

Changes in the monetary transmission mechanism in Thailand

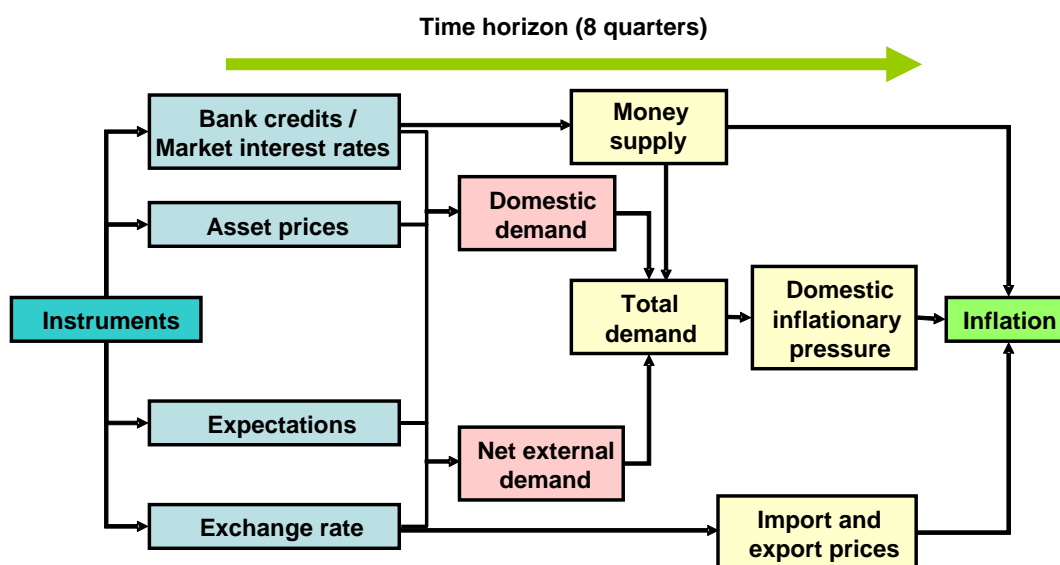
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1. Introduction

The Bank of Thailand (BOT) implements monetary policy through its influence on the selected key policy rate. The Monetary Policy Committee (MPC) has the responsibility for setting the appropriate rate that it believes will keep inflation within the target range. Once set, the rate change will affect monetary conditions through several channels of the transmission mechanism, including market interest rates, credits, asset prices, expectations and the exchange rate (Figure 1). The effect is gradual but expanding through changes in domestic demand and net exports, eventually hitting production and inflation.

Figure 1

Transmission mechanism of monetary policy



Disyatat and Vongsinsirikul (2002)¹ found that, for the period 1993–2001, the interest rate channel played the dominant role in Thailand and accounted for almost half of the total transmission to the real sector, while the credit channel, exchange rate channel and asset prices channel each contributed to the pass-through of monetary policy by around

¹ This study uses VAR analysis on quarterly data over the period 1993–2001, including the policy rate, GDP and proxy variables for each channel. In measuring a channel's impact from an interest rate impulse, the paper compares the impact with that particular channel closed (by exogenizing the representative channel variable) to the impact with that channel opened (by endogenizing that representative channel variable). The difference represents the impact of the channel of interest. Key results from the exercise are presented in Appendix A.

17 percent. It should be noted, however, that the pass-through via the credit channel declined after the financial crisis in 1997, due to the weakened banking sector. In other words, the estimated results from the period covering the years immediately following the crisis were likely to find a less significant pass-through via the credit channel compared to normal circumstances.

This paper aims to highlight significant changes in Thailand's transmission mechanism after the financial crisis of 1997 and during the recent monetary policy tightening cycle from mid-2004 onward. The interest rate and credit channels are discussed together, followed by the exchange rate channel and the asset prices channel. Conclusion remarks are presented in the last part.

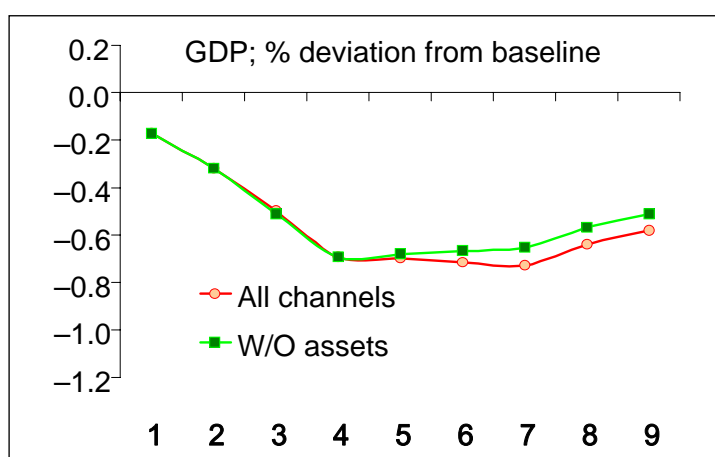
2. Channels of monetary policy transmission

2.1 Interest rate and credit channels

Traditionally, interest rate and credit channels – whereby the central bank's monetary decision influences economic activities through market, especially bank, interest rates and bank lending – are the dominant monetary policy transmission channels in Thailand. As confirmed by the estimated magnitude of monetary policy transmission using the Bank of Thailand Macroeconometric Model (BOTMM) and 1994–2002 data, the interest rate channel alone accounted for more than half of the total transmission from monetary policy to economic activities (Figure 2). Moreover, Disyatat and Vongsinsirikul (2002) wrote, “in addition to the traditional interest rate channel, the results ... point to a transmission mechanism in which banks play an important role. The exchange rate and asset price channels have been less significant by comparison”. The conclusion is not surprising given the economy's heavy reliance on the banking sector.

Figure 2

**Monetary policy transmission – interest rate channel
using BOTMM Jan 03 and the 1994Q1–2002Q3 sample period**

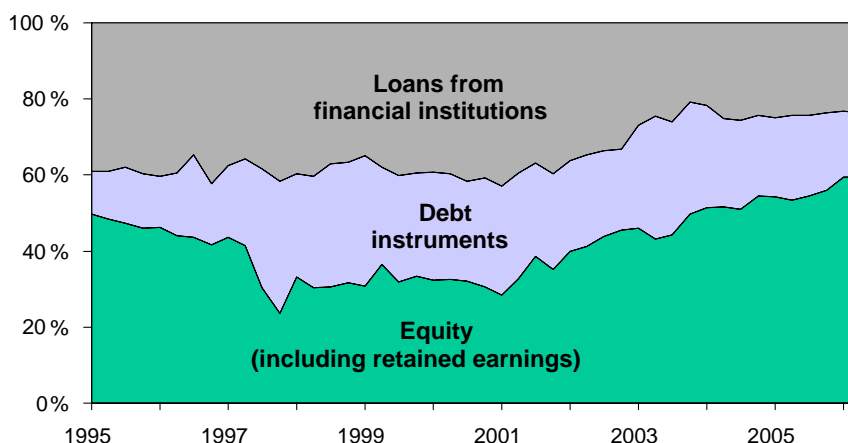


Source: Sriphayak and Vongsinsirikul (2006).

As shown in Figure 3, in 1995 as much as 40 percent of listed firms' financing was in the form of loans from financial institutions, and most likely the proportion was far higher for smaller firms, which had limited access to the equity and debt markets. Meanwhile, monetary policy transmission via bond holdings was muted by the limited supply of government bonds

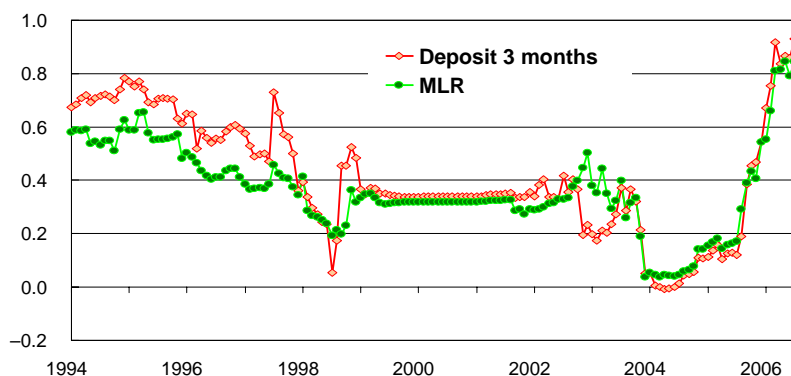
in the market, as the government was running budget surpluses between 1988 and 1996. Incidentally, total bonds outstanding accounted for less than 10 percent of GDP in 1995. In addition, the asset prices channel was restricted by limited participation of households in the equity market.

Figure 3
Sources of corporate financing



Source: Stock Exchange of Thailand and BOT staff calculations.

Figure 4
Pass-through¹ from 14-day repo to retail rates



¹ Using the **dynamic multiplier method**, ie, regressing Δ Deposit3m (or MLR) on Δ RP14d (contemporaneous and lagged) and lagged Δ Deposit3m (or MLR) with a rolling window of 50 observations.

Source: BOT staff calculations.

The financial crisis of 1997 brought about significant changes to the economy, including how monetary policy was transmitted. As shown in Figure 4, the pass-through from the 14-day

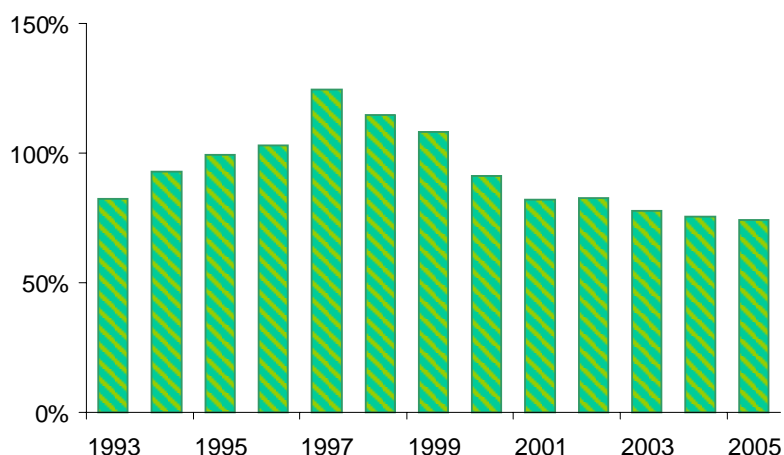
repo rate² to retail rates of commercial banks went down in the period following the financial crisis, with the stickiness of policy pass-through being most evident around 2004 and early 2005, when the policy rate had already been hiked by 125 basis points and large banks had not raised retail rates at all in response. Policy pass-through picked up quite strongly starting in late 2005, and by 2006 had even surpassed the degree of pass-through in the pre-crisis period.

This section of the paper aims to explain the factors which accounted for the significant decline in the pass-through and its subsequent pick-up as mentioned above.

Structural changes of the economy after the financial crisis

Important changes took place in the Thai economy following the 1997 financial crisis. Very clear at the time was the increase in the degree of risk aversion in both the corporate and banking sectors. For example, with the exchange rate experiencing unprecedented volatility, the corporate sector became far more cautious with regard to foreign borrowing. Banks' exposure to high-risk sectors, such as real estate, took a serious toll on their financial health, leading to far stricter lending practices in the post-crisis period. While the decline in economic activities was a key factor behind the shrinking of bank loans, increased risk aversion in the economy joined in and also pushed down the ratio of bank loans to GDP (Figure 5).

Figure 5
Bank loans to GDP



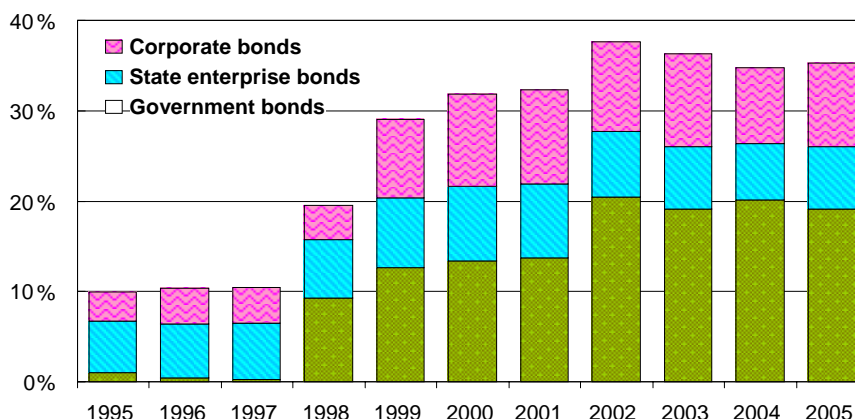
Source: Bank of Thailand.

Another evident change was the increase in the supply of debt instruments (Figure 6). While government bonds were issued to finance the budget deficit as tax revenues contracted along with economic activities and government spending was eventually used to stimulate the economy, corporate bonds rose as quality firms circumvented the banking sector in search of financing.

² The 14-day repo rate became the policy rate in May 2000, when the BOT first adopted inflation targeting as its monetary policy framework. Prior to that, the central bank was under a fixed exchange rate regime up until June 1997 and used monetary targeting between July 1997 and April 2000. Although the 14-day repo rate was not used formally to send the policy signal, it moved in line with other money market rates and responded quickly to the central bank's policy actions, which was aimed at maintaining either the exchange rate parity or some level of monetary growth.

Figure 6

Ratio of bonds outstanding to GDP

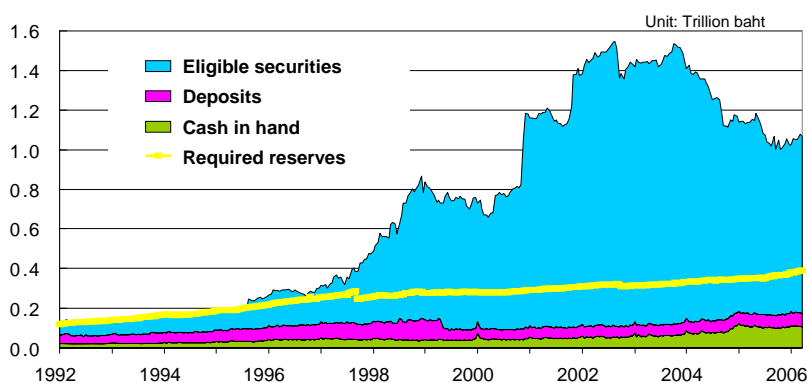


Source: BOT and National Economic and Social Development Board (NESDB).

Together, the heightened risk aversion and greater availability of debt instruments led to a very different structure of banks' balance sheet compared to the pre-crisis years. In particular, banks' asset composition switched from loans to the real sector toward liquid assets, ie securities holding, and with that their holdings of liquid assets ballooned far beyond prudential and liquidity requirements to levels not seen before (Figure 7). Banks also switched from being net borrowers in the pre-crisis period to being net lenders in the post-crisis period, with the BOT doing most of the borrowing on behalf of the Financial Institutions Development Fund (FIDF), which had incurred heavy losses in the attempt to restore stability to the financial system in 1997.

Figure 7

Banks' liquid asset holdings



Source: Bank of Thailand.

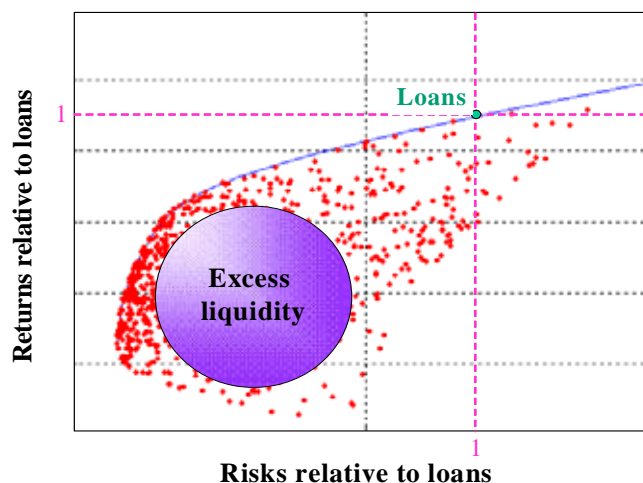
“Excess liquidity” and impaired transmission through the banking sector

The BOT uses the term “excess liquidity” to try to capture the idea that banks would have preferred to use part of the massive assets held in liquid form for other purposes, such as for lending at higher returns, but for some reason, for example soft loan demand, could not do so and thus are forced to maintain higher-than-desired levels of liquid assets. In that case, money market and bond investments, which are typically associated with lower risks and

accordingly lower returns compared to loans, would be considered excess liquidity if their risk-adjusted returns are less attractive to banks than that of loans. Graphically, liquid assets which are “excess” would be in the interior of the risk-returns frontier, as illustrated in Figure 8. The further an asset is from the frontier, the more “excess” it would be.

Figure 8

Risk-returns frontier of different bank assets



The presence of excess liquidity would then interfere with monetary policy transmission because the marginal increase in the policy interest rate would not tempt banks to raise their retail rates. In particular, banks would not want to hike deposit rates to mobilize more funds, for loan extension (the desired asset class) has not been constrained by the lack of funds and thus doing so would only raise their excess liquidity holding, making them hold even more of the undesirable asset class. What the marginal increase in the policy interest rate would do, however, is to raise the risk-adjusted returns of money market and bond investments slightly,³ nudging them closer to the frontier in Figure 8 and thereby bringing excess liquidity down a little.

Where excess liquidity is sizeable, the policy interest rate may have to be brought up significantly before the risk-adjusted returns of money market and bond investments reach the frontier. Once there, an additional increase in the policy interest rate would trigger a move in banks’ retail rates because banks are now willing to hold liquid assets. They would raise deposit rates to mobilize funds and use those funds to expand their money market and bond investments – not necessarily loans – in the asset portfolio. They may also raise retail lending rates to maintain their interest spread and profits. At that point, monetary policy transmission would resume.

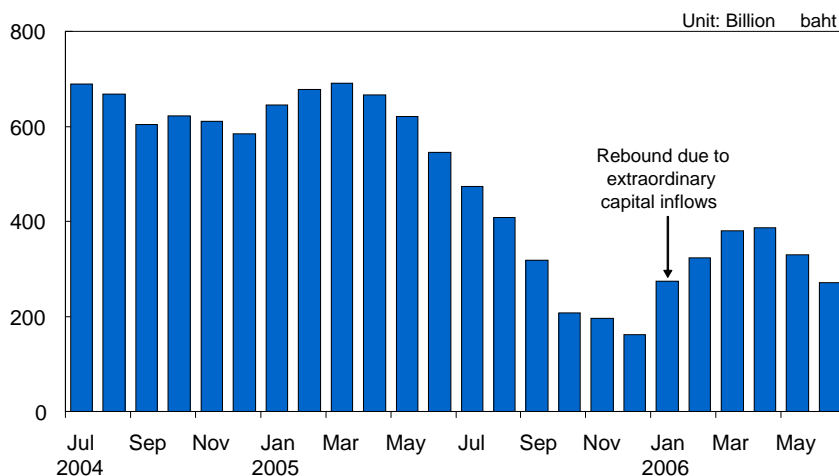
The above story illustrates the mechanism whereby policy transmission works through the asset side of banks’ balance sheet. This route may not be typical under normal circumstances, where banks usually are net borrowers in the money market and hence an increase in the policy interest would raise their funding cost more or less quickly, encouraging them to seek alternative sources of funds such as deposit mobilization through more attractive deposit rate offers (Figure 9). However, the “excess liquidity” concept has been useful in explaining what happened in Thailand in late 2004 and early 2005, when the interest rate pass-through took significantly longer than before.

³ Money market rates and short-term bond yields track the policy interest rate closely in Thailand.

excess liquidity associated with such liquid asset holdings in banks' portfolios was estimated to be close to 700 billion baht (Figure 11). And it was not until that amount was reduced by approximately half in the third quarter of 2005 that the interest rate pass-through began to pick up noticeably. It should be cautioned, however, that the estimated figures might not be numerically precise due to some assumptions on the risk-adjusted returns of each asset class in the calculation of excess liquidity. Nevertheless, the general direction of the estimated figures is consistent with the estimated degree of interest rate pass-through as presented in Figure 4.

Figure 11

Estimated excess liquidity



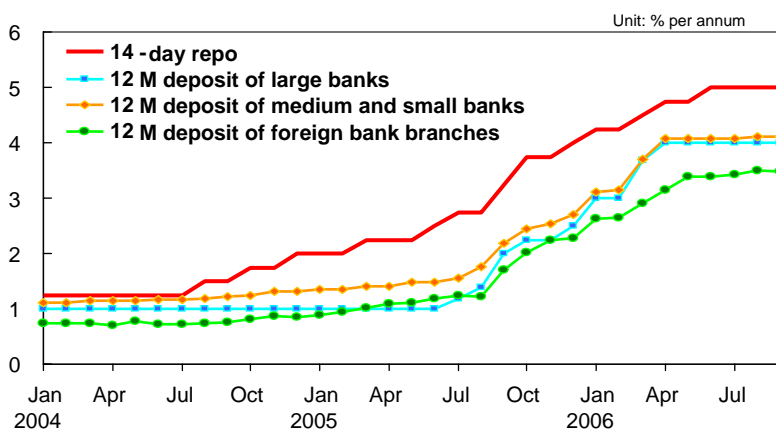
Source: BOT staff estimates.

Large banks, small banks

Another piece of evidence to support the validity of the excess liquidity story is the difference in the time lag of interest rate pass-through between large and small banks. Although the banking sector as a whole had considerable excess liquidity in hand, that liquidity was not distributed evenly among banks. While large banks were loaded with excess liquidity, smaller banks and foreign bank branches were still net borrowers in the money market. The increases in the policy rate put pressure on their funding costs, causing them to raise their deposit rates in order to mobilize funds sooner than large banks, by about one quarter (Figure 12).

Figure 12

Policy and retail interest rates

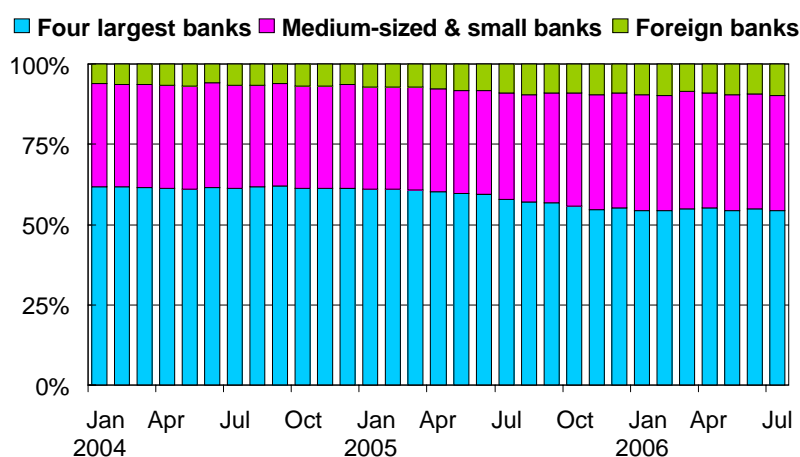


Source: Bank of Thailand.

The earlier increase in the deposit rates of medium-sized and small banks caused deposits to move away from large toward smaller banks. Facing an erosion of market share (Figure 13) and keener competition, as indicated by the decline in the Herfindahl index (Figure 14), large banks on the one hand felt the pressure to preserve their market share. On the other hand, the policy interest rate had meanwhile risen considerably and the risk-adjusted returns on money market investments as well as bond holdings started to become attractive. Therefore, even though loan growth did not accelerate significantly, large banks became interested in mobilizing deposits to expand their liquid asset holdings. As the two factors combined, large banks started to compete aggressively for funds, and the interest rate pass-through picked up very quickly from the latter half of 2005 onward.

Figure 13

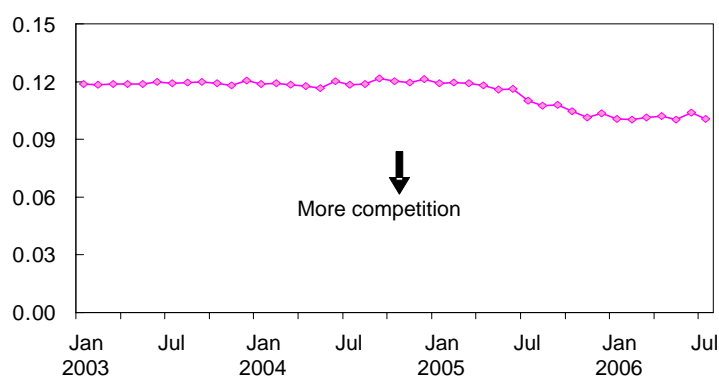
Share in the deposit market



Source: Bank of Thailand.

Figure 14

Herfindahl index for deposit market



Source: BOT staff calculations.

Interest rate pass-through via other routes

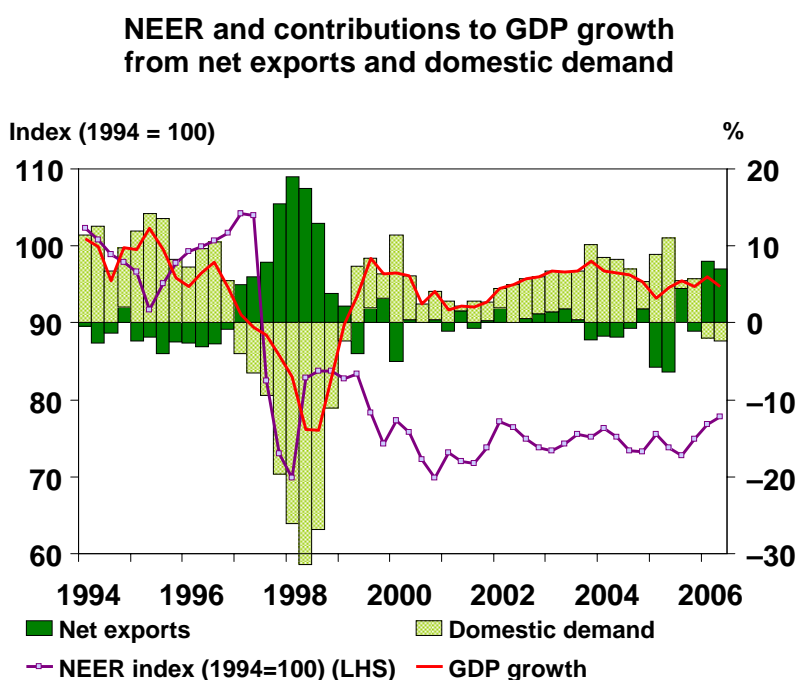
Aside from the weaker monetary policy transmission via the banking sector, other routes of interest rate pass-through strengthened in the post-crisis period. Greater participation in the

bond market by households and firms, as evidenced by the higher shares of households' holdings of debt securities to GDP and increased direct borrowing by firms (Figures 3 and 6), allowed changes in the policy rate to influence households' wealth and firms' cost of funding directly. However, given that the shares of such households and firms were still small, the increase in pass-through via these routes was unlikely to offset the decline in pass-through via the banking sector in the post-crisis period up to mid-2005.

2.2 Exchange rate channel

The exchange rate has played a prominent role in Thailand's monetary policy implementation as it can have a significant impact on inflation and the real economy through external competitiveness and foreign investors' sentiment, as is typical in a small economy open to both trade and capital flows. Although domestic demand has been the major contributor to GDP growth, prior to as well as after the financial crisis in 1997, net exports often provides a cushion for GDP growth when domestic demand temporarily softens, as seen in the first half of 2006 (Figure 15).

Figure 15



Source: Bank of Thailand.

This section aims to shed light on monetary policy transmission via the exchange rate channel in Thailand. The analysis is divided into two parts: firstly, the pass-through from the policy interest rate to the exchange rate, and secondly, the pass-through from the exchange rate to the real economy.

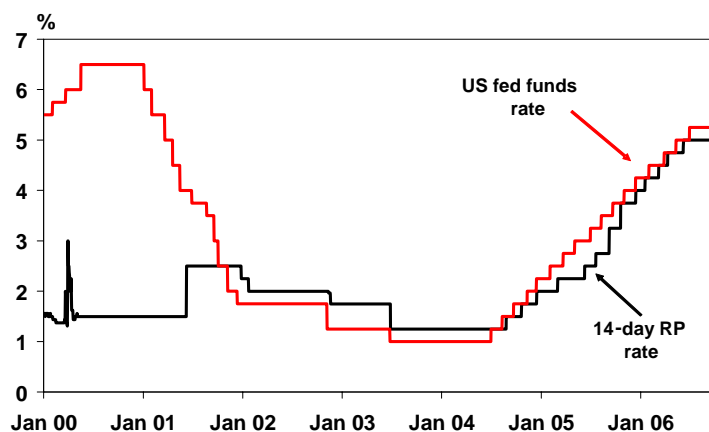
Pass-through from the policy interest rate to the exchange rate

According to the conventional view, when a central bank changes its policy rate, returns on domestic investments relative to foreign investments also change. Such interest rate differential drives capital flows and thus the relative exchange rate. As a result, a central bank often keeps the interest rate differential stable to help maintain capital account stability and keep the bilateral exchange rate from being too volatile for the economy.

During Thailand's most recent tightening cycle, against the backdrop of higher inflation risks from persistently high oil prices and satisfactory economic expansion, the 14-day repo rate rose from the trough of 1.25 percent per annum as of end-July 2004 to 5 percent as of end-October 2006, as shown in Figure 16. At the same time, the US fed funds rate was raised from its historical low of 1 percent per annum as of end-May 2004 to 5.25 as of end-October 2006. Consequently, at end-2006 Q3, the interest rate differential between the two countries was 25 basis points.

Figure 16

14-day repo rate and US fed funds rate

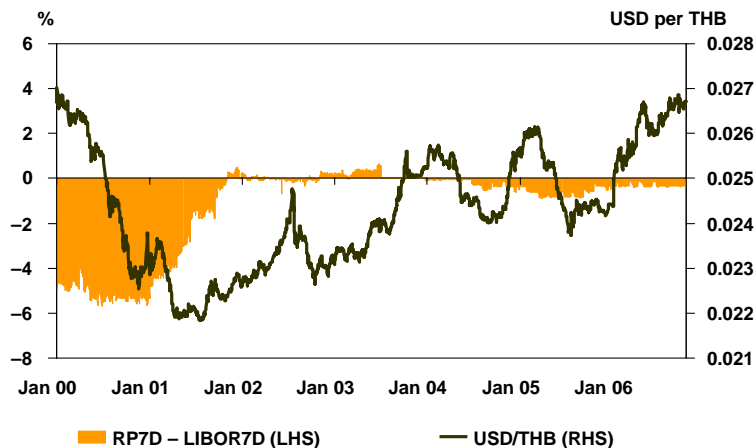


Source: Bank of Thailand.

Although the interest rate differential, which was quite large during 2000–2004, was consistent with the Thai baht's movements against the US dollar in 2000–2001 (Figure 17), it has not been the only reason for the exchange rate adjustments from 2002 onward. Despite a stable interest differential, the Thai baht continues to appreciate against the US dollar, supported by the deterioration in market sentiment over the US twin deficits and thus the US dollar, as well as market speculation on the Chinese renminbi revaluation, for which the Thai baht is a proxy currency in the eyes of investors. Both factors have brought about large capital inflows into the region and the trend appreciation in the Thai baht along with other regional currencies, as reflected in the improving capital account balance since 2001 and positive net capital inflows into Thailand since the second quarter of 2004 (Figure 18).

Figure 17

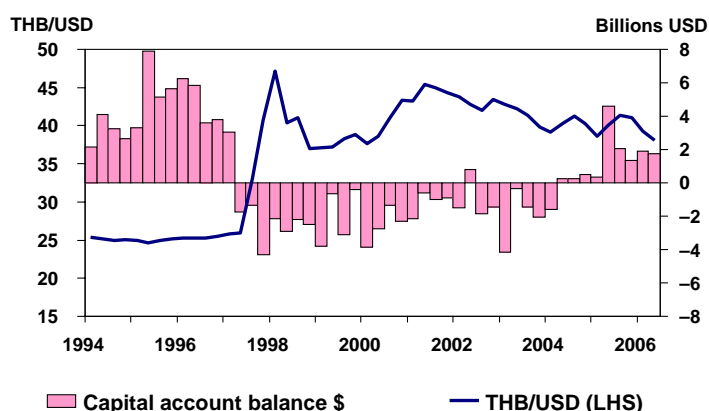
Thai-US interest rate differential and the exchange rate



Source: Bank of Thailand.

Figure 18

Capital flows and the exchange rate

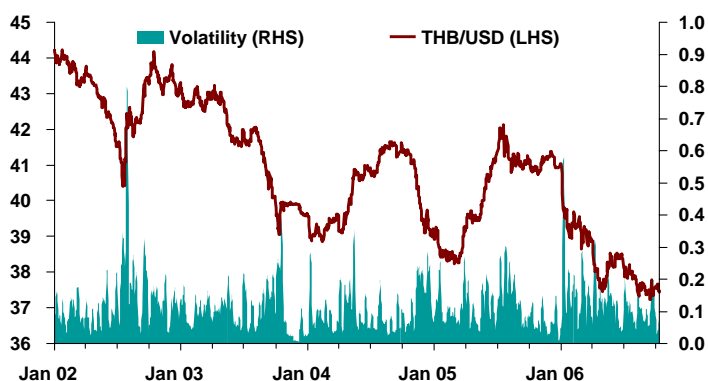


Source: Bank of Thailand.

The above empirical evidence is consistent with the conclusion drawn by the BOT's study that appeared in the October 2004 Inflation Report. The study concluded that unless the interest rate differential was sufficiently large, its impact on the exchange rate would be small compared to the daily exchange rate volatility. In particular, an increase in the policy rate of 25 basis points would cause the baht to appreciate by only 0.02 percent,⁴ marginal compared to the daily exchange rate fluctuation of 0.3 percent (Figure 19). Extending the sample to September 2006 gave a similar result. While the estimated impact of the interest rate differential increased slightly, it remained significantly lower than the daily exchange rate volatility.

Figure 19

Exchange rate and volatility



Source: Bank of Thailand.

In conclusion, the Thai baht exchange rate appears to be determined by a number of factors, the interest rate differential being just one of them. The impact of the interest rate differential

⁴ According to the econometric relationship, a 1 percent increase in the interest rate differential induces an appreciation of the exchange rate by 0.088 percent with 90 percent confidence.

$$D(\text{FX}) = -1.996\text{e-}06 \cdot D(\text{BP}(-1)) + 0.153 \cdot D(\text{YENDOLLAR}) - 0.088 \cdot \text{INTDIFF} + [\text{AR}(1)=0.426].$$

$$\text{GARCH} = 0.003 - 0.060 \cdot \text{RESID}(-1)^2 + 1.027 \cdot \text{GARCH}(-1).$$

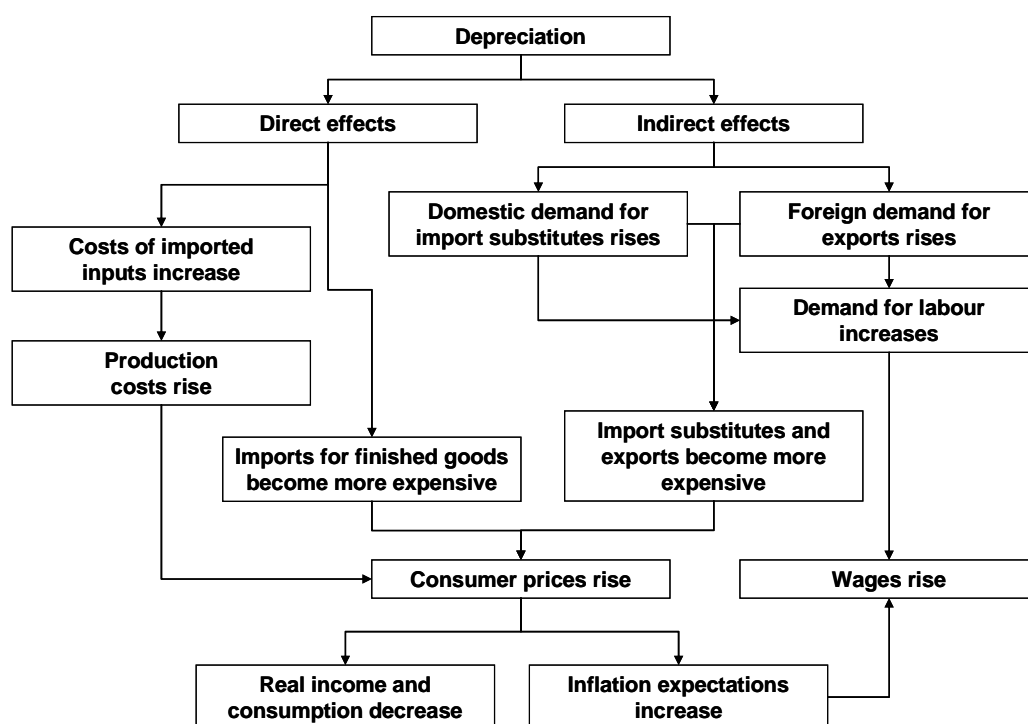
is also likely to be small and easily swamped by the exchange rate variability. Therefore, investors appear not to care much about the interest rate differential unless it becomes significantly wider than the present gap.

Pass-through from the exchange rate to inflation and the real economy

In general, as depicted in Figure 20, changes in the exchange rate transmit directly, and most likely quite quickly, to consumer prices via changes in the costs of imported inputs and finished goods. The magnitude and speed of pass-through depend on the prevailing demand conditions, price adjustment costs, and perceived persistence of the depreciation/appreciation. On the other hand, indirect or second-round effects on consumer prices occur over a longer period of time, through changes in the composition or levels of demand between domestic goods and import substitutes due to shifts in the country’s external competitiveness or via inflation expectations of wage bargainers and price-setters due to adjustments of the domestic production level by firms.

Figure 20

Pass-through from exchange rate to consumer prices

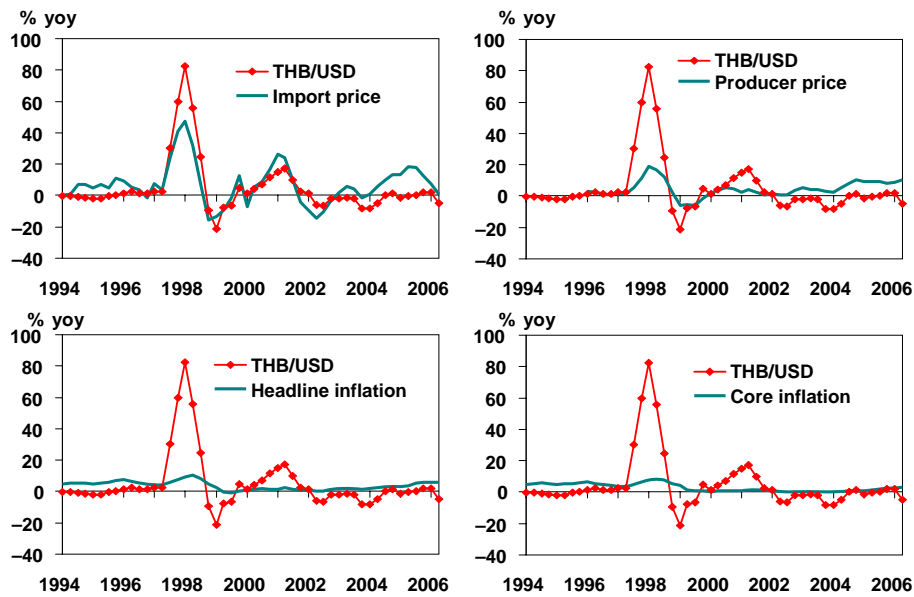


Source: Buddhari and Chensavasdijai (2003).

An analysis of the degree of exchange rate pass-through to consumer prices in Thailand was carried out by Buddhari and Chensavasdijai (2003). Using data from the period 1991–2003, they concluded that the degree of pass-through varied significantly. In particular, the pass-through declined at each stage along the pricing chain. That is, shocks to the exchange rate had the biggest impact on import prices in baht terms, followed by producer prices, headline consumer prices, and then core consumer prices (Figure 21). While import prices adjusted rapidly and completely to variations in the exchange rate, domestic consumer prices did not respond fully, even in the long run. The degree of pass-through also tended to vary across sectors, reflecting differences in the share of import content. Extending the study period to cover the most recent data shows that the degree of exchange rate pass-through to consumer prices has increased slightly (Table 1). Nonetheless, it is still small compared to the pass-through to import and producer prices.

Figure 21

Exchange rate pass-through to prices in Thailand along the pricing chain



Source: Bank of Thailand.

Table 1

Exchange rate pass-through coefficients

(1991–2003)	Response horizon (Quarters)		
	1	4	8
Local currency import price	0.79	1.86	1.79
Producer price	0.19	0.64	0.87
Headline CPI	0.06	0.23	0.34
Core CPI	0.04	0.15	0.26

Source: Buddhari and Chensavasdijai (2003).

(1995–2005)	Response horizon (Quarters)		
	1	4	8
Local currency import price	0.75	1.63	1.55
Producer price	0.22	0.67	0.76
Headline CPI	0.07	0.26	0.35
Core CPI	0.05	0.24	0.35

Source: Bank of Thailand.

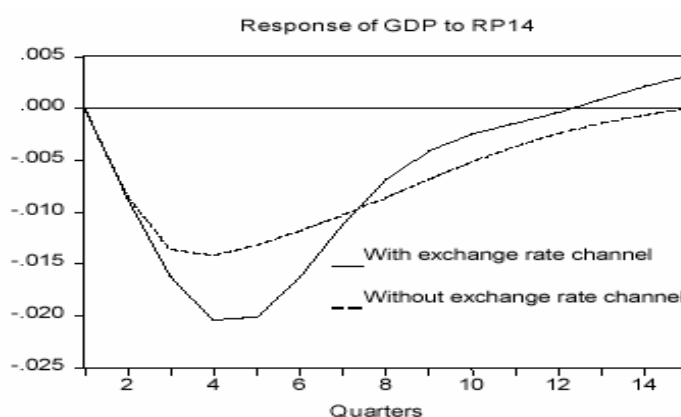
Buddhari and Chensavasdijai (2003) suggested a number of explanations for the fairly low exchange rate pass-through to consumer prices. Among them were the evolution in firms' pricing strategy, which depended in turn on the degree of firms' market power, the adoption of inflation targeting, which helped to anchor inflation expectations, and the increased prevalence of administered prices.

Monetary transmission via the exchange rate channel

Disyatat and Vongsinsirikul (2002) suggested that the exchange rate channel was not very strong in Thailand. Using a vector auto-regression (VAR) approach (Figure 22), they compared the response of output to innovations in the BOT's policy rate (RP14) with and without the real exchange rate endogenized. With the exchange rate channel blocked off, the output response was dampened somewhat, with the trough output being around 0.5 percent of baseline higher than the case where the exchange rate channel was allowed to operate. But given that the study was conducted over 1993–2001, which included a substantial period when the Thai baht was fixed, this result is not entirely surprising. Focusing on the post-fixed exchange rate period, a subsequent study by the BOT found that the significance of the exchange rate in propagating monetary policy shocks tended to increase.

Figure 22

Exchange rate channel



Source: Disyatat and Vongsinsirikul (2002).

In addition, Sriphayak and Vongsinsirikul (2006) used the BOTMM⁵ estimated in January 2003 (BOTMMJan03) and July 2006 (BOTMMJul06)⁶ to examine the relative importance of each monetary policy transmission channel, including the exchange rate channel, by following the same concept as that used in the aforementioned VAR approach.⁷ Their results (Figure 23) suggested that, along with the interest rate channel, the exchange rate channel was

⁵ The BOTMM is an ECM-approach system of equations covering four economic sectors, namely real, government, external and monetary sectors, and prices. It is used as the official economic forecasting tool at the BOT.

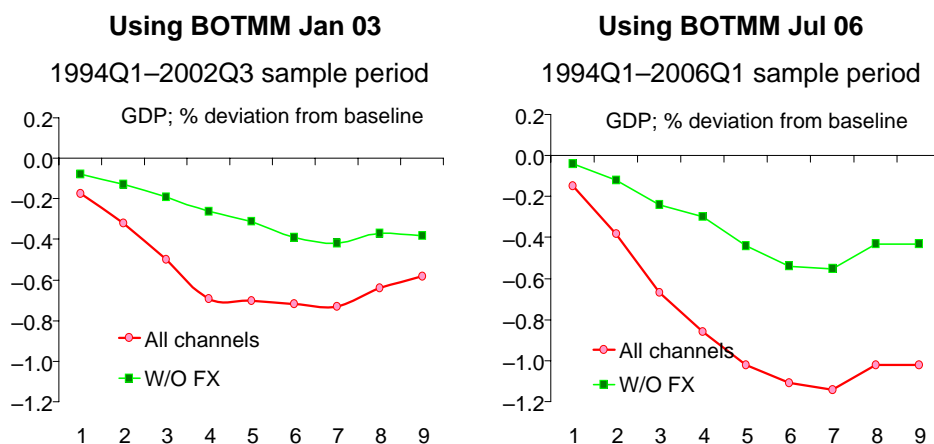
⁶ Key results for all transmission channels are shown in Appendix B.

⁷ As in Disyatat and Vongsinsirikul (2002), the study compared GDP responses to an innovation in the policy rate (a permanent shock of one standard deviation or approximately 1.75 percent) between the model with all transmission channels and the model with the channel of interest blocked off. The difference would be the impact of the channel of interest.

important and its influence on the economy became more prominent when more recent data were included in the model estimation.

Figure 23

Monetary policy transmission – exchange rate channel



Source: Sriphayak and Vongsinsirikul (2006).

In summary, the Thai economy, which is small and highly open, is inevitably affected by exchange rate changes. Although the role of interest rate differentials in the determination of the exchange rate is not substantial and tends to be overwhelmed by exchange rate volatility, the exchange rate channel is still quite important to both inflation and GDP growth under the floating exchange rate regime, and the impact appears to have increased in recent years.

2.3 Asset prices channel

A monetary tightening can dampen equity prices by making equity relatively less attractive compared to bonds (since interest rates rise), as well as worsening the earnings outlook for firms (since household spending declines). Lower equity prices lead in turn to a drop in the financial wealth of households and therefore lower consumption. They also reduce the market value of firms relative to the replacement cost of capital and thus delay investment (Tobin's q effect).

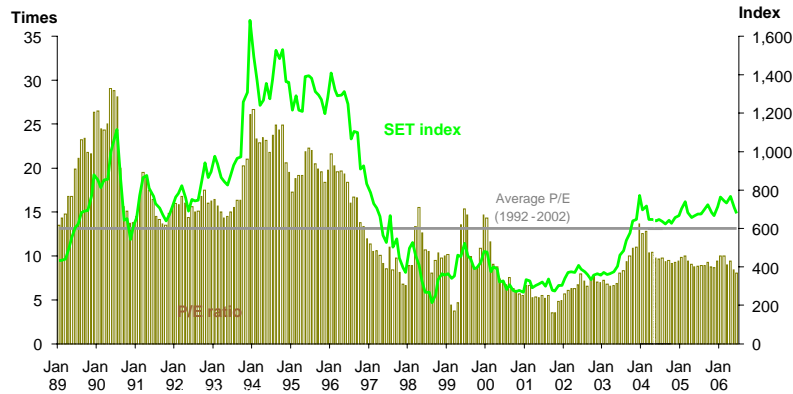
This section of the paper focuses on asset price adjustments during Thailand's recent monetary tightening cycle that began in August 2004, and the development of asset prices as one of the monetary policy transmission channels.

Equity prices or financial wealth

After a strong economic recovery, particularly in 2003 during which the Thai stock market gained 116 percent, the stock market began to level off in 2004 (Figure 24). This slowdown was attributed in part to avian flu, unrest in the southern provinces, oil price volatility, and tsunami. In early 2005, the stock market picked up again, though far more gradually than in 2003. However, there is thus far no sign of overheating in the equity market. The P/E ratio towards the end of the first half of 2006 stayed at around 8 percent. The low P/E ratio relative to Thailand's historical average of 14 percent before the 1997 financial crisis and to those of other regional markets – 16 percent for Malaysia and Singapore and 18 percent for the Philippines – suggests that there is potential for a further rally in the stock market.

Figure 24

Stock index and P/E ratio



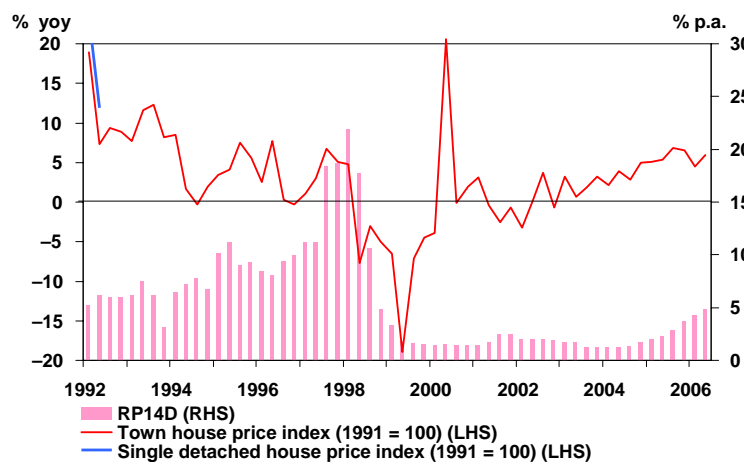
Source: The Stock Exchange of Thailand.

Property prices or physical wealth

As shown in Figure 25, housing price indices have been growing continuously since 2003, benefiting from the low interest rate environment and homeowners' greater access to bank loans together with some government stimulus measures related to a property transfer tax reduction which was scheduled to expire by the end of that year. Increased demand for housing due to these factors boosted commercial banks' housing loans. As a result, personal housing credits or mortgage loans grew by 19 percent in 2003, compared to 12.6 percent in 2002. This fast acceleration of housing credits led to the issuance by the BOT of new prudential guidelines regarding the property sector in December 2003.⁸ The stricter prudential guidelines together with the expiration of the transfer fee reduction have caused overall real estate activities to somewhat slow down since then. However, house prices have continued to rise, partly as a result of higher construction and transportation costs.

Figure 25

Housing price indices and the 14-day repo rate

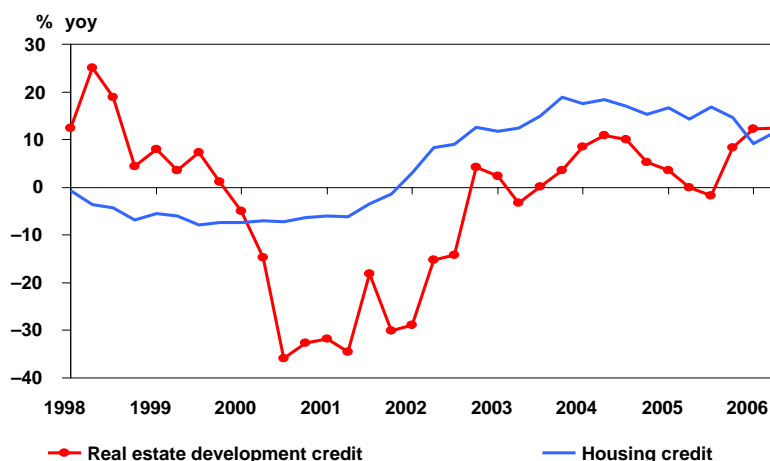


Source: The Stock Exchange of Thailand.

⁸ In December 2003, the BOT issued prudential guidelines for real estate loans to encourage financial institutions to become more cautious in extending real estate credits in order to avert market speculation. Key guidelines were (1) lowering the post-construction loan-to-value ratio to 70 percent for residential property with a transaction price exceeding 10 million baht, and (2) reporting to the BOT all new real estate loans over 100 million baht.

Figure 26

Real estate credits



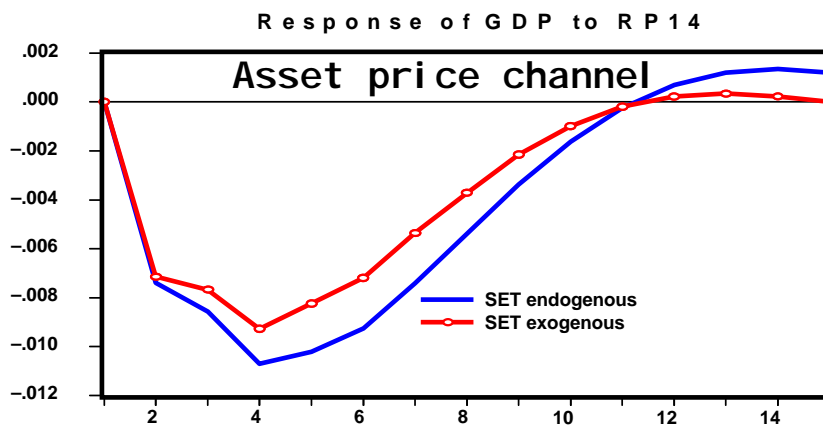
Source: Bank of Thailand.

Monetary transmission through the asset prices channel

There are a few studies by the BOT on the issue of monetary transmission via the asset prices channel. An analysis using the VAR approach was undertaken by Disyatat and Vongsinsirikul (2002). They found that the role of equity prices, specifically the Stock Exchange of Thailand's price index (SET), in the monetary policy transmission mechanism was less important than other channels during the period 1993–2001. A monetary tightening (corresponding to a rise in the policy rate by one standard deviation or around 200 basis points) led to an immediate but small fall in equity prices of approximately 4 percent that lasted for about six quarters, while innovations in stock prices by 16 percent boosted output by at most only 0.4 percent from the baseline. Therefore, not surprisingly, exogenizing the stock index dampened the response of GDP only slightly, as shown in Figure 27. Moreover, the accumulated responses suggested that movements in equity prices accounted for only around 17 percent of the total impact on output after two years.

Figure 27

Monetary policy transmission using VAR approach – asset prices channel



Source: Disyatat and Vongsinsirikul (2002).

The study explained this minimal impact by the fact that firms' reliance on equity financing was not very significant compared with bank loans and debt instruments, while stock holdings also made up only a small fraction of the household sector's wealth. Thus, at the macro level, both private investment and private consumption did not respond significantly to changes in equity prices. However, the study suggested that, given continued developments in the capital market in Thailand, monetary policy transmission through equity prices was expected to strengthen going forward.

For policy transmission via housing prices, the most recent study by Sriphayak and Vongsinsirikul (2006), using the BOTMM and cross-correlation analysis,⁹ suggested, firstly, that **equity prices were more sensitive to interest rate changes than property prices** and, secondly, that **the asset prices channel in Thailand – including both equity and property prices – gained in effectiveness but remained weaker than other transmission channels.**

The low sensitivity of property prices to interest rate changes could be explained by the following reasons. Firstly, homeownership in Thailand is not very high in an international comparison (53 percent in Bangkok compared with about 70 percent in the UK and US). Secondly, demand for property is more responsive to other factors, such as income growth and tax reduction, than interest rate changes, especially in the case of a marginal change from a very low level during 1999–2002. Thus, a positive relationship between interest rates and price indices of townhouses with land was found during that period, dampening the negative effect of interest rate changes on house prices for the whole period of the study. Finally, since the present value of an asset depends on the future stream of earnings from that asset and future interest rates, the interest rate as a discounted factor should have the same impact on both equity and property prices. However, while the future stream of earnings from equity holdings depends on the investors' view of economic prospects, which also varies with interest rates, that from property holdings depends less on interest rates since a house purchase is often considered a necessity. This makes equity prices more sensitive to interest rates than property prices.

From the July 2006 BOTMM, a 10 percent increase in the policy rate leads to a fall of 0.6 percent in physical wealth (property prices) and a fall of 1.4 percent in financial wealth (equity holdings) from the baseline after a year, confirming that financial wealth is much more responsive to changes in the policy rate than physical wealth. In addition, 10 percent increases in the house price index and equity prices cause output to deviate by 0.05 and 0.1 percent from the baseline in a year's time, respectively. That is, the wealth effect from equity prices is stronger than from property prices, though both routes are still considered small.

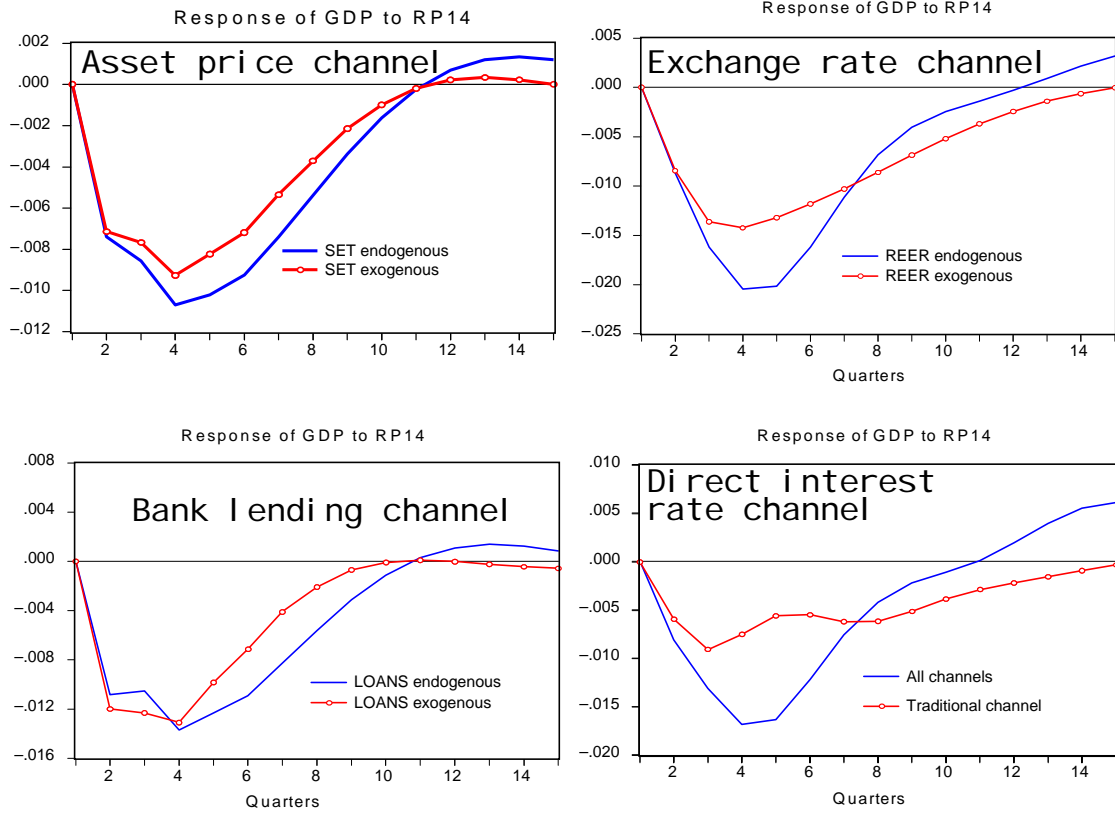
3. Conclusion

The financial crisis of 1997 brought about significant changes to the economy, including the monetary policy transmission mechanism. While the interest rate channel is generally the most important transmission channel in Thailand, its relative importance declined significantly for quite some time in the post-crisis period due to a heightened degree of risk aversion, in both the corporate and banking sectors, and excess liquidity in the banking sector. In the most recent period, however, there is evidence to suggest that this channel is regaining strength.

⁹ Results from the pair-wise cross-correlation approach by Sriphayak and Vongsinsirikul (2002) are shown in Appendix C.

Meanwhile, the **exchange rate channel** and **asset prices channel** have become relatively more important in the post-crisis period. For asset prices in particular, transmission via equity prices tends to be more important than via property prices, though both remain modest compared to the interest rate and exchange rate channels. However, the role of asset prices in transmitting monetary policy should strengthen going forward as households participate more actively in these asset markets and the assets constitute a growing portion of the household sector's total wealth.

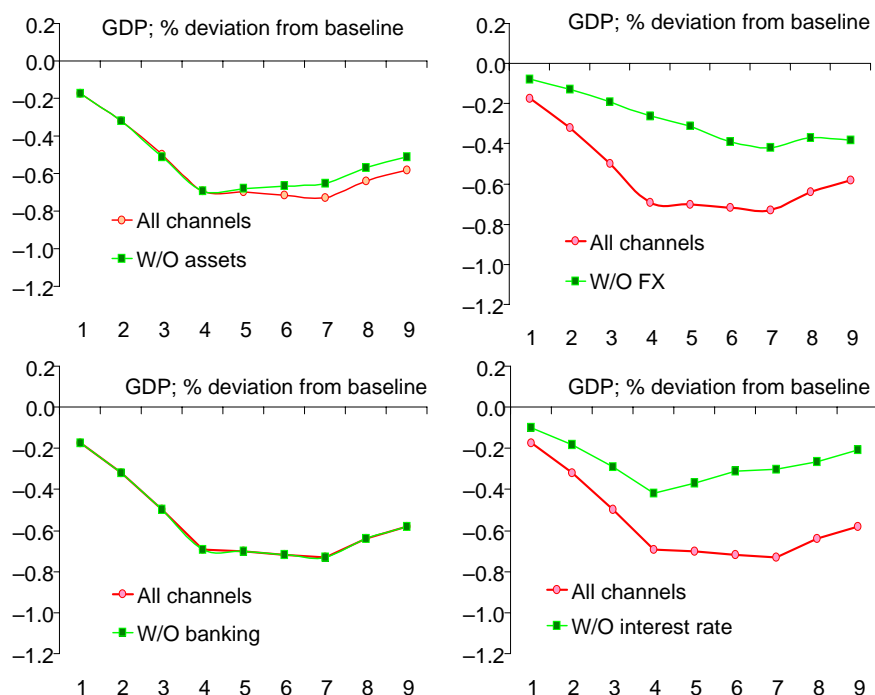
Appendix A: Relative importance of monetary policy transmission channels using VAR approach¹⁰



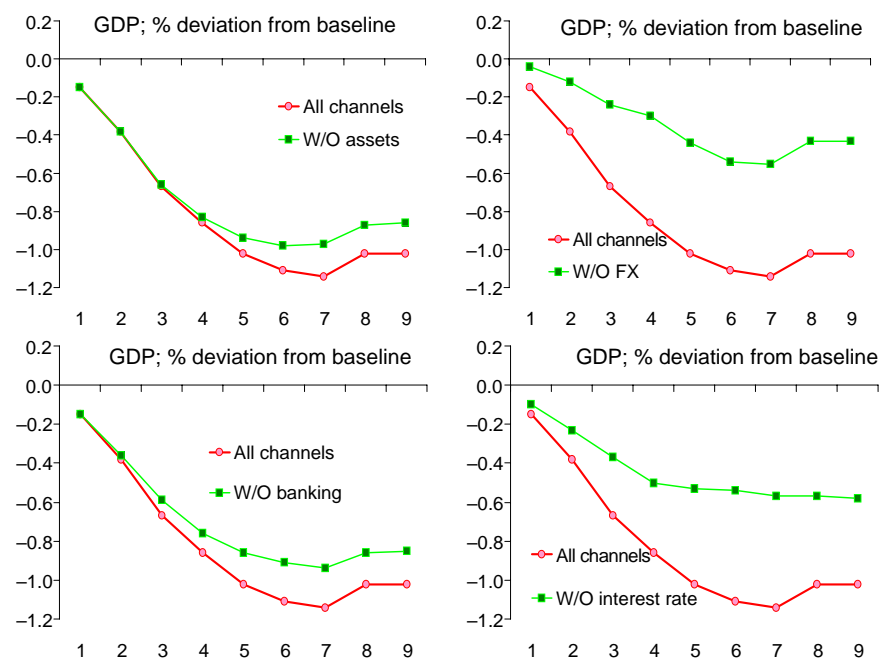
¹⁰ Disyatat and Vongsinsirikul (2002).

Appendix B: Relative importance of monetary policy transmission channels using BOTMM¹¹

1. Channels of monetary policy transmission using BOTMM Jan 03 from the 1994Q1–2002Q3 sample period



2. Channels of monetary policy transmission using BOTMM Jul 06 from the 1994Q1–2006Q1 sample period



¹¹ Sriphayak and Vongsinsirikul (2002).

Appendix C: Pair-wise cross-correlation approach¹²

1. Pair-wise cross-correlation among the first differences of policy rate, securities value, and real durable consumption

Period		d(rp) and dlog(bmcap)*		d(mlr) and dlog(bmcap)		dlog(bmcap) and dlog(cpr1)	
		Leading**	Contemp.	Leading	Contemp.	Leading	Contemp.
Whole Sample							
93Q1-97Q4	Pre-crisis	-0.41		0.04	0.36		0.56
93Q1-02Q4	Post-crisis	-0.55			-0.34		0.4
93Q1-06Q1	Present	-0.51			-0.32		0.39
Sub-sample							
93Q1-97Q4	Pre-crisis	-0.41		0.04	0.36		0.56
99Q1-02Q4	Post-crisis		-0.63		-0.53	0.46	
02Q1-06Q1	Present		-0.35	-0.49	-0.36	0.55	

* d(a) is first difference of a, dlog(a) is first difference of log(a), rp =14-day repurchase rate or policy rate,

mlr = minimum loan rate, bmcap = securities value representing equity value, cpr1 = private durable-goods consumption

** Leading of correlation between A and B represents the correlation of A one quarter ahead and B.

2. Pair-wise cross-correlation among the first differences of policy rate, price index of townhouse with land, and real durable consumption

Period		d(rp),dlog(plandth)		d(mlr),dlog(plandth)		dlog(plandth),dlog(cpr1)	
		Leading*	Contemp.	Leading	Contemp.	Leading	Contemp.
Whole Sample							
93Q1-97Q4	Pre-crisis	-0.27	-0.16	0	-0.35	0.19	0.19
93Q1-02Q4	Post-crisis	-0.04	0.1	0.21	0.17		0.13
93Q1-06Q1	Present	-0.03	0.1	0.21	0.16		0.14
Sub-sample							
93Q1-97Q4	Pre-crisis	-0.27	-0.16	0	-0.35	0.19	0.19
99Q1-02Q4	Post-crisis	0.05	0.4	0.37	0.29	-0.17	0.02
02Q1-06Q1	Present	0	0.2	0.31	0.16	-0.58	0.34

* Plandth = price index of townhouse with land representing property prices.

* Leading of correlation between A and B represents the correlation between A one quarter ahead and B.

¹² Sriphayak and Vongsinsirikul (2002).

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