

MONETARY AND EXCHANGE RATE POLICIES IN COLOMBIA:
PROGRESS AND CHALLENGES (1991-2002)

(Abstract)

This paper focuses on monetary and exchange rate policies in Colombia, with particular emphasis over the period 1999-2002, when flotation of the peso/dollar and inflation targeting were adopted. We argue, first, in favor of adopting “operational inflation ranges”, once inflation has been brought down to one digit over the last four years, and, secondly, 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. We find that it will only be significant if household expenses are alleviated, most likely by recontracting mortgages at lower rates. We also address the issue of Taylor rules in an open economy framework, presenting preliminary estimates for Colombia and discussing its relation with fiscal dependency.

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I. Introduction

Although the mix of macro results is not yet satisfactory (low inflation, but high unemployment and slow growth), there has been significant progress in the implementation of monetary and exchange rate policies over the years 1999-2002 in Colombia. Flotation of the peso/dollar was adopted beginning 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 Republica (BdR), 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, meaning: i) flexible exchange rate; ii) an inflation targeting; and iii) a monetary policy rule (Taylor, 2001 p.263). To be sure, this framework has allowed inflation to stabilize around 7%, completing four consecutive years of one-digit inflation in Colombia. This is certainly a remarkable performance for a country with the most persistent moderate-inflation over the previous three decades, when CPI-inflation averaged 22% (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 has depreciated by around 15-20% in real terms, against their 18-main trading partners, over the period 1999-2002.

On the financial front, it is worth highlighting that the availability of “last resort” money from the central bank avoided contagion of the financial system, when the housing crises exploded in 1998. However, it has been estimated that funding such financial crises might demand about 4-6% 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 affecting the monetary stance. By contrast, during the 1980s and good part of the 1990s, the prevailing outcome was dictated by the position of the monetary aggregates with respect to pre-determined corridors, sometimes referred to the money base and other times to broader aggregates.

In fact, the Constitutional mandate of the BdR, after the 1991-Charter, has a hierarchical character: to pursue low and stable inflation, but in line with the government development plan, which obviously targets high growth and low unemployment. In this sense, it is a natural result that the Central Bank pursues a more holistic approach to monetary and exchange rate policies, in line with such a mandate. As we have argued (Clavijo, 2000a), the adoption of “inflation targeting” is consistent with such mandate. Put differently, the BdR has only instrumental independence, but it is committed to a strict rule of disinflation over the medium term, on sustainable real growth basis.

This disinflation has taken place while facing prolonged international turbulence. In fact, the 1998-2001 period faced two international crises: the South-East Asian crises during 1997-98, with contagion effects over Russia and other emerging markets; and the world recession of 2001 and early 2002, including the terrorist attacks of September 11 and the implosion of the “currency board” regime in Argentina.

Additional financial stress was generated in Colombia due to the mismanagement of public banks and the asset-price inflation of the years 1993-97. Economic emergency was declared in November 1998 to tackle these problems, resulting in the foreclosure of some public banks and the adoption of a moderate financial transaction tax (initially of 0.2% and rose to 0.3% in January 2000). This tax has permitted an increase of about 0.7% of GDP in public revenues, but has inhibited the financial intermediation business. Demand for cash has increased significantly as a way to elude this tax, altering the monetary base composition and the historical behavior of monetary aggregates. Partial tax-exemptions have motivated additional financial innovations, which have all rendered monetary aggregates as a poor guide for implementing monetary policy.

In this difficult context, it is notorious the progress achieved by the BdR 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”. This paper is devoted to the analysis of monetary and exchange rate policies in Colombia, with particular emphasis over the period 1999-2002. We will argue, first, in favor of adopting “operational inflation ranges”, once inflation has been brought down to one digit over the last four years, and, secondly, 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. We found that it will only be significant if household expenses are alleviated, most likely by recontracting mortgages at lower rates.

Section II provides a brief macroeconomic assessment in terms of inflation, unemployment and growth, where it will become evident that results are far from satisfactory, since disinflation has occurred in an environment of low growth and high unemployment rates. We also present the outcome of some macrovariables in terms of the Extended Fund Facility (EFF) program agreed with the IMF for the years 1999-2002. In early 2003 a new two-year IMF-Stand-By Arrangement (IMF-SBA) was reached. Section III discusses monetary and exchange rate issues and Section IV presents a parallel between BdR and the Federal Reserve Bank of USA (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 the Colombian Economy

A. Inflation, Growth and Unemployment

Let us define “macroeconomic suffering” by way of computing a simple index as: (Inflation + Unemployment) – (Economic Growth), which is nothing else but a variation of “Okun’s in-miserising index” (Clavijo, 2000a). Table 1 shows that average annual inflation hovered around 22-24% over the years 1975-97, while falling to 10.6% during 1998-2002. Note that the later figure is similar to the average of 12% 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% in urban areas in recent years (and 15% nation-wide). Different studies show that the NAIRU for Colombia has been around 10%. 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 dis-indexation 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 UK, Israel, and Ireland, among others (Haldane, 1999).

The sum of inflation and unemployment (Okun's in-miserising factors) averaged 34% during 1975-97. In spite of the rapid disinflation, such sum only declined to 29% over 1998-2002. When adding the effect of economic growth, which average was nil in recent years, we find that our "suffering index" has been stranded at 28-31% 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 Var.) (3)	Index of Macroeconomic Suffering (4)=(1)+(2)-(3)
1967-74	12.1	9.9	6.2	15.8
1975-81	24.7	9.5	4.5	29.6
1982-89	22.6	11.7	3.5	30.9
1990-97	24.0	10.1	4.0	30.0
1998-02	10.6	18.1	0.5	28.3

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 over-performances during the years 1999-2000 (in the amounts of 0.2-0.5% of GDP). There were also significant over-performances in the current account of the balance of payments (0.7-1.9% of GDP), due to the decline in local aggregate demand and improved terms of

trade (with an increase of 20% over 1999-2000). Real growth, however, under-performed (by 0.7% in 1999 and 0.3% in 2000).

Table 2
Targets and Results under the EFF-IMF Program for Colombia: 1999-2002

	1999	2000	2001	2002
<u>Consolid.Fiscal Deficit (-) (% PIB)</u>				
Target:	-6.0	-3.6	-2.9	-2.6
Result:	<u>-5.5</u>	<u>-3.4</u>	<u>-3.2</u>	<u>-4.0</u>
Over-Performance (+):	+0.5	+0.2	-0.3	-1.4
<u>External Deficit (-) (% PIB)</u>				
Target:	-1.3	-2.4	-1.8	-3.2
Result:	<u>0.6</u>	<u>0.5</u>	<u>-1.9</u>	<u>-1.7</u>
Over-Performance (+):	+0.7	+1.9	-0.1	+1.5
<u>Real Growth (%)</u>				
Target:	-3.5	3.0	3.8	3.0
Result:	<u>-4.2</u>	<u>2.7</u>	<u>1.6</u>	<u>1.7</u>
Over-Performance (+):	-0.7	-0.3	-2.2	-1.3
<u>Inflation (%)</u>				
Target:	15.0	10.0	8.0	6.0
Result:	<u>9.2</u>	<u>8.8</u>	<u>7.7</u>	<u>7.0</u>
Over-Performance (+):	+5.8	+1.2	+0.3	-1.0

Source: Our computations based on IMF (2002a,b) and Banco de la Republica.

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

As mentioned, this over-performance of 1999-2000 is explained mainly by the weaknesses in local aggregate demand. Although it is true that proper monetary management avoided hyperinflation, where Ecuador and Turkey failed, it is clear that the dis-inflation process will be more complicated as growth recovers. In fact, note that CPI-Inflation was brought down by 1.1% during 2001 (from 8.8% down to 7.7%), while growth descended two-full percentage points from the expected value (from 3.8% down to 1.8%). During 2002 the 6% target was missed by a one percentage point due mainly to weather factors that increased crop-prices temporarily. Nevertheless, ex-food CPI inflation closed at 5,3%, below the CPI-headline target.

Since one-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 within +/- 1% with respect to the 2002 target of 6% would be allowed to accommodate such shocks. BdR had also set-up a range target of 5-6% for 2003 and 3,5-5,5% 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 the BdR 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 +/- 1% since 2001, within the IMF program. Furthermore, since uncertainty increases as inflation converges to the long-term value of 3% per-annum adopted by the BdR, excessive disinflation, as occurred during 1999-2000, should be avoided.

III. The New Monetary Policy and the Exchange Rate Flotation in Colombia

A. Elements of the New Monetary Policy

Colombia's formal adoption of inflation targeting, since October 2000 (Banco de la República, 2000; Uribe et.al. 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 later 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 BdR analyses, first, the “production gap” and assesses demand pressures. This information is used to forecast inflation to 6, 12 and 18 months ahead. Secondly, 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 BdR-watchers due to the continuous appearance of financial innovations, as occurred in the late 1980’s (Clavijo, 1991). In consequence, the exercises 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 BdR has also concentrated in transmitting the stance of the monetary policy through the “central 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, since June 2000 the Federal ceased announcing any monetary aggregate forecast, due to the expiration of the Humphrey-Hawkins Act, dating from 1978. See details in Board of Governors (2000 p.2) and Meyer (2001a p.7-9). Likewise, the Central Bank of Chile now concentrates in 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 BdR usually is a net provider of resources, so the relevant rate for the market is the repo-rate. However, in January the BdR 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 BdR-watchers.

The BdR also uses a system of a “ceiling lombard rate” to establish the cost of accessing “un-limited” 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 basic 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 changes in the composition of the monetary base. In early 2001, the BdR created an Internal Operational Committee to deal with issues, very much in line with the daily practices of the Federal of N.Y., 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 the monetary policy, turning it more powerful in the short-term. In 2001, BdR also announced the mechanism of “call” options in order to deal with eventual problems of pass-through (ie. Excessive exchange rate depreciation). 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 is more transparent than those instituted in Mexico or Chile, since in the former all public entities (including the Treasury) have to operate through the market. Finally, there exists a mechanism to control excessive volatility, set at +/- 4% of the 20 day moving average of the spot rate.

Table 3 illustrates the rules established under the adopted Dutch-option system. Under the “put” option modality, designed to increase NIR, the BdR has offered to buy between US\$30-200 million

per month (about 1 to 5% of the market). The trigger point is given by the condition: Spot < 20 day moving average of the spot rate (MA20), where Spot refers to the average daily quotation peso/dollar. The cumulative amount exercised has been US\$1,400 million over the period 1999-2002, representing 11% of the NIR at end-2002. Note that this value is lower than the 35% of the NIR accumulated in Mexico since 1995. Mexico suspended this mechanism back in August 2001, due to apparent over-accumulation of NIR.

The “call” options system was first used in February of 2003, when the exchange rate was depreciating nearly 30% annually, generating problems of pass-through that threatened the inflation range-target of 5-6%. The simple announcement diminished the expected rate of nominal depreciation significantly. The amount offered for sale by the BdR 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 trigger of the options was given by the condition of Spot > MA20.

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% of the MA20. On this occasion, the triggering conditions permitted the financial system to buy US\$414 million from the BdR (in several sessions) or about 3,8% of the NIR at end-2002. The Colombian experience is rather successful when compared to the Mexican experience, where US\$1,950 million (about 5,7% of the NIR at end-2001) were used over 1995-2001 to control exchange rate volatility.

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% of GDP, the pressure to issue local public debt is high, driving up real interest rates. Furthermore, the financial sector portfolio has increased mainly at the expenses of local treasury bonds, betting on zero risk on sovereign debt returning 8% in real terms. Fortunately, during 2002 this condition began to change as financial credit grew in real terms for the first time in almost three years.

Table 3: Foreign Exchange Options
(Million of Dollars and Percentages)

I. "Put" Options to Buy NIR

	Colombia (1999-2002)	Mexico (1995-2001)
Trigger Rule	Spot < Spot(MA20Days)	Spot < Spot(MA20Days)
Amount Offered in Auction	US\$ 30 – US\$ 200	US\$ 250
Cumulative Amount Exerted	US\$ 1,400	US\$12,000
Net Internat. Reserves (NIR)	US\$ 10,840	US\$ 34,000
Amount Exerted / NIR	11.3 %	35 %
NIR / Amortization's Due	1.0	1.2

II. "Call" Options to Sell NIR

	Colombia (1999-2003)	Mexico (1995-2001)
Trigger Rule	Spot > Spot(MA20Days)	-----
Amount Offered in Auction	US\$200 (or up to US\$1 billion)	-----

III. Options to Control Volatility

	Colombia (1999-2002)	Mexico (1995-2001)
Trigger Rule	Spot \pm 4 % of Spot(MA20Days)	Spot > 2% of Spot _{t-1}
Amount Offered in Auction	US\$ 180	US\$ 200
Cumulative Amount Exerted	US\$ 414	US\$ 1,950
Exerted Options / NIR	3.8 %	5,7 %

Source: Our computations based on Central Bank information.

It is then crucial to break down this fiscal dependency to reinstate credit 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 should be approved in 2003.

B. Signaling at the BdR: From “Quantities” (1991-1994) Towards “Prices” (1999-2002)

The operational practices of the BdR in the early 1990s followed the model of the BundesBank: where monetary aggregates were set as intermediate targets with the aim of reaching a desired combination of inflation and growth, very much 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 the monetary policy through their interest rate instruments, namely, the Federal Funds Rate (FFR) and the discount window (DW), see Hafer (2001) for details. Furthermore, and in line with this practice, the FED model has been correctly characterized as one that had evolved towards a “disguised inflation targeting” by mid-1990s, disregarding almost completely the targeting of monetary aggregates (Mankiw, 2001 p.51).

During the period 1995-1999, the BdR altered significantly operational procedures and moved towards signaling 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 pros/cons of having moved at that speed towards flotation (Hernández y Florez, 2000; Clavijo, 2000a; Villar, 2001; Fernández, 2001).

The Board of the BdR 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 break-through in the way monetary policy is being conducted after floating the peso, not simply an enhancement of procedures (Hernández y Tolosa, 2001 p.27). To be sure, 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) 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 BdR.

C. The Transmission Mechanism Throughout Interest Rates

The Case of Colombia

It has been well documented that the “central repo-rate” of the BdR “Granger-causes” movements of market rates in Colombia, with particular strength since floating the peso (Julio, 2001). This is a necessary but insufficient condition for the BdR 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 BdR 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 BdR, 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 BdR rates in the case of Colombia requires the analysis of at least three elements:

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

when market rates translated into mortgage rates in about 74% of the movement (Banco de la República, 2001).

ii) *Assessing the effect of mortgage debt restructuring induced by BdR rates reduction.* The above mentioned effect could only occur if mortgages were linked to floating rates. This was the case during the 1990s, when the norm was to pact at $DTF + X\%$, and the DTF referred to the spot interest rate and $X\%$ to the premium charged on mortgage credits (which in Colombia fluctuated around 8-10%). 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. Hence, under the new law the DTF component can be driven downwards by moving BdR rates, but the $X\%$ component (actually in real terms) is fixed. In this case, the impact of a 1% reduction in market rates could not translate into a 0.27% boost for the GDP, but much less, depending on the effects of recontracting over the $X\%$ component of the credit.

In fact, mortgage credits in Colombia are pact at inflation + $X\%$, so alleviating the servicing of the mortgage would require to recontract at a lower $X\%$, which would not happen automatically. Under the current legislation, it is the responsibility of the market to encourage such recontracting at lower rates, but this would require more competition within the financial sector. Interestingly, pre-payments are now allowed without financial punishments 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 would also benefit public works, although in the case of Colombia the available room for increasing public investment is nil due to structural limitations in the budget.

The Case of the USA

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 USA experienced a reduction in market rates of about 6%, induced by the 12 occasions in 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% 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% down to 6.5%, while CPI-inflation in USA averaged 3% 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% 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. Mortgage refinancing found its interest rate-floor at 6.3% per-year, coinciding with strange movements in 30-year treasury-bonds. It has been estimated that the USA-economy grew at 2,4% in 2002, after growing only 1% in 2001. The monetary impulse, estimated at 0.7% of GDP, plus the fiscal impulse, in the range of 1-1.5% of GDP, certainly contributed to such a recovery.

Note that these figures do not take into account wealth effects stemming from significant price-hikes of the houses. Recent local studies, however, revealed that a 10% increase in such prices over the years 1982-99 induced an increase in household consumption of about 0.6% of GDP or about double the traditional estimate of the wealth effect stemming from gains in stocks (Case, et.al. 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. In the case of the USA, the mechanism is already embedded in the market by means of recontracting mortgages in a very dynamic market, while in the case of Colombia such

mechanism has been actually hampered by Courts ordering the fixing of the 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 Republica (BdR) 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 BdR 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.

Objectives of the Central Bank

In the case of Colombia, the 1991-Constitution defined the central bank (Chartered in 1923) as an autonomous institution in charge of fighting inflation, but acting in conjunction with the Executive's agenda. Indirectly, then, the BdR has to take into account the government's goals of promoting growth and generating employment (See Constitutional Court Sentence C-481 of 1999). In this sense, the BdR mandate is "hierarchical": first, control inflation, but should also take into account the executive's goals of higher growth and employment (see Table 3). 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 (chartered in 1913), the central bank's objectives are dual in terms of controlling inflation and promoting employment, specially after the 1946 and 1977 reforms (Meyer, 2001b p.2). Furthermore, the Humphrey-Hawkins Act of 1978 included the promotion of economic growth as one of the objectives, in line with the potential product and the moderation of the long-term interest rate.

Table 3: The BdR and the FED: A Brief Comparison

	Banco de la República (Colombia) BdR	Federal Reserve Bank (USA) FED
Objectives	Hierarchical: Inflation Control and Coordination with Governmental Macro Policies	Dual: Inflation Control and Generation of Employment
Board Members	Seven (Including the Minister of Finance)	Twelve for the FOMC Seven for the “Discount Window”
Strategy	“Inflation Targeting” (Explicit)	“Inflation Targeting” (Implicit)
Monetary Instruments: Central: Reference Rates Limiting Rates Secondary: Aggregates Support: Treasury	REPO and Reverse REPO Lombard Rates-Discout Window Monetary Corridors / Reference Lines (announced) Semi-Automatic	REPO (Fed.Funds Rate) Discount Window Banking Reserves (un-announced) Automatic
Exchange Rates: Regime Instruments	Crawling Bands / Flotation Options: “puts” and “calls”	Flotation Intervention thru Treasury
Operational Procedures: Board Meetings: Board Announcements: Board Minutes: Transcriptions: Reports: To the Public To Congress Role of the Staff Econometric Models	Weekly (Various Subjects) Monthly (Inflation; 2 ^{da} Week) Immediate By Petition (referring to Resolutions) Confidential (for 3 yr., if Resolutions) Monthly Per Term Active (recommends) Uni-ecuational / Transmission	Every Month and a half (Inflation; Eight Times a year) Immediate Two Months (Excl.Sensible Topics) Confidential (for 5 yr.) Every Month and a half (Eight) Per Term Passive (without recommendations) Integrated National / International

Source: Our elaboration based on Central Bank’s Information.

It is then clear that the BdR and the FED have only partial “political independence” (or the so-called “instrumental independence”), but in neither case the objective of controlling inflation has been set aside from the events of the real sector (Grilli et. al. 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).

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 BdR, which includes seven members:

- The Minister of Finance (who chairs it, following a Constitutional mandate),
- Five full-time Directors, chosen by the President, of which two may be substituted 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, et.al. 2000). In practice, his unique edge stems from the fact that the Board cannot be convened without his participation (or that of his Deputy, when Minister is away). 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 works jointly on the technical issues (more details in 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 twelve) Presidents of the Federal Banks (where New York has a permanent sit). 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.

Anti-inflationary Policy

The BdR gradually moved towards inflation targeting over the years 1997-99 and formally announced it in October 2000. Interestingly, the FED has a peculiar system since early 1990s in which explicit targets are not announced. The FED operates with a “disguised inflation target” of around 3% 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 represent 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).

Monetary and Exchange Rate Instruments

As mentioned, BdR and FED have “instrumental independence”. The BdR 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 BdR 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 staff (including the system of “options”, already explained), while in the case of USA it is the Treasury which dictates the stance of the exchange rate policy, performed in conjunction with the FED.

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 BdR 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 sensible information. In Colombia, such minutes are provided only upon explicit petition regarding policy actions. Furthermore, transcriptions are provided on the relevant areas after three years in Colombia, while in the USA they remain confidential for up to five years. Both BdR 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) on USA.

The possible effect of changes in the interest rates are analyzed by using econometric models. In the case of the BdR they are based on the so-called inflation-transmission-mechanism (Gómez y Julio, 2001; Charry y Gómez, 2001). This system is improved constantly to better capture the dynamics of international markets and the foreign exchange “pass-through”. 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 BdR, 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.

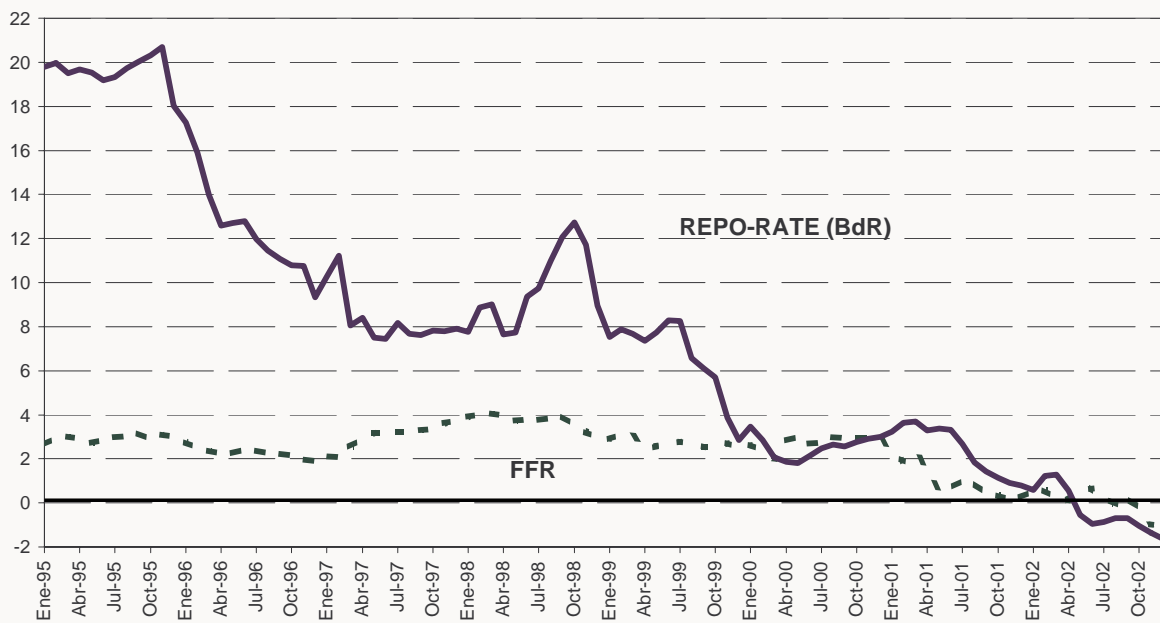
V. Reaction Functions and Taylor Rules

A. Reading the Monetary Stance

The relationship between the nominal interest rate and the rate of growth of the nominal GDP is sometimes used to decipher the stance of the monetary policy. If $\text{Market-Interest Rate} > \text{Rate of Growth of Nominal GDP}$, 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 tight condition. However, during years 2001-2002 the condition has been neutral, leveling off those variables. In the case of USA, the rate of growth of the nominal GDP declined from 5% to 2% during 2000, when signs of recession appeared. This condition of $\text{Market-Interest Rate} > \text{Rate of Growth of Nominal GDP}$ began to be corrected only by end-2001, thanks to prompt actions of the FED in reducing its rates.

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

Graph 1
REAL INTEREST RATES: REPO-RATE OF THE BdR and FEDERAL FUNDS RATE
(FFR)
(1995 - 2002)



BdR and the Federal Funds Rate (FFR), after discounting the effect of inflation. During the years 1995-1998 the repo-rate was reduced from 20% to 8%, showing clearly a relaxation of monetary conditions in Colombia. However, the contagion from the Asian-Brazilian Crises forced the BdR to increase it to 12% in mid-1998. After managing the crisis, by recurring to the flotation of the peso, the BdR 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 USA, the nominal FFR fluctuated between 4-6% and finally declined to 1.25% by end-2002. In real terms, the FFR hovered around 2-4% 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’s reaction functions that are set-up (implicit or explicitly) in terms of its reference 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 4 shows a family of theoretical Taylor rules and their empirical counterparts for the FED. The basic Taylor rule postulated that long-term real interest rate and long-term inflation rate converged to 2%, meaning ($r^* = \pi^* = 2\%$). 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% and 0.5%, respectively.

The second line of Table 4 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 was too timid (see Rudebusch, 2001). One possible explanation arises from concerns regarding excess volatility caused by FED actions. This argument lends support for central bankers acting firm but in a slow fashion, since changes of direction can harm economic stability.

Table 4: Central Bank Reaction Functions: The 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	$i = k + g_{\pi} \pi + g_y y_{-1}$	$i = 2.21 + 2.5 \pi + 1.6 y + \varepsilon$

Source: Based on Taylor (1993) and Rudebusch (2001).

C. The Case of the BdR

Table 5 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 $h_0 = h_1 = 0$. However, in the case of the European Central Bank, the estimated net effect of a real depreciation of 10% of the Euro with respect to the dollar could require an increase of an additional 1% 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).

Table 5: Central Bank Reaction Functions: The Case of the BdR
(Dependent Variable: Interbank Interest Rate)

Interest Rate Rules	Theoretical Models	Estimations
1. Taylor Rule in an Open Economy: Targeting the 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	$i = r^* + g_m(M - M^*) + g_i(i^* + e) + g_y y$	<p><u>Period 1989-2002 (Quarterly):</u></p> <p>A. Contemporaneous Values: $R^2 = 0.72$; $Dw = 2.1$; $AR(1) = 0.84$</p> $i = 23.9 - 0.04(M - M^*) + 0.05(i^* + e) + 1.67 y$ <p style="text-align: center;">(99%) (40%) (30%) (85%)</p> <p>B. Lagged and Contemporaneous Values: $R^2 = 0.77$; $Dw = 1.95$; $AR(1) = 0.45$</p> $i = 16,6 - \sum_{j=0}^2 0.03(M - M^*)_{t-j} + \sum_{j=0}^2 0.39(i^* + e)_{t-j} + \sum_{j=0}^2 3.69 y_{t-j}$ <p style="text-align: center;">(99%) (1%) (99%) (99%)</p>
3. Open Economy: Inflation Targeting	$i = r^* + g_{\pi}(\pi - \pi^*) + g_i(i^* + e) + g_y y$	<p><u>Period 1998-2002 (Monthly):</u></p> <p>C. Contemporaneous Values: $R^2 = 0.86$; $Dw = 2.29$; $AR(1) = 0.53$; $AR(2) = 0.41$</p> $i = 4.0 + 0.64(\pi - \pi^*) + 0.13(i^* + e) - 0.11 y$ <p style="text-align: center;">(20%) (78%) (66%) (74%)</p> <p>D. Lagged and Contemporaneous Values: $R^2 = 0.84$; $Dw = 2.31$; $AR(1) = 0.46$; $AR(2) = 0.44$</p> $i = 5.3 - \sum_{j=0}^2 0.69(\pi - \pi^*)_{t-j} + \sum_{j=0}^2 0.18(i^* + e)_{t-j} + \sum_{j=0}^2 0.09 y_{t-j}$ <p style="text-align: center;">(48%) (47%) (27%) (7%)</p>

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 Qui-Square Statistic.

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 BdR.

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 1989-1994, 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 5.

The econometric results are not satisfactory when using just contemporaneous variables, since we could only explain about 72% 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 5, only the production 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 were changed rather frequently, including new definitions of such aggregates (as M1 or M3), although the monetary base prevailed for the period as a whole. The product-gap is rather sensitive to 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 5 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 result 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 yet too short. In fact, case C in table 5 shows that the inflation gap is higher than the monetary gap (0.64 vs. 0.03), but significant only at the margin (78%). 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 not better results were achieved (see case D in table 5).

In short, we have seen that it is rather premature to postulate the existence of a clear reaction function of the BdR regarding the repo-rate with respect to inflation and product 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 that monetary authorities might be reacting to. However, our experience tells us that such forecasting values have been rather inconsistent within a short period of time, so their direct usage in the reaction function of the BdR 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% of GDP, drive real interest rates up. Although some of these effects could show-up in the inflation or the product gap, 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 emission, but on the commitment to sustain the value of public bonds, as in the “Accord of 1940” between the FED and the Treasury.

In the case of Colombia, the high level of the Public Debt/GDP ratio, now surrounding 55%, turns imperative to further coordinate monetary and fiscal policies (see Banco de la Republica, 2002; Clavijo, 2002). The central bank should enhance the mechanisms that allow the consolidation of inflation targeting (e.g. maintaining the flotation of the peso), while the government should make his best efforts to support the approval of the so-called “fiscal responsibility law”, recently proposed to Congress.

VI. Conclusions

We have discussed how monetary policy can work well in the long run under the trinity framework of: i) flexible exchange rate; ii) an inflation targeting; and iii) a monetary policy rule, with particular attention devoted to the case of Colombia. To be sure, this framework has allowed inflation to stabilize around 7% in 2002, completing four consecutive years of one-digit inflation in Colombia. This is certainly a remarkable performance for the country with the most persistent moderate-inflation over the previous three decades, when CPI-inflation averaged 22%.

We argued, first, in favor of setting range-targets for inflation, once inflation has been brought down to one digit figures, and, secondly, 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 was also assessed. We found that it will only be significant if alleviation of household expenses takes place, most likely through recontracting mortgages at lower rates.

Finally, Taylor rules were discussed in the context of emerging markets, where real exchange targets could play a role. However, we noted that such approach is of scant practical use, due to the 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 and, consequently, the composition and value of monetary aggregates and its relations with local interest rates.

In the case of Colombia, we found that it is rather premature to postulate the existence of a clear reaction function of the BdR regarding the repo-rate with respect to inflation and product gaps or the (uncovered) interest rate parity condition, for the period 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.

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