Monetary policy transmission in emerging market economies: what is new?

M S Mohanty and Philip Turner[1]

Introduction

The emergence of a truly global market economy and the associated changes in monetary policy regimes worldwide have sharpened the debate about how monetary policy affects the economy. When the Deputy Governors met at the BIS to discuss this topic a decade ago, several economies were either recovering from a crisis or in the midst of one. Inflation rates were high and volatile, and fixed or semi-fixed exchange rates dominated monetary policy regimes in a number of countries. In addition, the domestic economies and financial systems of several countries were relatively closed to the outside world. Financial markets were comparatively underdeveloped. Hence transmission channels in emerging economies were different from those in industrial countries. Much uncertainty surrounded the impact of monetary policy on prices and output and the channels through which they occurred. The survey of monetary policy transmission by Kamin et al (1998) grew out of this meeting.

Substantial changes over the past decade have doubtless altered transmission channels. Most, if not all, countries now have an independent monetary policy regime, with strong emphasis on inflation control. The financial markets in many countries are much more developed; the structure of the economy has undergone significant changes, and there has been a steady increase in trade and financial openness of emerging market economies. What do these developments mean for the transmission mechanisms of monetary policy? Have they reduced the degree of uncertainty concerning the impact of monetary policy? How have they influenced the response of the monetary authorities to various shocks? This paper seeks to update Kamin et al (1998), and draws extensively on the earlier paper. It discusses some of the new challenges facing monetary authorities in understanding the ways in which their policy instruments work through the economy.

The rest of the paper is organised as follows. Section 1 analyses the macroeconomic environment subject to which monetary policy is now conducted. Section 2 briefly reviews the major transmission channels for monetary policy and the extent to which their importance may have changed in the recent years. Based on a sample of emerging market economies, Section 3 provides some preliminary econometric evidence on whether the response of output and inflation to monetary policy shocks has changed between the early 1990s and 2000s. Section 4 focuses on implications for the transmission mechanism of key changes in household, corporate and banking system balance sheets. The penultimate section looks at the issues concerning the impact of globalisation on monetary policy transmission. The final section concludes.

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1. Monetary and macroeconomic environment: what has changed?

The monetary policy framework, the financial system in which the central bank operates and the real economy all condition monetary transmission mechanisms. The past decade has witnessed fundamental changes in each of these spheres. This section highlights some of the major policy changes with possible implications for the transmission mechanism.

More credible monetary policy regimes

One key change is in the growing focus of monetary policy on keeping inflation low, often (but not necessarily) in the context of formal inflation targeting. Targeting the exchange rate – often the alternative policy framework – fell out of favour after several crises from the mid-1990s demonstrated the increased vulnerabilities created by fixed exchange rate regimes. By 2005, some form of inflation targeting had become the most common monetary policy regime in emerging markets, with the number of fixed exchange rate and monetary targeting regimes falling sharply over the past decade (Graph 1).

Graph 1

**Monetary regime
(percentage distribution)[1]**
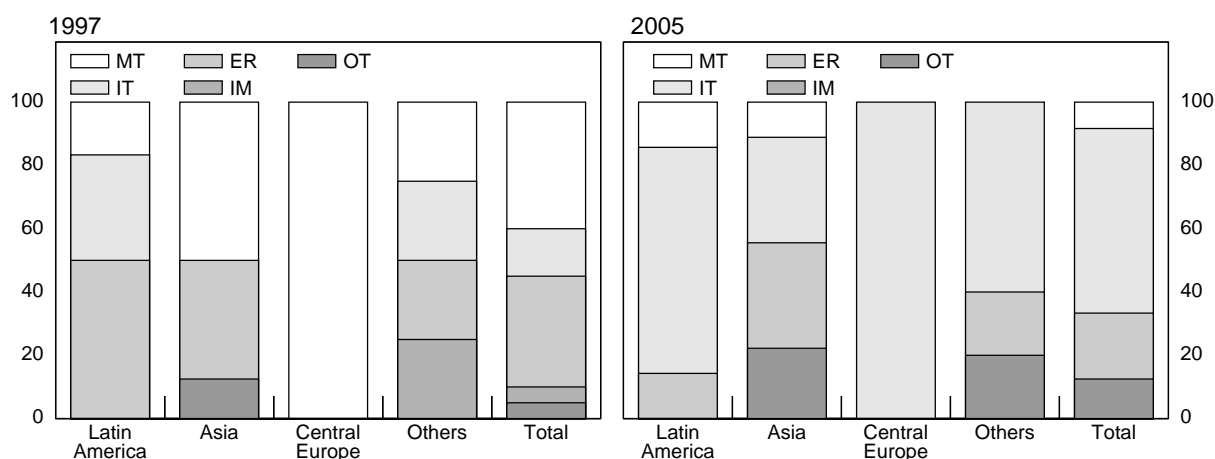
MT = monetary targeting; IT = inflation targeting; ER= exchange rate targeting; IM= IMF program; OT= others.

[1] Percentage of countries in the sample.

Sources: IMF; national data (questionnaire).

All major central banks in central Europe now conduct monetary policy through inflation targeting. Most do so in Latin America as well, although there are a few exceptions. Since the collapse of its dollar link in 2002, Argentina has been following monetary aggregates as an intermediate target for monetary policy. Since 2003, Venezuela has operated under a fixed exchange rate regime. In Asia, however, monetary policy regimes are much more mixed. Most crisis-hit economies switched to some sort of inflation targeting; but several nevertheless have a strongly managed exchange rate. China follows a quasi-fixed exchange rate regime and India has adopted a multiple indicator approach. Hong Kong SAR continues to operate under a currency board system and Singapore under an exchange rate (nominal effective rate) centred monetary policy regime. Among other countries, Israel, South Africa and Turkey have all adopted inflation targeting, while Saudi Arabia has a fixed exchange rate.

This focus on inflation has been accompanied by a further switch towards a market-oriented monetary policy operating system, and away from quantitative instruments of monetary control. Most countries now conduct monetary policy through indirect instruments such as

open market operations, discount rates and foreign exchange swaps (Table 1). Credit ceilings as a primary instrument of monetary control have ceased to exist in many countries, while only a few countries rely on reserve requirements or moral suasion for carrying out monetary policy operations. The operating systems in many countries are converging to that observed in industrial countries: the central bank sets a key short-term interest rate (the policy rate) and allows the market to determine other interest rates in the economy.

Table 1

Primary instruments of monetary policy

	Credit ceilings	Reserve/ liquid asset require-ments	Discount rates	Open market operations	FX market operations	Moral suasion	Others
Latin America							
Argentina		Yes	Yes	Yes	Yes		
Chile			Yes	Yes	Yes		
Colombia				Yes	Yes		
Mexico							Yes[1]
Peru			Yes	Yes	Yes		
Venezuela		Yes		Yes			
Asia							
China		Yes		Yes		Yes	
Hong Kong SAR			Yes		Yes		
Indonesia		Yes		Yes	Yes	Yes	
Korea			Yes	Yes			
Malaysia				Yes[2]	Yes[3]		
Philippines		Yes		Yes			
Singapore					Yes[4]		Yes[5]
Thailand				Yes	Yes		
Central Europe							
Czech Republic				Yes			
Hungary				Yes[6]			
Poland		Yes		Yes			Yes[7]
Other EMEs							
Israel			Yes				
Saudi Arabia				Yes			
South Africa			Yes				
Turkey				Yes[8]			

For footnotes, see the end of the table.

Table 1 (cont)

Primary instruments of monetary policy

	Credit ceilings	Reserve/ liquid asset require- ments	Discount rates	Open market operations	FX market operations	Moral suasion	Others
Memo:							
United States		Yes	Yes	Yes			
Japan		Yes	Yes	Yes			
Euro area		Yes	Yes	Yes			
United Kingdom		Yes	Yes	Yes			

[1] Floor for short-term interbank interest rate and a target for daily settlement balances ("corto"). [2] Includes direct borrowing through open tender. [3] Mainly to smooth ringgit movements. [4] To target the S$ trade-weighted exchange rate. [5] Parameters: exchange rate bandwith, slope of policy path. [6] The MNB also uses reserve requirement, interest rate corridor and FX market operations, but these are not the primary instruments of monetary policy. [7] Deposit facility; Lombard facility; and a corridor for o/n rates. [8] Overnight money market rate and other open market operations.

Source: National data (questionnaire).

One implication of these changes is that a flexible exchange rate opens up an additional channel of monetary policy transmission. Second, if monetary policy regimes have become more credible, there could be major implications for the transmission of monetary shocks. Several recent studies have confirmed the beneficial effects of inflation targeting for inflation expectations: see Mishkin and Schmidt-Hebbel (2001) and IMF (2006a).[2] Third, the shift to market-based monetary policy operations increases the role of the interest rate in the economy.

How visible has the impact of the monetary regime change been on the transmission mechanism? Graph 2, which reports the views of central banks on the relative importance of various factors in the transmission mechanism, suggests that it has been important in virtually every economy. In Mexico, studies show that a major break in the transmission mechanism was associated with the introduction of inflation targeting in 2001.[3] Since then, inflation has tended to become stationary, the degree of inflation persistence has fallen, and inflation forecasts of various private sector agents have converged to the central bank's inflation target. This appears to be true to varying degrees in several other countries as well (for instance, the Czech Republic, Colombia, Hungary and Poland). In Thailand, the switch from the fixed exchange rate regime to the managed float regime following the 1997–98 crises has had important effects on the transmission mechanism. In Turkey, the amendment of the Central Bank Law in 2001, providing a clear mandate to the central bank to maintain

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[2] Levin et al (2004) empirically confirm this hypothesis in the industrial country context. Although their findings do not provide such evidence for emerging markets they argue that this may be related to the fact that inflation was already falling in several countries when they introduced the IT regime and that the post-IT period is too short to conduct robust empirical tests for these countries.

[3] See, for instance, González and González-Garcia (2006).

price stability, and the recent disinflation have led to a significant reduction in the degree of inflation inertia and changes in firms' pricing behaviour.

Graph 2

Central banks' views on the importance of changes in the policy environment (percentage distribution)[1]
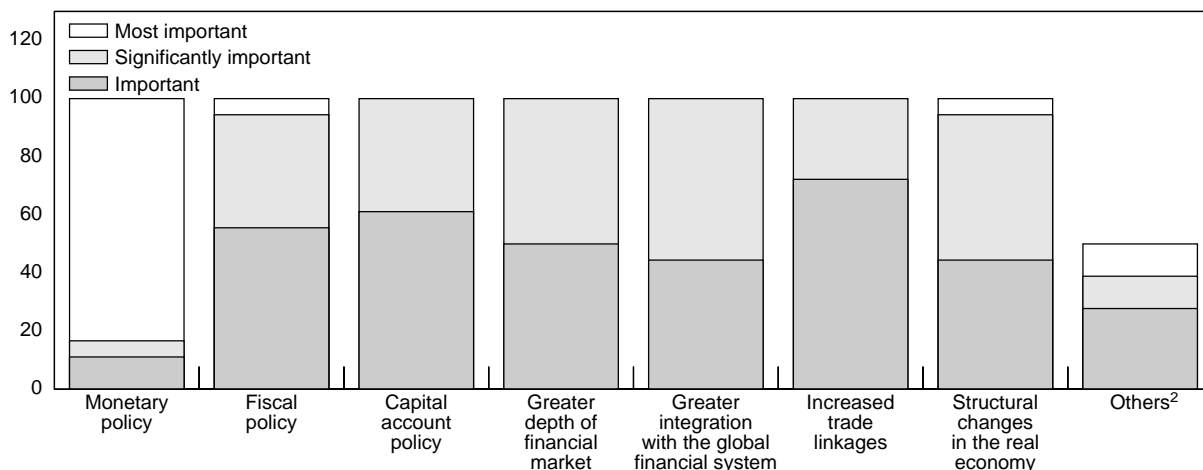
[1] Percentage of countries in the sample. Most important: score 1; significantly important: score 2 to 4; important: score 5 to 8. [2] "Others" refers to external shocks, trade credits and banking sector development.

Source: National data (questionnaire).

Experience in various countries indeed suggests that such effects are not confined to changes in the policy framework, but also extend to other areas of monetary policy. For instance, the introduction in India of a new liquidity management framework in 2004 (the so-called liquidity adjustment facility or LAF), setting a corridor for the movement of the daily interbank rate, has had significant implications for the transmission mechanism by improving the Reserve Bank of India's control over the interest rate. In Chile, such a change is associated with the removal of the unremunerated reserve requirement on short-term capital inflows (the "encaje"), the switch to a nominal interest rate as the operating target for monetary policy, and a greater degree of monetary policy transparency in the context of inflation targeting. In Malaysia, the transition to an interest rate-oriented monetary operating system in 2004 has strengthened the response of financial market prices to monetary policy changes. In Singapore, improved public communication of the monetary authority's exchange rate stance has affected the transmission mechanism by better stabilising private wage and price expectations.

Changed macroeconomic environment

The macroeconomic environment conditioning the conduct of monetary policy has also changed substantially over the past five years. As Table 2 shows, growth and inflation volatility has fallen in all regions (see Annex Table A1 for country details). The switch to a flexible exchange rate regime in many countries has limited the real overvaluations that often resulted when the exchange rate was used to stabilise inflation. Sudden currency crises have therefore become rare. Nevertheless, not all emerging market currencies have been fully flexible – several countries have witnessed an unprecedented and prolonged build-up of foreign currency reserves, particularly in Asia, during the past half decade. Indeed, the degree of exchange rate flexibility appears to have been much greater in Latin America and central Europe than in Asia (Annex Table A1).

Table 2

Volatility[1]

	Growth[2]		Inflation[3]	
	1990–99	**2000–Q206**	**1990–99**	**2000–Q206**
Latin America[4]	6.1	4.4	847.4	4.1
Asia[5]	4.3	2.5	5.0	1.7
China	1.8	1.3	8.2	1.6
India	1.2	2.3	3.6	0.9
Other Asia[6]	5.0	2.7	4.8	1.8
Central Europe[7]	1.7	1.5	14.1	2.5
Other emerging economies[8]	4.5	3.1	64.2	6.8
Total	**4.5**	**3.0**	**264.2**	**3.5**
Memo:				
United States	*1.5*	*1.3*	*1.1*	*0.8*
Euro area	*1.2*	*1.1*	*1.1*	*0.2*
Japan	*2.1*	*1.5*	*1.3*	*0.4*

[1] Measured as standard deviation using quarterly data; regional aggregation as simple averages of national volatilities.   [2] Annual changes in real GDP.   [3] Annual changes in consumer prices.   [4] Argentina, Chile, Colombia, Mexico, Peru and Venezuela.   [5] China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand.   [6] Asia as defined above but excluding China and India.   [7] The Czech Republic, Hungary and Poland.   [8] Israel, Russia, Saudi Arabia, South Africa and Turkey.

Source: National data.

A second major constraint on monetary policy – fiscal dominance – also appears to have eased. Since the ratio of the fiscal deficit to GDP has fallen (or stabilised) in many countries over the past five years, the public debt ratio has stopped growing rapidly (Annex Table A2). Substantial progress in lowering deficits has been achieved in Peru, Mexico, Saudi Arabia, South Africa, Russia and Venezuela during this period (partly because of higher commodity prices, however). In contrast, several countries in central Europe have seen a re-emergence of significant fiscal problems. In a number of countries, fiscal reforms have reduced direct borrowing by the government from the central bank. In India, the end to automatic monetisation of the central government fiscal deficit has ushered in a new era of monetary policy since 1997. In Chile, the introduction of the structural budget surplus rule (1% of GDP) since 2001 has reduced fiscal policy-related output volatility, enhancing the role of monetary policy in demand management. Several other countries (Brazil, India and Peru to name a few) have introduced similar budgetary laws to limit fiscal dominance.

Changes in the debt structure also affect transmission mechanisms. The reduced reliance on forex-denominated or forex-linked government debt has lowered the fiscal consequence of exchange rate changes. This has allowed governments to be more tolerant of such changes. Aktas et al (2007) point out that the fragile public debt structure of Turkey (dominated by short-term and inflation-indexed debt) in the past made the fiscal system very vulnerable to any tightening of monetary policy. The recent improvement in the fiscal situation has reversed much of this dynamic.

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Table 3

Degree of openness[1]

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	Trade openness[2]			Financial openness[3]		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**[4]
Latin America[5]	24.4	32.2	39.7	67.6	95.7	103.8
Asia[6]	40.9	61.9	80.7	72.1	111.4	126.2
China	26.8	44.2	69.3	38.9	84.7	96.2
India	16.4	28.8	44.3	30.2	42.3	57.8
Other Asia[7]	90.3	126.2	136.2	174.1	226.9	247.1
Central Europe[8]	49.4	93.2	101.4		113.5	134.2
Other emerging economies[9]	36.2	64.8	64.2		138.2	128.8
Total	**44.5**	**67.1**	**79.8**		**128.1**	**139.6**
Memo:						
United States	*19.8*	*25.7*	*26.2*	*80.1*	*166.2*	*198.3*
Euro area	*55.3*	*72.6*	*74.1*		*212.5*	*261.5*
Japan	*20.5*	*21.3*	*28.1*	*111.4*	*100.4*	*154.4*
United Kingdom	*50.5*	*58.2*	*56.2*	*351.2*	*618.2*	*759.6*

[1] Indicators shown expressed as a percentage of GDP; aggregated using 2000 GDP and PPP weights.
[2] Defined as the sum of imports and exports as a ratio to GDP.   [3] Measured as the sum of gross stocks of foreign assets and liabilities as a ratio to GDP.   [4] Data refer to 2004 for Mexico, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Poland, Saudi Arabia, South Africa and Turkey.   [5] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.   [6] China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand.   [7] Asia as defined above but excluding China and India.   [8] The Czech Republic, Hungary and Poland.   [9] Algeria, Israel, Russia, Saudi Arabia, South Africa and Turkey.

Sources: Lane and Milesi-Ferretti (2006); IMF.

These reforms have been accompanied by far-reaching changes to trade and capital account policies in many countries. Table 3 underlines the greater integration of emerging market economies with the global economy since the beginning of 2000 (see Annex Table A3 for country details). As discussed in a following section, such integration has several potential implications for monetary transmission.[4]

Reduced government intervention in the financial system

Another important change has been the gradual reduction of government intervention in the financial system over the past decade. As discussed by Kamin et al (1998), government intervention in the past affected the monetary transmission process in at least three major ways: by imposing interest rate controls or other limits on financial market prices; by

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[4] In Israel, for instance, a major break point in the transmission mechanism for monetary policy has been associated with the liberalisation of capital flows in 1997, which sharply increased the response of the exchange rate to the interest rate and significantly shortened monetary policy lags; see Barnea and Djivre (2004). See also Eckstein and Soffer (2008).

imposing direct limits on bank lending; or by providing government-financed credit to selected areas.

By 2005 *interest rate controls* had, by and large, been abolished in many countries. As Tables A4 and A5 in the Annex suggest, bank deposit and lending rates in most countries are now linked either directly to the policy rate or to a short-term market rate. In most countries, these rates are also negotiated with customers, implying some differentiation according to the latter's size and creditworthiness. Nevertheless, some countries still control interest rates for certain categories of borrowers and amounts of transactions. For instance, Colombia and Poland maintain a ceiling on interest rates for all categories of loans; Malaysia and Thailand have a maximum rate for consumer loans; and India imposes a minimum interest rate for saving deposits and small loans. It is unclear how far these controls affect the transmission of monetary shocks. For instance, a maximum rate for bank lending may not be binding if it is set at a fairly high level. But, as the experience of the United States with "Regulation Q" demonstrated, a sharp tightening of monetary policy can aggravate output and inflation volatility by leading to significant disintermediation of the banking system, thus squeezing credit supply. A floor rate for deposits implies that the nominal interest rate cannot fall beyond a limit, reducing both the flexibility of monetary policy to address deflationary pressures and the transmission of policy shocks through interest rates.

At the same time, several countries have significantly lowered *cash reserve requirements* for banks, which adversely affected their functioning and interfered with the development of financial markets. As Table A6 in the Annex shows, the typical cash reserve requirement in emerging markets is between 2 and 6%, which is still high relative to that seen in some industrial countries. Several countries (Argentina, Chile, China, Indonesia, the Philippines and Venezuela) impose reserve requirements in excess of 8%, although in some cases they may apply only to certain selected types of liabilities. Central banks in a number of countries do not pay interest on cash reserve requirements, and many pay interest at below market rates.

The picture varies with regard to *liquidity requirements*, which prescribe mandatory bank holdings of part of their liabilities in government securities or other such liquid assets. There is some evidence that such requirements have not fallen (and have even gone up in some countries) over the past decade (Annex Table A7). How far these requirements may be binding on banks' investment activities remains unclear. Given their attractive returns, banks in some countries (for instance, India) have invested in government securities beyond the prescribed minimum ratio. In other countries (for instance, Singapore), such a requirement is essentially a prudential, rather than a monetary regulation. To the extent that interest rates on government securities are market-determined, such requirements may not adversely affect banks' profitability but may have significant implications for trading volumes and market liquidity.

With the exception of a few countries, aggregate *credit controls* on banks have been abolished. China maintains monetary controls through the "window guidance" route, requiring banks to restrict credit expansion in certain sectors (for instance, real estate) and support development programmes. However, reliance on such controls is declining with the recent measures to liberalise interest rates in the economy (particularly the removal of a ceiling for the lending rate and a floor for the deposit rate). India has a minimum lending requirement for certain priority sectors. Prudential guidelines that would effectively restrict credit to certain sectors have been set in several countries. However, these are not explicitly used for monetary policy purposes.

Growth of financial markets

The past decade has also seen considerable development of financial markets in emerging market economies. The health of the banking system has improved substantially in all regions (Annex Table A8), and this has meant that the transmission of lower policy rates has

improved (in the late 1990s, by contrast, weak banking systems compromised the transmission of easier policies). Apart from enhancing its resilience to monetary policy shocks, there is evidence that a healthy and competitive banking system reduces intermediation spreads. It also leads to a more symmetrical (and arguably more predictable) response of bank interest rates to higher and lower policy rates.[5]

More importantly, and in contrast to the experience of the 1990s, money and bond markets in several countries have deepened. One indicator of increasing money market depth is the growing daily turnover in relation to the banking system's total assets (Annex Table A9). In a number of countries, this has been led by growing use of repurchase operations in central banks' monetary operations. In Argentina, the central bank has been developing a market for its notes and bonds in order to develop a benchmark interest rate in the interbank market. In India, such a trend has been led by a substantial migration of money market activity from the uncollateralised call market to the collateralised repo market, paving the way for the development of a short-term money market. However, the interbank repo market continues to be underdeveloped in a number of countries, limiting the development of a robust term money market. Similarly, money market derivatives such as interest rate swaps, an important component of market liquidity, are absent in a number of countries.

Table A10 in the Annex provides indicators of liquidity in the domestic bond market. This influences the monetary transmission mechanism because it makes the yield curve more sensitive to changes in the policy rate and reduces sharp, unwarranted volatility in financial asset prices. In several countries, there is evidence to suggest that bond markets have grown in size and that maturities have lengthened over the past five years. Typical bid-ask spreads have fallen, and attempts have been made to increase maturity at issue to develop long-term benchmarks. Nevertheless, turnover ratios in many countries continue to be low compared to those in mature markets. In countries where turnover ratios are relatively large, they tend to reflect low outstanding stocks, rather than a significant increase in transaction volumes.

Reflecting financial market growth, the sources of financing of the private non-financial sector have broadened over the past decade (Annex Table A11). The share of commercial bank lending in total financing has fallen in many countries – in some cases (for instance, Hungary, Malaysia, Mexico and Thailand) quite sharply – between 1993 and 2005. This also remains true of the state-owned development financial institutions, which in the past played an important role in the financing of long-term capital projects. By 2005, the share of equity and bond financing was tending to rise. Another development has been a strong increase in financing through international capital markets, which constituted 20–40% of total private non-financial sector financing in many countries in 2005.

2.   Major transmission channels

Among the various channels through which monetary policy can affect demand, five have been generally highlighted in the literature: short-term interest rates; long-term interest rates and asset prices; the exchange rate; the credit channel; and the expectations channel: see Mishkin (1995). This section extends and updates the analysis prepared by Kamin et al (1998) and examines whether the relative importance of various channels has changed over the past decade.

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[5]   See, for instance, Archer (2006) and Mohanty et al (2006) and the studies reviewed therein.

The interest rate channel

In most conventional models of monetary transmission, a change in the policy rate under the central bank's control spreads to bank lending and deposit interest rates, which directly affects business and household spending decisions.

As the marginal interest rate (ie that on new borrowing) changes, business and household spending decisions are affected. For this, the *real* rate is important: a rise in the nominal interest rate that reflects higher inflation expectations – so that the real rate remains constant – will not change the perceived marginal cost of borrowing. The impact on existing loan contracts (ie "old" borrowing) will depend on the terms of the contracts. With floating rate contracts, average rates will change in line with marginal rates. With fixed rate contracts, average rates change more slowly over time as old contracts come up for renegotiation. Such an effect is important because it will alter the cash flow and balance sheet positions of borrowers as it changes the average interest rate. Hence household and business spending responses to a given change in policy rate will depend on the nature of loan contracts and the degree of indebtedness (Section 4 expands this analysis further).

In industrial countries the interest rate channel generally plays an important role in the transmission of monetary shocks. For instance, according to research done by the European Central Bank (2002), direct and indirect effects of interest rate changes (including wealth and exchange rate effects) on investment explain about 80% of the total response of output to monetary shocks after a lag of three years. In emerging markets, during the 1980s and 1990s there were several impediments to the operation of the interest rate channel. The lack of well developed money and bond markets and frequent shifts in the risk premium are examples of such impediments. In some cases, binding interest rate controls combined with non-price mechanisms for allocating credit reduced the pass-through of the policy rate to other interest rates. This may have also reduced the macroeconomic effects of policy rate changes. A greater dependence of firms on the internal cash surplus for financing capital projects lowered the response of investment to interest rate changes. Limited possibilities for household borrowing restricted the impact of interest rate changes on households as well. As noted above, several of these constraints have eased over the past decade.

Has interest rate pass-through changed recently? While this issue is examined in detail by Moreno (2008), Table 4 summarises central banks' views about the relative strength of the pass-through of policy rates based on internal research. Several findings emerge from the table. First, in a majority of countries, pass-through is generally found to be stronger and longer-lasting for bank deposit and lending rates than for the bond rate. Second, long-term bond rates now react significantly to the policy rate, although the impact is seen as temporary in several cases (discussed below). Third, in economies with large external financing requirements – in particular Latin America – monetary policy easing may influence the inflation risk premium on local currency debt and even perhaps the country risk premium. If a lower policy rate is regarded as unsustainable or raises future inflation expectations, then market-determined rates further along the maturity spectrum may not fall and could even rise, sometimes sharply if the currency comes under pressure. As noted above, this has been a major dynamic in countries with weak fiscal positions and a history of high inflation. Because the credibility of fiscal and monetary policy has now improved in many crisis-prone countries and because of current account surpluses, this "perverse" dynamic has changed: an easier monetary policy may no longer warrant any rise in risk premia.

Table 4

Response of long-term interest rates to policy rates

	Bond rate			Bank lending rate			Country risk spreads		
	Most signi-ficant	Signi-ficant	Insigni-ficant	Most signi-ficant	Signi-ficant	Insigni-ficant	Most signi-ficant	Signi-ficant	Insigni-ficant
Latin America									
Argentina			Yes			Yes		Yes	
Chile		L		L					Yes
Colombia		T			L			T	L
Mexico		Yes			Yes				Yes
Peru		L		L					Yes
Venezuela			Yes		Yes				Yes
Asia									
Hong Kong SAR[1]		L			L				T
India		Yes			Yes				
Indonesia	Yes				Yes		Yes		
Korea		Yes		Yes					Yes
Malaysia	L			L				T	
Philippines		Yes							
Thailand		T			L				
Central Europe									
Czech Republic		T[2]		L[3]					Yes
Hungary	Yes[4]			L[5]					Yes
Poland			T						T
Other EMEs									
Israel	L[6]				Yes				Yes[7]
Saudi Arabia			Yes		Yes				Yes
South Africa		Yes		L					Yes
Turkey	Yes				Yes			Yes	

L = Long-lasting; T = Temporary.

[1] Policy rate movements refer to changes in US federal funds target rate. [2] Depends on market expectations. [3] Stronger on short-term rates, depends on market expectations. [4] Immediate. [5] Takes a few months but persistent. [6] Impact occurs during the following one-two months and remains persistent. [7] Generally insignificant, depends on the size of the policy rate change.

Source: National data (questionnaire).

Table 5 shows that most central banks see interest rates as the dominant channel of transmission. For instance, in Mexico, while shocks to the exchange rate explained over 60% of changes in inflation during the 1990s, the share had fallen to 16% by early 2000. In contrast, interest rates now explain a large part of the short- and long-run variation in output

and inflation.[6] In Argentina, during the high inflation years of the 1980s, nominal interest rates were largely determined by inflation expectations. Higher interest rates were often associated with a rise rather than a decline in inflation and the rate of nominal currency depreciation. In contrast, with inflation becoming more moderate since the early 1990s (aside from the spike when the exchange rate collapsed), interest rates now have a strong and predictable negative effect on inflation and output.[7]

Table 5

**Most dominant channels of monetary policy transmission:
central bank views**

Latin America	
Argentina	Interest rates, money growth and nominal exchange rate innovations (under an environment of low inflation).
Chile	Direct interest rate, exchange rate, credit and expectations channel.
Colombia	Expectations, cost push, aggregate demand and exchange rate channel.
Mexico	Nominal interest rate.
Asia	
China	Mainly credit channel.
Hong Kong SAR	Direct cost of capital effect.
India	Money growth, interest rate and credit channel.
Malaysia	Credit, interest rate, exchange rate and asset price channel.
Philippines	Base money, interest rate and exchange rate channel.
Singapore	Exchange rate channel.
Thailand	Interest rate, exchange rate and asset price channel.
Central Europe	
Czech Republic	Interest rate and exchange rate channel.
Hungary	Exchange rate channel.
Poland	Interest rate and exchange rate channel.
Other emerging economies	
Israel	Exchange rate channel.
South Africa	Interest rate and exchange rate channel.
Turkey	Exchange rate, interest rate, expectations and risk premium channel.

Source: National data (questionnaire).

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[6] See González and González-García (2006).

[7] See Basco et al (2006).

There is also evidence of the interest rate channel in several Asian economies having gained importance. This is particularly true of Thailand in the aftermath of the 1997–98 crises.[8] In Hong Kong SAR, as the Hong Kong Monetary Authority (2008) discusses in this volume, given its strong impact on consumption and fixed investment, the direct cost channel constitutes the most important channel for the transmission of monetary shocks from the United States (given the currency's link with the US dollar). In the Philippines, although monetary policy has a direct impact on inflation in the short run through base money, in the long run, it is the central bank borrowing rate which dominates the transmission channel.

The role of the interest rate channel has also increased in central and eastern Europe, although its relative importance varies across countries. For instance, in the Czech Republic and Poland, this rise has been accompanied by an increase in pass-through of the central bank policy rate to bank deposit and lending rates, and in Hungary by larger and more rapid changes in bond rates. The future adoption of the euro would presumably strengthen this trend. To the extent that a single currency will contribute to reducing money market volatility and further deepening the domestic bond market in the region, it will help increase the role of the interest rate in the transmission of euro area monetary policy shocks.

Long-term interest rates or the asset price channel

A major change since the mid-1990s is the development of market-determined long-term interest rates in many countries as bond markets have developed. This is discussed further by Moreno (2008) in this volume. Changes in growth and inflation expectations determine the long-term rate of interest. Monetary policy reactions to shocks that keep such expectations constant (eg higher policy rates to counter an incipient rise in inflation expectations) may thus have no visible impact on long-term rates. Unanticipated changes in monetary policy, however, will lead to changes in long-term rates. One important complication is the behaviour of term premia. It is difficult to interpret the sensitivity of long-term interest rates to monetary policy changes when term premia are also changing. This has important implications for the interpretation of changes in the shape of the yield curve.

The present value of any asset or durable good is inversely related to the real long-term interest rate and positively related to the earnings of the asset. Hence, for example, equity prices can be interpreted as reflecting the discounted present value of expected future enterprise earnings. It follows from this that the causality between asset prices and macroeconomic performance runs in both directions. Expectations of stronger growth raise expectations of future earnings and, possibly, equity prices. This two-way causality makes it difficult in practice to discern the true impact of asset prices on aggregate demand.

There are two major routes through which higher asset prices can increase demand. First, higher asset prices boost household wealth; if this is regarded as permanent, desired consumption will increase.[9] In addition, increased wealth can be used as collateral to allow intertemporal substitution. Second, higher asset prices raise the market value of firms in relation to the replacement cost of capital (the so-called Tobin's q), increasing the attractiveness of new residential and non-residential investment projects.

There is some evidence to suggest that private consumption has been positively associated with asset prices (Graph 3). House prices tend to be correlated with interest rates. In contrast, equity prices tend to be correlated with several variables only weakly related to monetary policy. Even so, there are still several mechanisms through which monetary policy

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[8] See Disyatat and Vongsinsirikul (2002).

[9] White (2006) argues that, in a closed economy, an increase in house prices may not imply an increase in wealth for the country as a whole, since they are likely to be offset by the expected future cost of living in a house.

could influence equity prices. First, lower interest rates reduce the discount factor for future dividend income, raising their present value. Second, to the extent that they raise expectations of future growth, lower interest rates may increase expected future cash flows and stock returns. Third, as pointed out by Bernanke and Kuttner (2003), an easy monetary policy may give rise to "expected excess return" by reducing the riskiness of stocks (for instance, by improving the balance sheet position of firms) as well as increasing investors' willingness to bear risk (for instance, by increasing expected future income).[10]

A major question is the extent to which the increased diversity of household wealth portfolios has enhanced the potential importance of asset prices for household consumption. Growing home ownership in many countries in recent years has been associated with a rise in the share of residential property in household wealth (for instance, over 60% in the Philippines and Colombia). This should, in principle, increase the sensitivity of consumption to policy-induced changes in property prices. In contrast, equities still constitute only a small part of household wealth in most emerging markets (for instance, between 1 and 2% in Colombia and India). In countries with a relatively diversified portfolio, such as Singapore, equities and residential property account for 18% and 48%, respectively, of total household wealth.

Graph 3
Asset prices and consumption[1]
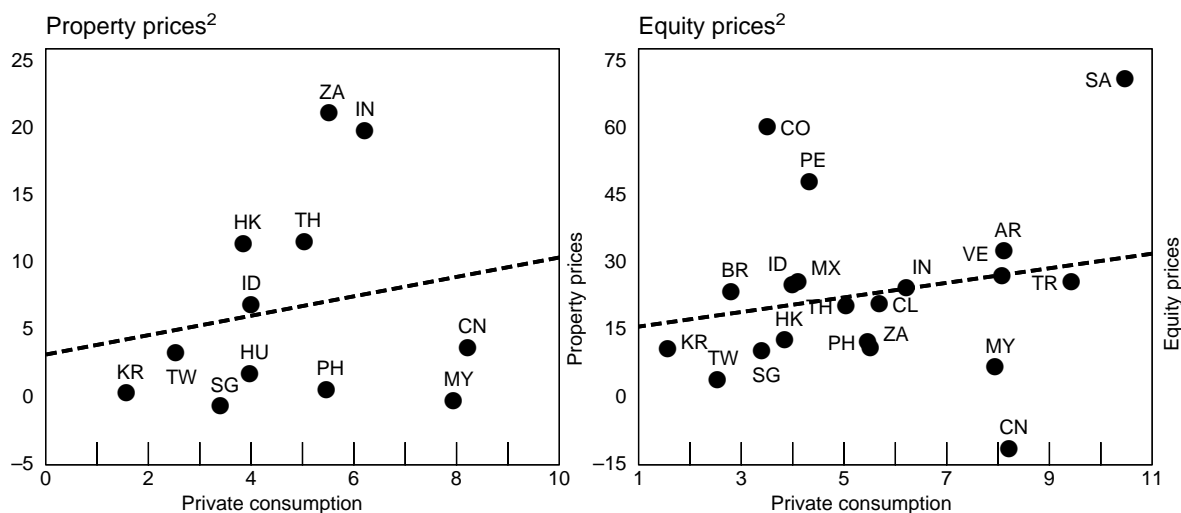
AR = Argentina; BR = Brazil; CL = Chile; CN = China; CO = Colombia; HK = Hong Kong SAR; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = Philippines; SA = Saudi Arabia; SG = Singapore; TH = Thailand; TR = Turkey; TW = Taiwan (China); ZA = South Africa.

[1] Average of annual changes 2002-05, in per cent; in real terms.   [2] Deflated by consumer prices.

Sources: OECD; Bloomberg; CEIC; Datastream; BIS.

Much depends on the degree of financial development and thus whether households are able to withdraw a part of their housing and equity wealth for consumption: see Mishkin (2007). This has been a major factor in many industrial countries in the current cycle, where households have borrowed against such collateral not only to finance higher consumption but also to invest in new residential property. In many emerging markets, however, banks might not be willing to lend even against collateral already in their possession. The

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[10] In the context of the United States, Bernanke and Kuttner (2003) show that a 25 basis point surprise reduction in the Fed rate on average is associated with a 1 per cent increase in stock return (CRSP value-weighted index). This is similar to findings obtained in other studies; see, for instance, Rigobon and Sack (2002).

underdevelopment of the mortgage-backed securities market could also limit the financing of such expenditure via the market. In Mexico, for instance, the lack of a proper refinancing mechanism has been a major factor restricting households' ability to borrow against their assets. In the Philippines, the rental market provides partial compensation for a similar bottleneck as house owners are able to monetise part of their housing wealth by adjusting rents.

Has the role of the asset price channel changed in emerging market economies? This channel seems to have played a greater role in Asia than other regions in the current cycle. In China, for instance, strong property prices have been associated with higher bank lending since early 2005. House price inflation has in turn boosted household spending on a wider variety of durable consumption goods. The paper from Hong Kong SAR for this meeting draws attention to the differential impact of property prices on inflation and output: see Hong Kong Monetary Authority (2008). It shows that interest rate shocks operating through property prices have a much stronger impact on consumer prices than on household wealth and consumption. This is because rent is a much larger component in the overall price index in Hong Kong than it is in other economies. Nevertheless, a large decline in property prices over a short period can produce significant negative effects on consumption. This was demonstrated by a prolonged period of deflation in Hong Kong following the bursting of the property market bubble in 1997.

There is some evidence to suggest that the sensitivity of asset prices to interest rates may have changed, especially in South East Asia, following the 1997–98 crises. In Korea, while house prices are historically sensitive to changes in monetary conditions – in particular, bank lending – this relationship has strengthened further since the crises.[11] In Singapore, while interest rate induced property market cycles have played a significant role in the consumption cycle, the same does not hold for equity prices.[12] In contrast, in Thailand interest rates have had a much stronger influence on equity prices than on property prices in the post-Asian crisis period.[13] In Saudi Arabia a large increase in oil revenues over the past few years has been associated with a "liquidity boom" and a shift in investors' preference towards domestic assets: see Al-Jasser and Banafe (2008). This has led to sharp increases in equity and residential property prices and a consumption boom.

The exchange rate channel

In open economies, monetary policy operates to a considerable extent through the *exchange rate*. A key assumption underpinning this relationship is the uncovered interest rate parity condition (UIP): when the exchange rate is floating, a policy-led cut in the interest rate leads to capital outflows and a depreciation of the nominal exchange rate.[14] With sticky prices, this leads to a real depreciation and an increase in the price of tradables relative to non-tradables. The exchange rate channel plays an important role in emerging market economies for several reasons. First, the influence of the exchange rate on demand in small open economies tends to be large. Second, the exchange rate often constitutes a key variable for private sector expectations about inflation. Third, exchange rate changes produce large balance sheet effects in those economies where households and firms have foreign currency assets and liabilities.

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[11] See Park (2006).

[12] According to the internal estimates of the Monetary Authority of Singapore, a dollar decrease in the main equity price index leads to a fall of 2 cents in private consumption.

[13] See Sriphayak and Vongsinsirikul (2006).

[14] More strictly, UIP implies that the exchange rate must fall enough to generate expectations of a subsequent appreciation equal to the new interest rate differential.

Singapore – an open economy par excellence – actually uses the nominal effective exchange rate as its intermediate target for monetary policy. In such an open economy, output and inflation are highly sensitive to changes in the exchange rate.[15] There is a similar adjustment mechanism in Israel, where the exchange rate appears to dominate other transmission channels.[16]

The importance of the exchange rate channel may also depend on the share of domestic value added (compared with imported goods/services) in tradables. If this is high, exchange rate changes have a large effect on output and on demand. But if import content is very high, then the exchange rate will have a more limited impact on domestic product, and a large direct impact on inflation instead.[17]

Graph 4

Relative prices of commodities and manufactured goods[1]
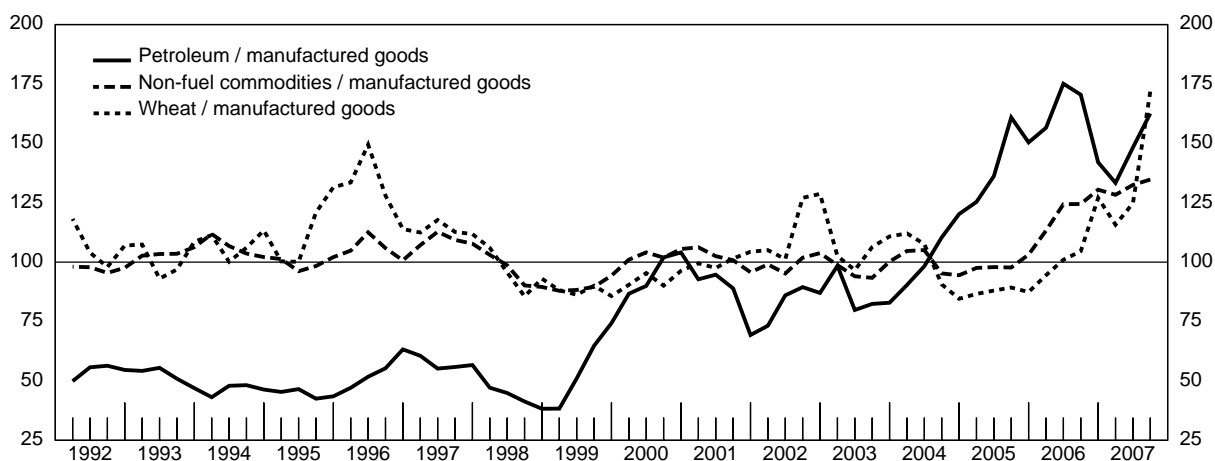
[1] 2000–05 = 100. Manufactured goods price is estimated as a weighted average of export prices of manufactures for industrial countries based on 2003 export values.

Sources: IMF; Datastream.

How far has the relationship between the interest rate and the exchange rate changed in recent years? Lower and more stable risk premia (eg as a result of the better macroeconomic environment) may have made the exchange rate response to domestic

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[15]   Research shows that the transmission of monetary shocks is relatively weak through the interest rate, which plays only a minor role in output and inflation development; see Chow (2005).

[16]   See Barnea and Djivre (2004). See Eckstein and Soffer (2008)

[17]   A special case in which devaluations can be contractionary has sometimes been put forward in the analyses of emerging market economies. This case arises when the debt of households, government or corporations is denominated in foreign currency and owed to non-residents: in such a case, a rise in the domestic currency value of debt following devaluation may offset the effect of expenditure-switching to domestically produced goods. This was frequently argued to be the case in Latin America during the 1980s – because of extreme currency mismatches in balance sheets.

Kim (2005) argues that in Korea a real depreciation has a negative impact on profitability and investment (through increased debt service payments as well as import costs). Sarikaya et al (2005) report a similar finding in Turkey. The 1997–98 Asian financial crises brought to light a similar problem for countries where firms and banks had borrowed heavily in foreign currency. As foreign currency debt declines, of course, these contractionary impulses are reduced. This devaluation-as-contractionary theory has often been used to resist necessary exchange rate adjustment ("fear of floating"); it is important to be clear on its limitations. Because bygones are bygones, inherited debt structures should not influence current production decisions: a devaluation therefore unambiguously makes domestically produced goods more competitive with foreign goods in an opportunity cost sense.

interest rates more predictable. In Hungary, for instance, volatile risk premia during the 1990s weakened the response of the exchange rate to monetary policy shocks. But studies covering a more recent period report that an unexpected 25 basis point increase in the policy rate results in an immediate exchange rate appreciation of 0.5–1%.[18]

In principle, the increased share of foreign goods and services in emerging markets should have made the exchange rate channel more potent. There is, however, econometric evidence that the pass-through for exchange rates to domestic prices appears to have declined in many emerging market economies: see Mihaljek and Klau (2008). One reason for this is that the "signal" value of the exchange rate for inflation has declined as confidence has grown in the efficacy of domestic policy frameworks in controlling inflation.

Finally, a new complication in exchange rate dynamics in many countries might be noted. This is the greater importance of medium-term changes in the terms of trade. During the 1990s, the terms of trade between raw material and manufactured goods showed no obvious trend (Graph 4). Beginning around mid-2003, however, oil prices rose. Then the prices of non-fuel commodities began to rise. Most recently, wheat prices have surged. At first, it was not clear whether these developments reflected market-specific factors and were purely temporary. However, it now appears that these relative price shifts are rather long-lasting.

Such shifts make it very hard for the central bank to "read" the exchange rate, and to decide how far (if at all) it would be wise to use monetary policy to offset or to spread over time the effects of exchange rate changes. The real long-term equilibrium exchange rate may well have risen in the commodity-exporting countries as commodity prices reach a new medium-term level. If so, this represents a real change that monetary policy should not seek to offset. Many would indeed argue that monetary policy cannot offset the real exchange rate in the long run – attempting to do so would eventually cause real appreciation via higher inflation. Exactly comparable arguments apply in the case of rapidly developing countries whose underlying capacity to produce tradables has expanded. In both cases, appreciation pressures are accentuated by capital inflows.

In practice, however, central banks have considerable room to manoeuvre in the short run. Policy decisions will be all the harder because it will not be clear *how far* the equilibrium exchange rate has risen. Nor will it be obvious how far a gradual – rather than abrupt – movement to a new equilibrium will reduce adjustment costs. Central banks will need to look very closely at the *determinants* as well as the size of exchange rate movements when setting interest rates.

The credit channel

A separate credit channel exists when banks ration credit through non-pricing mechanisms, so that the terms on which credit is available include variables additional to the interest rate. The credit channel has been particularly important in the emerging market context, where credit controls and directed credit programmes have limited firms' and households' access to the credit market. Such constraints have often been tightened during periods of monetary restriction.

Even in the absence of such restrictions, it has long been known that a tightening of monetary policy can generate a negative credit supply response (in addition to a demand-led contraction). Banks tend to respond to monetary tightening by cutting the supply of loans to small borrowers (the so-called bank lending channel) and raising the spread charged to them.[19] To the extent that banks hold limited equity, their lending capacity might be further

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[18] See, for instance, Vonnák (2006).

[19] Evidence in both developed and emerging markets shows that banks do face resource constraints (to the extent that they cannot replace lost deposits with market borrowing) because they might be subject to

impaired in the face of a binding capital-to-asset ratio due to a rise in non-performing loans.[20] In addition, banks' credit supply could be affected through a deterioration in borrowers' net worth and a decline in collateral values (the balance sheet channel).[21]

As noted above, the past decade has seen major developments in credit markets. Financial systems in most countries have been substantially deregulated and the health of the banking system and the regulatory environment has improved. How might these developments influence the credit channel?

Table 6

Investment response to bank credit from a panel regression: 2000–05

	Without control			After controlling[1]		
	Bank credit	**R^2**	**DW**	**Bank credit**	**R^2**	**DW**
Asia[2]	0.14	0.29	2.33	0.25**	0.63	1.94
	(0.90)			(2.20)		
Latin America[3]	0.70***	0.40	2.01	0.65***	0.60	2.42
	(2.96)			(2.69)		
Others[4]	0.44*	0.33	2.15	0.40	0.45	1.81
	(2.00)			(1.47)		
All emerging markets	0.49***	0.32	2.14	0.43***	0.48	2.03
	(3.82)			(3.72)		

*, **, *** denote coefficients significantly different from zero at the 10%, 5% and 1% level respectively; t-statistics are given in parentheses.

[1] The panel for the control specification is:

$$\Delta \log(inv) = \alpha_0 + \alpha_1 \Delta \log(bc) + \alpha_2 \Delta \log(y_{t-1}) + \alpha_3 \Delta(i - \pi) + \alpha_4 \Delta \log(xp) + \alpha_5 \Delta \log(inv_{t-1})$$

where "Δ" is the first difference operator, "bc" is real bank credit deflated by consumer prices, "π" is consumer price inflation, "inv" is gross fixed capital formation in real terms, "i" is the nominal bank lending rate, and "xp" is the volume of exports. All panels include cross-section fixed effects. [2] China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand. [3] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [4] The Czech Republic, Hungary, Israel, Poland, Russia, Saudi Arabia, South Africa and Turkey.

Source: BIS estimates.

Table 6 shows the estimated response of fixed investment to bank credit from a panel regression focusing on the first half of this decade. A main finding emerging from the table is that bank credit appears to have a significant influence on investment in emerging market economies. This finding does not change even after controlling for several demand factors (such as output, exports and the real interest rate), suggesting that the supply of bank credit does play a role in influencing fluctuations in investment spending (nevertheless, it should be

asymmetric information problems, and tighter monetary policy reduces their profitability; see Kashyap and Stein (2000) and Bean et al (2002).

[20] See Van den Heuvel (2002) for the role of bank capital in monetary policy transmission.

[21] See Bernanke and Gertler (1995).

borne in mind that reverse causation – investing firms becoming keener to take out loans – could bias the coefficients in this regression). Another important finding is that the relative impact of bank credit on investment varies across regions: the impact is stronger in Latin America and central and eastern Europe than in Asia.

Country experiences of the importance of the credit channel are mixed. In several countries, a prolonged period of easy monetary policy over the past few years may have reduced the influence of this channel. In Poland, for instance, there appears to have been some weakening of the credit channel as banks have built up a large "liquidity buffer". Such a buffer can shield banks from a tightening of monetary policy.[22] While a credit channel was operative in the Czech Republic during 1996–98, evidence of its existence is weak during the early 2000s. Yet some studies show that there may be a distributive effect of monetary policy in the sense that banks with higher levels of non-performing loans respond less positively to a cut in the interest rate.[23]

In Asia, a sharp decline in bank credit in the aftermath of the 1997–98 financial crises has been followed by a revival since the early 2000s. In several countries the degree of credit market imperfection appears to be declining. In the Philippines, while the development of a commercial paper market and greater use of loan commitments (fixed credit lines for discretionary use by firms) have reduced some of the effects associated with a tighter monetary policy, a relatively high non-performing loan ratio in the banking system has had an opposite effect. In Thailand, studies show a significant decline in the output and inflation response to bank credit, particularly following the 1997–98 financial crises, which has led to increased financial diversification. This also remains true in Singapore, where small and medium-sized enterprises are increasingly accessing the equity and bond markets for their financing needs.

In the two large Asian economies, however, bank credit is still central. In China, given the quantitative orientation of its monetary policy and significant credit controls, monetary policy primarily affects demand by changing the supply of credit. In India, recent research has shown that small banks tend to curtail credit supply more sharply than big banks during monetary tightening.[24]

In Latin America, the recent surge in lending has relieved the earlier fears of credit constraints. Investment and credit have been positively related in most countries in the current cycle. In Colombia, although the credit channel remains important, its role has been reduced in recent years as firms have increasingly relied on internal revenue for financing capital projects. At the same time, credit flow to small firms and households has improved substantially. The 1995 financial crisis had a widespread impact on the credit market in Mexico, with banks actively rationing credit. However, during the past few years, bank credit to the private sector has grown at a rapid rate.

The expectations channel

Although not a stand-alone channel, expectations have considerable significance for the effectiveness of all other channels of transmission. To the extent that private sector wage and price expectations are forward-looking, they can speed up the adjustment of nominal demand to a change in central bank policy and affect the transmission lag to inflation. The expectations channel could influence transmission to the extent that central bank policy is anticipated by the market and priced into the yield curve.

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[22] See, for instance, Lyziak et al (2006).

[23] See Pruteanu (2004).

[24] See, for instance, Pandit et al (2006).

The operation of any expectations channel depends on several factors. One is the degree of *central bank credibility*: a higher degree of credibility leads to greater anticipated effects of monetary policy and vice versa. A second factor is the degree of *predictability* of central bank actions, which can be improved by increasing transparency and public communication of policy. As a third factor, some have argued that a higher degree of *commitment* by the central bank to vary its instrument consistently can enhance the role of the expectations channel.[25] One example was the quantitative easing policy followed by the Bank of Japan from 2001 to early 2006 to bring an end to deflation in Japan. Under this policy, the Bank of Japan announced that it would maintain its zero interest rate policy until inflation was sustained at a positive level. The policy was intended to anchor public inflation expectations but it also helped to stabilise the long-term interest rate. Inflation targeting may do this in much the same way in other countries.

A review of experience reveals the increasing importance of the expectations channel. One indicator is the growing convergence of private sector inflation expectations around the central bank's inflation target in many countries (including the Czech Republic, Colombia, Mexico and South Africa) in recent years. A second indicator in several countries is the stronger reaction of financial markets to central bank policy announcements. In Thailand, for example, the housing and bond market responded to the recent monetary tightening at an early stage. With the mortgage interest rate adjusting to an expected rate increase, the overall financing cost for homeowners moved up before monetary policy was tightened. In Singapore, the volatility of market rates around policy announcement dates has fallen significantly following increased communication of the central bank's monetary policy stance to the public.[26] In India, the opening-up of a two-way communication channel between the central bank and market participants has increased the signalling role of monetary policy.[27]

As financial markets come to better anticipate central bank policy, the size of policy rate adjustments can be reduced. As money market and bond rates move in anticipation of policy rate changes, central banks will need to factor in the impact of such movements on demand and on their actual policy rate adjustments. Careful monitoring of such feedback effects can be crucial. In a sense, market rate movements may often "do the central bank's work".

In a questionnaire response, most central banks said that the growing role of the expectations channel has implications for the magnitude of their interest rate response. For instance, in the Czech Republic, during the early years of the inflation targeting regime (1998 and 1999), the central bank changed its policy rate somewhat aggressively (usually by 50 basis points). But with inflation expectations becoming well anchored and monetary policy actions being better anticipated in recent years, the central bank has reduced the magnitude of the policy rate adjustment (usually 25 basis points). In Colombia, the volatility of the policy rate has fallen since 2000 following improved credibility of monetary policy.

Greater credibility of monetary policy allows a central bank to pursue a countercyclical policy that it could not safely pursue in the past when inflation was high or when its anti-inflation commitment was not trusted. In Israel, for instance, more stable nominal wage expectations have allowed the central bank to moderate interest rate moves.

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[25] The often quoted "Taylor rule" is one variant of such a commitment device. For a discussion on optimal policy commitment see, for instance, Clarida et al (1999) and Eggertsson and Woodford (2003).

[26] An empirical test conducted by the Monetary Authority of Singapore showed that during 2001–2005 about 50% of the policy change was priced in by market participants 10 days ahead of the actual policy announcement date; see MAS (2005).

[27] Mohan (2005) discusses the channels through which the Reserve Bank of India's communication policy may have helped to increase the effectiveness of monetary policy. See also Mohan (2008).

3. Has the output and inflation response to monetary policy shocks changed?

This section presents an analysis of output and inflation responses based on a monthly VAR model for a sample of countries.[28] The variables considered are industrial output, consumer price inflation, the real effective exchange rate, and the nominal short-term interest rate. The model was run for two sample periods: the first one covering the period 1990–96 and the second, 2000–06. The idea is to compare output and inflation responses in these two periods without considering whether a break actually occurred.[29] Following other studies, the variable orders are as indicated above, with output entering as the most exogenous and the interest rate as the least exogenous variable.[30] The assumption is that the interest rate responds to contemporaneous values of all three other variables; viz, output, inflation and the exchange rate.[31]

Graphs A1 and A2 in the Annex show impulse responses of output and inflation to one standard deviation shock in the interest rate. Such a model is of course a very simple representation of the monetary transmission mechanism: for instance, it does not include inflation expectations, credit aggregates or commodity prices, all of which have a high degree of significance for the inflation process in many countries. The following findings emerge from this analysis.

- In several countries, the short-run industrial output response to an interest rate shock appears to be subdued in both periods. In some countries (for instance India, Korea, Thailand and South Africa) the short-run output response seems to have increased during the first half of this decade compared with that in the first half of the 1990s. In most countries, industrial output recovers relatively rapidly following the monetary shock. In both periods, the long-run neutrality of monetary policy is validated given that output returns to the base level within a period of one to two years.

- In contrast, the response of inflation to monetary policy shocks appears stronger in the first half of the 2000s than in the first half of the 1990s. However, the response varies across countries. For some countries (for instance, Mexico and South Africa), the response is relatively strong. In a number of other countries (Chile, the Czech Republic and India), however, inflation rises for several months before falling in response to monetary tightening, suggesting something of a "price puzzle".[32] One explanation is that the assumption of a policy shock being purely exogenous may not be valid; in reality, the monetary authorities look at a much wider set of information about the economy. Consequently, both inflation and the interest rate may rise together for some time before the contractionary impact of monetary policy

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[28] The countries are India, Indonesia, Korea and Thailand from Asia; Chile and Mexico from Latin America; the Czech Republic and Poland from central Europe; and South Africa.

[29] The second half of the 1990s was excluded from the model to allow for the fact that many Asian economies went through a crisis during this period and that having different estimation periods for different countries might affect the comparability of results.

[30] See, for instance, Christiano et al (1999) and Castelnuovo and Surico (2006).

[31] The base model was run with three lags and with absolute values of inflation and the interest rate and changes in industrial output and the real exchange rate. In subsequent estimations, to check for model robustness, several alternative specifications were attempted. These included a longer lag length and first differencing of the interest rate and inflation as well as a measure of the industrial output gap instead of levels. Given that the results are not very different across specifications, the findings are based on the base model.

[32] See Sims (1992).

takes hold.[33] A second explanation is that a "cost channel" might be in operation whereby higher interest rates raise the costs of working capital and, in turn, prices before firms adjust supply in response to lower demand. Some have argued that the importance of the cost channel may rise as financial "frictions" decline, leading to increased pass-through of policy rate changes to working capital costs; see, for instance, Chowdhury et al (2006).

These results are supported by the variance decomposition analyses:

- The longer-run impact of monetary policy on inflation differs across countries. In a number of countries, the impact seems to have increased significantly between the first half of the 1990s and the first half of this decade. For instance, in Indonesia, Mexico and South Africa the variance in inflation explained by interest rates two years after the monetary policy shock appears to have increased from 2–5% during the first period to 10–30% in the second period.

- In contrast, in several other countries (India, Korea, Thailand, Chile, the Czech Republic and Poland), the variance in inflation explained by the interest rate appears to be small and to have fallen in the first half of this decade (from 1–14% following two years of shocks during 1990–96 to 2–3% during 2000–06).[34]

- As regards the variance in industrial output explained by the interest rate, the picture is similar. With the exception of South Africa, in several countries it varies from 1 to 8% after a gap of two years.

What could explain such a difference? One explanation could be that the model does not adequately capture the dynamics of the transmission mechanism in some countries because it omits several other channels and includes only partial estimates of output.[35] Another could be an experience similar to that of industrial economies where the decline in the share of output and inflation volatility explained by the interest rate is related to the relative stability of inflation and output.[36] The argument is that, to the extent that monetary policy may now systematically respond to various shocks with an objective of stabilising inflation and output, one would expect a reduction of inflation and output variability due to monetary policy innovations. The role of expectations is crucial in this context.

4. Balance sheet developments and transmission

This section discusses three major issues for the transmission mechanism related to changes in the balance sheet position of the private sector. It focuses on both current and possible future implications. One is the nature and the extent of changes in household

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[33] Bernanke (2004) links such price puzzles to autonomous increases in inflation expectations, particularly in countries where such expectations are not sufficiently well anchored.

[34] But this does not necessarily mean that monetary policy measures have become less effective: as argued in the previous section, a more credible policy framework may well anchor inflation expectations without large changes in interest rates being necessary.

[35] One limitation of the model is its recursive ordering of the shocks. A structural VAR with a different ordering scheme may produce different results. However, implementing such a model for a large number of economies poses a difficult task.

[36] For instance, in the context of the United States, Boivin and Giannoni (2002) reported that the variance in output explained by monetary policy in the United States had fallen from 20% in a pre-1980s sample (1963–79) to 3% for the post-1984 sample (1984–97) and that of inflation from 14% to 6% during the same period. They attribute this finding to the greater success of monetary policy in stabilising inflation and output.

balance sheets implied by the recent rapid growth in household credit. The second is the ways in which recent corporate financial disintermediation might change the response of investment to monetary policy changes. A third issue is the impact of recent structural changes in the balance sheets of banks.

Implications of increased household lending

An important development since Kamin et al (1998) that has potential major implications for monetary transmission has been the greatly increased proportion of bank lending going to households (Table A12 in the Annex).[37] This has been accompanied by a rise in household debt as a percentage of disposable income in several countries, and growing household leverage ratio (debt as a percentage of household assets) in some countries (Table A13 in the Annex).

This in effect has relaxed household budget constraints, which could make the intertemporal substitution effects of monetary policy more powerful. In the past, in many countries, households were able to borrow relatively little from banks; during the past decade this has changed, increasing the substitution effects of monetary policy changes. At the same time, higher debt levels mean that changes in the policy rate can also generate substantial income effects as debt servicing payments amount to a greater share of household income. Such income effects could also be non-linear, rising substantially as the household debt levels rise beyond a certain threshold.

A second implication is that changes in the household balance sheet can lead to potential wealth effects from monetary policy, particularly through the housing market. Housing has become an important component of wealth in many countries, with possible implications for consumption. Such an effect could be reinforced by the use of housing as collateral.[38]

A third potential implication of changes in household balance sheets is linked to the cash flow effects of monetary policy on consumption and residential investment. Many factors influence the impact of policy on household cash flows: nominal interest rates; the size of gross financial liabilities and assets; and the nature of financial contracts. The argument is that high interest rates impose a cash flow constraint on prospective borrowers: the classic example is housing affordability indices, which have fallen in recent years following a large reduction in nominal interest rates. For existing borrowers, cash flow effects are substantial to the extent that they could refinance a previous loan at a lower rate. Households with a relatively high debt-to-income ratio tend to be relatively more cash constrained than others, exhibiting a higher degree of sensitivity to interest rate changes.[39]

Similarly, larger flows of financial liabilities produce stronger cash flow effects from a given change in the interest rate. With the exception of central Europe and Turkey, the ratio of gross financial liabilities flows of the personal sector to GDP has actually fallen in most countries over the past decade (Annex Table A14). In several cases, such a trend might reflect borrower prudence following a series of financial crises in the mid-1990s. If so,

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[37] For instance, as Table A12 shows, the share of mortgage credit in total bank credit in many emerging market economies (say between 20 and 40% in 2005) has recently exceeded that seen in the United States (25%). This is also the case for consumer credit (10–30% in several countries) led by a significant increase in credit card lending by banks.

[38] In addition, it is possible that greater borrowing opportunities allow younger households with little capital to "save" in the form of bigger houses, pushing up prices and stimulating demand. This would be dependent on the consumption response of those who do not own homes and whether they cut their spending in response to a rise in the cost of a future house purchase.

[39] See Grenville (1995) and Kneeshaw (1995) for a discussion on cash flow effects associated with monetary policy.

improved macroeconomic conditions and continued credit growth may reverse this trend. In contrast, in many countries the share of mortgage debt in the gross financial liabilities of the personal sector has increased.

As regards the nature of financial contracts, the shorter the duration of a loan contract, the more frequently it will be rolled over to reflect new interest rates, and hence the more quickly changes in policy rates will lead to changes in income and cash flows. The maturity structure of household loans is relatively short in many emerging market economies compared with industrial economies. Another important factor is the degree of indexation of financial contracts to inflation and the exchange rate which can aggravate cash flow effects of monetary policy. The rapid growth in foreign currency borrowing by households in central Europe over the past five years has increased their exposure to significant income and cash flow effects from changes in the exchange rate. In contrast, in those Asian and Latin American countries where a large proportion of debt had in the past been indexed to inflation and the exchange rate (a major vulnerability in earlier crises), indexation has generally been reduced.

What might be even more important is the extent to which households are borrowing at variable interest rates. Table A15 in the Annex shows that variable rate contracts dominate emerging mortgage markets. Fixed rate contracts are relatively important in Israel, the Czech Republic and Mexico. In addition, in most countries mortgage rates are either linked directly to the policy rate or indirectly through the banks' prime lending rate. Nevertheless, mortgage lending rates in a number of countries are subject to a maximum limit. Although similar information about consumer lending (particularly through credit cards) is not available, in most countries such loans tend to be at variable rates and of short-term duration.

In countries with primarily fixed rate lending, households will be insulated from movements in the policy rate. The burden of adjustment in this case shifts to lenders who might have funded themselves at adjustable interest rates.[40] Only new borrowers will be affected by such changes in interest rate. Much will also depend on how households view a particular change in the interest rate and on their forward-looking behaviour. If at the trough of the cycle, households expect the interest rate to go up, they might in effect raise precautionary saving by increasing repayments so as to maintain a constant debt repayment plus interest service rate. They may in short behave as if the interest rate is fixed over the cycle: see Debelle (2004).

Corporate balance sheets and the transmission mechanism

The impact of monetary policy on non-residential investment depends in part on the balance sheet position of corporations. As Kamin et al (1998) note, 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 increase the probability of insolvency, and so lead to a sharp and sudden fall in borrowing and spending. Such effects may be more marked in the emerging market context because capital market imperfections limit borrowing possibilities severely. The impact of monetary tightening could therefore be accentuated by the so-called "financial accelerator" where weak corporate balance sheets may act to exaggerate the impact of a rise in the interest rate.[41]

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[40] Yet an easy monetary policy could still have an impact to the extent that households might choose to refinance their mortgages at lower interest rates.

[41] See Bernanke et al (1999).

Trends in corporate balance sheet variables

Various indicators may capture the balance sheet vulnerability of firms to monetary policy shocks. One important measure is net worth, the ratio of net assets to income. Another is the ratio of debt to assets, which measures leveraging and may be better correlated with the probability that firms will have difficulty meeting scheduled debt service obligations. The degree of leveraging also indicates the prospective size of cash flow effects resulting from monetary policy measures as interest payments on debt rise. The latter effect could be captured by a third indicator, the ratio of net interest payments to income.

Graph 5

Internal resources[1]
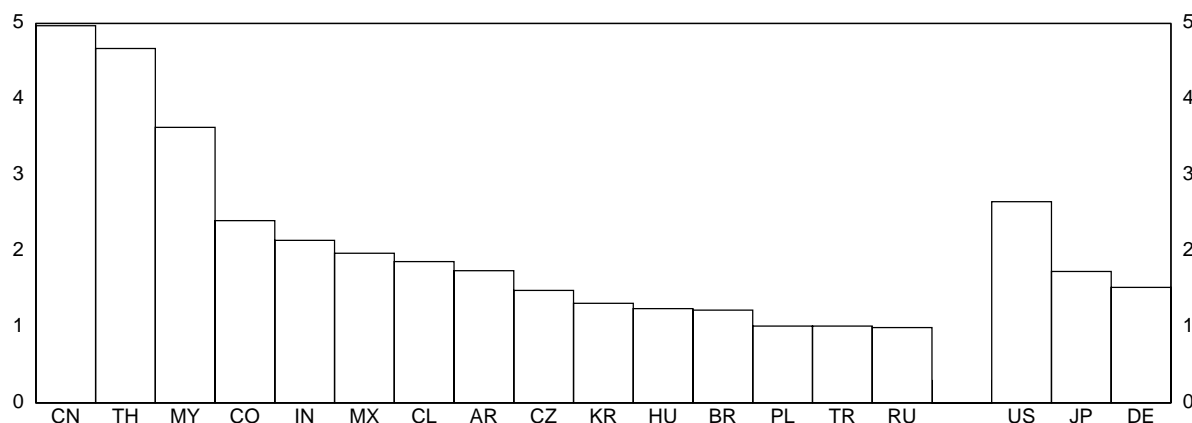
AR = Argentina; BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; DE = Germany; HU = Hungary; IN = India; JP = Japan; KR = Korea; MX = Mexico; MY = Malaysia; PL = Poland; RU = Russia; TH = Thailand; TR = Turkey; US = United States.

[1] The internal resources index is defined as the ratio between the sum of cash flow from operations, plus decreases in inventories and receivables, plus increases in payables, over the sum of capital expenditures. This index is the complement to the Rajan and Zingales Index of External Finance, extracted from the Corporate Vulnerability Utility.

Source: IMF (2005).

Unfortunately, data on many of these indicators are not available consistently across countries. Nevertheless, what information there is suggests that the typical corporate leverage ratio in emerging markets has often been surprisingly higher than in industrial countries; see IMF (2005). For instance, the average corporate leverage ratio in Asia stood at 38% between 1993 and 2003, compared with 24% for the G3 countries. Latin America and emerging Europe have comparatively low ratios (26% and 28%, respectively). One factor often cited for a relatively high leverage ratio of emerging market firms is their comparatively low market-value-to-book-value ratio, which encourages firms to finance investment through debt rather than equity. On the other hand, in several emerging market economies firms tend to rely more heavily on internal funds than those in industrial countries, which may help constrain the leverage ratio (Graph 5).

One major indicator of how the balance sheet position of firms may have changed in more recent years is given by trends in gross financial liability flows of the non-financial corporate sector (Annex Table 16). In most countries, such liabilities as a percentage of GDP fell sharply – in some cases dramatically – between 1995–97 and 2003–05. There are a few exceptions, such as Thailand, where the appetite of firms to borrow did rise following the 1997–98 financial crisis. In a number of Asian economies (for instance, China and India) in recent years, firms have funded a larger part of their investment out of (growing) profits. This is also true, albeit to a lesser extent, in other regions, particularly in crisis-hit countries. In Argentina, firms have mostly relied on self-financing (to the extent of 80% of their new capital spending) for investment following the recent crisis. Similarly, in Turkey the corporate leverage ratio has fallen steadily since 2001 following a sharp rise in corporate profits.

There have also been significant changes in the composition of corporate debt. Three major trends are discernible from Table 7. First, the share of bank debt in total liabilities fell in a number of countries between 1995–97 and 2003–05. Second, with firms' increasing access to both local and international bond markets, the share of market debt in total liabilities has increased in several countries. Third, there has been a significant rise in equity financing by the corporate sector, particularly in Asia, where stock valuations have seen rapid growth over the past few years.

Table 7

**Composition of outstanding financial liabilities
of the non-financial corporate sector**

In percentages

	Bank loans			Commercial paper and bonds			Equities		
	82–84	95–97	03–05	82–84	95–97	03–05	82–84	95–97	03–05
Latin America									
Argentina		24.0	21.9		41.7	33.5		34.3	44.6
Chile			20.9			34.7			[1]
Colombia[2]	20.7	36.3	32.2	13.2	35.7	40.0	66.1	28.0	28.0
Mexico		40.2[3]	26.4[3]		7.6[4]	11.1[4]			
Peru		95.0	80.0		5.0	20.0		0.0	0.0
Asia									
India[5]	27.0	17.2	34.2	8.1	14.4	–3.2	6.2	16.3	24.2
Korea	54.3	36.4	32.4	19.6	22.3	14.6	26.1	14.5	24.6
Malaysia[6]		73.6	55.0		24.1	43.6			
Philippines		5.3			16.4				
Singapore	68.8	40.4[7]	42.7[7]	5.3	8.5[8]	7.8[8]	25.9	10.4[9]	5.7[9]
Thailand		66.4	48.5		2.2	5.8		31.4	45.8
Central Europe									
Czech Republic[2]		28.9	19.7		1.9	2.7		38.4	43.7
Hungary		19.9[10]	23.7[10]		1.2	0.3		58.0	55.0
Poland[11]			17.9			2.5			57.9
South Africa		28.1	41.9		6.0	16.5		82.4	65.8
Memo:									
United States	*24.9*	*12.6*	*11.9*	*18.5*	*15.1*	*19.6*	*56.6*	*72.3*	*68.4*

Note: Data for 1982–84 refer to Table 9 in Kamin et al (1998).

[1] In terms of flows, equities represent a share of 15%. [2] Refers to 1996–97 and 2003–04. [3] Includes foreign and domestic bank financing. [4] Includes foreign and domestic debt issues. [5] Data are based on a sample of selected companies and refer to the financial years 1996–97 and 2004–05. [6] Refers to 1997 and 2005. For equities, only the share to total gross flow of financial liabilities can be provided: 20.3 (1997) and 35.3 (2003–05). [7] Including other loans. [8] Long-term loans and debentures. [9] Shareholders' equity. [10] Bank loans and credits from other sectors. Credits from non-financial corporate sector were excluded. [11] Refers to 2003 and 2004.

Sources: US Flow of Funds; national data (questionnaire); BIS statistics.

Will corporate deleveraging and financial diversification reduce the power of monetary policy?

The implications of recent changes in the corporate balance sheet for the monetary transmission process can go in several directions, and their relative importance is difficult to determine. On the one hand, lower corporate debt could ease cash flow constraints on firms, reducing the investment response to monetary tightening. Stronger corporate balance sheets could also weaken the role of the financial accelerator discussed above.

In addition, the reduced reliance of firms on bank loans could weaken the bank lending channel, particularly if firms can now more easily access commercial paper and bond markets as alternative funding sources. Similarly, the increased use of derivatives may protect firms from future interest rate and exchange rate shocks, reducing cash flows and debt servicing volatility and thereby balance sheet vulnerability.[42] The impact of financial market liberalisation, increasing the access of firms to the global capital market, may go in the same direction. In particular, large firms can increasingly switch from domestic to foreign financing when monetary policy is tightened.

On the other hand, better functioning capital markets could enhance the degree of pass-through of policy rates to the prices of a wider range of financial assets and so strengthen the direct cost impacts of monetary policy changes on investment. Similarly, to the extent that more liquid markets and actively traded securities increase the potential valuation effects of interest rate changes on the balance sheets of firms, investment spending might also become more responsive to changes in the policy rate. Changes in expectations about monetary policy could now play a more important role (than in the past) in firms' financial conditions.

Implications of changes in bank balance sheets

As already noted, the better health and greater productivity of the banking system in many emerging markets has been associated with several changes to the monetary transmission mechanism. On the one hand, it has probably led to a stronger direct cost channel. The paper from the central bank of Malaysia shows that the long-run pass-through from the overnight rate to the lending rate has increased steadily from 0.3 in 1989 to 0.6 in 2005 with associated increases in competition and efficiency in the banking system: see Ooi (2008). On the other hand, the decline in the balance sheet vulnerability of banks reduces non-price related distortions on credit supply and hence may reduce the importance of the bank lending channel in many countries. High capital levels and the increased access of banks to alternative sources of funding through certificates of deposit and long-term bonds (for instance, in Chile) will have similar effects by relaxing resource constraints on banks, particularly during monetary tightening.

Growing market risk exposure for banks

Yet some of these balance sheet changes and other changes may have altered the significance of some transmission channels. One question is the extent to which changes in banks' balance sheets might have affected their exposure to market risks and whether changes in monetary policy could aggravate such exposures.

Table A17 in the Annex provides information on the duration and maturity of banking system deposits and loans. In several countries, the share of lending at variable interest rates

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[42] On the other hand, the development of derivatives could also reduce market segmentation, reducing firms' ability to substitute alternative funding sources in response to monetary policy changes. On balance, evidence suggests that increased use of derivatives may have reduced investment response to monetary policy shocks in several countries; see Gomez et al (2005), who provide evidence in the context of Colombia.

exceeds that of deposits. With increased pass-through of the policy rate, this could increase banks' interest rate exposure if their average funding cost does not vary sufficiently with monetary policy. Nevertheless, such exposures can be managed by a proper hedging strategy. In several other countries (for example, South Africa), banks have tended to pass on such risks to borrowers by mobilising more deposits at variable interest rates.

As regards maturity mismatches, the average maturity of deposits in most countries is shorter than loans, which makes the cash flow of banks vulnerable to refinancing risks. This is particularly true in Latin America (with the exception of Chile), where the average maturity of deposits is less than five months.

Graph 6
Commercial banks' holdings of government and central bank securities

Annual average as a percentage of total assets
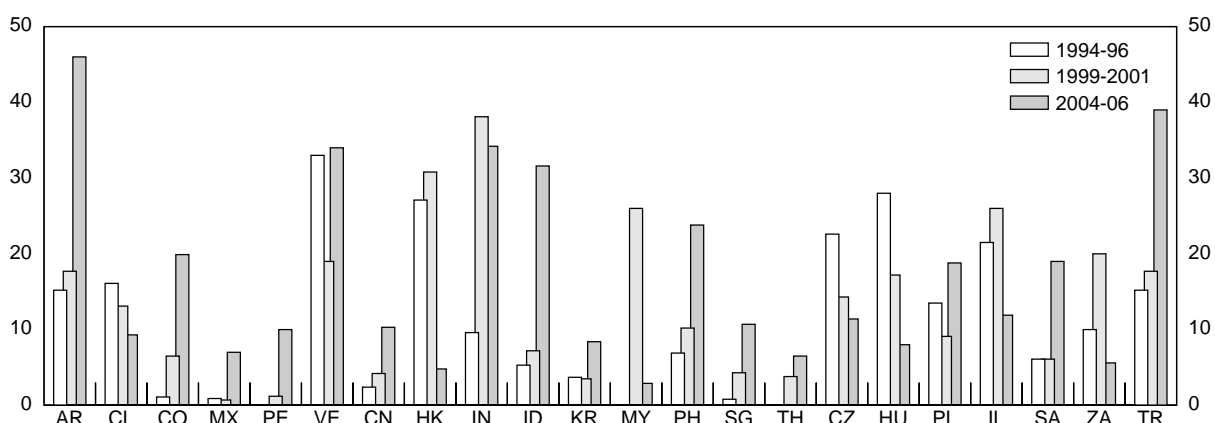
AR = Argentina; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; HK = Hong Kong SAR; HU = Hungary; ID = Indonesia; IL = Israel; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = Philippines; PL = Poland; SA = Saudi Arabia; SG = Singapore; TH = Thailand; TR = Turkey; VE = Venezuela; ZA = South Africa.

Source: National data (questionnaire).

Another major source of exposure to monetary policy shocks could arise from the investment portfolios of banks. Over the past decade, commercial bank investment in government securities has increased, raising its share in total assets (Graph 6). In several countries, such a trend has recently been associated with large-scale intervention to resist exchange rate appreciation. Central banks have sold government or their own securities to commercial banks to sterilise excess liquidity.[43] The increased exposure of banks to bond markets increases the probability of large valuation changes for banks. This could well have financial accelerator effects. Banks might expand credit rapidly during an easing phase, as their capital gains and trading profits from bond holdings rise, while cutting back lending as losses mount during periods of monetary tightening. Such a reaction function would magnify the demand impact of monetary policy changes. Another potential, more insidious, implication is that it could influence central banks' interest rate response, to the extent that worries about the stability of the banking system might delay or attenuate needed monetary tightening.

Dollarisation

As regards banks' exposure to currency mismatches, Table 8 below shows the share of foreign currency in assets and liabilities in emerging economies' banking systems; see

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[43] See Mohanty and Turner (2006) for a discussion on potential changes to bank lending behaviour associated with such sterilised intervention.

Table A18 for country details. Although the degree of "dollarisation" (or "euroisation" in the context of emerging Europe) of the banking system[44] has fallen over the past decade, it continues to be high in several cases. In most countries (outside of central Europe) the degree of asset-side dollarisation tends to be of roughly similar order to that on the liability side, suggesting that the direct exposure of the banking system to exchange rate risk is probably low. But banks' borrowers may have currency mismatches – and so they remain exposed through the credit risk channel.

Table 8

Currency denomination of bank balance sheets[1]

Percentage denominated in foreign currency

	Assets		Liabilities	
	2000	**2005**	**2000**	**2005**
Latin America[2]	30.1	15.7	29.6	14.5
Asia[3]	13.4	11.0	14.6	12.3
Hong Kong SAR	57.8	58.0	54.3	54.5
Singapore	75.4[4]	74.6[4]	75.1[5]	73.3[5]
Other Asia[6]	10.5	8.0	11.9	9.6
Central Europe[7]	23.1	25.0	21.1	18.7
Other emerging economies[8]	25.8	22.6	27.6	22.5
Total	**16.4**	**12.4**	**17.3**	**12.9**
Memo:				
United States	*0.7*	*0.8*	*0.8*	*0.7*
Japan	*12.7*	*21.3*	*9.1*	*12.9*

[1] Indicators shown are expressed as a percentage of GDP; aggregated using 2000 GDP and PPP weights. [2] Argentina, Chile, Colombia, Mexico, Peru and Venezuela. [3] Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. [4] Refers to Asian Currency Unit (ACU) assets and foreign notes and coins, net amount due from banks, negotiable certificates of deposit (NCDs) held, loans to non-bank customers and bills discounted/purchased in the Domestic Banking Unit (DBU). Items that do not have breakdowns by S$ and FC in the DBU are excluded. [5] Refers to ACU liabilities and non-bank deposits, NCDs issued, amount due to banks, bills payable in the DBU. Items in the DBU that do not have breakdowns by S$ and FC are excluded. [6] Asia as defined above but excluding Hong Kong SAR and Singapore. [7] The Czech Republic, Hungary and Poland. [8] Israel, Saudi Arabia, South Africa and Turkey.

Sources: IMF; national data (questionnaire); BIS statistics.

As Kamin et al (1998) note, the transmission of monetary policy in a dollarised system will depend not only on the substitutability between domestic currency assets and dollar assets, but also on the substitutability between domestic dollar assets and international dollar assets. Because of the presence of default and convertibility risk, domestic dollar and international dollar)

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[44] Using the definition in Kamin et al (1998) the term dollarisation is defined here as 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 transaction function of money.

assets are likely to be regarded as less than perfect substitutes. This is why dollar interest rates in dollarised financial systems have generally exceeded international levels.

Consideration of cases where markets regard domestic currency assets and dollar assets as close substitutes but view domestic and foreign assets as being non-substitutable serves to illustrate this point. Assuming limited exchange rate changes, policy-induced increases in domestic currency interest rates will induce borrowers to switch to domestic dollar loans and savers to shift their assets into domestic currency deposits leading to increases in domestic dollar deposit and lending rates. 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 of a non-dollarised system with perfect capital mobility, where the exchange rate channel might play a more important role. Inflation and output developments will more likely depend on public expectations of the exchange rate.

The paper from the central bank of Peru illustrates the dilemma facing the central bank in a highly dollarised economy: see Rossini and Vega (2008). It shows that monetary policy needs to take into consideration currency mismatches and the risk of a run on dollar deposits in the banking system.[45] While the central bank has introduced prudential measures to control some of the risks, it has combined these with exchange rate intervention to smooth currency fluctuations. The paper shows that tighter monetary policy on its own will tend to accelerate the short-run impact on inflation and could generate perverse output effects through the exchange rate channel. But when combined with exchange market intervention, the inflation and output effects of monetary tightening are longer-lasting and more effective. Yet excessive foreign exchange intervention runs the risk that people do not internalise risks of denominating their debts in foreign currencies.

Banking sector consolidation and monetary policy transmission

Another question is how far the trend towards bank consolidation (increased mergers and amalgamations of banks and foreign ownership) might affect the transmission mechanism. On the one hand, a few large banks may dominate the banking market, which could reduce and lower the pass-through of the policy rate to bank deposit and lending rates. On the other hand, bank consolidation could increase the effectiveness of the interest rate channel if it increased efficiency, reduced transaction costs, and speeded up information processing. This would imply a faster transmission of interest rate changes across various segments of financial markets.

The balance of these factors is uncertain since separating the impact of other changes in the financial system from bank consolidation is often difficult. However, both research and experience in the context of industrial economies have demonstrated that financial consolidation has not significantly altered the transmission mechanism for monetary policy: see OECD (2001). In some countries, net efficiency gains from financial system consolidation have been large, strengthening the pass-through of the policy rate to other interest rates. Given the early stage of the development of financial markets in emerging market economies, it is more likely that the efficiency aspects dominate other factors, increasing the overall effectiveness of monetary policy.

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[45] See also several papers on the policy implications of dollarisation in Armas et al (2006).

5. Globalisation and monetary transmission

The greater financial openness of emerging market economies is evident from a large build-up of gross foreign asset and liability positions and growing correlation between the prices of emerging market and industrial country assets. Two issues have received increasing attention in recent discussions about how these developments might affect the monetary transmission mechanism.

Internationalisation and inflation dynamics

The first issue relates to the implications of globalisation for the dynamics of domestic inflation. Trade integration affects the inflation process through the prices of tradable goods and through greater labour and product market competition with implications for the degree of pass-through of wage and cost increases to inflation.

There is little new in the debate about the impact of global influences as compared to domestic policies on inflation. An OECD study in 1973 noted that increasing integration was leading to a greater "internationalisation of the problem of inflation … and this was undermining the effectiveness of national stabilisation policies". But this conclusion, largely dependent on the fixed exchange rate regimes prevailing under Bretton Woods, was reversed by a 1982 OECD study which concluded that "with more flexible exchange rates, changes in policy (and particularly monetary policy) are likely to affect exchange rates and thus inflation".[46] Not all accepted this view: Beckerman and Jenkinson (1986) attributed the deceleration in OECD inflation from 1980 to 1982 to the fall in primary product prices, and not to the direct impact of higher unemployment.

Despite various challenges, however, the consensus view is still that domestic monetary policies dominate inflation outcomes – especially under flexible exchange rates.[47] A recent study by the OECD reported a significant impact of import prices on inflation in most industrialised economies since the mid-1990s: see Pain et al (2006). But it added that globalisation merely changed the price level of imported goods and services, with a one-time effect on inflation. Ihrig et al (2007) showed that while the sensitivity of inflation to the domestic output gap has fallen in industrial countries in recent years, there is only weak evidence of this being caused by either changes in import prices or global demand. Instead, they attributed the reduced sensitivity of inflation to the stabilising impact of increased trade openness on domestic output. In short, they found that domestic monetary policy determined inflation. The IMF reached a similar conclusion in its recent analysis of inflation in industrial economies.[48]

Global demand and supply developments, however, do have a major impact on *relative* prices. The greater effective use of labour in populous low-wage countries has compressed the prices of many manufactured goods in recent years. Real oil prices began to rise in 2003 and have remained high. Partly because higher energy prices have diverted crops to ethanol around the world and partly because higher incomes in poor countries have increased the

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[46] See OECD (1973) and Turner (1982).

[47] See Yellen (2006), IMF (2006b), and Ball (2006). Borio and Filardo (2007) put the contrary case.

[48] In the context of industrial economies, IMF (2006b) estimates that about 50% of the reduction in the sensitivity of inflation to domestic output stems from increased openness, while the other 50% is due to improved monetary policy credibility. It argues that while the impact of import prices on inflation tends to be large in the first two years it falls significantly in the subsequent years, suggesting that import prices only change relative prices and not overall inflation over a long-term horizon. See also Ball (2006) who argues that relative price changes generated by import prices have no major impact on long-term inflation or inflation expectations and hence on the central bank's response to them.

demand for food, wholesale food prices have risen substantially. Because food and energy represent a comparatively high proportion of the average household's spending in emerging markets, the impact of such price changes on real incomes can be substantial. The measurement of inflation then becomes more dependent on the weight of different goods in the index basket.

An additional complexity arises with respect to capital flows. A worldwide rise in food prices, for instance, will have a larger impact on the CPI in a low-income country than in a high-income country. If because of this policy rates are increased more in low-income than in high-income countries, then capital flows could induce unwanted exchange rate appreciation in low-income countries. All such factors inevitably complicate monetary policy decisions in emerging markets.

Reduced monetary policy independence?

The question of monetary policy independence and capital flows is examined in an accompanying background paper: see Saxena (2008). The famous trilemma from the Mundell-Fleming model states that countries cannot simultaneously fix their exchange rate, have an open capital account, and pursue an independent monetary policy. Only two out of these three objectives are mutually consistent. Since 2000, emerging markets have seen an increase in the flexibility of exchange rates and also more open capital accounts. While an open capital account would imply a stronger link between domestic and foreign interest rates, this link can be weakened given a willingness to allow the exchange rate to fluctuate.

Saxena (2008) finds that the response of domestic interest rates to changes in the US interest rate (a proxy used for world interest rates) is higher for countries with flexible exchange rates and higher capital mobility than in countries with fixed exchange rates and mobile capital (especially during 2000–06). The results suggest that high capital mobility may be leading to a greater co-movement of domestic and foreign interest rates. [49] However, the response of domestic interest rates to changes in foreign interest rates has decreased since 2000 (compared with 1990–99), implying that as emerging market economies gain credibility with their newer forms of monetary policies, a further delinking between these interest rates might be expected.

6.   Conclusion

The papers in this volume throw some new light on the old question of how monetary policy affects the economy in the emerging market economies. Policy transmission channels have changed in several important ways since the publication of Kamin et al (1998). Although the experiences of EMEs differ in many respects, some general conclusions are possible. Fiscal dominance has been largely overcome, and attempts to suppress inflation by currency overvaluation (sometimes at the price of non-convertibility) have been abandoned. Monetary policy frameworks have become more credible, and central banks more flexible in their operations. These shifts and the associated balance sheet changes have strengthened the interest rate channel. It is because of better monetary policies that inflation in most EMEs has become lower and less volatile.

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[49]   This result could also reflect the fact that exchange rates have not been sufficiently flexible in practice, as many central banks have intervened in the foreign exchange market to stabilise them.

As the channels of transmission will continue to change as economies evolve, central banks need to remain alert to the implications of such changes as they calibrate their policy responses to macroeconomic developments.

Annex

Graph A1

Impulse response of output to interest rate shocks

1990–96	**2000–06**
Chile	

| Czech Republic | |

| India | |

| Indonesia | |

Impulse response of output to interest rate shocks

1990–96	2000–06

Korea

Mexico

Poland

South Africa

Thailand
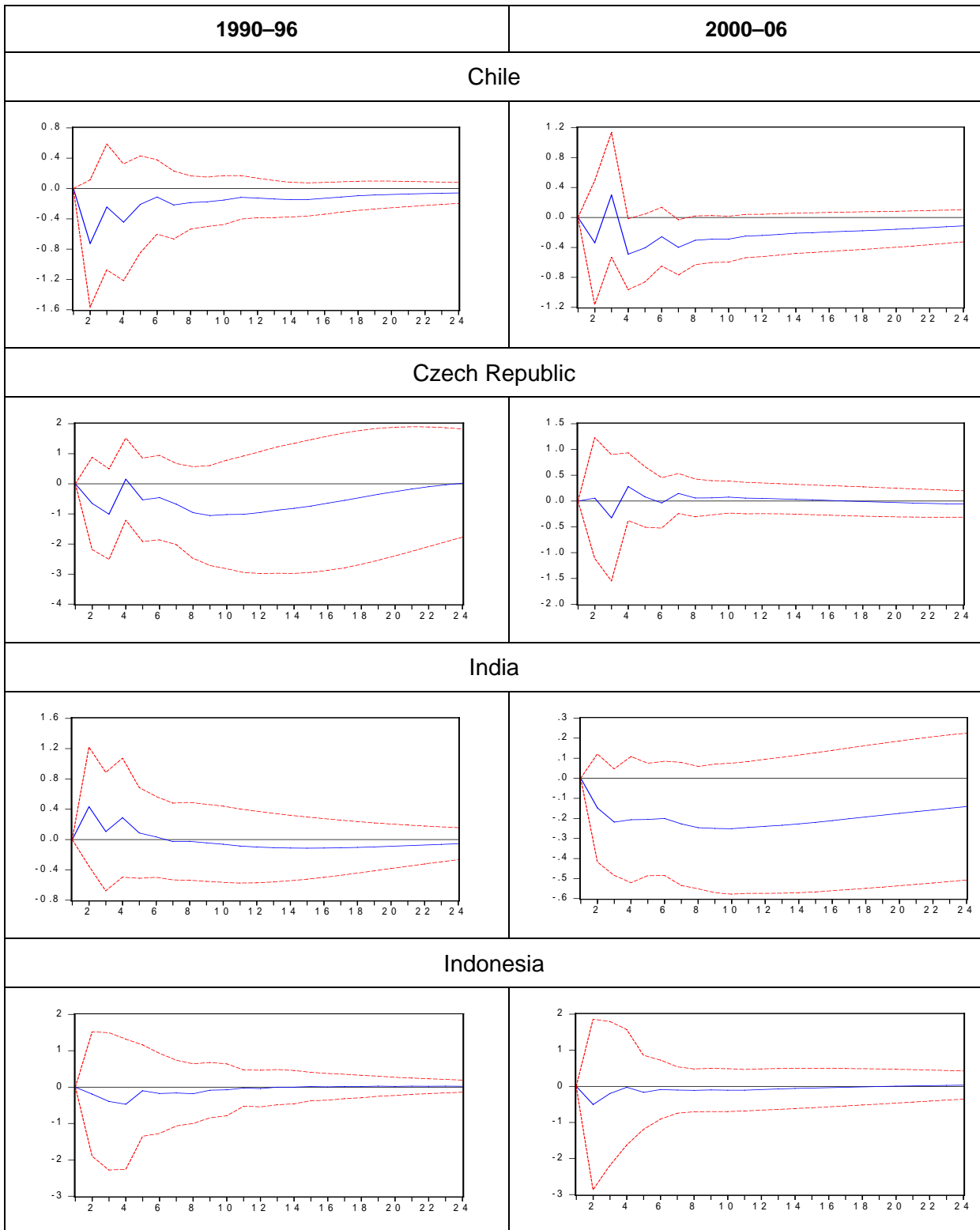
Source: National data; BIS calculations.
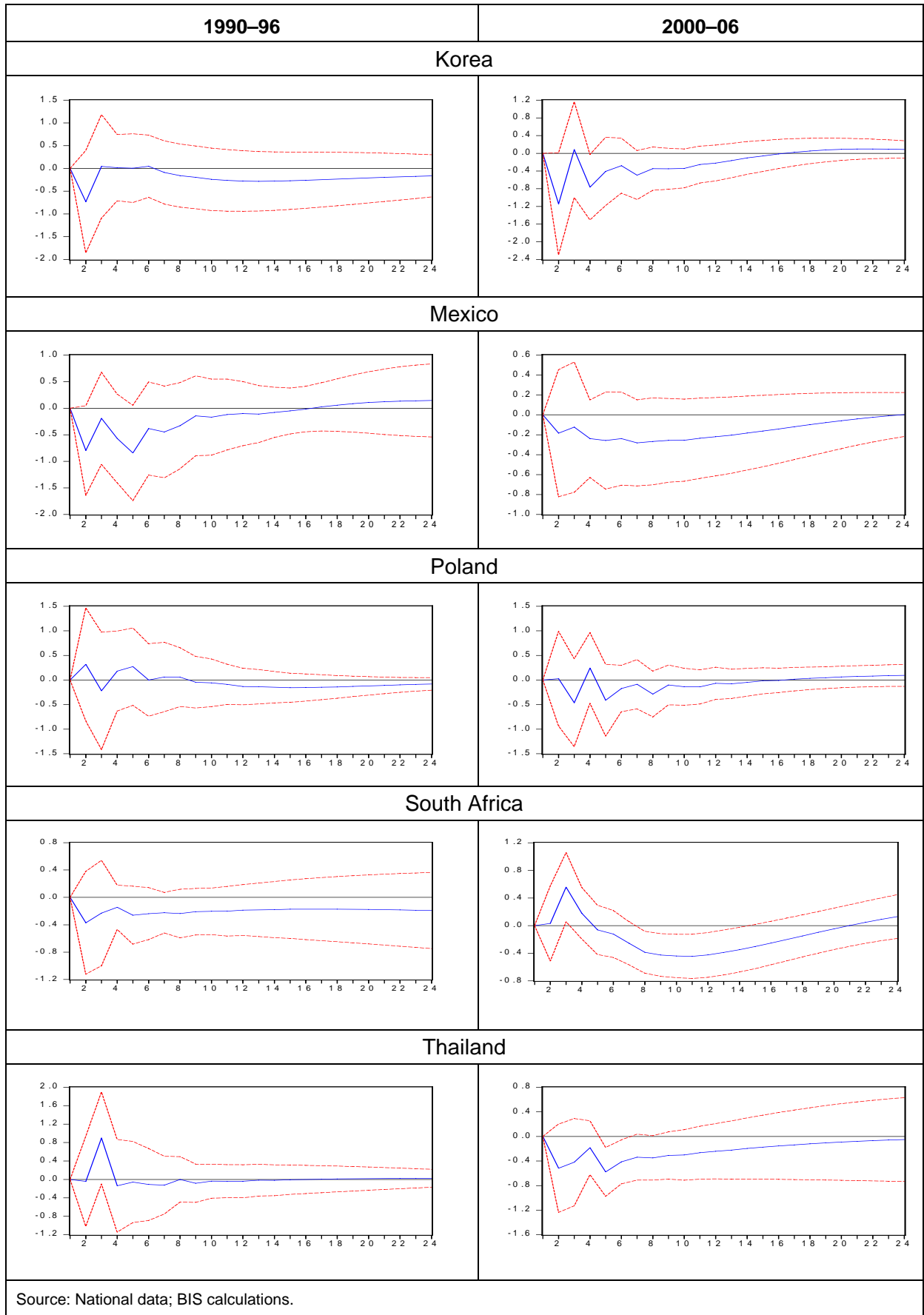
Graph A2

Impulse response of inflation to interest rate shocks

1990–96	**2000–06**

Chile

Czech Republic

India

Indonesia

Impulse response of inflation to interest rate shocks

1990–96	**2000–06**
Korea	

| Mexico | |

| Poland | |

| South Africa | |

| Thailand | |
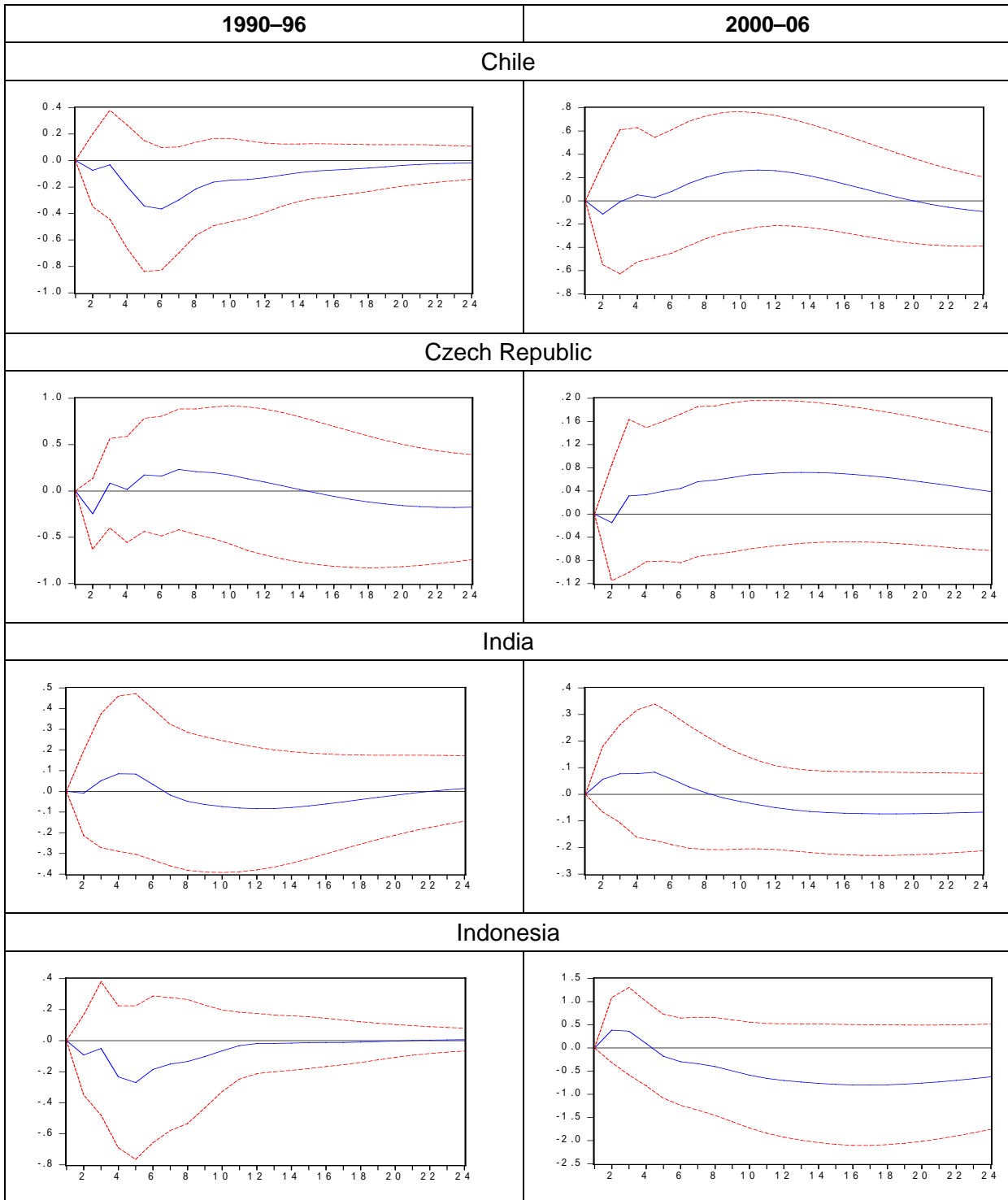
Source: National data; BIS calculations.
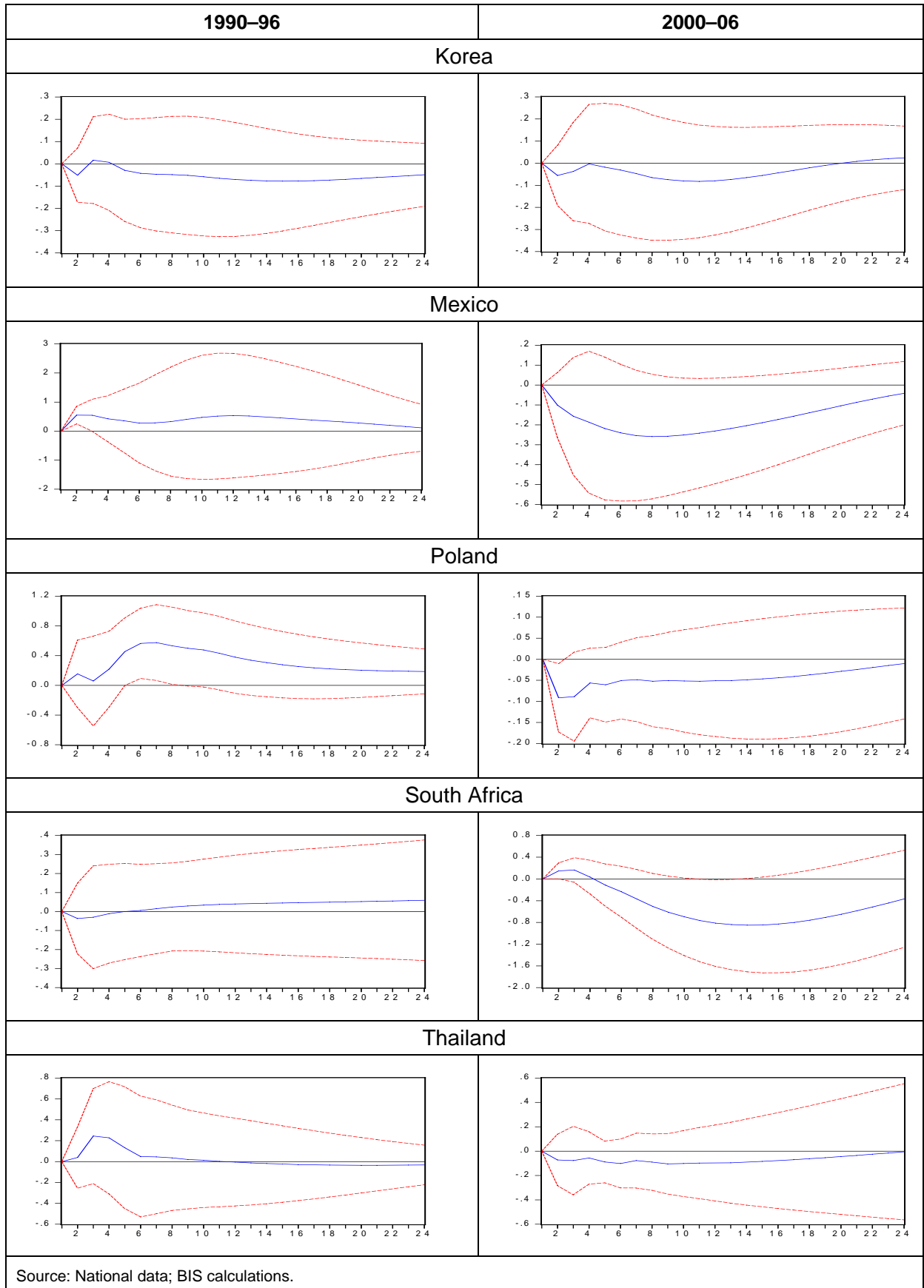
Table A1

Volatility[1]

	Output[2]		Prices[3]		Exchange rate[4]	
	1990–99	**2000–Q206**	**1990–99**	**2000–Q206**	**1990–99**	**2000–Q206**
Latin America						
Argentina	5.9	8.3	2,584.3	12.1	3,712.5	81.6
Brazil	8.7	2.0	1,138.3	3.2	1,211.9	20.8
Chile	9.1	1.7	7.3	1.1	6.7	11.5
Colombia	4.0	1.8	5.6	1.6	11.3	13.3
Mexico	3.9	2.6	10.5	2.0	26.0	6.4
Peru	6.8	3.0	2,162.9	1.4	2,280.5	3.1
Venezuela	4.3	11.3	23.1	7.1	41.7	26.3
Asia						
China	1.8	1.3	8.2	1.6	16.1	0.9
Hong Kong SAR	3.8	4.0	4.4	2.0	0.2	0.3
India	1.2	2.3	3.6	0.9	11.5	4.2
Indonesia	7.0	1.1	18.1	4.4	85.9	14.0
Korea	4.9	2.4	2.3	0.8	19.0	8.1
Malaysia	5.6	2.9	1.0	0.9	16.0	0.9
Philippines	2.6	1.6	4.0	2.0	16.0	7.8
Singapore	4.0	5.0	1.3	0.8	6.9	3.1
Thailand	7.5	1.7	2.2	1.7	19.3	6.6
Central Europe						
Czech Republic	1.4	1.6	15.8	1.6	11.7	9.8
Hungary	1.8	1.0	7.2	2.6	6.7	12.3
Poland	1.8	1.9	19.2	3.3	7.2	7.8
Other emerging economies						
Israel	5.8	3.9	4.6	2.5	5.3	6.2
Russia	5.0	1.5	293.9	4.5	137.2	7.6
Saudi Arabia	3.4	3.1	2.5	1.0	0.0	0.0
South Africa	2.3	1.0	3.6	3.1	9.1	21.2
Turkey	6.1	6.1	16.5	22.7	41.4	40.2
Memo:						
United States	*1.5*	*1.3*	*1.1*	*0.8*	*1.0*	*1.0*
Euro area	*1.2*	*1.1*	*1.1*	*0.2*	*9.6*	*11.3*
Japan	*2.1*	*1.5*	*1.3*	*0.4*	*11.6*	*8.6*

[1] Measured as the standard deviation of annual changes of quarterly averages; in per cent. [2] Real GDP.
[3] Consumer prices. [4] National currency per US dollar.

Source: National data.

Table A2

Fiscal indicators[1]

	Fiscal balance		Central bank credit to government		Public debt	
	1990–99	2000–06	1990–99	2000–05	2000	2006
Latin America						
Argentina	–1.9	–5.6	4.0	11.7	51.0	70.9
Brazil	–3.7	–3.7	26.8	16.6	48.8	50.1
Chile	1.5	1.4	16.9	8.5	14.0	5.9
Colombia	–1.8	–2.4	1.3	1.1	47.7	46.3
Mexico	–4.1	–2.7	1.4	0.0	49.3	43.1
Peru	–2.8	–1.6	0.3	0.1	45.5	35.3
Venezuela	–2.8	–0.3	6.0	1.1	27.3	35.8
Asia						
China	–2.2	–2.2	3.2	2.0	16.4	17.2
Hong Kong SAR	1.7	–1.8	…	…	0.0	1.7
India	–7.7	–8.6	11.8	4.4	75.0	80.9
Indonesia	–0.3	–1.6	3.7	14.3	52.1	25.0
Korea	–1.0	1.9	0.9	0.8	16.3	28.1
Malaysia	0.6	–4.5	1.3	0.2	36.7	43.5
Philippines	–1.7	–3.4	9.3	3.0	64.6	71.8
Singapore	10.0	5.5	0.0	3.7	84.1	97.8
Thailand	1.2	–0.1	1.5	1.9	56.9	43.9
Central Europe						
Czech Republic	–0.7	–3.4	1.2	0.3	15.2	26.6
Hungary	–5.1	–6.7	49.2	7.3	55.0	67.2
Poland	–3.4	–4.9	5.0	0.9	37.7	48.4
Other emerging economies						
Israel	–4.3	–4.0	4.8	2.0	87.0	95.3
Russia	–9.3	4.3	12.4	4.1	62.5	13.9
Saudi Arabia	–8.2	5.1	…	…	87.2	15.2
South Africa	–4.3	–1.1	1.7	2.2	42.9	32.8
Turkey	–8.5	–12.3	3.9	12.3	68.8	71.1
Memo:						
United States	*–2.8*	*–2.7*	*4.9*	*5.8*	*57.2*	*62.5*
Euro area	*–4.1*	*–2.2*	*1.7*	*1.9*	*69.6*	*69.8*
Japan	*–2.8*	*–6.8*	*6.5*	*17.6*	*142.5*	*181.8*

[1] Indicators shown are expressed as a percentage of GDP.

Sources: IMF, *World Economic Outlook*; JP Morgan, *Emerging markets debt and fiscal indicators*, October 2006; ECLAC; national data.

Table A3

Degree of openness

	Trade openness[1]			Financial openness[2]		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**[3]
Latin America						
Argentina	15.6	22.7	45.0	67.8	124.0	167.3
Brazil	13.2	22.8	29.2	44.0	89.5	82.7
Chile	61.4	60.1	74.5	134.1	181.7	186.2
Colombia	33.6	36.0	40.3	77.9	88.1	96.4
Mexico	30.3	42.5	41.8	70.3	72.9	83.5
Peru	28.3	33.9	43.6	102.9	113.2	92.0
Asia						
China	26.8	44.2	69.3	38.9	84.7	96.2
Hong Kong SAR	254.2	283.7	383.4	1,462.9	1,246.5	1,439.5
India	16.4	28.8	44.3	30.2	42.3	57.8
Indonesia	48.4	76.0	66.4	80.6	136.8	100.7
Korea	56.7	78.0	82.3	35.4	82.7	109.2
Malaysia	147.2	228.9	222.5	141.3	211.4	254.4
Philippines	57.5	117.6	100.0	95.0	143.3	137.3
Singapore	359.5	377.7	456.1	361.3	809.5	1,023.2
Thailand	81.8	125.0	152.2	68.8	142.7	125.0
Central Europe						
Czech Republic	39.8	129.4	141.2		146.4	147.4
Hungary	69.7	151.6	137.2	63.7	157.7	173.5
Poland	46.8	60.4	74.1	117.1	86.5	116.6
Other emerging economies						
Algeria	54.7	62.6	71.3	74.2	87.1	96.1
Israel	68.2	76.4	88.9	112.6	167.4	207.4
Russia	16.9	67.6	56.7		168.5	135.6
Saudi Arabia	79.3	73.3	89.1	162.6	100.8	114.4
South Africa	43.0	52.8	55.7	51.3	139.7	135.3
Turkey	34.2	61.8	65.5	45.4	96.3	103.9
Memo:						
United States	*19.8*	*25.7*	*26.2*	*80.1*	*166.2*	*198.3*
Euro area	*55.3*	*72.6*	*74.1*		*212.5*	*261.5*
Japan	*20.5*	*21.3*	*28.1*	*111.4*	*100.4*	*154.4*
United Kingdom	*50.5*	*58.2*	*56.2*	*351.2*	*618.2*	*759.6*

[1] Defined as the sum of imports and exports as a ratio to GDP. [2] Measured as the sum of gross stocks of foreign assets and liabilities as a ratio to GDP. [3] Data refer to 2004 for Mexico, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Poland, Saudi Arabia, South Africa and Turkey.

Source: Lane and Milesi-Ferretti (2006).

Table A4

Determinants of bank deposit rates

	Linked to policy rate		Linked to interbank rate		Agreed within bank associations		Negotiated with customers		Subject to regulation	
	1997	2006	1997	2006	1997	2006	1997	2006	1997	2006
Latin America										
Argentina		Yes		Yes				Yes		
Brazil			Yes						Yes	
Chile	No	Yes	(Yes)	Yes	No	No	Yes	Yes	No	No
Colombia	(Yes)	Yes	(Yes)	Yes	(Yes)		(Yes)	Yes	No	
Mexico	No		Yes		No		Yes	Yes	No	
Peru				Yes[1]	No	No		No	No	No
Venezuela	No		No		No		Yes		No	Yes
Asia										
China								Yes	Yes	
Hong Kong SAR	No		Yes	Yes	(No)		Yes	Yes	No	
India	No	[2]	No	[2]	No		No	Yes[3]	No	Yes[4]
Indonesia	No	Yes	Yes		No		Yes		No	
Korea	No	Yes	No	Yes	No		No		No	
Malaysia	No		No		No		Yes	Yes	No	Yes[5]
Philippines		Yes		Yes		No		Yes		No[6]
Singapore			Yes	Yes			Yes		No	
Thailand[7]		Yes	Yes	Yes	No		Yes		No	
Central Europe										
Czech Republic		No		No[8]		No		No		No
Hungary			Yes							
Poland			Yes					Yes		
Other emerging economies										
Israel	Yes	Yes		–		No	Yes	Yes	No	No
Russia					No		Yes		No	
Saudi Arabia	No		Yes	Yes	No		Yes		No	
South Africa		Largely		No		No		Partly		No
Turkey				Yes						

Note: Data for 1997 refer to Table 6 in Kamin et al (1998).

[1] This interest rate is a main component in banking funding.   [2] Interest rates on deposits (except as indicated in the last column) have been deregulated and are decided by the banks themselves. The deposit rates are influenced by the Reserve Bank's policy rates.   [3] Bulk deposits.   [4] Saving deposits and foreign currency deposits.   [5] Minimum rates were prescribed for fixed deposit balances of RM1 million and below (with the exception of deposits placed by non-SME corporations and non-residents) for tenures between one and 12 months.   [6] Refers to a typical domestic commercial bank.   [7] Others: competition from other saving alternatives and competition among banks.   [8] Little short-run link, but there is an effect in the long run.

Source: National data (questionnaire).

Determinants of bank lending rates

	Linked to policy rate		Linked to interbank rate		Agreed within bank associations		Negotiated with customers		Subject to regulation	
	1997	2006	1997	2006	1997	2006	1997	2006	1997	2006
Latin America										
Argentina		Yes		Yes				Yes		
Brazil										
Chile		Yes		Yes		No	Yes	Yes	Yes	No
Colombia	(Yes)	Yes	(Yes)	Yes	(Yes)		(Yes)	Yes	No	Yes
Mexico			Yes	Yes			Yes	Yes		
Peru				Yes[1]	No	No		No	No	No
Venezuela	No	Yes	No		No		Yes	Yes	No	Yes
Asia										
China									Yes	Yes
Hong Kong SAR	No		(Yes)	Yes	No		Yes	Yes	No	
India	No	[2]	No	[2]	No		Yes	Yes	No	Yes[3]
Indonesia	No		Yes		No		Yes		No	Yes[4]
Korea[5]	(Yes)		(Yes)		No		Yes		No	
Malaysia	Yes		Yes		No		Yes	Yes	Yes	Yes[6]
Philippines		Yes		Yes		No		Yes		No[7]
Singapore		Yes	Yes	Yes			Yes		No	
Thailand		Yes	Yes	Yes	No		Yes		No	Yes[8]
Central Europe										
Czech Republic		No		Yes		No		No		No
Hungary				Yes				Yes		
Poland				Yes				Yes		
Other emerging economies										
Israel	Yes	Yes		–		No		Yes	No	No
Saudi Arabia	No		Yes	Yes	No		Yes		No	
South Africa		Yes		No		No		Partly		No
Turkey				Yes						

Note: Data for 1997 refer to Table 7 in Kamin et al (1998).

[1] This interest rate is a main component in banking funding.   [2] Interest rates on loans (except as indicated in the last column) have been deregulated and are decided by the banks themselves. The lending rates are influenced by the Reserve Bank's policy rates.   [3] Export credit rate.   [4] Blanket Guarantee Rate.   [5] An additional item is the market interest rate (CD, etc.).   [6] Applicable to prescribed rate for loans extended through special funds administered by Bank Negara Malaysia and the ceiling on lending rates for housing loans extended to low-income groups. In addition, rates on hire purchase loans are subject to the Hire Purchase Act 1967, while rates on credit card loans are subject to the Credit Card Guideline issued by Bank Negara Malaysia.   [7] Refers to a typical domestic commercial bank.   [8] Only for credit card and personal loans.

Source: National data (questionnaire).

Table A6

Reserve requirements

In percentages

	Reserve requirement ratio				
	1990	**1998**	**2000**	**2006**	**Remuneration (latest)**
Latin America					
Argentina	5.0–88.0		15.0–22.0	14.0–35.0	BM
Chile	4.0–10.0	9.0	3.6–9.0	3.6–9.0	No
Colombia	18.2	31.0	4.8	5.7	BM
Mexico	0.0	0.0	0.0	0.0	
Peru	52.5	7.0	7.0	6.0	No
Venezuela	15.0	17.0	17.0	15.0	No
Asia					
China			6.0	8.5	BM
Hong Kong SAR	No	No	No	No	No
India	15.0	10.0	8.0	5.0	No
Indonesia	2.0	3.0–5.0	5.0	5.0–13.0	BM
Korea	1.0–11.5	3.1	1.0–11.5	1.0–5.0	
Malaysia	6.5	13.5	4.0	4.0	No
Philippines	25.0		9.7	10.1	Yes
Singapore	6.0	6.0	3.0	3.0	No
Thailand	2.0	No	1.0	1.0	No
Central Europe					
Czech Republic	8.0		2.0	2.0	Yes
Hungary	11.0	12.0	11	5.0	MR
Poland	9.9–20.8		5.0	0.0–3.5	BM
Other emerging economies					
Israel	0.0–10.0	8.0	0.0–6.0	0.0–6.0	No
Saudi Arabia	2.0–7.0	7.0	2.0–7.0	2.0–7.0	No
South Africa	2.0–5.0		2.5	2.5	No
Turkey	9.0–19.0		6.0	6.0	BM
Memo:					
United States	*3.0–12.0*	*0.0–10.0*	*0.0–10.0*	*0.0–10.0*	*No*
Japan	*0.125–2.5*	*0.05–1.3*	*0.05–1.3*	*0.05–1.3*	*No*
Euro area			*0.0–2.0*	*0.0–2.0*	*No*
United Kingdom		*0.4*	*0.0*	*0.0*	*No*

MR = Market rate. BM = Below market rate.

Note: Data for 1998 refer to Table 2 in Kamin et al (1998). Reserve requirements vary for some countries depending on the nature of the liabilities.

Source: National data (questionnaire).

Table A7

Liquidity requirements

In percentages

	1990	**1998**	**2000**	**2006**
Latin America				
Mexico	30.0	0.0	0.0	0.0
Peru			8.0	8.0
Asia				
India	38.5	25.0	25.0	25.0
Indonesia	4.5		11.6	19.4
Malaysia	10.0–17.0	17.0	3.0–7.0	3.0–7.0
Philippines			30.0	30.0
Singapore	18.0	18.0	8.0	18.0
Thailand	5.0	6.0	5.0	5.0
Other emerging economies				
Saudi Arabia	20.0	20.0	20.0	20.0
South Africa	5.0–20.0		5.0	5.0
Turkey			8.0–14.0	

Note: Data for 1998 refer to Table 2 in Kamin et al (1998).

Source: National data (questionnaire).

Table A8

Structural bank indicators

	Non-performing loans[1]		Capital asset ratio[2]		Operating costs[3]		Return on assets[4]	
	2000	2005	2000	2005	2000	2005	2000	2005
Latin America								
Argentina	16.0	5.2	10.6		4.6	4.6	0.0	0.9
Brazil	8.3	4.4	13.8	17.4	6.9	5.8	1.1	2.1
Chile	1.7	0.9	13.3	13.0	3.0	3.0	1.0	1.3
Colombia	11.0	2.7	13.2	13.5	11.0	5.3		2.8
Mexico	5.8	1.8	13.8	14.3	5.6	4.7	0.9	2.4
Peru		2.1	12.9	12.0	5.3	4.7	0.3	2.2
Venezuela	6.6	1.2		15.5	8.7	6.2	2.8	3.7
Asia								
China	22.4	10.5			1.4	1.1	0.1	0.8
Hong Kong SAR	7.3	1.5	17.8	14.9	1.2	1.0		1.7
India	12.8	5.2	11.1	12.8	2.6	2.4	0.7	0.9
Indonesia	34.4	15.6	21.6	19.6	2.5	3.6	0.3	1.7
Korea	8.9	1.2	10.5	12.8	1.8	1.7	–0.6	1.2
Malaysia	15.4	9.9	12.5	13.1	1.6	1.5	1.4	1.3
Philippines	24.0	20.0	16.2	18.1	3.4	3.4	0.4	1.1
Singapore	3.4	3.8	19.6	15.8	2.4	1.0	1.3	1.2
Thailand	17.7	11.1	11.3	13.3	1.9	2.0	–0.2	1.5
Central Europe								
Czech Republic	29.3	4.3	17.4	11.9	3.3	2.1	0.7	1.4
Hungary	3.0	2.1	13.7	12.0	4.9	3.6	1.3	2.0
Poland	15.5	7.7	12.9	14.5	4.8	3.7	1.1	1.6
Other emerging economies								
Israel	6.9	10.3	9.2	10.9	2.4	2.5	0.5	0.8
Russia	7.7	3.2	19.0	16.0	6.3	3.8	0.9	3.2
Saudi Arabia	10.4	10.6	21.0	17.1	1.6	1.6	2.0	3.5
South Africa		1.5	14.5	12.3	4.9	3.1		1.1
Turkey	9.2	4.8	17.3	24.2	5.7	6.0		1.7
Memo:								
United States	*1.1*	*0.7*	*12.4*	*13.0*	*2.9*	*2.3*	*1.1*	*1.3*
Germany	*4.7*	*4.8*	*11.7*	*13.4*	*1.5*	*1.2*	*0.2*	*0.2*
Japan	*5.3*	*1.8*	*11.7*		*1.2*	*1.1*	*0.0*	*0.5*

[1] As a percentage of total loans.   [2] As a percentage of risk-weighted assets.   [3] As a percentage of total assets.   [4] In per cent.

Sources: IMF, *Global Financial Stability Report*; Bankscope; BIS calculations.

Table A9

Average daily money market turnover

As a percentage of outstanding banking assets

	Total money market		Interbank repo market		Interest rate swaps		Others	
	2000	2005	2000	2005	2000	2005	2000	2005
Latin America								
Argentina				0.1			0.6[1]	0.2[1]
Chile		0.2						0.2[2]
Colombia	1.2	2.4	0.6	0.9			0.6[3]	1.6
Mexico	7.3	5.9					0.0[4]	1.7[5]
Peru	0.3	0.3	0.3	0.3				
Venezuela	0.7	0.6	0.7	0.6				
Asia								
China	15.6	62.2	10.6	41.9				
Hong Kong SAR	7.0	8.0			3.8	4.1		
India	2.4	2.6	0.0	0.9	0.1	0.1	2.4	1.6
Indonesia	0.2	0.4						
Korea					2.5	3.5	0.2[6]	0.2[6]
Malaysia[7]	0.2	0.1	...	0.1	1.6	2.4	...[8]	...[8]
Philippines	0.5	0.3				0.0		
Singapore								
Thailand	1.4	2.1	0.0	0.0			1.4[9]	2.1[9]
Central Europe								
Czech Republic	1.9	1.6	0.0	0.0				
Hungary	0.8	3.8	0.0	0.2			0.8[10]	3.5[11]
Poland		5.1		0.2		0.9		4.0
Other emerging economies								
Israel	0.2	0.3						
Saudi Arabia			0.6	0.8				
Turkey	2.2	2.8	2.0[12]	1.9[12]			0.2[13]	0.9[13]

Note: Money turnover data include various instruments that are not uniformly classified across countries. In some countries they include the central bank's own repo (and reverse repo) transactions with counterparties.

[1] Call market (interbank loans). [2] Interbank short-term loans. [3] Includes repo and buy/sell-backs. 4 Includes reverse repos. [5] Mexican Derivatives Exchange. Daily average volume for TIIE (Interbank Interest Rate) 28-day futures contracts traded in Mexder. [6] Monetary Stabilization Bonds issued by the Bank of Korea. [7] "…" denotes negligible. [8] Includes negotiable certificates of deposit and bankers' acceptances. [9] BOT Repo, interbank deposits and FX swaps. [10] FX swaps: 0.1 and unsecured market: 0.7. [11] FX swaps: 2.9 and unsecured market: 0.6. [12] Data cover the transactions of banks, intermediary institutions and the Central Bank of the Republic of Turkey (CBRT) in the Istanbul Stock Exchange Repo Market and open market operations and repo transactions at the CBRT. [13] Interbank repo transactions in the money market at the CBRT.

Source: National data (questionnaire).

Depth of government bond market

	Outstanding stocks (as a percentage of GDP)		Typical bid-ask spreads ("on the run" bonds; in bp)		Ratio of annual turnover to average outstanding stocks		Average contractual maturity (in years)	
	2000	2005	2000	2005	2000	2005	2000	2005
Latin America								
Argentina	35	50						
Chile	36	25		3.0–5.0	0.8[1]	1.1	3.3	3.1
Colombia	14	25	15.0[2]	10.0[2]	0.6	15.0	3.5	3.8
Mexico	10	13	14.0	5.0		5.2	1.5	3.2
Peru		4		30.0		1.3		12.0
Venezuela	7.3	9.8	28.0	52.0			2.5	3.7
Asia								
China	9	15			4.7	40.2		
Hong Kong SAR	8	9			52.6	55.2		
India	19	26	1.0–3.0	1.0–2.0			12.6[3]	14.1[3]
Indonesia	31	15			0.1	0.7		
Korea	2	11			8.6	9.2	3.5	5.9
Malaysia	71	80	2.0	4.0	1.4	0.9	5.1	5.1
Philippines	31[4]	39[4]		17.3	0.1	0.0		
Singapore	77[5]	103[5]	...[6]	S$0.1–0.2[7]	...[6]	15.0	4.1[8]	5.7[8]
Thailand	15	22	2.0–5.0	2.0–5.0			6.7	9.9
Central Europe								
Czech Republic	5	16	9.0[9]	7.0[9]	2.2	1.0	4.1[10]	7.9
Hungary[11]	31	40		5.0–18.0	5.0	3.2	1.6	3.6
Poland[12]	17	31	9.0	2.5	10.5	36.8	3.9	5.8
Other emerging economies								
Israel	31	45			0.5	1.1		
Saudi Arabia	104	59	10.0–15.0	10.0	0.0	0.0	7	5
Turkey	29[13]	50		20.0	19.7[14]	9.4	1.3	3.2

[1] Refers to 2001. [2] Denominated in domestic currency. [3] New loans issued during the year. [4] Central government local currency issuances. [5] Includes marketable and non-marketable securities. [6] Trading of marketable securities not active. [7] The market convention in terms of prices. [8] Marketable securities only. [9] Excluding bonds with shorter times to maturity than one year. [10] Average residual maturity weighted with the annual turnover. Maturity of each bond is median maturity of the year. [11] Data for local currency denominated marketable government securities. [12] Market bonds and bills together. [13] Total of cash and non-cash stocks. [14] Daily transaction volumes in the Bonds and Bills Market in the Istanbul Stock Exchange.

Sources: The US Federal Reserve Board; Bloomberg; national data (questionnaire); BIS statistics.

Sources of financing for the private non-financial sector

As a percentage of total financing

	Commercial banks		Other institutions		Foreign sources		Others	
	1993	2005	1993	2005	1993	2005	1993	2005
Latin America								
Argentina		54.0						46.0[1]
Chile		22.6						77.4[1]
Colombia		25.0				23.0		52.0[1]
Mexico	91.5	36.9	8.5	31.6		24.4		7.1[2]
Peru		67.0		20.0[3]		12.0		1.0[4]
Asia								
India[5]	21.7	51.7	34.4	16.6	4.6	2.2	39.3	29.5[6]
Indonesia		13.3		10.0		37.0		39.7[1]
Korea	24.5	32.1[7]	35.0	23.5	3.7	7.2	36.8	37.3
Malaysia	54.9	38.9	45.1	3.7		22.5		34.9[1]
Philippines								
Singapore	87.2	75.2[8]	12.8	9.2[9]				15.6[2]
Thailand	84.1	58.4		0.3	7.5	16.8	1.0	24.5
Central Europe								
Czech Republic[10]		13.8[11]		3.2		5.2		77.8[1]
Hungary	22.5	12.2[12]	0.3	1.5[12]	49.2	37.2[13]	28.0	49.0[1]
Poland[14]		13.4				1.1		85.5
Other emerging economies								
Israel	51.6	61.0		18.0	6.6	18.0	41.8	3.0[2]
Turkey		75.6		3.3[15]		21.1		
Memo:								
Japan	*42.7*	*63.5*	*27.9*	*17.3*	*0.0*	*0.0*	*18.0*	*19.1*
United States	*25.8*	*20.6*	*26.9*	*27.0*	*2.9*	*5.7*	*44.5*	*46.8*

Note: Data for 1993 refer to Table 5 in Kamin et al (1998).

[1] Includes equity.   [2] Equity excluded.   [3] Mainly pension and mutual funds.   [4] Other residents.
[5] Financial year 2004–05.   [6] Includes non-bank borrowings, trade dues and other current liabilities.
[7] Commercial banks and specialised banks.   [8] Includes domestic banking units and Asian Currency Units of commercial banks.   [9] Includes finance companies and merchant banks.   [10] Data cover loans to NFCs and HHs.   [11] Commercial banks, money market funds and credit unions.   [12] Credit.   [13] Credit and equity.   [14] Operating activity, excluding investment.   [14] Equity included in 1993.   [15] Investment and Development Banks.

Sources: Central banks; IMF; national data (questionnaire); BIS.

Composition of commercial bank credit

As a percentage of total credit

	Home mortgage			Consumer credit			Enterprise credit		
	1993	2000	2005	1993	2000	2005	1993	2000	2005
Latin America									
Argentina		5.9	4.3		33.3	26.4		37.8	39.8
Chile[1]	11.2	16.8	20.6	4.0	8.0	12.2	44.5	68.3	65.1
Colombia		32.8	10.7		14.4	26.1		41.2	5.3
Mexico	13.0	26.7	18.4	7.2	5.9	27.8	36.3	60.9	43.0
Peru		7.0	13.0		9.0	13.0		68.0	62.0
Venezuela		3.0	0.0		12.0	10.0		51.0	56.0
Asia									
China					3.8	10.5		96.0	89.5
Hong Kong SAR	9.4	33.7	31.4	3.6	7.1	8.3	87.0	59.2	60.3
India[2]		2.5	6.8		4.5	6.9	56.5	55.3	47.9
Indonesia	4.1	5.9	8.1	6.9	14.9	29.9	70.7	63.1	48.7
Korea[3]	12.7			11.7	31.5[4]	48.9[4]	74.5	63.0	48.8
Malaysia[5]	13.9	15.7	27.7	11.2	12.4	26.1	30.1	61.6	40.9
Philippines[6]		1.7	1.6		1.8	4.1		91.2	84.1
Singapore	14.9	25.0	33.8		16.0	16.4		58.9	49.8
Thailand[7]	8.3	7.9	11.0	4.1	3.3	7.0	58.8	62.5	61.4
Central Europe									
Czech Republic		8.6[8,9]	18.5[9]		5.3[8]	8.9		41.7	42.5
Hungary	6.2	4.3	23.0	3.5	8.4	14.4	52.4	86.0	60.0
Poland[10]			11.1		21.7	19.5		57.9	43.5
Other emerging economies									
Israel		11.0	14.0		7.0	8.0		74.0	66.0
Saudi Arabia					14.3	39.9		78.0	52.8
South Africa		33.9	46.4		9.2	10.7		28.6	24.5
Turkey					13.7	17.3		50.4	32.2
Memo:									
United States	*17.4*	*19.2*	*24.6*	*14.9*	*13.5*	*12.6*	*40.2*	*47.0*	*44.2*
Japan	*8.0*	*13.7*	*20.6*	*3.5*	*2.4*	*2.1*	*80.2*	*63.2*	*47.4*

Note: Data for 1993 refer to Table 14 in Kamin et al (1998).

[1] Interbank loans excluded.   [2] End of March of the respective year.   [3] Interbank loans excluded. They represent 1.6% in 2000 and 0.8% in 2005.   [4] Total loans to the HH sector.   [5] The residual categories are loans to financial institutions, foreign entities and other domestic entities.   [6] Accounts lodged under foreign offices excluded.   [7] Other household credit: 14.5% in 2000; 10.3% in 2005.   [8] Refers to 2002.   [9] Includes mortgages and loans from building societies.   [10] Annual average; government securities and securities issued by other sectors held by commercial banks are excluded.

Sources: US Flow of Funds; BoJ Flow of Funds; national data (questionnaire).

Table A13

Structure of household balance sheet

	Household debt as a percentage of household disposable income			Household debt as a percentage of household assets		
	1995	**2000**	**2005**	**1995**	**2000**	**2005**
Latin America						
Chile		34.0	56.0			
Colombia	27.6	25.7	23.7			
Mexico	17.3	10.5	14.9[1]		18.3[2]	18.7[2]
Peru		17.0	12.0			
Asia						
China	0.9	5.2		4.0	27.3	10.4
India				2.5[3]		2.8[3]
Korea	85.1	93.9	139.6	46.0	41.2	52.9
Philippines	3.5[4]	2.8	4.1			
Singapore		218.1	218.7		20.2	19.5
Thailand	46.9[5,6]	46.7[5]	59.3[5]			
Central Europe						
Czech Republic	11.9[7]	14.1	25.3[1]	3.6[7]	4.1	7.5[1]
Hungary	6.4	7.0	28.9	8.4	7.1	26.0
Poland[8]	7.0[6]	13.5	21.1	20.1[6]	27.0	34.7
Other emerging economies						
Algeria						
Israel	70.0	76.0	64.0	20.4	17.4	15.6
South Africa	58.3	53.3	62.4	20.6	18.2	18.8
Turkey	1.2	5.5	9.3			
Memo:						
United States	*93.5*	*102.8*	*135.1*	*15.5*	*15.2*	*19.1*
Japan	*130.2*	*131.0*	*127.9*	*15.0*	*14.6*	*14.7*
Euro area	*70.9*	*83.0*	*89.2*	*11.8*	*12.4*	*12.3*

[1] Refers to 2004. [2] Refers to households' financial assets: M2 and equity holdings. Without equity holdings the ratios are 31.2% in 2000 and 34.1% in 2005. [3] Refers to urban HHs. For rural HHs: 1.8% and 2.8%. Data pertain to 1991–92 and 2002–03. [4] Refers to 1999. [5] HH debt as a percentage of HH income. [6] Refers to 1996. [7] Refers to 1998. [8] Refers to HH debt (without interest) to financial institutions and HH assets (currency in circulation, gross deposits (without interest), assets outside banking system).

Sources: OECD; US Flow of Funds; national data (questionnaire).

Gross flow of financial liabilities of the personal sector

In percentages

	Annual flow of gross financial liabilities as a percentage of GDP		Composition of outstanding financial liabilities			
			Mortgage debt		Other debt	
	1995–97	2003–05	1995–97	2003–05	1995–97	2003–05
Latin America						
Chile		17.5[1]		54.3		45.7
Colombia	5.0	1.1	49.1	25.7	50.9	74.3
Mexico	2.8	1.7	87.9	74.6	12.1	25.4
Peru	0.3	1.5	2.5	14.0	97.5	86.0
Asia						
Indonesia	20.9	9.9				
Korea	8.5	4.8				
Malaysia[2]	16.3	13.4	36.0	48.2	64.0	51.9
Singapore		2.0		73.5		26.5
Thailand[3]	3.0	2.1	34.6	53.4	65.4	46.6
Central Europe						
Czech Republic[4]	2.5	4.2	3.0	13.5	97.0	86.5
Hungary[5]	0.5	5.3	56.0[6]	38.0[6]	44.0	62.0
Poland	1.3[7]	1.6		28.7		71.3
Other emerging economies						
South Africa	8.6	6.9	36.7	58.0	63.3	42.0
Turkey[5,8]	2.2	6.6			100.0	100.0
Memo:						
United States	*6.0*	*11.9*	*64.2*	*67.9*	*35.8*	*32.2*

[1] As a percentage of disposable private income.   [2] Refers to 1997.   [3] Liabilities with commercial banks.
[4] 1997 and 2004.   [5] Household sector.   [6] Housing loans.   [7] Refers to 1997.   [8] Consumer credits, credit card claims and credit to personnel.

Sources: US Flow of Funds; national data (questionnaire); BIS.

Structure of the mortgage loan market

	Percentage share in total outstanding mortgage loans		Determinants of mortgage lending rate				Use of mortgage-backed securities
	Fixed rate	Variable rate	Linked to policy rate	Linked to prime lending rate	Subject to regulation	Others	
Latin America							
Argentina				Yes			Limited
Chile			No[1]	No	No[2]	No	Limited
Colombia				Yes		Yes[3]	Limited
Mexico	41.0[4]	59.0[5]		Yes	Yes	Yes[6]	Limited
Peru				Yes	No		Limited
Venezuela	0.0	100.0		22.0	78.0		No
Asia							
Hong Kong SAR	0.3	99.7		Yes			Yes[7]
India	[8]	[8]				Yes	
Indonesia	1st year	2nd year	Yes				No
Korea						Yes[9]	
Malaysia	23.4	76.6		Yes	Yes[10]		Limited
Philippines[11]		100.0	Yes	Yes	Yes		Limited
Singapore				Yes		Yes[12]	Limited
Thailand		Majority		Yes			No
Central Europe							
Czech Republic	Majority					Yes[13]	
Poland	1.8	98.2		Yes		Yes[14]	Very limited
Other emerging economies							
Israel	68.0	32.0	Yes	Yes	No		No
Saudi Arabia							No
South Africa		Majority		Majority[15]			Yes[16]

[1] Positive correlation between both variables, but they are not linked. [2] Ceiling interest rate, but not binding. [3] 93% of mortgage loans are indexed to inflation (UVR). However, recently half of the new disbursements have been made at a fixed rate. [4] Mortgage loans originated by banks and sofoles. [5] Credits originated by public sector government agency indexed to inflation. [6] Negotiated with customers. [7] Exists but limited usage. [8] Interest rates on housing loans are deregulated and decided by the banks. Borrowers have the option of both fixed and variable rate loans. [9] Linked to market interest rates (CD, etc.). [10] Ceiling rate on housing loans extended to low-income groups under the Lending Guidelines to Priority Sectors. [11] Local commercial bank. [12] S$ interbank rates. [13] Mostly 5Y. [14] Also negotiated with customers. [15] Mostly linked to prime lending rate which is in turn linked to policy rate. [16] Started in 1989 and accelerated in 2002.

Source: National data (questionnaire).

Table A16

**Annual gross flow of financial liabilities
of the non-financial corporate sector**

	As a percentage of GDP		
	1982–84	**1995–97**	**2003–05**
Latin America			
Argentina		6.6	6.6
Chile	11.6		11.2
Colombia	10.7	22.4[1]	5.8[2]
Asia			
China		19.4	19.1
Korea	21.8	25.2	10.4
Malaysia		46.1	7.8
Singapore	9.6	59.6	14.9[2]
Thailand		4.0	21.0
Central Europe			
Czech Republic[2,3]		22.7	8.2
Hungary		26.8	18.6
Other emerging economies			
South Africa		9.1	5.5
Turkey		16.8	12.0

Note: Data for 1982–84 refer to Table 9 in Kamin et al (1998).

[1] Refers to 1997.   [2] Refers to 2003–04.   [3] Refers to 1996–97.

Source: National data (questionnaire).

Table A17

Structure of outstanding bank deposits and loans

As a percentage of total

	Deposits			Loans		
	At fixed interest rate	At variable interest rate	Average contractual maturity (months)	At fixed rate	At variable rate	Average contractual maturity (months)
Latin America						
Argentina	94.4	5.6		...	...	
Chile	99.4	0.6	13.0	74.0	26.0	17.0[1]
Colombia	…	…	2.1	42.0	58.0	4.5
Mexico	94.9	5.1	1.1			
Peru	48.0[2]	52.0	4.2			
Venezuela	13.0	87.0	1.0	0.0	100.0[3]	60%<12.0
Asia						
India	Majority		2.0			4.4
Indonesia	50.2	49.8		0.7	99.3	–
Korea				[4]	[4]	
Malaysia	48.7	51.3		40.9	59.1	…
Philippines	36.4[5]		3.5[5]	93.2		15.5
Singapore[6]	70.7	29.3	6.0			36.0–60.0
Thailand	Majority		8.4[7]	20.0	80.0	75.6[8]
Central Europe						
Czech Republic		Majority of deposits of households and corporate sector	48% o/n deposits 25% deposits with agreed maturity up to 2Y	Majority of loans to households[9]	Majority of loans to corporate sector	Above 60.0[10]
Hungary	54.0	46.0	3.0	15.0	85.0	15.0
Poland[11]	55.0	45.0	3.2[12]	12.0[13]	88.0	84.2[2]
Other emerging economies						
Israel			14.2			15.2
Saudi Arabia[15]	46.8	9.4	Short-term			…
South Africa	23.0	77.0	0.0–1.0	Minority	Majority	24.0–240.0
Turkey	99.9	0.1	2.8	78.3	21.7	...

[1] Estimated. [2] Term deposits. [3] In Venezuela the CB regulates interest rates for loans to a top rate of 28% per year. Loans can have variable rates below that. [4] Corporations: 46.1% at fixed rate; 53.9% at variable rate; households: 13.8% at fixed rate; 86.2% at variable rate. [5] Time deposits. [6] Deposits refer to non-bank customers' deposits; loans refer to non-bank loans and advances including bills discounted/purchased. [7] Excluding current and saving deposits (41% of total deposits). [8] Excluding call loans (11% of total loans). [9] Specially housing loans. [10] 57% of loans to private sector. [11] Information on deposits is unavailable; figures reflect the interest rate structure of the sum of all interest bearing liabilities. [12] Of liabilities to non-financial sector. [13] Share in total loans to financial sector (excluding banks), non-financial sector, general government sector. [14] Of loans to non-financial sector. [15] Non-interest bearing deposits are excluded.

Source: National data (questionnaire).

Table A18

Currency denomination of bank balance sheets

Percentage denominated in foreign currency

	Assets			Liabilities		
	1993	**2000**	**2005**	**1993**	**2000**	**2005**
Latin America						
Argentina		69.8	20.6		69.1	17.6
Chile	19.7	14.4	18.9	20.6	12.9	17.8
Colombia	13.0	8.1	6.5	11.1	10.0	5.4
Mexico	26.7	16.1	9.8	28.2	15.6	9.8
Peru		74.0	66.0		76.0[1]	66.0[1]
Venezuela	12.2	8.1	5.7	3.5	2.2	1.2
Asia						
Hong Kong SAR	74.5	57.8	58.0	75.5	54.3	54.5
India		2.9	1.1		5.0	4.3
Indonesia	35.1	25.1	19.6	36.4	30.3	19.3
Korea	4.1	13.4	9.9	3.9	12.2	9.9
Malaysia		6.2	6.4		4.2	7.5
Philippines		32.4	31.0		40.8	37.8
Singapore		75.4[2]	74.6[2]		75.1[3]	73.3[3]
Thailand		14.0	11.8		6.8	5.4
Central Europe						
Czech Republic		18.6	18.5		17.1	14.7
Hungary	28.8	35.6	38.4	30.9	35.9	31.6
Poland[4]		21.0	23.3		18.0	16.2
Other emerging economies						
Israel	36.1	39.0	42.0	36.9	38.0	43.0
Saudi Arabia	25.6	34.5	19.3	29.1	31	22.8
South Africa		6.8	8.7		3.1	2.0
Turkey[5]		35.0	32.0		46.0	36.0
Memo:						
United States	*1.2*	*0.7*	*0.8*	*1.5*	*0.8*	*0.7*
Japan	*11.6*	*12.7*	*21.3*	*14.3*	*9.1*	*12.9*

[1] Excludes capital.   [2] Refers to Asian Currency Unit (ACU) assets and foreign notes and coins, net amount due from banks, NCDs held, loans to non-bank customers and bills discounted/purchased in the Domestic Banking Unit (DBU); items that do not have breakdowns by S$ and FC in the DBU are excluded.   [3] Refers to ACU liabilities and non-bank deposits, NCDs issued, amount due to banks, bills payable in DBU. Items in the DBU that do not have breakdowns by S$ and FC are excluded.   [4] Annual average.   [5] Year-end figures.

Sources: IMF; national data (questionnaire); BIS statistics.

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