

Box

Box: Estimating a Monetary Condition Index for Bangladesh³

Monetary condition index (MCI) is a type of measure of the overall effect of monetary policy on the economy. MCI offers a view of the relative ease or tightness in monetary conditions. This index allows central banks to monitor the effect of short-term monetary policy by linking changes in interest rates with changes to exchange rates. There are various methods of estimating MCI, given local market and other initial conditions. Interest rates and exchange rates are both important channels of monetary policy transmission. And thus, a combination of interest rates and exchange rates provides a better indicator of policy stance than either variable alone (Freedman 1995). This box provides a sample construct for estimating an MCI for Bangladesh for the period of 2005-2018 using monthly data.

In nominal term MCI at time t can be written as:

$$MCI_t = w_r(R_t - R_0) + w_e(E_t - E_0)..... (1)$$

where R_t is short-term nominal interest rate at period t, E_t is the nominal exchange rate in period t, R_0 and E_0 are nominal interest rate and nominal exchange rate, respectively, in a given base period, w_r and w_e are the MCI's weights with $w_r + w_e = 1$. In general, two steps are involved to construct a MCI. In the first step, weights of interest rate and exchange rate need to be calculated using some econometric model. The model could be either output model or inflation model. The idea is to reveal relative importance of exchange rate and interest rate on output or inflation estimation. This study relies on output model where dependent variable is Quantum Index (QI) instead of GDP as QI data is available at monthly frequency (GDP data is available on yearly basis only). Weighted average lending rate is used as a representation of interest rates. We use nominal exchange rate (dollar per taka) as another variable in the model.

$$QI_t = \beta_0 + \beta_1 \text{lending rate} + \beta_2 \text{exchange rate} + \epsilon_t..... (2)$$

In the second step, the normalized weights are applied in equation (1) to calculate monetary condition index. Applying co-integration technique the estimated equation is given below:

$$\log(QI) = - 9.05 \text{lending rate} - 4.34 \log(\text{exchange rate})..... (3)$$

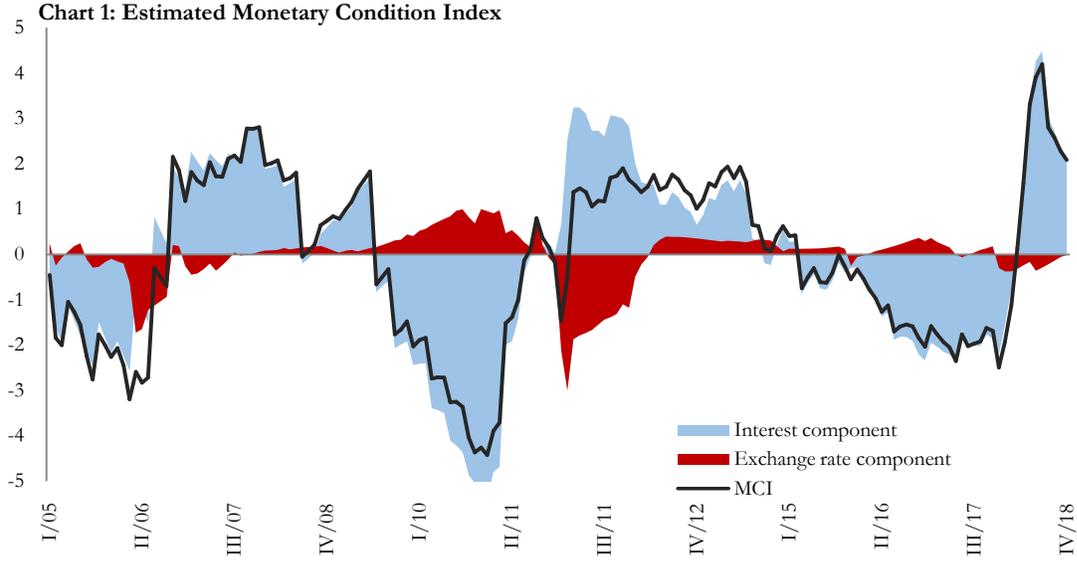
Both the coefficients exhibit expected signs and turned out to be statistically significant. From equation (3), the weights for interest rate (w_r) and exchange rate (w_e) suggest to be 0.68 [$w_r/(w_r + w_e)$] and 0.32 [$w_e/(w_r + w_e)$], respectively. The estimated monetary condition ratio is about 2:1 (w_r/w_e) which implies that a 1 percentage point change (100 basis points) in the interest rate or a 2 percent change in the exchange rate has about the same effects over time on aggregate demand as

MCI is calculated as the weighted average of the deviations of lending rate and the exchange rate from their equilibrium levels⁴. Positive values of MCI refer to tight monetary condition and negative values refer to easy monetary condition.

³ The team comprising of Md. Rashel Hasan, Md. Habibour Rahman, Raju Ahmed and Mahmud Salauddin Naser of Chief Economist's Unit. The views expressed in the paper are authors' own and do not reflect those of Bangladesh Bank.

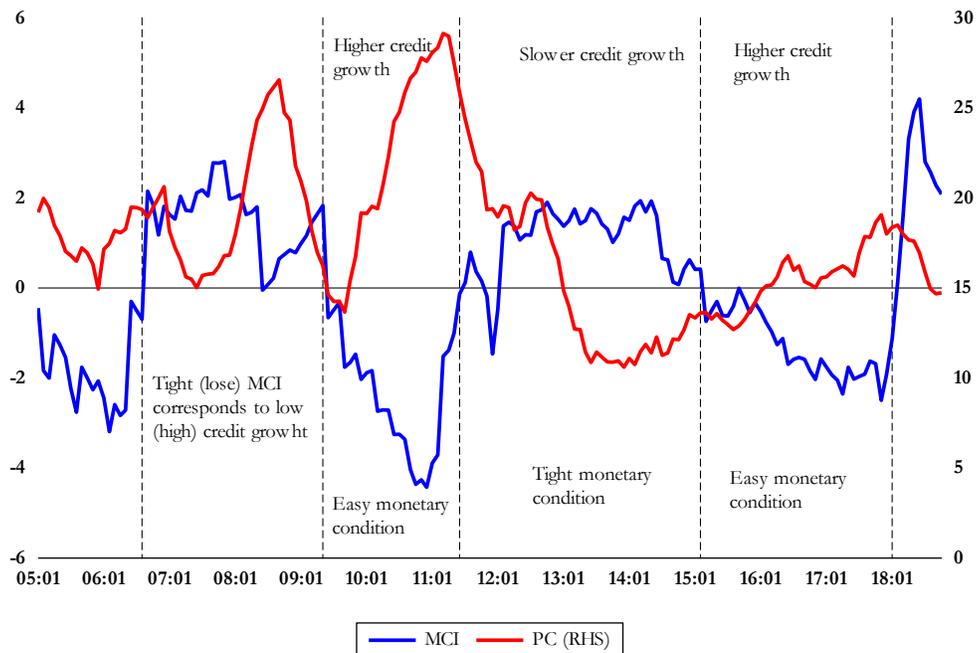
⁴ Instead of considering base periods to measure the deviations, Czech National Bank considers deviation from equilibrium level. In our case, equilibrium exchange rate and equilibrium interest rate has been calculated employing Hodrick-Prescott (HP) filter. In order to avoid end sample bias generated from HP filter, we truncated estimated value of both interest rate exchange rates for the last two months in our final results.

Chart 1 indicates various cycles of monetary condition index, with varying duration of each phase. Component wise MCI shows that the index movement is dominated by the interest rate and for some period exchange rate was moving in the opposites, off-setting the affect of the interest rate. The recent shift in MCI shifted as the global and domestic secular decline in interest rates that started in the aftermath of the Global Financial Crises initially slowed in 2017 and subsequently reversed.



One commonly used though somewhat simplistic proxy of monetary conditions in other countries is the trend of private credit, although that reflects both the demand and supply factors. Chart 2 shows that in Bangladesh easier monetary conditions were broadly accompanied by higher private credit growth and vice versa.

Chart 2: Monetary Condition Index and Private Credit Growth



To see how MCI is associated with inflation, the study explores the link between non-food inflation and monetary conditions, given their close theoretical link. In chart 3, it is seen that in almost all the time, higher inflation was associated with lower MCI. In other words, easier monetary condition was associated with higher inflation. However, during 2011-2012, sudden hike of fuel oil price in the international market contributed to higher inflation although MCI was tight, in line with expectations from the supply shocks.

Chart 3: MCI and Non-food Inflation

