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Revisiting the Monetary Conditions Index for Bangladesh

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Abstract

The monetary conditions index (MCI) combines the effect of interest rates and exchange rates in a single indicator and can be used for assessing the overall monetary policy stance. This paper attempts to construct MCI for Bangladesh for the period 2004 to 2020 using monthly data. The weights of interest rate and exchange rate are derived from the aggregate demand framework using Johansen's cointegration techniques. Our estimated monetary conditions ratio is 1.86:1 implying that a 1.86 percent increase (depreciation) in the exchange rate or a 1.0 percentage point rise (100 basis points) in the interest rate has about the same effects over time on aggregate demand. That implies the interest rate channel is stronger than the exchange rate channel in influencing monetary conditions in Bangladesh. This paper is different from Younus (2012) which estimated the monetary condition ratio as 4.88:1 based on the inflation model, reflecting the interest rate channel was even stronger during 2004-2011. The obtained estimates of MCI using the weights of interest rate and exchange rate fairly track the light and soft episodes of monetary policy stance which suggests that in the observed period monetary policy in Bangladesh was mostly expansionary. Furthermore, the findings of the paper show the movements between MCI and inflation are broadly opposite, suggesting that cautious monetary policy might able to tame inflation to some extent. Thus MCI can be used as an indicator of monetary policy decision-making instrument alongside other indicators.

Keywords: Monetary Condition Index, Monetary Policy

JEL Classification: E52, E58

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1 Introduction

Monetary Conditions Index (MCI) is a way of measuring the changes in monetary condition that influences the economic activities. To assess the changes in monetary conditions, central banks calculate the MCI that combined effect of interest rates and exchange rates on the price level and aggregate demand. The weights of interest rate and exchange rate can be obtained employing inflation model or aggregate demand model using the econometric technique. The weights represent the relative impacts of the variables (interest rate and exchange rate) on policy goals. In theory, this calculation allows central banks to monitor the effect of short-term monetary policy by linking changes in interest rates set by central banks with changes to exchange rates influenced by the foreign exchange market. The measure is typically used to help central banks craft monetary policy.

Monetary policy affects economic activities through a series of channels, which are collectively known as the transmission mechanism. Many central banks around the globe, particularly emerging economies, are entrusted with the responsibilities of pursuing multiple objectives of maintaining price stability, supporting inclusive, equitable, and environmentally sustainable economic growth along with the financial stability. Therefore, central banks pursue monetary policies that might have a fragile commitment to its prime objective i.e. price stability. Assigning multiple objectives to central banks induce them to deemphasize on single transmission channels of monetary policy.

In the implementation of policies, central banks try to affect the final targets of monetary policy (usually inflation and growth) with its policy instruments (such as short-term interest rate) through influencing key financial variables such as interest rates, exchange rates etc. with different lags. But the financial deregulations and innovations (both financial and technological) made it difficult for central banks to follow a single channel of monetary policy.

Thus, not only from the point of view of pursuing multiple objectives but also from the perspective of implementation of monetary policy, it is difficult for central banks to rely on single channels of transmission. It is known by the central banks with the time that no single transmission mechanism is enough to understand the monetary policy stance of that country. As a result, the MCI is getting higher importance in central banks' thinking. The appeal of the MCI can be seen from two perspectives:

Firstly, the MCI is based on the transmission of monetary policy that combines two main channels with two monetary transmission variables including the interest rate and exchange rate.

Secondly, the primary usefulness of such a composite index is that the signal provided by the underlying variables is clear and more employable.

Interest rate affects output through its impact on the intertemporal consumption and savings decisions of households, as well as the intertemporal investment decisions of firms. Meanwhile, the exchange rate influences output through its impact on the relative price of domestically versus foreign-produced goods. Thus, a combination of interest rates and exchange rates provides a better indicator of policy stance than either variable alone (Freedman 1995).

Bangladesh has instigated a number of measures in the last decade, including financial innovations within the banking system, financial inclusion activities and updating payment technologies that rapidly transformed the landscape of the financial sector. These financial reforms seem to have affected the behavioral pattern of the velocity and hence could cause instability in the underlying money demand relationship with important consequences for the conduct of monetary policy. Technological development led to greater integration of financial markets and facilitates the faster transaction of monetary policy impulses, thereby helping interest rates emerge as a most preferred operating instrument for Bangladesh.

On the external front, with significant trade and financial account openness in the last two decades, Bangladesh economy has become considerably more integrated with the global economy. Despite the dominance of domestic demand, the role of foreign flows in conditioning the growth process in Bangladesh has become important over time. The domestic economy now reflects global economic developments reasonably quickly. A higher degree of trade openness and integration of Bangladesh economy with the rest of the world have also imparted difficulties in targeting exchange rates, inducing Bangladesh Bank (BB)-the central bank of Bangladesh increasingly adopts flexible exchange rate regime. As a result, instead of putting increasing reliance on either monetary targeting or exchange rate targeting in the conduct of monetary policy, BB may rely more on an assessment of overall monetary conditions that originating from changes in both domestic and external macroeconomic factors.

The most obvious benefit of the MCI is that it is straightforward and easy to understand. In general, two steps are involved to construct the 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. This study relies on output model where the dependent variable is Quantum Index of manufacturing industries (QI) instead of GDP as QI data is available at the monthly frequency (GDP data is available on yearly basis only). The weighted average lending rate is used as a representation of interest rates. We use the nominal exchange rate (dollar per taka) as another variable in the model.

In light of the foregoing, the objectives of the study are to

- Construct MCI in the context of Bangladesh;
- Identify the extent of interest rate and exchange rate on the MCI;

The study attempts to answers two following questions

- What are the important sources of changes in monetary conditions in Bangladesh?
- How MCI and inflation is moving over time;
- How should we use MCI in explaining the current stance of monetary policy?

Our study contributes to the existing literature on MCI in Bangladesh in several ways. Firstly, in the earlier study, Yonus (2012) estimated the weights of interest rate and exchange rate based on inflation model. However, the effect of interest rate and exchange rate are viewed as equally important influencing output in small open economies (Kannan 2006, Hyder 2006). In this paper, we exploited aggregate demand model to estimate the relative weights of interest rate and exchange rate[2]. Our results suggest that the weight of interest rate and exchange rate is 0.65 and 0.35 respectively. And the estimated monetary conditions ratio is 1.86:1, implying that a 1.0 percentage point rise (100 basis points) in the interest rate or a 1.86 percent increase (depreciation) in the exchange rate has about the same effects over time on aggregate demand. That implies that the interest rate channel is stronger than the exchange rate channel in influencing monetary conditions in Bangladesh.

Secondly, while calculating MCI, the common practice is to deduct the actual value of interest rate and exchange rate from that of a specified base period. In such case, the movement in MCI (up or down) need to be compared to that base period. However, few papers also do the deviation

[2] We also exercised the inflation model while calculation weight of interest rate and exchange rate. The details can be found in the annexure.

of interest rate and exchange rate from their equilibrium levels. For instance, the Czech National Bank (CNB) in their inflation report published in the second quarter of 2015 utilized that technique. MCI that uses the deviation of interest rate and exchange rate from their equilibrium level make it possible to compare the movement of MCI of a specific time point relative to the same time point. This paper study tried to estimate the equilibrium level of interest rate and exchange rate by using Hodrick-Prescott (HP) filter as did by CNB bank and finally obtained MCI values[3].

Obtained estimates of MCI using the weights of interest rate and exchange rate, suggest that in the observed period monetary policy in Bangladesh was mostly expansionary, as reflected by easing monetary condition. The paper also identifies four tight and three soft periods of monetary stance during 2004 to 2020. Furthermore, our findings show the movements between MCI and inflation are broadly opposite, suggesting that cautionary monetary policy can tame inflation.

The study proceeds as follows. Following the introduction in Section-1, section-2 reviews the related studies on the concept of MCI. Section-3 outlines the various analytical and empirical issues in constructing the index taking into the structural characteristics of Bangladesh economy, while section 4 looks at the implications and interpretations of its movement in recent years. The concluding observations are specified in section-5.

2 Literature Review

Monetary Condition Index was developed in the early 1990 and used as an operational target by the Bank of Canada and Reserve Bank of New Zealand (Neil R. Ericcson et al., 1998). Moreover, many international institutions such as IMF, OECD, Goldman Sachs, JP Morgan, Merrill Lynch, and many others calculates MCI for different countries to track monetary policy stance.

In 1997, Dennis, R. estimated MCI for New Zealand using monthly data over the period 1986-1996. To estimate the effect of real interest rate and real exchange rate on excess demand, the study exploits output gap equations. The result indicated a ratio of interest rate and exchange rate

[3] We also calculated MCI where the interest rate and the exchange rate has been deducted from a pre-defined base period and can be found in the annexure.

is approximately 2:1. The findings of this study suggested MCI give a better indication of the monetary policy stance than either variable alone (interest rate and exchange rate).

Hataiseree, R. (1998) constructed MCI for Thailand over the period of January 1990 to July 1998 based on inflation model linking to import price index, agricultural price indices and government fiscal indicator. Their result indicated the ratio of interest rates and exchange rates were 3.3:1. Their study employed autoregressive distributed lagged model as econometric technique. The resultant MCI ratio indicates that 1 percent change of interest rate in monetary stance offset by 3.3 percent change of exchange rate.

Kesriyeli and Kocaker (1999) generated monetary condition index (MCI) for Turkey using inflation model. Their study incorporates real interest rate and real effective exchange rate while estimating weights. The study suggests that the exchange rate is more sensitive than the interest rate for the monetary transmission channel in Turkey.

Afterwards, in 2002, Abdul Qayyum estimated a monetary condition index (MCI) for Pakistan over the period 1990 to 2001. Their study relied on inflation model to estimate the weights of interest rate and exchange rate. The estimated weights of interest rate and nominal exchange rate were 0.736 and 0.264 and in terms of ratio, it becomes 2.79:1. Their resultant MCI indicates that monetary condition was tight during 1997 to 1999.

In another Study, Peng and Leung (2005) calculates a monetary conditions index (MCI) using quarterly data from 1994Q1 to 2004Q2 for assessing monetary conditions on Mainland China. They estimated two forms of MCI (narrow and board) using real interest rates, real effective exchange rates and credit supply in aggregate demand equation. The estimated MCI suggests easing monetary conditions with an appreciation of the local currency, reducing the interest rate, grew of bank credit which is accelerated to economic growth.

Tobias (2005) developed a monetary condition index for South Africa over the period of 1994Q1-2003Q4. They estimated the weights of real interest rate and real effective exchange rate by least square approach where the output gap was the dependent variable. The study shows the ratio of interest rate and exchange rate was 1.9:1 that means the real interest rate is more influential than the exchange rate on the monetary transmission process for South Africa.

Hyder and Khan (2006) constructed the monetary condition index for Pakistan and relative weights of interest rate and exchange rate have been calculated using Johansen cointegration approach. The estimated MCI found that there were eight tightening and six easing episodes of monetary conditions in Pakistan over the period of 1991 to 2006.

Khannan et al. (2006) estimated monetary condition index (MCI) for India over the period of 1996Q2 to 2007Q1. Their paper constructed broad MCI which derived from credit growth with interest rate and exchange rate channel along with traditional narrow MCI. Their analysis indicates that interest rate is more sensitive than the exchange rate to explain the monetary condition in India.

Similarly, Poon, W. C, et al. (2008) estimate a monetary condition index by examining the relationship among real interest rate, exchange rate, share price and claims on private sector credit with regards real output in Singapore. This study uses ARDL bound test approach to calculate the weight of the selected variable as estimated to MCI ratio. The result of this study indicates that monetary authorities consider MCI indication to take their monetary decision because MCI is significantly interlinked with real output in Singapore. This analysis suggests the MCI will more efficient in inflation targeting regime in Singapore.

Younus, S. (2012) derived Monetary Condition Index (MCI) for Bangladesh using weights of real lending rate and nominal exchange rate through the price equation model over the period of 2004 to 2011. The paper shows the weights of interest rate and the exchange rate was 0.83 and 0.17 respectively and the ratio of these two rates become 4.88:1. It indicates that 1 percentage change in the lending rate would have 4.88 percent offsetting effect on the exchange rate.

Horry, H., et. al. (2018) calculated the monetary condition index for Iran for the period of 1978 to 2012. They used ARDL approach to estimate the weight of MCI variable based on the demand equation. They found the exchange rate is more powerful than the interest rate to influence monetary condition in Iran.

3 Construction of MCI

3.1 Methodology

The MCI is defined as the weighted average sum of the changes in the interest rates and in the exchange rates in relation to the base period.

$$MCI_t = w_r(i_t - i_0) + w_e(e_t - e_0), \quad w_r + w_e = 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where i_t is short-term interest rate and e_t is the exchange rate in period t respectively, i_0 and e_0 are interest rate and exchange rate, respectively, in a given base period, w_r and w_e are weights of the interest rate and exchange rate express the impacts of those parameters on policy goal such as output growth or inflation. Both interest rate and the exchange rate could be either in nominal or real term, however, estimated MCIs derived from nominal or real terms would have similar movements in the short-run as relative prices and inflation rates are reasonably the same (Eika et al (1996)).

The construction of MCI is involved in several steps. At the very first, we need to estimate the weights of the exchange rate and the interest rate as those are not directly observable. The literature addresses various methods to estimate those weights using econometric techniques. The most commonly used theoretical models are aggregate demand equation or price equation (IMF, OECD, Deutsche Bank estimated MCI using these approaches). Kannan and Bhoi (2006) also exploited the aggregate demand model to estimate weights of interest rate and exchange rate for the Indian economy. As a small open economy like Bangladesh, both interest rate and exchange rate can be considered as policy variables in the monetary transmission process. Moreover, changes in the interest rate and exchange rate can significantly influence both domestic demand and export earnings (external sector heavily dependent on export, more than 80% of external income is coming from export). To quantify the relative importance of interest rate and exchange rate, we exploited the aggregate demand model. As the relationship among output, interest rate and exchange rate may be dynamic in nature and all the three variables exhibited having unit-roots, we applied Johansen's co-integration technique to reveal both short-term and long-term relationship among them. Aggregate demand equation can be expressed as below:

$$y_t = \beta_0 + \beta_1 i_t + \beta_2 e_t + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where y_t is aggregate demand, i_t is short-term interest rate, e_t is the exchange rate ϵ_t is the error term.

3.2 Data

Data of the selected variables namely lending rate, exchange rate and quantum index are observed on a monthly basis from July 2004 to August 2020. It may be noted that a market based floating exchange rate has been introduced in the mid of 2003. The study period has been incorporated since 2004 to capture the effect of market-based exchange on the economy. The lending rate was used as a proxy variable to track the interest rate channel of the monetary policy transmission mechanism. The bilateral nominal exchange rate has been employed to capture the exchange rate channel. Both weighted average lending rate and nominal exchange rate have been collected from Bangladesh Bank's various publications. Quantum index of manufacturing industries has been used as a proxy of gross domestic product (GDP) to quantify economic activities (GDP is available annual basis only). Data on the quantum index has been incorporated from the Bangladesh Bureau of Statistics.

3.3 Model Specification

As discussed earlier, we need to have relative weights of interest rate and exchange rate to construct MCI. In order to estimate weights of interest rate and exchange rate, we rely on the output model which is shown in the following equation (3):

$$logQ_t = \beta_0 + \beta_1 LR_t + \beta_2\, log\_exch_t + \epsilon_t \quad \text{..... (3)}$$

Where $logQ_t$ is the quantum index for manufacturing industries in logarithm form for time t, LR is the weighted average lending rate, log_exch refers to nominal exchange rate taka per USD in logarithm form, $\beta's$ are the parameters to be estimated and ε are error term.

3.4 Testing Stationarity of the Data

The property of data, whether it has unit root or not, is checked by the standard ADF method and Phillips-Perron unit root test. All data series except lending rate are in natural logarithm. The result reported in Table 3 indicate that all the series are not stationary evident by both the ADF

test and PP test. However, the first difference of each of the data series shows stationary at 1% significance level according to both ADF and PP test.

Table 1: Unit Root Test

Variable	Level		First difference	
	t-stat, ADF test	t-stat, PP test	t-stat, ADF test	t-stat, PP test
logQ	-0.506	-0.741	-5.266***	-40.708***
LR	-0.354	0.204	-4.539***	-11.621***
log_exch	-2.207	-2.108	-6.413***	-10.607***

Note: ***, **, * indicate significance at 1, 5 and 10% respectively

3.5 Cointegration Analysis

As data series can be made stationary after first differencing, there is a possibility that data series might have a co-integration relationship in the long-run. We can apply Johansen (1988, 1990) techniques to test the co-integration relationship among the variables (output, interest rate and exchange rate). Before applying co-integration technique, selection of appropriate lag length is very important. Optimal lag length can be determined with the help of the unrestricted VAR model. After running unrestricted VAR, optimal lags have been selected as 1 on the basis of Schwarz Criterion (SC). Johansen's cointegration technique that uses both maximum eigenvalue and trace statistics has determined the existence of one co-integrating vector. Table 2 displays test statistics values that can be obtained from both rank test and trace tests.

Table 2: Cointegration Results Based on Johansen Test

	Max Rank Test H0		Trace Test H0	
	r =0	r =1	r =0	r =1
Intercept and no trend				
[logQ, LR, log_exch]	25.33**	8.99	35.94**	10.60

** Denotes rejection of null hypothesis at 5% significance level

Based on the normalized value that we got from the first cointegrating analysis can be represented in the following equation:

$$\log Q = -8.09\, LR + 4.27\, log\_exch \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

(0.0164) (0.2489)

Both the coefficients exhibit expected signs and turned out to be statistically significant (values in the parentheses are standard error). That is an increase in lending rate lowers aggregate demand. On the other hand, an increase in nominal exchange rate measured as taka per UDS (depreciation) has positive impact on aggregate demand. From this estimated model we can obtain weights of rate of interest and exchange rate. From equation (3), the weights for interest rate (w_r) and exchange rate (w_e) suggests to be 0.65 [$(w_r/(w_r + w_e)$] and 0.35 [$(w_e/(w_r + w_e)$], respectively. The estimated monetary condition ratio is about 1.86:1 (w_r/w_e) which implies that a 1.0 percentage point rise (100 basis points) in the interest rate or a 1.86 percent increase (depreciation) in the exchange rate has about the same effects over time on aggregate demand. That implies interest rate channel is more powerful than exchange rate channel to influence aggregate demand in Bangladesh. Kannan (2006) who exploited output model for India and also found interest rate channel is superior to exchange rate (estimated ratio of interest rate and exchange rate was 1.36:1 for India). Moreover, Younus (2012) exploited inflation model to estimate relative weight of interest rate and exchange rate and found the ratio 4.88:1 for Bangladesh during January 2004 to March 2011.

4 Movements of the Monetary Condition Index: Implications and Interpretations

By using estimated weights that we obtained in the preceding section, a monetary condition index has been prepared. While calculating MCI, the common practice is to deduct the actual value of interest rate and exchange rate from that of a specified base period as shown in eq(1). However, few studies also use the deviation of interest rate and exchange rate from their equilibrium levels[4]. This study tried to estimate the equilibrium level of interest rate and

[4] For instance, the Czech National Bank (CNB) in their inflation report published in the second quarter of 2015 utilized that technique.

exchange rate by using Hodrick-Prescott (HP) filter as did by CNB bank[5,6,7]. This would provide the possibilities to compare any situation with the equilibrium and to conclude whether or not the monetary conditions in the period have been too tight or too loose compared with the equilibrium period. By using the relative weight of interest rate and the exchange rate of 0.65 and 0.35 respectively, MCI values have been calculated using equation (1). Thus a rise in MCI values refer to an indication of tight monetary condition and a fall in MCI values indicate an easing of the monetary condition[8].

Based on the values of MCI, chart 3 displayed different phases of the monetary conditions in Bangladesh. The development of the MCI shows that there are seven distinct phase of monetary conditions during July 2004 to August 2020 of which four indicates ease monetary conditions and three shows tight monetary conditions.

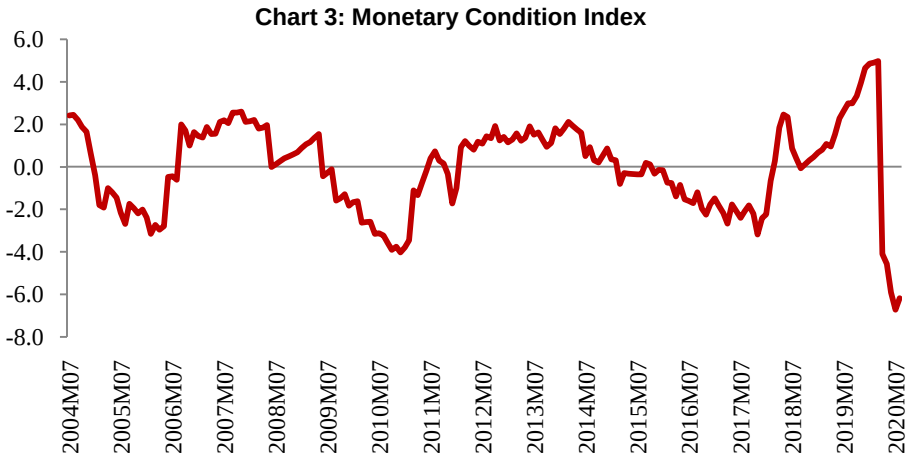
[5] Although MCI calculated based on deviation from a base period or deviation from equilibrium level would have result similar interpretation, the later would be more useful as it would not require comparing the tightness or easiness from a specific period in time.

[6]Estimates of MCI based on the deviation from the interest rate exchange rate from a base period have also been calculated and can be found in the annexure.

[7] In order to avoid end sample bias generated from HP filter, we truncated the estimated value of both interest rate exchange rates for the last two months in our final results.

[8] While calculating MCI using equation (1), nominal exchange rate has been used as dollar per taka. So an increase in the exchange rate indicates domestic currency appreciation and thus higher interest rate and currency appreciation will resultant higher MCI (that is, tight monetary condition). MCI values close to zero indicates a neutral monetary condition.

$$MCI_t = w_r(i_t - i_0) + w_e(e_t - e_0), \quad w_r + w_e = 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$



Phase I: The downward movement of MCI since the beginning of 2005 until mid-2006 indicates an easy monetary policy stance. Bangladesh economy was adversely affected by the 2004 flood. Accordingly, the monetary policy stance in 2005 has been supportive of growth reflecting in part by increased lending to the agricultural sector for flood rehabilitation. But an accommodative stance generated pressures on the exchange market leading to a sharp fall in the nominal exchange rate (depreciation) exacerbated further by the aftershock of the introduction of the market-based floating exchange rate in May 2003.[9] At the same time, Bangladesh economy faced with an upswing in global oil and commodity price that contributed to a surge in inflation. Subsequently, a tighter monetary policy stance was essential to ensure price stability and orderly exchange market conditions. Monetary tightening came in the form of an upward adjustment of repo interest rate and Cash Reserve Requirement (CRR).

Phase II & III: As depicted by the upward MCI, the monetary conditions were tight in most of the period in FY2006-FY2009 with GDP growth remained firmed spurred by strong growth of export and remittances. But inflation remained uncomfortably high due to multiple natural disasters and elevated international food and fuel prices. Government and private sector credit growth soared during the period due to the need to finance rice procurement from domestic

[9] Since the introduction of floating the exchange rate in 2003, the authorities have confined their interventions to counter disorderly market conditions. The foreign exchange market, however, had been truly tested in early 2005 when the economy was confronted by multiple external shocks i.e. global fuel oil and commodity price shocks. To ease the pressure, Bangladesh Bank sold foreign exchange reserves in January 2005 while allowing the taka to depreciate by 5 percent against the U.S. dollar.

markets and imports from international markets. With short-term government securities rates increased gradually, banks lending and deposits interest rates have seen a modest increase creating tight monetary conditions at that point. The real effective exchange rate appreciated somewhat in this period as a result of domestic inflation. Responding to the situation, Bangladesh Bank has kept the dollar exchange rate stable to guard against intensifying imported inflation pressures. The concerns of the global economic downturn since 2008 prompted Bangladesh Bank like many central banks to pursue an easy monetary policy that facilitated the process of the economic recovery that traced till the start of 2011. Monetary conditions were increasingly loosened as shown by a falling MCI during FY09-FY10. The improvement in the current account at that period put upward pressure on taka which Bangladesh Bank countered through unsterilized foreign exchange purchases. The injection of liquidity from unsterilized interventions caused the bank's excess reserves to rise sharply, pushing interest rates below.

Phase IV: The continued pursuance of easy monetary policy helped to recover growth. But the resulted growth pressures along with rising crude oil and other commodity price fuelled inflationary spirals warranting Bangladesh Bank to pursue preemptive monetary tightening since 2011. Lending rate caps for most of the types were lifted in March 2011, with a subsequent 200-300 basis points rise in their base rates. Bank-by-bank credit to deposit ratio (CDR) ceiling was imposed around the same time. The MCI started to pick-up strongly from early 2012 until reaching its pick at the beginning of 2014. The monetary tightening was a result of the rise in both the real interest rate and the exchange rate. Repo interest rate was raised by 100 basis points. Moreover, the rising of CRR by 50 basis points in June 2014 was also attributable to such tight episode.

Phase V & VI: Against global headwinds and episodes of domestic political turmoil and uncertainty, domestic demand and activity have weakened markedly in the second half of FY15. However, headline inflation eased helped in part by favourable agricultural production and falling global commodity prices. In the meantime, the current account balance turned into a deficit due to slower exports, higher imports and a decline in remittances. Repo interest rate was reduced a couple of times to boost credit growth. During FY18 private credit growth picked-up strongly. In response, Bangladesh Bank reduced the maximum advances-to-deposit ratio (ADR). The CRR was also increased by 50 basis points. With liquidity tightening, deposit and lending

rates have begun to increase in 2018. The adverse impact of high issuance of higher interest-bearing National Savings Certificates (NSCs) and growing non-performing loans kept the upward pressure on interest rates. The high level of stressed assets narrowed banks' ability to engage in new lending and constrained access to credit thereby generating tight monetary conditions well traced by the upward movement of the MCI curve.

Phase VII: Domestic activities started to decline as the COVID-19 pandemic concentrated in the last quarter of FY20 and the first quarter of FY21.The government and Bangladesh Bank have announced a series of stimulus package with a total size of over Taka 1.21 trillion (about 4 percent of GDP). Bangladesh Bank moved rapidly to provide the necessary flow of credit to support the economy functioning. Bangladesh Bank has eased monetary policy by lowering the repo interest rate and the CRR, expanded provision of the repo facility, initiated the outright purchase of t-bills, raised Advance-Deposit Ratio (ADR) to facilitate credit to the private sector and improve liquidity in the banking system. Liquidity provision in the foreign exchange market was eased by selling USD by Bangladesh Bank. The easy monetary conditions are reflected by the sharp fall in the MCI since March 2020.

Relative strength of exchange rate and interest rate on the MCI is shown Chart 4. It shows that the index movement is mostly subject to the movement in interest rate and for some period exchange rate was moving in the opposites direction, off-setting the affect of the interest rate.

Finally, chart 5 and 6 represents the movement of MCI and nonfood inflation. It shows that in most of the cases higher MCI values is associated with falling nonfood inflation.

Chart 4: Component Wise MCI

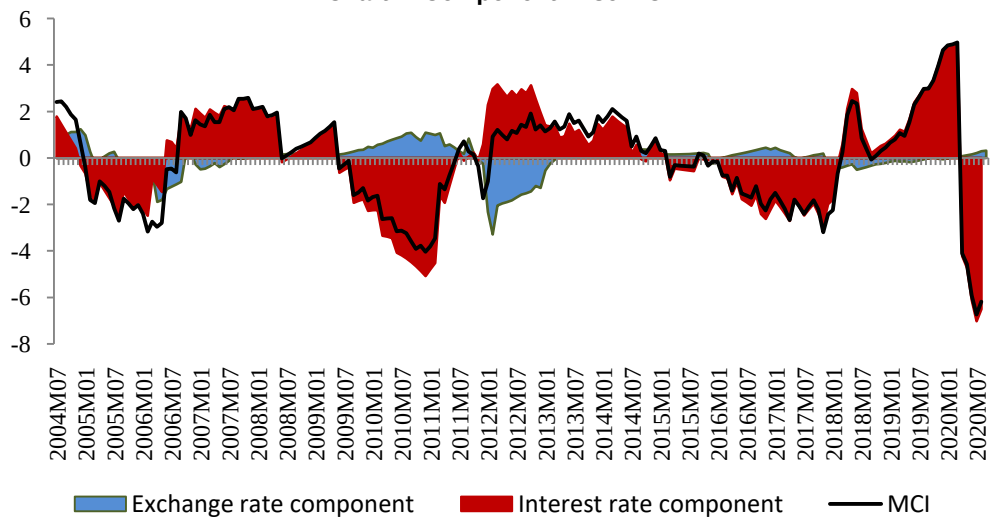


Chart 5: MCI and Nonfood Inflation (p-t-p)

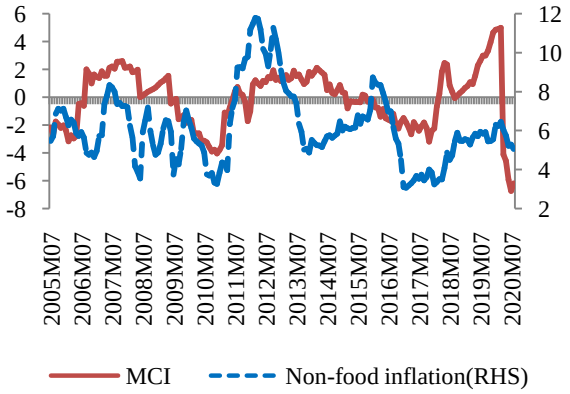
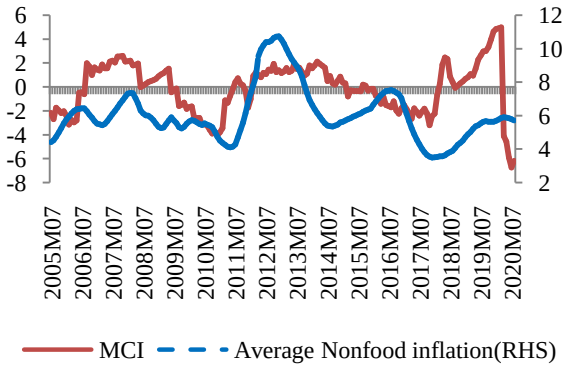


Chart 6: MCI and Nonfood Inflation (average)



5 Conclusion

The study focused on the contribution of MCI for Bangladesh and its application to the Bangladesh economy. The MCI derived in this study appears to indicate the actual monetary policy stance. The different phases of monetary tightening or easing in the context of Bangladesh can be better captured by the MCI compared to the trends in the interest rate or the exchange rate alone. Although Younus (2012) estimated the monetary condition index for Bangladesh over the period January 2004 to March 2011, our paper differs and adds values to the existing literature in several ways. Firstly, Younus (2012) exploited the inflation model to estimate relative weights of interest rates and exchange rate. Though, the effect of interest rate and the exchange rate is

viewed as equally important influencing output in small open economies (Kannan 2006, Hyder 2006). In this paper, we introduced an aggregate demand model to estimate the relative weights of interest rate and exchange rate from July 2004 to August 2020. Our results suggest that the weight of the interest rate and the exchange rate is 0.65 and 0.35 respectively. And the estimated monetary conditions ratio is 1.86:1, implying that a 1.0 percentage point rise (100 basis points) in the interest rate or a 1.86 percent increase (depreciation) in the exchange rate has about the same effects over time on aggregate demand. That implies that the interest rate channel is stronger than the exchange rate channel in influencing monetary conditions in Bangladesh. Younus (2012) found the monetary condition ratio as 4.88:1 indicating interest rate channel even stronger during 2004-2011 based on the inflation model. Secondly, calculating MCI is generally based on deducting the actual value of the interest rate and exchange rate from that of a specified base period. In such a case, the movement in MCI (up or down) needs to be compared to that base period. However, few papers also do the deviation of interest rate and exchange rate from their equilibrium levels (for instance, the Czech National Bank (CNB) in their inflation report published in the second quarter of 2015 utilized that technique). MCI that uses the deviation of interest rate and exchange rate from their equilibrium level makes it possible to compare the movement of MCI of a specific time point relative to the same time point. This paper tried to estimate the equilibrium level of interest rate and exchange rate by using Hodrick-Prescott (HP) filter as did by CNB bank and finally obtained MCI values.

Obtained estimates of MCI using the weights of interest rate and exchange rate suggest that in the observed period monetary policy in Bangladesh was mostly expansionary, as reflected by easing monetary condition. The paper also identifies four tight and three soft episodes of monetary policy stance from July 2004 to August 2020. Furthermore, our findings show the movements between MCI and inflation are broadly opposite, suggesting that cautionary monetary policy might able to tame inflation to some extent. Thus MCI can be used as an indicator of monetary policy decision-making as a technical instrument alongside other indicators. Bangladesh Bank can use the MCI as an indicator in monetary policy analysis. In this capacity, Bangladesh Bank would not use monetary policy tools to adjust the level of the index to the desired path, but rather it would help to inform policymakers of the current stance of monetary conditions, and whether they are tighter or easier relative to other periods.

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