

# Domestic securities markets and monetary policy in Latin America: overview and implications<sup>1</sup>

Serge Jeanneau<sup>2</sup> and Camilo E Tovar<sup>3</sup>

## 1. Introduction

During the last decade, Latin American economies have transformed their monetary policy arrangements. Most countries in the region have given their monetary authorities more independence and/or developed policy frameworks that put greater emphasis on controlling inflation. Furthermore, monetary operations have shifted towards market-based frameworks. These arrangements should in principle be better and more efficient than previous ways of conducting monetary policy. However, their effectiveness depends to a large extent on the existence of developed financial systems that offer monetary authorities the choice of markets in which to operate and guarantee that actions in short-term markets will spread effectively to other market segments. The development of domestic securities markets and, more generally, the range of issues affected by the ongoing changes in the financial system not only have helped complete markets, but have also modified the impact and the extent of monetary control. In particular, such changes are likely to have altered the transmission mechanism of monetary policy. However, whether new financial developments have strengthened or weakened the impact of policy measures is open to debate.

Although financial developments may have important implications for monetary policy, there is also a question about the role that central banks should play, if any, in fostering the development of domestic financial markets. This is not a moot point given that central banks need to coordinate policies with finance ministries. In fact, there are good reasons to believe that the extent of financial market deepening will depend on strategies for developing primary and secondary securities markets (Sundararajan and Dattels (1997)).

This chapter discusses some of the issues linking the development of Latin American securities markets and monetary policy. In particular, a key aspect is how securities markets affect the effectiveness of monetary policy. Whenever possible, the chapter cites relevant evidence for the region but does not provide an exhaustive analysis of this complex topic.

The next section offers a brief overview of how the transformation of financial markets may have affected key transmission mechanisms. The following section discusses the role of central banks in developing domestic securities markets. This discussion highlights the need for coordinating public debt management between central banks and treasuries. A final section concludes.

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<sup>2</sup> Bank for International Settlements, [serge.jeanneau@bis.org](mailto:serge.jeanneau@bis.org).

<sup>3</sup> Bank for International Settlements, [camilo.tovar@bis.org](mailto:camilo.tovar@bis.org).

## 2. The transmission mechanism of monetary policy<sup>4</sup>

The transformation of the financial sector has affected the transmission mechanism of monetary policy. In particular, the development of securities markets and the entry of non-bank financial intermediaries have brought changes to central banks' operating procedures.<sup>5</sup> These shifts are also likely to have changed how instruments directly under the central bank's control (eg short-term interest rates or reserve requirements) affect the financial conditions of corporations and households. Overall, this transformation may have modified the link between financial conditions and the spending decisions of economic agents, thus affecting the transmission mechanism.

The changes just discussed have come about in part because bank intermediation has become less dominant as financial markets have developed. This shift is reflected in households that place their savings outside the banking sector, enterprises that rely on non-bank sources of financing and banks that are exploring new markets. Also, the setting of commercial bank rates appears to have become more responsive to financial market conditions, and privatisation and the subsequent reduced presence of state-owned banks have influenced the transmission mechanism.

This section focuses on how the monetary transmission channels identified in the literature may have changed during the last decade.<sup>6</sup> We start with a general overview of the evidence, then look in more detail at the evidence for some specific channels. The main arguments here are that the development of domestic securities markets together with the adoption of new operating procedures have affected:

- (i) the interest rate channel, by affecting the pass-through of policy rates to market rates.
- (ii) the exchange rate channel, by reducing the vulnerabilities associated with currency mismatches.
- (iii) the credit channel, by reducing the funding availability response to changes in policy rates or shocks.
- (iv) the expectation channel, which has probably become more important as developed financial markets rely more on expectations about future policy decisions.

### 2.1 Evidence of structural changes in the transmission mechanism

The empirical evidence confirms that a change in the transmission mechanism has taken place in some Latin American economies in recent years. For instance, evidence for Mexico suggests a major structural break in transmission associated with the introduction of the inflation-targeting regime (IT) in 2001 (Gaytán and Gonzalez (2006)). In particular, there appears to be a stronger response of the real exchange rate and inflation to movements in

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<sup>4</sup> A more general discussion of the transmission mechanism in emerging market economies is found in Kamin et al (1998).

<sup>5</sup> The article also includes an appendix reviewing the transformation of central bank operating procedures in the region. In particular, it argues that the choice of operating procedures determines the extent to which monetary policy relies on financial markets to exercise monetary control.

<sup>6</sup> For a more general treatment of the transmission mechanism, see Mishkin (1995), Kamin et al (1998), Loayza and Schmidt-Hebbel (2002), Agénor (2004) and Archer (2006).

the interest rate. Although IT is identified as the main driver for the change in transmission,<sup>7</sup> it seems difficult to isolate this factor from the development of domestic securities markets or from the strengthening in bank intermediation. In fact, as discussed in the accompanying article in this volume, “Latin America’s local currency bond market and overview”, the Mexican government began in 2000 to follow a clearly defined public debt management strategy aimed at developing the longer-term fixed-rate debt market. The result has been an impressive growth in this market segment. In the banking sector, there has also been a gradual but sustained increase in credit to new market segments.

Evidence for other countries in the region also points to a structural break that has improved the transmission mechanism. However, each country has its own reasons for the break, and they are not necessarily related to the development of the financial system. In Chile, changes in the transmission mechanism appear to have been driven by a combination of such factors as improved macroeconomic policies, increased financial and trade openness, a more stable external environment and a deepening of the financial system (Betancour et al (2006)). In Colombia, the decline of inflation, the adoption of IT and the financial crises of the late 1990s and early 2000s were all instrumental in the changing transmission of monetary policy (Vargas (2007)).

While some studies have emphasised how the adoption of new policy frameworks has been associated with changes in the transmission mechanism, they have focused less on the immediate and lagged effects of financial crises. In Argentina, the Dominican Republic<sup>8</sup> and Uruguay, for example, banking crises disabled the transmission mechanism. These crises weakened the balance sheet positions of households and firms, which reduced the interest rate elasticity of credit supply and demand and prevented an expansionary monetary policy from inducing greater bank lending.<sup>9</sup>

## 2.2 The interest rate channel: impact on the interest rate pass-through

Available evidence suggests that the impact of monetary policy on short-term interest rates has strengthened over time, but with differentiated effects across countries. In particular, it seems that the interest rate channel is likely to be less relevant in the smaller economies of the region than in the larger ones, which tend to be financially more advanced.<sup>10</sup>

Quicker and stronger pass-through of policy rates to commercial bank rates appears to be the norm in Colombia nowadays (Amaya (2006)).<sup>11</sup> In Peru, interest rate pass-through

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<sup>7</sup> An advantage of IT is that it induces a stronger response to inflation expectations. Therefore, an IT framework that reduces the volatility of inflation expectations will require a smoother response on the part of the central bank, thus indirectly reducing the volatility of the exchange rate.

<sup>8</sup> In fact, for the Central Bank of the Dominican Republic, the 2003–2004 banking crisis prompted changes in operating procedures for monetary policy, which in turn had an impact on the transmission mechanism. In particular, overnight rate and Lombard facilities were introduced. The latter had the goal of building a corridor of interest rates oriented towards signalling the stance of monetary policy.

<sup>9</sup> Balance sheet positions have also encouraged a shift of resources into government debt in some countries, as occurred in Brazil, Colombia and Mexico, among others. In Colombia, this shift into government debt may explain the large exposure of banks to government paper, which has created financial instability *ex post* (Vargas (2006)). Betancour et al (2006) also offer an interesting discussion of how the behaviour of policy and market rates differed in recent periods of stress.

<sup>10</sup> See Tovar (2007) for evidence in this direction.

<sup>11</sup> This study reports an average pass-through coefficient of 0.75 for CDs, taking an average of 6.1 months for the maximum response to take place. The average pass-through for the credit market is 0.76 on average, taking 4.4 months for the maximum response to take place. However, this study does not evaluate how policy interest rate changes are transmitted to consumption and investment decisions. Vargas (2007) does so and

continues to be incomplete but has improved with the adoption of IT as well as with the adoption of the policy rate as an operational instrument. There is also evidence that the introduction of an interest rate band has allowed a faster adjustment of interbank interest rates (Lahura (2006)).<sup>12</sup> The evidence suggests a strengthening of this channel in recent years in Mexico as well, as captured by the impact of the nominal interest rate on the real exchange rate and a modified trajectory of inflation (Gaytán and Gonzalez (2006)).

In Chile, the evidence shows a pass-through from the overnight rate to market rates similar to those in advanced economies (eg the United States or Canada).<sup>13</sup> Interestingly, there appears to be no evidence of differences in interest rate pass-through among nominal or inflation-indexed instruments, and no evidence of asymmetric pass-through (Espinosa-Vega and Rebucci (2004)). However, in contrast to other countries, Chile seems not to have changed in response to amendments to the exchange rate and monetary policy regimes in September 1999 and June 2001.

In Argentina, the central bank had to rebuild the instruments and channels of monetary policy, not just because of the disruption created by the currency and financial crises but also because the focus of policy in the previous decade had been different. The central bank has relied on the development of central bank notes and bonds (LEBACs and NOBACs). Those instruments were initially intended to compensate for the expansionary effects of financing to banks during the crisis but are now employed to compensate for the expansionary effects of a precautionary policy of reserve accumulation. The central bank has also started active intervention in the repurchase market to increase the response of the interbank market, which shows signs of segmentation. This process has allowed the central bank to extend the maturity of its debt, which in principle should also help the central bank to influence longer-term rates (Pesce (2006)).

A related issue is whether greater openness and liberalisation of the financial system has strengthened the interest transmission mechanism. Some evidence for emerging market economies (EMEs) suggests that foreign long-term interest rates have a larger impact on domestic long-term rates than on the domestic policy rate (Moreno (2007)). This finding would imply that liberalisation does not automatically translate into more powerful interest rate transmission in EMEs. Some evidence for Asian economies indicates that the pass-through of money market rates to commercial lending rates did not significantly increase between 1990–94 and 2000–04. Although the explanation for this is not straightforward, one possibility is that increased capital mobility might have limited pass-through by strengthening the international convergence of long-term interest rates (Archer (2006)). Another possibility is that unhealthy financial systems might have kept pass-through from rising. For instance, good loans might be crowded out in countries where accounting practices allow bad loans to be hidden, therefore limiting the stimulatory effect of lower interest rates. Finally, another possibility is that unhealthy banks do not lend to the private sector, instead investing most of their funds in government securities.

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finds that the debt build-up observed in Colombia during the 1990s increased the sensitivity of aggregate demand to interest rates. This appears to have been most relevant during the 1999 recession.

<sup>12</sup> This study finds that (i) interest rate pass-through increased from 0.5 on average before IT to 1.2 later; (ii) the speed of adjustment to long-run levels increased for all interest rates; and (iii) the average lending rate adjustment for negative interest rate deviations from its equilibrium declined from 6 to 3 months, and from 9 to 4 months when the deviation was positive.

<sup>13</sup> Their estimates indicate that in Chile the degree of pass-through upon impact is 0.63 and 0.18 for the short-term and medium-term nominal lending rates, which implies an average pass-through of 0.61. For deposit rates, the respective numbers for the short and medium term are 0.68 and 0.20. As for inflation-indexed rates, the pass-through is 0.31 (0.21) and 0.31 (0.19) for short-term (long-term) lending and deposit rates, respectively.

## Box 1

### **Structural change in the banking sector and the interest rate channel**

Specific structural changes in the banking sector, such as deregulation or consolidation, can also affect the interest rate channel. Although deregulation can take many forms, it is possible to illustrate its overall impact by considering the effect of a removal of interest rate ceilings on deposits. In economies with some development of financial markets, such a measure would strengthen the role of interest rates in allocating credit. The evidence for advanced economies such as the United States supports such an evolution (Sellon (2002)). However, the impact of deregulation in emerging or developing countries has not been studied.

Equally relevant is how much the trend towards bank consolidation has affected the transmission mechanism. On the one hand, domination of the banking market by a few large banks could have reduced the degree of competition, potentially weakening the pass-through of policy rates to commercial bank rates. On the other hand, bank consolidation may have increased the effectiveness and speed of the interest rate channel if it improved market efficiency and reduced transaction costs. However, it is also possible that consolidation reduced the access of small borrowers to the credit market and made them more dependent on small local banks, amplifying the credit channel. Given the early stage of financial market development in the region, it is likely that efficiency aspects have dominated other factors, increasing the overall effectiveness of monetary policy.

A special G10 report (2001) argues that market concentration could affect the interest rate transmission channel in conflicting ways. On the one hand, it might lead to more variable margins between borrowing and lending rates, and reduce the lag in the transmission mechanism if bigger firms process information faster. On the other hand, it could increase the lag if bigger firms are able to exploit customer inertia when official rates change. Unfortunately, the evidence on the relevance of pass-through is scarce and inconclusive, even for advanced economies. This is not surprising given that in practice many factors affect the pass-through of policy to market rates, such as the introduction of new technologies by financial intermediaries, the development of new financial instruments, the reduced barriers to entry in some financial markets and the greater integration of capital markets across countries.<sup>1</sup> Therefore, even if consolidation were to affect the interest rate channel, central banks would have to adjust their policy settings over time in response to the observed modifications in pass-through, without necessarily needing to identify the precise reasons for those changes.

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<sup>1</sup> Exchange rate pass-through is also likely to be influenced by the manner in which banks react to different shocks and to the state of the economy. Betancourt et al (2006) highlight the relevance of considering the behaviour of perfectly competitive banks under alternative economic conditions. They assess this for Colombia using VARX estimations and simulations of a small open economy model. They show that in the event of an external shock associated with an increase in international interest rates, the response of policy rates is much lower than that of market rates. They take this as evidence that to keep inflation on target, the response of policy rates need not be as large as the required reaction in deposit rates.

### **2.3 The exchange rate channel: reducing balance sheet vulnerabilities**

The exchange rate can play a significant role in the transmission mechanism of monetary policy if authorities keep in mind considerations affecting a country's financial stability. Countries with a high degree of financial dollarisation could be highly vulnerable to the impact of currency devaluations on firms' and banks' balance sheets. For instance, if firms' debts are denominated in foreign currency while their revenues are denominated in local currency, a devaluation could result in a deterioration of their net worth. This in turn would impose restrictions on firms' ability to roll over their debts, which could then reduce investment. On the other hand, there could also be a magnification effect associated with the impact of currency devaluations on firms' balance sheets. In particular, the deterioration of their financial position could increase the cost of new financing.

In general, it is possible that by addressing the problem of currency mismatches, the development of local currency bond markets has actually weakened the impact of exchange rate fluctuation on firms' balance sheets (see complementary evidence in the chapter "Financial stability implications of local currency bond markets: an overview of the risks").

## **2.4 The credit channel: sustaining credit in periods of stress**

Economists have great difficulty in explaining quantitatively the role of monetary policy through interest-sensitive components of aggregate spending (Bernanke and Gertler (1995)). For this reason, the literature has emphasised the role of asymmetric information and costly enforcement of contracts. In such frameworks, the credit channel is effectively an enhancement mechanism, in the sense that it amplifies endogenous changes in the external finance premium. The key issue here is whether changes in the policy rate affect the external finance premium or not. If they do, then monetary policy would not only have a direct effect via the cost of borrowing but also an indirect one through the external premium that might lead to credit rationing. Therefore, rather than emphasising the impact of monetary policy on the price of credit, this channel highlights the effects on the quantity or availability of credit. Two basic channels of monetary transmission have been emphasised within the credit channel: the bank lending channel and the balance sheet channel. The first one focuses on the effect of monetary policy on the supply of loans, while the second emphasises the impact of monetary policy on a borrower's net worth, cash flow and liquid assets. In this section, we look at some of the issues and the (scarce) evidence available concerning the credit channel.

It follows from the previous discussion that monetary policy is likely to have a stronger impact if it affects the supply of credit as well as interest rates. In principle, it is unclear whether the development of the financial sector has strengthened or weakened the credit channel (Archer (2006)). On the one hand, it may have strengthened it because more developed and stronger financial entities can increase credit to households and firms. On the other hand, it may have weakened it as a result of economic agents gaining access to more liquid and deeper securities markets, both onshore and offshore. In addition, financial development may have weakened the credit channel if bank access to the interbank market has improved. Banks with limited access to this market (because of actual or perceived weakness in their balance sheets) are forced to rely on the central bank for liquidity. These banks are likely to be very sensitive to changes in interest rates. Although empirical evidence supporting the existence of a credit channel is limited, some studies suggest that such a channel might be particularly relevant for EMEs that have less developed financial markets or that are subject to direct credit controls.<sup>14</sup>

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<sup>14</sup> Identifying the credit channel is complicated in practice because it is not easy to distinguish between tight credit conditions arising from a decline in liquid bank reserves and those arising from a deterioration in the creditworthiness of potential borrowers.

## Box 2

### Dollarisation and the transmission mechanism

Dollarisation can affect both the way in which monetary policy is conducted and the transmission mechanism. The *conduct of monetary policy* can change with dollarisation for several reasons. First, dollarisation can affect the choice of assets included in monetary aggregates. Second, it can increase the sensitivity of monetary aggregates to sudden shifts in interest and exchange rates (especially if dollarisation reflects a high degree of currency substitution). Third, it can increase the volatility of money demand as a result of the lower costs of switching to foreign currency.

The *transmission mechanism* can be modified by dollarisation in at least two dimensions (Leiderman et al (2006)). First, the exchange rate is expected to play a more important role than in non-dollarised economies due to a higher and possibly non-linear exchange rate pass-through, as well as increased volatility under flexible regimes due to an increased sensitivity of monetary aggregates to interest and exchange rates. Second, balance sheet effects might have the potential to induce contractionary devaluations, which in turn can create financial stress. For these reasons, there is an incentive for central banks to intervene in the foreign exchange market under certain circumstances to mitigate exchange rate fluctuations. In this respect, it can be argued that dollarisation also affects the choice of exchange rate regime.

*Is the transmission mechanism different in dollarised economies than it is in non-dollarised economies?* Some have pointed to the lower exchange rate pass-through in Chile than in Peru as evidence (Leiderman et al (2006)). In Peru there is a causal relationship (in the Granger sense) between non-performing loans and the nominal exchange rate, but such a relationship cannot be established for Chile. This discrepancy is taken as evidence of balance sheet vulnerabilities in dollarised economies. Equally important is whether there are asymmetric and non-linear effects of transmission in highly dollarised economies. In this respect, the evidence suggests that dollarisation does not distort the curvature of the aggregate supply curve. In particular, the evidence suggests that monetary shocks at different stages of the economic cycle have qualitative effects in Peru similar to those in non-dollarised neighbouring economies – that is, a larger impact on output and a smaller one on inflation in periods of low growth and vice versa (Bigio and Salas (2006)). However, an analysis of the impact of real exchange rate shocks indicates that contractionary devaluations may occur in the short run, particularly in the lower part of the cycle.

*Dollarisation and inflation targeting.* A number of highly dollarised countries in the region have shown interest in implementing IT regimes (eg Bolivia, Paraguay and Uruguay). However, meeting the conditions can be difficult in practice. Peru's is the only highly dollarised economy with a fully fledged inflation targeting scheme. Under these conditions, monetary policy requires a special design and implementation (Armas and Grippa (2006)). First, the inflation target must be low (Peru's is currently at 2% +/- 1%, the lowest in Latin America) so that the currency is able to compete with the dollar as a unit of account and means of payment. Second, forecast models must carefully consider the risks of financial dollarisation. Consequently, it is necessary to implement de-dollarisation policies, internalise the risks of financial dollarisation and limit the vulnerability of the financial system.

Overall, the Peruvian experience appears to confirm that, with appropriate policy implementation, dollarisation should not impair the effectiveness of monetary policy in achieving low and stable inflation. Another interesting lesson is that shifting from a monetary aggregate to an interbank interest rate can help to establish a more predictable and transparent monetary policy and favour the issuance of long-term financial instruments, thus helping to reduce financial dollarisation.

Finally, it is important for dollarised countries to determine the transitional impact of switching to IT. Evidence is limited. The Peruvian case shows that in most recent years, as the economy switched to IT, the inflation response to interest rates increased, but the response to the nominal exchange rate decreased (Leiderman et al (2006)).

Two studies provide mixed evidence on the relevance of the lending channel for the region. The first one finds weak support for the existence of supply side effects in credit markets for EMEs. In particular, the study relies on structural changes in the banking sector in EMEs (including Latin America) and shows that loan and deposit growth are highly sensitive to economic activity in a way that does not differ significantly across domestic and foreign

banks (Arena et al (2006)). The other, which looks at Chile, shows that less liquid banks are forced to curtail the supply of credit following a monetary policy shock, so that the access of households and small and medium-sized enterprises to external financing is severely restricted following a drop in the supply of bank credit. Furthermore, this decline in bank credit is unevenly distributed due to flight-to-quality effects, and thus has a major impact on macroeconomic activity (Alfaro et al (2004)).

## 2.5 The expectations channel: increasing the sensibility to future developments

Market expectations about the future stance of monetary policy and, more generally, about forward-looking financial variables constitute another channel for the transmission of monetary policy, one that has possibly become more complex with the changes in financial systems and in central banks' operating procedures. The development of government securities markets allows for a better extrapolation of implied expectations. To the extent that pricing information improves, central banks and market participants will be able to employ such measures in a more efficient manner. This in turn can reduce the volatility of the markets and provide a stronger role for the expectations channel.

Historically, central banks have been somewhat cautious in providing information about monetary policy to financial markets. However, in recent years there has been a marked change as it appears that providing more information might actually help central banks to achieve their goals and improve policy effectiveness. In this regard, a notable improvement in the region (and worldwide) has been the trend towards greater transparency. In practice, the role of expectations has become so fundamental in some countries that what a central bank says about its goals and its economic outlook might be as significant, or even more significant, than what it does.<sup>15</sup> Furthermore, changes in expectations can magnify the transmission channels discussed earlier, depending on the degree of credibility of the policy change and its perceived duration (Agénor (2004)). Credibility can also be so well established that a temporary interest rate hike might have no effect on private sector behaviour or on the real economy if agents expect monetary authorities to reverse their course of action. In contrast, a policy change can be magnified if the policy decision is completely credible. In such a case, an interest rate hike that reduces investment and consumption over time might instead have an immediate effect, eg as in lower wage demands in current labour contracts (Céspedes and Soto (2005)).

The shift to IT in some Latin American economies has given greater prominence to the management of inflationary expectations. Such a regime is expected to anchor inflation around the inflation target. Therefore, two issues emerge: first, whether inflationary expectations are indeed well anchored around the target and, second, whether IT achieves such a result. Regarding the first, evidence shows that in some of the larger economies of the region (eg Brazil, Chile and Mexico), inflation expectations 12 months out have recently displayed lower variability than contemporary 12-month inflation, and have been close to their target levels (BIS (2006)). Furthermore, in most of the largest countries, inflationary

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<sup>15</sup> The role of expectations is of great importance in the new theoretical frameworks. These frameworks (Clarida et al (1999)) build simple macroeconomic models from which new IS and Phillips curves are derived. The new IS curve differs from its old counterpart in that current output depends on expected future output and real interest rates. As a result, higher expected output raises current output. In particular, since individuals prefer to smooth consumption, the expectation of higher consumption in the next period leads them to want to consume more today, which raises current demand. In turn, the negative effect of the interest rate reflects intertemporal substitution of consumption. In this framework, the output gap also depends on the expected future path of demand shocks. The new Phillips curve in turn depends on, among other things, expected inflation. In contrast to the old Phillips curve, however, what matters is future expected inflation rather than the expected current inflation. Consequently, inflation can be shown to depend on current and future economic conditions – that is, firms set nominal prices based on the expectations of marginal costs and cost push shocks.



expectations have moved within the central bank's target range for some years now. For instance, 12-month inflation expectations in Chile have moved around the target of 3% since they were first announced in 2002. In Brazil, inflationary expectations have remained below the upper band of the inflation corridor set by the central bank since 2003. However, it is difficult to assess more formally how well anchored inflation expectations are given their endogeneity. Also the worldwide trend to lower inflation complicates the identification of the role of IT. Finally, the size, persistence and frequency of shocks are usually of a greater magnitude in EMEs. Despite these difficulties, Capistrán and Ramos-Francia (2006) offer empirical evidence contrasting the experience of five countries in the region that have implemented IT (Brazil, Chile, Colombia, Mexico and Peru) with two countries that have not (Argentina and Venezuela) along with eight non-targeting industrial countries (France, Germany, Italy, Japan, the Netherlands, Spain, Switzerland and the United States). In particular, they quantify the dispersion of inflation expectations<sup>16</sup> using data from surveys of private forecasts as well as from interest rate differentials. They find that the dispersion of inflation expectation is lower under IT regimes than non-IT ones.

The anchoring of inflationary expectations observed in recent years in the larger economies of the region thus appears to have increased the credibility of monetary policy, which has consequently allowed authorities to set more forward-looking policies. With increased alignment of inflation expectations with actual inflation, price-setting behaviour has also changed. Indeed, evidence for Chile shows that costly price adjustments are carried out less frequently and inflation indexation has decreased (Céspedes and Soto (2005)).

### **3. Fostering domestic financial markets: policies and policy coordination**

To what extent should policymakers and, in particular, central banks foster the development of financial markets? And what role should central banks play in them? There is no consensus on this issue, and many EMEs are still struggling to find the appropriate balance. One view is that monetary policy instruments and procedures should accommodate themselves to the level of development of financial markets, even if such markets are little developed. An alternative view is that central banks should be ready to set the pace of financial development.

Evidence suggests that waiting for institutions to evolve before adopting market-based mechanisms might be a less successful strategy than promoting that evolution by adopting such mechanisms as part of a modernisation programme (Archer (2006)). In either case, a long period of transition in which market-oriented instruments coexist with quantitative controls is frequently necessary. The sequencing and speed of this transition need to be carefully assessed so that policymakers have enough time to learn about the new environment and financial institutions are better able to cope with greater interest rate volatility.<sup>17</sup> Furthermore, policymakers must recognise that the inherited institutional structure

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<sup>16</sup> This is defined by the coefficient of variation as measured by the ratio of the inter-quintile range and the median.

<sup>17</sup> The International Monetary Fund (IMF) (2004) identifies four stages in the development of money markets: (i) re-establishing key functions in post-conflict countries in areas where a central bank has responsibilities; (ii) developing financial intermediation where monetary policies rely on rules-based instruments (eg reserve requirements or deposit or refinance facilities available to the banks on demand); (iii) fostering inter-bank market development through the introduction of money market operations, while retaining rules-based instruments; and (iv) diversifying markets so that liquidity management can start to rely fully on money markets.

might not be appropriate for a market-driven environment. This has happened when, for instance, state-owned banks have continued to play a significant role or if savings have continued to be channelled through national savings institutions.

### 3.1 What can central banks and treasuries do?

One of the main challenges in developing bond domestic markets is in promoting their liquidity. Two fundamental prerequisites for achieving this liquidity are good economic policies and governance. In particular, both domestic and foreign residents will have the confidence to participate actively in a country's domestic bond market if a number of conditions are met, such as a sustainable overall fiscal position, a well-designed and efficient tax system, well-controlled government expenditures directed at achieving policy objectives that are widely accepted, and an accountable and independent central bank with a clear goal of maintaining price stability. Furthermore, it is necessary that these policies foster confidence in the authorities' commitment to maintain full convertibility of the currency. Governance also matters to the extent that these markets require clear rules regarding the legal system, and these rules must ensure that property rights are clearly defined.

Beyond these well-known elements, there are more practical policy areas that can foster the liquidity of domestic bond markets. First, public debt should when possible be consolidated under a single obligor. The issuance of separate public sector bonds under a variety of issuing entities (government, central banks and other public entities) raises questions about the nature of the government's backing and guarantee. In addition, issuance by a variety of public sector entities may divide the market into less liquid market segments.<sup>18</sup> Second, concentrating the issuance in a limited number of benchmarks, and reopening issues may also improve liquidity. Third, a more liberal attitude towards short selling may help. The practice of selling a security that is not actually owned and borrowing it to finance the position is restricted in many EMEs on the grounds that it may increase leverage. However, such a stance seems to imply the need for better supervision of the financial systems. In contrast, allowing short selling can add to pricing efficiency by bringing additional trading opportunities and liquidity to markets (CGFS (2000)). Fourth, central banks can make an effective contribution to the liquidity of bond markets by using government and other high-grade securities as collateral for their lending operations (see Box 3).

In Latin America, a number of countries have made significant progress in many of these areas. In Brazil, the National Treasury (Tesouro Nacional) is the authority responsible for the issuance and management of public sector debt, both internal and external. The Central Bank of Brazil plays an important debt management role as it is in charge of operating primary auctions of public sector securities. In addition, in the conduct of monetary policy, the central bank plays an active role in repurchase operations linked to these bonds (Amante et al (2007)). In Mexico, the Finance Ministry (Secretaría de Hacienda y Crédito Público) has full responsibility for all activities related to federal government debt and coordinates its activities with other federal agencies in determining the type of instruments to be marketed, their amount and the timing of issues.<sup>19</sup> In order to foster liquidity in the secondary market, the federal government has frequently reopened a small number of reference issues with the intention of building the outstanding amount of each issue until an acceptable degree of liquidity has been reached. In turn, the Bank of Mexico has used government securities to add and subtract liquidity to and from the money market (Jeanneau and Perez Verdia (2005)).

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<sup>18</sup> In Korea, for instance, the 2-year monetary stabilisation bond has sometimes traded nearly 20 basis points above the 3-year treasury bond, even though they enjoy the same explicit government guarantee.

<sup>19</sup> The Bank of Mexico publishes quarterly calendars that provide guidance to the market about the volume and composition of the forthcoming issue.

### Box 3

#### Repurchase (“repo”) transactions

Repurchase transactions involve the exchange of securities for cash with an agreement to repurchase the securities at a future date.<sup>1</sup> The securities serve as collateral for what is effectively a cash loan. Conversely, the cash serves as collateral for the lending of securities.<sup>2</sup> The key distinguishing feature is that repos can be used to obtain either funds or securities. These instruments play an important role for central banks.<sup>3</sup> For instance, they can serve as: (i) monetary policy instruments for liquidity management – ie by setting an upper and lower limit for short-term market interest rates; (ii) a source of information about market expectations, thus complementing information on expectations over a longer horizon derived from securities with longer maturities; (iii) a mechanism for signalling the stance of monetary policy; (iv) intraday credit provision to support the operation of real-time gross settlement payment systems; and (v) a means to manage foreign currency reserves.

Some of the largest central banks in the region employ repos for liquidity management. In fact, the depth of money markets in these countries has been led by the increasing use of repos in central bank operations. However, the repurchase market continues to be underdeveloped in a number of countries, thus limiting the development of robust money markets (see Table A5 and BIS (2006)). Several features make repos attractive to central banks. First, they do not directly affect bond prices or the yield curve. As a result, they can help to reduce market volatility. For instance, Figueiredo et al (2002) mention this as one of the reasons why the Central Bank of Brazil has preferred repos to outright operations. Second, the injection of good collateral into markets through central bank money market operations can provide a powerful stimulus to bond trading. In other words, repos can help central banks to foster the liquidity and depth of secondary securities markets by using either government or other high-grade securities as collateral for lending operations. Furthermore, repos carry low credit risk as they are collateralised and flexible in terms of their characteristics (amount, maturity, frequency, interest rate and tender system). This allows central banks to tailor them according to liquidity conditions. Finally, repos can help reduce risk associated with shocks transmitted from uncollateralised interbank and money markets or help to ensure access to financial institutions if markets dry up.

Despite these benefits repos also pose important risks to participants – eg credit, operational or liquidity risks, or risks associated with the use of leverage – or systemic risks associated with the linkages they have with other short-term financial and securities markets.

A key question is, how can the authorities support sound and efficient repo markets? Several elements are required, including an adequate market infrastructure, legal frameworks, and settlement systems, as well as low transaction costs, such as those which result from eliminating tax or legal impediments to trading (eg short selling). Authorities can also encourage sound and efficient repo markets by encouraging the pricing of collateral to market, both when initiating the repo and during its life.

<sup>1</sup> Here the term repo may comprise several types of transactions that have equivalent economic functions, eg standard repurchase agreements, sell/buybacks and securities lending.

<sup>2</sup> Central banks only use repos with “general” collateral – that is, sovereign debt instruments rather than private sector debt instruments or equity.

<sup>3</sup> Central banks assign different levels of importance to repos. Repos in some countries constitute the key policy rate, so a shift in the repo rate signals a shift in monetary policy. In other central banks, the overnight or discount rates are used instead. In such cases, repos can still signal the stance of monetary policy or the direction of the key official rate.

## 3.2 Coordination of debt management

Policy coordination is essential when the central bank is directly involved in developing securities markets. Something to keep in mind is that the degree of coordination depends to a large extent on the institutional arrangements in place. In particular, debt management

operations in some countries are separated from the central bank's monetary policy operations, with the government tapping the primary market to finance itself while the central bank uses the secondary market for liquidity reasons. In such cases, the role of coordination is mainly tactical. Under these circumstances, it is important for the central bank and the treasury to share information regarding the market's liquidity (Mohanty (2002)). Implicit coordination, for instance, would mean that the central bank signals interest rate conditions while it extracts information from the yield curve for monetary policy operations. In other countries, central banks play a role as debt managers. Most countries in the region, however, have abolished or restricted direct financing of government deficits by the central bank.

In any case, central banks should be able to promote bond markets, especially in environments of low fiscal deficits and inflation rates, even when central banks play a debt management role. Still, high fiscal deficits increase the need for coordination, especially given the shift towards market-based instruments. A conflict may arise here because high deficits induce expectations of higher inflation and interest rates in the future; therefore, a tightening by the central bank could adversely affect government financing costs.

In general, potentially conflicting objectives of debt management and monetary policy may develop because of the trade-off between minimising the borrowing costs to the government and stabilising prices for central banks.<sup>20</sup> In these circumstances, coordination could help to ensure that price stability remains the main concern of central banks. It could also help to strengthen the market's confidence that the authorities' commitment to market principles will not be weakened by the overlapping responsibilities of these economic authorities. Through prudent debt management, fiscal and monetary policies can also reinforce each other in lowering the risk premia in the structure of long-term interest rates. In this context, it would be desirable for central banks to communicate the effects of government debt levels on the achievements of their monetary objectives. Governments in turn should share information on their current and future liquidity needs.

Another conflict may arise if both central banks and governments issue their own paper, which, unless there is appropriate coordination, could segment the market. In such cases, the respective authorities should communicate the maturity, issue size and auction schedule of both instruments. However, as Mohanty (2002) points out, this coordination could open the door to another issue: whether the central bank should continue to issue its own paper after the treasury bill market develops. Central bank securities have the advantage of allowing the separation of monetary management from debt management, giving the central bank operational flexibility in its monetary policy interventions. On the other hand, they have two important disadvantages: they increase the risk of central bank losses when central bank paper is used to absorb a large amount of excess liquidity, and they may segment the market when other securities exist and thus limit the development of money markets in general (Quintyn (1997)).

#### **4. Concluding remarks**

Monetary policy today relies more than ever on domestic securities, in part because of a shift to market-based instruments and the adoption of IT regimes, which also assign greater prominence to the role of interest rates. Under these circumstances, the attempts of central

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<sup>20</sup> Some countries express their government debt management objectives in terms of expected cost and risk. The development of domestic bond markets can also be a government objective, especially for countries where short-term debt, floating debt and foreign currency debt are the main alternatives to extensive borrowing from the central bank (see World Bank (2003) and IMF (2004)).

banks to induce actions in the short-term market have spread to longer-term markets, where they have been more effective, improving the overall degree of monetary control.

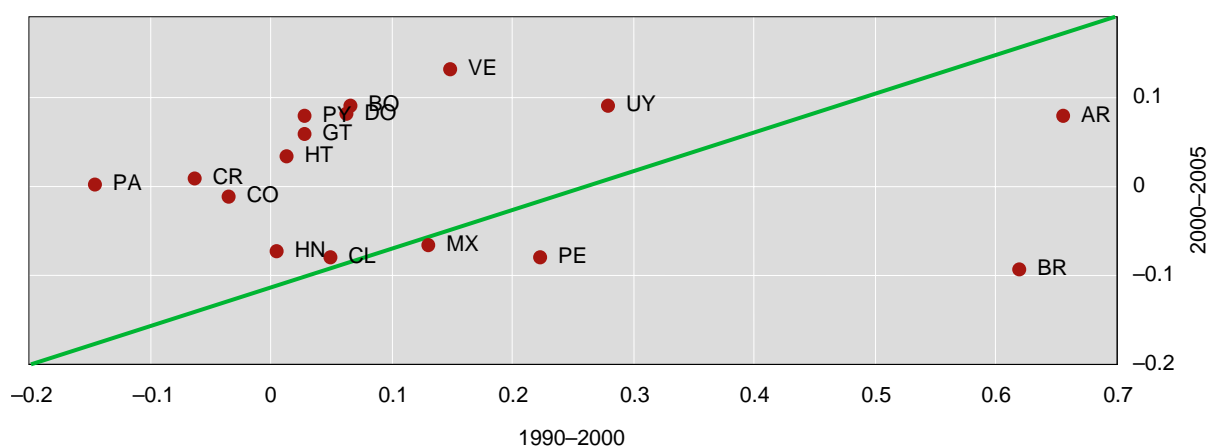
Evidence today suggests that as securities markets in Latin America have developed, the transmission mechanism has changed. At the same time, securities markets, at both the short and the long end, remain underdeveloped across the region. In particular, they remain illiquid. Central banks may still have a role to play in developing these markets, but doing so will require better coordination with treasuries.

## Appendix: Monetary operating procedures and monetary control in Latin America

Over the last 15 years, as central banks have gained more independence, operational procedures have evolved, altering the dynamics and control of financial transmission. Experience suggests that central banks first established monetary targets, with weights that varied significantly over time. Then, with the advent of financial deregulation and innovation, they relied less on targets (due to the sharp decline in the correlation between money and inflation (Figure 1)) and switched to operating procedures that targeted interest rates. Nevertheless, some countries – the smaller ones in particular – have continued to rely on monetary aggregates as intermediate targets due to the difficulties involved in successfully implementing an inflation targeting (IT) regime or to the presence of dual goals (eg inflation and the exchange rate).<sup>21</sup>

Figure 1

### Correlation between inflation and money<sup>1</sup>



AR = Argentina; BO = Bolivia; BR = Brazil; CL = Chile; CO = Colombia; CR = Costa Rica; GT = Guatemala; HN = Honduras; HT = Haiti; MX = Mexico; PA = Panama; PE = Peru; PY = Paraguay; UY = Uruguay; VE = Venezuela.

<sup>1</sup> Annual percentage changes in monthly consumer prices and narrow money (M1).

Sources: IMF; Datastream; national data; BIS calculations.

In Latin America and the Caribbean, changes in operating procedures have also been closely related to the exchange rate regime in place. In the 1990s many central banks

<sup>21</sup> A number of conditions are required for IT to be put in place, including: (i) an appropriate legal framework that identifies price stability as the central bank's primary objective; (ii) the empowerment of the central bank with the operational independence to achieve such objectives; and (iii) the establishment of rigorous accountability and transparency mechanisms. In addition, any other primary goals or targets must be made secondary to the inflation objective. Fiscal dominance must also be eliminated and the financial system must be strengthened. However, meeting such conditions is not always easy. For instance, in Bolivia and Paraguay, the high degree of dollarisation has been a problem. On the other hand, Peru offers an interesting case study of how IT can be successfully implemented in a highly dollarised economy. In Paraguay and Trinidad and Tobago, one obstacle has been the prevalence of excess liquidity in the banking system, which has eroded the role of the policy rate as a signalling device. Finally, in Jamaica, fiscal dominance has been an obstacle in moving towards IT.

targeted the exchange rate, surrendering their capacity to conduct monetary policy. Financial crises and the subsequent adoption of flexible exchange rates encouraged a number of central banks in the region (Brazil, Chile, Colombia, Guatemala, Mexico and Peru) to implement IT schemes, which also implied the adoption of new monetary policy frameworks. However, in others, currency and financial crises led to a collapse of the financial system, preventing central banks from adopting IT. For instance, Argentina and Uruguay had few alternatives but to rely on monetary base targeting for their operational focus (Table 1). Specifically, in the case of these economies, no instruments or markets were available for the central bank to influence the demand for funds in the financial system after their respective crises (Pesce (2006)).<sup>22</sup> However, other arguments for relying on monetary base targets are that bank reserves are assumed to have a reliable and predictable influence on the broader aggregates,<sup>23</sup> and price signals are less reliable in illiquid and volatile financial markets than in more stable ones. In fact, this was the rationale for the continued use of a liquidity target, the “corto”, as the main operating target in Mexico.<sup>24</sup>

IT is consistent with the use of a short-term interest rate as the principal instrument of monetary policy and the adoption of transparent rules to send signals to the market about the monetary policy stance (Carstens and Jácome (2005)). Central banks that have adopted IT now tend to employ overnight interest rates rather than quantity variables as their operational or policy variable.<sup>25</sup> The adoption of overnight interest rates facilitates the task of the central bank since such rates are, in principle, easier to control. In fact, as Figure 2 shows, the level and volatility of interest rates declined across the region in the last few years, which has had a positive impact on commercial bank rates. To maintain interbank interest rates, central banks engage in open market operations or use repos and reverse repos. However, due to the volatility of interbank interest rates, most central banks have opted for an IT scheme with an interest rate corridor to reduce such volatility.<sup>26</sup> With the adoption of short-term money market rates as an operational target, central banks seek to influence the behaviour of longer-term interest rates and the exchange rate. In turn, this influences aggregate demand and supply.

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<sup>22</sup> In Uruguay, the monetary policy committee (COPOM) recently decided to move from a monetary base growth target to M1 growth, which is considered to be more closely associated with inflation. This move should mitigate the volatility associated with the monetary base multiplier. The central bank is expected to continue with monetary targeting until the right conditions are in place to move to a system of formal inflation targeting and to operate a floating exchange rate policy. In that sense, it is important to clarify that in 2006 the central bank announced a commitment only to the inflation rate, which is intended to be reached within a time horizon of 18 months. Currently, the inflation target range, to end March 2008, is 4.5–6.5%.

<sup>23</sup> From a theoretical viewpoint, the advantage of using an interest rate rule relative to a money rule depends on whether money demand shocks are observable or not. An unobservable money demand shock under a monetary rule would lead to a greater volatility of interest rates, which would then feed through the Phillips curve into higher volatility of output and other macroeconomic variables (see Clarida et al (1999)).

<sup>24</sup> After the 1994–95 devaluation, the Bank of Mexico faced public criticism regarding transparency in the conduct of monetary policy, which led to the use of a visible anchor: a monetary growth target. However, concerns about the risks of using interest rates as an instrument of monetary policy motivated the central bank to use borrowed reserves (the “corto”) as its main policy instrument (Martinez et al (2001)).

<sup>25</sup> Mexico had been an exception. However, in August 2005 the Bank of Mexico started to rely on an interest rate target (the overnight CETES rate, or “tasa de fondeo”) as its main policy instrument.

<sup>26</sup> The floor is typically the overnight rate applicable to a deposit facility for intermediaries that for some reason were unable to place their excess liquidity on the interbank market at the end of the day. The ceiling is usually the rate charged by the central bank to financial intermediaries for overnight lending. In practice, this is similar to some developed economies such as the euro zone.

Table 1  
Monetary policy framework

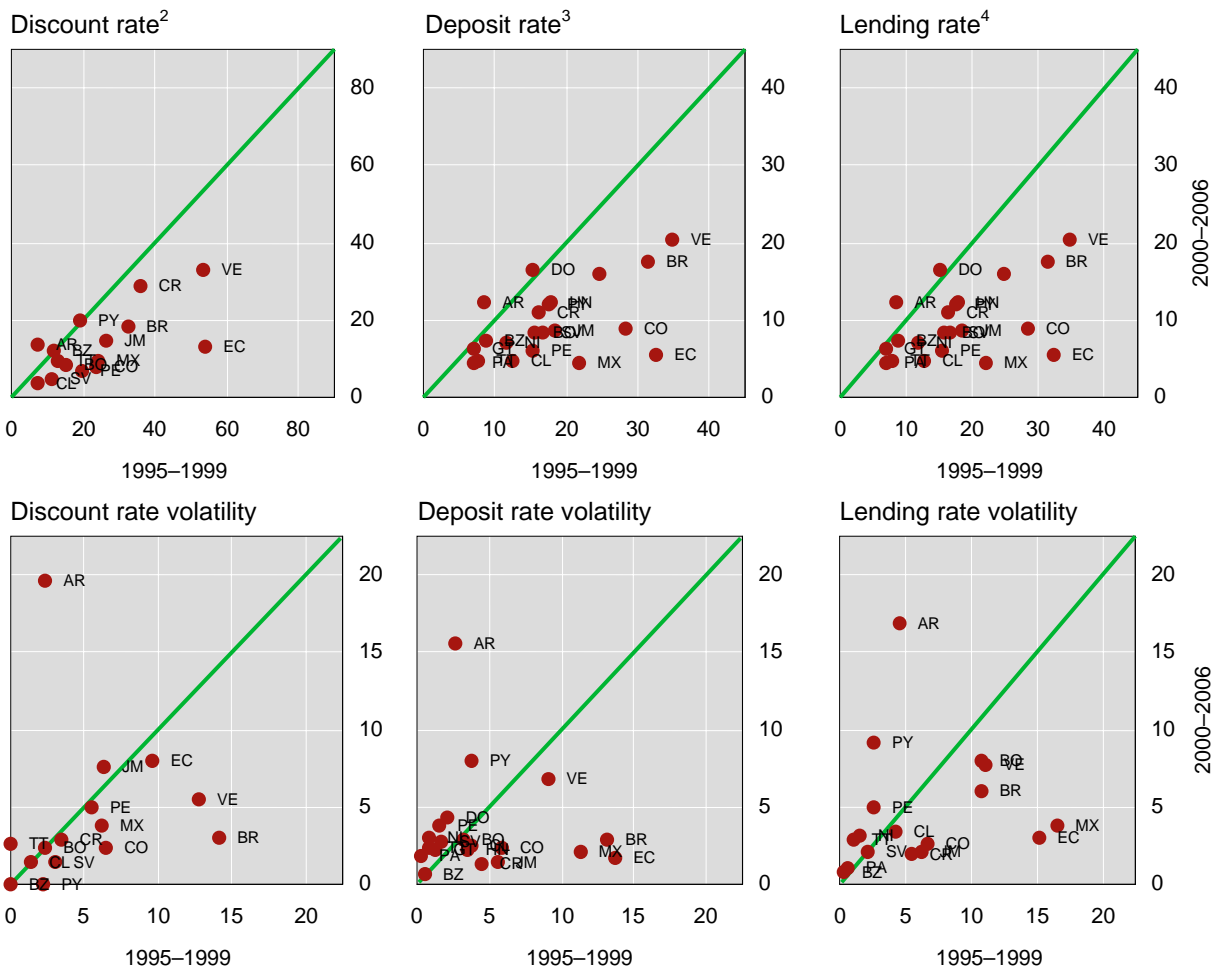
	Exchange rate anchor				Monetary aggregate	Inflation target	IMF-supported or other monetary programme <sup>2</sup>
	Dollarised <sup>1</sup>	Currency board	Fixed pegs	Crawling pegs			
<b>Central America</b>							
Belize			X				
Costa Rica				X			
El Salvador	X						
Guatemala						X	
Honduras				X			X
Nicaragua				X			
Panama	X						
<b>Caribbean countries</b>							
Aruba			X				
Bahamas			X				
Barbados			X				
Dominican Republic							X
ECCU <sup>3</sup>		X					
Haiti							X
Jamaica					X		
Trinidad & Tobago							X
<b>South America and others</b>							
Argentina					X		
Bolivia				X			
Brazil						X	
Chile						X	
Colombia						X	
Ecuador	X						
Mexico						X	
Peru						X	
Venezuela			X				
Guyana					X		
Paraguay							X
Suriname					X		
Uruguay					X <sup>4</sup>		

<sup>1</sup> Another currency is legal tender. <sup>2</sup> May imply floors for international reserves and ceilings for the central bank's net domestic assets, and consequently also indicate targets for reserve money. <sup>3</sup> Eastern Caribbean Currency Union members are: Antigua and Barbuda, Dominica, Grenada, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines. <sup>4</sup> Gradually moving to an inflation target.

Source: IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*, 2004.



Figure 2  
Interest rate levels and volatilities<sup>1</sup>  
In per cent



AR = Argentina; BO = Bolivia; BR = Brazil; CL = Chile; CO = Colombia; CR = Costa Rica; EC = Ecuador; JM = Jamaica; MX = Mexico; NI = Nicaragua; PA = Panama; PE = Peru; PY = Paraguay; SV = El Salvador; TT = Trinidad and Tobago; UY = Uruguay; VE = Venezuela.

<sup>1</sup> Measured as standard deviations of monthly data. <sup>2</sup> Line 60 of *International Financial Statistics*. For Argentina, seven-day interbank rate; for Brazil, SELIC overnight rate; for Chile, monetary policy rate; for Colombia, expansion BR's minimum intervention rate; for Jamaica, policy rate; for Mexico, bank funding rate. <sup>3</sup> Line 60L. <sup>4</sup> Line 60P.

Sources: IMF, *International Financial Statistics*; national data; authors' calculations.

Which interest rate the central bank should focus on as the main or subsidiary target is an important question that central banks must answer. Van't Dack (1999) points out that, from a practical point of view, it should be the overnight rate. However, it has proven very difficult for some countries (eg Uruguay) to conduct certain operations that are common in other countries, such as reverse repos, due to the lack of liquidity. In other countries, such as Costa Rica, the overnight rate has only recently been adopted with the expectation of setting a floor on short-term rates. However, its effectiveness still needs to be tested.<sup>27</sup> The problem

<sup>27</sup> Under current macroeconomic conditions, this floor is expected to limit speculative capital inflows and stimulate investment in longer-term securities.

with targeting overnight rates is that they can experience sudden changes, resulting from temporary technical pressures, which the central bank might not always want to counteract. In addition, the financial system might be so underdeveloped that the overnight rate simply plays no major role in transmission. An alternative approach would be for central banks to rely on interest rates that have a longer maturity than the overnight rate (eg Guatemala employs a seven-day CD rate). However, there are drawbacks to this approach. The impact on liquidity would be smaller than in a market for bank reserves, given that the central bank would have limited influence on either the supply or the demand side at the longer end. In addition, targeting longer-term interest rates might make it difficult to determine how market expectations influence rates at the relevant horizon.

### ***Increasing reliance on market-based instruments***

The shift towards interest rates as the main policy instrument has been complemented by a general change in operating procedures, which has altered the manner in which central banks interact with financial markets. Despite the fact that several central banks in the region still conduct monetary policy through direct instruments,<sup>28</sup> there has been a gradual shift towards greater use of indirect instruments (ie market-based instruments). Such instruments seek to affect overall monetary and credit conditions through the demand or supply of liquidity.<sup>29</sup>

Table 2

### **Use of monetary instruments at various stages of development**

In per cent of the countries in the sample

	<b>Developing countries</b>	<b>Emerging economies</b>	<b>Developed countries</b>
Credit and interest rate controls	4	22	0
Liquid asset ratio (LAR)	65	30	9
Reserve requirements	100	96	70
Open-ended/standing facilities	96	96	100
Discretionary/market-based tools	96	96	100

Note: Data relate to 23 countries in each of the three categories.

Source: IMF (2004).

Central banks around the world employ different operational tools (see Table 2). Developing and emerging market economies still rely on credit and interest rate controls and liquid asset

<sup>28</sup> Traditionally, monetary authorities in developing countries and EMEs have relied heavily on direct, or non-market, instruments for the conduct of monetary policy. Such instruments include interest rate controls, credit guidelines, reserve requirements and lending through the discount window. Heavy reliance on direct controls has a number of potential disadvantages. First, credit is often denied to certain sectors (eg small and medium-sized enterprises), which leads to a misallocation of resources, with possibly significant economic costs. Second, it can impair the supply of financial services; for example, high reserve requirements function as an implicit tax on the banking sector. Third, controls are often circumvented by informal or offshore financial sectors that operate in parallel to the formal domestic sector. As a result, monetary management can become a very complicated exercise.

<sup>29</sup> For instance, several countries in the Caribbean still rely on quantitative instruments (eg Aruba, the Bahamas, Belize and Trinidad and Tobago).

ratios, most of which have largely been phased out in developed countries. In addition, all the developing countries in the sample rely on reserve requirements. Open-ended standing facilities and discretionary market-based instruments are also part of the standard toolkit for the conduct of monetary policy in developing countries and EMEs. However, the key difference vis-à-vis developed countries is that most developing countries and EMEs use a broader set of tools, which could indicate the presence of market and institutional shortcomings.

Table 3  
Use of monetary instruments in selected economies  
of Latin America and the Caribbean<sup>1</sup>

	Credit and interest rate controls	Liquid asset ratio (LAR)	Reserve requirements	Open-ended standing facilities	Discretionary/market-based tools
Argentina	No	No	Yes	Yes	Yes
Brazil	Yes	No	Yes	Yes	Yes
Colombia	Yes	Yes	Yes	Yes	Yes
Dominican Republic	No	No	Yes	Yes	Yes
Ecuador	No	Yes	Yes	No	Yes
Jamaica	No	Yes	Yes	No	Yes
Paraguay	No	No	Yes	No	No
Uruguay	No	Yes	Yes	Yes	Yes

<sup>1</sup> See details in Tovar (2007).

Source: Central banks.

In Latin America and the Caribbean, credit and interest rate controls are slowly disappearing (Table 3). Although some countries, such as Brazil and Colombia,<sup>30</sup> still employ interest rate ceilings or directed credit, other monetary instruments, such as requirements for banks to hold minimum amounts of specified liquid assets, are more widespread. Reserve requirements continue to be common for the conduct of monetary policy. In this respect, data collected in a questionnaire to central banks show that there was a clear decline in their levels prior to this decade (Table 4), while in more recent years, reserve requirements have remained more or less stable.<sup>31</sup>

<sup>30</sup> In May 2007 Colombia adopted three measures to reduce appreciation pressures and high credit growth: (i) a marginal reserve requirement (27% for checking accounts, 12.5% for savings accounts and 5% on CDs, up from 13%, 6% and 2.5%, respectively) to slow credit; (ii) a six-month 40% deposit, in pesos, at the central bank on all foreign borrowing – with this measure, the central bank aims to increase the cost of foreign borrowing and reduce liquidity in the economy; and (iii) a cap on the amount that companies can invest in derivatives and hedging operations; more specifically, a 500% leverage limit on banks and brokerages.

<sup>31</sup> Arena et al (2006) and Tovar (2007) provide additional evidence.

Table 4  
Reserve requirements<sup>1</sup>

In percentages

	1990	1998	2000	2006	Remuneration (latest) <sup>1</sup>
Argentina	5.0–88.0		15.0–22.0	14.0–35.0	BMR
Chile	4.0–10.0	9.0	3.6–9.0	3.6–9.0	No
Colombia	18.2	31.0	4.8	5.7	BMR
Mexico	0.0	0.0	0.0	0.0	
Peru	52.5	7.0	7.0	6.0	No
Venezuela	15.0	17.0	17.0	15.0	No

<sup>1</sup> BMR = Below market rate.

Source: BIS (2006).

Open market operations, ie operations used at the discretion of the central bank and bearing an interest rate linked to market conditions, are widely employed in the region. The use of standing facilities is also common. In this regard, it is worth noting that while some smaller economies, such as the Dominican Republic and Uruguay, rely on “Lombard-type” lending facilities, the larger ones, such as Argentina, Brazil and Colombia, manage liquidity through the use of repurchase agreements (possibly reflecting the higher degree of financial market development). For instance, in Brazil the central bank’s monetary policy committee (COPOM) sets a target for the SELIC interest rate, which is an average measure of the rates on overnight repo operations involving federal domestic marketable debt registered in the SELIC system. The central bank then uses open market operations to achieve this target together with other traditional monetary policy instruments to control the money supply.

### ***Implications for the effectiveness of market-based instruments***

The adoption of market-based instruments requires the existence of developed financial systems that offer monetary authorities a choice of markets in which to operate and guarantee that actions in short-term markets will spread effectively to other market segments. Illiquid or volatile money markets may limit the ability of investors to undertake maturity transformation along the yield curve.<sup>32</sup> As is well known, financial markets in the region are still at an early stage of development and are often segmented.<sup>33</sup> Furthermore, they often lack the depth and liquidity necessary for adopting market-oriented monetary policies. In some countries, other factors, such as the lack of a stable macroeconomic environment, together with a low degree of central bank autonomy, have also limited the success of money market operations for the conduct of an efficient monetary policy.

<sup>32</sup> If the market for overnight funds is liquid and the overnight rate is relatively stable, a bank may feel it is worth the risk to take a funding mismatch by borrowing overnight, adding a margin, and lending for, say, 14 days. In turn, if the 14-day market is liquid and stable, the bank may fund at 14 days and lend at 30 days, and so on. However, banks only accept the maturity mismatch required to create the liquid yield curve if the availability of funds (liquidity) and the variability of interest rates (interest rate risk) are manageable at each maturity (see World Bank and IMF (2001)).

<sup>33</sup> This note focuses on the formal domestic sector. However, informal, unregulated parallel markets should not be forgotten when assessing the challenges and risks faced by central banks in conducting monetary policy.

The lack of liquidity in government securities should be a concern to central banks for at least three reasons (CGFS (2000)). First, the lack of liquidity might limit the central bank's ability to provide and absorb the necessary amount of funds through its open market operations (outright purchases and repos of government securities) and, in turn, such operations could have unintended effects such as excessive price volatility. In situations of financial stress, this excessive volatility can further complicate the conduct of monetary policy due to financial stability considerations. Second, effective monetary operations require appropriate information about prices in government securities markets. This includes information about implied expectations contained in the term structure of interest rates. Thus, differences in liquidity across the term structure between fixed-coupon and inflation-linked bonds could easily distort the information derived. Third, liquid government securities should improve the financial intermediation process, making it more efficient, stable and resilient to adverse shocks. It is worth noting that in extreme situations, lack of liquidity can also lead to the closure of markets and interruptions in financing.<sup>34</sup>

Table 5  
**Average daily money market turnover**  
As a percentage of outstanding banking assets

	Total money market		Interbank repo market		Others	
	2000	2005	2000	2005	2000	2005
Argentina				0.1	0.61 <sup>1</sup>	0.21 <sup>1</sup>
Chile		0.2				0.22 <sup>2</sup>
Colombia	1.2	2.4	0.6	0.9	0.63 <sup>3</sup>	1.6
Mexico	7.3	5.9			0.04 <sup>4</sup>	1.75 <sup>5</sup>
Peru	0.3	0.3	0.3	0.3		
Venezuela	0.7	0.6	0.7	0.6		

<sup>1</sup> Call market (interbank loans). <sup>2</sup> Interbank short-term loans. <sup>3</sup> Includes repo and buy/sellbacks.  
<sup>4</sup> Includes reverse repos. <sup>5</sup> Mexican derivatives exchange. Daily average volume for TIIE (interbank interest rate) 28-day futures contracts traded in Mexder.

Source: BIS (2006).

Evidence for the region shows that interest rate volatility has declined in different market segments (Figure 2), implying that progress in the development of securities markets has been made, particularly at the short end. However, the daily turnover of money markets (measured as a percentage of banking assets) remains very low, indicating the need for further progress. In fact, only Mexico and, to a lesser extent, Colombia appear to have achieved a reasonable degree of liquidity in their money markets (Table 5).

<sup>34</sup> For instance, in Colombia during the second half of 1998, the cost of government paper (TES) reached 35%, compared with 23.6% at the beginning of the year. A similar problem was experienced during 2002, leading to the so-called "mini-TES" crisis. During this period, the government was unable to tap the market for several months due to the high costs of financing.

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