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The Effectiveness of Unconventional Monetary Policy (UMP) on Financial Markets in Indonesia and Malaysia during the Covid-19 Pandemic

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Abstract: This paper discusses the effectiveness of unconventional monetary policy (UMP) on financial markets, includes the exchange rate and stock return index in Indonesia and Malaysia during the Covid-19 pandemic. Using announcements issued by the central banks of Indonesia and Malaysia as a benchmark for changes of yield curve in response to UMP, the effectiveness of UMP on exchange rates and stock return index is estimated using the sign and zero restriction VAR. As a result, UMP is effective on exchange rates in Indonesia and Malaysia, but it is not effective on stock return index in those two countries.

Keywords: Announcement; Unconventional Monetary Policy; Sign and Zero Restriction VAR

Introduction

Financial market is one of those affected by the Covid-19 pandemic, such as falling stock return index in 64 countries (Ashraf, 2020) and increasing volatility in equity, bitcoin, and gold prices in Germany, China, the United States, England, and South Korea (Ali et al., 2020). Various efforts were made to stabilize economic and financial market conditions, such as providing fiscal stimulus (Topcu & Gulal, 2020) and implementing expansionary monetary policies by the central bank, both in the form of conventional monetary policies by reducing interest rate instruments, as well as with unconventional monetary policies such as quantitative easing (QE).

However, the use of interest rate instruments has limitations. If interest rates are close to zero, they are no longer effective in stimulating the economy (Abbassi & Linzert, 2012; Gilbert et al., 2015; Mishkin, 2010; Wright, 2011). Therefore, central banks in various countries use unconventional monetary policies to stimulate the economy, such as the

United States which implements QE, and Brazil and China which reduce the reserve requirement ratio (Ozili & Arun, 2020). This unconventional monetary policy was effective in boosting the economy even though interest rates were close to zero, by increasing the money supply and encouraging investment.

Although unconventional monetary policy can stimulate the economy in crisis conditions, the implementation of unconventional monetary policy also risks reducing the credibility of the central bank, fiscal dominance, inflation, currency depreciation, and increasing the risk premium (Hofman & Kamber, 2020). So the effectiveness of unconventional monetary policy will depend on a country's ability to manage these risks.

The research on the effects of unconventional monetary policy also obtained different results. Several studies have proven that expansive unconventional monetary policies are effective in reducing government bond yields (Bernhard & Ebner, 2017; Fratto et al., 2021; Mamaysky, 2018; Rogers et al., 2011; Wright, 2011), causing the currency to depreciate against the USD (Bernhard & Ebner, 2017; Fratto et al., 2021; Glick & Leduc, 2012; Rossi, 2020), and increase stock index prices (Bernhard & Ebner, 2017; Ferreira & Serra, 2022; Fiordelisi et al., 2014; Rogers et al., 2011). On the other hand, research by Wei and Han (2021) found that unconventional monetary policy had no significant effect on financial markets in the form of stock return index, 10 year government bond yields, credit default swaps (CDS) and currency exchange rates against the USD in 37 countries. In addition, Indrajaya (2022) found that unconventional monetary policies were not effective in increasing credit growth in Indonesia.

Based on the empirical results regarding the effectiveness of various unconventional monetary policies in various countries, exacerbated by the Covid-19 pandemic, this has opened up more space to research the effectiveness of unconventional monetary policies on financial markets during the Covid-19 pandemic. Taking into account that the characteristics of the shock caused by the Covid-19 pandemic are different from previous crises, Rebucci et al. (2021) examined the effect of QE announcements at 21 central banks on government bond yields and bilateral currency exchange rates against the USD. Using the GVAR model, Rebucci et al. (2021) obtained the result that there are differences in the effect of announcement QE on government bond yields and bilateral currency exchange rates against the USD in developed countries (advanced economies) and developing countries (emerging economies).

Therefore, bearing in mind that financial market conditions have experienced a shock due to the Covid-19 pandemic, as well as the results of research on the effects of unconventional monetary policies on financial markets in previous studies, this still raises debate. In addition, even though it can stimulate the economy, the implementation of unconventional monetary policy also has the potential to reduce the credibility of the central bank, fiscal domination, inflation, currency depreciation, and increase the risk premium (Hofman & Kamber, 2020). The funds to be able to implement unconventional monetary policies over a long period of time are also limited. This raises the question whether unconventional monetary policy is effective in influencing two types of financial markets, namely stock index returns and currency exchange rates against the USD during the Covid-19 pandemic.

The research results of Rebucci et al. (2021) stated that the effectiveness of unconventional monetary policy differs in developed countries from developing countries. However, the majority of studies on the effectiveness of unconventional monetary policies only focus on developed countries in Europe, the USA and Japan, which have large and well-developed financial markets, as well as independent central banks (Abbassi & Linzert, 2012; Bernhard & Ebner, 2017 ; Ferreira & Serra, 2022; Fiordelisi et al., 2014; Gilchrist et al., 2014; Glick & Leduc, 2012; Haitsma et al., 2016; Mamaysky, 2018; Mclaren et al., 2014; Rogers et al., 2011; Rossi, 2020; Swanson, 2021). In fact, the characteristics of developing countries are different from developed countries, where the implementation of unconventional monetary policies in developing countries can be hampered due to factors such as underdeveloped government and corporate bond markets, vulnerability to inflation and potential capital outflows (Morgan, 2009).

Therefore, this study takes the locus of Indonesia and Malaysia with the consideration that there is still limited research on the effectiveness of unconventional monetary policies on financial markets conducted in these countries. In fact, Indonesia and Malaysia's financial markets have huge market opportunities and in order to advance their economies and financial markets, Indonesia and Malaysia, which are part of ASEAN countries, have strengthened the ASEAN Economic Community (AEC) cooperation which aims to build an advanced, competitive and integrated economy. In addition, Indonesia and Malaysia adhere to a managed float exchange rate regime (Tan & Mohamed, 2020) and use the ITF monetary framework (Ascarya, 2012). Although the exchange rate regimes and monetary frameworks used by the two countries are the same, the unconventional monetary policy instruments used by the two countries are different. Indonesia uses the LSAP instrument, while Malaysia uses the liquidity provision instrument. Therefore, research on the effectiveness of unconventional monetary policies on financial markets in Indonesia and Malaysia needs to be analyzed.

This study aims to analyze the effectiveness of unconventional monetary policy on financial markets (stock index returns and currency exchange rates against the USD) in Indonesia and Malaysia during the Covid-19 pandemic. It is important to note that the purpose of this study is the intermediate target, namely the exchange rate and stock index returns. The reason is to be able to analyze market behavior which changes rapidly following policy, so that it can help predict the direction of central bank policy as a benchmark for achieving the ultimate goal. If the central bank's policy can affect the intermediate target, then in the long term the effect of the policy can influence and achieve the final goal.

The hypothesis of this study is that unconventional monetary policy is effective on financial markets (stock index returns and currency exchange rates against the USD) in Indonesia and Malaysia during the Covid-19 pandemic. Unconventional monetary policy is said to be effective on stock index returns if the policy can increase stock index returns, or in other words, stock indexes respond positively to unconventional monetary policy. Unconventional monetary policy is said to be effective against the currency exchange rate against the USD if the policy can depreciate the currency against the USD, because depreciating the currency against the USD is expected to stimulate exports and drive a sluggish economy due to the Covid-19 pandemic (Fratto et al., 2021).

To answer the objectives and hypotheses above, the first step that must be taken is to build a database of non-conventional monetary policy announcements that is used as a benchmark to identify changes that occur in the yield curve due to non-conventional monetary policy announcements. Changes in the yield curve are expressed as a function of shock and used as a proxy for unconventional monetary policy. Then, to estimate the effectiveness of unconventional monetary policy on stock index returns and currency exchange rates against the USD by considering monetary policy transmission mechanisms that require a time lag, the vector autoregression (VAR) model is used which is adopted from Inoue and Rossi (2019) which using zero and sign restriction VAR (VARsignR) developed by Uhlig (2005), which allows structural shock analysis in this research model. Finally, non-conventional monetary policy is declared effective based on the shape and direction of the impulse response function (IRF) resulting from the shock announcement of non-conventional monetary policy as reflected by changes in the yield curve. Unconventional monetary policy is said to be effective on stock index returns and currency exchange rates against the USD if the resulting IRF has a positive or increasing direction. The timeframe for this research is from 1 January to 31 December 2020.

The motivation for this study is to review the effectiveness of unconventional monetary policy on financial markets during the Covid-19 pandemic, especially in developing countries, by using announcements issued by central banks as proxies for unconventional monetary policy and to estimate yield curve changes. By using zero and sign restriction VAR adopted from Inoue & Rossi (2019), the effectiveness of unconventional monetary policy on stock index returns and exchange rates is stated to be effective if the resulting IRF has a positive or increasing direction.

This research is expected to contribute to discussing the effectiveness of unconventional monetary policies on financial markets in developing countries, especially during the Covid-19 pandemic. In addition, this research presents an alternative method for analyzing unconventional monetary policy, namely by using the zero and sign restriction VAR model which is a development of the VAR structural model which is currently increasingly popular in the literature (Chudik & Fidora, 2011).

Literature Review

Under normal conditions, conventional monetary policy using interest rate instruments will affect asset prices so that financial market participants respond by balancing their asset portfolios (Markowitz, 1952) so that the monetary policy effect can be transmitted to the real sector. However, when the Covid-19 pandemic disrupts the economy, financial market players will demand a higher risk premium due to increased uncertainty, or choose to withdraw funds from financial markets so that this behavior can disrupt market functioning and hinder the monetary policy transmission mechanism. In responding to this, the central bank implemented an expansionary monetary policy by lowering interest rates with the aim of increasing investment and encouraging economic growth. If interest rates have been reduced to near zero but the effect is still not significant in driving the pace of the economy, then a more aggressive policy is needed (Mishkin, 2009).

To overcome these conditions, the central bank implemented unconventional monetary policy. Unconventional monetary policy is said to be effective on stock index returns if the policy can increase stock index returns, or in other words, stock indexes respond positively

to unconventional monetary policies (Fratto et al., 2021; Morgan, 2009). Meanwhile, unconventional monetary policy is said to be effective against the currency exchange rate against the USD if the policy can depreciate the currency against the USD, because depreciating the currency against the USD is expected to stimulate exports and drive a sluggish economy due to the Covid-19 pandemic (Fratto et al. ., 2021; Inoue & Rossi, 2019). This is based on the impossible trinity framework which states that exchange rate stability, freedom of foreign mobility, and monetary policy autonomy for the purpose of domestic price stability are three objectives that are difficult to achieve simultaneously in an open economy.

There are several types of unconventional monetary policy instruments that can be used by central banks, including the following:
- Liquidity provision, namely efforts to loosen loan facilities by the central bank to commercial banks.
- Large scale asset purchases (LSAP) otherwise known as quantitative easing (QE), namely market operations carried out by the central bank to purchase large scale debt securities. The aim is to influence the interest rate of certain debt segments. The debt securities purchased can be in the form of government-owned debt securities or private company debt securities. LSAP is carried out to increase the amount of money in circulation, which in turn will increase spending or consumption so that it can drive a sluggish economy.
- Forward guidance, namely the way the central bank manages the expectations of market players, especially regarding long-term interest rates.

Even though unconventional monetary policy is a good alternative to boost economic recovery during the Covid-19 pandemic, unconventional monetary policy can also be risky, so it must be considered carefully. Unconventional monetary policy can undermine the credibility of the central bank by creating a bad perception that the central bank is unable to achieve the target of monetary financing. In addition, liquidity provision has the risk of depressing the central bank's balance sheet by increasing the amount of arrears on maturing bank loans and the risk on commercial bank loans. Then, the increase in exposure to long-term debt from the LSAP program can also raise concerns over the central bank's willingness to raise interest rates in the future when conditions have improved. Unconventional monetary policies also run the risk of creating fiscal dominance resulting from massive purchases of government bonds, which can trigger currency depreciation and increase the risk premium (Haitsma et al., 2016).

Based on the consideration of the positive and negative sides of the implementation of unconventional monetary policy above, a credible monetary policy framework and good governance are needed so that unconventional monetary policy can run effectively. Therefore, the implementation of unconventional monetary policy, especially LSAP, must be temporary. The central bank must have a well-thought-out plan for implementing the policy and communicate it clearly to the public and financial market players.

In addition, the central bank needs to pay attention to the criteria for debt securities to be purchased. The debt securities purchased are targeted at quality and guaranteed assets, such as government bonds. This is done to minimize concerns about the credibility and risk for the central bank. For countries with liquid capital market conditions, the range of assets that meet the requirements of the LSAP program can include large private corporate bonds

(blue chips) (Hofman & Kamber, 2020). So based on these criteria, the effectiveness and impact of implementing unconventional monetary policies will vary in each country, depending on country-specific factors, such as the structure and liquidity of the capital market, the availability of high-quality domestic assets, and a well-developed financial sector.

The transmission mechanism through which unconventional monetary policy reaches its goals is at least through four channels (Bernhard & Ebner, 2017; Mishkin, 2010), namely:
- Channel rebalancing portfolio
  This channel mainly applies to government bonds based on the theory that investors have a preference for bonds with certain characteristics, for example maturity. With the large demand for government bonds caused by the LSAP policy, the supply will be absorbed and reduced, as well as causing a decrease in the yield on the government bonds. As a result, investors who seek to optimize their investment will rebalance their asset portfolios by diverting their funds to purchase bonds with similar characteristics. In addition, if investors choose bonds based on their preferences for the amount of yield offered, then a decrease in yield on government bonds will encourage investors to switch to riskier assets, for example private corporate bonds, which offer higher yields than government bonds.
- Liquidity channels
  Liquidity channel is also related to the LSAP program. The purchase of bonds by the central bank causes the amount of available liquidity to the government or the company to increase, so investors who maximize profits will see the increase in liquidity as a business opportunity that can provide profitable returns. This causes investors to move to buy the company's assets resulting in an increase in demand. Increased demand resulted in an increase in the price of the company's assets. On the other hand, an increase in the availability of liquidity will reduce the average expected risk-free interest rate, in other words, reduce the risk of these assets. As a result, investors tend to be risk-taking, so they are more willing to take risks by buying the company's assets.
- Signaling channels
  Unconventional monetary policy announcements can have an effect on financial markets through signaling channels. This is based on the theory that monetary policy announcements contain relevant information regarding the central bank's commitment to maintaining interest rates and its policy direction towards the economic situation (Bauer & Neely, 2014). The plot is that the announcement of a monetary policy decision taken by the central bank will provide a signal for financial market participants so as to arouse their perception of the attitude they will take to anticipate the central bank's policy. For example, when the central bank gives a signal by announcing it will implement the LSAP program, investors who hear the announcement will make perceptions about the liquidity and prices of government/company assets purchased by the central bank, which will ultimately influence decision making in investing in these assets.
  An important point in this signaling channel is regarding the size of the effect which depends on the attitude of economic actors in anticipating announcements. Kuttner (2011) found empirical evidence that monetary policy announcements that had been anticipated by the public had no effect on financial markets, however announcements that were not anticipated or surprised by the public proved to have a significant effect on financial markets.
- Exchange rate channels

Monetary policy can also influence through the exchange rate channel. For example, expansionary monetary policy will cause a depreciation of the nominal exchange rate of the country's currency.

By considering the transmission mechanism through several of these channels, the effectiveness of unconventional monetary policy may provide different results in each country, based on the economic structure and depth of the country's financial market. If a country has a more credible central bank and a larger capital market, the signaling channel effect on the announcement of the implementation of unconventional monetary policy will be greater. In addition, if a country's financial markets are interconnected, portfolio rebalancing channels can be more efficient. Likewise with the exchange rate channel. In countries with financial markets that are more open to foreign investors, the exchange rate channel becomes very important.

Based on a literature study on research on the effects of unconventional monetary policy, it is known that there are several methods for identifying the effects of unconventional monetary policy on financial markets, such as functional VAR (Inoue & Rossi, 2019) as used in this research, heteroscedasticity-based identification (Rigobon, 2003; Wright, 2011), as well as high frequency identification/event studies using the panel model (Bernanke & Kuttner, 2005; Gürkaynak et al., 2004; Kuttner, 2011; Wei & Han, 2021).

Of the several identification methods, what is commonly used in researching the effects of unconventional monetary policy is high frequency identification/event studies such as Wei & Han's (2021) research which examines the impact of the Covid-19 pandemic on the transmission of monetary policy to financial markets in the form of government bonds, the stocks, exchange rates, and credit default swaps (CDS) in 37 countries. Wei & Han (2021) distinguishes between conventional monetary policy (using an interest rate proxy) and unconventional (using a dummy variable proxy that has a value of 1 if there is an announcement of non-conventional monetary policy on that date). Using the panel equation, Wei & Han (2021) obtained the result that the Covid-19 pandemic weakened the effectiveness of monetary policy, both conventional and unconventional. Nevertheless, the effect of unconventional monetary policy is slightly larger than that of conventional monetary policy on financial markets.

Apart from Wei and Han (2021), other studies that use the high frequency identification method in estimating the effects of unconventional monetary policies on financial markets include, among others, Abbassi & Linzert (2012); Bernhard & Ebner (2017); Ferreira & Serra (2022); and Swanson (2021). Research by Abbassi & Linzert (2012) and Bernhard & Ebner (2017) analyze the effectiveness of unconventional monetary policies in influencing financial markets. Both of these studies use announcements as a proxy for unconventional monetary policy. The findings from this study are in line with the theory which states that unconventional monetary policy is effective in influencing bond yields, stock market indices, and exchange rates. In addition, research by Abbassi & Linzert (2012) found that conventional monetary policy was ineffective on the eurobor rate during the financial crisis, while non-conventional monetary policy was effective in reducing the eurobor rate by more than 80 basis points.

Another study, namely Ferreira & Serra (2022), studied the effect of changes in asset prices due to unconventional monetary policy announcements in countries in Europe, England

and the USA. By creating a date database containing unconventional monetary policy announcements from the European Central Bank (ECB), the Bank of England (ECB), and the Federal Reserve, Ferreira & Serra (2022) analyzes the price response of stock indices on the announcement date and the day after the announcement. This research also classifies announcements into several types such as "coordination", "asset purchases", and "forward guidance". The results of this study indicate that unconventional monetary policy announcements have various effects on European government bonds, but the effect is positive and significant on stocks. In addition, this study states that well-coordinated policy implementation has a strong influence on the capital market. Furthermore, the announcement of unconventional monetary policy has a large effect.

In line with Ferreira & Serra (2022), Swanson (2021) classifies announcements into several types, and analyzes the effect of unconventional monetary policy announcements announced by the Federal Reserve on stock market indices, bonds, and exchange rates. The difference is, this study analyzes price changes that occur 30 minutes after the announcement of unconventional monetary policy. The results of this study state that unconventional monetary policy is effective in influencing stock market indices, bonds and exchange rates. Furthermore, the types of announcement "forward guidance" and "LSAP" have a significant and persistent effect on treasury yields, corporate bond yields, stock prices and exchange rates compared to the magnitude of the effect of interest rate instruments in normal times.

Although the event study method is widely used in examining the effect of unconventional monetary policy on financial markets, this method cannot accommodate the dynamic effects caused by unconventional monetary policy. Therefore, research by Rebucci et al. (2021) used the Global VAR (GVAR) identification method to examine the effect of QE announcements at 21 central banks in advanced economies and developing countries on 10 year government bond yields and bilateral currency exchange rates on USD. By using the GVAR model, this study can accommodate dynamic aspects that cannot be covered by the high frequency identification/event study method. The research concluded that the QE effect did not lose its effectiveness on financial markets in developed countries even during the Covid-19 pandemic. In addition, this study found that in developing countries the effect of QE announcements on reducing 10 year government bond yields was greater than the effect in developed countries. The findings of this study are in line with the theory which states that expansive unconventional monetary policies (such as QE) can reduce yields on bonds.

Then, based on the VAR sign restriction model (VARsignR) developed by Uhlig (2005), Inoue and Rossi (2019) added a zero-block restriction and developed it into a VAR functional model. Instead of only using 10 year government bond yields as a proxy for unconventional monetary policy, as was done by Rebucci et al. (2021), Inoue and Rossi (2019) use yield curves at various maturity levels to estimate the effect of unconventional monetary policy on exchange rates in England, Japan, Europe and the USA. This is based on the term structure of interest theory which states that yield curves with various maturity levels have different characteristics in projecting monetary policy (Belke & Polleit, 2009).

In this study, a shock to unconventional monetary policy is defined as a change in the yield curve caused by an announcement of unconventional monetary policy. Inoue & Rossi (2019) also differentiates announcements into several types such as coordination, asset

purchases, and forward guidance. In line with the theory, the empirical results obtained by this study state that expansionary monetary policy, both conventional and unconventional, causes exchange rate depreciation.

Methods

This study uses daily data from January 1 2020 to December 31 2020 with the locus of Indonesia and Malaysia. The use of daily data is needed to analyze and predict the direction of market changes. In addition, in determining investment strategies, investors need high frequency data by utilizing the business cycle in transactions (Frino et al., 2000; Kawaller et al., 1987).

For the variables of the types of financial markets, stock index return data and currency exchange rates of each country against the USD are used, all of which are sourced from the data stream. Government bond yield data at all maturity levels for the two countries are collected from the datastream as a proxy for unconventional monetary policy. Because Indonesian and Malaysian government bonds have different maturity, this research uses government bond yield data adjusted for each of these countries, where the Indonesian state uses government bond yield data with maturity 1, 3, 5, 10, 15, 20, 25, and 30 years; Meanwhile, Malaysia uses government bond yield data with maturity of 3, 5, 7, 10, 15, 20 and 30 years. A summary of the research variables is presented in Table 1 below.

Table 1. **Research Variable**

Variable	Variable Definition	Proxy
$YM(\tau)Y$	Change in government bonds yield with maturity (τ=1,3,5,..,30) on day t	$(ym_{\tau,t} - ym_{\tau,t-1})d_t$ $ym_{\tau,t}$: yield curve with maturity τ on day t $ym_{\tau,t-1}$: yield curve with maturity τ on day $(t-1)$ d_t: dummy of the day with unconventional monetary policy announcement $t = 1, 2, .., T$
$rstock_t$	return stock market index on day t	$\dfrac{(rstock_t - rstock_{t-1})}{rstock_{t-1}} \times 100\%$
$dlnexc_t$	The growth of the currency exchange rate on day t against USD	$ln(exc_t) - ln(exc_{t-1})$

To answer the research objective, namely to analyze the effectiveness of unconventional monetary policy on financial markets in the form of stock index returns and currency exchange rates against the USD in Indonesia and Malaysia during the Covid-19 pandemic, this research uses the VAR functional model built by Inoue & Rossi (2019) which assumes a shock due to the announcement of unconventional monetary policy as a shift in the yield curve at all maturity levels. Therefore, the first step that must be taken to achieve the research objective is to build a database of non-conventional monetary policy announcements that is used as a benchmark to identify changes that occur in the yield curve due to non-conventional monetary policy announcements. The next step is to estimate the effect on stock index returns and currency exchange rates against the USD in Indonesia and Malaysia. Finally, unconventional monetary policy is declared effective on

stock index returns and currency exchange rates against the USD based on the shape and direction of the resulting impulse response function (IRF).

Data on the date of announcement of unconventional monetary policies was collected manually by researchers from the web pages of each country's central bank. Unconventional monetary policies covered in this research include LSAP, liquidity provision, and forward guidance. The non-conventional monetary policy announcement database used in this study can be seen in Appendix I.

As described in Table 1. above, $YM(\tau)Y$ that is a change in the yield curve caused by an announcement of unconventional monetary policy. To obtain the effect of changing the yield curve as a whole, as well as taking into account the possibility of financial market inefficiencies that cause the market to need time to respond to unconventional monetary policy announcements, this study uses a multiple day event window for 5 days starting from the date of unconventional monetary policy announcement. Therefore, d_t which is a dummy will have a value of 1 when there is an announcement of unconventional monetary policy on day t to day t+4. The use of the multiple day event window is also used in the study of Joyce et al. (2011), Krishnamurthy and Vissing-Jorgensen (2011), and Swanson (2011) who used a 2-day event window, and Rebucci et al. (2021) which uses a 3-day event window. Meanwhile, Oler et al. (2008) in their research regarding the duration of the window event study stated that the range of 1 to 5 days is included in the short-time window category. The use of the duration of the short-time window in identifying unconventional monetary policy shocks can accommodate the assumption that other shocks that occur during the same timeframe will only have a minor effect. In addition, the effects that occur as a result of unconventional monetary policy announcements in other countries are not included in this research model.

Before forming a research model, it is important to test the stationarity of the data to avoid spurious (false) regression results, namely conditions where the regression results are statistically significant and the coefficient of determination is high, but in reality there is no relationship between the variables in the model.

A time series data is called stationary if the mean and variance for different lags are constant over time. Testing the stationarity of the data can be done with the unit root test, which if a variable y_t at the data level has one unit root, then the variable is nonstationary. This can be described as follows:

$$y_t = \rho y_{t-1} + u_t$$

If $\rho = 0$ so the model becomes a random walk without a trend and will face a problem where the variance y_t is not stationary (y_t has a unit root). If each side of the equation on the left and right is subtracted y_{t-1}, then the equation becomes:

$$y_t - y_{t-1} = \rho y_{t-1} - y_{t-1} + u_t$$
$$\Delta y_t = (\rho - 1)y_{t-1} + u_t$$
$$\Delta y_t = \delta y_{t-1} + u_t$$

From the equation above, a hypothesis can be made:

$$H_0: \delta = 0$$
$$H_1: \delta \neq 0$$

H_0 means that there is a unit root, while H_1 containing the hypothesis that there is no unit root. The statistical hypothesis testing above was carried out by comparing the ADF_{test}

regression results with the McKinnon critical value t statistic of 1%, 5%, and 10%. If ADF_{test} it is smaller than the McKinnon critical value, then H_0 it is accepted and H_1 rejected, or there is not enough evidence to reject the hypothesis that the equation contains a unit root (non-stationary data). Conversely, if ADF_{test} it is greater than the McKinnon critical value, then H_0 it is rejected and H_1 accepted, or there is sufficient evidence to reject the null hypothesis that the equation contains a unit root (stationary data).

Determining the optimal lag is important because it considers the possibility of serial correlation and degree of freedom. If the selected lag is too short it will cause a serial correlation, whereas if the selected lag is too long it will cause a decrease in the degree of freedom of the resulting equation and the number of parameters to be estimated becomes more and more so it is not efficient.

Determination of the optimal lag length can be obtained by several criteria, such as LR (sequential modified LR test statistic), FPE (Final Prediction Error), AIC (Akaike Information Criterion), SC (Schwarz information criterion), and HQ (Hannan-Quinn information criterion). In addition, determining the optimal lag can also be done by comparing the highest Adjusted R value among the existing candidates.

This study uses the VAR sign and zero restriction model which is a development of the VAR structural model (SVAR) with the addition of sign restrictions and zero restrictions. The VAR sign and zero restriction model used in this study was adopted from Inoue and Rossi (2019) which also refers to the sign restriction model by Uhlig (2005). In this study, shocks resulting from unconventional monetary policy announcements are proxied using a yield curve for each maturity level so that there are multiple/structural shocks in the model.

In identifying models with multiple/structural shocks using the SVAR model, obstacles will be found where the restrictions on SVAR are not sufficient to identify the model so that it will produce under-identified equations. To overcome this, a sign and zero restriction VAR model is used which can identify models with multiple/structural shocks and IRF is formed with a Bayesian inference approach which can accommodate a sign and zero restriction VAR model (Uhlig, 2005).

The initial step in the specification of this research model is to form the unrestricted VAR equation which is denoted as follows:
$$Y_t = B_1 Y_{t-1} + \ \dots \ + B_l Y_{t-2} + \varepsilon_t \tag{1}$$

Where ε_t is a set of errors with mean 0, zero autocorrelation, and a matrix of variance covariance $\Sigma = E[\varepsilon_t \varepsilon_t']$, and B_i is a matrix of coefficients with a measure $(m+1) \times (m+1)$ of maturity. Y_t is a variable vector of size which:

For the Indonesian exchange rate equation:
$$Y_t = [YM1Y \ YM3Y \ YM5Y \ YM10Y \ YM15Y \ YM20Y \ YM25Y \ YM30Y \ DLNEXC]' \tag{2}$$
For the Indonesian return stock equation:
$$Y_t = [YM1Y \ YM3Y \ YM5Y \ YM10Y \ YM15Y \ YM20Y \ YM25Y \ YM30Y \ RSTOCK]' \tag{3}$$
For the Malaysia exchange rate equation:
$$Y_t = [YM3Y \ YM5Y \ YM7Y \ YM10Y \ YM15Y \ YM20Y \ YM30Y \ DLNEXC]' \tag{4}$$
For the Malaysia return stock equation:
$$Y_t = [YM3Y \ YM5Y \ YM7Y \ YM10Y \ YM15Y \ YM20Y \ YM30Y \ RSTOCK]' \tag{5}$$

The order of the variables in the equation indicates the degree of endogeneity of the variables. The yield curve variables for all maturity levels are assumed to be a set and can influence one another. In the exchange rate equation, the dlnexc variable is influenced by the yield curve variable so that it is positioned as the last variable. Likewise in the stock index return equation, the rstock variable is influenced by the yield curve variable so that it is positioned as the last variable.

Based on Uhlig (2005) which assumes that in fundamental innovation a number of $(m + 1)$ are mutually independent from one another so that they can be written as vectors v with $E[vv'] = I_{m+1}$, need an $\boldsymbol{A}$ matrix that satisfies $\varepsilon_t = Av_t$. The columns in the $\boldsymbol{A}$ matrix are expressed as vectors $\boldsymbol{a}$ which represent the contemporaneous effects of fundamental innovation on each variable. This relationship can be written as:

$$\Sigma = E[\varepsilon_t \varepsilon_t'] = AE[vv']A' = AA' \tag{6}$$

So to get the value $\hat{A}$ and $\hat{\Sigma}$, form the unrestricted VAR equation in equation (1) above. Then, $\tilde{A}\tilde{A}' = \Sigma$ is a Cholesky decomposition and $\boldsymbol{a}$ is an impulse vector if and only if there are $(m + 1)$ number of vector dimensions $\boldsymbol{a}$, so:

$$a = \tilde{A}\alpha \tag{7}$$

Furthermore, a positive restriction sign is applied to the exchange rate equation and stock index return. Based on the theory that expansive unconventional monetary policy (as reflected by changes in the yield curve) will give a positive response to stock index returns and depreciate the exchange rate against the USD, positive restriction sign is applied to variable impulses. This procedure is referred to as a set identification approach, because the identified model conforms to the desired restriction sign.

In addition, following Inoue and Rossi (2019) and based on the monetary policy transmission channel, the yield curve directly affects stock index returns and the exchange rate, but stock index returns and the exchange rate do not directly affect the yield curve, it is necessary to add a zero-block restriction. on the DLNEXC variable (in the exchange rate equation) and the RSTOCK variable (in the stock index return equation) to assume that there is a direct (contemporaneous) relationship between the yield curve variables, but the yield curve cannot respond contemporaneously to changes that occur in the DLNEXC variable (in the exchange rate equation) and the RSTOCK variable (in the stock index return equation). The impact matrix is (M+1) (M+1) in size where M is a number of yield curve variables and the last column is an exchange rate variable (for exchange rate equations) or a stock index return variable (for stock index return equations). The non-zero elements in the matrix are expressed as NA, so the impact matrix takes the following form:

Figure 1. **Impact Matrix**
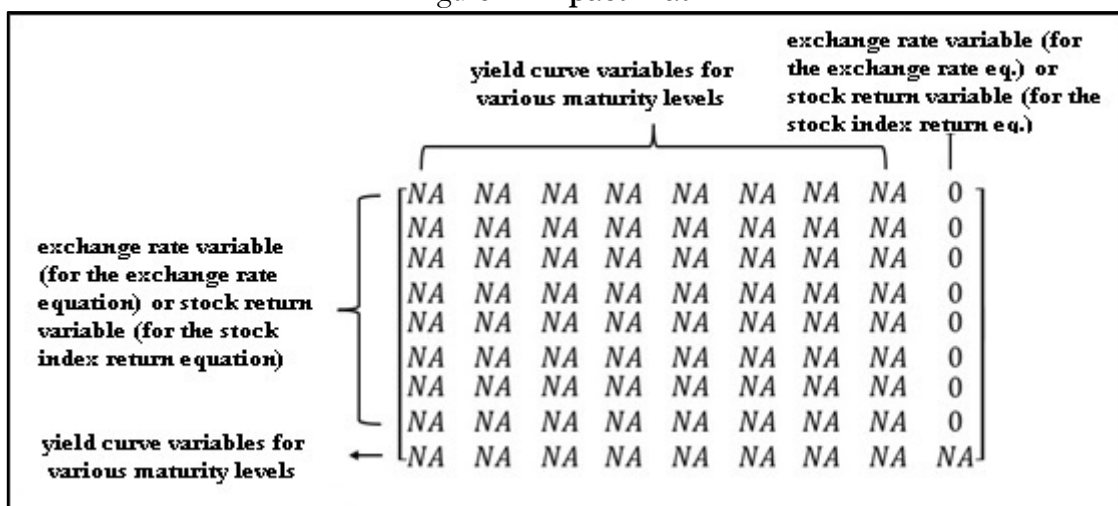
Furthermore, equation (1) can be written in the form:

$$Y = XB + \varepsilon \tag{8}$$

Where $Y = [Y_1, \ldots, Y_T]'$, $X = [X_1, \ldots, X_T]'$, $\varepsilon = [\varepsilon_1, \ldots, \varepsilon_T]'$, and $B = [B_1, \ldots, B_l]'$. Equation (8) is estimated using maximum likelihood estimation (MLE) as follows:

$$\hat{B} = (X'X)^{-1}X'Y \tag{9}$$

$$\hat{\Sigma} = \frac{1}{T}(Y - X\hat{B})'(Y - X\hat{B}) \tag{10}$$

(B, Σ) follows the Normal-Wishart distribution $(\bar{B}, S)$ with mean $\bar{B}$ and a positive definite covariance matrix $\mathbf{S}$, as well as an additional positive definite matrix $\mathbf{N}$ of size $ml \times ml$ with degrees of freedom (dof) $v \geq 0$. Uhlig (2005) states that the prior and posterior (B, Σ) belong to the Normal-Wishart family $W\left(S^{-1}/v, v\right)$ with $E(\Sigma^{-1} = S^{-1})$, with column vectors$(\mathbf{B})$ that are conditional to Σ assumed to follow the normal distribution $\mathcal{N}(vec(\bar{B}), \Sigma \otimes N^{-1})$. Uhlig (1994) shows that if the prior is represented by a parameter set $(\bar{B}_0, S_0, N_0, v_0)$, then the posterior is represented by the parameter set $(\bar{B}_T, S_T, N_T, v_T)$, which is:

$$v_T = v_0 + T \tag{11}$$

$$N_T = N_0 + X'X \tag{12}$$

$$\bar{B}_T = N_T^{-1}(N_0\bar{B}_0 + X'X\hat{B}) \tag{13}$$

$$S_T = \frac{v_0}{v_T}S_0 + \frac{T}{v_T}\hat{\Sigma} + \frac{1}{v_T}(\hat{B} - \bar{B}_0)'N_0N_T^{-1}(\hat{B} - \bar{B}_0) \tag{14}$$

Then, the structural shock is identified using the penalty function method (Uhlig, 2005). The procedure for the penalty function is to find an impulse vector whose value is as close as possible to meeting the restriction sign applied, by minimizing the function that violates the sign restriction. It is stated that J is the number of sign restrictions applied and K is the response period, so $\boldsymbol{a}$ is an impulse vector that minimizes the total penalty $\psi(\alpha)$ for each constraint response $j \in J$ in each period $k \in K$ (Danne, 2015).

Based on Danne (2015) and the attachment to Inoue and Rossi (2019), the above procedure can be carried out technically with the following steps:

1. Form the unrestricted VAR equation to get the value of $\hat{A}$ and $\hat{\Sigma}$.
2. Form an orthogonal innovation model using the Cholesky decomposition. In this study, the Cholesky decomposition does not aim to identify model parameters, but only to obtain orthogonal shocks.
3. Calculate the response impulse results obtained from step (2).
4. Randomly draw vector orthogonal impulses $\boldsymbol{a}$.
5. Multiply the responses from steps (3) and (4), and check whether the results match the restriction sign applied.
6. If yes, save the result. Otherwise, eliminate the result.
7. Repeat steps (2) to (6).

This procedure can be done with R software by following the syntax provided by Danne (2015), as well as Eviews software version 12 with the addition of ARW add-ins (Zero and Sign restricted VAR).

Findings

A summary of the results of the data stationarity testing for Indonesia and Malaysia is presented in Table 2 below. Based on the table, at the level of all variables are stationary at a significance level of 1%. Therefore, the VAR equation is estimated at the level level. Based on the VAR Lag Order Selection results for Indonesia and Malaysia, the optimal lag according to the smallest AIC criterion is lag 2, so the VAR model for the four equations uses lag 2.

Table 2. **Stationarity Test**

| Indonesia			Malaysia		
Variable	**ADF test**		**Probability**	**Variable**	**ADF test**		**Probability**
DLNEXC	-7.438488	***	0.0000	DLNEXC	-12.85568	***	0.0000
RSTOCK	-7.388655	***	0.0000	RSTOCK	-16.21466	***	0.0000
YM1Y	-21.04566	***	0.0000	YM3Y	-15.24193	***	0.0000
YM3Y	-14.06431	***	0.0000	YM5Y	-9.465415	***	0.0000
YM5Y	-12.60764	***	0.0000	YM7Y	-19.32322	***	0.0000
YM10Y	-11.37905	***	0.0000	YM10Y	-15.48513	***	0.0000
YM15Y	-11.11202	***	0.0000	YM15Y	-14.30558	***	0.0000
YM20Y	-7.942087	***	0.0000	YM20Y	-14.05231	***	0.0000
YM25Y	-5.745709	***	0.0000	YM30Y	-9.898272	***	0.0000
YM30Y	-16.44073	***	0.0000				

Note:
*** : Significant on level 1%

Impulse Response Function (IRF) Analysis

Model of the Effectiveness of Unconventional Monetary Policy on the USD Exchange Rate: Indonesia

Based on the impulse response graph in Figure 2 below, the shock resulting from the announcement of unconventional monetary policy led to a depreciation of the Rupiah exchange rate against the USD. On the first day of the announcement of unconventional monetary policy, the Rupiah exchange rate against the USD still did not respond. The growth of the Rupiah exchange rate against the USD only occurred on the second day of 0.0013 percentage point which was the highest response and decreased progressively to near zero on the tenth day. This means that unconventional monetary policy causes the Rupiah exchange rate to depreciate against the USD, so this answers the research hypothesis which states that unconventional monetary policy is effective in depreciating the Rupiah exchange rate against the USD during the Covid-19 pandemic. This finding is in line with the research of Bernhard & Ebner (2017); Fratto et al. (2021); Glick & Leduc (2012); and Inoue & Rossi (2019) who found that unconventional monetary policy led to currency depreciation against the USD.

Figure 2. **IRF Exchange Rate Equation in Indonesia**
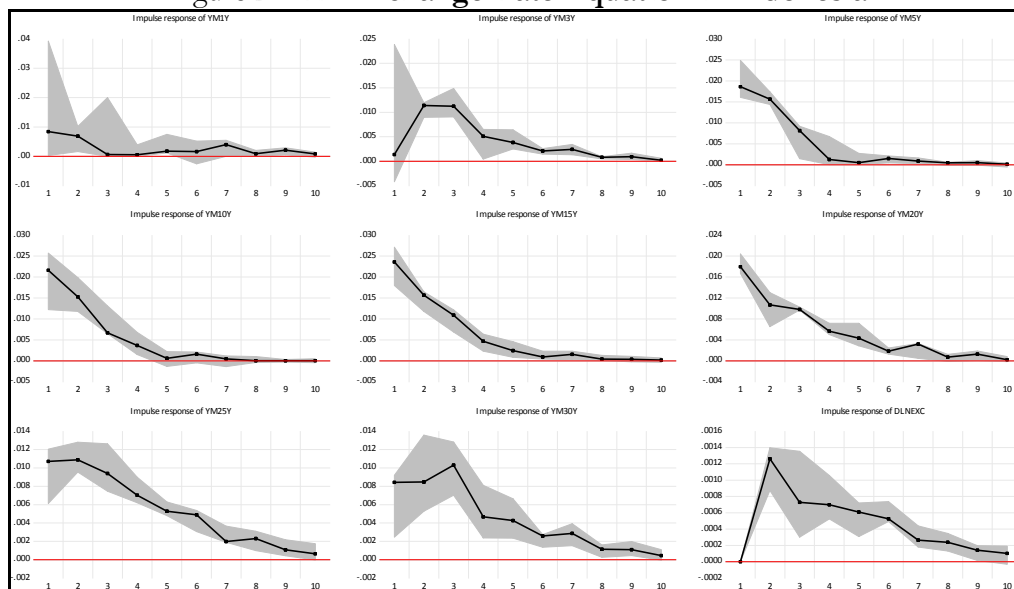
In addition, the graph above shows that there are differences in yield curve responses at each maturity level due to unconventional monetary policy announcements. This difference lies in the magnitude and shape of the response. For example, in the yield curve with maturity levels of 1, 5, 10, 15, 20 and 25 years, the response immediately decreased after the announcement of unconventional monetary policy. However, on the yield curve with maturity levels of 3 and 30 years, there was a positive response after the announcement of unconventional monetary policy, although on the second day and thereafter the response decreased. This is consistent with the theory of the term structure of interest which states that yield curves with various maturity levels have different characteristics in projecting monetary policy (Belke & Polleit, 2009).

Nonetheless, overall the yield curve's response to unconventional monetary policy announcements showed a downward trend. This is in accordance with the theory and empirical studies by Bernhard & Ebner (2017); Fratto et al. (2021); Mamaisky (2018); Rogers et al. (2011); and Wright (2011) who stated that expansive unconventional monetary policy reduced government bond yields.

The transmission mechanism caused by the announcement of unconventional monetary policy that can affect the exchange rate (Rupiah against USD) can occur through a signaling channel. This is based on the theory that monetary policy announcements contain relevant information regarding the central bank's commitment to maintaining interest rates and its policy direction towards the economic situation (Bauer & Neely, 2014). Announcements of monetary policy decisions taken by the central bank will provide a signal to financial market players so as to arouse their perceptions of the stance they will take to anticipate the central bank's policies. For example, when the central bank gives a signal by announcing it will implement the LSAP program, investors who hear the announcement will make perceptions about the liquidity and prices of government/company assets purchased by the central bank, which will ultimately influence decision making in investing in these assets.

Model of the Effectiveness of Unconventional Monetary Policy on the USD Exchange Rate: Malaysia

Similar to Indonesia, the shock resulting from the announcement of unconventional monetary policy led to a depreciation of the Ringgit exchange rate against the USD. It can be seen from the impulse response graph in Figure 3 below that on the first day of the unconventional monetary policy announcement, the Ringgit exchange rate against the USD still did not respond. The growth of the Ringgit exchange rate against the USD only occurred on the second day of 0.0001 percentage point, and reached the highest growth on the fourth day of 0.0002 percentage point. The growth response of the Ringgit exchange rate against the USD began to subside and stabilized on the seventh day after the announcement. This means that unconventional monetary policy causes the Ringgit exchange rate to depreciate against the USD, so this answers the research hypothesis which states that unconventional monetary policy is effective in depreciating the Ringgit exchange rate against the USD during the Covid-19 pandemic.

On the other hand, based on Figure 3 below, it can be seen that there are differences in the yield curve response at each maturity level due to unconventional monetary policy announcements, although overall the yield curve response to unconventional monetary policy announcements shows a downward trend. This follows the theory of the term structure of interest which states that yield curves with various maturity levels have different characteristics in projecting monetary policy (Belke & Polleit, 2009).

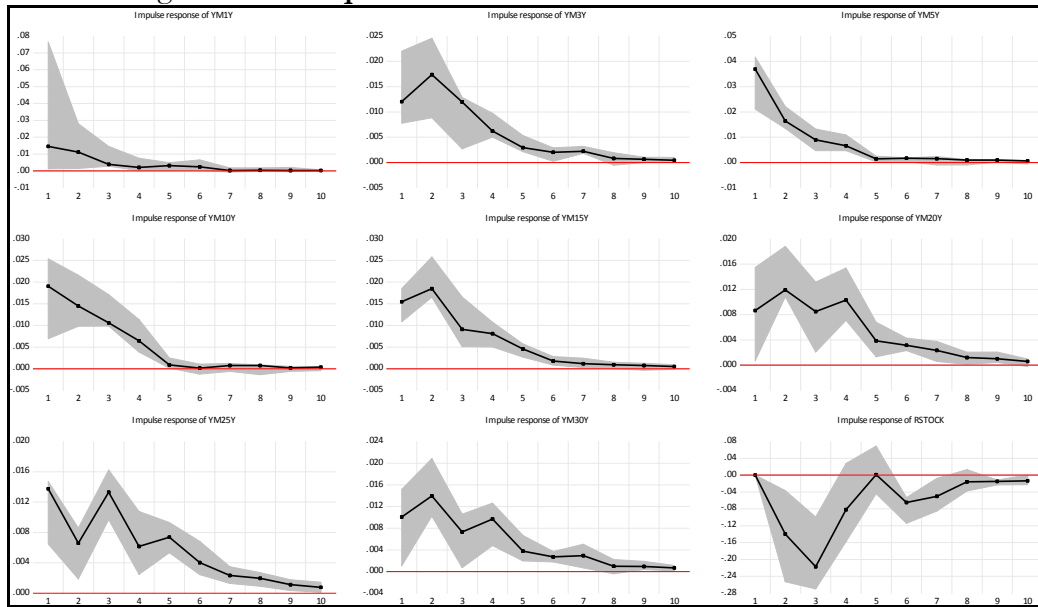Figure 3. **IRF Exchange Rate Equation in Malaysia**
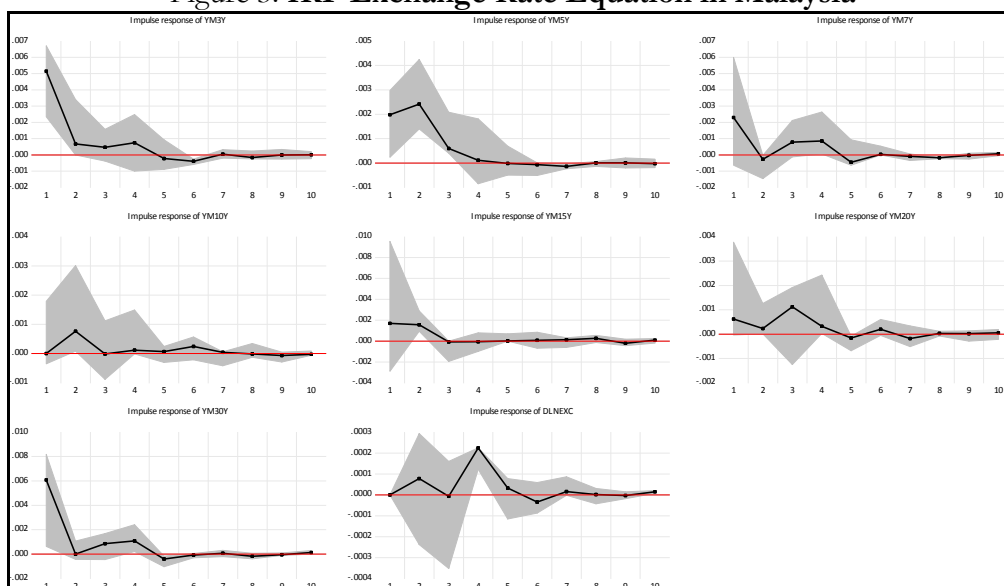
Model of the Effectiveness of Unconventional Monetary Policy on Stock Index Returns: Indonesia

The graph below shows the response of stock index returns in response to the shock announcement of unconventional monetary policy. It can be seen in the graph that stock index returns respond negatively to announcements of unconventional monetary policies. The negative effect touched -0.24 percent on the third day after the announcement of unconventional monetary policy, then the negative effect slowly subsided and stabilized on the eighth day. This finding contradicts the theory which states that stock index returns respond positively to unconventional monetary policy. This is contrary to the research hypothesis, because empirically it was found that unconventional monetary policy was not effective on stock index returns in Indonesia during the Covid-19 pandemic. The reason is likely that investors responded to unconventional monetary policy as expectations of inflation, which would push production costs up and reduce company profits. As a result, the value of the company decreases and the return on the stock index is also low. One study that is in line with the findings of this study is Ferrer et al. (2016) who found that government bond yields with a maturity of 10 years and stock index returns move in the same direction in European countries.

This anomaly in stock index returns can also occur because movements are not only caused by monetary policy, but also caused by various investor behavior factors in the stock market in making investment decisions, such as sentiment, overconfidence, and herding behavior so that the direction of stock index returns is difficult. predictable (Baker & Wurgler, 2006). In addition, this anomaly in stock index returns can allegedly occur due to the problem of heteroscedasticity, as stated by Schwert & Seguin (1990), that the problem of heteroscedasticity has become a common phenomenon in the stock market.

Figure 4. **IRF Equation of Stock Index Return in Indonesia**

Model of the Effectiveness of Unconventional Monetary Policy on Stock Index Returns: Malaysia

Impulse response returns on stock indexes in response to shock announcements of unconventional monetary policies are shown in Figure 5 below. Based on the graph, it can be seen that the stock index return in Malaysia hardly responds at all to the effect of the announcement of unconventional monetary policy. These empirical results show that unconventional monetary policy was not effective in increasing stock index returns in Malaysia during the Covid-19 pandemic. As previously explained, that there are many factors that can affect the movement of stock index returns, such as investor behavior in making investment decisions and the problem of heteroscedasticity which causes stock index returns to not respond to announcements of unconventional monetary policies.

Figure 5. **IRF Equation of Stock Index Return in Malaysia**
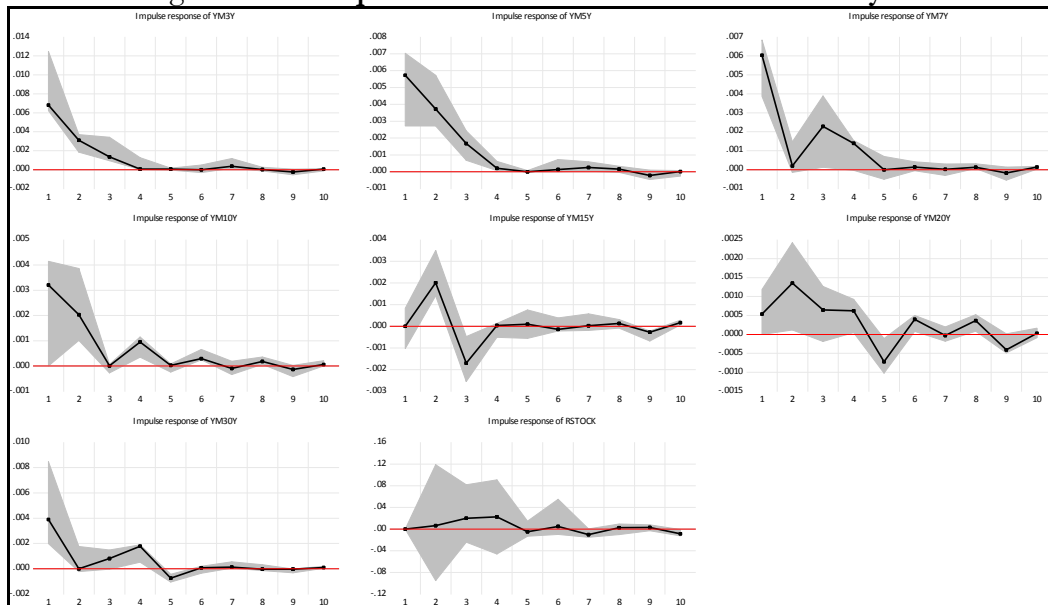
Robustness Test

The robustness test in this study was carried out by using a different window length from the main research model, namely by using a 3-day window, and by carrying out the same procedure for each equation (exchange rate and stock index return) in Indonesia and Malaysia. Based on the impulse response obtained, it was found that the impulse response results in the robustness equation are in line with the impulse response in the main research equation. So it can be concluded that the research model has been robust. The results of the impulse response robustness test equation are presented in the graph below.

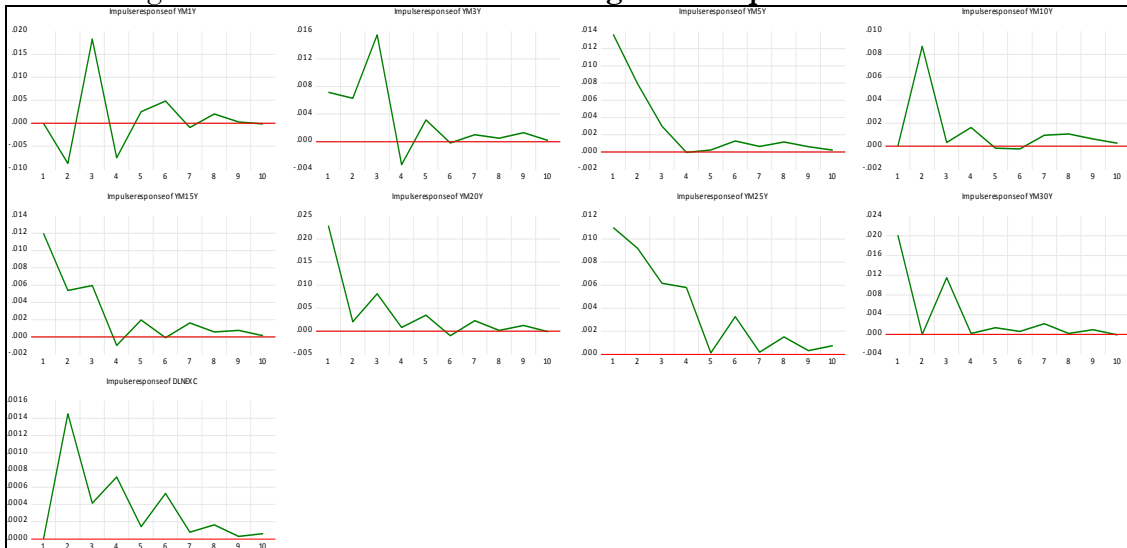Figure 6. **IRF Robustness of Exchange Rate Equation in Indonesia**

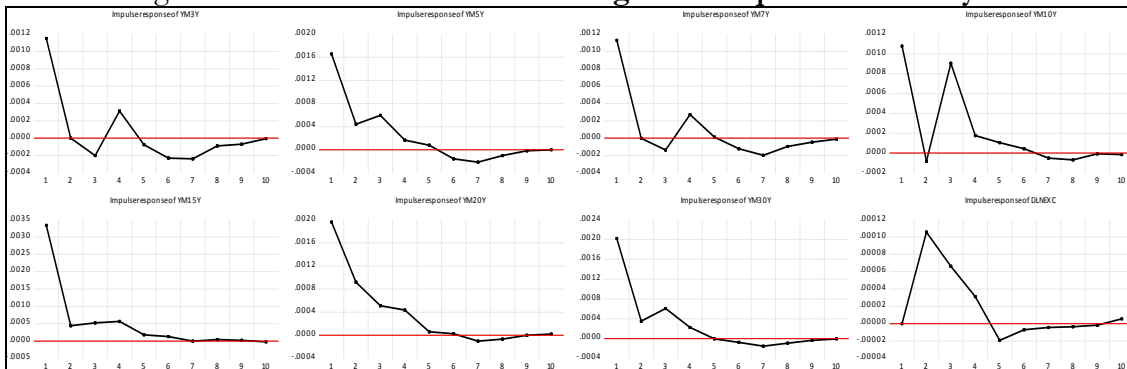Figure 7. **IRF Robustness of Exchange Rate Equation in Malaysia**

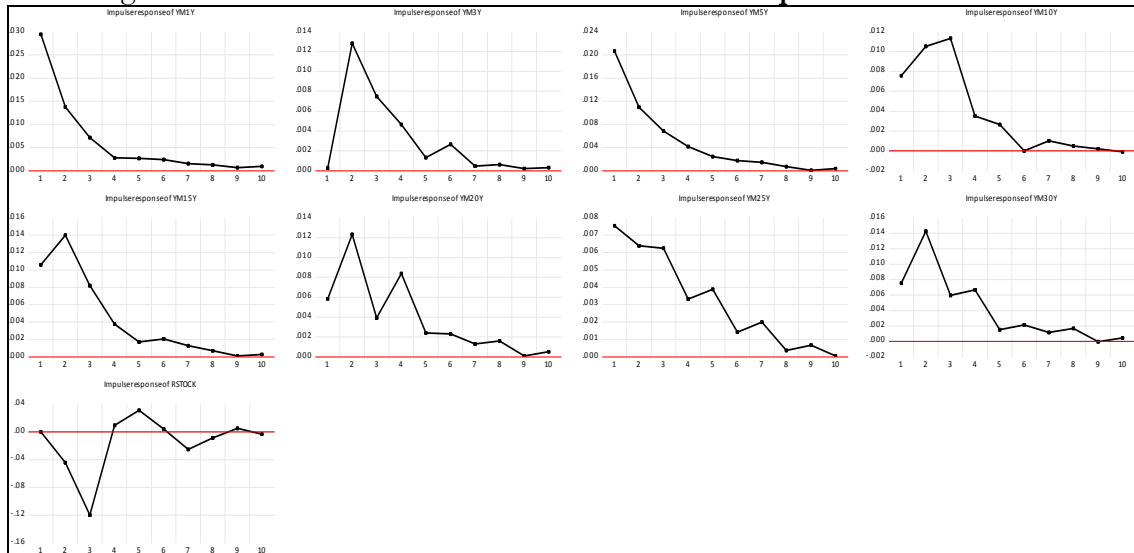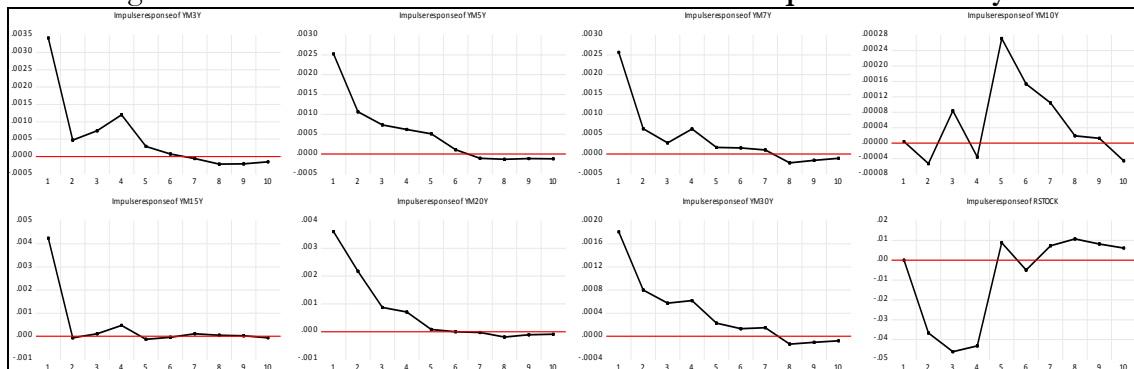Figure 8. **IRF Robustness of Stock Index Return Equation in Indonesia**

Figure 9. **IRF Robustness of Stock Index Return Equation in Malaysia**

Conclusion

Based on the results of IRF analysis, this study obtained empirical evidence that unconventional monetary policy was effective in depreciating currency exchange rates against the USD in Indonesia and Malaysia during the Covid-19 pandemic, but was not effective on stock index returns in Indonesia and Malaysia. This is allegedly due to the problem of heteroscedasticity in stock returns and various investor behaviors in making investment decisions. In addition, according to the theory of the term structure of interest, this research finds that yield curves with various maturity levels have different patterns and characteristics in projecting monetary policy.

The author realizes that in this study there are still many shortcomings and limitations, one of which is that this research model can only include 1 source of shock, so that the effects that might occur due to shocks caused by monetary policy by the Fed are assumed to be ignored in this research model. Therefore, future research is expected to use methods that can include more than 1 source of shock.

On the other hand, the zero and sign restricted VAR method used in this research is a method that has recently been widely studied and developed. So there is a lot of room for the development and modification of this method for future research.

Finally, research on the effect of unconventional monetary policies on financial markets in developing countries is still limited, especially during the Covid-19 pandemic. In fact, the economic and financial characteristics of developing countries are different from developed countries. Therefore, it is hoped that further research can complement the literature regarding the influence of unconventional monetary policies on financial markets in developing countries.

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Appendix I. **Unconventional Monetary Policy Announcement Database**

	Country	Indonesia
No	**Date**	**Link**
1	13-Mar-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/BI-Sempurnakan-Ketentuan-Giro-Wajib-Minimum-Valas.aspx
2	19-Mar-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_222220.aspx
3	24-Mar-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Perkembangan-Langkah-Langkah-BI-dalam-Hadapi-COVID-19.aspx
4	31-Mar-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Bank-Indonesia-Sempurnakan-Ketentuan-GWM--Dalam-Rupiah-dan-Valuta-Asing.aspx
5	31-Mar-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Perkembangan-Terkini-Perekonomian-dan-Langkah-BI-dalam-Hadapi-COVID-19--310319.aspx
6	01-Apr-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_222620.aspx
7	02-Apr-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Perkembangan-Terkini-Perekonomian-dan-Langkah-BI-dalam-Hadapi-COVID-19-020420.aspx
8	14-Apr-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_223020.aspx
9	16-Apr-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/BI-Terbitkan-Ketentuan-Pelaksanaan-Kebijakan-Perluasan-Insentif-Pelonggaran-GWM.aspx
10	21-Apr-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/BI-Terbitkan-Ketentuan-Pelaksanaan-Lelang-SUN-dan-atau-SBSN-Jangka-Panjang-di-Pasar-Perdana.aspx
11	29-Apr-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Perkembangan-Terkini-Perekonomian-dan-Langkah-BI-dalam-Hadapi-COVID-19-29-April-2020.aspx
12	30-Apr-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/BI-Terbitkan-Ketentuan-Tindak-Lanjut-Kebijakan-Hadapi-Pandemi-COVID-19.aspx
13	06-May-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Perkembangan-Terkini-Perekonomian-dan-Langkah-BI-dalam-Hadapi-COVID-19-6-Mei-2020.aspx
14	19-May-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_223920.aspx
15	28-May-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Perkembangan-Terkini-Perekonomian-dan-Langkah-BI-dalam-Hadapi-COVID-19-28-Mei-2020.aspx
16	05-Jun-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Perkembangan-Terkini-Perekonomian-dan-Langkah-BI-dalam-Hadapi-COVID-19-5-Juni-2020.aspx
17	18-Jun-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_224620.aspx
18	22-Jun-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/Tinjauan-Kebijakan-Moneter-Juni--2020-Kontraksi-Ekonomi-Global-Berlanjut-Pertumbuhan-Ekonomi-Indonesia-Menurun.aspx

19	16-Jul-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_225220.aspx
20	19-Aug-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_226420.aspx
21	17-Sep-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_227120.aspx
22	13-Oct-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_227520.aspx
23	19-Nov-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_228720.aspx
24	17-Dec-20	https://www.bi.go.id/id/publikasi/ruang-media/news-release/Pages/sp_229520.aspx

	Negara	**Malaysia**
No	**Date**	**Link**
1	27-Feb-20	https://www.bnm.gov.my/-/measures-to-assist-businesses-and-households-affected-by-the-covid-19-outbreak
2	19-Mar-20	https://www.bnm.gov.my/-/additional-measures-to-further-support-smes-and-individuals-affected-by-the-covid-19-outbre-1
3	25-Mar-20	https://www.bnm.gov.my/-/measures-to-assist-individuals-smes-and-corporates-affected-by-covid-19
4	27-Mar-20	https://www.bnm.gov.my/-/additional-measures-to-further-support-smes-and-individuals-affected-by-the-covid-19-outbreak
5	29-Jul-20	https://www.bnm.gov.my/-/banks-to-provide-loan-repayment-flexibility-to-borrowers-affected-by-covid-19
6	06-Nov-20	https://www.bnm.gov.my/-/budget-measures-to-assist-individuals-and-smes-affected-by-covid-1
7	01-Dec-20	https://www.bnm.gov.my/-/new-and-enhanced-financing-facilities-for-smes-affected-by-covid-19