

Financial reform and the monetary transmission mechanism: the case of Thailand

Tanya Sirivedhin

Introduction

It is generally accepted that the financial liberalisation and reforms undertaken thus far in Thailand have opened up new avenues and increased opportunities for financial market development. The implications are, however, less clear for other areas of the economy. Moreover, in the new environment of closer financial integration and strong capital flows, the effectiveness of monetary policy has often been called into question. This paper attempts to explain the impact of financial deregulation on the real economy, as well as its effects on the operating procedures of monetary policy. The paper is organised into six parts. Section 1 provides a broad overview of current monetary policy management and mechanisms. Section 2 analyses the effects of financial liberalisation on various aspects of the economy and certain indicators, namely the financial sector, domestic interest rates, the capital market, the foreign exchange market and the private corporate sector. Section 3 briefly discusses the three main channels of monetary policy transmission: credit, interest rates and wealth. Section 4 is an empirical study on the implications of the transmission mechanism for the economy using a vector autoregression (VAR) model. Section 5 looks at future tasks and challenges for improving monetary management. Section 6 concludes the paper.

1. The framework of monetary policy management and mechanisms

This section reviews the framework of monetary policy management and mechanisms in Thailand. The overall objective of monetary policy is to achieve sustainable economic growth with a reasonable level of internal and external stability. Of particular concern is price stability, which is defined as a low and stable rate of inflation. In the past, the Bank of

Thailand used the money supply, bank credits and reserve money as intermediate targets. However, with the advent of global financial integration and reforms, the behaviour of the demand for money in Thailand has become more complicated and quantitative monetary targets less useful in guiding monetary policy. The Bank has therefore been focusing more on money market liquidity and short-term repurchase and interbank lending rates over a short horizon. Monetary aggregates are monitored very closely as they are still good indicators of monetary and economic conditions, although their explanatory power and predictability are not as great as in the past.

Within this framework, the primary instruments of monetary policy are operations through various so-called “windows”. The *repurchase market* for government, state enterprise and Bank of Thailand bonds provides the Bank with the means to monitor developments in short-term liquidity and interest rates. In the past, the arrangement did not allow the Bank much liberty in its open market operations, as the Bank could only conduct its policy through the repurchase market as long as other participants came to the market. However, since the primary dealer system was set up in April 1997, the Bank has been able to conduct open market operations on its own initiative. The *loan window* embodies the traditional “lender of last resort” function of a central bank; commercial banks and finance companies may borrow from this window through seven-day repurchase agreements. It is, however, resorted to only when money is exceptionally tight.

In addition, the Bank operates *refinancing and other credit facilities*. These are generally related to the Bank’s development role and its duty to preserve the stability of financial institutions. They therefore play a relatively minor part in the conduct of monetary policy. The refinancing window gives banks another channel for adjusting their liquidity position by selling eligible promissory notes to the Bank at concessional interest rates.

The *Exchange Equalisation Fund (EEF)* has served as a mechanism for implementing the basket-peg exchange rate policy (which was in place until mid-1997). It can perform a useful function as a “safety valve” for banks to manage their liquidity, especially during periods of heavy capital inflows or outflows. Experience has shown that banks tend to sell dollars to the EEF when money is tight and interest rates are high and, similarly, to buy dollars when liquidity is high and interest rates are low.

In all, monetary policy operations have mainly relied on intervention in the repurchase market as a way of containing sharp volatility in short-term interest rates, with sterilisation operations being carried out to counter the tendency towards large shifts in liquidity when necessary. This approach is normally supported by a strong *policy signal* as to the preferred direction of domestic interest rates, such as an adjustment of the “Bank Rate”, as well as a systemic tightening of *prudential regulations* such as those on liquid assets, capital adequacy, loan loss provisions and foreign exchange exposure. For example, commercial banks are required to hold liquid assets, averaged over a fortnight, of not less than 7% of their deposit base;¹ the capital/risk asset ratio has been raised to 8.5% for commercial banks, and 7.5% for foreign bank branches and finance companies, while the reserve requirement against doubtful debt has been increased to 100%. The rule on net foreign exchange exposure limits has also been strengthened, allowing banks to run positions in terms of their first-tier capital of no more than 20% overbought and 15% oversold.

2. Financial liberalisation and its effects²

The country’s financial liberalisation process can be generally characterised as following a gradual approach, implemented in steps so as to allow financial institutions and consumers to adjust to the new environment. Prior to reform, the level of competition between financial institutions was relatively low while monetary management was effected largely through the use of direct control measures, such as interest rate ceilings and exchange control regulations. With the rapid growth of the Thai economy and the wave of globalisation and reforms, the first comprehensive financial reform plan was formulated in 1990. The objectives of the plan were to increase the efficiency of the financial system and to enhance

¹ Liquid assets comprise at least 2% non-interest-bearing deposits at the Bank of Thailand, a maximum of 2.5% vault cash, and – making up the remainder – bonds issued by the Government, approved state enterprises, specialised financial institutions or the Bank of Thailand. The range of eligible securities was widened mainly on account of the declining supply of government bonds in the market. The maintenance period was also lengthened (from one week previously) in order to give banks more room to adjust their reserves and thus help somewhat to limit fluctuations in the money market.

² Sections 2 and 3 of this paper are drawn partly from Duriyaprapan and Supapongse (1996).

the competitiveness of Thai financial institutions. The first phase of the three-year Financial System Development Plan (1990–92) encompassed four major areas: financial deregulation and liberalisation; development of financial instruments and facilities; strengthening of the supervision and examination of the financial system; and development of the payment system.

The authorities took the initiative further under the second Financial System Development Plan (1993–95), aimed at increasing financial market efficiency, mobilising domestic savings and developing Thailand into a regional financial centre. It should also be noted that financial reform measures were introduced in parallel with economic reforms in other areas, including the fiscal and industrial sectors, and price deregulation. In addition, the objectives of the plan were consistent with national economic policy, as laid down in the Seventh National Economic and Social Development Plan (1992–96).

The third Financial System Development Plan (1996–98) was launched with four main objectives: to support the economy's growth potential and ensure the stability of the economic and financial system; to broaden, deepen and strengthen the financial system; to enhance the efficiency of supervision and examination; and to develop financial infrastructures, including information technology and human resources development.

The financial reforms undertaken so far entail many important changes to the financial system that include, for example, the removal of controls on interest rates, the liberalisation of the capital account – with only a few restrictions on capital outflows remaining, new entries into the domestic financial market, and the development of the country's debt market and instruments. Some of the major accomplishments are summarised in Annex 1.

The impact of financial liberalisation on the economy is examined in the five major areas below.

(a) Growth of the financial sector

During the last few years, Thailand's financial sector has grown significantly in terms of both depth and breadth. As shown in Table 1, the progress in financial deepening is revealed by the development of the money supply/GDP ratio. The M2/GDP ratio rose from 64.6% in 1989 to 78.7% in 1994. Moreover, the M3/GDP ratio (i.e. using the definition of the money supply including other financial institutions' deposits) also

Table 1
Growth of the financial sector
 In billions of baht, unless otherwise indicated

	1989	1990	1991	1992	1993	1994	1995
GDP at current prices	1,868.4	2,186.0	2,507.0	2,827.2	3,163.9	3,597.4	4,169.4*
<i>percentage change</i>	19.1	17.0	14.7	12.8	11.9	13.7	15.9
M1	174.7	195.4	222.4	249.7	296.2	346.5	388.3
<i>percentage change</i>	17.6	11.8	13.8	12.3	18.6	17.0	12.1
M2	1,207.1	1,529.1	1,832.4	2,117.8	2,507.1	2,829.4	3,310.6
<i>percentage change</i>	26.3	26.7	19.8	15.6	18.4	12.9	17.0
M3	1,477.5	1,873.8	2,246.3	2,662.8	3,187.1	3,747.9	n.a.
<i>percentage change</i>	28.8	26.8	19.9	20.8	19.7	17.6	n.a.
M1/GDP in %	9.4	8.9	8.9	8.8	9.4	9.6	9.3
M2/GDP in %	64.6	69.9	73.1	74.9	79.2	78.7	79.4
M3/GDP in %	79.1	85.7	89.6	94.2	100.7	104.2	n.a.
Total assets	2,022.3	2,553.8	3,078.0	3,714.1	4,725.6	6,031.5	7,653.3
<i>percentage change</i>	25.5	26.3	20.5	20.7	27.2	27.6	26.9
Total assets/GDP in %	108.2	116.8	122.8	131.4	167.1	167.7	183.6

* Preliminary.

increased substantially, from 79.1% in 1989 to 104.2% in 1994. This implies that the role of other financial institutions in savings mobilisation also increased during this period.

In the meantime, the number of inhabitants per commercial bank branch declined from 26,721 in 1987 to 20,659 in 1994. This suggests that commercial banks are now able to provide more effective services, and this trend is likely to continue with the establishment of new types of financial institution such as the Export and Import Bank of Thailand and the Thai Rating and Information Services (TRIS).

(b) *Determination and movements of interest rates*

The removal of interest rate ceilings and other financial reforms promoted increasingly flexible capital movements, especially those related to short-term private loans. External factors are therefore playing an increasing role in the determination of domestic interest rates. As noted by Subhaswadikul (1995), the long-run equilibrium level of domestic interest rates is mostly determined by foreign interest rates.³ This reflects the increasing degree of openness of the Thai financial market since exchange control deregulation.

At the same time, the reforms have also led to more variability and less predictability in domestic interest rates. Commercial banks' deposit and lending rates have tended to adjust more frequently and with a larger magnitude in the 1990s than in the 1980s (Table 2). This is because the

³ Since 1989, foreign interest rates have gained greater influence on the Thai money market. Subhaswadikul (1995) estimated the domestic interest rate function as follows:

$$i_t = .823 + .895 (i^{*+fp})_t + .00003 SCBL_t + .504 SII_t^e \\ (1.64) (18.99)^* (1.03) (7.55) \\ -.108 smgth_t^u - .059 smgth_{t-1}^u - .202 smgth_{t-2}^u \\ (-1.52) (-.810) (-2.83)^* \\ + .280D(i^{*+fp})_t - .064 SCBLgth_t - .045 SCBLgth_{t-1} \\ (2.44)^* (-2.45)^* (-1.76)^*$$

where i = domestic interest rate (interbank rate)
 (i^{*+fp}) = eurodollar rate
 $SCBL$ = fiscal balance
 SII^e = expected inflation
 $smgth^u$ = money surprises
 $D(i^{*+fp})$ = change in the eurodollar rate
 $SCBLgth$ = change in the fiscal balance
 t = time t

This study uses the cointegration method and the sample period 1989–95. It indicates that the long-run equilibrium level of the domestic interest rate is mostly determined by the foreign interest rate. The coefficient estimate of the foreign interest rate is about 0.9, implying that a 1.0 percentage point rise in the foreign interest rate will result in a rise in the domestic interest rate of 0.9 percentage points, other factors remaining constant.

Table 2
Selected short-term interest rates, 1985–95

		B/R	R/P	I/B	D/R	MOR	MLR	MRR*			
201	1985	Q1	12.00, 13.50	..	..	11.00–13.00	16.50	16.20	..	
		Q2	12.00, 13.50	..	..	11.00	16.50	16.50	..	
		Q3	11.00, 12.00	..	..	10.50	15.50	15.50	..	
		Q4	11.00, 12.00	..	..	10.50	15.50	15.50	..	
		1986	Q1	10.00, 11.00	..	..	9.00	14.00	14.00	..
			Q2	10.00, 11.00	..	..	8.50	14.00	14.00	..
			Q3	8.00	..	..	6.75	12.25	12.00	..
			Q4	8.00	..	..	6.75	12.25	12.00	..
			1987	Q1	8.00	6.75	11.50	11.50	..
			Q2	8.00	..	..	6.75	11.50	11.50	..
			Q3	8.00	..	..	6.75	11.50	11.50	..
			Q4	8.00	..	..	6.75	11.50	11.50	..
			1988	Q1	8.00	6.75	11.50	11.50	..
			Q2	8.00	..	..	6.75	11.50	11.50	..
			Q3	8.00	..	..	6.75–7.50	11.30	11.50	..
			Q4	8.00	..	..	6.75–9.50	12.00	12.00	..
		1989	Q1	8.00	9.26	10.47	9.00–9.50	12.00	12.00	..	
		Q2	8.00	9.24	9.80	9.50	12.00–12.50	12.00–12.50	..		
		Q3	8.00	9.59	10.80	9.50	12.50	12.50	..		
		Q4	8.00	10.44	11.30	9.50	12.50–13.50	12.50	..		
		1990	Q1	8.00	9.81	10.32	11.00–11.50	13.55	13.56	..	
		Q2	9.50	10.98	12.01	11.50	14.48	14.48	..		
		Q3	9.50	12.77	14.71	12.50–13.50	14.71	14.71	..		
		Q4	12.00	13.01	14.43	13.00–15.50	15.69	15.41	..		

Table 2 (continued)
Selected short-term interest rates, 1985–95

		B/R	R/P	I/B	D/R	MOR	MLR	MRR*
1991	Q1	12.00	12.25	13.64	14.00–14.50	16.38	16.13	..
	Q2	12.00	11.00	12.81	13.25–14.50	15.54	15.37	..
	Q3	11.00	10.36	10.70	12.50	15.99	15.99	..
	Q4	11.00	6.70	7.46	10.50–11.50	14.66	14.66	..
1992	Q1	11.00	5.39	5.48	8.50–9.00	13.16	13.16	..
	Q2	11.00	6.34	7.66	8.00	12.06	12.06	..
	Q3	11.00	6.39	7.38	8.00–9.00	12.00	12.00	..
	Q4	11.00	5.95	7.21	7.50–9.50	11.80	11.80	..
1993	Q1	11.00	5.79	8.12	7.50–9.50	11.40	11.40	..
	Q2	10.00	7.53	8.60	7.50–9.50	11.25	11.25	..
	Q3	9.00	6.02	6.34	7.50	11.25	11.25	..
	Q4	9.00	3.55	3.10	6.50–7.00	10.95	10.95	12.50
1994	Q1	9.00	6.22	7.24	6.50–7.25	10.09	10.09	11.75
	Q2	9.00	7.49	8.00	7.50–8.75	10.44	10.44	11.75
	Q3	9.50	8.22	7.35	8.25–9.50	11.22	11.22	11.75
	Q4	9.50	7.27	6.41	8.75–10.00	11.54	11.54	12.00–12.25
1995	Q1	10.50	9.99	13.30	10.00–11.50	12.13	12.13	12.50–13.00
	Q2	10.50	11.29	11.41	10.25–12.00	13.43	13.43	13.00–13.50
	Q3	10.50	9.06	9.24	10.50–11.50	13.63	13.63	13.50–14.00
	Q4	10.50	9.25	10.17	10.50–12.50	13.83	13.83	14.00–14.50

Notes: B/R = Bank Rate (or Discount Rate)
R/P = Repurchase Rate (30 days)
I/B = Interbank Rate
D/R = Deposit Rate (3–6 months)
MOR = Minimum Overdraft Rate
MLR = Minimum Lending Rate
MRR = Minimum Retail Rate.

* Introduced from October 1993.

Source: Bank of Thailand Annual Bulletin (various issues).

liberalisation process allows greater flexibility for commercial banks and other financial institutions to adjust their interest rate policies to suit their strategies and financial environments. The task of maintaining stable money market rates has therefore become increasingly difficult.

(c) *Capital market developments*

Financial deregulation and reform have contributed significantly to the development of the Thai capital market. As shown in Table 3, market capitalisation as a percentage of GDP rose from 29.4% in 1990 to 85.9% in 1995. The SET (Stock Exchange of Thailand) index rose from 612.9 in 1990 to peak at 1,682.9 in 1993, before declining to 1,280.8 in 1995 in line with slowing economic activity. Meanwhile, the types of investor have widened to cover not only small investors but also institutional investors such as provident funds, mutual funds and insurance companies.

In parallel with this development, the private debt market has assumed an increasingly important role in the capital market. For the domestic market, new issues of debentures, which totalled Baht 8.8 billion in 1992, rose to Baht 50.5 billion in 1995 (Table 4). Convertible debentures

Table 3
Stock market indicators, 1990–95

	1990	1991	1992	1993	1994	1995
Number of quoted companies . . .	214	276	320	369	450	485
Capitalisation						
(in billions of baht)	613.5	897.2	1,485.0	3,325.4	3,300.8	3,564.6
(as a percentage of GDP)	29.4	35.8	52.5	105.1	91.8	85.9
New capital raisings ¹						
(in billions of baht)	17.5	55.1	55.7	55.1	137.2	122.9
Trading value						
(in billions of baht)	627.2	793.1	1,860.1	2,201.1	2,113.9	1,535.0
(as a percentage of capitalisation) .	102.2	88.4	125.3	66.2	64.0	43.1
Foreign/total turnover						
(in percentages)	14.4	8.2	7.2	17.0 ²	21.0 ²	26.3 ²
SET index (1975 = 100)	612.9	711.4	893.4	1,682.9	1,360.1	1,280.8
(percentage change)	-30.3	16.1	25.6	88.4	-19.2	-5.8
Average dividend yield						
(in percentages)	3.63	3.59	2.91	2.01	1.86	2.25
Average price/earnings ratio	13.81	15.59	16.29	26.09	19.51	19.75

¹ At market prices. ² Including transactions through sub-brokers.

Table 4
Issuance of private fixed income securities
 In millions of baht

	1991	1992	1993	1994	1995
1. Domestic issues					
1.1 Debentures	6,304.6	8,844.2	20,354.4	58,887.1	50,547.5
1.2 Bills of exchange issues by financial institutions ¹	0	0	0	0	38,723.3
1.3 Negotiable certificates of deposit ² (outstanding)	50.1	1,562.6	17,945.3	17,312.1	21,390.9
1.4 Floating rate notes (outstanding)	6,400.0	5,800.0	5,733.2	4,733.2	3,733.2
1.5 Commercial paper ³ (outstanding)	271,283.8	311,008.5	390,402.8	525,431.5	574,447.9
2. Overseas issues					
2.1 Debentures	0	0	31,229.9	50,448.6	34,975.1
2.2 Floating rate notes and floating rate certificates of deposit	n.a.	9,287.5	26,602.8	49,609.9	66,294.2
2.3 Negotiable certificates of deposit (outstanding)	n.a.	n.a.	65,706.0	65,712.0	78,261.0
2.4 Asian currency notes	0	0	1,000	1,300	2,130
3. Changes in commercial bank credit	313,500	365,000	501,200	800,400	837,300
4. (1.1) + (2.1) as a percentage of (3)	2.0	2.4	10.3	13.7	10.2

¹ Only those issued by finance companies and finance and securities companies. ² Only those issued by commercial banks. ³ Estimated from bills availed by commercial banks and finance companies and investment in bills of financial institutions, and Citi notes and IFCT notes outstanding.

increased eightfold during 1993–95, while unit trusts also grew markedly before registering more moderate growth in 1995.

The volume of fixed income instruments placed in overseas markets also rose sharply, owing mainly to the higher degree of capital mobility resulting from the liberalisation process. The volume of debentures rose by 61.5% in 1994. Total fixed income issues overseas increased from Baht 58.8 billion in 1993 to Baht 103.4 billion in 1995.

The Thai capital market has therefore emerged as a more sophisticated market, substantially integrated into the world market. The degree of linkage can be observed in the growth of net private capital inflows, which has been persistently large over the past few years. Portfolio investment rose from Baht 36.6 billion in 1989 to Baht 84.9 billion in 1995, of which Baht 53.6 billion was equity investment (Table 5).

The increased openness of the capital account has led to a higher degree of capital mobility, largely reflected in the growing importance over the years of offshore credits through the Bangkok International Banking Facilities (BIBF) and non-resident baht accounts. Since their introduction in 1993, BIBF credits have grown at an annual rate of around 5%, while non-resident baht deposits increased more than eightfold during 1985–95. A large part of non-resident baht deposits are intended for investment on the SET. With the growing importance of the capital market and more accessible overseas markets, firms therefore have a larger choice of external financing options, and households a wider range of saving options.

(d) Efficiency of the foreign exchange market

The degree of capital movement can also be observed in the volume of transactions in the foreign exchange market, both spot and forward. Since domestic interest rates tend to move in the same direction as foreign interest rates, the differential between the one-month repurchase rate and the one-month eurorate plus the forward premium tended to decrease during 1989–94, as shown in Graph 1. This suggests that activity in arbitrage should show a generally declining trend, reflecting improved market efficiency.

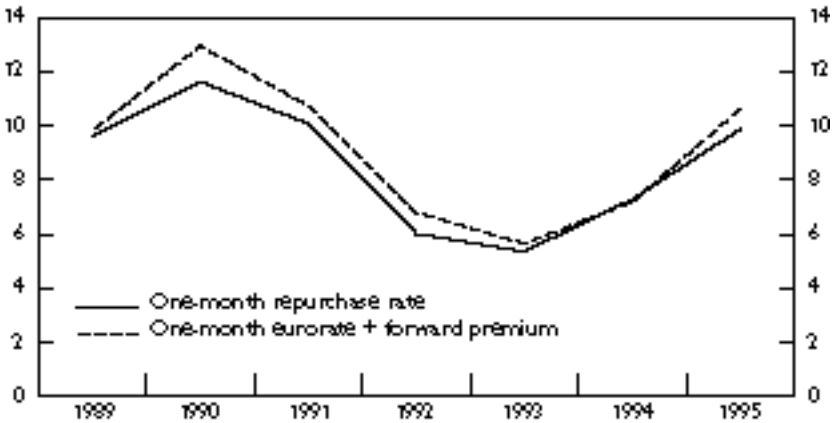
(e) Financing of activity in the private corporate sector

The opening of the capital account has allowed overseas fund-raising to become an increasingly important source of financing. Total external

Table 5
Net flows on private financial account
 In billions of baht

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
1. Banks	-14.2	-22.0	5.9	21.5	-7.7	40.9	-6.6	49.1	91.0	349.9	279.7
Commercial banks	-14.2	-22.0	5.9	21.5	-7.7	40.9	-6.6	49.1	-102.2	96.4	77.2
BIBFs	-	-	-	-	-	-	-	-	193.2	253.4	202.4
2. Non-banks	19.6	12.5	16.5	74.1	159.9	238.6	268.8	188.1	169.9	- 48.0	243.9
2.1 Direct investment	4.4	6.9	4.7	27.3	44.4	61.1	47.1	50.2	36.4	22.7	29.6
2.1.1 Foreign direct investment	4.4	6.9	9.0	28.0	45.7	65.0	51.4	53.7	43.8	33.2	49.7
2.1.2 Thai direct investment	-	-	- 4.3	-0.6	-1.3	-3.6	-4.3	-3.5	- 7.4	- 10.6	-20.1
2.2 Other loans	2.1	- 3.3	-16.0	4.6	46.9	114.9	143.7	69.2	- 61.2	-146.7	35.3
2.3 Portfolio investment	3.9	2.5	12.9	11.2	36.7	11.5	3.8	14.1	122.6	27.5	84.9
2.3.1 Equity securities	3.9	2.5	12.9	11.2	36.7	11.5	0.9	11.5	67.9	- 10.3	53.6
2.3.2 Debt securities	-	-	-	-	-	-	2.9	2.6	54.8	37.8	31.3
2.4 Non-resident baht accounts	10.8	9.7	10.6	21.7	28.1	34.3	52.4	44.5	67.8	51.1	87.9
2.5 Trade credits	- 2.0	- 3.6	3.7	8.7	3.1	15.2	19.0	7.8	13.6	11.4	8.3
2.6 Other	0.5	0.4	0.6	0.5	0.7	1.6	2.7	2.3	- 9.4	- 14.1	- 2.2
3. Total	5.4	- 9.4	22.4	95.6	152.2	279.4	262.2	237.2	260.9	301.9	523.6

Graph 1
One-month repurchase and eurorate
 In percentages



financing of Thai enterprises as a percentage of GDP rose from 15.7% in 1989 to 26.9% in 1995. As observed by Callen and Reynolds (1996), between 1980 and 1990 about two-thirds of investment is estimated to have been financed by internal funds. In 1991–95 the ratio fell to one-third. Within external finance, debt has been the most important financing source and, within this category, financial intermediaries predominate. At the same time, as the leverage ratio of firms increases, so too does the risk in their management because they become more susceptible to changes in overseas markets.

3. Channels of monetary policy transmission

The financial reform process has led to a close relationship of domestic money and capital markets with overseas markets and has complicated the task of implementing monetary policy. Moreover, the increased volatility of domestic interest rates and greater capital mobility have had a considerable impact on the real economy and have exerted pressure on the management of macroeconomic policy. Naturally, under the exchange rate arrangement in place until mid-1997, the coexistence of a fully independent monetary policy and perfect capital mobility has been

unattainable. The Bank of Thailand, therefore, needed to find an acceptable balance between monetary policy autonomy and openness of the capital account. To achieve that objective and formulate the appropriate monetary policy framework, it is necessary to understand how the real economy can be affected through the different channels of transmission of monetary policy.

(a) Credit availability effects

Following the introduction of the BIBF in 1993, borrowers now have more convenient access to foreign loans at a lower cost compared with domestic borrowing. As a result, the outstanding amount of commercial bank credits (including BIBFs and out-in lending) has risen sharply, from Baht 1,479 billion in 1990 to Baht 4,300.9 billion in 1995 (Table 6), and average credit growth during 1993–95 was almost 26% per year. The total private credits extended by commercial banks (including BIBF) and finance companies in 1995 accounted for 89.5% of total credit outstanding extended by all financial institutions in Thailand.

Although recent statistics show that about 90% of BIBF lending was used to finance productive sectors such as exports, manufacturing, trade and investment, the Bank deemed it necessary to restrain the excessive growth of BIBF lending by implementing a number of measures: first, BIBF units, besides commercial banks, are required to submit credit plans;

Table 6
Commercial bank credits and property registration fees
 In billions of baht

	Commercial bank credits	Property registration fees
1985	514.30	2.07
1986	532.20	2.14
1987	666.80	3.21
1988	849.90	5.81
1989	1,107.50	8.62
1990	1,479.00	13.97
1991	1,792.70	10.62
1992	2,161.70	11.81
1993	2,662.90	13.80
1994	3,463.30	16.80
1995	4,300.90	14.74

secondly, the minimum size of BIBF loans was raised from US\$ 0.5 million to US\$ 2.0 million; thirdly, under the regulation on net open foreign exchange positions, certain types of BIBF lending can no longer be treated as foreign assets; finally, short-term foreign borrowing by BIBFs is subject to a 7% reserve requirement. Finance companies have since 1995 also been required to submit credit plans consistent with the Bank's guideline. In parallel with these developments, the private sector has increasingly relied on direct financing and foreign borrowing. The importance of the credit availability effect therefore seems to have been eroded over time.

(b) Interest rate effects

Under the current exchange rate regime and given the close linkages between domestic and foreign money markets, domestic money market rates, in the long run, cannot be significantly different from US dollar interest rates. However, if measures to reduce capital mobility are introduced or the expected rate of exchange rate depreciation increases, a differential between domestic and foreign money market rates can persist. As mentioned in the previous section, the increased linkage between domestic and foreign money markets has reduced the Bank of Thailand's autonomy in conducting interest rate policy. Hence, the Bank has needed to implement price-based capital control measures to enable it to pursue a high interest rate policy to regain economic stability.

With a higher degree of leverage in the household and corporate sectors, partly caused by financial liberalisation, the interest rate is likely to become a more important channel of monetary transmission. Moreover, long-term interest rates, namely time deposit rates and the Minimum Lending Rate (MLR), are now more responsive to changes in short-term money market rates. Therefore, the Bank of Thailand's policy has been geared towards maintaining stability in interbank rates and repurchase market rates.

(c) Wealth effects

Since the period of financial liberalisation, there has been a greater range of financial assets in the portfolios of the household and corporate sectors. As indicated in Table 3, stock market capitalisation increased five-fold and the stock index rose by 121.9% during 1991–94. The participation of foreign investors also expanded significantly, as evidenced by the increase in the share of non-residents' transactions on the SET from 8.2%

of total turnover in 1991 to 21% in 1994. During the same period, the value of properties also registered a marked increase (Table 6). Property registration fees, which are the proxy for property prices, climbed by 58%. However, the rapid rise in wealth seemed to have a negative correlation with households' average propensity to save, i.e. the ratio of household saving to disposable income, which declined from 14% in 1987 to 7% in 1995.⁴ Although Thailand's national saving as a percentage of GDP has risen steadily, the contribution of the corporate sector to private saving has grown, while that of households has dropped significantly, especially since 1989. In other words, while there has been a declining trend in the average propensity to save of households, the household sector has also been receiving a somewhat smaller share of national income. A limited share of income, therefore, implies a limited contribution to national saving.

4. The transmission mechanism and some implications for real economic activity

The monetary transmission mechanism is usually defined by the impact of a change in the monetary policy instrument (e.g. the short-term interest rate or base money) on intermediate variables (such as broad money or domestic credit) and final objectives (output and inflation). This section examines a model using VARs⁵ to characterise the dynamic relationship between the key indicators in the economy in order to understand the monetary policy transmission mechanism in Thailand. A VAR model can be used to predict the impact of a shock in the interest rate and domestic credit on real economic activity. This study therefore aims to compare the impact of such a change before and after financial deregulation. To this end, a VAR was estimated using the interbank rate, domestic credit, the

⁴ For details, see Bank of Thailand (1996a).

⁵ A VAR model is a system of OLS equations that estimate how each variable is related to the lagged values of all variables in the system. For example:

$$\chi_t = \alpha_1 \chi_{t-1} + \alpha_2 \chi_{t-2} + \dots + \alpha_j \chi_{t-j} + \beta_1 Y_t + \dots + \beta_k Y_{t-k} + e_t$$

where χ = vector of endogenous variables
 Y = vector of exogenous variables
 e = vector of error terms

private investment index and the consumer price index.⁶ Exogenous variables introduced to isolate an external shock were LIBOR, an oil price index and the exchange rate. Monthly data for the period 1980:1–1996:6 were used. The study period was divided into two subperiods: 1980:1–1989:12 (before liberalisation) and 1990:1–1996:6 (after liberalisation).

Graphs 2 and 3 show the impulse response⁷ of domestic credit, the private investment index and the consumer price index to an “interbank rate shock”. Graph 2 demonstrates results for the period before the liberalisation. Domestic credit is predicted to rise to its initial value in three months and then to decline. The private investment index increases to its initial value in four months and then declines. The price index registers a steep fall for four months after the shock. The results for the period after liberalisation are given in Graph 3. Domestic credit is predicted to go down substantially for three months and then to rise slightly, with some fluctuations throughout the period. The private investment index increases after the shock and starts to decline after month six. However, the pattern of change in the private investment index seems to be a random walk, which implies that an “interbank rate shock” has no effect. The price index is predicted to remain almost unchanged for four months and then to increase substantially.

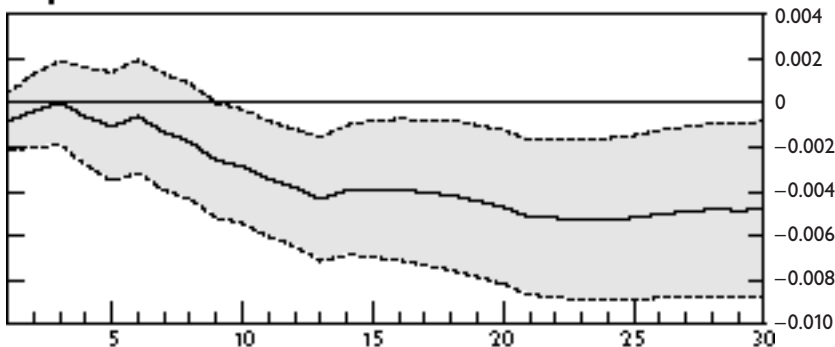
The impulse responses of economic variables to a “domestic credit shock” are analysed in Graphs 4 and 5 for the period before and after financial liberalisation, respectively. Graph 4 shows the results for the period before liberalisation. The interbank rate is predicted to rise substantially for three months and then to decline. The private investment index increases slowly for three months after the shock. The price index starts to rise in month two, then declines in month four. The results for the period after liberalisation are shown in Graph 5. The interbank rate is

⁶ These variables are listed in the order used, i.e. a shock of the interbank rate at time t can affect all variables in the system at t . However, the implications of VARs have some limitations, in view of the limited number of observations that are generally available in macroeconomic analysis and introduction of several lags of each variable can consume a lot of degree of freedom, especially for the period of post-liberalisation.

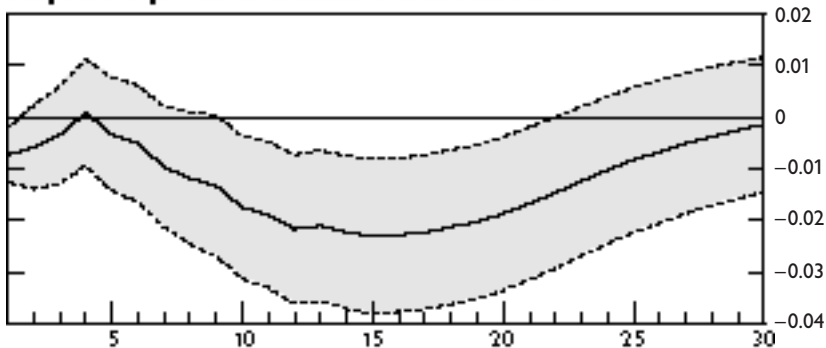
⁷ In VARs, it is not always easy to interpret each coefficient, especially since the signs of the coefficients sometimes alternate. Therefore, the impulse response functions in the VAR model are shown. Eight lags of endogenous and exogenous variables were included in the VAR estimated. All variables appearing in this study were used in terms of logs except the interbank rate and LIBOR, where the log of domestic credit, the private investment index and the CPI are INDCREDIT, INPRI and INCP, respectively.

Graph 2
Impulse responses to an interbank interest rate shock*
 Pre-liberalisation

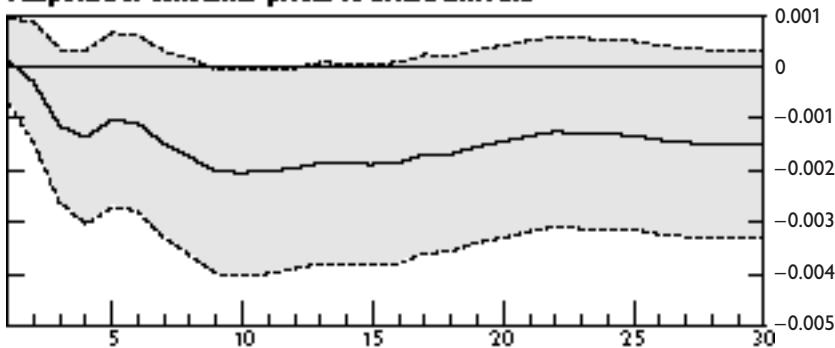
Response of domestic credit to interbank rate



Response of private investment to interbank rate



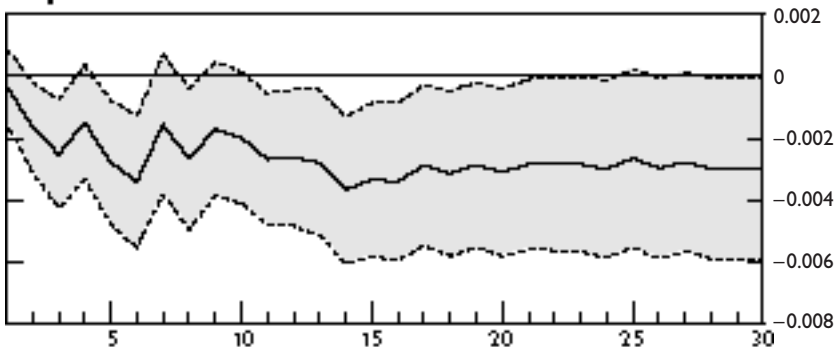
Response of consumer prices to interbank rate



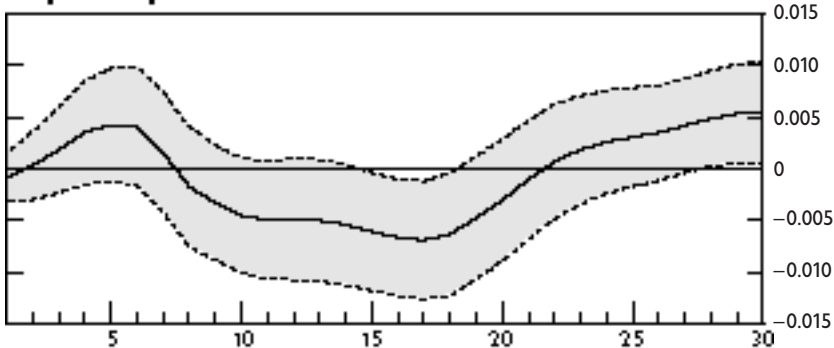
* Response to a one-standard deviation innovation ± 2 standard errors.

Graph 3
Impulse responses to an interbank interest rate shock*
 Post-liberalisation

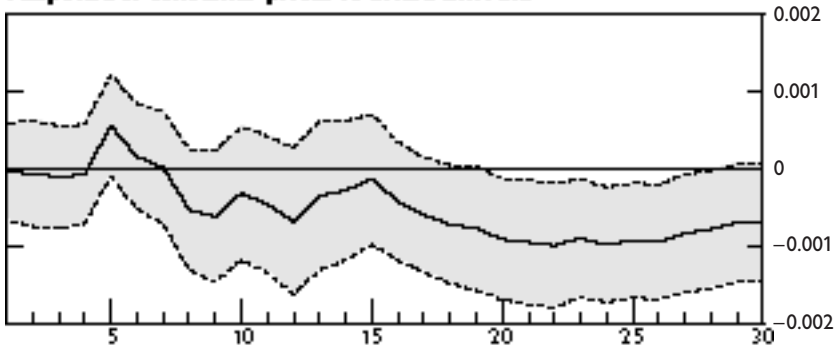
Response of domestic credit to interbank rate



Response of private investment to interbank rate



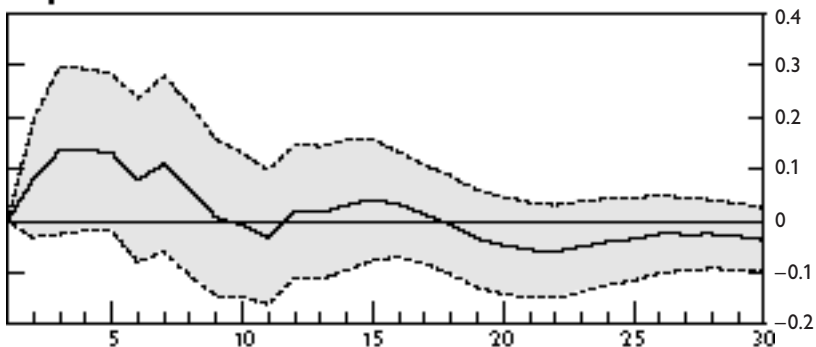
Response of consumer prices to interbank rate



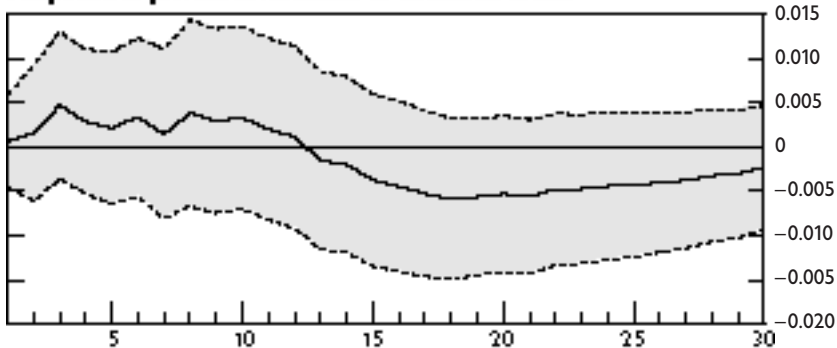
* Response to a one-standard deviation innovation ± 2 standard errors.

Graph 4
Impulse responses to a domestic credit shock*
 Pre-liberalisation

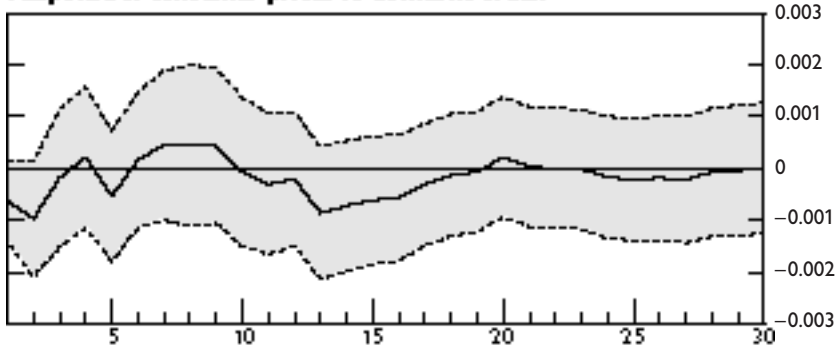
Response of interbank rate to domestic credit



Response of private investment to domestic credit



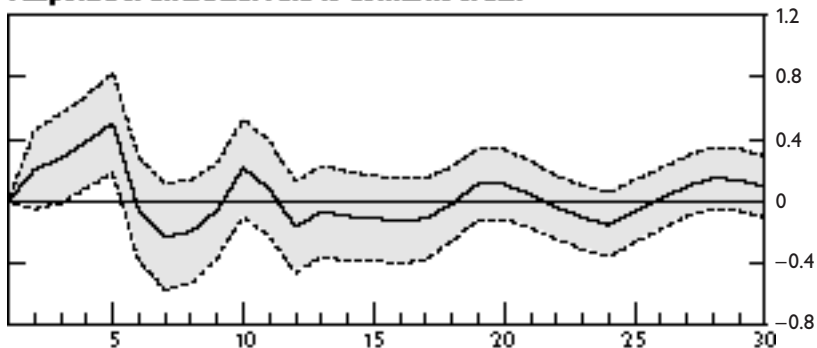
Response of consumer prices to domestic credit



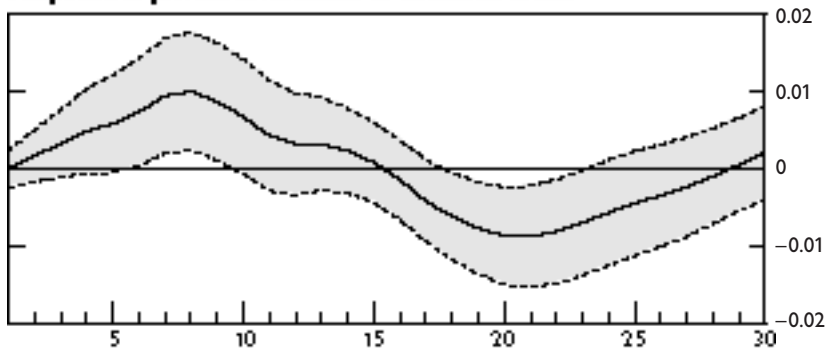
* Response to a one-standard deviation innovation ± 2 standard errors.

Graph 5
Impulse responses to a domestic credit shock*
 Post-liberalisation

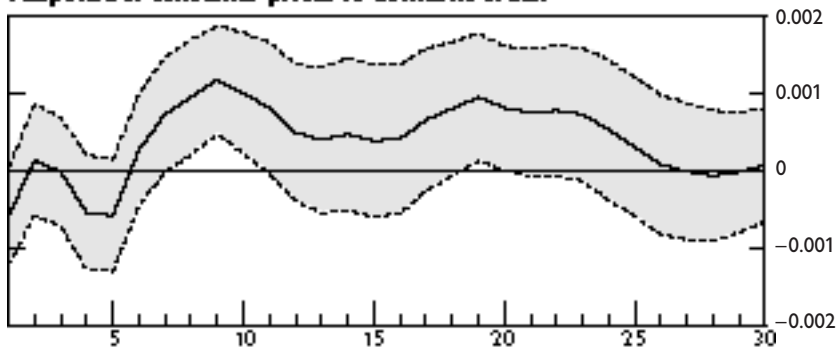
Response of interbank rate to domestic credit



Response of private investment to domestic credit



Response of consumer prices to domestic credit



* Response to a one-standard deviation innovation ± 2 standard errors.

predicted to rise substantially for five months and then to fall steeply. The private investment index goes up gradually for eight months and then declines. The price index is predicted to increase for two months and then to decrease.

As shown in Graphs 2 and 3, the responses of the economic activity variables to the “interbank rate shock” seem to be more distinctive after the liberalisation in 1990. Domestic credit starts to go down immediately. The “interbank rate shock” seems to have no effect on the private investment index after liberalisation. This may be due to the greater reliance on foreign financing. The adjustments of domestic credit and the price index seem to be more sensitive to shock after liberalisation. According to Graphs 4 and 5, the responses of all variables to the “domestic credit shock” are more significant after financial liberalisation. However, the patterns of change of all three variables are similar to the random walk in both periods. This implies that the “domestic credit shock” has no effect on all three variables in both periods. In all, interest rate policy seems to be more efficient than credit policy, especially after financial liberalisation.

5. Improving monetary controls

Although monetary policy management has so far proved adequate in influencing domestic financial conditions, new instruments for monetary control are needed in order to cope with the huge and volatile movement of foreign capital. As noted in two recent empirical studies,⁸ the scope for sterilisation is found to be somewhat limited in the long run, although in the short run there appears to be some room for monetary policy. As a result, the Bank of Thailand has widened its range of market-based monetary policy instruments so as to improve the effectiveness of monetary management. In this regard, starting with foreign exchange swaps, new methods of monetary operations have been used more actively, so as to better influence the liquidity of the money market. Bank of Thailand bonds with maturities ranging from one month to two years have been auctioned every Friday since August 1995. This approach provides the Bank of Thailand with an additional channel to absorb liquidity on its own

⁸ See the studies by Robinson, Byeon and Teja (1991) and Schadler, Carkovic, Bennett and Khan (1993) quoted in Nijathaworn (1995).

initiative and provides an essential operational framework that will help develop the securities market. In this connection, the planned appointment of primary dealers and outright purchases or sales of securities by the Bank of Thailand will be another significant development, as it will provide an important means of influencing the liquidity of the banking system and short-term interest rates. Finally, efforts to further develop the foreign exchange market will be intensified so that it can better withstand volatility and adverse shocks. On a broader scale, closer cooperation among regional central banks to exchange views and enter into liquidity support arrangements should help ensure financial stability within the region.

6. Conclusion

After a period of difficulty during 1979–84 and a period of consolidation in 1985–86, the Thai economy recorded unprecedented economic growth in the following four years. In parallel with this development, major steps were taken to liberalise the financial sector so that the momentum of economic growth could continue into the future.

The effects of financial liberalisation on the financial system and the economy as a whole have many facets. It is quite clear that financial liberalisation has spurred the pace of financial deepening and broadening and helped create a wider range of financial assets in the portfolios of the household and corporate sectors. It has also brought about a closer linkage between domestic and foreign markets. However, the task of monetary management has become more complex, with a lower degree of autonomy. As suggested by the impulse response functions of economic activities to a “domestic credit shock” in the VARs estimated, it is inadequate to monitor commercial banks’ credits amidst the increasing popularity of direct financing and foreign borrowing. In addition, with respect to the study of the “interbank rate shock” using the VAR model, although domestic interest rates have become a major channel of monetary transmission, they are largely influenced by foreign interest rates. It also appears that the “interbank rate shock” has no impact on private investment. Moreover, the wealth effect seems to exert a stronger impact on household saving behaviour, and needs to be a major consideration in the conduct of monetary policy.

Annex I

Major financial liberalisation and reforms

April 1975	The Securities Exchange of Thailand begins trading (name changed to the Stock Exchange of Thailand (SET) in 1991).
1979	The repurchase market is established to help develop the money market and facilitate the free flow of money between foreign exchange and domestic markets, and to serve as a vehicle for the implementation of monetary policy.
March 1985	The Bank of Thailand encourages commercial banks to introduce BIBOR – Bangkok Interbank Offered Rate – as a reference for the pricing of floating rate loans to customers.
May 1985	Controls on the opening of letters of credit are lifted.
1986	The interest rate ceiling on credit to priority sectors is lifted.
June 1989	The interest rate ceiling on time deposits with a maturity of more than one year is lifted.
March 1990	The interest rate ceiling on time deposits with a maturity of one year or less is abolished.
May 1990	Acceptance of obligations under Article VIII of the IMF's Articles of Agreement and relaxation of foreign exchange controls by liberalising all current account transactions and reducing restrictions on capital movements.
April 1991	Second-stage liberalisation of foreign exchange controls, including more liberal outward transfer of funds for investment, provision for foreign investors to repatriate investment project dividends and proceeds from sales of stocks.
January 1992	Removal of the interest rate ceiling on savings deposits. Revision of the rural credit policy.
March 1992	Expansion of the scope of activities of commercial banks, finance companies and securities companies. Enactment of the Securities and Exchange Act (B.E. 2535).
June 1992	Ceilings on savings deposit rates and all lending rates are abolished.
January 1993	Adoption of the Basle standard (capital to risk asset ratio) for commercial banks.

March 1993	The Bangkok International Banking Facility (BIBF) is established. Participants may provide three types of service: banking to non-residents in foreign currencies and baht ("out-out" transactions), banking to domestic residents in foreign currencies only ("out-in" transactions), and international financial and investment banking services.
July 1993	The first credit rating agency, Thai Rating and Information Services (TRIS), is established.
August 1993	The Export-Import Bank of Thailand Act (B.E. 2536) is promulgated, to be effective from 7th September 1993. The EXIM Bank is established in February 1994.
October 1993	Commercial banks are required to announce the Minimum Lending Rate (MLR), the Minimum Retail Rate (MRR) and the maximum margin to be added to the MRR as a reference rate for customers other than those eligible for the MLR.
February 1994	Third round of the liberalisation of foreign exchange controls. <ol style="list-style-type: none"> 1. The limit on the amount of baht that can be taken out to countries sharing a border with Thailand, and to Vietnam, is raised from Baht 250,000 to Baht 500,000. 2. The limit on the amount of foreign currency that may be taken out when travelling abroad is abolished. 3. The limit on the amount of foreign investment by Thai residents requiring no prior approval from the Bank of Thailand is raised from US\$ 5 million to US\$ 10 million. 4. Residents are permitted to use foreign exchange originating from abroad to service external obligations without surrendering it or depositing it in a domestic banking account.
March 1994	Finance companies and finance and securities companies are permitted to open credit offices outside the Bangkok area.
May 1994	Conditions are drawn up for BIBFs to open branches outside the Bangkok area.
July 1994	Adoption of Basle standards for finance companies. Finance companies are required to maintain a 7% capital/risk asset ratio.
August 1994	Finance companies are allowed to open representative offices abroad. BIBFs are authorised to open provincial branches. Guidelines are issued on the separation of finance business from securities business.
November 1994	The Bond Dealers' Club is set up to function as a secondary market for debt instruments.

February 1995	The Cabinet approves the Financial System Development Plan (1995–2000) drawn up jointly by the Bank of Thailand, the Ministry of Finance and the Securities and Exchange Commission.
March 1995	Adjustment of the new calculation of the MRR based on total deposit cost.
May 1995	Adoption of the Basle guidelines for commercial banks on risk management in derivatives trading. Finance companies are authorised to mobilise funds from the public by issuing bills of exchange (B/Es). The minimum amount of each domestic B/E is Baht 10 million. Finance companies may also issue B/Es abroad after seeking approval from the Bank of Thailand. Crédit foncier companies are allowed to operate as loan service agents. Guidelines on mobilising funds in the form of contractual saving are issued.
July 1995	Commercial banks are permitted to act as customers' unsecured debenture holder representatives.
August 1995	Commercial banks are required to hold no less than 7% of non-resident baht accounts in the form of demand and time deposits at the Bank of Thailand.
September 1995	Adjustment of the measurement of net foreign exchange exposure for Thai banks.
October 1995	Finance companies are authorised to issue bills of exchange and certificates of deposit in foreign currency on the offshore market with a maturity of not less than one year.
January 1996	New guidelines are adopted for central bank lending to commercial banks, finance companies and finance and securities companies. The loan window is henceforward operated via repurchase agreements instead of securities pledging.
March 1996	Announcement of the issuance of long-term Bank of Thailand bonds: 1. Bonds with a maturity of one year will be auctioned every two months for Baht 1,000 million each, effective April 1996. 2. Bonds with a maturity of two years will be auctioned every quarter for Baht 500 million each, effective June 1996. Institutions qualified to participate in the auction include commercial banks, finance companies, the Government Savings Bank and the Financial Institutions Development Fund.
May 1996	Adoption of a 100% ratio for provision against doubtful debt for finance companies, finance and securities companies, and crédit foncier companies.

June 1996	Short-term offshore borrowing by financial institutions is subject to a 7% liquidity requirement.
July 1996	The new electronic clearing system (ECS) begins operation.
October 1996	The first-tier capital/risk asset ratio for commercial banks is raised from 5.5 to 6%, and the overall capital/risk asset ratio to 8.5%. The capital/risk asset ratio of finance companies is increased from 7.0 to 7.5%, with the existing ratio for first-tier capital, effective 1st January 1997. (From 1st January 1998, the overall capital/risk asset ratio will increase to 8%, with the ratio for first-tier capital at 5.5%.)
November 1996	Upgrading of seven new foreign BIBFs to full branch status.

References

- Bank of Thailand, Economic Research Department (1996a): "Private saving in Thailand". *Bank of Thailand Economic Focus*, 1(2), April–June.
- Bank of Thailand, Economic Research Department (1996b): "Analysing Thailand's short-term debt". *Bank of Thailand Economic Focus*, 1(3), July–September.
- Callen, Tim and Patricia Reynolds (1996): "Capital market developments and financial deregulation in Thailand and Malaysia: implications for financial structure and the monetary transmission mechanism". International Monetary Fund.
- Chotewattanakul, Jinda et al. (1994): "Monetary policies and strategies". *SEACEN Course Paper*, Kuala Lumpur, Malaysia.
- Duriyaprapan, Chittima (1995): "Deregulation process: the Thai experience". Paper presented at *ASEAN Banking Council Conference Workshop on Treasury*, the Philippines.
- Duriyaprapan, Chittima and Mathec Supapongse (1996): "Financial liberalization: case study of Thailand", in Monetary Authority of Singapore: *Proceedings of the 12th Pacific Basin Central Bank Conference on "The Impact of Financial Market Development on the Real Economy"*. Singapore, 18th–20th December 1996.
- Hataiseree, Rungsun (1993): "The demand for money in Thailand: a cointegration and error-correction approach". *Singapore Economic Review*, 38(2), pp. 195–230.
- Hataiseree, Rungsun (1995a): "Capital mobility, sterilization and monetary policy: some evidence from Thailand since 1980". *Papers on Policy Analysis and Assessment*, Bank of Thailand, pp. 27–51.
- Hataiseree, Rungsun (1995b): "Financial liberalization and its effect on monetary policy: Thailand's recent evidences". *Chulalongkorn Review* (7), pp. 102–19.
- Nijathaworn, Bandid (1995): "Capital flows, policy response, and the role of fiscal adjustment: the Thai experience". *Papers on Policy Analysis and Assessment*, Bank of Thailand, pp. 13–26.
- Robinson, D., Y. Byeon and R. Teja (1991): "Thailand: adjusting to success: current policy issues". *IMF Occasional Paper*, No. 85, International Monetary Fund.
- Schadler, S., M. Carkovic, A. Bennett and R. Kahn (1993): "Recent experiences with surges in capital inflows". *IMF Occasional Paper*, No. 108, International Monetary Fund.
- Subhaswadikul, Mathinee (1995): "Determination of short-term interest rate and the degree of financial openness: a case study of Thailand". *Papers on Policy Analysis and Assessment*, Bank of Thailand, pp. 80–96 (in Thai).
- Sucharitakul, C. and V. Arromdee (1994): "An evaluation of Thailand's financial reform". *Papers on Policy Analysis and Assessment*, Bank of Thailand, pp. 72–100 (in Thai).
- Wibulswasdi, Chaiyawat (1995): "Strengthening the domestic financial system". *Papers on Policy Analysis and Assessment*, Bank of Thailand, pp. 1–12.