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Article

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Measuring Monetary Policy in Emerging Economy: The Role of Monetary Condition Index

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Abstract

Measuring the stance of monetary policy is of importance for the analysis and implementation of monetary policy. In emerging economies, the popular use of multiple instrument framework as well as the significance of interest rate channel and exchange rate channel implies that monetary condition index (MCI) can play an important role in evaluating the timing of tightening or loosing monetary policy. In this paper, we aim to evaluate the role of MCI as an overall measure of monetary policy in emerging economy that follow inflation targeting by using the VAR model. The weight of MCI components, exchange rate and interest rate, is derived from the inflation equation in the VAR model. It shows that exchange rate plays a significant role but its weight is less than that of interest rate in most emerging economies. Furthermore, the empirical results show that inflation shows a reduction after a contractionary shock of monetary policy in most emerging economies. The finding implies that MCI is a useful indicator that can predict changes in the stance of monetary policy and the trend in inflation.

Keywords: *monetary condition index, monetary policy, multiple instruments, emerging economies*

JEL Classification: E50, E52, E59

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Introduction

A good measure of monetary policy is an indicator that can provide numeric information about size and direction of policy actions. In addition to this, measuring monetary policy is the first step to investigate further issues of monetary policy such as transmission mechanisms. Furthermore, effective implementation

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of monetary policy is necessary to achieve good economic performance. If monetary authorities want to steer the economy effectively, they require good assessment of monetary policy stance. However, the choice of monetary policy indicator in emerging economies seems challenging due to the problem of multiple instruments in these countries.

In the regime of inflation targeting, the interest rate is the main instrument in the conduct of monetary policy (Coşkun, 2021). Compared to advanced economies where the interest rates is the primary operating target (Egan and Leddin, 2016), the role of interest rate is weaker in the inflation targeting in emerging economies because these countries are price taker and they have high exposure to international shocks such as sudden increases in oil or commodity prices. The high openness of emerging economies indicates that changes in official interest rate instrument can alter exchange rate, which then influences the relative price of domestic and foreign goods, import, and finally aggregate demand and inflation. Moreover, changes in the exchange rate have a crucial effect on the price of domestic goods and thus demand. According to Poon (2010), both interest rate channel and exchange rate channel are active in emerging economies. Furthermore, Bui and Kiss (2021) found that the price puzzle problem, whereby inflation increases after a contractionary shock of monetary policy, emerged when measuring monetary policy by interest rate in a group of twelve emerging economies that follow inflation targeting. They also emphasize that a composite index such as MCI may be a useful indicator of monetary policy in the sense that it can mitigate the problem of price puzzle

Moreover, according to Nucu and Anton (2018), emerging economies is still in the process of transitioning toward an open market economy and thus the stance of monetary policy requires a look at principal transmission channels such as the interest rate and exchange rate. The lagged effect of monetary policy is another reason that questions the importance of exchange rate in the assessment of monetary conditions. The lagged effect motivates monetary authorities to rely more on intermediate targets such as monetary aggregates and exchange rate. Therefore, monetary authorities should respond to these intermediate targets when setting the primary instrument like the interest rate. Hence, in emerging economies, a good measure of monetary policy should consider changes in both interest rates and exchange rates.

MCI, a weighted average of changes of interest rates and exchange rates relative to their values in the reference period, is a common composite measure of monetary policy, especially in open economies (Goodhart and Hofmann, 2001; Osborne-Kinch and Holton, 2010). Changes in the index depict whether monetary policy is in loose or tight conditions (Osborne-Kinch and Holton, 2010).

The use of MCI is attractive for both foreign and domestic institutions and agents. Since MCI can capture information from both exchange rate channel and interest rate channel in the transmission of monetary policy (Zulfiqar and Khan, 2007; Osborne-Kinch and Holton, 2010), it helps understand the behaviour of the central bank as well as the general monetary condition of a small and open economy (Ericsson et al., 1998; Zulkhibri, 2012).

Although there is vast literature about the construction of a composite measure of monetary policy such as the monetary condition index (Batini and Turnbull, 2002; Kari et al., 1996; Ericsson et al., 1998; Freedman, 1994; 1995; Gerlach and Smets, 2000; Majid, 2012; Osborne-Kinch and Holton, 2010; Marga, 1999), much less evidence on its impact on the objective variable of monetary policy is available for emerging economies, especially those in Asia, South America, and Africa.

Therefore, the question whether MCI can be considered a good measure of monetary policy becomes a critical question. This paper aims to fill this gap by constructing MCI and examining the response of inflation to shocks of MCI in emerging economies that follow inflation targeting.

The paper contributes to the existing literature in several manners. Firstly, it examines whether monetary policy can stabilize inflation in inflation-targeting emerging economies when considering the role of exchange rate in measuring monetary policy. Because of this, the paper sheds light about the possible effect of openness on measuring monetary policy stance and the importance of MCI to inform the monetary stance for the pubic. Secondly, this paper fills the gap in the existing literature by investigating the superiority of MCI as a useful indicator of monetary policy in the sense that MCI can mitigate the problem of the price puzzle. Furthermore, to the best knowledge of the author, there is a dearth of study investigating the MCI by examining its relationship with inflation, the primary target of monetary policy conduct in inflation-targeting economies. In fact, Bui and Kiss (2021) argued that interest rate cannot fully reflect changes in the stance of monetary policy in emerging economies that follow inflation targeting. Their study found that the price puzzle appears when measuring monetary policy by interest rate and argued that changes in both interest rate and money supply can contain information about changes in the monetary policy stance. Thirdly, contrary to the previous studies, the paper uses the VAR model to compute the weight of components of MCI.

Therefore, it accounts for the endogeneity in the conduct of monetary policy. Finally, the comparative analysis also gives more insight into the application of MCI in the implementation of monetary policy for emerging economies that follow inflation targeting.

The rest of this paper is organized as followed. Section 1 presents the literature about the construction and basic characteristics of MCI and empirical evidence about the effectiveness of MCI as an indicator of monetary policy. It also shows the gap in the existing literature about the study of MCI. Section 2 discusses methodology and data. Section 3 presents empirical results. Section 4 presents tests that show the robustness of empirical results. The last section concludes the paper.

1. Literature Review

In this section, we define MCI and discuss the function of MCI as well as its advantages and disadvantages. Then, it focuses on the empirical studies about the use of MCI and identifies the gap of the existing literature.

1.1. Monetary Condition Index as an Indicator of Monetary Policy

MCI is a composite measure of monetary policy that capture information from two channels of monetary policy, interest rate and exchange rate. Bank of Canada is one of the pioneers using MCI as an operational target in the late 1980s (Kari et al., 1996; Ericsson et al., 1998; Majid, 2012). In the 1990s, MCI became more popular in the analysis and implementation of monetary policy. Conventionally, MCI is the weighted average of the spread between interest rate and exchange rate with the value of a baseline time. As noted by Kari et al. (1996), the weight of MCI components reflect their relative effects on long-term target indicators such as output or inflation. Such a construction implies that MCI reflects the significance of both interest rate channel and exchange rate channel (Batini and Turnbull, 2002; Qayyum, 2002) when measuring monetary policy for emerging economies (Zulfiqar and Khan, 2007). General speaking, monetary authorities alter the official interest rate, which in turn leads to changes in the money market interest rate and then affects the behaviour of investment and spending and finally aggregate demand and inflation. However, it should be noted that in emerging economies with flexible exchange rate regime, changes in the official interest rate also cause changes in the value of domestic currency. The fluctuation of the exchange rate then affects the competitiveness of domestic export and import, leading to changes in the price of imported goods and hence aggregate demand and inflation. The transmission from exchange rate to inflation depends on many factors (Zulfiqar and Khan, 2007). The presence of the exchange rate channel can magnify or lessen the contractionary stance of the setting of the official interest rate. Because of these, monetary authorities can

alter interest rate and exchange rate tools to stabilize prices in the economy. As a result, observing the two as a separate indicator may provide misleading information about the expected changes in inflation. To put it differently, a composite measure of monetary policy that captures both channels can give more accurate representation of the stance of monetary policy in emerging economies (Batini and Turnbull, 2002; Hataiseree, 1998; Zulfiqar and Khan, 2007).

From empirical perspectives, many studies use interest rate as a measure of monetary (Cermeño et al., 2012; De Mello and Moccero, 2011; Furlani et al., 2010; Jawadi et al., 2014; Mehra, 2020; Sánchez-Fung, 2011). The common use of interest-rate-based measure of monetary policy is conditional on the fact that it is a price-based instrument, which is easily monitored by both policymakers and market participants. Generally, short-term interest rates are a good measure of monetary policy when monetary policy effectively operates through the interest rate channel. Since the effectiveness of the interest rate channel depends on the existence of a well-functioned financial market, interest rates are a good indicator for advanced economies. For emerging economies where financial system is underdeveloped, the interest rate channel is weak, even though there are substantial improvements and liberalization in the financial system in emerging economies over the last decades. Furthermore, compared to advanced economies, the exchange rate channel plays a more important role in emerging economies. The importance of exchange rate depends on the degree of the openness of the economy under investigation. Moreover, foreign exchange interventions can be a possible policy when capital flows are volatile (Goyal, 2016). According to Osborne-Kinch and Holton (2010), MCI rather than interest rate is a better indicator of monetary policy when exchange rates play an important role in the transmission mechanism.

According to Batini and Turnbull (2002), MCI can be used as an operational target, as an indicator of monetary policy or as a monetary policy rule. Firstly, as an indicator of monetary policy, MCI depicts the movement of both interest rates and exchange rates (Poon, 2010) and signals the timing of the expansion and restriction of monetary policy (Şıklar and Doğan, 2015). This function is highlighted for many countries such as Nordic countries (Gerlach and Smets, 2000), Thailand (Hataiseree, 1998), Turkey (Kesriyeli and Kocaker, 1999), Croatia (Benazić, 2012), Pakistan (Zulfiqar and Khan, 2007), Sweden and Norway (Kari et al., 1996; Engelbrecht and Loomes, 2002). Hataiseree (1998) argues that MCI rather than interest rate and exchange rate is effective in determining the stance of monetary policy as well as accessing the future behaviour of inflation in Thailand. Secondly, MCI can be used as an operational target. The central bank of Canada and New Zealand utilizes this capacity of the index (Engelbrecht and

Loomes, 2002; Ericsson et al., 1998) because they believe that exchange rate can affect inflation through its impact on import price (Gerlach and Smets, 2000). In this case, the central bank can use monetary policy tools to set the desired MCI when the index deviates from desired levels (Osborne-Kinch and Holton, 2010). With this function, the desired MCI should be consistent with the monetary policy objective such as inflation targets (Osborne-Kinch and Holton, 2010; Qayyum, 2002). Finally, MCI can be used as a monetary policy rule. This requires the rearrangement of the interest rate to construct the parallel between the interest rate and exchange rate (Batini and Turnbull, 2002). The idea obtains the support of Us (2004) for the case of Turkey.

However, it should be noted that the use of MCI as an operational target can cause difficulties for the practical implementation of monetary policy (Kari et al., 1996; Engelbrecht and Loomes, 2002). Firstly, many difficulties emerge because interest rates are a monetary policy tool whereas exchange rates are a macroeconomic outcome (Osborne-Kinch and Holton, 2010). Therefore, it might cause conflict when monitoring or adjusting the movement of MCI. Secondly, MCI may provide ambiguous communication with financial markets when there exists a negative relationship between interest rates and exchange rates (Engelbrecht and Loomes, 2002). Because the depreciation of exchange rate causes inflation whereas interest rate rise reduces inflation, the opposite movement between exchange rate and interest rate causes it difficult to interpret the effect of monetary policy changes on the economy and inflation. The transparency issue forces the Reserve Bank of New Zealand to replace MCI by an official cash rate in March 1999. Thirdly, changes in MCI require the understanding of drivers underlying changes in the exchange rate (Engelbrecht and Loomes, 2002; Ericsson et al., 1998; Gerlach and Smets, 2000). If exchange rates are affected by changes in supply and demand, it is optimal to adjust the target of MCI. On the other hand, if exchange rates are affected by other shocks, it is optimal to maintain the current MCI and adjust the interest rate. The caution when using MCI as an operating target is intensified by the fact that the terms of trade has substantial effects on exchange rate movement (Gerlach and Smets, 2000).

Since using MCI as an operational target causes difficulties for the implementation of monetary policy, using MCI as an indicator of monetary policy gains more attention (Zulfiqar and Khan, 2007; Osborne-Kinch and Holton, 2010). Zulfiqar and Khan (2007) do not support the use of MCI as an operational target because the weight of components can be time-varying weight or MCI is sensitive to the choice of variable. Similarly, Benazić (2012) combined effects of both interest rates and exchange rates to determine MCI for Croatia and suggested that the feasible function of MCI is an indicator of monetary policy rather than

an instrument. One factor that constrains the use of the index as an instrument is the liberalization of the international financial flows and the popular use of the euro in Croatia.

It should be noted that using MCI as an indicator is to provide more information about the current status of monetary policy stance. In this case, monetary authorities do not need to change their tools to return MCI to its desired path.

Another reason supporting the indicator function of MCI is that monetary authorities in emerging economies use multiple instruments to influence the movement of output or prices. It is likely that monetary authorities change many instruments at the same time or at two very close points of time. Consequently, observing changes in only interest rate can provide misleading interpretation about the intention of monetary policy. In particular, changes in interest rates may provide little information about changes in monetary policy when monetary authorities implement the framework of multiple instruments (Bui and Kiss, 2021; Egan and Leddin, 2016; He and Pauwels, 2008; Ma, 2014). According to Egan and Leddin (2016), MCI, which is the weighted average of the five instruments, can be considered as an accurate representation of various monetary policy instruments.

1.2. Empirical Studies about the Use of MCI

The literature about the role of MCI is extensive for advanced economies. Freedman (1994), Freedman (1995), Marga (1999), and Ericsson et al. (1998) are seminal papers that provide excellent explanation about the construction of MCI. Gerlach and Smets (2000) argued that the construction of MCI requires small weight on the exchange rate, which is associated with its effect on aggregate demand. Osborne-Kinch and Holton (2010) examined the role of MCI for Euro Area, UK, and US from 1999 to 2009 and found that the index can be used as a timely indicator of monetary policy stance. However, they noted that the index copes with the uncertainty caused by its estimation and interpretation. Similarly, Batini and Turnbull (2002) studied the case of UK from 1984 to 1999 and concluded that MCI can be used as an indicator of monetary policy. Babecká Kucharčuková et al. (2016) showed the role of MCI in measuring monetary policy conducted by the ECB. They used the factor analysis to calculate the weight of two sub-components of the MCI. The result of a standard monetary VAR showed that monetary policy has an effect on prices whereas it has a muted effect on output.

However, the literature for emerging economies is rather limited and mainly focus on the construction of the MCI. Benazić (2012) used the Engle-Granger co-integration method to construct the MCI for Croatia over the period 1998 –

2010. As shown in this study, the weight derived from the price equation suggests that the exchange rate is more important than the interest rate in the construction of MCI. Moreover, the observation of the MCI shows that monetary policy in this country is restrictive in the period 1998 – 2000 while easing in the following period. Over the period of the Global financial crisis, the MCI fluctuated strongly and arbitrarily in Croatia.

Qayyum (2002) took into account the openness of emerging economies when constructing the MCI for Pakistan. The author defined MCI by summarizing the deviation of two quantitative variables, the interest rate and the exchange rate, from the base period. The author determined the weight of the two MCI components by their relative importance in the inflation equation. Zulfiqar and Khan (2007) used Johansen cointegration method to determine weights of MCI components for Pakistan over the period March 1991 to April 2006. They used both price and output equation to calculate the weights of MCI components and found that the importance of the exchange rate is model-dependent. The exchange rate has a greater effect on output whereas it has a smaller effect on price. However, their findings show that two MCIs calculated from the two equations show a strong co-movement and deviations between MCIs and interest rate show a reduction after September 2001. Hataiseree (1998) constructed MCI with weights derived from inflation model and noted the advantage of MCI as an indicator of monetary policy in the short run in Thailand. The author used autoregressive distributed lagged model to estimate the inflation equation. The finding emphasized the significance of MCI relative to either exchange rate and interest rate. The study also found the high correlation between MCI and inflation; therefore, MCI plays an important role in the conduct of monetary policy.

Berument (2007) argued that monetary authorities in a small and open economy such as Turkey cope with the problem of currency substitution and the fear of floating. As a result, they can use both interest rate and exchange rate to fulfil the objective of price stability. Therefore, monetary policy should be measured by an index that captures changes in both instruments. However, Berument (2007) introduced a new measure by the differential between the interbank interest rate and the depreciation rate. In term of MCI construction, such a construction implies that the exchange rate and interest rate have equal weights. If the spread is positive, monetary policy is restrictive; otherwise, it is expansive. Using this measure, the author found that the response of output, prices, and exchange rates to restrictive monetary policy is consistent with the theory. Other studies construct the traditional MCI for Turkey but the relative importance of exchange rate and interest rate is different depending on the methodology of the weight calculation and research period. Kesriyeli and Kocaker (1999) derived the

weights of MCI components from the price equation and concluded that exchange rate is the principal source of price fluctuation over the period 1987 – 1999 in Turkey. They emphasized the cautious use of MCI in the analysis and implementation of monetary policy.

Other studies emphasize other aspects of the weight of MCI components. To begin with, some studies emphasize that the weight of MCI components varies over time. Using TVP-VAR model, Coşkun (2021) showed that in Turkey, interest rate has a rising weight after the adoption of inflation targeting whereas the weight of the real exchange rate showed a declining trend since its highest level in the 1990s when the capital movement was liberalized. Similarly, Şıklar and Doğan (2015) emphasized the time-varying characteristic of the MCI weights over the period 1992 – 2012 and concluded that the interest rates is more important than the exchange rate. They argued that the reduction in the importance of the exchange rate may stem from the development in the financial system, which strengthens the effectiveness of interest rate policy, in Turkey over the last decades. On the other hand, other studies put an emphasis on the variance structure of MCI components and used Principal Component Analysis in its calculation. For instance, Prachi et al. (2016) used the first principal component that summarizes about 50 percent of variance in the four instruments: the repo rate, the reserve repo rates, the cash reserve ratio, and the statutory liquidity ratio. They used this composite measure as well as three other indicators to investigate the transmission of monetary policy in India. Their study indicated the ineffectiveness of monetary policy. Similarly, Memon and Jabeen (2018) used the Principal Component Analysis to compute the weight of MCI components and used Vector Autoregression Model to investigate the effect of MCI on the economy in Gulf countries – Bahrain, Iraq, Kuwait, Oman, Qatar, Kingdom of Saudi Arabia (KSA), and United Arab Emirates (UAE). They found that MCI rather than interest rates and exchange rates is a good device to predict prices and economic growth in the long run. Moreover, monetary authorities can use MCI to access the tight and loose condition for Gulf countries.

Recently, many studies attempt to construct a more sophisticated version of the MCI by augmenting one or several other variables. Hematy and Boostani (2014) augmented the standard MCI with the asset price channel. By observing the cross correlation between MCI and inflation, they concluded that changes in MCI can lead to inflation in Iran over the period 1991Q2 – 2014Q1. Poon (2014) takes into account two critical issues when determining MCI for Philippines: 1. including additional variables such as changes in credit, share price, and long-run interest rate and 2. distinguishing between the long-run and short-run effect of MCI components on output movement. Using a UECM model, Poon (2014)

used the long-run estimated parameters to determine the MCI and showed that interest rate is much less important than exchange rate, suggesting the high significance of the exchange rate in the implementation of monetary policy in Philippines. Kannan et al. (2007) added credit growth to the construction of MCI for India. They noted that interest rate is more powerful than exchange rate in affecting economic activity and inflation. They reached a similar consensus that MCI is better than any single component to represent the stance of monetary policy in India by the graphical analysis.

However, it should be noted that the augmentation of MCI lead to the introduction of new indices that may provide information about other aspects rather than the stance of monetary policy. This problem occurs when added variables capture little or no information about the transmission of monetary policy. For instance, Angelopoulou et al. (2014) added more variables into the MCI and named the estimated index as the financial condition index (FCI). The so-called FCI is highly likely to illustrate the condition of the financial system rather than that of monetary policy. Similarly, Kapetanios et al. (2018) used the principal component analysis method to extract common factors from a set of 28 financial indicators, including interest rate and exchange rate, and considered them as FCIs for the United Kingdom. In their study, FCI provides a broader information about the status of financial market, excepting for the second factors derived from a small set of data that are considered as monetary conditions indices.

Despite of the vast literature for the construction of the MCI, little is known about its impact on the target variables of monetary policy such as output or inflation. In fact, there is a dearth of study investigating the relationship between the MCI, monetary policy, and target variables such as output or inflation. A few studies stated that the MCI has predictive power about changes in the stance of monetary policy by observing graph or cross correlation coefficients. For instance, Benazić (2012) provided a short description about the stance of monetary policy from 1998 to 2010 by observing the movement of the MCI. Accordingly, the evolution of the MCI indicated the restriction in the period 1998 – 2000 and expansion after 2000 excepting for some fluctuation during the Global financial crisis. Nucu and Anton (2018) used the MCI to evaluate changes in the stance of monetary policy in four Central and Eastern European countries (Czech Republic, Hungary, Poland, and Romania) over the period August 2005 – December 2015 and to examine the spillover of the monetary condition from Euro area to mentioned countries. Their Granger causality analysis suggested that the spillover exists, which can to some extent provide some suggestions about their convergence with the Euro area. They also noted that MCI is useful to predict whether monetary policy moves towards loosening or tightening.

Nevertheless, to the best knowledge of the author, there are no studies investigating the dynamics in the impact of MCI on inflation or output. Hataiseree (1998) is one of rare studies illustrating that MCI has a relationship with inflation. Based on the graphical evidence, the author argued that there may be some relationship between MCI and inflation in Thailand. However, such a speculation provides no information about the possible impact of MCI on inflation. Similarly, Hematy and Boostani (2014) noted that there is a positive correlation between MCI and inflation and supported the view that MCI is a leading indicator of inflation in Iran. Nevertheless, Memon and Jabeen (2018) focused on the response of MCI to output or inflation rather than the reverse in gulf countries. In the same manner, Majid (2012) used Granger-causality test to examine the predictive power of MCI and stated that changes in inflation precedes changes in MCI components.

In summary, MCI can be considered as an indicator of monetary policy. However, the existing literature mainly focuses on the construction of MCI. Meanwhile, there is little evidence indicating the performance of the MCI in measuring the stance of monetary policy in emerging economies that follow inflation targeting. Moreover, little is known about whether MCI is able to mitigate the problem of price puzzle in emerging economies that follow inflation targeting. Furthermore, a comparative analysis can give more insight into the indicator problem when implementing and analysing monetary policy in emerging economies.

2. Methodology and Data

2.1. Measuring MCI

A proper choice of a monetary policy indicator is of importance to understand the behaviour of monetary authorities and to assess the stance of monetary policy. MCI can be used as an indicator to evaluate whether monetary policy is contractionary or expansionary. Following previous studies (Ericsson et al., 1998; Kesriyeli and Kocaker, 1999; Nucu and Anton, 2018; Şıklar and Doğan, 2015), we use the equation below to determine the MCI:

$$mci = \beta_r (r_t - r_b) + \beta_e (e_t - e_b) * 100 \quad , \quad \beta_r + \beta_e = 1 \tag{1}$$

where e_t is the logarithm of the bilateral exchange rate, which indicates the price of domestic currency in term of the main currencies of international transactions (the euro for European countries and the US dollar for other countries). An increase in e_t reflects the appreciation of the domestic currency. r_t is the short-term

interest rate. It is a proxy for policy rate because it is closely linked and quickly responded to the central bank policy rate (Osborne-Kinch, and Holton 2010). r_b and e_b are the value of the base period, which is the value of interest rate and exchange rate in January 2000 respectively. For Turkey, the base period of interest rate is June 2000 instead of January 2000 because of data availability. β_r and β_e are estimated parameters that reflect the relative weight of interest rate and exchange rate. Their sum is one. According to Equation 1, an increase in interest rates or an appreciation of exchange rate indicates higher value of MCI, which suggests the restriction of monetary policy.

As shown in equation (1), the estimation of weights is of importance to calculate MCI. Since MCI weights reflect the relative importance of the exchange rate and interest rate channel in the transmission mechanism and in influencing the objective of output or inflation (Zulfiqar and Khan, 2007; Şıklar and Doğan, 2015), their estimates require modelling the objectives of monetary policy (Qayyum, 2002). This implies that the weights of MCI components can be derived from their relative impact on aggregate demand (Egan and Leddin, 2016; Ericsson et al., 1998; Gerlach and Smets, 2000; Knedlik, 2006; Majid, 2012; Poon, 2010) or prices (Hataiseree, 1998; Kesriyeli and Kocaker, 1999; Qayyum, 2002) or both (Zulfiqar and Khan, 2007). The weight of exchange rate derived from the price equation is greater than the figure derived from aggregate demand equation because the calculation combines the direct effect of exchange rate on import price and the indirect effect of exchange rate on aggregate demand (Kesriyeli and Kocaker, 1999). In addition, the weights can also be the coefficient of variance of the monetary policy instruments that the central bank has at their disposal (Egan and Leddin, 2016). According to Marga (1999), the ratio β^r / β^e depends on the degree of the openness of the economy under investigation. For small and open economies, the weight on exchange rate may be larger than the weight on interest rate, which opposes large and closed economies where the weight of exchange rate can be negligible (Knedlik, 2006). Since price stability is the primary objective of monetary policy in countries under investigation, we measure the weight of MCI components by the elasticity of inflation to changes in interest rates and exchange rates.

$$\pi_t = \alpha + \alpha_r r_t + \alpha_e \Delta e_t + \alpha_z z_t \tag{2}$$

where z_t is other endogenous variables which includes aggregate demand or lagged values of price changes.

The existing literature (Batini and Turnbull, 2002; Şıklar and Doğan, 2015) suggests three basic methods to estimate the MCI weights: single equation, trade

elasticities equation, and the system of equation through cointegration and VAR. The first method estimates the MCI weights by coefficients from either price or output equation. The second method estimates the elasticities of trade share (export expressed as the percentage of GDP) to exchange rate and interest rate. The final method extracts coefficients of exchange rate and interest rate in the corresponding equation in the system.

The paper uses the vector autoregression model to estimate the elasticity of inflation to interest rates and exchange rates. The choice of the vector autoregression model is of importance to take into account certain issues that emerge in the estimation of the MCI weights: the endogenous relationship between regressors, the problem of simultaneity biasedness, and the lagged effect of exchange rates and interest rates on inflation. In particular, we sum all coefficients that are statistically significant.

β_r and β_e are calculated as follows:

$$\beta_r = \frac{\alpha_r}{\alpha_r + \alpha_e} \tag{3}$$

$$\beta_e = 1 - \beta_r \tag{4}$$

2.2. Measuring the Effect of Monetary Policy

Following previous studies (Berument 2007), we focus on the significance of the inflation response to shocks to MCI and the absence of price puzzle in their impulse response to examine whether MCI is an appropriate indicator of monetary policy. For this purpose, we generate both country and panel evidence by using a VAR and panel VAR. The endogenous variables are:

$$Y_t = [\text{DLCOM, MCI, DLEX, DLCPI, DLY}]' \tag{5}$$

where DLCOM, DLEX, DLCPI, DLY are the first difference of the logarithm of commodity price, exchange rate, consumer price index, and industrial production index. MCI is the monetary condition index determined by weighted average of changes in exchange rates and interest rates relative to their value in the base period. The weights are derived from their estimated coefficients in the inflation equation.

It should be noted that the VAR model is recursive with the ordering specified in Equation (5). Such an ordering indicates that MCI has a contemporaneous effect on inflation and other economic variables. On the other hand, inflation, output, and exchange rates have an effect on monetary policy with lags.

In addition to time-series VAR, we also apply the panel VAR to investigate the response of prices to MCI. The use of panel VAR confirms the robustness of the empirical results. Contrary to time-series data, panel data contains rich information about the heterogeneity in a group of emerging economies. Therefore, the panel VAR results provide more evidence about the effectiveness of MCI in measuring the stance of monetary policy in emerging economies that follow inflation targeting.

In this paper, we focus on the response of monetary policy to shocks of MCI. MCI can be considered as a good measure of monetary policy if inflation shows a reduction in response to a positive shock of MCI which represents the contractionary stance of monetary policy.

2.3. Data

Due to data availability, we investigate a group of twelve emerging economies that follow inflation targeting: Brazil, Chile, Colombia, Mexico, Hungary, Poland, Romania, Turkey, Korea, Philippines, Thailand, and South Africa. As noted by Rupa and Ceyla (2021), there is no official definition of emerging economies. In their paper, they stated that the IMF World Economic Outlook classifies 39 economies as "advanced" and 40 as "emerging market and middle-income". In emerging group, Brazil, Chile, Colombia, Mexico, Hungary, Philippines, Poland, Thailand, Turkey, and South Africa are considered as top emerging economies.

Cannavale et al. (2021) summarize different views about the classification of Korea. In their studies, Korea can be considered as developed or emerging economy depending on classification criteria. In fact, IMF shows no change in the classification of Korea as an emerging market in its reports until 2014 (IMF, 2013; 2014). Furthermore, according to MSCI (2022), Korea still belongs to the emerging market. In Song (2021), Korea is also considered emerging. In our study, Korea is considered as an emerging economy.

The data are monthly, spanning January 2000 to June 2018. Series such as consumer price index (price), industrial production index (output), exchange rate, and interest rate are collected from IMF and national central banks. Money market rate, which is derived from the IMF, is proxy for interest rate. For some countries, interest rate is proxied by other series which are derived from the national statistics: interbank rate (Hungary) and TRY Deposits (Turkey). Exchange rate of most economies is from the IMF whereas that of Korea, Turkey, and Thailand is from Bank for International Settlements. Other variables are derived from the IMF.

Table 1

Mean and Standard Deviation of Selected Variables

	Inflation rate	Output growth	Exchange rate growth	Interest rate
Brazil	6.32 (2.5)	1.11 (6.39)	–3.26 (18.37)	13.64 (4.45)
Chile	3.14 (2)	2.19 (5.31)	–1.11 (11.14)	4.26 (2.31)
Colombia	4.98 (1.99)	2.32 (5.5)	–2.76 (13.88)	6.36 (2.38)
Mexico	4.52 (1.51)	0.95 (3.78)	–3.63 (9.33)	7.14 (3.47)
Hungary	4.26 (2.82)	3.15 (8.94)	–1.13 (5.43)	5.02 (3.08)
Poland	2.54 (2.42)	5.05 (5.83)	–0.01 (8.99)	5.47 (4.63)
Romania	9.08 (10.26)	4.24 (6.51)	–5.67 (10.19)	12.10 (13.35)
Turkey	14.28 (12.98)	5.17 (8.98)	–12.67 (18.62)	21.68 (19.31)
Korea	2.51 (1.16)	4.87 (7.47)	0.43 (10.55)	3.19 (1.27)
Philippines	3.76 (1.9)	2.92 (10.56)	–1.48 (7.62)	5.44 (2.62)
Thailand	2.08 (1.96)	4.00 (9.92)	0.83 (6.57)	2.19 (1)
South Africa	5.21 (2.67)	0.90 (5.5)	–4.02 (17.35)	7.56 (2.18)

Notes: Standard deviation is in the parentheses; otherwise, it is mean.

Source: Author's estimation.

Table 1 shows the mean and standard deviation of six variables: inflation rate (annual growth of consumer price index), output growth (annual growth of industrial production index), exchange rate growth (annual growth), and interest rate. As observed, inflation rate was rather low in emerging economies, ranging from 2 to 5 percent. In few economies, inflation rate was relatively high. For instance, Turkey experienced a double-digit inflation rate, 14.28 percent. In Brazil and Romania, inflation rate was moderate, standing at 6.32 and 9.08 percent respectively. Output growth was slightly different between emerging economies. Brazil and South Africa has a lower growth than other economies, fluctuating around 1 percent. Furthermore, the exchange rate exhibits a negative growth rate in all economies but Korea and Thailand. The negative growth implies the depreciation of the exchange rate, which is in line with the accumulation of international reserves in emerging economies.

Table 2 presents the stationary status of various variables used in this paper. As shown, it shows the test statistics of the ADF test (Z(t)), significance level ($^{*}/^{**}/^{***}$), and the order of integration (0/1). For instance, in Brazil, the logarithm of output has the test statistic of –4.37, the significance level of 1 percent, and the integration order of 0. This means that the logarithm of output is stationary at

level with the significance level of 1 percent. Overall, the result of the ADF test indicate that most variables are highly likely to be stationary at first difference whereas interest rate are stationary at level in emerging economies. Output is stationary at level in most countries but Poland and Turkey, whereby the series is stationary at first difference. Similarly, exchange rate requires no first differencing to be stationary in most emerging economies but Mexico, Thailand, and South Africa. Interest rate contains a unit root at level and has the integration order of one in Hungary but it is stationary at level in other economies. On the other hand, consumer price index satisfies the stationarity condition at first difference in most countries, excepting for Mexico, Romania, and Turkey where the variable is stationary at level. In a nutshell, to ensure the stationarity condition, the simplicity in the estimation as well as the comparability of empirical results, we use the first difference of variables in the VAR model. However, we use the level of the interest rate in the VAR model.

Table 2

ADF Test for the Stationarity of Variables

	LCOM		**LY**		**LCPI**		**LEX**		**R**	
	Z(t)	*Order*	*Z(t)*	*Order*	*Z(t)*	*Order*	*Z(t)*	*Order*	*Z(t)*	*Order*
Brazil	–7.35*	1	–4.37*	0	–6.41*	1	–1.39***	0	–2.39*	0
Chile	–7.35*	1	–1.57***	0	–8.38*	1	–2.07**	0	–3.48*	0
Colombia	–7.35*	1	–2.28**	0	–7.73*	1	–1.53***	0	–3.08*	0
Mexico	–7.35*	1	–1.77**	0	–3.58**	0	–8.44*	1	–2.51*	0
Hungary	–7.35*	1	–1.99**	0	–6.67*	1	–1.45***	0	–11.1*	1
Poland	–7.35*	1	–14.12*	1	–8.57*	1	–2.92*	0	–2.27**	0
Romania	–7.35*	1	–1.7**	0	–5.64*	0	–4.27*	0	–1.85**	0
Turkey	–7.35*	1	–11.64*	1	–4.98*	0	–1.93**	0	–1.69**	0
Korea	–7.35*	1	–1.49***	0	–8.66*	1	–2.64*	0	–1.56***	0
Philippines	–7.35*	1	–1.52***	0	–6.38*	1	–1.8**	0	–1.47***	0
Thailand	–7.35*	1	–2.15**	0	–8.12*	1	–8.65*	1	–2.7*	0
South Africa	–7.35*	1	–5.02*	0	–5.42*	1	–9.56*	1	–2.58*	0

Notes: The optimal lag is selected by AIC criterion. *, **, *** indicates the significance at 1%, 5%, and 10% respectively. Order 0 and 1 indicates the variable of interest has the integration order of 0 and 1, meaning being stationary at level and first difference respectively.

Source: Author's calculation.

3. Empirical Results

This section starts by presenting the empirical results about the construction of the MCI for emerging economies. As MCI components, interest rate and exchange rate, requires time to realize their effect on the movement of inflation, VAR model is a proper choice to estimate the inflation equation. In addition to this, the VAR model can capture the simultaneous interaction between variables in the model, which is termed as the endogeneity problem.

As shown in Table 3, the lagged values of exchange rate and interest rate are useful indicators of inflation. To begin with, although these variables exhibit a lagged effect on inflation, a few coefficients are statistically significant. For instance, in Brazil, only the first lag of the exchange rate has a negative and statistically significant effect on inflation. Regarding the interest rate, its first lag has a positive and statistically significant effect on inflation. For Chile, the relationship shows a different pattern. In Chile, exchange rate requires more time to realize its impact on inflation, whereby the effect is statistically significant at the sixth, eleventh, twelfth, and thirteenth lag. Concerning interest rate, its show statistically significant effect on inflation only at the second lag. In other countries, inflation also show a quite similar pattern of response to exchange rate and interest rate.

T a b l e 3

Coefficients on Interest Rates and Exchange Rates

Country	Exchange rate	Interest rate
Brazil	(1)-0.017*	(1)0.106***
Chile	(6)0.027**; (11)-0.03*; (12)0.024**; (13)-0.021**	(2)-0.084***
Colombia	(1)-0.02*; (3)-0.017*; (4)0.011**; (5)-0.022*; (6)0.011**; (7)-0.018*; (8)0.013**; (9)-0.01***; (11)-0.017*	(4)-0.198**
Mexico	(2)-0.016**; (3)0.015***; (13)0.018**	(12)0.088***
Hungary	(5)-0.042**	(6)0.1***; (7)-0.078***
Poland	(1)-0.022**; (4)-0.017***; (5)-0.02**	(1)-0.08***; (2)0.131**
Romania	(1)-0.062*; (2)0.055**	(1)0.069**; (4)0.04***
Turkey	(4)-0.051*; (8)-0.026***	(6)0.092***; (7)-0.107***; (8)0.091***; (10)0.133*; (11)-0.124*
Korea	(11)-0.02***	(5)0.694***
Philippines	(13)0.023***	(1)0.153***; (2)-0.255***; (10)-0.204***
Thailand	(2)0.076*; (4)0.055**; (5)-0.076*; (6)0.065**; (9)-0.067**	(9)-0.502***
South Africa	(1)-0.014**; (4)-0.012***; (7)-0.017*	(1)0.362**; (7)0.426***

Notes: The lag order of statistically significant coefficients is in parentheses. ***, **, * denote significance at 10%, 5%, and 1%, respectively.

Source: Author's estimation.

Table 4 presents the relative significance of interest rate and exchange rate in the construction of the MCI. It should be noted that the focus is on the statistically significant coefficients of MCI components (Table 3) that are shown in the inflation equation in the VAR model (Equation 2). As observed, the exchange rate plays a relatively important role. The weight of the exchange rate has a significant size in all emerging economies but Korea, Philippines, and South Africa, whereby the weights are under 0.05. The exchange rate is highly significant in Chile, Colombia, Mexico, Romania, and Thailand, at approximately 0.55, 0.41, 0.36, 0.52, and 0.40 respectively. In other emerging economies, the exchange rate plays a non-trivial role, fluctuating in the range from 0.10 to 0.20. Nevertheless,

the exchange rate plays an insignificant role in Korea, Philippines, and South Africa, being under 0.05.

Overall, the weight of the exchange rate is less than that of the interest rate in emerging economies (except for Chile and Romania). Such a finding is consistent with Ericsson et al. (1998) and Zulfiqar and Khan (2007), whereby the weight of MCI components is derived from the inflation equation. It is contrast with the empirical estimates derived from the output equation in Zulfiqar and Khan (2007). The importance of the exchange rate in these countries suggest that it is a good choice to use the MCI to measure changes in the stance of monetary policy. The significance of the exchange rate may indicate the relevance of the MCI and its ignorance would increase the volatility of monetary condition (Knedlik, 2006). However, it should also be noted that the small weight of exchange rate implies that MCI may have little use in Korea, Philippines, and South Africa.

T a b l e 4

Weights on Exchange Rate and Interest Rate in MCI

	Lag	β^{EX}	β^{R}
Brazil	4	0.14	0.86
Chile	13	0.55	0.45
Colombia	12	0.41	0.59
Mexico	14	0.36	0.64
Hungary	7	0.19	0.81
Poland	11	0.22	0.78
Romania	4	0.52	0.48
Turkey	13	0.12	0.88
Korea	11	0.03	0.97
Philippines	13	0.04	0.96
Thailand	10	0.40	0.60
South Africa	10	0.05	0.95

Source: Author's estimation.

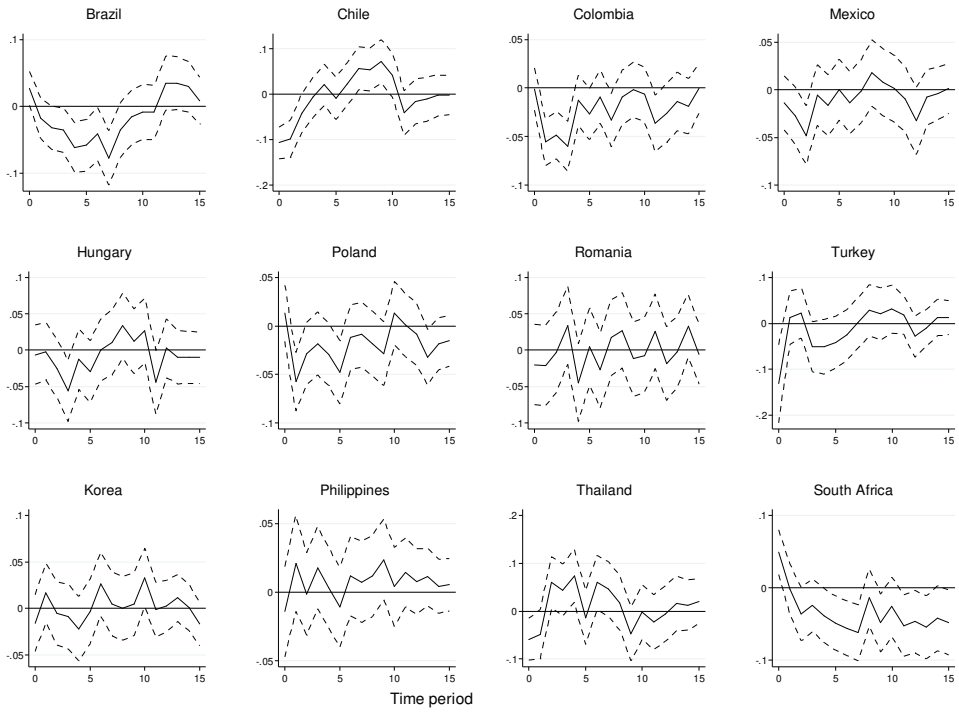
We further investigate the significance of MCI as an indicator of monetary policy in emerging economies by observing the response of inflation to exogenous changes in the MCI. As shown in Figure 1, inflation shows a negative and statistically significant response to MCI shocks in most emerging economies. To begin with, inflation shows an immediate reduction following a monetary policy contraction (a positive MCI shock) in Chile, Colombia, Turkey and Thailand. In other emerging economies, the negative response of inflation is visible in the very short run, from the one-month ahead. In Romania, Korea, and Philippines, inflation shows a negative response to MCI shocks but such a response is not statistically significant.

The absence of the price puzzle when using MCI as a measure of monetary policy in most emerging economies provides supportive evidence for the argument

of Bui and Kiss (2021) that a composite measure can better measure the stance monetary policy than any single indicator does in inflation-targeting emerging economies. In fact, Bui and Kiss (2021) also conduct a study about the indicator problem of monetary policy for the same group of emerging economies as in this paper. They examined the relative significance of interest rate and monetary aggregates as a monetary policy indicator in emerging economies that follow inflation targeting by using a pallet of methods such as Granger causality test, impulse response function, and forecast error variance decomposition. Accordingly, they argued that interest rate cannot fully reflect changes in the stance of monetary policy in emerging economies. Their study found that the price puzzle appears when measuring monetary policy by interest rate and argued that more information about monetary policy stance stems from the use of other instruments such as monetary aggregates. Therefore, the finding about the superiority of MCI in mitigating the price puzzle problem shed more light about how to measure changes in the stance of monetary policy in inflation-targeting emerging economies.

F i g u r e 1

Response of Inflation to Innovations of MCI



Source: Author's construction.

Furthermore, the stabilizing effect of monetary policy on inflation is in line with Berument (2007). However, it should be noted that the spread constructed by Berument (2007) implies that that interest rate and exchange rate is equally important. In this paper, the exchange rate has a smaller weight. Therefore, the exchange rate may show a reduction in its importance during the post-crisis period.

In summary, the findings have some implications. As aforementioned, inflation reduces after a contractionary shock of monetary policy represented by a positive shock of MCI. Such a finding implies that MCI can be considered as a useful indicator of monetary policy in emerging economies that follow inflation targeting. Furthermore, the fact that MCI mitigates the price puzzle problem provides supportive empirical evidence for the argument of Bui and Kiss (2021) that interest rate may not fully capture changes in the stance of monetary policy in emerging economy. It also suggests that a composite index can be a good choice to solve the problem of price puzzle in the analysis of monetary policy in inflation-targeting emerging economies.

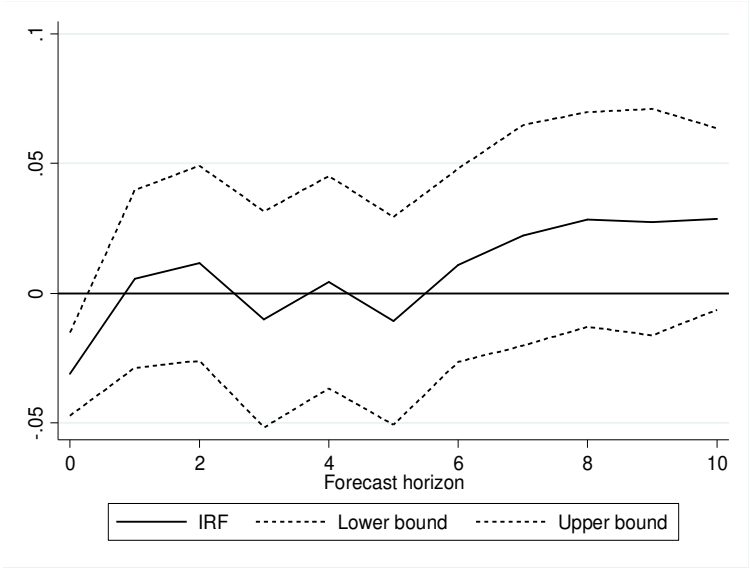
4. Robustness Tests

The paper conducted a series of tests to ensure the robustness of the empirical results. To begin with, the VAR estimation is performed with different lag orders, ranging from 3 to 18. Stability and autocorrelation tests are applied to all regressions. The results (not shown, available upon request) show that there is no change in the general conclusion about the role of the MCI. In fact, the price puzzle does not emerge in most emerging economies. Another robustness test involves changing the base value of exchange rate and interest rate specified in equation 2. In the paper, the benchmark regression used the value in January 2000 as the base value. For robustness test, the paper selects the value of exchange rate and interest rate in January 2005 as new base values. Accordingly, the impulse response function shows similar patterns to those derived from the base value of January 2000.

In addition to this, a panel analysis is conducted since panel data contains more information than time-series data. As shown in Figure 2, MCI has a negative and statistically significant effect on the movement of inflation in emerging economies, which is consistent with most theoretical models. As observed, MCI shows a negative effect on impact. However, the effect of MCI bounces back and fades out quickly. Such an economic meaningful response of inflation indicates the usefulness of the MCI as an indicator of monetary policy in emerging economies.

Figure 2

Panel Evidence about the Inflation Response to MCI



Source: Author's construction.

Conclusions

Measuring monetary policy is the first step to analyse the effect and transmission of monetary policy. However, the significance of the exchange rate channel questions the relevance of the monetary condition index, which is a weighted average of the deviation of exchange rate and interest rate from their baseline value, as an indicator of monetary policy in emerging economies. The objective of this paper is to investigate whether changes in the MCI can capture changes in the stance of monetary policy in emerging economies that following inflation targeting.

The empirical results show that inflation shows a negative and statistically significant response to a positive MCI shock or a monetary policy contraction in most emerging economies. Such an impulse response is of expected sign, economic meaningful, and consistent with most theoretical models. Therefore, MCI can be considered as a useful indicator of monetary policy and it can be used to predict the movement of inflation. However, this does not mean that MCI should be used as an operational target, especially when it creates a systematic negative interaction between interest rate and exchange rate (Engelbrecht and Loomes, 2002). Furthermore, using MCI as an operational target is difficult due to the consideration of adjustment timing and additional information (Ericsson et al., 1998).

The empirical results provide crucial policy implications. Firstly, it implies that the interest rate can capture only a part of information about change in the stance of monetary policy in emerging economies that follow inflation targeting. In other words, a composite index such as MCI can better indicate whether monetary policy is easing or tightening. However, it should be noted that MCI is not a recommendation as an operational target in the conduct of monetary policy. Secondly, the importance of MCI also implies that both the interest rate and the exchange rate are active transmission channels in inflation-targeting emerging economies. Since the exchange rate plays an important role in emerging economies, the market participants should consider the exchange rate when analysing the intention of the central bank in inflation-targeting emerging economies. Finally, the public can use MCI to have a more accurate assessment of changes in the stance of monetary policy. They can also incorporate information of MCI into that of other instruments at their disposal when analysing the expected movement of inflation.

It should also be noted that the construction of the MCI in the paper copes with some limits. Firstly, to interpret the monetary conditions, it is better to observe the movement rather than the value of MCI, which is in line with the finding and suggestion of Nucu and Anton (2018). Such a weakness prevents the use of the MCI as a technical instrument through which monetary authorities can make a decision. Secondly, the public copes with difficulties when predicting the effect of MCI on inflation when there is an inverse relationship between interest rate and exchange rate (Engelbrecht and Loomes, 2002).

References

ANGELOPOULOU, E. – BALFOUSSIA, H. – GIBSON, H. D. (2014): Building a Financial Conditions Index for the Euro Area and Selected Euro Area Countries: What Does It Tell Us about the Crisis? Economic Modelling, *38*, pp. 392 – 403.

BATINI, N. – TURNBULL, K. (2002): A Dynamic Monetary Conditions Index for the UK. Journal of Policy Modeling, *24*, No. 3, pp. 257 – 281.

BENAZIĆ, M. (2012): Monetary Conditions Index for Croatia. Economic Research – Ekonomska istraživanja, *25*, sup. 1, pp. 47 – 64.

BERUMENT, H. (2007): Measuring Monetary Policy for a Small Open Economy: Turkey. Journal of Macroeconomics, *29*, No. 2, pp. 411 – 430.

BUI TRUNG THANH – KISS, D. G. (2021): Measuring Monetary Policy By Money Supply and Interest Rate: Evidence from Emerging Economies. Review of Economic Perspectives, *21*, No. 3, pp. 347 – 367.

CERMEÑO, R. – VILLAGÓMEZ, F. A. – POLO, J. O. (2012): Monetary Policy Rules in a Small Open Economy: An Application to Mexico. Journal of Applied Economics, *15*, No. 2, pp. 259 – 286.

COŞKUN, A. (2021): Construction of the Monetary Conditions Index with TVP-VAR Model: Empirical Evidences for Turkish Economy. Handbook of Research on Emerging Theories, Models, and Applications of Financial Econometrics, pp. 215 – 228.

De MELLO, L. – MOCCERO, D. (2011): Monetary Policy and Macroeconomic Stability in Latin America: The Cases of Brazil, Chile, Colombia and Mexico. Journal of International Money and Finance, *30*, No. 1, pp. 229 – 245.

EGAN, P. G. – LEDDIN, A. J. (2016): Examining Monetary Policy Transmission in the People's Republic of China-Structural Change Models with a Monetary Policy Index. Asian Development Review, *33*, No. 1, p. 74.

ENGELBRECHT, H.-J. – LOOMES, R. (2002): The Unintended Consequences of Using an MCI as an Operational Monetary Policy Target in New Zealand: Suggestive Evidence from Rolling Regressions. New Zealand Economic Papers, *36*, No. 2, pp. 217 – 233.

ERICSSON, N. R. – JANSEN, E. S. – KERBESHIAN, N. A. – NYMOEN, R. (1998): Interpreting a Monetary Conditions Index in Economic Policy. [Paper Presented at the Bank for International Settlements.]

FREEDMAN, Ch. (1994): The Use of Indicators and of the Monetary Conditions Index in Canada. Frameworks for Monetary Stability: Policy Issues and Country Experiences, pp. 458 – 476.

FREEDMAN, Ch. (1995): The Role of Monetary Conditions and the Monetary Conditions Index in the Conduct of Policy. Bank of Canada Review, Autumn, pp. 53 – 59.

FURLANI CASSILATTI, L. G. – PORTUGAL SAVINO, M. – POLETTI LAURINI, M. (2010): Exchange Rate Movements and Monetary Policy in Brazil: Econometric and Simulation Evidence. Economic Modelling, *27,* No. 1, pp. 284 – 295.

GERLACH, S. – SMETS, F. (2000): MCIs and Monetary Policy. European Economic Review, *44,* No. 9, pp. 1677 – 1700.

GOODHART, Ch. – HOFMANN, B. (2001): Asset Prices, Financial Conditions, and the Transmission of Monetary Policy. [Paper Presented at the Asset Prices, Exchange Rates, and Monetary Policy, California.]

GOYAL, A. (2016): Unconventional Monetary Policy in Emerging Markets. Macroeconomics and Finance in Emerging Market Economies, *9*, No. 2, pp. 101 – 108.

HATAISEREE, R. (1998): The Roles of Monetary Conditions and the Monetary Conditions Index in the Conduct of Monetary Policy: The Case of Thailand under the Floating Rate Regime. Bank of Thailand Quarterly Bulletin, pp. 1 – 22.

HE, D. – PAUWELS, L. L. (2008): What Prompts the People's Bank of China to Change Its Monetary Policy Stance? Evidence from a Discrete Choice Model. China & World Economy, *16*, No. 6, pp. 1 – 21.

HEMATY, M. – BOOSTANI, R. (2014): Constructing a New Monetary Condition Index for Iran. Journal of Money and Economy, *9*, No. 3, pp. 119 – 147.

JAWADI, F. – MALLICK, S. K. – SOUSA, R. M. (2014): Nonlinear Monetary Policy Reaction Functions in Large Emerging Economies: The Case of Brazil and China. Applied Economics, *46,* No. 9, pp. 973 – 984.

KANNAN, R. – SANYAL, S. – BHOI, B. B. (2007): Monetary Conditions Index for India. RBI Occasional Papers, *27*, No. 4, pp. 57 – 86.

KAPETANIOS, G. – PRICE, S. – YOUNG, G. (2018): A UK Financial Conditions Index Using Targeted Data Reduction: Forecasting and Structural Identification. Econometrics and Statistics, *7*, pp. 1 – 17.

KARI, H. E. – ERICSSON, N. R. – NYMOEN, R. (1996): Hazards in Implementing a Monetary Conditions Index. Oxford Bulletin of Economics and Statistics, *58*, No. 4, pp. 765 – 790.

KESRIYELI, M. – KOCAKER, I. I. (1999): Monetary Conditions Index: A Monetary Policy Indicator for Turkey. Ankara: Central Bank of the Republic of Turkey, Research Department.

KNEDLIK, T. (2006): Estimating Monetary Policy Rules for South Africa. South African Journal of Economics, *74*, No. 4, pp. 629 – 641.

BABECKÁ KUCHARČUKOVÁ, O – CLAEYS, P. – VAŠÍČEK, B. (2016): Spillover of the ECB's Monetary Policy Outside the Euro Area: How Different Is Conventional from Unconventional Policy? Journal of Policy Modeling, *3*, No. 2, pp. 199 – 225.

MA, Y. (2014): Monetary Policy Based on Nonlinear Quantity Rule: Evidence from China. International Review of Economics & Finance, *34*, pp. 89 – 104.

MAJID, M. – ZULKHIBRI, A. (2012): Measuring Monetary Conditions in a Small Open Economy: The Case of Malaysia. Journal of Financial Economic Policy, *4*, No. 3, pp. 218 – 231.

MARGA, P. (1999): Measuring Monetary Conditions in Europe: Use and Limitations of the MCI. De Economist, *147*, No. 2, pp. 183 – 203.

MEHRA, Y. P. (2020): Monetary Policy and Long-Term Interest Rates Handbook of Monetary Policy. New York: Routledge, pp. 931 – 949.

MEMON, I. A. – JABEEN, H. (2018): Monetary Condition Index and Its Changing Transmission on Macro-Economic Variables. Arab Economic and Business Journal, *13*, No. 2, pp. 111 – 124.

NUCU, A. E. – ANTON, S. G. (2018): Monetary Conditions Index: New Empirical Evidence from Central and Eastern European Countries. Ekonomický časopis/Journal of Economics, *66,* No. 2, pp. 139 – 158.

OSBORNE-KINCH, J. – HOLTON, S. (2010): A Discussion of the Monetary Condition Index. Quarterly Bulletin, *1*, No. 1, pp. 68 – 80.

PRACHI, M. – MONTIEL, P. – SENGUPTA, R. (2016): Monetary Transmission in Developing Countries: Evidence from India Monetary Policy in India. New Delhi: Springer, pp. 59 – 110.

POON, W.-Ch. (2010): A Monetary Policy Rule: The Augmented Monetary Conditions Index for Philippines Using UECM and Bounds Tests. Melbourne: Monash University Business and Economics, Department of Economics.

POON, W.-Ch. (2014): Monetary Conditions in the Philippines: An Assessment from DOLS and ARDL. Journal of Asia-Pacific Business, *15*, No. 4, pp. 290 – 306.

QAYYUM, A. (2002): Monetary Conditions Index: A Composite Measure of Monetary Policy in Pakistan. The Pakistan Development Review, pp. 551 – 566.

SÁNCHEZ-FUNG, J. R. (2011): Estimating Monetary Policy Reaction Functions for Emerging Market Economies: The Case of Brazil. Economic Modelling, *28*, No. 4, pp. 1730 – 1738.

ŞIKLAR, İ. – DOĞAN, B. (2015): Monetary Condition Index with Time Varying Weights: An Application to Turkish Data. Business and Economic Research, *5*, No. 1, pp. 117 – 132.

US, V. (2004): Monetary Transmission Mechanism in Turkey under the Monetary Conditions Index: An Alternative Policy Rule. Applied Economics, *36*, No. 9, pp. 967 – 976.

ZULFIQAR, H. – KHAN, M. M. (2007): Monetary Conditions Index for Pakistan. SBP Research Bulletin, *3*, No. 2, pp. 165 – 190.

ZULKHIBRI, M. (2012): Policy Rate Pass-through and the Adjustment of Retail Interest Rates: Empirical Evidence from Malaysian Financial Institutions. Journal of Asian Economics, *23*, No. 4, pp. 409 – 422.