of the central bank and try to come out with a "reaction function" of the central bank to economic events. Central bank reaction functions that are set up (implicit or explicitly) in terms of policy interest rates are known as Taylor Rules (1993). In fact, in the case of the federal funds rate (FFR), it has been shown that such a rule follows the criteria of:

(1) presenting a premium with respect to the long-term real interest rate;

(2) increasing whenever the inflation surpasses the long-term target set up by the FOMC; and

(3) increasing whenever real output surpasses potential output.

Table 5 shows a family of theoretical Taylor rules and their empirical counterparts for the FED. The basic Taylor rule postulated that the long-term real interest rate and long-term inflation rate converged to 2 percent, meaning ($r^* = \pi^* = 2$ percent). Then, short-term deviations of inflation with respect to such a value or deviations of output with respect to potential output, where $y = Y - Y^*$, called for increases of the FFR of about 1.5 percent and 0.5 percent, respectively.

The second line of Table 5 shows a generalized Taylor rule, where $k \equiv r^* - (g_\pi - 1)\,\pi^*$. Estimations for the 1987–96 period indicate that $k = 0.63$ and that inflation and product gaps closely follow the theoretical values mentioned above, since $g_\pi = 1.78$ and $g_y = 0.82$. However, when comparing these parameters with the implicit values derived from a Fed reaction function that contemplated dynamic effects (lines 3–5), it is clear that "observed" values represented "slow" actions, as if the Fed were too timid (Rudebusch, 2001). One possible explanation arises from concerns regarding excess volatility caused by Fed actions. This argument lends support for central bankers acting firmly but in a slow fashion, since changes of direction can harm economic stability.

Table 5. Central Bank Reaction Functions: Case of the Fed

Interest Rate Rules	Theoretical Models	Estimations
1. Basic Taylor rule	$i = r^* - 0.5\,\pi^* + 1.5\,\pi + 0.5\,y$	
2. Generalized Taylor rule	$i = k + g_\pi\,\pi + g_y\,y$	$i = 0.63 + 1.7\,\pi + 0.8\,y + \varepsilon$
3. Optimal Taylor rule		$i = 2.21 + 2.8\,\pi + 1.6\,y + \varepsilon$
4. Optimal dynamic	$i = (1-\rho)(k + g_\pi\,\pi + g_y\,y) + \rho\,i_{-1}$	$i = 2.21 + 2.8\,\pi + 1.8\,y + \varepsilon$
5. Optimal lagged	$i = k + g_\pi\,\pi + g_y\,y_{-1}$	$i = 2.21 + 2.5\,\pi + 1.6\,y + \varepsilon$

Sources: Taylor (1993) and Rudebusch (2001).

C.   Case of the Banco de la República

Table 6 illustrates variations of Taylor rules for the case of emerging markets. Equation 1 postulates that the central bank could also react to changes in the real exchange rate (q_t) and to its dynamics (q_{t-1}). As mentioned by Taylor (2001 p. 266), this does not make much sense in cases where alterations in q_t correspond to changes in productivity. Furthermore, temporary changes in the real exchange rate do not affect the long-term solution of such a rule, where $f > 1$ and $g_y > 0$, since these changes would show up in either inflation or product alterations. Put differently, the dynamics of a Taylor rule for an open economy are consistent with setting the values $h_o = h_1 = 0$. However, in the case of the European Central Bank, the estimated net effect of a real depreciation of 10 percent of the Euro with respect to the dollar could require an increase of an additional 1 percent in the short-term interest rate of the European central bank.

The problem of postulating a Taylor rule that includes the real exchange rate is that it turns out to be of scant practical use, due to well-known problems of uncertainty regarding the long-term purchasing power parity. *In our opinion, it is more relevant to introduce instead the (uncovered) interest rate parity condition, since capital flows drastically affect net international reserves (NIR) and, consequently, the composition and value of monetary aggregates and its relations with local interest rates.* In equation 2 we adopt this approach, where the condition $i < (i^* + e)$ induces capital outflows (here i^* stands for the external interest rate and "e" represents the expected rate of depreciation of the local currency with respect to the foreign currency).

We distinguish two periods: 1989–2002 (quarterly), characterized by the targeting of monetary aggregates and a fixed exchange rate system (crawling peg and crawling bands); and, 1998–2002 (monthly), a period of flotation of the peso, inflation targeting, and signaling through the repo rate of the BR.

Equation (2) postulates that, during the 1989–2002 period, the market interest rates increased whenever the monetary expansion surpassed the quantitative target of the money base, there existed negative disparity with respect to external financial assets, and/or a positive product gap. For the period 1989–94, the postulated dependent variable was either the market interest rate (known as DTF) or the interbank rate and, for the period 1995–2002, the dependent variable was either the interbank rate or the repo rate, when it was instituted as one of the main instruments. Best results were achieved when using the interbank rate, which are reported in Table 6.

Table 6. Central Bank Reaction Functions: Case of Banco de la República
(Dependent Variable: Interbank Interest Rate)

Interest Rate Rules	Theoretical Models	Estimations
1. Taylor rule in an open economy: Targeting real exchange rate	$i = f_\pi\,\pi + g_y\,y + h_o\,q_t + h_1\,q_{t-1}$	
2. Open economy: Targeting monetary aggregates	$i = r^* + g_m(M - M^*) + g_i(i^* + e) + g_y\,y$	**Period 1989–2002 (Quarterly)**: **A. Contemporaneous Values:** $i = 23.9 - 0.04\,(M - M^*) + 0.05\,(i^* + e) + 1.67\,y$ (99%) (40%) (30%) (85%) $R^2 = 0.72;\ Dw = 2.1;\ AR(1) = 0.84$ **B. Lagged and Contemporaneous Values:** $i = 16{,}6 - \sum_{j=0}^{2} 0.03\,(M - M^*)_{t-j} + \sum_{j=0}^{2} 0.39\,(i^* + e)_{t-j} + \sum_{j=0}^{2} 3.69\,y_{t-j}$ (99%) (1%) (99%) (99%) $R^2 = 0.77;\ Dw = 1.95;\ AR(1) = 0.45$
3. Open economy: Inflation targeting	$i = r^* + g_\pi(\pi - \pi^*) + g_i(i^* + e) + g_y\,y$	**Period 1998–2002 (Monthly):** **C. Contemporaneous Values:** $i = 4.0 + 0.64\,(\pi - \pi^*) + 0.13\,(i^* + e) - 0.11\,y$ (20%) (78%) (66%) (74%) $R^2 = 0.86;\ Dw = 2.29;\ AR(1) = 0.53;\ AR(2) = 0.41$ **D. Lagged and Contemporaneous Values:** $i = 5.3 - \sum_{j=0}^{2} 0.69\,(\pi - \pi^*)_{t-j} + \sum_{j=0}^{2} 0.18\,(i^* + e)_{t-j} + \sum_{j=0}^{2} 0.09\,y_{t-j}$ (48%) (47%) (27%) (7%) $R^2 = 0.84;\ Dw = 2.31;\ AR(1) = 0.46\ ;\ AR(2) = 0.44$

Source: Taylor (2001) and our computations. Values in parenthesis show the significance level of the t-statistic and, for the t and t-2 values, correspond to the Chi-Square Statistic.

The econometric results are not satisfactory when using just contemporaneous variables, since we could only explain about 72 percent of the variation of the interbank rate and mainly by the effect of autoregressive movements, with great persistence of the inflation rate. For instance, in case A of equation (2) in Table 6, only the output gap seems to have played a marginal role, while monetary or interest rate gaps were not significant.

It should be said that part of the econometric problems arise from attempting to measure such gaps. Monetary targets where changed rather frequently, including new definitions of such aggregates (as M1 or M3), although the definition of the monetary base prevailed for the period as a whole. The output gap is rather sensitive to the definition of the method of decomposition (first we used a Hodrick-Prescott filter, but decided to move to a gap computed through a structural model). In fact, the order of integration of the variables represent a challenge in terms of long-term interpretations as the gaps are I(0), while the interest rates are I(1).

However, when considering contemporaneous and lagged values, econometric estimates improved significantly. Case B in Table 6 shows that the (uncovered) interest rate gap of the last three quarters exert a significant effect of about 39 basic points over the interbank rate. Additionally, the lagged product gap was also significant and showed a 3.7 value with respect to the log difference between the observed and the potential real GDP. The monetary aggregates gap remained insignificant.

We expected better econometric results for the period 1998–2002 (monthly), thanks to the adoption of inflation targeting and the consolidation of the repo rate as the main instrument of monetary policy. However, it seems that the span of the historical experiment is still too short. In fact, case C in Table 6 shows that the effect of the inflation gap is higher than that of the monetary gap (0.64 vs. 0.03), but significant only at the margin (78 percent). Something similar occurs with the (uncovered) interest rate gap and the product gap, where the later is related only to the industrial production. In order to overcome these problems, we introduced lagged values, but better results were not achieved (see case D in Table 6).

In short, we have seen that it is rather premature to postulate the existence of a clear reaction function of the BR regarding the repo rate with respect to inflation and output gaps for the period 1998–2002. There are theoretical and practical reasons to expect that in the near future econometric estimates should improve, especially after taking into consideration the effect of the (uncovered) interest parity condition, which significantly alters monetary policy in emerging markets.

Another strategy which is worth exploring is the use of forecasting values to compute the gaps to which the monetary authorities might be reacting. However, our experience tells us that such forecasting values have been rather inconsistent within a short period of time, so their direct use in the reaction function of the BR has not been a practical option up to now. This is one feature of the debate that intends to distinguish between inflation targeting seen as "an instrument rule" from the one that postulates inflation targeting as a "targeting rule" (Svensson, 2002).

Finally, we should also remark that the current strategy of inflation targeting in Colombia is threatened by fiscal dependency. High fiscal deficits, hovering around 3 percent of GDP, drive real interest rates up, and the long-term stability of the central bank reaction function is not clear under such dependency. Furthermore, this fiscal dependency goes beyond seigniorage whenever capital markets depend critically on the stability of public bond prices (Friedman, 1986 p. 17). As emphasized by Woodford (2001 p. 671), the central bank would feel the pressure of the fiscal deficit, not through monetary issue, but through pressure to sustain the value of public bonds, as in the "Accord of 1940" between the Fed and the U.S. Treasury.

In the case of Colombia, the high level of public debt in relation to GDP, now about 55 percent, makes it imperative to further coordinate monetary and fiscal policies (Banco de la República, 2002; Clavijo, 2002). The central bank should enhance the mechanisms that allow the consolidation of inflation targeting (such as maintaining the flotation of the peso), while efforts continue to lower public debt in relation to GDP.

VI. CONCLUSIONS

This paper has discussed how monetary policy in Colombia can work well in the long run under the trinity framework of (i) a flexible exchange rate; (ii) inflation targeting; and (iii) a monetary policy rule. To be sure, this framework has allowed inflation to fall to 6 percent by 2003, completing five consecutive years of single-digit inflation in Colombia. This is certainly a remarkable performance for the country, which has had the most persistent moderate inflation over the past three decades.

We argued in favor of, first, setting target ranges for inflation once inflation has been brought down to single-digit levels, and, second, strengthening the current scheme of foreign exchange options as a way to better confront turbulence in the international capital markets. The impact of reductions in the reference rates of the Central Bank of Colombia was also assessed. We found that these reductions will have a significant effect only if resources are freed for more spending, most likely through refinancing of mortgages at lower rates.

Finally, Taylor rules were discussed in the context of emerging markets where real exchange targets could play a role. However, the paper has noted that such an approach is of scant practical use, owing to the well-known problems of uncertainty regarding long-term purchasing power parity. In our opinion, it is more relevant to introduce instead the (uncovered) interest rate parity condition, since capital flows affect net international reserves and, consequently, the composition and value of monetary aggregates and local interest rates.

For Colombia, this study has found that it is rather premature to postulate the existence of a clear reaction function of the repo rate with respect to inflation and output gaps or the (uncovered) interest-rate-parity condition for 1998–2002. Nevertheless, there are theoretical and practical reasons to expect that in the near future econometric estimates should improve, especially after taking into consideration the effect of the (uncovered) interest-parity condition.

REFERENCES

Alesina, A., A. Carrasquilla, and R. Steiner, 2001, "Coordinating Macroeconomic Policies: A Response to Sergio Clavijo," *Quarterly Journal of Central Banking*, Vol. XI (May), pp. 39–42.

Banco de la República, 2000, "La Estrategia de la Política Monetaria," *Revista del Banco de la República*, Vol. 76, No. 876, pp. 5–15.

———, 2001, "Estimación del Efecto Ingreso sobre los Balances de los Sectores Privado y Público: 1996–2000," *Revista del Banco de la República*, Vol. 75, No. 894 , pp. 16–37.

———, 2002, *Informe al Congreso de la República* (March).

Board of Governors of the U.S. Federal Reserve System, 2000, "Monetary Policy Report to the Congress," (July).

Case, K., J. Quigley, and R. Shiller, 2001, "Comparing Wealth Effects: The Stockmarket versus the Housing Market," National Bureau of Economic Research Working Paper No. 8606 (October).

Charry, L. F., and J. Gómez, 2001, "El Canal de la Demanda Agregada y el Modelo Triangular de la Inflación," Working Paper, Banco de la República, (September).

Clavijo, S., 1991, "Monetary Uncertainty and Control Policies," *Money Affairs* (CEMLA), Vol. 4, No. 1 (January/June), pp. 41–52.

———, 2000a, "Reflexiones sobre Política Monetaria e 'Inflación Objetiva' en Colombia," *Revista del Banco de la República* (August), Vol. 73, No. 874, pp. 54–89.

———, 2000b, "Coordinating Macroeconomic Policies: The Case of Colombia," *Quaterly Journal of Central Banking*, Vol. XI (November), No. 2, pp. 71–84.

———, 2002, "Deuda Pública Cierta y Contingente: El Caso de Colombia," *Revista del Banco de la República* (May), Vol. 75, No. 895, pp. 30–47.

Debelle, G., P. Masson, M. Savastano, and S. Sharma, 1998, Inflation Targeting as a Framework for Monetary Policy, IMF, *Economic Issues*, No. 15 (September).

Dornbusch, R., and S. Fischer, 1992, "Inflación Moderada," *Ensayos sobre Politica Económica*, Banco de la República (June), No. 21, pp. 7–68.

Edwards, C.L., 1997, "Open Market Operations in the 1990s," *Federal Reserve Bulletin*, Vol. 83, No. 11, pp. 859–874.

Fernández, J., 2001, "Tipo de Cambio y Tasas de Interés," *Prospectiva Económica y Financiera*, December 24, No. 310.

Friedman, M., 1986, "Monetary Policy: Theory and Practice" in *Central Bankers, Bureaucratic Incentives, and Monetary Policy*, ed. by E. Toma and M. Toma (Netherlands: Martinus Nijhoff Publishers).

García, P.S., L.O. Herrera, and R.O. Valdes, 2002, "New Frontiers for Monetary Policy" in *Chile, Inflation Targeting: Design, Performance, Challenges*, ed. by N. Loayza and R. Soto (Santiago:Central Bank of Chile).

Gómez, J., and J.M. Julio, 2001, "Transmission Mechanism and Inflation Targeting: The Case of Colombia´s Disinflation," Working Paper, Banco de la República, (January), No. 186.

Grilli, V. , D. Masciandaro, and G. Tabellini, 1991 "Political and Monetary Institutions and Public Financial Policies in the Industrial Countries," *Economic Policy* (October), No. 13, pp. 341–392.

Hafer, R.W., 2001, "What Remains of Monetarism?" *Federal Reserve Bank of Atlanta Economic Review*, Fourth Quarter, Vol. 86, No. 4, pp. 13–33.

Hakkio, C.S., and G.H. Sellon, 2000, "The Discount Window: Time for Reform?" *Economic Review*, Federal Reserve Bank of Kansas, Second Quarter, Vol. 85, No. 2, pp. 5–20.

Haldane, A. G., 1999, "Targeting Inflation: The UK in Retrospect," Bank of England, November.

Hernández, A., and L.B. Florez, 1999, "Aclaración de Voto de los Co-Directores: Sesión del 25 de Septiembre de 1999," *Revista del Banco de la República* (October), Vol. 72, No. 864, pp. 42–52.

———, and J. Tolosa, 2001, "La Política Monetaria en Colombia en la Segunda Mitad de los Noventa," *Revista del Banco de la República* (February). Vol. 74, No. 880, pp. 24–67.

Hernández, G., 1997, "El Banco de la República como Banco Central Independiente" in La Banca Central en América Latina, ed. by E. Aguirre et al (Bogotá: Banco de la República).

International Monetary Fund (IMF), 2002, *Colombia: Third Review Under the Extended Arrangement*, Country Report 02/15, February 7 (Washington).

———, 2003, *Colombia: Staff Report for the 2002 Article IV Consultation and Request for Stand-By Arrangement*, Country Report 03/19, January 24 (Washington).

Julio, J.M., 2001, "Relación entre la Tasa de Intervención del Banco de la República y las tasas de Mercado: Una Exploración Empírica," Working Paper, Banco de la República, No. 188.

Lindsey, D. E., 2000, "Making Monetary Policy: The FOMC," Paper presented at the 25th Annual Central Banking Seminar, *Federal Reserve Bank of New York,* October.

Mankiw, G., 2001, "U.S. Monetary Policy During the 1990s," National Bureau of Economic Research, Working Paper 8471, September.

McDonough, W.J., 1994 "An Independent Central Bank in a Democratic Country: The Federal Reserve Experience" Federal Reserve Bank of New York, *Quarterly Review,* Spring, Vol. 19, No. 1, pp. 1–6.

Meyer, L., 2001a "Does Money Matter?" Federal Reserve Bank of St. Louis, *Economic Review*, September–October, Vol. 83, No. 5, pp. 1–15.

_____, 2001b, "Inflation Targets and Inflation Targeting," Federal Reserve Bank of St. Louis, *Economic Review*, November–December, Vol. 83, No. 6, pp. 1–13.

Rudebusch, G.D., 2001, "Is The Fed Too Timid? Monetary Policy in An Uncertain World," *The Review of Economics and Statistics*, May, Vol. 83, No. 2, pp. 203–217.

Svensson, L., 2002, "Inflation Targeting: Should it Be Modeled as an Instrument Rule or a Targeting Rule?" National Bureau of Economic Research, Working Paper No. 8925, May.

Taylor, J.B., 1993, "Discretion versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy* (December), Vol. 39, pp. 195–214.

_____, 2001, "The Role of the Exchange Rate in Monetary Policy Rules," *American Economic Review* (May), Vol. 91, No. 2, pp. 263–67.

Uribe, J., J. Gómez, and H. Vargas, 1999, "Strategic and Operational Issues in Adopting Inflation Targeting in Colombia," paper presented in Banco de la República Seminar on Inflation Targets (November).

Urrutia, M., 2001, "Proceso de Toma de Decisiones para las Politicas Monetaria y Cambiaria," *Revista del Banco de la República* (October),Vol. 74, No. 888, pp. 5–13.

Villar, L., 2001, "Reflexiones para una Evaluación de la Política Monetaria," *Revista del Banco de la República* (September), Vol. 74, No. 887, pp. 8–27.

Walsh, C. E., 1993, "Central Bank Strategies, Credibility, and Independence: A Review Essay," *Journal of Monetary Economics* (November), Vol. 32, No. 2, pp. 287–302.

Woodford, M., 2001, "Fiscal Requirements for Price Stability," *Journal of Money, Credit and Banking*, August, Vol. 33, No. 3, pp. 669–728.

Woodward, R., 2000, *Maestro: Greenspan's Fed and the American Boom* (New York: Simon and Schuster).