Central Bank Operating Procedures in Thailand and the Philippines

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Abstract

This paper examines monetary policy operating procedures in Thailand and the Philippines. Following the crisis, the monetary policy schemes in these two countries moved toward inflation targeting. Since the financial systems of emerging countries are not as well-developed as those of industrial countries, this inflation-targeting policy may lead to problems that are not identified with inflation targeting in industrial countries. Analysis of central bank operating procedures in Thailand and the Philippines is important in order to investigate the current status of monetary policy and problem of the financial systems in these countries; yet, few studies have focused on this issue and as yet, monetary policy procedure has not been explored in Thailand and the Philippines. This study uses the structural VAR approach of Bernanke and Mihov (1998) to analyze the operating procedures of the central banks in Thailand and the Philippines. Though the regression results do not support one procedure model, they do not suggest that central bank operation through policy interest rates be conducted in these two countries. In addition, there is no great difference between the regression results for the entire period versus the results under inflation targeting.

1. Introduction

International capital mobility has increased because of globalization since the 1990s. However, as shown by the Asian crisis of 1997–98, capital flows have created financial crises in some emerging countries. In this crisis, Thailand, Korea and Indonesia were forced to call in the International Monetary Fund (IMF) and embark on IMF-supported programs. Those countries discarded the *de facto* U.S.-dollar peg and adopted a floating exchange rate after the crisis in order to avoid falling into crisis again. In addition, they introduced the inflation targeting regime for monetary policy and employed inflation as the nominal anchor for its monetary policy.[1] For example, the monetary policy in Thailand was the monetary targeting regime from July 1997 to May 2000; since May 2000, however, the policy has been inflation targeting. The monetary policy schemes in Korea, Indonesia and the Philippines have also moved to inflation targeting.[2]

A great deal of studies have focused on the framework and the application of the inflation targeting policy, and research on this monetary policy approach have been growing.[3] In contrast, few studies have focused on inflation targeting policy in Asia. For example, Ito and Hayashi (2006) explored the schemes and the experiences of inflation targeting in Asian countries, while they discuss the possibility of introducing the inflation targeting to Japan.[4]

Since the financial systems of Asian countries are not as well-developed as those of industrial countries, the inflation targeting policy in Asia may involved problems that have not been experienced in the case of inflation targeting in industrial countries. One of these is the issue of policy procedures. Because the banking system and the financial market are fragile in emerging countries, it is more difficult to operate monetary policy in those countries than in industrial countries. In other words, it is important to analyze policy measures and the policy transition mechanism in emerging countries. However, there are few articles about these issues in Asia and, in particular, the monetary policy procedure has not been analyzed as yet. This paper examines central bank operating procedures in two Asian countries to investigate the current status of monetary policy and the problem of financial system.

In particular, this study focuses on monetary policy procedure in Thailand and the Philippines. In official announcements of the Bank of Thailand (BOT) on its monetary policy instruments, it explains that the issuance of BOT bonds is aimed at expanding the range of instruments used in the implementation of monetary policy. This implies that there has not been enough progress in the bond market for central bank operations in Thailand. In the Philippines, outstanding sovereign bonds is smaller than in other Asian

countries, and in this context, we can imagine that it would be difficult for Bangko Sentral ng Philipinas (BSP) to operate in the money markets.[5] If the level of development of the bond markets is insufficient for monetary policy operation, a central bank can use reserve money as part of its policy procedures. In other words, a central bank may employ both changes of policy interest rates and reserve money as monetary policy measures. Since the operating procedures of monetary policy in Thailand and the Philippines have not been explored, this paper analyzes (1) which policy procedures are used by the authorities of both countries, and (2) whether the policies were changed after the introduction of inflation targeting policy.

Previous studies have investigated the use of monetary policy instruments in industrial countries.[6] For example, Bernanke and Mihov (1998) use a Vector Autoregression (VAR) approach to evaluate measures of the Fed's monetary policy operation and shows changes in the operating procedures from 1965–96 in the U.S. Their approach has been applied to other countries. Kasa and Popper (1997) and Nakashima (2006), for example, employ this VAR approach to examine monetary policy measures in Japan. This study also uses the structural VAR approach of Bernanke and Mihov and analyzes the operating procedures of the central banks in Thailand and the Philippines.

Though the regression results do not support one model for operating procedures in Thailand and the Philippines, at the same time, they do not indicate that central banks implement the operation through policy interest rates. There is no great difference between the regression results spanning the entire period and the results under inflation targeting. These results may imply that central banks cannot effectively conduct open market operations through policy interest rates and that the monetary policy procedures have not changed after the introduction of the inflation targeting in these two countries.

The outline of this paper is as follows. Section 2 presents the changes in the monetary policy regimes in Thailand and the Philippines and discusses the inflation targeting policy in these countries. This section also graphically illustrates the trends in inflation and policy interest rates. Section 3 describes estimation of the monetary policy measure using the structural VAR approach. Section 4 is devoted to an examination of the results to explore primal operating procedure and its change before and after the introduction of inflation targeting in Thailand and the Philippines. Concluding remarks are offered in section 5.

2. Inflation targeting policy in Thailand and the Philippines
2.1 Monetary policy in Thailand and the Philippines

This section explains the development of monetary policy and the framework of inflation targeting in Thailand and the Philippines. The foreign exchange regime followed in Thailand until June 1997 was that the baht was pegged to the U.S. dollar. (Though authorities officially announced the baht was pegged to a basket of currencies, the U.S. dollar had a large share in the basket and the exchange rate system was *de facto* a dollar peg). After the crisis, the floating exchange rate was chosen and the monetary policy scheme was changed to a monetary targeting regime. The period of monetary targeting is from July 1997 to May 2000. According the BOT website, inflation targeting was introduced in May 2000, because the relationship between money supply and output growth was becoming less stable in Thailand. The Philippine monetary policy regime was changed from money supply targeting to inflation targeting in January 2002. The BSP decided to introduce inflation targeting in January 2000, and the period from January 2000 to January 2002 was considered to be a preparatory interval.

The core CPI rate (excluding raw food and energy) is used as a policy target and the target range is 0–3.5% for the quarterly average in Thailand. The coverage period is two years and the BOT releases inflation reports for discussion about the inflation forecast and the policy decision.[7] If the core CPI rate misses the target, the BOT must provide explanations to the public. According to the recent inflation report (January 2008), the actual core inflation never exceeded the target band until the fourth quarter of 2007. When the BOT implemented inflation targeting in May 2000, macroeconomic conditions recovered and the inflation rate was low. Therefore, the period for introducing inflation targeting was good. While the BOT has the Monetary Policy Committee (MPC) which sets monetary policy, one of the problems in inflation targeting in Thailand is the questionable independency of the BOT.[8]

In the Philippines, the policy target is the annual percentage change in the CPI and the range depends on the year. The range was 4.5–5.5% in 2002–03, 5–6% in 2005, and 4–5% in 2004 and 2006–07. Though the target rate is set and announced jointly by the BSP and the government, the BSP has primarily responsibility for achieving the target.[9] In contrast to Thailand, the actual rates have not attained the target rates. The CPI rates were 2.9% in 2002, 3.0% in 2003, 5.5% in 2004, 7.6% in 2005, 6.2% in 2006 and 2.8% in 2007.[10] The main reasons for falling short of the targets as given by the BSP include: the falling food prices due to favorable agricultural production, the decline in economic activity in the Philippines' trading partner countries in 2002 and 2003, and the increase in global oil prices in 2004, 2005 and 2006.

2.2 Fluctuation in inflation rates and interest rates

Figures 1-1 and 1-2 show fluctuations in the actual inflation rates and policy interest rates in Thailand (core-CPI growth rate, year-on-year) and the Philippines (CPI growth rate, year-on-year), as well as the inflation targeting range (bold line). In Thailand, the core-CPI growth rate has been under 3% since April 1999, and it was very low from 2003 to the beginning of 2004. In contrast, the CPI growth rate has changed more significantly in the Philippines than has the core-CPI of Thailand. Even after the introduction of inflation targeting, the range of fluctuation in the CPI rate did not decline in the Philippines.

Figure 2-1 shows the 14-day repurchase rate in Thailand and Figure 2-2 illustrates the overnight reverse repurchase rate in the Philippines. While the policy target rate was the 14-day repurchase rate until 16 January 2007 in Thailand, the 1-day repurchase rate has been employed as policy rates since 17 January 2007. Therefore, Figure 2-1 reports the 14-day repurchase rate until December 2006. After 1999, the 14-day repurchase rate was never above 5%, and rose from the latter half of 2004 to the first half of 2006. This fluctuation may be in response to the change in inflation. For instance, the hike of the interest rate from 2004–06 seems to follow the trend in the rise of the inflation rate from 2005–06. In the Philippines, the overnight reverse repurchase rate has ranged from about 7.5% to about 5.6% after the introduction of inflation targeting, and the fluctuation is not large. In contrast, inflation rates moved from about 2% to about 7.5%.

3. Regression analysis
3.1 Bernanke and Mihov regression methodology

This paper employs the structural VAR approach of Bernanke and Mihov (1998) to examine the policy operating procedures in Thailand and the Philippines. The structural macroeconomic model of Bernanke and Mihov is as follows:

$$\mathbf{Y}_t = \sum_{i=0}^{k}\mathbf{B}_i\mathbf{Y}_{t-i} + \sum_{i=0}^{k}\mathbf{C}_i\mathbf{P}_{t-i} + \mathbf{A}^y\mathbf{v}_t^y, \tag{1}$$

$$\mathbf{P}_t = \sum_{i=0}^{k}\mathbf{D}_i\mathbf{Y}_{t-i} + \sum_{i=0}^{k}\mathbf{G}_i\mathbf{P}_{t-i} + \mathbf{A}^p\mathbf{v}_t^p, \tag{2}$$

Boldface letters define the vectors or the matrices of variables or coefficients. $\mathbf{Y}$ is a vector of macroeconomic variables (growth rates of production index, inflation rates and the foreign exchange rates). $\mathbf{P}$ is a vector of policy indicators and contains the variables indicating the stance of policy (total reserves, nonborrowed reserves and the policy rates). Vectors $\mathbf{v}_t^y$ and $\mathbf{v}_t^p$ are mutually uncorrelated "primitive" or "structural" disturbances. It is assumed that policy shocks do not affect variables in the

macroeconomic block within the period. Following Bernanke and Mihov, equations (1) and (2) can be rewritten in the VAR model and let $\mathbf{u}_t^p$ be the VAR residuals in the $\mathbf{P}$ block that are orthogonal to the VAR residuals in the macroeconomic block. In addition, the $\mathbf{u}_t^p$ satisfies:

$$\mathbf{u}_t^p = (\mathbf{I} - \mathbf{G}_0)^{-1} \mathbf{A}^p \mathbf{v}_t^p. \tag{3}$$

Equation (3) can be rewritten, after dropping subscripts and superscripts, as follows:
$$\mathbf{u} = (\mathbf{I} - \mathbf{G})^{-1} \mathbf{A} \mathbf{v}. \tag{4}$$
Equation (4) is a standard structural VAR (SVAR) system, which relates observable VAR- based residuals $\mathbf{u}$ to unobservable shocks $\mathbf{v}$.

3.2 Structural shocks and the VAR residuals

This section presents the model relating the VAR residuals and the structural shocks in the policy block. As employed by Bernanke and Mihov (1998), this is a standard model of the market for commercial banks and central bank's operating procedures. It assumes that the market for bank reserves is described by the following equations:

$$u_{TR} = -\alpha u_{REP} + v^d \tag{5}$$

$$u_{BR} = \beta(u_{REP} - u_{DISC}) + v^b \tag{6}$$

$$u_{NBR} = \phi^d v^d + \phi^b v^b + v^s \tag{7}$$

Equation (5) describes the bank demand for reserves. The variable u_{TR} is the innovation in the demand for total reserves and depends on innovation in the policy rate (repurchase rate) u_{REP} and on a demand disturbance v^d. Equation (6) provides the reserve that banks choose to borrow. The innovation u_{BR} denotes the demand for borrowed reserves and depends on innovation in the repurchase rate u_{REP}, the discount rates u_{DISC}, and a borrowing disturbance v^b. Equation (7) is the behavior function of the central bank. The variable u_{NBR} is the innovation in the demand for nonborrowed reserves, which is the difference between total and borrowed reserves (u_{TR} - u_{BR}). The central bank responds to the shock of total reserves and to the demand for borrowed reserves. The disturbance v^s is a shock to the monetary policy.

According to Bernanke and Mihov (1998), this paper ignores innovation to discount rate u_{DISC} in order to simplify the model.[11] In addition, it imposes that the supply of nonborrrowed reserves plus the borrowings equals the demand for reserves. Our model is as follows in the form of equation (4):

$$\mathbf{u}' = [u_{TR} \quad u_{NBR} \quad u_{REP}] \quad \mathbf{v}' = [v^d \quad v^s \quad v^b]$$

$$(\mathbf{I} - \mathbf{G})^{-1}\mathbf{A} = \begin{bmatrix} -\left(\frac{\alpha}{\alpha+\beta}\right)\left(1-\phi^d\right)+1 & \frac{\alpha}{\alpha+\beta} & \left(\frac{\alpha}{\alpha+\beta}\right)\left(1+\phi^b\right) \\ \phi^d & 1 & \phi^b \\ \left(\frac{1}{\alpha+\beta}\right)\left(1-\phi^d\right) & -\frac{\alpha}{\alpha+\beta} & -\left(\frac{1}{\alpha+\beta}\right)\left(1+\phi^b\right) \end{bmatrix}$$

In order to determine how the monetary policy shock v^s depends on the VAR innovation, the above relationship can be inverted to the following equation:

$$v^s = -\left(\phi^d + \phi^b\right)u_{TR} + \left(1+\phi^b\right)u_{NBR} - (\alpha\phi^d - \beta\phi^b)u_{REP} \tag{8}$$

The system has seven unknown parameters to be estimated from six covariances. This paper employs additional parameter restrictions and five identifications of the unrestricted model, which is the same as Bernanke and Mihov (1998).

The repurchase rate model (*REP model*) corresponds to the parametric assumption $\phi^d = 1$, $\phi^b = -1$. In this case, the equation (8) is $v^s = -(\alpha + \beta)u_{REP}$. This equation means that the central bank offsets shocks to total reserve demand and borrowing demand, and the policy shock is expected to be proportional to the innovation to the policy rate. The nonborrowed reserve model (*NBR model*) is assumed to have the restriction $\phi^d = 0$, $\phi^b = 0$, which implies that nonborrowed reserves respond only to policy shock, and the policy shock is $v^s = u_{NBR}$. The parametric restrictions by the "orthogonalized" nonborrowed reserve model (*NBR/TR model*) are $\alpha = 0$, $\phi^b = 0$ and the equation (8) becomes $v^s = -\phi^d u_{TR} + u_{NBR}$. This can be interpreted to mean that the total reserves are purely demand shocks, and ignores the central bank's response to borrowing shocks. The borrowed reserve model (*BR model*) corresponds to the restrictions $\phi^d = 1$, $\phi^b = \alpha/\beta$. This implies that the quantities of borrowed reserves is the potential indicator of policy, and the policy shock is $v^s = -(1+\alpha/\beta)(u_{TR} - u_{NBR})$.

All four models above impose two restrictions and are overidentified. The just-identification model (*JI model*) can be utilized to check how well the parameter

estimates correspond to the predictions of the alternative models. This model assumes that the demand for total reserves is inelastic in the short run ($\alpha = 0$).

3.3 Data and estimation

The regression period is from January 1999 to December 2006 in Thailand, because the policy rate was changed in January 2007. In the Philippines, the period is from January 1997 to July 2007 due to data availability. In addition, this paper considers the periods following the introduction of inflation targeting. The periods under the inflation targeting regime are defined as May 2000 or later in Thailand and January 2002 or later in the Philippines.

This regression uses policy and nonpolicy variables in the VAR. The policy variables are total reserves, nonborrowed reserves and the policy rates. As section 2.2 shows, the policy rate is the 14-day repurchase rate in Thailand and the overnight reverse repurchase rate in the Philippines. Nonpolicy variables are growth rates of production index, inflation rates and the foreign exchange rates.[12] The inflation rates are the core-CPI growth in Thailand and the CPI growth in the Philippines, since they are targeting index in each country.[13] Data on inflation, production index, foreign exchange rates and policy rates are on a monthly basis and were taken from the CEIC data base. Total reserves and nonborrowed reserves in Thailand were taken from the BOT website, and those in the Philippines were obtained from the CEIC database.

This paper uses a two-step procedure for estimation of the structural VAR. The first step is the OLS estimation of the coefficients of the VAR system.[14] The second step is maximum likelihood estimation.[15]

4. Regression results

Table 1 shows the regression results with the parameter restrictions associated with each model indicated in boldface. The final two columns of the table show a *p*-value corresponding to the test of the overidentifying restriction (OIR) and a *p*-value for the two parameter restrictions of the model under the just-identification model. When *p*-values are greater than 0.05, they are written in boldface, and indicates that the model can not be rejected at 5 percent level of significance.

The regression results are not consistent and it is difficult to evaluate the five models. In Thailand, the coefficient ϕ^d is significantly positive in the JI model in the regression for the entire period. After the introduction of inflation targeting, this coefficient is significant and positive in the NBR/TR model and the JI model. If the ϕ^d is significant and not small, the NBR model is inconsistent because the ϕ^d is 0 in

this model. In contrast, the coefficient α is significantly positive in the NBR model after the introduction of inflation targeting. This implies that the NBR/TR model and the JI model are inconsistent after the introduction of inflation targeting, because these models assume that α =0. In addition, the test of the restriction under the JI model suggests that the REP model, the BR model and NBR/TR model may be significant in the regression for the entire period, while the test of the OIR implies the significance of NBR/TR model. Though those results cannot indicate which model is the best, the REP model may be not correct under the inflation target regime. It supports the hypothesis that the BOT did not choose the repurchase rate operation primarily and use reserve accounting procedures in spite of its announcements. [16]

In the Philippines, it is also difficult to evaluate the model especially in the period following the introduction of inflation targeting. In the regression for the entire period, the coefficient ϕ^d is significant and positive in NBR/TR model, though the β is negative. The OIR test and the retraction test under the JI model insist that the NBR/TR model is significant. Under inflation targeting, while the ϕ^d is positive in JI model and β is significantly positive in NBR/TR and BR model, α is significant and positive in NBR model. Though these results cannot justify any specific model, the coefficients of REP model are not significant. The policy rate operation by BSP may not be the main procedure.

5. Conclusion

This paper explores which procedures were used in central bank operations in Thailand and the Philippines. Following Bernanke and Mihov (1998), we employ the structural VAR approach. Though the regression results are not consistent, they do not support the hypothesis that the central banks implemented operation through policy interest rates in Thailand and the Philippines. In emerging countries, this may imply that the central banks cannot effectively conduct operations through policy interest rates, and they utilize nonborrowed or total reserves as a main policy procedure. No significant difference could be found between the regression results for the entire period and the results covering the period under inflation targeting. This suggests that the monetary policy procedure may not have changed after introduction of inflation targeting in these two countries.

While our estimation findings support the argument that improvement in the financial markets is necessary, the authorities may have understood the actual conditions of their policy operations. In fact, the BOT has reformed its monetary operation framework since January 2007, and the program includes the switching of the

policy rate from the 14-day repurchase rate to the 1-day repurchase rate. According to the BOT inflation report, purpose of the reform is to further enhance the efficiency of policy implementation and to promote development of domestic money markets. Improvement in the money market in the Philippines will also be necessary in order to operate monetary policy effectively.

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[1] Since the crisis-ridden countries transferred the foreign exchange system from the peg to the float, they did not need to consider the foreign exchange rates as monetary policy

anchor and had more flexibility of policy. However, the monetary policy without nominal anchor may pose a risk of inflation. The International Monetary Fund (IMF) was concerned that the massive depreciation in the exchange rate could be potential factor generating inflation.

[2] Many non-Asian countries have already adopted the inflation targeting policy.

[3] For example, Bernanke *et al.* (2001) discussed the framework of inflation targeting policy and the experiences of some countries.

[4] Miyao (2008) examined the behavior of monetary policy after the crisis in Indnesia, Korea, Malaysia, the Philippines, and Thailand. He implied that central banks of these countries cared about the exchange rates.

[5] According to the news releases of the Ministry of Finance, it occasionally rejects some bids for the TB because of unexpected rates.

[6] Walsh (2002) explains the outline of this issue and discusses the operating procedures in the US.

[7] The BOT has learned how the Bank of England operates.

[8] For instance, the MPC member contains high government official.

[9] The policy target is decided by the Development Budget Coordinating Committee (DBCC) in consultation with the BSP. The DBCC is composed of the Department of Budget and Management, the National Economic and Development Authority, and the Department of Finance.

[10] When the inflation targeting was introduced, the actual inflation was not high and then the target rates may have been too high.

[11] As the Bernanke and Mihov explain, the discount rate does not change infrequently and may not be well modeled by the linear VAR framework. In addition, they provide that the previous results using the model with a nonzero discount rate innovation are consistent with the regression results using a zero discount rate innovation in the case of the U.S. Bernanke and Mihov refer to Bernanke and Mihov (1995) and Bernanke and Mihov (1997).

[12] Bernanke and Mihov (1998) employs the index of spot commodity prices instead of the exchange rates. This paper uses the exchange rates, because the exchange rates are important for emerging countries especially and we could not obtain the index of commodity prices.

[13] We use the total bank reserves and the nonborrowed reserves normalized by a long (6-month) moving average of total reserves, the first differences of policy rates, the rate of changes in foreign exchange rates, the inflation rates, and the growth rates of production index. The Augmented Dickey Fuller (ADF) test supports that all variables are stationary in the VAR regression.

[14] The number of lags is 1. This is chosen on the basis Schwarz' Bayesian information criterion (SBIC).

[15] While Bernanke and Mihov (1998) employs the generalized method of moments (GMM) estimation in the second step, Kasa and Popper (1997) and Nakashima (2006) use the maximum likelihood estimation. According to Bernanke and Mihov, they are asymptotically equivalent.

[16] This paper also applies Hamilton's regime switching approach to the JI model of the VAR model in Thailand and the Philippines. The two parameter ϕ^b and ϕ^d are focused and two possible states are assumed. Estimates are derived by Hamilton (1990) and

Hamilton (1994). The results show that many regime switches exist in the sample period, and we can not determine that the regime switch in the period before and after introducing the inflation targeting policy is important.

Figure 1-1
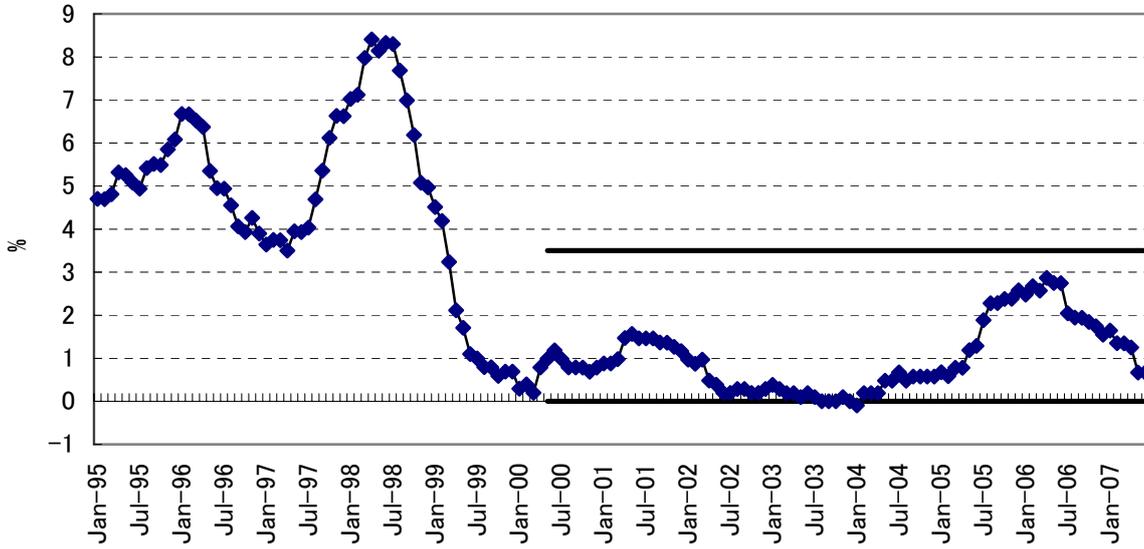
Thailand: Core-CPI (year-on-year rate of increase)

Figure 1-2

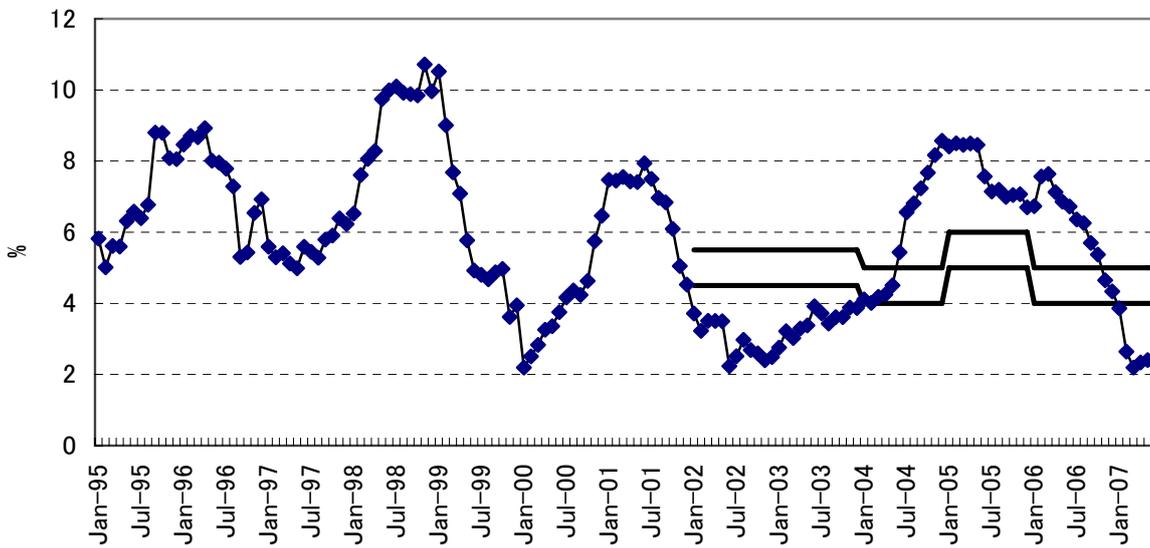Philippines: CPI (year-on-year rate of increase)
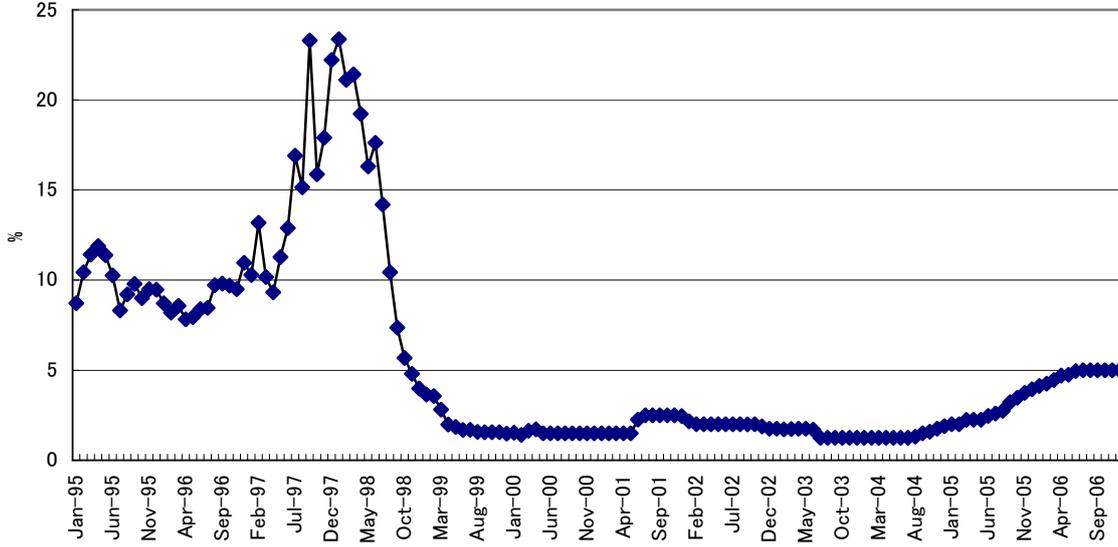
Figure 2-1

Thailand: 14day repurchase rate

Figure 2-2

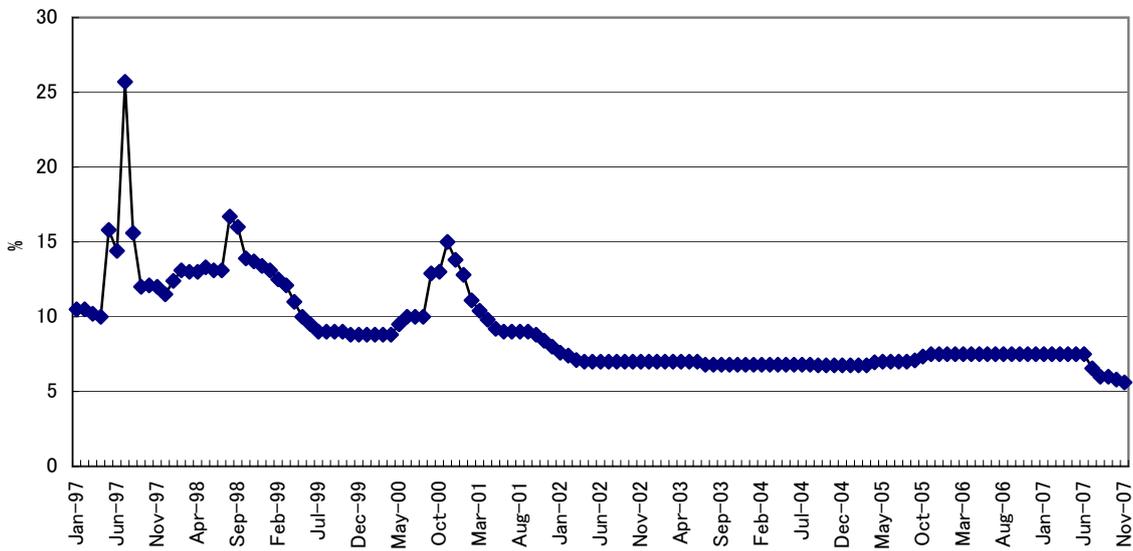Phillipines: overnight reverse repurchase rate

Table 1 Estimation results

Country	Period	Model	α	β	ϕ_d	ϕ_b	OIR	Restrictions under JI model
			Coefficient				**Test (_p_-value)**	
Thailand	1999:1– 2006:12	**REP**	0.01307 (1.00000)	−0.00782 (1.00000)	1	−1	0.006628	**0.05656**
		NBR	−8199.77013 *** (1.00000)	−0.00782 (0.01265)	0	0	0.000000	0.000000
		NBR/TR	0	−1.97236 ** (1.00000)	1.10674 (1.00000)	0	**0.54913**	**0.948598**
		BR	0.01307 (1.00000)	−1.97318 ** (1.00000)	1	α / β	0.006628	**0.056558**
		JI	0	0.79727 (1.96581)	1.10674 *** (0.03766)	−0.03265 (0.12947)		
	2000:5– 2006:12	**REP**	0.10448 (1.00000)	−0.02827 (1.00000)	1	−1	0.000432	0.000347
		NBR	1.68290 * (1.00000)	−0.01734 (1.00000)	0	0	0.000000	0.000000
		NBR/TR	0	−0.66808 * (0.35498)	1.10736 *** (0.03806)	0	0.003538	0.012277
		BR	0.10447 (1.00000)	−0.66809 (1.00000)	1	α / β	0.000961	0.000347
		JI	0	0.15256 (0.09276)	1.10736 *** (0.03802)	−0.45681 ** (0.23263)		
Phillipine	1997:1– 2007:7	**REP**	−0.00193 (1.00000)	−0.00282 (1.00000)	1	−1	0.000082	0.001421
		NBR	−1.19899 (1.00000)	−0.01553 (1.00000)	0	0	0.000000	0.000000
		NBR/TR	0	−5.52951 *** (1.00005)	0.69030 *** (0.07600)	0	**0.80782**	**0.99624**
		BR	−0.00193 (1.00000)	−5.43079 *** (1.00000)	1	α / β	0.000082	0.001421
		JI	0	3.35166 (23.42676)	0.69033 *** (0.06763)	−0.00219 (0.02390)		
	2002:1– 2007:7	**REP**	−0.09592 (1.00000)	0.17829 (1.00000)	1	−1	0.036069	**0.19918**
		NBR	12.74829 *** (1.00000)	0.27359 (1.00000)	0	0	0.000212	0.000000
		NBR/TR	0	7.08795 *** (1.00000)	0.80404 (1.00000)	0	**0.85653**	**0.99844**
		BR	−0.09592 (1.00000)	7.08803 *** (1.00000)	1	α / β	0.036069	**0.19918**
		JI	0	4.68091 (9.12489)	0.80404 *** (0.08676)	−0.01996 (0.14635)		

Notes: The parameter restrictions associated with each model are indicated in boldface. *, **, and *** indicates that the statistic is significant at the 10%, 5%, and 1% level respectively. The final two columns of the table show a _p_-value corresponding to the test of the overidentifying restriction (OIR) and a _p_-value for the two parameter restrictions of the model under the just-identification model. When _p_-values are greater than 0.05, they are written in boldface, and indicates that the model can not be rejected at 5 percent level of significance.

Memo