

The transmission mechanism of monetary policy in emerging market economies: an overview

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Introduction

Economists do not agree about how monetary policy affects the economy. Different observers weigh in different ways the various specific channels through which monetary policy works. Views diverge even about the monetary transmission process in individual industrialised nations, the subject of decades of theoretical and empirical research; the process in developing countries is still more uncertain.

Yet an understanding of the transmission process is essential to the appropriate design and implementation of monetary policy. Because changes in the structure of the economy – including changes in balance-sheet positions, in financial sector technology and institutions, or in expectations concerning future policy – tend to alter the economic effects of a given monetary policy measure, central banks need to be alert to the impact of structural change. They need to be able to continuously reinterpret the channels of transmission of monetary policy.

These important questions were discussed by a small group of senior central bankers at the BIS in January 1997. Two days of very lively debate revealed not only much common ground but also important differences. Much depended on the specific context in which monetary policy was framed: the historical record of inflation; the nature and depth of the financial system; the international financial background; and so on. The country papers that follow highlight the main experiences of specific countries. This paper provides an overview of some of these issues and tries, where possible, to delineate the differences between countries.

* This overview has benefited greatly from the co-operation and the statistical input of the central banks which participated in the meeting. Special thanks also go to Zenta Nakajima who commented on parts of the paper, to Ib Madsen who was responsible for most of the statistical work and to Stephan Arthur for preparing the graphs and overseeing the publication. Nigel Hulbert, Judith Hunter and Alison Spurway provided much valued editorial assistance and Christine Mapes typed various drafts most efficiently.

The paper begins by reviewing some of the arguments associated with the choice of ultimate objectives of monetary policy. The following section briefly summarises the main channels of transmission of monetary policy that have been identified, drawing chiefly on research into the experiences of industrialised economies. The factors that may alter these transmission channels, or affect their relative importance, are then discussed. The focus is on differences in the monetary transmission process between industrialised and developing nations, comparing data provided in response to a questionnaire prepared for this meeting with analogous data for key industrialised countries. The final section of the paper reviews topical, and unresolved, issues involving the monetary policy transmission process.

The objectives of monetary policy

In recent years, many have argued that central banks should emphasise price stability as a single objective of monetary policy and eschew consideration of other goals such as growth or employment. The desire to limit the objectives of monetary policy in this way is based on the near-unanimity among economists and policy-makers that monetary policy cannot affect the long-term growth of the economy. In this view, efforts to stimulate growth above its potential rate merely lead to higher inflation: accordingly, monetary policy can at most only moderate short-run fluctuations in output. Many analysts even doubt that discretionary monetary policy can effectively dampen economic fluctuations. Lags in recognising turns in the business cycle, and subsequent lags in the response of the economy to changes in monetary policy, make it difficult to time policy actions accurately enough to moderate business cycles. Moreover, while many central banks may in practice continue to attempt to stabilise output, they find it useful for their public mandate to be restricted to price stability alone, since this reduces their vulnerability to political pressure for expansionary policy.

How should a number be placed on the price stability objective? Figures of 2 to 3% have often surfaced in discussions in industrial countries with a small but positive rate of inflation (rather than zero) taking account of (i) difficulties of statistical measurement and (ii) relative price

adjustments reflecting differential productivity trends in various sectors. In rapidly developing countries, some argue, inflation targets need to be somewhat higher. One reason is that relative price adjustments will be more significant in economies where productivity gains in the tradable sectors are large. In addition, price liberalisation will also increase measured inflation in situations where there is downward rigidity of nominal prices: this has been a particularly important consideration in the transition economies.

In developing countries, there are additional arguments both for and against restricting the objectives of monetary policy solely to price stability. On the one hand, the case for an activist monetary policy rests on the difficulties faced by developing economies. The concentration of output in a smaller range of products, combined with more limited development of financial markets that could diversify risk, may make developing countries more vulnerable to destabilising shocks, both internal and external, creating a greater need for countercyclical monetary policy. The limited and uncertain access to international capital markets faced by many developing countries may lead central banks to give a larger weight to balance-of-payments equilibrium in their monetary policy objectives. Finally, where financial systems remain particularly rudimentary, the authorities may seek to use monetary policy to direct credit to sectors regarded as central to the nation's development strategy.

On the other hand, monetary policy in developing countries may be less able than in industrialised countries to achieve goals other than price stability. In industrialised countries, monetary expansion is generally believed to affect output in the short run, even if such actions merely lead to changes in the price level over longer periods of time. In many developing countries, however, monetary expansion may lead immediately to higher prices with little even transitional impact on the level of activity. This situation arises when inflationary psychology, usually reflecting a prior history of high inflation, combines with a lack of central bank credibility, so that monetary policy actions generate immediate changes in inflation expectations and, in turn, actual prices. The presence of shallow and volatile financial markets may further undermine the ability of monetary policy to influence output in a predictable manner. Under such circumstances monetary policy may be required to concentrate exclusively on the goal of price stability.

Yet if the ultimate objective of monetary policy is price stability alone, it may not be possible to ignore the implications of monetary policy for output and employment. In particular, the output costs of reducing high levels of inflation may need to be taken into account in determining the extent and pace of disinflation. Various features of high-inflation developing economies, including a lack of credibility, the indexation of contracts and wages and structural rigidities in labour and goods markets, may impart a high degree of inflation inertia and thereby exacerbate the output costs of disinflation. While the use of the exchange rate as a nominal anchor can sharply reduce output costs at the outset of stabilisation programmes, this strategy may lead to overvaluation, a large external deficit and, possibly, an eventual collapse in the exchange rate. This might result in a rebound of inflation. For such reasons, central banks may opt for a more gradual disinflation policy (relying on purely domestic channels of disinflation) because the inflation reduction thus achieved will be more sustainable.

The debate on the objectives of monetary policy is still very much alive in many emerging market economies and views continue to differ, sometimes widely. In the Indonesian paper reference is made to the multiple objectives of monetary policy to be achieved “primarily through control of monetary aggregates at levels adequate to support the targeted rate of economic growth without giving rise to internal and external macroeconomic equilibrium”. In a similar vein, the objective in Thailand is described as “to achieve sustainable economic growth, with a reasonable level of internal and external stability”, while it consists in India of ensuring an adequate provision of credit for the productive sectors of the economy without jeopardising price stability. The Central Bank of Peru’s paper describes how the previous central bank charter, which assigned to the central bank three objectives which could be mutually inconsistent, was replaced by one that defines the central bank’s objective much more narrowly, emphasising that “price stability is the sole objective of the central bank”.

The channels of transmission of monetary policy

Four channels of transmission of monetary policy have been identified in modern financial systems. The first is through the direct interest rate

effects – which affect not only the cost of credit but also the cash flows of debtors and creditors. Changes in interest rates alter the *marginal* cost of borrowing, leading to changes in investment and saving and thus in aggregate demand. Changes in *average* interest rates will also have cash-flow effects on borrowers and lenders.

The second channel is through the impact of monetary policy on domestic asset prices – including bond, stock market and real estate prices. The third channel is through the exchange rate. Credit availability is the fourth major channel. In countries with either poorly developed or tightly controlled financial systems, interest rates may not move to clear the market. Aggregate demand is often influenced by the *quantity* of credit rather than its *price*. Even in liberalised, highly developed markets, credit changes operating in addition to interest rate changes have been identified as important factors influencing economic activity. An increasing body of research has found that the financial condition of households, firms and financial institutions can play a key role in the propagation of monetary policy actions.

How these channels function in a given economy depends on its financial structure and the macroeconomic environment. A major purpose of this meeting was to explore the important links between financial structure and the transmission mechanism of monetary policy. Several central bank papers in this volume analyse how the financial structure of their economies has evolved under the twin influences of liberalisation and internationalisation. The Brazilian paper focuses on the macroeconomic environment explaining how chronic inflation produced many adaptations in economic life that tended to reduce the power of all the main channels of monetary policy transmission. To a large extent, then, stabilisation has to do with restoring the effectiveness of monetary policy.

Direct interest rate effects: cost of credit and cash flow

In the most conventional model of monetary transmission, a shift in policy leads to a change in the money supply that, for a given money demand, leads to a change in money-market interest rates. Changes in policy and interbank rates lead, in turn, to changes in bank loan rates for borrowers, which may affect investment decisions, and in deposit rates, which may affect the choice between consuming now and later.

A key issue in this channel of transmission is the extent to which a policy-induced change in the interest rate most directly under the central

bank's control (usually an overnight interbank rate) affects all short-term money market interest rates, and in turn spreads to the entire spectrum of interest rates, in particular the long-term interest rates most relevant to investment (including housing) or to purchases of durable goods. The propagation of monetary policy actions along the term structure of interest rates depends upon various factors, including the organisation of financial markets and the state of expectations (see below).

In this model, the present value of durable goods is inversely related to the real interest rate. A lower rate of interest increases the present value of such goods and thus increases demand. In this framework, interest-rate-sensitive spending is affected by changes in the *marginal* cost of borrowing. Changes in interest rates also lead to changes in *average* rates on outstanding contracts, and these changes increase over time as old contracts come up for renegotiation. Similarly, marginal adjustments in deposit rates will over time change the average deposit rate. These changes in average interest rates will affect the income and cash flow of borrowers and lenders. Policy-induced movements in average interest rates could thus lead to cash-flow-induced changes in spending (akin to income effects) that could be as important as – or more so than – the substitution effects associated with changes in marginal interest rates. In particular, balance-sheet positions would determine the relative importance of marginal versus average interest rate effects.

In differentiating between the effects of marginal and average interest rates, the distinction between real and nominal rates is important. The real interest rate affects the marginal cost of borrowing that determines spending and saving decisions. While a rise in nominal interest rates that reflects higher inflation expectations – so that the real rate remains constant – will not change the perceived marginal cost of borrowing, it will alter the cash-flow and balance-sheet positions of borrowers as it changes the average rate of interest. It does this because the portion of interest payments associated with the inflation premium represents a prepayment of the real part of the debt, so that changes in inflation alter the effective maturity of loans. These cash-flow effects could have a large impact on aggregate demand.

Indirect effects via other asset prices

Policy-induced interest rate changes also affect the level of asset prices – principally those of bonds, equities and real estate – in the

economy. In Israel, for instance, interest rates have been a significant factor behind cycles in equity and housing markets in the 1990s, with the stock market peaking in late 1993 and housing prices surging in 1993–94 when interest rates reached a trough. In Colombia, too, a positive (though temporary) response of asset prices to monetary policy easing has been observed in recent years.

Where long-term fixed interest bond markets are important, higher short-term interest rates may lead to a decline in bond prices. As such markets develop, this channel of transmission may be strengthened. (However, the nature of this link is complicated and is discussed further in the final section of this paper.)

Another means by which asset price changes triggered by monetary policy actions can affect aggregate demand is described by the so-called q theory of investment pioneered by James Tobin. With an easier monetary policy stance, equity prices may rise, increasing the market price of firms relative to the replacement cost of their capital. This will lower the effective cost of capital, as newly issued equity can command a higher price relative to the cost of real plant and equipment. Hence, even if bank loan rates react little to the policy easing, monetary policy can still affect the cost of capital and hence investment spending. Policy-induced changes in asset prices may also affect demand by altering the net worth of households and enterprises. Such changes may trigger a revision in income expectations and cause households to adjust consumption. Similarly, policy-induced changes in the value of assets held by firms will alter the amount of resources available to finance investment.

A decline in asset prices may have particularly strong effects on spending when the resultant change in debt-to-asset ratios prevents households and firms from meeting debt repayment obligations; it can have similar effects if it raises fears about the ability to service debts in the future. A substantial fall in stock and bond prices for instance, may reduce the value of liquid assets available to repay loans. As households and firms thus become more vulnerable to financial distress, they may attempt to rebuild their balance-sheet positions by cutting spending and borrowing.

The effects of monetary policy actions on aggregate demand, working through asset prices and balance sheets, may become amplified as the pace of economic activity begins to respond. For example, increases in interest rates that depress asset prices and weaken balance sheets may lead to an initial decline in output and income. This initial decline in

economic activity, in turn, reduces the cash flow of households and firms, further heightening their vulnerability to financial distress, and leading to a second round of expenditure reduction. In this way, changes in monetary conditions may lead to prolonged swings in economic activity, even if the initial monetary policy action is reversed soon afterwards. The severe recession in Malaysia in 1985–86 exemplified this effect. A steep drop in the prices of commodities, shares and real estate accompanied weak foreign and domestic demand. The result was a marked contraction of the cash flow of many enterprises, caught by falling income, collapsing asset values and rising debt servicing costs.

Exchange rate effects

One particularly significant price monetary policy can affect is the exchange rate. Indeed, in many developing countries – particularly those with only rudimentary markets for bonds, equities and real estate – the exchange rate is probably the most important asset price affected by monetary policy. When the exchange rate is floating, a tightening of monetary policy increases interest rates, raises the demand for domestic assets, and hence leads to an appreciation of the nominal and – at least initially – the real exchange rate.

This appreciation can feed through to spending in two distinct ways. The first is the relative price effect: it tends to reduce the demand for domestic goods, which become more expensive relative to foreign goods, and thus aggregate demand. Secondly, changes in the exchange rate also may exert significant balance-sheet effects. In many countries, households and firms hold foreign currency debt, either contracted abroad or intermediated through the domestic banking system. Unless such debts are fully offset by foreign currency assets, changes in the exchange rate may significantly affect net worth and debt-to-asset ratios, leading to important adjustments to spending and borrowing. Where domestic residents are net debtors to the rest of world, as in many emerging market countries, a large appreciation of the exchange rate may lead to an improved balance-sheet position that may give rise to a marked expansion of domestic demand. Thus this balance-sheet effect tends to offset – and in some cases may even dominate – the relative price effect.

In small open economies with flexible exchange rates, the exchange rate channel is likely to be particularly important because, in contrast to the other channels described above, it affects not only aggregate demand

but also aggregate supply. A loosening of monetary policy, for example, may lead to a depreciation of the exchange rate, an increase in domestic currency import costs, and hence induce firms to raise their domestic producer prices even in the absence of any expansion of aggregate demand. Because exchange rate changes are viewed as a signal of future price movements in many countries, particularly those with a history of high and variable inflation, wages and prices may change even before movements in import costs have worked their way through the cost structure. This issue will be addressed again at the end of this paper.

When the exchange rate is fixed or heavily managed, the effectiveness of monetary policy is reduced but not entirely eliminated. Often (as in Israel) relatively wide margins exist within which the exchange rate can fluctuate. Moreover, if domestic and foreign assets are only imperfectly substitutable, there is some scope for domestic interest rates to deviate from international levels. Therefore, even if the nominal exchange rate is fixed, monetary policy may be able to affect the real exchange rate by acting on the price level. In this manner, monetary policy retains its ability to affect net exports, albeit to a much lesser degree and with much longer lags. However, where domestic and financial assets are close to perfect substitutes, as they may be under currency board arrangements (e.g. in Argentina and Hong Kong) or where there is a long tradition of dollarisation (e.g. in Argentina and Peru), the scope for monetary policy is severely limited.

Credit availability effects

In countries where private markets for credit either are poorly developed or are prevented by government regulation from operating freely, monetary policy is likely to affect aggregate demand more by altering the quantity or availability of credit than through the direct or indirect effects of changes in the price of credit. This will be true especially when binding controls or guidelines on the quantity of credit itself are present, as is the case in several major developing countries (see below). In addition, binding ceilings on interest rates (or statutory rates as in China) will force banks to use non-price means of rationing loans and thus enhance the importance of credit availability effects. Finally, direct government involvement in the loan market, either through official development banks or through fiscal subsidies of commercial bank loans, will have a similar effect.

The liberalisation of financial markets does not necessarily eliminate credit availability effects. Recent financial market research has emphasised the importance of imperfect information and contract enforcement problems that alter the means by which credit markets clear. When monetary conditions tighten, for example, banks may wish not to rely exclusively on raising interest rates in order to ration available credit, since this would not only encourage riskier investment behaviour on the part of borrowers but also attract riskier borrowers as customers. Hence, in response to increases in the cost of credit, banks are likely both to raise loan interest rates *and* to tighten creditworthiness standards, leading to declines in the supply of credit along with increases in its price. Even borrowers whose creditworthiness has not been affected will face less favourable terms for their loans during periods of recession and at times of financial distress, because banks may be unable to distinguish fully between borrowers who have been adversely affected and those who have not.

Partly in response to the special role credit can play even in liberalised systems, several central banks (e.g. in India, Indonesia, Israel, Malaysia, Peru, Thailand and Venezuela) explicitly monitor credit growth in evaluating the stance of monetary policy. The Korean paper argues that “in formulating policy, the central bank should monitor an alternative indicator, such as the volume of bank loans, which has shown a close link to aggregate spending”.

Credit rationing is likely to hit smaller borrowers particularly hard because of the high cost of gathering information about them. The Colombian paper shows that during past periods of monetary contraction the implicit cost of external funds for smaller firms rose significantly relative to that for larger firms, and the growth of their financial liabilities was significantly lower. Especially where financing sources other than bank lending are scarce (or access to them is limited to a few borrowers), the credit rationing effects may amplify the conventional interest rate effects of restrictive monetary policy.

The availability of credit also may be affected by shifts in loanable resources from one market to another. At the core of the view that a “bank lending channel” exists in addition to an “interest rate channel” is the proposition that when monetary policy tightens, banks lose some of cheaper sources of loanable funds. According to some analysts, this logic would apply particularly to smaller banks that depend primarily on

deposits for funding and cannot tap as easily as larger banks other sources of funds (e.g. international capital market). The Korean paper presents econometric evidence that a tightening of monetary policy leads to a greater cutback in lending by small banks than by large banks, thereby supporting the existence of a credit channel for monetary policy. To the extent that certain firms depend heavily or exclusively upon bank financing, shifts in loanable resources from banks to other markets may exert an impact on aggregate demand that goes beyond the effects of increased interest rates alone.

Finally, monetary policy may affect the availability of credit more directly through effects on the value of assets of both borrowers and lenders. As changes in monetary conditions lead to changes in asset prices, the value of collateral for bank loans may be affected and changes in the access of borrowers to credit could be induced. For instance, residential housing loans in Singapore are not to exceed 80% of the cost or valuation of the house, whichever is lower. In addition, where a large proportion of bank assets is invested in equities or real estate, declines in asset prices, by lowering capital/asset ratios, could force banks to tighten the supply of credit.

Changes in the creditworthiness of bank customers and in the financial condition of banks themselves will induce changes in credit rationing only if the banks perceive themselves to be facing hard budget constraints. The Colombian paper suggests that, in the early 1980s, the perception that the Government would bail out ailing banks caused banks to tighten credit insufficiently in the face of monetary contraction: "A monetary contraction in the context of systems endowed with high levels of government involvement in the marketplace, and thus high degrees of moral hazard, might not lead bankers to implement the same type of behavioural adjustments (i.e. credit rationing) as would be the case in a more liberal environment. A banking crisis could well emerge as a consequence of bankers lacking incentives, failing to perceive and respond to policy decisions."

Factors influencing the transmission of monetary policy

Two aspects are important in evaluating how fast monetary policy affects the real economy. The first is the transmission from the instruments

directly under the central bank's controls – e.g., short-term interest rates or reserve requirements – to those variables that most directly affect conditions in the non-financial sector – loan rates, deposit rates, asset prices and the exchange rate. This linkage is determined primarily by the structure of the financial system. The second aspect of the monetary transmission process is the link between financial conditions and the spending decisions of households and firms. In this regard, the initial financial position of households, firms and banks is likely to play a key role, including the extent of leveraging, the composition and currency denomination of assets and liabilities, and the degree of dependence upon external financing sources, in particular bank financing.

Both aspects of the monetary transmission channel are likely to have been affected by the process of financial liberalisation in many countries in the past decade. The reduced role of the government in the financial system has lessened the importance of the credit availability channel of monetary policy compared with the interest rate channel (and related effects). But the increased fragility of the financial sector in the wake of financial liberalisation may have accentuated other aspects of the credit availability channel – particularly perhaps in the aftermath of crises. At the same time, the opening and deepening of financial systems in emerging market countries has caused both the assets and the liabilities sides of the private non-financial sector's balance sheet to become more diversified, thereby enhancing the role of asset prices, in particular the exchange rate, in the monetary transmission process.

Official intervention

Government intervention in financial markets may influence the monetary transmission process in three ways: by imposing interest rate controls or other limits on financial market prices; by imposing direct limits on bank lending; or by providing government-financed credit to selected areas.

In the past decade, the trend almost everywhere has been towards liberalisation. Direct controls on the quantity and allocation of credit have given way in practically all cases to greater reliance on indirect mechanisms of monetary control such as open market operations. Table 1 compares the primary instruments of monetary policy used by various countries. Compared with the beginning of the 1980s, when the use of credit ceilings and changes in reserve requirements was pervasive, the table indicates greater reliance on open market operations and on central

Table 1
Primary instruments of monetary policy

	Credit ceilings	Reserve/ Liquid asset requirements	Discount rate	Open market operations	FX market operations	Moral suasion
China	✓					
India		✓	✓	✓	✓	✓
East Asia						
Hong Kong			✓	✓	✓	✓
Indonesia		✓	✓	✓		✓
Korea			(✓)	✓		(✓)
Malaysia	(✓) ¹	✓		✓		✓
Singapore				✓	✓	
Thailand				✓		✓
Latin America						
Argentina						
Brazil			✓	✓		
Chile			✓	✓		
Colombia				✓	✓	
Mexico				✓		
Peru			✓	✓	✓	
Venezuela				✓		
Hungary		✓	✓	✓	✓	(✓)
Israel			✓		✓	
Russia		✓	✓	✓		
Saudi Arabia		✓	✓ ²	✓	✓	✓
<i>Memorandum:</i>						
United States		✓	✓	✓		
Japan	(✓)	✓	✓	✓		
Germany	(✓)	✓	✓	✓		
United Kingdom		✓	✓	✓		

¹ Lending guidelines for development purposes and occasional recourse to selective credit controls to reduce undue demand pressures. ² Overnight repo rate.

bank credit and deposit facilities in the 1990s. Some central banks (such as those of Brazil, Chile, Hong Kong and Israel) rely in the first instance on their own loan and deposit facilities to implement monetary policy; in the first three countries this practice leads to the setting of an interest rate corridor for money market interest rates. Other central banks (such as

Table 2
Reserve and liquid asset requirements
 In percentages

	Reserve requirement ratio			Liquid asset ratio
	1980	Latest	Remuneration	
China . . . . .	..	..	Yes	..
India	6.0–10.0	10.0	Yes	25.0
East Asia				
Hong Kong	None	None	..	25.0
Indonesia	15.0	3.0–5.0	No	..
Korea	18.5	3.1	No	30.0
Malaysia	5.0	13.5	No	17.0
Singapore	6.0	6.0	No	18.0
Thailand	7.0	None	..	6.0
Latin America				
Argentina . . . . .	..	..	..	17.0
Brazil	14.0	78.0	No	..
Chile	10.0	9.0	No	..
Colombia	45.0	31.0	..	11.8
Mexico . . . . .	..	0	..	0
Peru	6.0–64.0	7.0	No	..
Venezuela	15.0	17.0	Yes	..
Hungary . . . . .	..	12.0	Yes	..
Israel	64.0	8.0	No	12.8
Russia . . . . .	..	8.0–14.0	No	..
Saudi Arabia	7.0	7.0	No	20.0

those of Colombia, Indonesia, Korea, Malaysia, Peru, Russia, Saudi Arabia, Singapore, Thailand and Venezuela) aim to change liquidity conditions mainly by auctioning Treasury or their own paper, by performing foreign exchange swaps or by operating in the open markets.

Although the use of reserve requirements has declined significantly (see Table 2), they are still high in Brazil and Colombia and are relatively important in several other countries. Reserve requirements are often imposed in a differentiated way. Chile and Peru maintain a higher reserve requirement on foreign-currency-denominated deposits in order to limit the impact of capital inflows on the exchange rate. Several central banks (e.g. in Chile and Argentina) impose higher reserve requirements on more short-term instruments.

Table 2 (cont.)
Reserve and liquid asset requirements
 In percentages

	Reserve requirement ratio			Liquid asset ratio
	1980	Latest	Remuneration	
<i>Memorandum:</i>				
United States	3.0–12.0 ¹	3.0–10.0	No	..
Japan	0.125–2.5 ¹	0.05–1.3	No	..
Germany	4.15–12.1 ²	1.5–2.0	No	..
United Kingdom . . .	0.45	0.35	No	..

Notes: *Argentina*: Liquidity requirements apply to almost all banks' liabilities except central bank borrowing, interbank loans and trade financing. The rate declines from 17% for liabilities with a maturity of less than one month to zero for those with a maturity of over one year. *Brazil*: Ratios shown apply to demand deposits; lower ratios apply to other deposits; required reserves on time and saving deposits are remunerated. *Chile*: Ratios shown apply to domestic currency demand deposits; reserve requirements on longer-term and foreign currency deposits are 3.6% and 30% respectively. These reserves are not remunerated. Reserve requirement on the "reserva técnica" is 100%, is applied to short-term deposits in excess of 2.5 times the bank's capital and is remunerated on the basis of the Unidad de Fomento. *Colombia*: Latest (1996) ratio applies to demand deposits; lower ratios apply to other deposits. *India*: 1980 ratio applies to outstandings at 6% and to increments at 10%. *Indonesia*: Statutory reserve ratio of 5% for banks' liabilities in rupiah and 3% for banks' liabilities in foreign currency. *Israel*: 1980 ratio applies to domestic currency deposits. *Korea*: 1980 ratio applies to demand deposits; lower ratios apply to other deposits. *Malaysia*: 1980 ratio applies to commercial banks only. *Peru*: Ratios shown apply to domestic currency deposits. A marginal reserve ratio of 45% is applied to foreign currency deposits (remunerated at LIBOR less 1 3/4%). *Russia*: Ratios shown apply to rouble deposits of various maturities with the ratio set higher for shorter maturities; the ratio for foreign currency deposits is 9%. *Saudi Arabia*: Ratios shown apply to demand deposits; the ratio for time and savings deposits is 2%. *Venezuela*: 1980 ratio applies to demand deposits at commercial banks only (10% savings deposits; 8% term deposits). Since August 1997 a uniform rate is applied to all financial institutions (commercial banks, universal banks, mortgage banks, investment banks and leasing companies).

¹ 1990. ² 1991.

Interest rate controls

Very few countries still impose limits on loan or deposit interest rates. Only in China are a significant number of loan and deposit rates non-market-determined. In Brazil, the authorities continue to exert some direct control over interest rates: the so-called "Reference rate" which guides several deposit and loan rates deviates from the freely determined rates in the interbank market by a fixed margin exogenously set by the central bank. In Chile, the interest rate on short-term demand deposits is regulated. In India, limits are imposed on interest paid on savings deposit

accounts and on interest charged for a selected number of types of credit (mainly export credits and small value loans). A ceiling on lending rates (which, however, permits competitive pricing) exists in Malaysia. Below-market interest rates are charged on agricultural loans in Venezuela.

Limits on bank lending

Not only does the monetary authority (either government or central bank) impose direct targets or limits on bank lending, but it may also exert influence through moral suasion and the use of prudential regulations. In China, credit controls remain the most important instrument of monetary policy. Brazil, India and Venezuela retain credit allocation prescriptions. Moreover, Brazil imposed credit ceilings in 1995 to stem the rapid growth of credit triggered by the Real Plan; taxes on credit operations continue to be levied. In Malaysia, lending guidelines to priority sectors and selective, short-term credit controls (mainly on loans for automobile purchases, credit cards and real estate) are applied; cyclical conditions have on occasion led to the discretionary adjustment of such guidelines. In Korea, Russia and Thailand, credit controls are not used at present, but recourse to some form of credit ceilings is possible. In Thailand, financial institutions are required to submit credit plans for the next half-year, allowing the central bank to better monitor lending growth. Annual credit plans had to be submitted by Indonesian banks in 1996; this practice was continued in 1997. In several Asian economies (such as Hong Kong, India, Indonesia, Malaysia, Thailand and, to a lesser extent, Korea) the central bank at times uses moral suasion to steer credit (growth) in the right direction. In Singapore, the Monetary Authority can make recommendations to banks concerning credits and investments. In Israel and Peru, the last controls on credit were lifted as recently as the early 1990s. Controls on private sector credit were one of the main instruments of monetary policy in Venezuela before 1990.

In some countries it is recognised that prudential regulations could also play a supporting role in the conduct of monetary policy (see Table 3). There are of course major objections – both of principle and of practicality – to gearing prudential regulations to the (often cyclical) demands of monetary policy. However, rules about bank loan exposures to particular spending categories, about loan-to-value ratios, or about collateral valuations (e.g. preventing assets being valued at an overpriced peak) can limit the risk of swings in bank lending fuelling boom-and-bust

Table 3

Use of prudential guidelines for monetary policy purposes

China	Not used
India	Occasionally monetary policy considerations may play a role in determining bank exposure limits
Hong Kong	Not used; however, rates on saving deposits and on time deposits of less than 7 days are subject to the "Interest Rate Rules" of the Hong Kong Association of Banks
Indonesia	Some prudential guidelines have been applied to help reach monetary policy objectives
Korea	Not used
Malaysia	Tightening of prudential guidelines may coincidentally serve monetary policy needs
Singapore	Tightening of prudential guidelines may coincidentally serve monetary policy needs
Thailand	Move towards market-based system of monetary control supported by a systematic tightening of prudential regulations. Changes may have desirable monetary policy implications
Argentina	Choice of monetary policy regime (currency board) meant that prudential regulations for banks had to become stricter
Brazil	Not used
Chile	Not used
Colombia	Not used
Mexico	Not used
Peru	Not used
Venezuela	Not used
Hungary	Not used
Israel	Not used
Russia	Not used in normal circumstances
Saudi Arabia . . .	Occasionally used

cycles. In addition, a change of monetary regime may require a change in prudential standards. Moving from ceilings on bank credit to interest-rate-based mechanisms of control will require tighter prudential controls. In a fixed exchange rate regime which limits the scope for independent monetary policy, prudential rules may need to be stiffened.

Government-provided finance

Finally, the government may itself provide much of the non-financial private sector's total credit, either directly through official development institutions or indirectly through subsidisation of certain credits extended by commercial banks. Special development institutions receiving and lending funds at preferential rates or conditions can still be found in Brazil, India and, to a lesser extent, Israel (special mortgage banks). Development institutions in Malaysia receive substantial long-term funding from the central bank and the Federal and State Governments, usually in the form of equity participations and low interest loans. Special credit institutions in Venezuela grant subsidised loans to small enterprises, funded from the national budget. In Russia, up to one-fifth of enterprises' capital investments are still financed from federal and local government budgets, to a large extent on favourable terms. Another significant share comes from extra-budgetary investment funds. In all these cases, the role of credit availability in the transmission of monetary policy is likely to be strengthened relative to other channels, particularly interest rate effects.

Although the role of the government as a source of credit also has diminished substantially over time, a high proportion of the banking sector was still owned by the government in several countries (for example, Argentina, Brazil, India and Indonesia) at end-1994 (the year of comparison shown in Table 4). In the last couple of years, however, several institutions in Argentina and Brazil have been privatised and further privatisations are in course.

Overall trends in the relative importance of different sources of financing for the private non-financial sector are summarised in Table 5. The share of financing provided by commercial banks has remained very large in most of the emerging economies for which data can be found (Table 5). In industrial countries, the share of alternative sources of financing tends to be much more pronounced.

Competitiveness, depth and diversity of financial markets

In a liberalised financial environment, a key feature of the monetary transmission process is the responsiveness of the interest rates faced by borrowers and savers to the short-term money market rate most directly influenced by the central bank. Several factors have an important influence on this: the degree of competition within the banking sector;

Table 4
Indicators of the structure of the banking industry

	Five largest banks	Foreign banks	State-owned banks	<i>Memorandum: Share of bank assets in total financial sector assets</i>
	assets as a percentage of total bank assets, at end-1994 ¹			
India	45.0	8.3	83	80
East Asia				
Hong Kong	30.7	72.0	0	..
Indonesia		3.7	48	91
Korea	31.8	4.2	13	39
Malaysia	49.0	21.0	9	78
Singapore	39.0	80.0	0	71
Thailand	60.9	6.4	7	75
Latin America				
Argentina	37.5	21.7	36	98
Brazil	49.4	2.8	48	97
Chile	46.7	21.4	14	62
Colombia	24.5	3.6	23	86
Mexico	61.9	1.2	28	87
Peru	71.2 ²	19.2 ²	0 ²	91
Venezuela	56.1	44.7	8	90
Hungary	57.0	..	..	91
Israel	85-90	0.0	Large	65
Russia	38.5	2.7	..	..
Saudi Arabia	65.9	..	..	61
<i>Memorandum:</i>				
United States	12.8	22.0	0	23
Japan	27.3	1.8	0	79
Germany	16.7	3.9	50	77
United Kingdom	57.0	..	..	46

¹ Or more recent. ² Excludes Banco Central de Reserva and Banco de la Nación.

access to alternative financing sources; and the depth of the various financial markets.

The greater and more rapid the response of loan and deposit rates to changes in money market rates, the more rapid and effective will be the transmission of monetary policy measures to the real economy. Tables 6 and 7 show to what extent loan and deposit rates are linked to policy or

Table 5
Sources of financing for the private non-financial sector
 Percentage of total financing received

	Commercial banks		Other institutions		Foreign sources		Other	
	1983	1993	1983	1993	1983	1993	1983	1993
India	26.4	21.7	16.4	34.4	0.8	4.6	56.5	39.3
East Asia								
Korea	30.7	24.5	21.9	35.0	13.0	3.7	34.4	36.8
Malaysia	76.8	54.9	23.2	45.1	..	..	..	..
Singapore	86.5	87.2	13.5	12.8	..	..	..	..
Thailand . . . . .	..	84.1	..	..	..	7.5	..	1.0
Latin America								
Brazil	60.3	80.1	39.7	19.9	..	..	..	..
Mexico	80.6	91.5	19.4	8.5	..	..	..	..
Hungary . . . . .	..	22.5	..	0.3	..	49.2	..	28.0
Israel . . . . .	..	51.6	..	..	..	6.6	..	41.8
Saudi Arabia	29.3	45.9	70.7	54.1	..	..	..	..
<i>Memorandum:</i>								
United States	20.4	16.6	23.6	20.9	0.6	0.1	55.3	62.4
Japan	46.6	42.7	21.0	23.5	..	..	32.3	33.8
Germany	57.9	64.9	..	..	7.8	6.7	34.3	28.4
United Kingdom	38.2	42.3	..	..	10.9	6.2	50.9	51.6

Notes: For *Brazil, Malaysia, Mexico, Saudi Arabia, Singapore* and *Thailand*, total financing is taken to be the sum of the data shown. Other institutions are defined as other financial institutions and official development banks.

Hungary: Data are for 1996 and cover the non-financial corporate sector. *Korea*: Respective data for 1996 are: 24.1, 35.5, 5.0 and 35.4. *Malaysia*: Other institutions refer to finance companies, merchant banks and non-bank financial intermediaries. Data for 1996 are commercial banks (51.3); other institutions (48.7). *Saudi Arabia*: Data for 1996 are: commercial banks (47.9); other institutions (52.1). *Thailand*: Data are for 1995.

money market rates. The rates most subject to central bank control or intervention are identified in Table 8. A key determinant of this responsiveness is the degree of competition within the banking sector. When there are several banking institutions (a development that could be promoted by lowering barriers to new entrants, in particular to foreign banks) and market conditions are competitive, changes in the cost of funds are likely to rapidly affect loan and deposit rates. Conversely, in a highly concentrated banking sector, oligopolistic pricing may be possible,

Table 6
Determinants of bank deposit rates

	Linked to policy rate	Linked to interbank rate	Agreed within bank association	Negotiated with customers	Subject to regulation
China					Yes
India	No	No	No	No	No
East Asia					
Hong Kong	No	Yes	(No)	Yes	No
Indonesia	No	Yes	No	Yes	No
Korea	No	No	No	No	No
Malaysia	No	No	No	Yes	No
Singapore		Yes		Yes	No
Thailand		Yes	No	Yes	No
Latin America					
Brazil		Yes			Yes
Chile	No	(Yes)	No	Yes	No
Colombia	(Yes)	(Yes)	(Yes)	(Yes)	No
Mexico	No	Yes	No	Yes	No
Peru			No		No
Venezuela	No	No	No	Yes	No
Israel	Yes			Yes	No
Russia			No	Yes	No
Saudi Arabia	No	Yes	No	Yes	No
<i>Memorandum:</i>					
United States	No	Yes	No	(No)	No
Japan	No	Yes	No	(Yes)	(Yes)
Germany	(No)	Yes	(No)	Yes	No
United Kingdom	Yes	Yes	No	(No)	No

Notes: The link to the interbank rate may also be a link to another money market rate or a long-term bond rate.

Hong Kong: Rates on saving deposits and on time deposits of less than 7 days are subject to the "Interest Rate Rules" of the Hong Kong Association of Banks. *India:* Bank deposit rates are not subject to regulation except for savings deposits.

making the response of loan and deposit rates to changes in money market rates sluggish and asymmetric. In addition, the presence of state-owned or state-subsidised banks under little pressure to maximise profits could diminish the responsiveness of loan and deposit rates to monetary policy. (A number of measures of competition in emerging country banking sectors were shown in Table 4 above.)

Table 7
Determinants of bank loan rates

	Linked to policy rate	Linked to interbank rate	Agreed within bank association	Negotiated with customers	Subject to regulation
China					Yes
India	No	No	No	Yes	No
East Asia					
Hong Kong	No	(Yes)	No	Yes	No
Indonesia	No	Yes	No	Yes	No
Korea	(Yes)	(Yes)	No	Yes	No
Malaysia	Yes	Yes	No	Yes	Yes
Singapore		Yes		Yes	No
Thailand		Yes	No	Yes	No
Latin America					
Brazil		(Yes)			
Chile	No		No	Yes	Yes
Colombia	(Yes)	(Yes)	(Yes)	(Yes)	No
Mexico	No	Yes	No	Yes	No
Peru			No		No
Venezuela	No	No	No	Yes	No
Israel	Yes				No
Russia			No	Yes	No
Saudi Arabia	No	Yes	No	Yes	No
<i>Memorandum:</i>					
United States	(No)	Yes	No	Yes	No
Japan	No	Yes	No	(Yes)	No
Germany	(No)	Yes	(No)	Yes	No
United Kingdom	Yes	Yes	No	No	No

Notes: The link to the interbank rate may also be a link to another money market rate or a long-term bond rate.

India: Bank loan rates are not subject to regulation except for export credits and credits for amounts of less than Rs. 200,000 (about US\$ 5,500).

The impact of banking sector competitiveness on the responsiveness of deposit and loan rates can be illustrated by a number of country experiences. In Colombia, competition among banks in the deposit market is much greater than in the loan market (partly because Colombia is still rather underbanked). The Colombian loan market is much more concentrated as many banks belong to conglomerates: interest rates charged to

Table 8
Interest rates under central bank control/intervention

China	Central bank lending rate; financial institutions' loan and deposit rates
India	Central bank (lending) rate (Bank rate); reverse repo rates; general refinance and export refinance rates; rate on line of credit to two specialised banks (for housing and agriculture); selected lending rates and deposit rates on savings bank accounts
Hong Kong	Bid and offer rate on the "Liquid Adjustment Facility" at the HKMA
Indonesia	Discount rate
Korea	Discount rate; overnight interbank rate
Malaysia	Overnight, one-month and three-month interbank rates
Singapore	Interbank rate
Thailand	Loan window central bank rate; repo rate
Argentina	Repo and reverse repo rates
Brazil	Overnight repo rate ("SELIC" rate); two rediscount rates
Chile	Daily interbank rate
Colombia	Rate on one-day borrowing (for liquidity absorption) and rate on reverse repos (for liquidity supply)
Mexico	Central bank auctioned loan rate; repo rate
Peru	Discount rate
Venezuela	Interest rate on central bank stabilisation bonds (TEMCs) (the central bank stopped auctioning TEMCs in October 1997)
Hungary	One-month reverse repo rate
Israel	Commercial banks' prime rate and short-term deposit rate
Russia	Rate on Bank Refinancing Facility
Saudi Arabia	Overnight repo rate

preferred customers within these conglomerates tend to be adjusted only sluggishly to changing market conditions. In Indonesia and Thailand, too, commercial banks tend to adjust lending rates less frequently than deposit rates. Sometimes adjustment throughout the banking sector depends on the initiative of the most important banks in the deposit and/or loan segment of the market. In Hong Kong, smaller banks usually follow the

best lending rate charged by the bigger banks. In Indonesia there is evidence of price leadership by the largest state banks.

The interest rates on deposits and loans set by the domestic banking system may also depend on the access of households and firms to *alternative domestic funding sources*, including securities markets and/or informal “curb” markets. Table 9 shows the reliance of enterprises in emerging economies on various sources of financing, including securities markets. Moreover, in several countries (e.g. Israel and Thailand) access to foreign sources of funds has increased widely, an issue addressed separately below. The key determinants of the impact of these alternative sources of financing on the efficacy of monetary policy are their degree of integration with the domestic banking market and their state of development.

In principle, the presence of *domestic securities markets* should accelerate the transmission of monetary policy shocks. Well-developed and competitive capital markets often tend to respond more flexibly to changes in policy rates than do bank-administered loan and deposit rates. The Israeli paper notes the importance of institutional investors and recent financial deregulation in the transmission of monetary policy. Since the portfolios of such investors contain various maturities of government bonds, including short-term notes (which are an important monetary policy instrument), a change in the central bank’s policy rate can quickly spread throughout domestic securities markets. Some of the rates in these markets may be more relevant for spending decisions than those on short-term bank deposits or loans.

Moreover, if the banking sector and the securities markets are well integrated, banks may be forced to enhance the responsiveness of the interest rates under their control. The Israeli case is also illustrative in this regard. As institutional investors also hold bank deposits, they represent an important element of the linkage between individual financial market segments, ensuring that a change in the policy-controlled rate reverberates through the entire spectrum of interest rates.

Restrictions on the financial sector have led in many countries to the emergence of *informal “curb” markets for credit*. In some countries, these curb markets have become large enough for the monetary authorities to actively monitor them. For example, developments in the curb market remain even today an indicator for guiding the policies of the Bank of Korea. To the extent that the formal banking sector and curb markets are highly segregated (e.g. if each market has its own small group of distinct

Table 9
Gross flow of financial liabilities of the non-financial corporate sector
 In percentages

	Annual flow of gross financial liabilities as a % of GDP		Composition of gross financial liabilities					
	1982–84	1992–94	Bank loans		Commercial paper and bonds		Equities	
			1982–84	1992–94	1982–84	1992–94	1982–84	1992–94
India	3.9	6.8	27.0	16.8	8.1	8.9	6.2	21.9
East Asia								
Korea	21.8	25.4	54.3	48.8	19.6	29.3	26.1	21.9
Malaysia . . . . .	..	11.2	..	54.9	..	26.9	..	18.2
Singapore	9.6	3.8	68.8	31.5	5.3	26.8	25.9	41.7
Thailand . . . . .	..	73.1	..	45.7	..	32.4	..	22.0
Latin America								
Chile	11.6	45.4	71.9	20.0	2.8	3.7	25.3	76.3
Colombia	10.7	16.6	20.7	31.9	13.2	4.7	66.1	63.4
Mexico . . . . .	..	23.5	..	..	..	..	..	..
Venezuela	4.8	7.2	5.6	36.2	–0.2	–3.3	27.9	67.1
Hungary . . . . .	..	17.9	..	41.1	..	1.9	..	57.0
<i>Memorandum:</i>								
United States	4.7	1.9	127.5	–51.5	44.3	133.1	–71.9	18.4
Japan	10.2	2.5	84.4	76.3	7.5	18.6	8.1	5.1
Germany	4.5	7.1	89.4	56.1	2.8	36.1	7.9	7.8
United Kingdom	3.5	3.9	61.6	20.9	10.8	17.1	27.7	61.9

Notes: *Hungary*: Data are for 1996. Bank loans include loans from resident banks and foreign sources. *India*: Non-bank borrowing constitutes the main other financial liability of the corporate sector. *Korea*: Respective data for 1992–96 are: 27.5, 43.3, 39.4 and 17.3. *Thailand*: 1990–93. *Venezuela*: The earlier period is for 1984–86. Bank loans include loans of the personal sector.

depositors and borrowers), the impact of monetary policy will be diminished. Contractionary monetary policy, for example, will raise interest rates and reduce credit availability in the formal sector, but may have little impact on conditions in the curb market.

The transmission of monetary policy is more complex when formal and curb markets are integrated to some degree. Tighter monetary policy which raises bank deposit rates may cause households to shift their savings from the curb market to formal bank deposits. Because borrowers in the curb market are likely to lack access to formal bank lending, this shift in loanable resources may cause disruptive declines in credit and spending in those sectors served by the curb market. The uneven nature of the incidence of monetary policy in a partially segregated market suggests that its effects may be harder to predict than in a more unified one.

The *depth of money and capital markets* can also have an important bearing on how policy-controlled rates affect other rates and ultimately spending behaviour. A thin or uncompetitive financial market can cause major volatility of money market interest rates. Insofar as it is costly to adjust loan and deposit interest rates, both for administrative reasons and for reasons of customer relations, banks may not adjust these rates in response to movements in money market rates if these rates are highly variable and expected to reverse their movements quickly. (On the other hand, greater money market volatility may lead banks to develop mechanisms to link administered loan and deposit rates more closely to money market rates.)

Similarly, the response of interest rates in thin capital markets to changes in policy rates may be more-than-usually unpredictable. Although they have grown over time, bond markets in many developing countries indeed remain shallow and volatile. In the early stages of capital market development, therefore, the transmission of monetary policy measures may be particularly uncertain.

In sum, various factors, including the degree of competition within the banking sector, the availability of alternative sources of financing, and the depth and volatility of domestic financial markets, are likely to condition the extent and rapidity of the adjustment of bank deposit and loan rates to monetary policy actions.

There is some statistical evidence that the response of bank rates to monetary policy measures has been slower in some emerging market

economies than in the larger industrialised countries, perhaps reflecting the more limited competitiveness, depth and flexibility of financial markets in emerging market economies. This difference is least apparent in the response of three-month money market rates to changes in overnight rates; possibly, it is easiest to ensure competitive conditions in the interbank market. On the other hand, the response of bank deposit and loan rates to same-month changes in three-month money market rates clearly has been slower in the emerging market countries than in the industrialised nations. The average long-run response of bank rates to money market rates also is smaller in the emerging market economies, though less markedly so.

Terms of financial contracts

As noted earlier, an important means by which monetary policy affects economic activity is by altering the cash-flow position of borrowers. This depends not only on the extent to which changes in the policy interest rate lead to changes in new short-term deposit and loan rates, but also on how quickly changes in these *new* rates lead to changes in *average* rates. One of the most important determining factors is the maturity of financial contracts. The shorter the maturity, the more frequently will loans and deposits be rolled over at new interest rates, and hence the more quickly will changes in policy rates lead to changes in average interest rates earned by depositors and paid by borrowers.

Table 10 shows that the share of loans with maturities exceeding one year in the major emerging market countries is considerably lower than in several industrialised countries. Loans in Latin America are typically of an even shorter maturity (but comprehensive data are not available). This reflects the greater degree of uncertainty over future inflation and interest rates in those markets. For instance, in Brazil, most enterprise loans have a maturity of less than three months and bonds of less than one year. No long-term instruments existed in Peru until the early 1990s. Monetary policy might therefore be expected to produce a more rapid impact on cash-flow positions in developing countries than in industrialised countries, and hence on aggregate demand as well.

A second factor determining the impact of policy rates on average interest rates is the extent to which interest rates on loans and deposits can be adjusted prior to maturity. The more frequently contractual interest rates are adjusted, and the more fully adjustments reflect changes

Table 10
Structural characteristics of bank loans (1996)

	Maturity structure of loans	Share of loans with adjustable interest rates	
	Percentage with original maturity greater than one year	Home mortgages	Long-term business loans
		percentage of loan category	
East Asia			
Hong Kong	40.1	96.0	..
Korea	26.7	..	..
Malaysia	88.2	..	..
Singapore	59.1	100.0	..
Thailand	53.7	100.0	100.0
Latin America			
Brazil . . . . .	..	100.0	100.0
Chile . . . . .	..	0.0	..
Colombia . . . . .	..	100.0	..
Mexico . . . . .	..	100.0	..
Peru	19.0	..	..
Venezuela . . . . .	..	100.0	100.0
Hungary	42.6	100.0	100.0
Israel	33.5	19.0	..
Russia	2.2	..	..
Saudi Arabia	21.5	..	..
Memorandum:			
United States	83.0	15.0	19.0
Japan	68.0	60.0	38.0
Germany	84.0	90.0	24.0
United Kingdom	62.0	90.0	48.0

Notes: *Hong Kong*: Percentage of loan category: 1994; maturity structure of loans based on remaining maturity in 1997. *Korea, Malaysia and Saudi Arabia*: Maturity structure of loans: 1995. *United States, Japan, Germany and the United Kingdom*: 1993 data; maturity structure includes loans from other financial institutions; share of loans with adjustable interest rates includes short-term loans for Japan and the United Kingdom; long-term business loans include securities.

in money market rates, the more rapid will be the impact of changes in policy rates on average loan and deposit rates. Table 10 indicates the share of loans with adjustable interest rates in emerging and industrialised countries: as a general rule, most loans carry adjustable interest rates.

A third feature of financial contracts that should be highlighted is the indexation of principal to some nominal variable, usually the price level or the exchange rate. In countries such as Chile and Israel with a history of high inflation, the majority of longer-term contracts are indexed; by contrast, indexation is insignificant in Hong Kong, Korea, Malaysia, Singapore and Thailand (see Table 11). The presence of indexed loans and deposits introduces several considerations. First, the interest rate on such contracts may be interpreted as a real interest rate, depending upon the specific manner of indexation. This may help clarify the signal that a

Table 11
Indexation of principal of debt instruments

India	No indexation
Hong Kong	Mostly non-indexed
Indonesia	No indexation
Korea	No indexation
Malaysia	No indexation
Singapore	No indexation
Thailand	No indexation
Brazil	Indexation to a price index is possible when debt instrument has a maturity of more than one year; in special cases (including some government bonds) US\$-linked indexation is possible
Chile	Two-thirds of bank loans and almost all public securities are indexed to prices
Colombia	Indexation to the CPI is applied to 20% of the financial system's loans, to 14% of the financial system's liabilities and to 20% of public debt
Mexico	Mechanism to index some bank loans to the CPI introduced after the 1994 crisis. Some index-linked bonds
Peru	Some bonds are indexed to the CPI
Venezuela	No indexation
Hungary	Issuance of an indexed bond is planned for 1998
Israel	Most financial assets and liabilities are indexed; longer-term instruments usually indexed to the CPI; shorter-term instruments (as well as some government bonds) to the US dollar
Saudi Arabia	No indexation

central bank sends to financial markets through its monetary policy action; it may also help the central bank interpret movements in free market interest rates on indexed debt instruments. Secondly, when deposits and loans are properly indexed, swings in expected inflation and/or exchange rate depreciation will not lead to swings in deposit and loan interest rates, and hence will not affect cash flow as such developments will in non-indexed financial systems. In Mexico in 1995, for example, the Government encouraged the re-contracting of loan rates on a price-adjusted basis so as to eliminate the high inflation-risk premium built into nominal interest rates and thereby reduce the impact of debt service on borrowers' cash flows.

External finance and dollarisation

A particularly important form of access to resources outside the domestic financial system is foreign finance. In contrast to many other aspects of the monetary transmission process in developing countries, there has been considerable research into the role of capital mobility in conditioning the effects of monetary policy. The textbook analysis of the implications of external capital flows for monetary policy transmission suggests several important conclusions. Two related phenomena – offshore borrowing by enterprises and dollarisation – require particular analysis.

Capital flows and monetary policy

In the absence of capital controls, the efficacy of domestic monetary policy is in theory determined by the exchange rate regime and the degree of substitutability between domestic and foreign financial assets. Under a floating exchange rate, monetary policy works through two channels. First, since the money supply is exogenously controlled by the central bank, monetary policy can work through conventional interest rate and liquidity effects. Secondly, monetary policy influences aggregate demand and prices through its impact on the exchange rate. The greater the substitutability between domestic and foreign assets, the greater the response of the exchange rate to policy-induced changes in interest rates, and hence the larger the impact of monetary policy through that channel.

In a fixed exchange rate regime, the influence of asset substitutability on the impact of monetary policy is reversed. When domestic and foreign

assets are perfect substitutes, any monetary policy action is immediately offset through capital flows, so that monetary conditions remain unchanged. The lesser the degree of substitutability, the more scope the monetary authorities will have to move domestic interest rates independently of foreign rates. As will be discussed in greater detail below, the evidence suggests that asset substitutability is less than perfect, indicating that governments fixing their exchange rate have some scope, albeit limited, for pursuing independent monetary policy.

Offshore borrowing

An important feature of increased capital mobility has been the growing ability of many firms in emerging market economies to get finance abroad. For instance, international capital markets have become the main source of capital raised by Israeli firms. The Singapore economy is dominated by multinational corporations with access to financing from abroad. External financing of Thai enterprises grew from 16% of GDP in 1989 to 27% in 1995. Offshore borrowing effectively reduces these firms' exposure to domestic credit-market conditions, and acts to limit the impact of monetary policy on aggregate demand. A monetary tightening that raises domestic loan rates will cause firms to switch to foreign borrowing, thereby limiting the incidence of the monetary tightening and constraining the ability of domestic banks to raise loan rates. To the extent that a change in the differential between the domestic and foreign rate is not offset by an equivalent expected change in the exchange rate, the impact of monetary policy on spending (other than the important effect operating through the exchange rate change itself) may thus be constrained in a floating exchange rate regime.

In practice, only a small number of large firms – often those with foreign currency revenue streams – are able to tap international credit markets directly. Some central banks restrict enterprise access to offshore finance or subject it to reserve requirements (e.g. in Chile and Thailand). The aggregate impact of monetary policy on aggregate demand will not be much affected. Instead, the incidence of monetary policy will fall primarily on smaller firms and households. Whether or not this is desired, it may make the transmission of monetary policy more uncertain, since the firms that are most affected might be those with the weakest balance-sheet positions and most vulnerable to credit rationing.

Dollarisation

Many countries having experienced high inflation – particularly in Russia and Latin America – have seen a substantial rise in the use of foreign currency. The term “dollarisation” has been employed somewhat indiscriminately to refer to the use of dollars as a unit of account, a store of value, a means of transactions, or all three. This paper focuses on the provision of dollar-denominated loans and deposits by the domestic banking system, an activity which embraces both the store-of-value and, to a lesser extent, the transactions function of money. Table 12 compares the shares of bank assets and liabilities denominated in foreign currencies

Table 12
Currency denomination of bank balance sheets
Percentage denominated in foreign currency

	Assets		Liabilities	
	1983	1993	1983	1993
East Asia				
Hong Kong	68.1	74.5	69.4	75.5
Indonesia . . . . .	..	35.1	..	36.4
Korea	5.1	4.1	12.6	3.9
Latin America				
Chile	41.6	19.7	46.7	20.6
Colombia . . . . .	..	13.0	..	11.1
Mexico	41.7	26.7	47.2	28.2
Peru	54.0	..	56.4	..
Venezuela	7.0	12.2	9.3	3.5
Hungary . . . . .	..	28.8	..	30.9
Israel . . . . .	..	36.1	..	36.9
Russia . . . . .	..	29.0	..	25.1
Saudi Arabia	12.3	25.6	21.5	29.1
<i>Memorandum:</i>				
United States	0.4	1.6	0.3	2.1
Japan	14.4	12.0	14.4	12.8
Germany	2.1	5.1	2.2	4.1
United Kingdom	90.6	69.7	93.2	70.7

Notes: Data for 1996 respectively: Korea (6.3, 9.2); Mexico (31.9, 33.4); Peru (74.1, 73.0); Russia (24.6, 23.2); Saudi Arabia (20.6, 22.4).

Hungary: 1996. Russia: 1995. United States: Only positions against non-residents.

among various emerging market countries. Foreign-currency-denominated shares in some of these economies are much higher than in the industrialised countries shown in the table and, given the legacy of unsettled macroeconomic conditions over the past decade, have risen since the early 1980s.

Assets can be denominated in foreign currency (“dollars”) or in the domestic currency (“pesos”); the other dimension is that assets can be local or foreign. The transmission of monetary policy in a dollarised system will depend not only on the substitutability between domestic peso and dollar assets, but also on the substitutability between domestic dollar assets and foreign dollar assets. Because of the presence of default and convertibility risk, domestic and foreign dollar-denominated assets are likely to be regarded as less than perfect substitutes. As evidence of this, dollar interest rates in dollarised financial systems have generally exceeded international levels.

Consideration of the case where the markets regard domestic peso and dollar assets as close substitutes but view domestic and foreign assets as being not substitutable serves to illustrate the importance of asset substitutability. Assuming limited exchange rate changes, policy-induced increases in peso interest rates will induce borrowers to switch to domestic dollar loans and savers to shift their assets into peso deposits, leading to increases in domestic dollar deposit and loan rates as well. Therefore, monetary policy is effective in this case. Conversely, where domestic and foreign dollar assets are highly substitutable, the monetary transmission channel will more closely resemble that in a non-dollarised system with perfect capital mobility, except that access to dollar loans might be more widespread in a dollarised system than in a non-dollarised one.

There is considerable evidence that relative holdings of peso and dollar deposits respond to changes in relative rates of return. However, little research has focused on the degree of substitutability between domestic and foreign dollar-denominated assets. The conduct and transmission of monetary policy in a partially dollarised financial system remains a relatively unexplored topic.

The role of initial financial conditions

The initial financial position of households, firms and banks is likely to interact with monetary policy in three important ways. First, the impact

of monetary policy on consumption and investment will depend upon the extent to which these expenditures are financed through the financial system. Secondly, changes in asset prices resulting from monetary policy action will have different effects on net worth depending on the composition of financial portfolios. Finally, the initial strength or weakness of balance-sheet positions will influence how monetary policy action will induce changes in borrowing and spending aimed at achieving a sustainable or acceptable balance-sheet position.

Sources of financing

In economies where financial intermediation is underdeveloped and investment (both housing and corporate) usually is financed from internal sources (such as personal savings and retained earnings), the impact of monetary policy actions on aggregate demand may be relatively modest. Limited reliance on external financing sources could be a reason why enterprise investment in India is only slightly affected by interest rate changes.

As economies develop, the availability of intermediated savings tends to rise, and a greater share of investment and, in some cases, consumption expenditures is financed by bank lending. In the past decade, this long-term evolution has been amplified by the process of financial liberalisation, which has improved the financial sector's efficiency and ability to channel savings – both foreign and domestic – to borrowers. Often, too, fiscal adjustment has released resources for private sector use that previously had financed government budget deficits. These developments are likely to have increased the sensitivity of aggregate demand to monetary policy.

Tables 13 and 9 (p. 29) display flow-of-funds data on the personal and the non-financial corporate sector's liabilities to the financial sector, respectively. The rather incomplete data are consistent with the view that dependence upon intermediated savings has risen in emerging market countries in the past decade. For instance, two-thirds of investment by enterprises in Thailand was financed by external funds in 1991–96, compared with only one-third in the period 1980–90.

The pattern of financing of household and enterprise expenditures also plays an important role in the sectoral impact of monetary policy. In industrialised countries, the construction sector is especially sensitive to interest rates, since buildings and real estate are too large and “lumpy” to

Table 13
Gross flow of financial liabilities of the personal sector
 In percentages

	Annual flow of gross financial liabilities as a % of GDP		Composition of gross financial liabilities			
	1982-84	1992-94	Mortgage debt		Other debt	
	1982-84	1992-94	1982-84	1992-94	1982-84	1992-94
East Asia						
Korea	6.2	8.9	..	..	..	..
Malaysia	2.5	5.6	58.2	37.7	41.8	62.3
Singapore	2.1	4.4	30.0	75.3	70.0	24.7
Thailand . . . . .	..	10.8	..	20.9	..	79.1
Latin America						
Colombia	4.0	7.6	55.9	63.2	44.1	36.8
Mexico . . . . .	..	17.3	..	37.0	..	63.0
Hungary . . . . .	..	-0.4	..	70.0	..	30.0
<i>Memorandum:</i>						
United States	4.6	4.4	55.1	61.9	44.9	38.1
Japan	4.7	1.1	5.6	21.6	94.4	78.4
Germany	3.8	4.3	83.1	85.9	16.9	14.1
United Kingdom . . .	6.4	2.9	78.8	101.6	21.2	-1.6

Notes: Hungary: 1996. Korea: Annual flow of gross financial liabilities (% of GDP) in 1992-96: 9.1. Thailand: 1990-93.

be financed in ways other than by borrowing; for much the same reason, consumer durable expenditures are also quite interest-sensitive. Similarly, sectors in which requirements for fixed capital or working capital (because of the cyclical behaviour of demand or supply) are high are likely to be heavily dependent on bank credit and sensitive to bank interest rate changes. There has been less research on the sectoral response of demand to monetary policy shocks in developing countries; but there is some evidence that in such countries construction and consumer durables expenditures are also especially sensitive to monetary conditions. Colombian studies also suggest high sensitivity in certain other sectors, such as agriculture and manufacturing.

In several emerging market countries, financial liberalisation and capital inflows have given rise to particularly marked growth in mortgage lending and consumer credit, including credit cards. In Argentina, for

instance, consumer loans have led credit growth in recent years. As indicated in Table 14, the share of consumer credit and mortgage lending in total bank loans has grown considerably in the past decade, although it still remains below levels in industrialised countries. Given the interest

Table 14
Composition of bank loans
In percentages

	Home mortgages		Consumer credit		Enterprises		Government	
	1983	1993	1983	1993	1983	1993	1983	1993
India . . . . .	..	..	..	..	59.2	56.5	40.8	43.5
East Asia								
Hong Kong	6.4	9.4	5.4	3.6	88.2	87.0	..	..
Indonesia . . . . .	..	4.1	1.0	6.9	..	70.7	..	2.2
Korea . . . . .	..	12.7	..	11.7	..	74.5	..	1.1
Malaysia	11.3	13.9	1.0	11.2	20.1	30.1	..	0.5
Singapore	1.8	14.9	..	..	..	..	0.0	0.0
Thailand . . . . .	..	8.3	..	4.1	..	58.8	..	0.7
Latin America								
Brazil . . . . .	..	22.1	..	3.4	..	65.3	..	9.2
Chile	7.8	11.2	1.2	4.0	36.7	44.5	..	..
Mexico	2.5	13.0	0.8	7.2	16.8	36.3	29.2	9.5
Venezuela . . . . .	..	..	..	..	..	..	3.2	0.7
Hungary . . . . .	..	6.2	..	3.5	..	52.4	..	37.9
Israel . . . . .	..	..	..	..	..	..	..	19.1
Russia . . . . .	..	..	..	1.7	..	74.6	..	..
Saudi Arabia . . . . .	..	..	..	..	..	..	..	18.8
<i>Memorandum:</i>								
United States	20.8	29.8	13.4	12.6	28.6	20.7	11.3	10.1
Japan	7.5	8.7	0.4	3.8	73.7	70.4	13.5	9.0
Germany	16.9	15.6	8.2	8.5	45.3	44.9	19.4	13.9
United Kingdom	48.8	56.0	8.7	8.3	25.3	21.0	10.8	2.8

Notes: *Brazil*: Total bank loans exclude inflation correction component. *Chile*: 1985 data (instead of 1983). *Hungary*: 1996 data. *India*: Bank loans include bank credit to the commercial sector (i.e. households, non-bank, non-financial private and public sector enterprises) and net bank credit to the government; data for 1993 are at end-March 1997. *Korea*: Data for 1996 are: home mortgages (2.6), consumer credit (20.2), enterprises (75.1) and government (1.1). *Malaysia*: Bank loans include loans extended by commercial banks, finance companies and merchant banks. Data for 1996: home mortgages (11.9), consumer credit (12.0), enterprises (33.4) and government (0.3). *Russia*: 1995. *Venezuela*: Commercial banks only.

sensitivity of residential investment and consumer durables purchases, this promises to further strengthen the effects of monetary policy in developing countries, as well as to accentuate its uneven incidence across different sectors. In Mexico, heavy consumer lending in the years prior to the peso's 1994 devaluation was followed by a near-elimination of new credit availability thereafter, making the subsequent contraction even deeper than it otherwise would have been.

Composition of financial portfolios

As monetary policy can change the valuation of assets and liabilities, the impact on aggregate demand depends crucially upon the initial composition of portfolios. In economies in the early and middle stages of financial development, most savings are intermediated through the domestic banking system, and relatively small proportions of household and corporate portfolios are invested in securities whose value varies with market conditions. More important may be the share of foreign currency assets and liabilities.

As financial markets develop, the diversity of portfolios and their sensitivity to policy actions affecting asset values may be expected to grow. Table 15 compares movements in the share of securities in the total assets of banks. Unfortunately, very few data for the household and the non-financial corporate sector are available, making it difficult to discern to what extent this share has grown and come closer to the levels observed in selected industrialised countries.

Holdings of foreign currency assets and liabilities may represent a particularly important source of balance-sheet exposure to asset prices – in this case, exchange rate changes. Data on the foreign currency exposure of households and firms are not readily available. The data on the foreign currency exposure of the banking system are shown in Table 12, but they must be interpreted carefully. In most countries, regulations restrict the size of net foreign currency exposure by banks. However, insofar as bank borrowers may hold open positions in foreign currency, the quality of bank portfolios and banks' ability and willingness to provide credits may be affected by changes in exchange rates. In Mexico, for example, foreign exchange exposure was limited as a share of capital (and foreign liabilities as a share of total liabilities), but the 1994 devaluation seriously eroded the financial situation of many domestic customers with dollar-denominated debts, contributing to a rise in non-performing loans

Table 15
**Share of securities in total assets of the
consolidated banking sector**
In percentages

	1983	1993
India	32.5	40.0
East Asia		
Hong Kong	3.8	5.5
Indonesia . . . . .	..	4.1
Korea	8.1	10.3
Malaysia	11.9	7.0
Singapore	7.8	10.6
Thailand . . . . .	..	5.4
Latin America		
Brazil . . . . .	..	4.8
Chile	7.5	18.2
Colombia . . . . .	..	8.9
Mexico	2.4	1.1
Peru	2.4	..
Venezuela	6.8	15.4
Hungary . . . . .	..	22.8
Israel	7.0	12.6
Russia . . . . .	..	16.1
Saudi Arabia	5.7	21.1
<i>Memorandum:</i>		
United States	25.5	27.2
Japan	16.4	16.9
Germany	11.2	14.5
United Kingdom	5.3	14.1

Notes: Holdings of commercial paper, corporate and government bonds and equities where available. For *Chile, Colombia, Indonesia, Israel, Malaysia, Saudi Arabia, Singapore, Thailand* and *Venezuela*, holdings of all securities.

Data for 1996: India (October 1997: 40.9), Korea (12.4), Malaysia (6.9), Saudi Arabia (23.9), Peru (6.9), Venezuela (39.7; June 1997: 29.1).

Chile: 1980 data (instead of 1983). *Hong Kong*: 1983 excluding equities. *Hungary*: 1996. *India*: Includes government securities and other securities approved for statutory liquidity ratio. *Israel*: 1987 data (instead of 1983). *Malaysia*: Securities refer to Malaysian Government, foreign and corporate securities. *Mexico*: Government bonds and equities. *Russia*: 1995. *Saudi Arabia*: Saudi commercial banks only as the information for specialised government institutions is not available.

that has seriously damaged bank balance sheets. Banks, in turn, have responded by tightening lending, which may have further reinforced

contractionary tendencies. The depreciation of a number of Asian currencies since mid-1997 may have similar effects, especially where there has been large foreign-currency-denominated borrowing to finance the acquisition of domestic assets.

Leveraging and net worth

As already noted, the strength of balance-sheet positions is likely to be an important determinant of borrowing and spending, insofar as it affects both permanent income and financial vulnerability. The relationship between balance-sheet strength and financial vulnerability, and therefore between balance-sheet strength and expenditures, is likely to be non-linear. When initial balance-sheet positions are strong – that is, assets far exceed debt repayment obligations – the probability of future financial distress may remain low even after a marked reduction in the value of asset holdings, and therefore expenditures may be little affected. But if balance-sheet positions are weak, the same reduction in asset values may significantly boost the probability of insolvency or illiquidity, and therefore lead to a sharp and sudden adjustment to borrowing and spending.

The initial financial condition of households and firms thus represents a key determinant of the impact of monetary policy. The stronger the initial position of balance sheets, the weaker will be the contribution of this channel to the impact of monetary policy on consumption and investment. In addition, the smaller the share of *net debt* (interest-bearing liabilities minus interest-bearing assets) in household and firm portfolios, the smaller will be the cash-flow effects of a given change in monetary conditions.

Various indicators could capture the vulnerability of the non-financial sector to different means by which balance-sheet changes affect spending. Unfortunately, very few countries (industrial as well as developing) collect the necessary statistics to allow the derivation of such ratios. One important measure is *net worth*, the ratio of net assets to income, which through standard neoclassical effects is expected to influence expenditures, even in the absence of concerns over debt repayment and financial distress. Another is the ratio of debt to assets which measures *leveraging* and may be better correlated with the probability that households or firms will have difficulty meeting scheduled debt service obligations. Insofar as interest payments on debt are likely to move more closely with changes in policy interest rates than returns on assets, the degree of leveraging

also indicates the prospective size of the cash-flow effect resulting from monetary policy measures. However, the latter effect would be more precisely captured by a third indicator, the ratio of net interest payments to income.

As a result of financial liberalisation, the private non-financial sector has had more access to credit as public sector use of bank credit has fallen and capital inflows have risen: this implies that, as in the industrialised countries, various measures of balance-sheet vulnerability to monetary policy actions are likely to have increased in emerging market countries in the past decade.

Balance-sheet heterogeneity

One implication of the non-linear relationship between balance-sheet positions and expenditures is that the effects of monetary policy will depend not only on the *aggregate* balance-sheet position of the non-financial sector, but also on its *distribution* among households and firms. If the financial condition of enterprises in an economy is very dispersed (some strong, others weak) the non-linearities between balance-sheet strength and spending will make the effects of monetary policy much more unpredictable than where most firms have rather similar balance-sheet positions. Aggregate measures of financial positions may therefore be misleading.

The financial condition of the banking system

The financial condition of the banking system is an important determinant of the cost and availability of bank loans. Declines in risk-adjusted capital/asset ratios can lead banks to limit lending by raising both interest rates and loan-qualification standards. As in the case of firms and households, the weaker their financial position, the more likely banks are to reduce loan supply as monetary policy tightens. When bank capital is high relative to assets, reductions in asset value (due to declines in securities prices or increases in non-performing loans) may still leave capital/asset ratios at comfortable levels. When initial capital/asset ratios are low, however, policy-induced increases in the cost of funds, declines in asset prices and deterioration in loan performance may force banks to sharply restrict loan availability, inducing a credit crunch that reinforces the effect of monetary policy in raising the cost of borrowing to households and firms.

Various developments over the past decade have accentuated the vulnerability of banks in emerging market economies to financial distress, and hence increased the sensitivity of bank lending to monetary policy. Macroeconomic misalignments and their delayed correction have been a major source of disturbance. Secondly, the reduced dependence of the banking system on government support, both through privatisation and the reduction of subsidies, has made capital/asset ratios for banks more binding than in the past. Thirdly, financial liberalisation and reduced fiscal deficits have encouraged a marked shift in bank lending from the public sector to the private sector. Because banks in many emerging market countries had limited experience in private loan assessment and monitoring, and because prudential oversight mechanisms were not sufficiently strengthened, loan quality deteriorated. Finally, this tendency has been reinforced by large-scale capital inflows, which caused the supply of loanable resources to increase faster than banks could properly allocate. Two summary measures of banking sector financial strength (the ratio of non-performing to total loans and the capital/asset ratio) are shown in Table 16.

Discerning whether there has been a credit crunch or not depends on distinguishing between declines in loan supply and declines in loan demand as explanatory factors for the reductions in lending that typically have accompanied recessions. Attempts to identify significant effects of a credit crunch in both the weak 1990–91 recovery in the United States and the Japanese recession of the 1990s have met with only mixed success. The decline of bank lending in Mexico in 1995 has been subject to less formal analysis, but again there is disagreement as to how far the huge drop in real credit outstanding reflected the response of bank loan supply to widespread financial fragility in the economy in general, and the banking sector in particular, and how far the response of bank loan demand to high interest rates, economic recession and weak balance sheets. Similar observations could be made for Russia, where the sizable share of idle assets in banks' balance sheets could be due to both the financial problems of enterprises and the extensive bad loan portfolios of banks. The distinguishing line between the fragility of banks and that of borrowers as the primary cause of tighter credit availability is also difficult to draw in the cases of Brazil and Thailand.

One difficulty in identifying significant contractionary pressures from a credit crunch – that is, a tightening of loan supply induced by a weakening

Table 16
Balance-sheet position of the banking system
 In percentages

	Non-performing loan ratio			Risk-weighted capital ratio	
	1983	1993	1996	1983	1993
China . . . . .	..	19.5	..	..	9.5
India . . . . .	..	..	9.2	..	..
East Asia					
Hong Kong . . . . .	..	2.9	2.7	15.1	17.5
Indonesia	4.5	10.4	8.8	..	11.9
Korea . . . . .	..	1.8	0.8	..	11.0
Malaysia	20.6	6.1	3.9	10.4	11.3
Singapore . . . . .	..	..	..	..	18.7
Thailand	9.7	7.7	8.2	8.6	9.3
Latin America					
Argentina	16.0	12.3	9.4	..	18.5
Brazil	4.7	7.9	5.8	..	12.9
Chile	11.4	1.0	1.0	..	8.2
Colombia	2.2	2.7	4.6	..	13.5
Mexico	9.9	7.6	21.4	9.3	11.3
Peru . . . . .	..	9.3	5.1	..	10.5
Venezuela	7.6	7.8	4.4	..	10.5
Hungary . . . . .	..	..	4.0	..	15.7
Israel . . . . .	..	4.8	..	11.3	10.5
Russia . . . . .	..	..	..	..	8.7
Saudi Arabia . . . . .	..	4.8	6.6	59.7	42.2
<i>Memorandum:</i>					
United States	3.3	1.3	1.1	8.6	12.8
Japan . . . . .	..	3.4	..	9.1	9.1
United Kingdom . . . . .	..	..	..	8.4	8.1

Notes: For *Russia*, *Saudi Arabia* and the *United Kingdom* the capital ratio is measured as net assets/total assets.

Data for the 1996 risk-weighted capital ratio: *Korea* (9.1), *Saudi Arabia* (39.8), *Venezuela* (17.9).

Chile: Equity plus reserves/total assets (excluding fixed assets, contingency loans and other assets). *Hungary*: 1996. *India*: Public sector banks; end-March 1997. *Malaysia*: End-October 1997 data: non-performing loan ratio (4.3%); risk-weighted capital ratio (10.8%). *Saudi Arabia*: Non-performing loan ratio for 1993 is 1995. *Venezuela*: Non-performing loan ratio in June 1997 is 3.7%.

of bank balance sheets – is that even healthy banks will react to a tightening of monetary policy and a subsequent slowing of economic activity

by raising loan rates and loan standards. This in practice blurs the distinction between loan supply and loan demand. However, emerging market economies may be more exposed to a credit crunch than industrial countries because they are more dependent on bank financing.

Unresolved issues in the monetary transmission process

There are four important aspects of the monetary transmission process where uncertainties and/or disagreements are especially deep, namely (i) the transmission of monetary policy actions to long-term interest rates and asset prices, (ii) gauging the tightness of monetary conditions, (iii) the scope for monetary policy under fixed exchange rates and financial fragility, and (iv) the effects of monetary policy in high-inflation economies. In all cases, the state of expectations very largely conditions the impact of monetary policy, and it is this which gives rise to the uncertainties.

Long-term interest rates and asset markets

As noted earlier, an important facet of the monetary transmission process is the impact of policy-induced changes in short-term interest rates on long-term interest rates and asset prices. According to the expectations theory of the term structure, long-term interest rates represent the average of future expected short rates plus a risk premium, while equity prices could be interpreted as reflecting the discounted present value of expected future enterprise earnings and real estate prices that of expected future rents. According to the principle of uncovered interest parity, exchange rates are determined by changes in international interest rate differentials. Therefore, changes in the short-term interest rate will influence long rates and asset prices, depending upon how monetary policy affects the path of expected future short-term rates, earnings or rents.

In practice, the response of long rates and asset prices to policy-induced changes in short rates has been difficult to predict, even in industrialised countries. First, it depends on how the expected future path of short-term interest rates is affected by a policy step. Much depends on how the action alters market expectations of the need for further measures. For example, the Federal Reserve's raising of short rates in February 1994 might have been expected to lower long rates on

Table 17
Volatility of exchange rates, interest rates and equity markets

	Exchange rates		Interest rates				Equity markets	
	1986-90	1991-95	Overnight		Three-month		1986-90	1991-95
			1986-90	1991-95	1986-90	1991-95		
China	3.4	4.3	..	..	0.5	0.3	..	21.6
India	1.3	3.2	2.6	5.7	..	..	8.9	10.4
East Asia								
Hong Kong	0.1	0.2	2.4	1.4	0.8	0.5	8.8	7.6
Indonesia	3.9	0.2	2.2	2.0	1.6	0.6	10.8	8.6
Korea	0.8	0.6	0.9	1.3	0.0	0.2	8.9	7.7
Malaysia	1.0	1.4	1.2	0.3	0.4	0.3	8.6	7.0
Singapore	1.2	1.0	2.5	1.1	0.5	0.5	7.3	4.1
Thailand	0.6	0.5	1.2	1.9	0.5	0.7	9.3	8.8
Latin America								
Argentina	18.8	5.3	∞	26.9	∞	23.1	31.7	17.6
Brazil	10.5	11.2	∞	∞	..	..	22.9	16.2
Chile	1.3	1.8	..	..	0.6	0.2	8.3	8.1
Colombia	0.3	2.2	..	..	0.9	1.8	6.4	11.5
Mexico	3.7	5.8	..	..	12.2	5.9	15.9	10.8
Peru	18.9	4.6	..	..	944.1	25.1	32.6	16.4
Venezuela	10.0	7.1	..	..	2.9	5.1	13.7	13.3
Hungary	3.0	2.9	..	..	5.7	1.6	..	10.8
Israel	2.2	2.1	..	0.7	..	1.2	5.0	7.7
Russia . . . . .	..	13.1	..	182.9	..	14.8	..	34.7
Saudi Arabia	0.0	0.0	..	0.3	0.6	0.4	3.0	7.9

Table 17 (cont.)
Volatility of exchange rates, interest rates and equity markets

	Exchange rates		Interest rates				Equity markets	
	1986–90	1991–95	Overnight		Three-month		1986–90	1991–95
			1986–90	1991–95	1986–90	1991–95		
<i>Memorandum:</i>								
United States	1.4	1.5	0.3	0.2	0.2	0.2	3.9	2.2
Japan	3.9	3.1	0.3	0.2	0.2	0.2	6.4	6.0
Germany	3.4	3.5	0.3	0.2	0.3	0.2	5.9	3.6
United Kingdom	3.4	3.5	0.6	0.4	0.6	0.4	5.5	3.4

Notes: Volatility as measured by the standard deviation of monthly changes. Exchange rates vis-à-vis the US dollar. For the United States, the nominal effective exchange rate. ∞ denotes exceeds 1,000. Equity markets in US dollar terms.

Chile: Interest rate: the real interest rate as officially defined. *China:* Interest rate: one-year deposit rate. *Peru:* Interest rate: up-to-six-months deposit rate. *Russia:* Exchange rate: starting in mid-1992. *Saudi Arabia:* Exchange rate: starting in July 1996.

the grounds that it was pre-emptive (i.e. aiming to contain inflation even before it had started to rise). Instead, long rates rose as the market (correctly) foresaw further interest rate adjustments in the immediate period afterwards.

Secondly, asset prices are also determined by expectations of future macroeconomic performance which affect both future short-term interest rates and future earnings and rents. The difficulties of predicting future macroeconomic variables (not least after a significant monetary policy measure has been taken) make the response of long-term interest rates and asset prices to a change in short-term rates particularly uncertain. This is especially the case as the causality between asset prices and macroeconomic performance runs in both directions.

A final complication is that asset market behaviour frequently appears to deviate from the basic expectations model. Many movements in asset prices appear to reflect changing risk premia, speculative bubbles or other factors not obviously related to expected future returns. Asset market responses to monetary policy are likely to be particularly uncertain in emerging market countries, where asset markets tend to be shallower and less competitive. Often small groups of players can move the market. Swings in asset market prices may well be amplified by the greater availability of credit or other financing in the wake of financial reform. Market participants also may have less experience in pricing assets, and less access to timely and accurate information on the financial condition of firms seeking to raise funds. Furthermore, many of these firms may be new and therefore without an extensive track record, making them inherently more difficult to price. All of these considerations contribute to uncertainties about the appropriate level of asset prices and the prospective response of asset prices to monetary policy actions.

The unpredictability of asset market responses in many emerging market economies is likely to be magnified by the greater volatility of macroeconomic performance – including output and inflation – compared with industrialised countries (see Tables 17 and 18). This widens the range of possible responses to a given change in short-term interest rates.

One feature of many highly volatile economies, particularly in Latin America, is that this volatility takes the form of alternating high and low-inflation periods, which are usually associated with alternating fixed and flexible exchange rate regimes. In such countries, market expectations may focus narrowly on the probability of a future switch in regime, placing

Table 18

The volatility of macroeconomic indicators and banking aggregates over the period 1980–95

	GDP	Inflation	Bank deposits	Bank credit to private sector
China	3.5	7.7	7.5	6.1
India	2.2	3.6	2.3	3.5
East Asia				
Hong Kong	3.4	3.5	7.9	6.9
Indonesia	2.0	3.1	7.8	20.1
Korea	3.5	7.2	5.3	5.6
Malaysia	6.9	3.7	8.8	8.4
Singapore	3.3	2.6	5.7	4.6
Thailand	2.7	4.6	6.6	6.5
Latin America				
Argentina	5.5	860.0	23.5	34.4
Brazil	3.7	767.6	20.7	32.8
Chile	5.8	7.5	20.9	21.8
Colombia	1.5	3.9	9.0	9.1
Mexico	4.2	39.4	16.4	22.1
Peru	7.6	1,964.5	15.1	19.5
Venezuela	4.9	21.9	12.7	16.0
Hungary	3.8	9.1	12.0	7.9
Israel	2.0	111.0	15.0	10.7
Russia	4.5	363.3	7.6	24.9
Saudi Arabia	5.4	2.5	19.6	16.8
<i>Memorandum:</i>				
United States	2.1	3.1	4.4	3.4
Japan	1.8	2.0	2.5	2.5
Germany	1.8	1.9	5.4	3.1
United Kingdom	2.4	4.1	4.4	6.1

Notes: Volatility as measured by the standard deviation of annual percentage changes. Bank deposits and bank credit to private sector as a percentage of nominal GDP.

India: Financial year data. Russia: 1993–95. United Kingdom: 1987–95.

less weight on prospective marginal changes in fundamentals that may occur within regimes. Accordingly, monetary policy affects long-term interest rates and asset prices mainly by influencing market expectations of a future regime shift or, more broadly, market assessments of the credibility of monetary policy. In Venezuela, for instance, prices of real

estate have tended to be determined in the first instance by the prospects of significant exchange rate adjustments (as property was viewed as a good store of value to protect against exchange rate depreciation), rather than by changes in domestic interest rates.

In a volatile environment, even a limited change in monetary policy might have large and not necessarily intentional effects on asset markets and aggregate demand. A loosening of monetary policy, if it prompts concerns of a new surge in inflation, may lead to sharp increases in all but the very short-term interest rates and to sharp declines in equity prices and the exchange rate; the net effect of these movements may be contractionary, not expansionary. Conversely, in the context of high and rising inflation, a sharp tightening of monetary policy may instil confidence, lower longer-term rates, and encourage a recovery of financial markets and economic activity. Of course, asset markets may move in ways that offset the direct effect of a monetary policy action in more stable industrialised countries as well, but experience suggests that the degree of offset is much less than in more volatile economies. Hence, the monetary authorities' room to manoeuvre probably is more limited in developing than in industrialised nations.

To the extent that asset market responses to monetary policy in emerging market countries are particularly uncertain and volatile, the question arises as to whether this volatility may be destabilising for economic activity in general. In principle, when asset markets are highly volatile, the informational content of particular movements in asset prices is reduced. This should cause investors to discount asset price movements to some extent, thereby reducing the impact of asset price fluctuations on consumption and investment decisions, and hence on economic activity.

In practice, asset market volatility has been closely associated with macroeconomic volatility (although as noted above, this certainly reflects some causality running from the latter to the former). Probably, a certain amount of myopia among investors and consumers contributes to a failure to discount asset market fluctuations sufficiently. Moreover, swings in asset market prices may well be correlated, for reasons discussed earlier, with the availability of credit or other financing. If certain classes of households and firms are excluded from credit market access during financial downswings, it may make sense for them to borrow as much as possible during the upswings. This will be particularly true if a poorly

developed legal system makes it difficult for creditors to recover their loans, thereby reducing risks associated with over-borrowing during periods of credit availability.

Gauging the tightness of monetary conditions

When monetary conditions are extreme, the direction in which to adjust monetary policy may be obvious: inflation calls for a tightening of monetary policy, while severe recession and/or price deflation would make monetary loosening appropriate. In more intermediate circumstances, it may be less obvious whether current monetary conditions are too tight or too loose, and therefore the direction in which to adjust monetary policy may be uncertain.

Unfortunately, there are no clear or unambiguous grounds for gauging the tightness of monetary conditions. Central banks have relied upon various statistical indicators of monetary conditions, but none of them has proved entirely reliable in providing an indication of future movements in aggregate demand and inflationary pressures. A common shortcoming of statistical indicators of monetary stance is that their relation to the ultimate objectives of monetary policy – aggregate demand and prices – will shift as the channels of transmission of monetary policy evolve.

The monetary authorities in many industrialised countries have largely abandoned monetary targeting, since changes in the demand for money have caused the relationship between the monetary aggregates, aggregate demand and prices to shift over time. This movement away from targeting has been less pronounced in several emerging economies (see Table 19). Both Brazil and Korea still formulate monetary targets, although they are only indicative and rather broadly defined given the volatility of money demand in recent years. M3 is an indirect intermediate target in Malaysia. By contrast, in China and Russia, where financial market reform has not yet progressed very far, the usefulness of monetary targeting does not appear to have been eroded much. Despite extensive liberalisation in recent years, Indonesia and Peru also continue to use a monetary aggregate target (respectively, the monetary base and base money) at least as a starting-point (while closely monitoring interest rate movements). In Venezuela, an IMF-supervised economic programme includes a target for M2. In India the money demand function appears to have remained stable over a long period as well as in the recent past, notwithstanding institutional changes and financial market development. However, because the

Table 19

Principal intermediate/operating target for monetary policy

China	M1 and M2
India	M3 (Broad money)
Hong Kong	Exchange rate against the US dollar
Indonesia	Monthly target range for the monetary base; target range for the real effective exchange rate
Korea	M2 and MCT (M2 + CDs + Money in trust)
Malaysia	Interbank interest rate, M3 is indirect target
Singapore	Exchange rate against a basket of currencies
Thailand	Money market liquidity; interbank lending rate; exchange rate
Argentina	Exchange rate against the US dollar
Brazil	Four monetary aggregates: the monetary base, M1 and two broader aggregates
Chile	Short-term interest rate (consistent with an annual inflation target)
Colombia	Annual target range for the exchange rate against the US dollar; interest rate range
Mexico	Net domestic credit; monetary base
Peru	Base money (consistent with an annual inflation target)
Venezuela	M2
Hungary	Pre-announced crawling peg supported by interest rate objective
Israel	Short-term interest rate
Russia	Money supply and money base (including upper ceilings on net domestic assets of the monetary authorities and minimum floors on net foreign assets); exchange rate band
Saudi Arabia	Exchange rate against the US dollar

interest rate has a significant, albeit still small, impact on money demand, the Reserve Bank monitors a host of indicators, quantities as well as prices, belonging to both the financial and the real sector.

Some central banks attach importance to the real rate of interest. However, the issue of what definition of inflation should be taken to define the real rate of interest is far from trivial. A particularly thorny

question is the weight to be attached to asset prices compared with goods prices – rapid changes within the financial system have often caused these two indicators to diverge. For example, some analysts speculate that in Japan during the 1980s changes in the structure of financial markets caused looser monetary policy to lead to higher asset prices rather than inflation of goods prices. According to this view, because goods prices were stable and the yen was strong, policy-makers failed to interpret surging asset prices as a signal of loose monetary policy until dangerous imbalances in the Japanese economy had already developed. The linkage between monetary expansion and asset prices also is believed to have assumed some importance in other East Asian economies such as Korea and Taiwan during the 1980s. In Indonesia, stock market prices have become an indicator used in guiding monetary policy. Unsustainable property price booms both fuelled, and were fuelled by, an excessively rapid expansion of bank credit in several Asian countries in the first half of the 1990s, contributing to the financial crises that erupted recently.

In emerging market economies, uncertainties about the channels of transmission of monetary policy, combined with rapid structural change in these channels, make the interpretation of indicators of monetary stance especially difficult. Moreover, even if the channels of monetary transmission are stable and well-understood, the greater volatility of financial markets and macroeconomic performance may loosen the linkage between indicators of monetary conditions and future economic outcomes. Also, if inflation expectations are high and volatile, it may be very difficult to identify which part of the interest rate reflects the real interest rate and which part the inflation risk premium. As the Brazilian paper puts it, the relevant real interest rate is the nominal interest rate minus the certainty equivalent of inflation, which will exceed its expected value by a “volatility” premium. Hence a high real interest rate is not necessarily synonymous with tight monetary policy if the “volatility” premium is similarly high. The Brazilian paper argues that the interest rate channel is strengthened when stabilisation policies have produced less volatile inflation. To avoid such problems, some central banks (e.g. in Chile) set monetary policy in terms of a real interest rate.

In some cases, different indicators simultaneously may point to very different monetary conditions. In the aftermath of inflation stabilisation, for example, certain emerging market economies have experienced simultaneous increases in real interest rates (pointing to monetary tightness)

and rapid credit growth (pointing to monetary ease). This was the case in Mexico after it stabilised the peso in 1988 and in Brazil following the implementation of the Real Plan in mid-1994. These developments could stem from a recovery of bank deposits and of access to international lending, which allows a loosening of credit rationing by banks, combined with continued concerns about future inflation and exchange rate depreciation, which cause nominal interest rates to decline less quickly than actual inflation. In general, whenever both price- and quantity-rationing are used to clear the market, opposite movements of prices and quantities may occur, making the determination of the monetary stance particularly uncertain.

Monetary policy under fixed exchange rates and financial fragility

Many countries have relied on the exchange rate as the nominal anchor. This largely reflects the fact that fixed exchange rates historically have provided the fastest and, at least initially, least costly way to reduce high rates of inflation.

A major drawback of this policy choice is that independent monetary action is constrained. In theory, a fixed exchange rate can force a central bank to accept the international level of interest rates, thus preventing it from increasing rates as much as needed to contain excessive credit and demand growth. Equally, a fixed exchange rate that becomes overvalued can lead to very large current account deficits. The automatic adjustment mechanisms associated with fixed exchange rates can be too disruptive. Downward rigidities in domestic prices mean that current account deficits, for example, must be adjusted through monetary outflows and demand compression, not through real exchange rate depreciation: this could severely test both the strength of the banking system and the political viability of the monetary authority.

In practice, however, there may be scope for a *somewhat* independent monetary policy even with a fixed exchange rate. This exists as long as domestic and foreign assets are not perfect substitutes, even when capital flows are entirely unregulated. The evidence is that domestic and foreign assets in developing economies are indeed less than perfect substitutes: statistical research indicates that rates of return on assets are neither equalised nor perfectly synchronised. In addition, the effects of monetary policy measures are not usually fully reversed by offsetting capital flows. Finally, the historical experience of countries which have had fixed

exchange rates and sterilised capital inflows suggests that these policies usually did succeed in raising domestic interest rates (or limiting their decline), at least temporarily. However, such effects are unlikely to be permanent and a country may have to cope with a sudden reversal after a period of prolonged capital inflow.

The lack of perfect substitutability between domestic and foreign assets, and hence the failure of exchange-rate-adjusted rates of return to converge, may in part reflect institutional factors. To the extent that financial markets are highly segmented and clear through non-price rationing mechanisms, market participants may fail to arbitrage deviations of domestic rates of return from international norms. For example, the domestic money market might be well integrated with international capital markets, but changes in money market rates might not lead to immediate, corresponding movements in deposit or loan rates. Market segmentation has been cited as a factor in maintaining a degree of monetary independence in East Asian countries that had fixed or quasi-fixed exchange rates before July 1997.

Another factor is that divergent risk premia for exchange rate changes may prevent the equalisation of returns across countries. Depending upon individual assessments of the sustainability of a fixed exchange rate regime, a given domestic interest rate may be viewed as highly attractive by some participants and too low by others. This may give the monetary authority a certain amount of leeway in targeting interest rates, although the more these rates deviate from international levels, the greater is the risk of triggering offsetting capital flows.

In practice, using the scope for some degree of policy independence often has taken the form of sterilising capital inflows or outflows. Unfortunately, sterilisation poses significant risks. Sterilising capital inflows can be costly, because it requires issuing domestic currency liabilities that generally pay higher rates of return than the foreign currency assets being acquired in exchange. If capital inflows rise more than expected in response to sterilisation, the fiscal costs of sterilising can become unacceptable. Another price, as pointed out in the Israeli paper, is that sterilisation reduces the exchange rate risk in the eyes of the typical domestic borrower.

Another issue that recently has attracted a good deal of interest is the scope for monetary policy – in particular in defence of pegged exchange rates – under conditions of financial fragility. In certain conditions of

financial fragility, the central bank may feel constrained from allowing the exchange rate to fall. This is particularly the case when there has been heavy foreign currency borrowing by domestic investors. The monetary authority may also feel constrained from raising interest rates sufficiently to defend a pegged exchange rate if banks already are in poor financial condition. Market participants usually realise when the central bank is confronted with a dilemma and this can cause great difficulties.

The constraint posed by financial fragility on monetary policy does not disappear once exchange rates are floated. Under normal circumstances, a depreciated currency tends to ease the problem of financial fragility by stimulating economic growth. However, heavy foreign currency indebtedness of residents can undermine this effect because an exchange rate depreciation increases the domestic currency burden of debt. Several currency crises in both industrial and emerging market countries have been preceded by heavy foreign currency borrowing to finance investment in local real estate. Exchange market crises have often struck when local real estate markets are depressed – so that a depreciation increases the local currency value of debtors' liabilities at the same time as the value of the assets falls. This double effect increases the risk of bankruptcy and poses severe problems for the local banking system. Awareness of this predicament has often tempted the authorities to delay for too long a needed exchange rate adjustment, thus distorting monetary policy.

These considerations underscore the need for structural measures to strengthen the banking system, so that monetary policy is free to concentrate on macroeconomic stability. This need, perhaps particularly evident in fixed exchange rate regimes, is also important under more flexible exchange rate arrangements.

Monetary policy in highly inflationary economies

The effects of monetary policy in highly inflationary economies are likely to differ from those in more stable economies in two respects: (i) the impact of monetary policy on aggregate demand; and (ii) the translation of changes in aggregate demand, in turn, into changes in output and changes in prices. Turning to the first of these aspects, various considerations outlined in the Brazilian paper suggest that in a highly inflationary environment monetary policy will have a smaller impact on aggregate demand than would be the case with low inflation. First, as noted above, when inflation is high and variable, the level of the real interest rate becomes

very uncertain, diminishing the importance of the interest rate channel in the monetary transmission mechanism. Secondly, in a highly inflationary environment, the maturity of financial instruments shrinks and long-term, non-indexed assets disappear. In this context, wealth and asset price effects of changes in monetary policy become much less important. Thirdly, in high inflation economies, both a reduction in bank deposits and a desire by banks to match the maturities of assets and liabilities severely restrict the role of bank intermediation in financing consumption and investment. Because the dependence of aggregate expenditures on bank loans already is low, they may be little affected by marginal changes in monetary policy.

Inflationary economies are distinctive not only in the linkage between monetary policy and the level of aggregate demand, but also in the impact of changes in aggregate demand on output and inflation. Among low-inflation industrialised countries, changes in monetary policy are believed to affect inflation initially by altering levels of aggregate demand and employment, which subsequently lead to changes in wages, costs and ultimately consumer prices. Conversely, in many emerging market economies with recent histories of high inflation, there is little *prima facie* evidence of a positive link between economic activity and inflation. In Argentina, Mexico and Peru, peaks in inflation rates were associated with sharp economic contractions, while disinflation programmes were linked to recoveries in output. This suggests that in certain cases the short-term Phillips curve may be vertical or even slope the wrong way – that is, higher levels of inflation may lead economic activity to contract. The verticality of the Phillips curve in such circumstances arises from the hyper-sensitivity of inflation expectations and price determination to changes in the monetary stance. This hypersensitivity, in turn, probably reflects memories of recent episodes of high inflation and monetary instability.

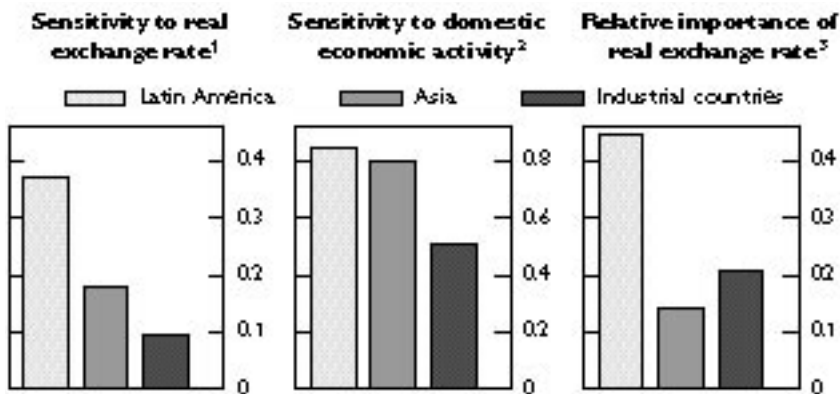
Because it is the most visible and frequently revised proxy for the aggregate price level, the exchange rate typically dominates expectations formation and price setting during high-inflation episodes. Shopkeepers in high-inflation economies know that depreciation of the exchange rate is soon followed by higher prices, and this leads them, in turn, to link their own prices to the exchange rate. One heritage of the very high inflation experienced in the 1980s is that the prices of many goods, in particular housing, are quoted in terms of US dollars in Israel and in many Latin

American economies. Hence, the proximate causes of inflationary upswings, even if induced initially by monetary expansions, have been mutually-reinforcing surges in inflation expectations and exchange rate depreciation, *not* an overheated economy following increases in aggregate demand. Virtually all successful disinflation programmes in recent decades therefore have centred on a stabilisation of the exchange rate, not a contraction in aggregate demand and in output.

There is statistical evidence (summarised in Graph 1) that inflation on average has been more sensitive in the short term to the level of the real exchange rate (relative to the sensitivity to domestic economic activity) in Latin America than in either Asia or in industrial countries. Inflation history appears to play a big part in this relationship: the scatter diagram shown in Graph 2 suggests that the estimated sensitivity of inflation to the real exchange rate is directly related to the country's inflation history.

This evidence suggests that in countries where memories of high inflation are fresh, monetary policy may affect prices primarily through its effects on the exchange rate. Moreover, in such countries, monetary

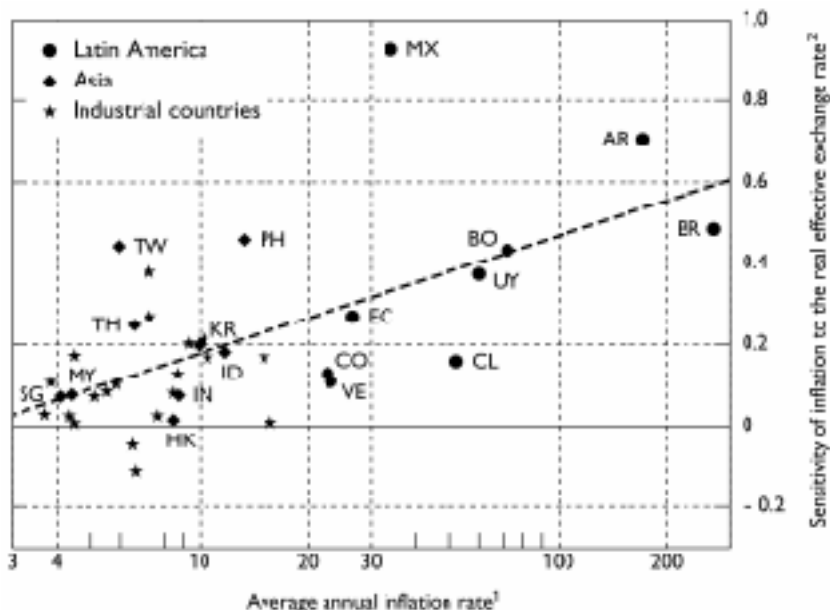
Graph 1
Estimated sensitivity of inflation in major world regions



Notes: Sensitivities were estimated for nine Latin American countries, nine Asian countries and 20 industrial countries (see Graph 2 for a list of the first two groups). Regression equations also controlled for lagged inflation, the domestic currency value of foreign inflation and long-term trends.

¹ Average percentage point increase in inflation in response to a 1 percentage point depreciation of the real effective exchange rate. ² Average percentage point increase in inflation in response to a 1 percentage point increase in the output gap. ³ Median ratio of exchange rate sensitivity to economic activity sensitivity.

Graph 2
Inflation sensitivity and inflation history



AR = Argentina; BO = Bolivia; BR = Brazil; CL = Chile; CO = Colombia; EC = Ecuador; MX = Mexico; UY = Uruguay; VE = Venezuela; HK = Hong Kong; ID = Indonesia; IN = India; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; TW = Taiwan.

¹ Percentage change in consumer prices between 1970 and 1996, subject to data availability (logarithmic scale). ² Estimated increase in inflation in response to a 1 percentage point depreciation of the real effective exchange rate.

policy may be relatively powerless to affect aggregate demand, except insofar as it affects inflation expectations and the credibility of the monetary authority. Monetary loosening may frighten financial markets, causing a decline in asset values and a collapse in aggregate demand, while contractionary monetary policy that lowers inflation expectations may boost asset prices and encourage economic activity.

At what point do inflation expectations become sufficiently quiescent so that the monetary authority in countries with a history of high inflation has sufficient credibility to engage successfully in conventional aggregate demand management? The experiences of several countries that have implemented disinflation programmes present mixed evidence on this point. In Chile and Israel, which successfully reduced inflation from

triple-digit levels to rates close to international averages in recent years, monetary policy appears to have been implemented nowadays in a standard, countercyclical manner without reigniting inflation expectations. By contrast, in Mexico, the 1994 devaluation led very quickly to changes in prices, suggesting that even after several years of relatively low inflation, inflation expectations remained highly sensitive to changes in the monetary and financial environment.

Concluding observations

The channels through which monetary policy work are complex. They also change over time, sometimes radically especially when new instruments emerge and financial markets are rapidly evolving or are becoming more international. It is therefore hardly surprising that the meeting produced no simple unifying philosophy behind the practical working of monetary policy.

The transformation in macroeconomic background that has taken place during the last fifteen or twenty years in many of the countries represented at this meeting deserves emphasis. Some suffered from chronic inflation, even hyperinflation, which rendered the normal channels of monetary policy transmission inoperative. In many countries, interest rates were not market determined, there were quantitative ceilings on credit and the State often influenced the allocation of credits. Moreover, capital controls meant that the exchange rate was not very sensitive to interest rates.

As these conditions have changed, so too have the transmission mechanisms. At the risk of oversimplification, discussion on transmission has often turned on two basic dimensions. The first is the relative importance of internal, closed-economy channels (such as domestic interest rates, money supply etc.) and external channels (notably the exchange rate). The second is the very old question in the theory of monetary policy – whether prices (interest rates) or quantities (monetary aggregates) give a better indication of the thrust of monetary policy.

For those developing countries going through major liberalisation and internationalisation in recent years, the exchange rate became, at least for a time, the main anchor of monetary policy. Similarly, for the authorities of a country gripped by hyperinflation, a fixed exchange rate can often

provide the only feasible way to rapidly disinflate. Precise modalities differed from country to country in the degree of commitment to a precise target: currency board; virtual fixing but without public announcement; or cases where the exchange rate dominated the central bank's policy moves.

However, with the exception of currency board regimes, the exchange rate has not in the majority of cases provided a *permanent* anchor. On the contrary, an exchange rate kept fixed too long has, in many cases, accentuated boom-bust cycles. A fixed exchange rate has often served to further stimulate already heavy capital inflows; despite attempts at sterilisation, few countries have managed to prevent a significant subsequent expansion of bank credit. In many cases, several years of widening current account deficits have eventually led to a very sharp drop in the exchange rate, sometimes causing great disruption. This experience, repeated in several countries in recent years, has led perhaps to a greater sense of realism about the authorities' ability to fix exchange rates in a world of ever-increasing capital market integration. This has prompted closer attention to the domestic channels by which monetary policy works.

Recent experience has also prompted some further reflection about the key role played by the quantity of bank credit and about the importance of balance-sheet adjustments as a channel of monetary transmission. Major recent financial crises in both industrial and emerging market countries have been preceded by periods of a very rapid growth in bank credit. Relatively high real interest rates often served to reassure central banks and others that monetary policy was sufficiently tight, but did not effectively curtail excessive credit expansion. One explanation for the co-existence of relatively high real interest rates with very rapid credit growth can be found in changes affecting balance sheets. Financial liberalisation and innovation gave firms and households greater freedom to borrow – in other words, to expand the liabilities side of their balance sheets. Banks often reacted to lower margins induced by deregulation by accepting more risk (e.g. by extending credit for the purchase of equities and real estate). In almost all countries that liberalised their financial markets, these developments triggered an asset price boom. For a time, rising asset prices created the illusion of strengthening balance sheets, thus permitting further borrowing. In such circumstances, a speculative bubble in property and equities becomes almost inevitable: when it bursts, the balance sheet positions of both banks and their customers

rapidly deteriorate sometimes leading banks to ration credit and often forcing the sudden adjustment of spending plans. These developments have led many central banks to take greater account of rates of bank credit expansion than they did in the past – both in upswings and downswings. More attention has been focused on how swings in asset prices affect the balance sheet positions of firms, households and banks.

Yet it was clear from this meeting that any dogmatism about how monetary policy works would be misplaced. The channels of transmission continue to evolve, often in unexpected ways. Policy-makers need to keep alert to these changes; they cannot escape the weighing of many complex factors in reaching decisions about monetary policy.