Abstract

This paper demonstrates that, in small open economies, focusing on interest rate and the exchange rate seems particularly important in policy making because the exchange rate may be a primary channel through which monetary policy affects inflation and economic activity. The Monetary Conditions Index (MCI) can be used to compare the degree of importance between interest rate and the exchange rate in influencing the future inflation rate. Empirically, it was found that the MCI ratio for Thailand takes the value of 3.3:1. This ratio implies that when the baht is expected to depreciate at an average rate of 3.3% in any particular time, ceteris paribus, the interest rate needs to be raised by an average of 1% in order to prevent the expectation of the baht depreciation from effecting the forecasting of the future inflation rate.

Empirical finding of the kind is of particularly valuable information in improving the evaluation of the overall policy stance of the central bank. Using the MCI index as an indicator in determining the policy stance seems to be more effective than using either the exchange rate or interest rate alone.

Though the finding from this study gives a positive view for the use of the MCI index as an important indicator for characterizing the short-term monetary conditions in the conduct of monetary policy in Thailand as well as for assessing the behaviour of the inflation rate in the future, the actual application of this type of indicator to guide the conduct of monetary policy under the floating exchange rate needs further investigations. The issue deserved most attention concerns the question as to whether the Thai authorities should use the MCI index as an operating target or only as an indicator for the policy stance.

Key words : MCI index, Inflation Targeting, Monetary Policy, Inflation Rate, Monetary Conditions.
1. Introduction

Over the past decade or so, the framework and strategy of central banks in implementing monetary policy has continually evolved along with a rapidly changing economic and financial environment at home and abroad. An increase in the volume and volatility of the international capital flows coupled with an intensified financial innovation have made financial markets and economic systems more and more interdependent. As the domestic financial market becomes more closely linked to the global financial system, the exchange rate becomes an increasingly important factor as a channel through which monetary policy may have potential impacts on the real sector.

During the 1950s and 1960s, most central banks tended to place more emphasis on using the fixed exchange rates system as the main framework in the conduct and implementation of monetary policy. The framework of this kind is normally characterized by pegging the domestic currency to major international currencies. Monetary policy management through the pegged exchange rate with serving as a nominal anchor has been, to a certain extent, claimed to have exerted a positive impact on economic performance of a number of countries. Despite such perceived benefits, however, the risks of currency misalignment have still remained a serious concern.

In the 1970s, central banks of leading industrialized nations — such as Germany, the United States and Japan — have utilized monetary targeting as the primary strategy for monetary policy. This has primarily been in response to the escalating inflation during 1973-74 and 1979-80 that resulted from the oil crisis. However, since the early 1980s, the central banks of many industrialized nations have gradually shifted away from monetary targeting. This was because the targeted monetary levels have been made more volatile by the increased pace of financial innovations and the intensified movements of international capital transactions.

Towards the late 1980s, central banks of many industrialized nations have turned their attention towards an inflation targeting regime as the focal point of their monetary policy. The list includes the central banks of New Zealand, Canada, England, Sweden, Finland, Australia, Spain and Israel (Green 1996, Svensson 1997, Kahn, et.al. 1998).

The framework and strategy in implementing an inflation targeting-oriented monetary policy rests upon the basic assumption that: “…Monetary policy affects the economic system and in particular, the inflation rate, through two main transmission mechanisms: (i) the interest rate, which influences the level of expenditure and investment, and (ii) the exchange rate, which influences the price of imports, and ultimately the inflation level…” (Figure 1). In view of this, a continued depreciation (appreciation) in the exchange rate would require an increase (decrease) in the interest rate in order to sustain the target rate of inflation.

1/ For more detail on the implementation of monetary targeting as a monetary policy strategy in major industrialized countries, see Argy et al. (1990) and Neumann (1996). Further information in the case of Thailand may be found in Hataiseree (1993, 1998a, 1998b), and Hataiseree and Phipps (1996b).
As interest rates and exchange rates are both important channels through which monetary policy affects economic activity and inflation, it has been argued that, combining both interest and exchange rates in a single policy indicator, a Monetary Conditions Index (MCI), may serve as a better indication of the overall policy stance (Freedman 1995, Nadal-De Simone et.al. 1996). For this reason, central banks of many industrialized countries, e.g., The Reserve Bank of New Zealand, Bank of Canada, place importance on the construction and implementation of the MCI. The MCI is designed to indicate the stance (the degree of tightening or loosening) of monetary policy during a given period.

Although an inflation-targeting regime has not yet been adopted officially, the Bank of Thailand has for sometime paid a close watch to the developments and behaviour of interest rate and the exchange rates in its periodical assessment of Thailand’s economic and monetary conditions (M.R. Chatu Mongol Sonakul; Hataiseree and Rattanalungkarn 1998). More importantly, the floatation of the Thai baht since July 2, 1997 has been claimed to be the major development which has heightened the role of the exchange rate as the main channel through which monetary policy gets transmitted to economic activity and the general price level. Incorporating the effect of both interest and exchange rates seems to be particularly relevant in small open economies like Thailand where interest and exchange rates tend to be highly linked with the domestic/foreign interest rate differential offset by expected exchange rate changes (Hataiseree and Phipps 1996a). This close relationship implies that shocks are rapidly transmitted between money markets and foreign exchange markets.

Using the MCI which encompasses movements in both interest rates and exchange rates may help the Thai authorities to gain a better assessment of the overall monetary conditions. This is because the information content contained in the MCI would characterize the degree of pressure that monetary policy is placing on the economy and, therefore, on inflation rate. Nonetheless, the potential adopting of a MCI-oriented monetary policy, and therefore an inflation-targeting regime, calls for a more detailed analysis of whether interest rate and exchange rate variables are particularly important factors determining future inflationary pressures in the context of Thailand.

This paper aims to introduce the concept and framework of implementing a MCI-oriented monetary policy by considering the benefits of and issues involved in putting this concept into practice in the case of a small open economy like Thailand. It also discusses how the implementation of the MCI would help enhance the clarity and accuracy in determining the policy stance of the central bank when compared to a policy assessment based on either interest rate or exchange rate alone. In this paper, we also attempt to build a MCI for Thailand.

The remainder of this paper is divided into four sections. It begins in Section 2 by describing the main features of using the MCI in monetary policy making. Section 3 discusses the framework and strategy for the conduct of monetary policy and implementing the MCI for Thailand. Section 4 provides estimates with respect to the relative weights of interest rate and the exchange rate in a MCI for the overall price level for Thailand. This section also presents research findings on the relationship between the MCI and the rate of inflation. Section 5
concludes the paper and considers the implications of using the MCI in the administration of monetary policy in the future.

2. The Thinking Underlying New Monetary Policy Arrangements

In the formulation and implementation of monetary policy, the central bank needs to select an appropriate set of policy tools to implement its monetary policy. This is deemed necessary for the smooth attainment of ultimate targets of monetary policy. Over the past decades, central banks, especially those in developing countries, have not been clear in establishing their ultimate targets and have not yet prescribed explicitly what to do in order to attain such ultimate targets. Apart from this, there has been no in-depth analysis of the relationship between monetary policy instruments and the ultimate targets of the monetary policy instruments (Duguay 1994).

Nonetheless, in recent years, central banks of many industrialized countries have begun to more seriously consider the importance of clearly stating their ultimate targets of monetary policy and announce those targets to the public, as it has been argued that this kind of information seems to serve as a guidance for private companies in conducting business transactions. In doing so, the conduct and implementation of monetary policy tends to become clearer and more transparent. As a result, the credibility of the central bank’s actions tends to have enhanced (Blinder 1999). For instance, in the case of the Reserve Bank of New Zealand, the term of the governor has been specified as being contingent upon his ability to maintain the inflation level at the pre-established target level that has been announced by the authorities. Most significantly, the attainment of a low inflation rate in accordance with the target agreed with Government (initially 0 to 2 percent, now 0 to 3 percent) has been clearly codified by the 1989 Reserve Bank Act (Brash 1998).

The central banks of many industrialized countries, such as the central banks of New Zealand, Canada, Sweden, and Norway, are aware of the necessity of creating a new framework for conducting monetary policy so as to be a clear indicator of the central bank’s policy stance and allow for a better communication with participants in the money markets. At the same time, the adoption of a MCI-oriented monetary policy is seen as an essential framework for use to follow and gauge the likely effects that monetary policy actions may have on the economy — especially in terms of the level of inflation — which is a direct responsibility of the central bank. As can be seen from Figure 2, an inflation targeting framework for monetary policy was first adopted by New Zealand’s central bank in March 1990, followed by the central bank of Canada in February 1991.

The framework and strategy of implementing inflation targeting-oriented monetary policy fundamentally stresses on the condition that “Inflation Targets” must clearly be the ultimate target of monetary policy (Kahn, et.al. 1999). Under an inflation-targeting regime, the monetary authorities normally have to make announcement of the target or a range of inflation target for the future. If the inflation projection for the next 1-2 years is believed to fall outside the range of the official target,
a series of policy actions needs to be carried out in order to bring the inflation level back into the targeted range. The monetary authorities may have to send a signal reflecting a change in the policy stance by adjusting short-term interest rates or intervening in the foreign exchange market.

It is interesting to note, however, that the management of monetary policy under the framework of monetary targeting primarily targets the inflation level — just as the management of monetary policy under the inflation targeting regime. For monetary targeting, monetary aggregates are used as intermediate targets for the conduct and implementation of monetary policy. In the case of inflation targeting, however, inflation forecasts are used as intermediate targets for the conduct and implementation of monetary policy (Figure 3). Under an inflation targeting regime, short-term interest rates tends to be pushed upwards in the event that forecasted inflation shows a tendency of stabilizing at a higher level than the “established targeted inflation.” Further details on this matter may be found in Svensson (1997), among others.

Under an inflation targeting framework for monetary policy, there will be monetary indicators that uses the Monetary Conditions Index, which is a kind of monetary indicator that shows whether a central bank’s monetary policy at any one point in time is relatively loose or tight, and to what degree. This indicator therefore acts as an indicator of operating target within an administration of monetary policy (Freedman, 1995).

Indicator of this kind reflects the degree of influence that the monetary policy has on the overall economy — especially on the level of inflation. Overall, a MCI index has a base-year equivalent to 100, as is the case of New Zealand, and serves as a benchmark indicating the direction and outlook of the future inflation. Formulating and conducting monetary policy under the MCI framework (in addition to other economic and monetary indicators) is therefore considered a policy strategy that is forward looking.

The use of the MCI as part of the central bank's monetary policy administration is based on the premise that: "Both the interest rate and the exchange rate are important and influential factors of the overall economic condition — especially to the inflation rate." When the interest rate rises or the exchange rate strengthens, the effect is for the economy to decelerate in the future and eventually lead to a weakening of the pressure on price levels. In contrast, when the interest rate falls or the exchange rate weakens, the effect is for expenditures, consumption and investments to rise in the future, which may eventually lead to a higher level of inflation (Figure 1).

Because the interest rates and the exchange rate are both important and influential channels that link the monetary policy to the real sector, the central banks of many countries tend to have faced with an increasing difficulty in sending a clear signal to the market about the direction and tendency of the monetary policy. As such, on some occasions, the interest rates and the exchange rate may have influenced the economy and thus the level of inflation in the same directions as those characterized in Row I and II of Figure 4. Nonetheless, in many cases, it is also possible that the interest rates and the exchange rate may have influenced the economy and, thus, the inflation in the opposite directions (Row III and IV).
This is the case in the periods when the exchange rate is strengthening, but interest rates are falling (and *vice versa*) with the MCI staying fairly steady as those characterized in Row III of Figure 4. It is at those periods when the MCI is most useful. If the authorities concerned were watching just interest rates, or just the exchange rate, as a separate indicator of monetary policy, it would be misleading because both parts are important in determining future inflationary pressures.

From the stated situation, coupled with the fact that both the interest rate and the exchange rate are continuously changing makes it very difficult for the central bank of many nations to estimate whether the monetary conditions at a certain point in time is relatively tight or relaxing and thus may cause the inflation rate to fall or to rise. This is especially the case where the interest rate is adjusted upwards (downwards) while the exchange rate weakens (strengthens).

The assessment of liquidity conditions in the financial system and the monetary policy stance of the central banks requires a careful consideration of the behaviour of the interest rates and the exchange rate. Therefore, a MCI index can be served as an *informative indicator* for liquidity conditions in the financial system. It also provides useful information regarding the central bank's *monetary policy stance* by comparing the effects of interest rate and exchange rate on the inflation rate (Hanson and Lindberg 1994).

Figure 2 characterizes some principal features associated with an inflation targeting-oriented monetary policy. As can be seen from the figure, the MCI is an important tool in the administration of monetary policy for a number of central banks. This is particularly the case for the central banks of New Zealand and Canada, which have used the MCI as an operating target variable for the administration of monetary policy.

3. **Policy Framework and the Application of a MCI Index in the Thai Context**

3.1 **Thailand’s Monetary Policy Framework in the New Environment**

Since the early 1990s, the Thai economy has been claimed to be more open. The monetary environment has been relaxed and the financial reform has been progressively implemented (Hataiseree, 1995d, 1995f, 1996a). Example in this regard included the official acceptance of IMF’s Article VIII in 1990 and the elimination of all interest rate ceilings for financial institutions in 1992. Such a relaxation of financial policies have allowed the Thai economy and financial system to become increasingly integrated with the economy and financial system of other nations. This can be observed from the increased flow of international capital that came

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2/ Empirical evidences obtained thus far have shown that the Thai financial system has become increasingly open. The degree of financial integration has increased from the level of 0.85 during the period 1980-1992 to 0.89 during the period 1980-1994. Further details on this matter, see Hataiseree (1995a, 1995b), Hataiseree and Phipps (1996a).
into the country since the beginning of the 1990s until the economic crisis in July 1997. In such the rapidly changing economic and financial environment, the movements of the exchange rate have become increasingly important in the Thai economy. Further details may be found in the recent study of Hataiseree (1997a).

As Thailand is regarded as a small open economy, the exchange rate, as it has been claimed, has gained a relatively important role in the Thai economy and financial system through international trade and investments. With such rapidly changing economic and financial environment together with the fact that the exchange rate system of Thailand was changed from a basket-pegging regime to a managed floating regime on July 2, 1997, the role of the exchange rate has become increasingly important as a channel through which monetary policy may have affected the real sector and, thus, the inflation rate (M.R. Chatu Mongol Sonakul, 1998 and Hataiseree 1997a).

It has been argued that this new exchange rate regime has given the Thai monetary authorities more room to manoeuvre its exchange rate policy in the sense that an adjustment in the nominal exchange rate under the new regime can be implemented continuously in response to developments at home and abroad and without the risk of being politically unacceptable which was the case under the previous exchange rate regime.

Under the present circumstance where the understanding of the monetary transmission mechanism in Thailand is still far from complete, an evaluation of the stance of monetary policy needs to rely on various sets of monetary indicators. It has been claimed, in evaluating the economic conditions and inflation levels in Thailand, the Thai authorities rely on a variety set of economic information and monetary indicators, including in particular the manufacturing production index, import and export levels, the behaviour of interest rate and exchange rates, monetary aggregates, credit aggregates, to name but a few. The various economic information and monetary indicators mentioned above have, to a certain extent, assisted the authorities in forecasting the direction and likely outlook of the economy and the inflation levels.

In the near future, however, the authorities tend to have encountered with an increasing difficulty in evaluating and estimating the effects that the interest rate and the exchange rate may has on the inflation. This is because the effects of the changes in the interest rate and exchange rate on the direction and level of inflation cannot be clearly observed. The variables influencing the future direction of the inflation tend to change rather easily, as a result of shocks from both domestic and internal factors.

The application of a MCI index in the case of Thailand is therefore an important issue which deserves further study. The exchange rate has played an increasingly important role as a channel through which the monetary policy may have affected the real economy, particularly the future direction of the inflation. Thus, an evaluation of the overall economic picture, monetary conditions and the level of inflation in the case of Thailand requires a careful consideration of the movements of a MCI index together with some other economic and monetary indicators mentioned above.
3.2 The Application of a MCI Index in the Case of Thailand

As mentioned in Sections 2 and 3.1, it is important to evaluate monetary conditions in order to show how tight (easy) monetary policy is and thus its likelihood to lead to a lower (higher) inflation level. In order to do this effectively, it is crucial for the monetary authorities to simultaneously consider the behaviour of the movements of both the interest rates and the exchange rate.

Such an interactive movement may be expressed in equation (1) as follows:

\[
MCI = w_r \ast (r_t - r_b) + w_e \ast (e_t - e_b) ; w_r + w_e = 1
\]  

(1)

Where \( r_t \) and \( e_t \) are interest rates and exchange rates during time \( t \), respectively; \( r_b \) and \( e_b \) are interest rates and exchange rates during a given base year. The exchange rate variables in equation (1) are expressed in terms of logarithms.

Within an analytical framework of the CPI, the base indicator of economic activity and inflation is a variable that appears in equation (1) which in turn is the interest rate \( r \), and the exchange rate \( e \). The most important factor is weight \( w \), derived from the subsequent empirical analysis. The value of this weight provides a useful information regarding the relative importance of the weight given to the interest rates \( (w_r) \) compared to the weight given to the exchange rates \( (w_e) \), which stipulates the direction of demand (economic activity) or inflation level.

Based on the theoretical discussion in the literature and on the country-specific circumstances, it is hypothesized that the model explaining the behaviour of the inflation in Thailand can be formulated as follows:

\[
\pi_t = \Delta P_t = \alpha + \beta \Delta r_t + \gamma \Delta e_t + \delta \Delta pm_t + \phi \Delta pag_t + \nu \Delta g_t + \varepsilon_t
\]  

(2)

Where, \( \beta < 0, \gamma < 0, \delta > 0, \phi > 0, \nu > 0 \)

\( \Delta \) = Difference operator  
\( \Pi \) = Consumer Price Index or CPI (base year 1990 = 100)  
\( \pi \) = Inflation (rate of change in CPI), or \( \Delta \Pi \)  
\( r \) = Interest rate (an average weight between 1-day interest rate in the repurchase market and the minimum lending rate or MLR)  
\( e \) = Nominal effective exchange rate (NEER)  
\( pm \) = Import Price Index (unit value index, base year 1985 = 100)  
\( pag \) = Agricultural Price Index (weighted average of major crop and livestock)  
\( g \) = Government Fiscal Indicator (ratio of expenditure to revenue of the government)  
\( \varepsilon \) = Error variable

A formulation of inflation determining model like (2) is based on an eclectic view of different theories of inflation determination. A preference for this type of specification is not an arbitrary choice. Indeed, it is based upon a priori knowledge of the institutional framework of
Thailand’s economic structure which, in many aspects, appears to be different from that in developed countries\(^3\). It would be worth noting, however, that some important factors that might have potential influence on behaviour of the inflation rate have not yet been included in equation (2). It is planned to incorporate some additional factors such as world income and potential output in the subsequent study.

It is important to note also that the weight of interest rate \((w_r)\) together with the weight of the exchange rate \((w_e)\) in equation (1) can be calculated from the coefficients from equation (2) which equal:

\[
\frac{\beta}{\beta + \gamma} \quad \text{and} \quad \frac{\gamma}{\beta + \gamma}, \quad \text{where } \beta < 0 \text{ and } \gamma < 0
\]

4. Empirical Results

4.1 Estimating the Weight of Interest Rate and the Exchange Rates

The monthly and seasonally unadjusted data employed in this paper cover the period from January 1990 to July 1998. They were obtained from the Bank of Thailand Monthly Statistical Bulletin or the Bank's in-house data base.

The econometric results as seen in Figure 5 suggest that Model A and Model B can explain the movements of the inflation rates fairly well. The estimated coefficients obtained from the two models, especially those associated with the interest rate and the exchange rate variables, have the right signs and are consistent with economic theories. For instance, the esti-

\[^3\] Generally speaking, a simple macroeconomic model that can be used to characterize a set of potential determinants of the inflation may include the following equations:

\[
y^{s}_t = \gamma (p_t - E_{t-1} p_{t-1}) + \varepsilon^s_t
\]

\[
y^{d}_t = -\alpha r - \beta (e_t + p_t - p_{t-1}) + \varepsilon^d_t
\]

\[
R_t = R_{t-1} + E_{t} e_{t+1} + \varepsilon^x_t
\]

\[
r_t = R_t - E_t (p_{t-1} - p_t)
\]

\[
P_t = \phi p^d_t + (1 - \phi)(e_t + p^f_t)
\]

Equation (i) is an aggregate supply equation which assumes the production level to rely on expected price and supply shocks \((\varepsilon^s_t)\). Equation (ii) represents an aggregate demand equation hypothesized to depend on interest rates, exchange rates and demand shocks \((\varepsilon^d_t)\). Equation (iii) shows the equilibrium of the international capital market. Equation (iv) describes the behaviour of the real interest rate which is the difference between interest rates and expected inflation rates. Equation (v) shows the movement of the price index by averages between domestic and international prices. For a detailed discussion of the model used in this paper, see Duguay (1994), Nadal-De Simone et.al. (1996), among others.
mated coefficients of the interest rate and the exchange rate calculated from Model A take the values of -0.272 and -0.0818, respectively.

In addition, Model A and B seem to have a similar lag structure. More importantly, the changes in interest rates were found to have significant impacts on the inflation rate after the lag of 4 periods compared to 7 periods in the case of changes in the exchange rates. However, it is important to note that the exchange rate was found to have no significant influence on the movements of the inflation rates when the number of lag variables was adjusted downward from 7 to 4 lags as in the case of Model C.

The finding that interest rate effects the inflation after 4 months and the exchange rate after 7 months is of particular importance. The empirical findings of the kind also lent support to the monetary economic theory which states that changes in the monetary policy actions appear to have a long and variable impact on the ultimate targets of monetary policy.

Comparing the relative importance between interest rate and the exchange rate in influencing the inflation, in each model the coefficients on the interest rates have larger values than those of the exchange rate. Empirical evidence of this kind is considered to be essential information for the construction of the MCI index which is basically derived from the weighted average of the interest rate and the exchange rate as expressed in equation (1).

Note that the $R^2$ figures calculated from Model A, B, and C have relatively low values. Nonetheless, the low values of the reported $R^2$ are regarded as the natural result in an econometric analysis in which variables in 'first difference' are used in an empirical analysis. Indeed, the calculated $R^2$ may have a higher value if the variables used are in 'level' form instead of 'first difference' form. Nonetheless, the use of variables in 'level' form may result in a spurious relationship problem, especially in the case where the variables used are associated with time trends. A more detailed explanation on this issue, see Hataiseree (1995c).

4.2 The Construction of the MCI

Judged from the estimated coefficients on interest rate and the exchange rate variables, it is likely that the ratio of the MCI index in the case of Model A, B and C, are in the values of 3.3:1, 3.5:1 and 9:1, respectively. However, the subsequent analysis is based on Model A, as it appears that the estimated coefficients from Model A tended to be relatively statistically more credible when compared to those derived from Model B and C.

On the whole, the empirical findings seem to suggest that Thailand’s MCI ratio to be roughly 3.3:1. More importantly, the interest rate channel into demand pressure, and thus inflation, is found to be not only more powerful than the exchange rate channel, but it is also faster impact.

It would be worth noting, however, that the Thai MCI ratio of 3.3:1 seems to be slightly larger than those of other small open economies such as New Zealand, Sweden, Canada. The estimated values of the MCI ratio are reported to be in an approximate value of 2:1 for New
Zealand (Nadal-De Simone et al. 1996); 2:1 for Sweden (Hansson and Lindberg 1994); 3:1 for Canada (Freedman 1995). One possible factor attribute to a relatively larger weight on interest rate may be associated with the fact that Thailand has pursued monetary policy using the flexible exchange rate within a much shorter period compared to those countries aforementioned. As such, the exchange rate channel on demand pressure, and thus inflation, may have not yet produced a full impact compared with the interest rate channel.

One important implication of the MCI index calculated from Model A is that in the case where the baht is expected to weaken at the average of 3.3 percent in a period of time, the monetary authorities may have to influence the way of forecasting by pushing up the interest rate averaging 1 percent provided that other variables in the model being unchanged. This sort of operations is needed if the officials concerned do not want the weakening of the baht to affect the forecasting of future inflation.

Nonetheless, considerable care needs to be taken in interpreting the estimated MCI ratio. For example, the authorities concerned are not necessary to automatically push up the short term interest rate to a ratio of 1:3.3 (or by 12 percent) in the case where the baht has weaken by more than 40 percent. This seemed to be the case during the first six months after the floatation of the Baht since July 2, 1997. In other words, the authorities concerned need to evaluate and take into account the consideration of the movements of some other factors (e.g. credit expansion or the changes in money supply) that might effect the forecasting of the future inflation rates.

Although the weakening of the baht may have adverse impact on the forecasted inflation, however, after an in-depth evaluating of the recent economic and financial developments, there seemed to be insufficient evidence supporting an upward adjustment in the interest rates. For one thing, credit extensions in the private sector tended to decline dramatically following unfavourable economic conditions which do not support commercial banks to extend credits. In effect, it is not always necessary for the monetary authorities to adjust the market interest rates in line with those as implied from the calculated MCI ratio, especially in the case where there are good reasons to believe that some other factors might have exerted the opposite influences on the forecasted inflation.

It is important to note that the calculated MCI ratio may be of particularly sensitive to changes in the structure of the economy. As one can see, the MCI ratio calculated in this study is based on data ranging from January 1990 to July 1998, a period in which there were several shifts in the economic system, especially those related to the change in the exchange rate regime, from the basket regime to the managed float regime. For this reason, it is necessary to be cautious in inferring the value of the coefficients derived from the model in this study. In particular, one has to be extremely cautious when opting for using this sort of information in the empirical analysis.

Figures 6 portrays the movements of the estimated MCI using the monthly data from January 1990 to July 1998. As one can see, the movements of the MCI index appeared to be
able to reasonably reflect the tightening or relaxing of the stance of monetary policy. More
detailed exposition of this is discussed in the following section.

4.3 The Relationship between the MCI and the Inflation Rate

Figure 7 shows the comparison of movements of the interest rate, inflation rate, and the
rate of change of the MCI index. Figure 8 demonstrates the movement of the exchange rates, interest rates and the MCI index from January 1990 to July 1998.

From Figure 8, the monetary policy became less tight on average 3% during the year
1992-1994 compared to the base year 1990. As one can see, the MCI index tended to decline continuously during the mentioned period. However, the monetary policy became more discipli-
plined during the year 1995 until the period prior the floatation of the baht. Thereafter, the overall tightness of monetary policy lessened slightly as the rate of increase in the interest rate was less than the rate of depreciation of the baht. Nonetheless, when the baht hit the lowest value in January 1998, the monetary policy became tighter again. This could be noticed from the increase in the rate of interest in the repurchase market particularly in January 1998 when the repurchase rate reached the recorded peak of 24%. However, the monetary policy became more loosened in the second quarter of the year 1998 when the baht continued to show signs of stabilization.

It is important to note, however, that the degree of tightness of the monetary policy showed a significant transformation from mid-1997 to January 1998. The MCI index declined continuously during the mentioned period due to the rate of depreciation of the baht being more than offset by the increase in the interest rate.

The fact that the monetary policy was less tight than it should have been otherwise since the second half of the year 1997 could have been one possible reason for the relatively high inflation rate in that period. This is particularly the case, especially in the environment where the market expected the baht to have been pressured into further depreciation, while the authorities concerned were obliged to alleviate the liquidity problem in the money market.

Another noticeable point is the direction of the MCI index (which manifests the degree of tightness of the monetary policy) and the rate of inflation appeared to be in line with the recent movements of the flexible exchange rates. However, one needs to be cautious in assessing the further direction of the baht, as the bath may be adversely affected by an increasing uncertainty of the international economy in the recent periods. Such an unfavourable international environment may cause depreciation of the Thai baht and, thus, may result in a higher rate of inflation as implied from the relationship mentioned earlier. This is particularly the case where a reduction in the interest rate is chosen with a view to encouraging the resumption of the economy in the real sector.

5. Conclusions and Implications for the Conduct of Monetary Policy

This paper has established that in small open economies like Thailand monetary policy can be transmitted through both interest rate and the exchange rates.
As the MCI index clearly manifests the comparison of the importance of the interest and the exchange in effecting the aggregate demand and the price stability which is one of the most important objectives for many central banks, the MCI index can thus be served as an useful indicator for the monetary authorities when making policy decisions. Using a MCI index which characterizes the relative importance of interest rate and the exchange rates on inflationary pressure provides a better indication of the policy stance compared to either interest rate and the exchange rates alone.

The empirical analysis in this study suggests that the relative importance of the interest rate and the exchange rate (MCI ratio) to be 3.3:1. The finding of this kind is essential in improving an assessment of the policy stance of the central bank. In particular, the assessment of economic and monetary conditions using the MCI index was found to be more effective than that using either interest rate or the exchange rate alone as an independent variable.

The study also provides an empirical analysis of the relationship between the MCI index and the inflation rate for the Thai economy. The empirical results seem to suggest that the overall movement of the MCI index has some correlation with the movement of the inflation rate.

Another important implication of this finding for the conduct of monetary policy is that the MCI index appears to be an useful indicator for the short-term outlook of monetary conditions which can be used to influence the future movements of the inflation rate to be in line with the target. In addition, the finding reflects that the exchange rate plays an increasing role in transmitting the effect of monetary policy to the real economy and, thus, the inflation rate. The development of this kind is deemed to be consistent with the recent economic conditions and developments in Thailand.

Although the above findings seem to provide many positive aspects in using the MCI index as one of the indicative instruments in comparing the impact of interest rate and the exchange rate on the rate of inflation, the actual application of this index in the conduct of monetary policy in Thailand calls for a further study in many important areas. Chief among these are:

Firstly, one can debate whether the MCI is correctly calibrated, whether a 3.3 percent fall in the exchange rate is equivalent to a 1 percent movement in interest rate. Additionally, one can debate whether the Trade Weighted Index, represented by NEER, correctly measures the movements of the Thai baht.

Secondly, the Thai authorities need to decide between using the MCI index as an operational target (as in the case for New Zealand and Canada) or as an useful indicator for the future assessment of the policy stance (as being the case for those operating in many Scandinavian countries).

Thirdly, the degree of tolerance for the movements of the MCI index needs to be reasonably established. The important message is that in order for the MCI to be effective, the
authorities need to be flexible in implementing the policy instruments, thus preventing the use of the MCI index as a fixed formula.

Fourthly, an empirical evaluation of the monetary conditions and its likely outlook, using the MCI index in real or in nominal term as presented in this paper, needs to be compared to ascertain whether or not there is any statistically significantly different.

Lastly, price stability has long seen regarded as one of the main objectives for the conduct of monetary policy. However, careful consideration needs to be projected at the choice between using the inflation targeting or monetary targeting regime\(^4\) in order to be most applicable and consistent with the Thai economy. As seen from the empirical analysis, together with the changing of the exchange rate regime from fixed exchange rate regime to the managed-floating regime, the reliance on the fixed exchange rate as a nominal anchor to control the rate of inflation has now been removed.

\[4\] The empirical findings reported in Hataiseree (1993, 1998a, 1998b) seem to lend supports for the use of the monetary targeting as a potential framework for the conduct of monetary policy in Thailand. In particular, the demand for money M1 was found to be stable and, thus, can be used as a guidepost to control the inflation rate. In addition, M1 was found to have both short-term and long-term relationships with the monetary base which is considered the main monetary instrument of the authorities. As such, M1 seems to be a leading indicator for the future movements and likely outlook of the inflation rate.
<table>
<thead>
<tr>
<th>Country</th>
<th>Date first instituted</th>
<th>Current target</th>
<th>Time-frame</th>
<th>Inflation measure</th>
<th>Factors excluded from CPI</th>
<th>Target announcement</th>
<th>Inflation forecasts published?</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>March 1990</td>
<td>0-3%</td>
<td>5 years (to 1999)</td>
<td>Underlying CPI</td>
<td>Interest cost component excl. Mortgage interest payment (RPIX)</td>
<td>Defined in policy target agreement APA (RBNZ) between the Minister of Finance and the Governor of the Reserve Bank of New Zealand in terms of trade and other significant items</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>February 1991</td>
<td>1-3%</td>
<td>through end-1998</td>
<td>CPI</td>
<td>None</td>
<td>Joint agreement between the Minister of Finance and the Governor of the Bank of Canada</td>
<td>No</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>October 1992</td>
<td>2-4%</td>
<td>by spring 1997, 2.5% or less thereafter</td>
<td>CPI</td>
<td>None</td>
<td>Chancellor of the Exchequer</td>
<td>No</td>
</tr>
<tr>
<td>Sweden</td>
<td>January 1993</td>
<td>2%</td>
<td>1996 onwards</td>
<td>Underlying CPI</td>
<td>Mortgage interest payment</td>
<td>Bank of Sweden (Riksbank)</td>
<td>No</td>
</tr>
<tr>
<td>Finland</td>
<td>February 1993</td>
<td>2%</td>
<td>onwards</td>
<td>Underlying CPI</td>
<td>Mortgage interest payment</td>
<td>Bank of Finland</td>
<td>No</td>
</tr>
<tr>
<td>Australia</td>
<td>Summer 1994</td>
<td>less than 3%</td>
<td>for all years</td>
<td>CPI</td>
<td>None</td>
<td>Reserve Bank of Australia</td>
<td>No</td>
</tr>
<tr>
<td>Spain</td>
<td>Summer 1994</td>
<td>less than 3%</td>
<td>for all years</td>
<td>CPI</td>
<td>None</td>
<td>Bank of Spain</td>
<td>No</td>
</tr>
</tbody>
</table>

**Figure 2: Salient Features of Inflation Targeting**

**Country**
- New Zealand
- Canada
- United Kingdom
- Sweden
- Finland
- Australia
- Spain

**Inflation Target Band Width**
- New Zealand: 0-3% in December 1996.

**Date first instituted**
- New Zealand: March 1990
- Canada: February 1991
- United Kingdom: October 1992
- Sweden: January 1993
- Finland: February 1993
- Australia: Summer 1994
- Spain: Summer 1994

**Current Target**
- New Zealand: 0-3%
- Canada: 1-3%
- United Kingdom: 2-4%
- Sweden: 2%
- Finland: 2%
- Australia: less than 3%
- Spain: less than 3%

**Time-frame**
- New Zealand: 5 years (to 1999)
- Canada: through end-1998
- United Kingdom: by spring 1997, 2.5% or less thereafter
- Sweden: 1996 onwards
- Finland: onwards
- Australia: for all years
- Spain: for all years

**Inflation measure**
- New Zealand: Underlying CPI
- Canada: CPI
- United Kingdom: CPI
- Sweden: Underlying CPI
- Finland: Underlying CPI
- Australia: CPI
- Spain: CPI

**Factors excluded from CPI**
- New Zealand: Interest cost component excl. Mortgage interest payment (RPIX)
- Canada: None
- United Kingdom: None
- Sweden: None
- Finland: None
- Australia: None
- Spain: None

**Inflation forecasts published?**
- New Zealand: Yes
- Canada: No
- United Kingdom: No
- Sweden: No
- Finland: No
- Australia: No
- Spain: No

**Source:** Debelle (1997)
Figure 3: Major Frameworks for the Conduct of Monetary Policy

<table>
<thead>
<tr>
<th>Ultimate Target</th>
<th>Intermediate Target</th>
<th>Operating Target</th>
<th>Policy Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation Growth</td>
<td>Monetary Aggregates</td>
<td>Monetary Base</td>
<td>OMOs</td>
</tr>
<tr>
<td>Unemployment</td>
<td>Credit Aggregates</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation</td>
<td>Forecasted Inflation</td>
<td>MCI (MCI)</td>
<td>Interest Rates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Monetary Conditions Index)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4: Interest Rate and the Exchange Rate: Their Role as Indicators of Monetary Policy Stance

<table>
<thead>
<tr>
<th></th>
<th>$\Delta r$</th>
<th>$\Delta e$</th>
<th>Policy Stance (Monetary Conditions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>$r \downarrow$ (i.e. 15% → 10%)</td>
<td>$e \uparrow$ (i.e. 35 → 40)</td>
<td>Easy Monetary Policy</td>
</tr>
<tr>
<td>II</td>
<td>$r \uparrow$ (i.e. 10% → 15%)</td>
<td>$e \downarrow$ (i.e. 40 → 35)</td>
<td>Tight Monetary Policy</td>
</tr>
<tr>
<td>III</td>
<td>$r \downarrow$ (i.e. 15% → 10%)</td>
<td>$e \downarrow$ (i.e. 40 → 35)</td>
<td>Inconclusive (Depending on the Relative Importance of $r$ and $e$)</td>
</tr>
<tr>
<td>IV</td>
<td>$r \uparrow$ (i.e. 10% → 15%)</td>
<td>$e \uparrow$ (i.e. 35 → 40)</td>
<td>Inconclusive (Depending on the Relative Importance of $r$ and $e$)</td>
</tr>
</tbody>
</table>

Notes: $r$ = short-term interest rates  
$e$ = the exchange rate, defined here as baht/US dollar which is different from those in equations (1) and (2).
### Figure 5: The Relative Importance between Interest Rate and the Exchange Rate: The Estimation Results

<table>
<thead>
<tr>
<th></th>
<th>Model A</th>
<th>Model B</th>
<th>Model C</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \pi_t )</td>
<td>0.360121</td>
<td>0.3616</td>
<td>0.3867</td>
</tr>
<tr>
<td></td>
<td>(8.7)**</td>
<td>(8.9)**</td>
<td>(9.0)**</td>
</tr>
<tr>
<td>( \sum_{i=0}^{4} \Delta r_{t-i} )</td>
<td>-0.272 (-1.9)*</td>
<td>-0.289 (-2.0)*</td>
<td>-0.197 (-1.2)*</td>
</tr>
<tr>
<td>( \sum_{i=0}^{4} \Delta \ln e_{t-i} )</td>
<td>–</td>
<td>–</td>
<td>-0.0216 (0.9)</td>
</tr>
<tr>
<td>( \sum_{i=0}^{7} \Delta \ln e_{t-i} )</td>
<td>-0.0818 (-3.0)*</td>
<td>-0.0828 (-3.1)*</td>
<td>–</td>
</tr>
<tr>
<td>( \Delta \ln pag_{t-6} )</td>
<td>0.034 (2.19)*</td>
<td>0.0334 (2.1)*</td>
<td>0.0353 (2.1)*</td>
</tr>
<tr>
<td>( \Delta \ln pm_{t-6} )</td>
<td>0.0305 (2.0)*</td>
<td>0.030025 (2.0)*</td>
<td>0.0394 (2.6)*</td>
</tr>
<tr>
<td>( \sum_{i=5}^{9} \Delta g_{t-i} )</td>
<td>0.0071 (1.2)</td>
<td>–</td>
<td>0.0073 (1.2)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.17</td>
<td>0.17</td>
<td>0.09</td>
</tr>
<tr>
<td>( D.W. )</td>
<td>2.0</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>( F\text{-statistics} )</td>
<td>4.5**</td>
<td>5.6**</td>
<td>2.7*</td>
</tr>
<tr>
<td>( MCI \text{ ratio } (r:e) )</td>
<td>3.3:1</td>
<td>3.5:1</td>
<td>9:1</td>
</tr>
<tr>
<td>( W_r )</td>
<td>0.77</td>
<td>0.78</td>
<td>0.90</td>
</tr>
<tr>
<td>( W_e )</td>
<td>0.23</td>
<td>0.22</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**Notes:**
1) Figures in parentheses are t-statistics.
2) * and ** represent significance level of 0.05 and 0.01, respectively.
Figure 6: Different Paths of Monetary Conditions Index for Thailand
(January 1990 - July 1998)

Figure 7: Inflation, Interest Rate, and MCI
(January 1990 - July 1998)
Figure 8: Nominal Effective Exchange Rate (NEER), Interest Rate, and MCI

Baht Index (NEER)

Interest Rate (RP1, MLR: Averages)

Monetary Conditions Index (MCI)
References


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