The interest rate channel of SBV's monetary policy: An empirical analysis

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1. Introduction

The conduct of monetary policy requires an understanding of the way policy actions are transmitted to, and affect, the economy. This transmission mechanism comprises various channels, with banks playing a crucial role, especially in economies where they are an important part of the financial market. Hence, understanding the pass-through of monetary policy actions to retail bank interest rates and then to the economy is essential from a policy perspective.

The literature indicates that there are various channels that can be used to transmit monetary policy to the economy including (i) interest rate channel; (ii) credit channel; (iii) exchange rate channel; (iv) asset price channel. The interest rate channel was based on traditional Keynesian IS-LM model, and on the assumption of price and wage rigidity, thus allowing central banks to change aggregate demand and output through adjusting its short-term policy rates. The credit channel comprises of two distinct components which are the bank lending channel and the balance sheet channel. While the bank lending channel operate by changing the external finance premium, the balance sheet channel exerts effects on non-financial firms' cash flows by changing policy rates, which in turn impact the firms' balance sheet position. In exchange rate channel, monetary policy could affect both the nominal exchange rates (by adjusting interest rates) and real exchange rate (by influencing the price level), which in turn would have an impact on demand of domestic and foreign goods. Last but not least, the asset price channel underscores the role of monetary policy in affecting equity prices, thereby leading to an increase or reduction in consumption and investment.

Among listed channels, interest rate channel has attained a lot of attention, particularly since 1986 when Bernanke provided alternative explanations of real and nominal sources of prices for explaining money-income relationship. In countries where banking system play a crucial role, many researches has also focused on the interest rate channel of monetary policy transmission. In the traditional Keynesian textbook IS-LM model, the interest rate channel is also the key component in the monetary transmission mechanism. It highlights the role of money market equilibrium when interest rates change. A monetary policy change affects money supply and interest rates. In the short term, price and wage are sticky and not adjustable to monetary changes, causing a change in aggregate demand and output.

It is well-known that money market plays an important role in the process of monetary policy transmission. The impact of monetary policy on the economy, to begin with, takes place *via* money market. Vietnam's money market was formed in 1989 along with the reform of Vietnam's banking sector from the one-tier banking system to the two-tier banking system. Together with the economic development, money market has steadily grown, from small number of members, the monetary market has grown both in scale and sales. The money market has really become channels of money policy transmission efficiency of the State Bank of Vietnam (SBV). The SBV participants in money market as both a member and the market management agencies. As a member of the market, the SBV participates in money market through the issuance of Treasury bills and participate in buying and selling of valuable papers with credit institutions through open market operations. As an agency manager, SBV has issued a legal framework for the operation of the money market and track, monitor and control the operation of the money market to serve the targeted operating national monetary policy.

The study proceeds as follows. Introduction and review of empirical studies of the interest rate pass-through is presented in Section 1. Section 2 overviews of Vietnamese money market and policy rates. Section 3 reviews interest rate policy in Vietnam. Empirical analysis of interest rate channel is present in Section 4. The concluding remarks in Section 5

2. Literature reviews

The monetary transmission mechanism is a process in which monetary policy decisions are transmitted to real GDP and inflation (Taylor, 1995). The literature indicates that there are various channels that can be used to transmit monetary policy to the economy and a large number of studies have focused on interest rate channel.

The interest rate channel describes how the central bank policy rates impact on retail interest rates then real variables such as aggregate domestic demand and output. One of the first influential research on interest rate channel is conducted by Bernanke and Blinder (1992) in which they concluded that the Federal fund rate could be considered a true measure of monetary policy stance, at least in short term. This is because fluctuations in short term Fed fund rate are heavily driven by the supply side, not by demand for reserves. In other developed countries, especially in the Euro area, a substantial body of research on interest rate channel has confirmed the interest rate pass-through effect, but also notes that this pass-through effect is incomplete.

Murarasu (2007) concluded that while the interest rate pass-through from policy rate to interbank rate (one month BUBOR and BUBID) is complete, it does not hold in case of pass-through effect from money market rates to average lending and deposit rates. The outbreak of the 2008 global financial crisis further complicates this issue in developed countries as risk concerns is a primary factor governing fluctuations in money market rates, thus reducing

central banks' ability to influence short term interest rates (Abbassi and Linzert 2012).

In less developed countries, similar results have been also found such as India, Malaysia, Pakistan, and Turkey, where the incomplete interest rate pass-through was also confirmed (Fazal and Salam, 2013; Erdogan and Yildirim, 2010; Mohanty, 2013; Zulkhibri, 2012). Turner (2006) indicated that because of many reforms[1] in 19 studied central banks, the pass-through of interest rate was incomplete.

The role of money market in the interest rate channel has also been explored in a growing body of literature. Laurens (2005) indicated that a shallow money market caused by market segmentation, chronic excess liquidity or weak financial position of members could block the liquidity shocks from central banks and impede the interest rate transmission channel, thereby reducing the effectiveness of monetary policy.

The transmission mechanism of monetary policy in Vietnam still remains a popular topic for researchers. Therefore, there is very little and limited study on the interest rate pass-through only. Phan (2003) analyzes the transmission channels of monetary policy in Vietnam from 1991 to 2002 by using an SVAR approach. He found that the balance sheet channel is not important because of the less developed financial market. Meanwhile, the interest rate channel plays important role, when rates increase slightly and impact negatively on the price and money supply. In addition to the traditional interest rate channel, his research shows that although the exchange rate channel is quite weak, it still affects price levels with a lag of about ten months.

Le and Wade (2008) use a VAR approach with quarterly, seasonally adjusted data from 1996 to 2005 to analyze the monetary transmission mechanism in Vietnam. They conclude that monetary policy can affect real output but the connection between money and inflation is not clear. Furthermore, the credit and exchange rate channels are more important than the interest rate channel in the transmission mechanism. Bui and Tran (2015) analyses monetary transmission mechanism in Vietnam from 1995 to 2010 by using a Vector Autoregression (VAR). The empirical results show money demand and interest rates account for a major part of variations in output. And output is affected by monetary tightening in some lags, bottoming out after 5-6 quarters.

3. Interest rate policy and interest rate channel in Vietnam: An overview

Before 2000, the SBV managed interest rate administratively by ceiling and floor mechanism. A new interest rate policy was adopted in August 2000, under new mechanism, commercial banks could adjust their domestic currency lending

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[1] Reforms include the adoption of market-based monetary tools, the openness and liberation of their money markets to international capital market

rates based on a base interest rate announced by the SBV. However, for lending rate, the ceiling was 0.3% and 0.5% for short-term loans and medium and long-term respectively. Interest rates were fully liberalized in June 2002, banks are now free to determine their business interest rate based on their own appraisal and negotiation with their customers. However, due to negative effects of the Global Financial Crisis in 2007, the SBV had to return the administrative mechanism. Since then borrowing and lending of commercial banks has not been allowed to exceed 150% of the base interest rate, which is announced by the SBV monthly.

To date, the SBV has three types of policy interest rates including the base rate, the refinancing rate, and OMOs' rate:

(i) **The base rate:** The SBV calculate and announce the base rate monthly based on economic performance and commercial interest rates. This SBV's rate was used as a reference rate for commercial banks to determine their business interest rate. However, in fact this rate had no impact on market rate, event just for reference. In a number of period, the base rate was kept unchanged while market rate fluctuate significantly. This is because the calculation of the base rate had not actually based on economic performance and more importantly, there was no policy instrument to support this rate.

(ii) **The refinancing rate** is the interest rate of the central bank's last lending resource for the market (the highest interest rate ceiling), but it tends to be lower than the interest rates on the interbank market. This situation has been terminated since the middle of 2011 when the central bank began to adjust and continuously improve refinancing to push interest rates higher compared to the market rate. However, binding and the impact of this rate to the market are still limited to control the market interest rates. Thus, the central bank must use additional interest rate tools such as the ceiling rate

(iii) **The interest rate on the open market** in theory is the interest rate that had the closest relationship with the interbank interest rates, however, the relationship between these two types of interest rates are not tight. Simultaneously, interbank interest rates are lower than deposit rates on the primary market. This reflects the excess of liquidity in the system but difficulties in attracting liquidity by the central bank. Thus, the control of interest rates by the system tools/money market operations of the central bank was not effective. This is also why besides the use of this tool from 2010 till now to bring the market interest rate to the desired level, the central bank must use the ceiling rate.

Discount rate, refinancing rate and base rate were positively correlated with market rates (3-month deposit and lending rate). However, deposit rate was

above discount rate and refinancing rate for most of the period. Hence, Vietnam has not succeeded in establishing a benchmark interest rate corridor in which deposit rate should be between the discount rate and refinancing rate (Graph 1)

Relationship between Policy rates and market rates from 2001-2014
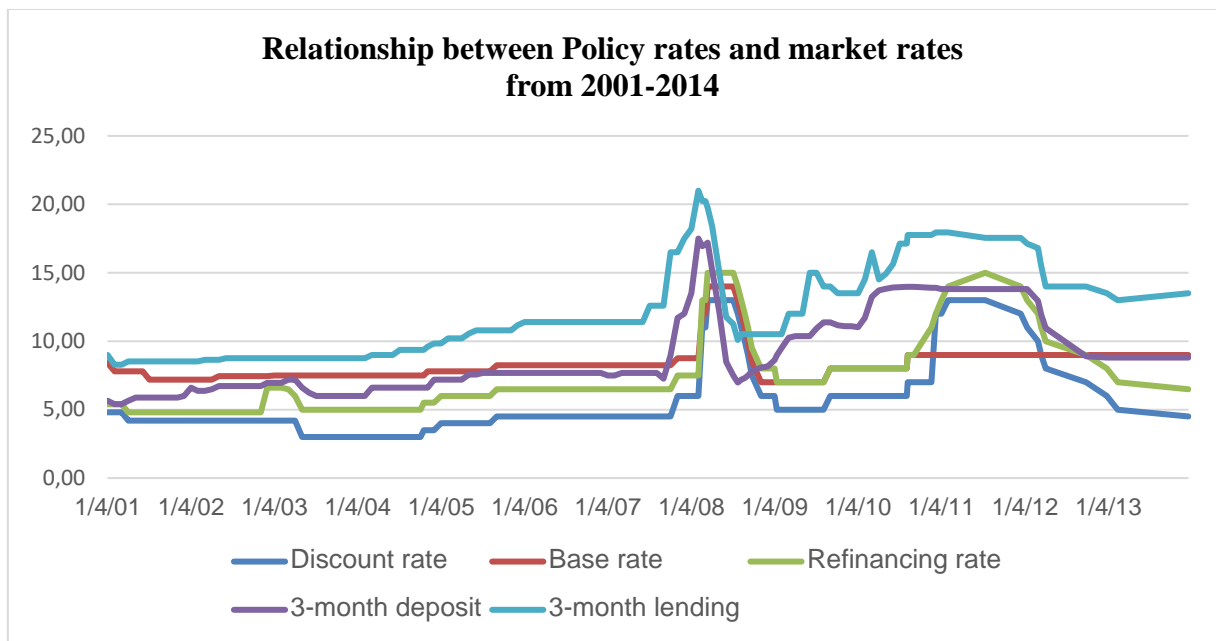
Before 2010, REPO rate and discount rate were not a reliable benchmark for overnight interbank interest rate since interbank rate was frequently higher than both the REPO rate and discount rate. After 2010, various solutions/policies from the State Bank of Vietnam (increasing trading sessions in OMO, expand the range of accepted securities ...) had been introduced to improve the depth of OMO, hence the REPO rate succeeded in orienting interbank interest rate. However, the impact of interbank rate to market rates (deposit and lending rates) is still limited since these interest rates sometimes moved in opposite direction (Graph 2&3)

Graph 2: REPO rate, discount rate and overnight interbank rate from 2008-2015

Legend: 7-day REPO rate — Overnight interbank rate — Discount rate
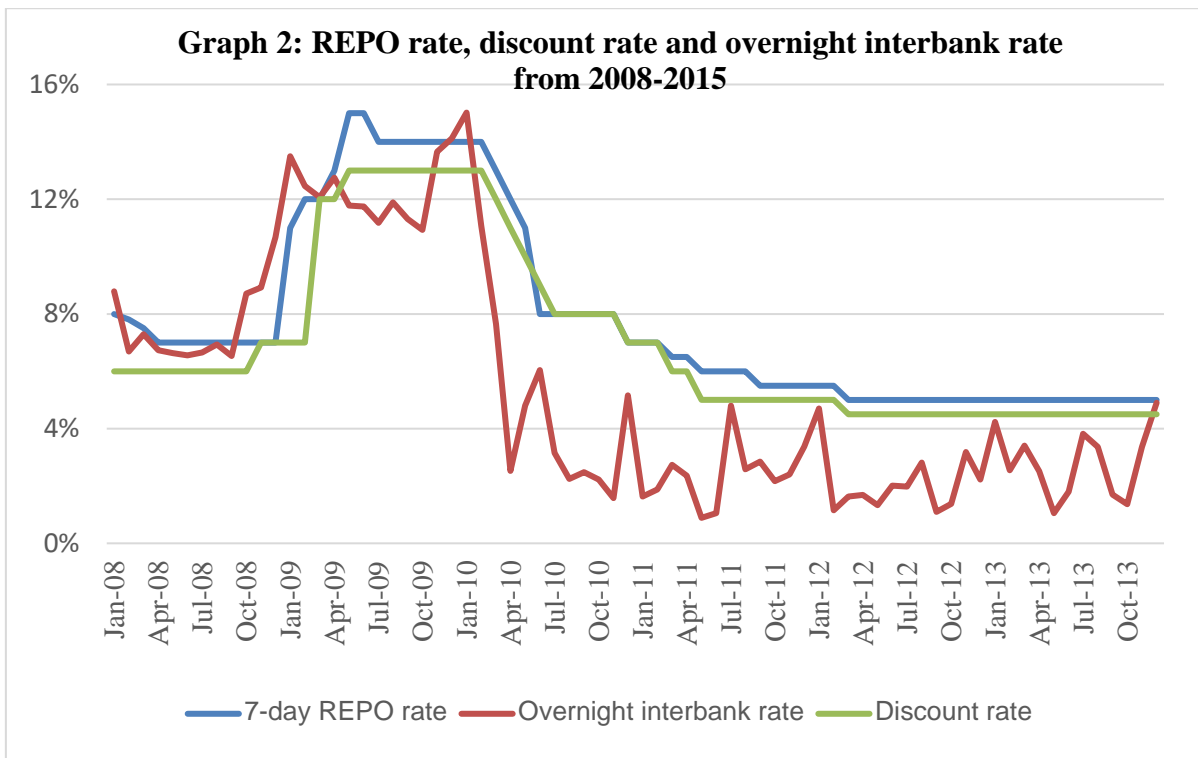
Graph 3: Evolution of overnight interbank rate, 3m deposit rate and 3m lending rate of commercial banks 2010-2015

Legend: 3m deposit rate — 3m lending rate — overnight interbank rate

4. Empirical analysis of interest rate channel

In this section, empirical evidence of the effectiveness of monetary policy in Vietnam will be provided by evaluating the impact of policy rates (repurchase rate and discount rate) to different wholesale and retail rates (overnight interbank rate, deposit rate, lending rate). First, some visual analysis will be used to provide an overall relationship between these different interest rates in

Vietnam. Second, a VAR model will be estimated to further explore the relationship between policy rates and other macroeconomic variables such as GDP and CPI.

4.1 Scatter-plot analysis

Regardless of the range of instruments such as OMOs, the discount rate, reserve requirement… the Central bank can target either the monetary base or the money market interest rate only. The monetary base is also called high-powered money because it is the spring of the money supply. The money market interest rate is the rate at which banks lend and borrow for the shortest maturity, overnight loans which affect all interest rates in the economy, including those on mortgage lending. Modern central banks tend to move from using direct instruments (quantity channel) to indirect ones (price channel). Instead of using reverse requirement/or credit control, short-term interest channel through money market has become gradually a better option. In fact, many central banks signal their policy stance through the short-term interest rate on the interbank market, in other words, this interest rate is often chosen as the reference rate for commercial banks and as the target rate for the state bank operations.

The reason that central banks prefer to target money market interest rates to the monetary base or non-borrowed bank reserves is because an operating target like the monetary base implies a high volatility of interest rates, politically costly. Currently, SBV has relied more on interest rate pass-through in recent years and their main policy rate are discount rate and repurchase rate in OMOs. Figures below depict the relationship between discount rate and REPO rate and overnight interbank rate (wholesale rate) as well as commercial banks' short term retail rates (3-month deposit and lending rate). These figures show that there is a closer relationship between policy rates and wholesale and retail rates, implying that the interest rate pass-through is more effective than money supply mechanism. However, it is far from a perfect transmission since the volatility of wholesale rate and retail rates are much higher when policy rates are low, suggesting that the interest rate pass-through is only effective if policy rates are high.

Scatter-plots for the relationship between pairs of different interest rates

Relationship between REPO rate and 3-month deposit rate

Relationship between REPO rate and 3-month lending rate

Relationship between discount rate and 3-month deposit rate

Relationship between discount rate and 3-month lending rate

Relationship between REPO rate and overnight interbank rate

Relationship between discount rate and overnight interbank rate
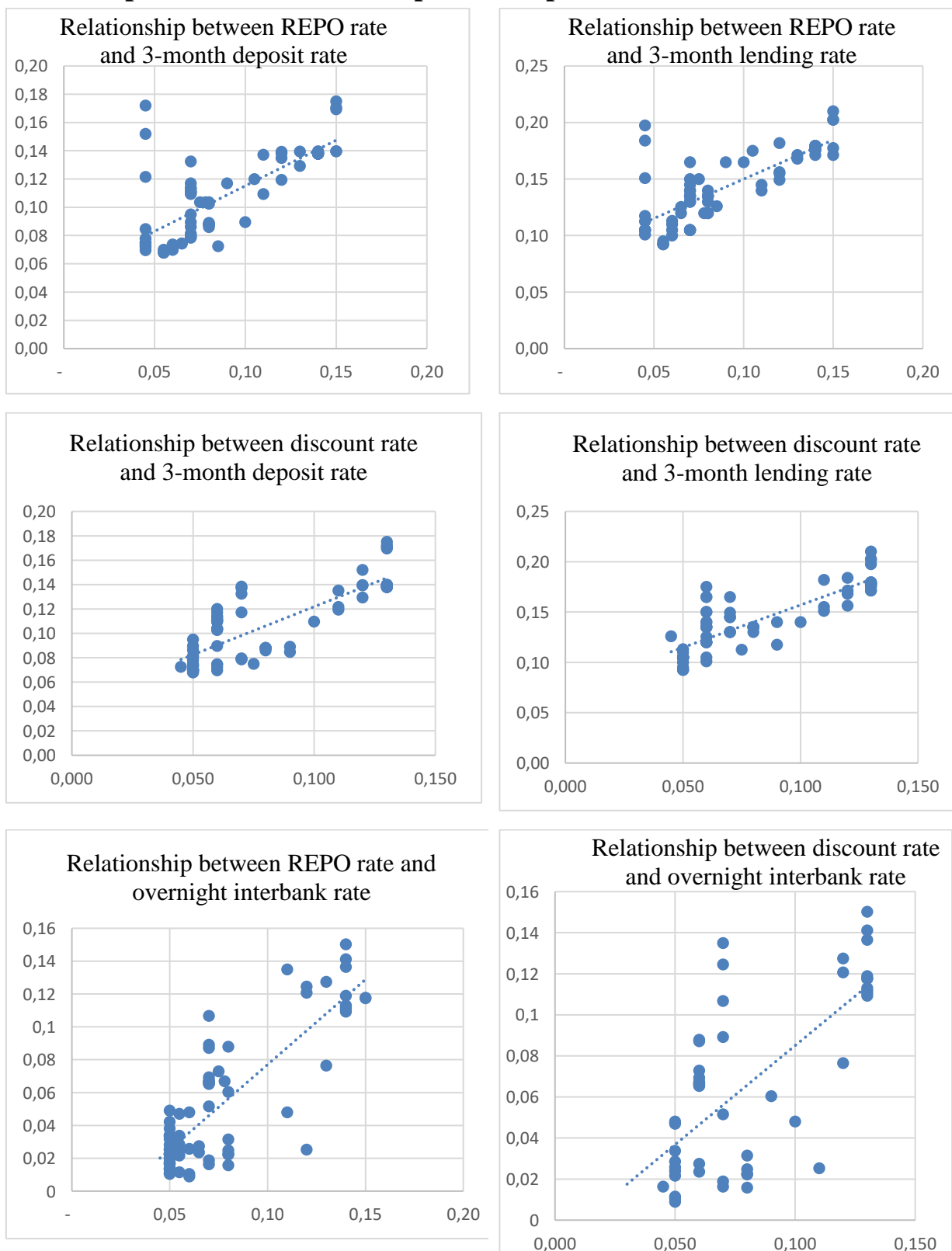
4.2 Empirical analysis

In addition to scatter-plot analysis, this paper also investigates the effectiveness of the interest rate channel of the monetary policy transmission mechanism using VAR model. The VAR model is used in many studies on

….and its advantage is that it provides the means to distinguish between the endogenous impulses that monetary authorities implement and the exogenous monetary response. This VAR model is set up with the vector of four endogenous variables, $Z_t = (gdp_t, cpi_t, lend_t, omo_t,)$, where omo_t is repurchase rate in open market operation, $lend_t$ is 6-months average lending interest rate, cpi_t is consumer price index, and gdp_t is GDP growth rate .

Dataset comprises of 4 quarterly variables: average lending rate (LR), repurchase rate in OMOs (REPO), GDP growth rate and CPI. Although, SBV also announce the base rate, the policy rates is REPO due to the fact that the base rate has no impact on market rate as above analysis. These quarterly data for the period from 2000 to 2016 are sourced from SBV and the General Statistical Office. All series in the estimation are in normal except for CPI in logarithm.

Table 1 presents the results of the Augmented Dicley-Fuller test (ADF) and Phillips-Perron test (PP) unit root test conducted on the included variables with the lag structure automatically determined based on the Schwarz criterion. The results revealed that all the variables are non-stationary at level but integrated of order one, implying the need to difference them once.

Table 1 Unit roots test

Variables	Augmented Dickey-Fuller test		Phillips-Perron test	
	Level	1st difference	Level	1st difference
GDP	-2.8459	-7.9466*	-2.9811	-8.7216*
	(0.0574)	(0.0000)	(0.0419)	(0.0007)
CPI	-0.3009	-4.7481*	0.1202	-3.8702*
	(0.9184)	(0.0002)	(0.9650)	(0.0038)
Lend	-2.6607	-6.0581*	-2.1722	-5.8212*
	(0.0865)	(0.0000)	(0.2182)	(0.0000)
OMO	-2.2591	-6.8287*	-2.4442	-6.7585*
	(0.1882)	(0.0000)	(0.1339)	(0.0000)

*Note: P-value in ( ); * denote significant at 5%*

Given all variables are I(I), It is able to analyze the co-integrating relationships between variables. Johansen co-integration test is used to examine cointegrating relationships. The results of Trace and Maximum Eigenvalue test are summarized in Table 2, indicating that at the significance level of 5%, there is a co-integrating relationship between GDP, CPI and lending rate and REPO.

Table 2 Johansen Co-integration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.300117	34.09718	29.79707	0.0362
At most 1	0.130025	11.97300	15.49471	0.3177
At most 2	0.052400	3.337000	3.841466	0.0677

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.196110	22.12418	21.13162	0.0150
At most 1	0.109138	8.636001	14.26460	0.1582
At most 2	0.052975	3.337000	3.841466	0.0677

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
**MacKinnon-Haug-Michelis (1999) p-values

The results for the Johansen cointegration test based on trace and maximum eigen values test statics are presented in Table 3. The results for the maximum eigen values and the trace test statistic show at least one test statistic which is greater than the 95% critical value therefore, rejecting the null hypothesis of no cointegrating variables. After determining that cointegration was present, the study proceeds by estimating the data with the Vector Error Correction Model (VECM) and not the general VAR. The reason for the divergence from the VAR to the VECM is that, the VECM is preferred for long run dynamics.

In order to analyse the response of GDP, CPI to lending and OMO rates, an impulse response function is used. Graph 4 presents the results of impulse response function of GDP, Inflation to a 1% of lending rate and OMO rate. It can be seen that the responses of inflation to FII, ER, and IR are consistent with theory suggestions, reacting positively to exchange rate and negatively to financial inclusion index and lending interest rate.

Graph 4: Impulses response function for GDP, CPI and lending interest rate to policy rate

Response to Cholesky One S.D. Innovations
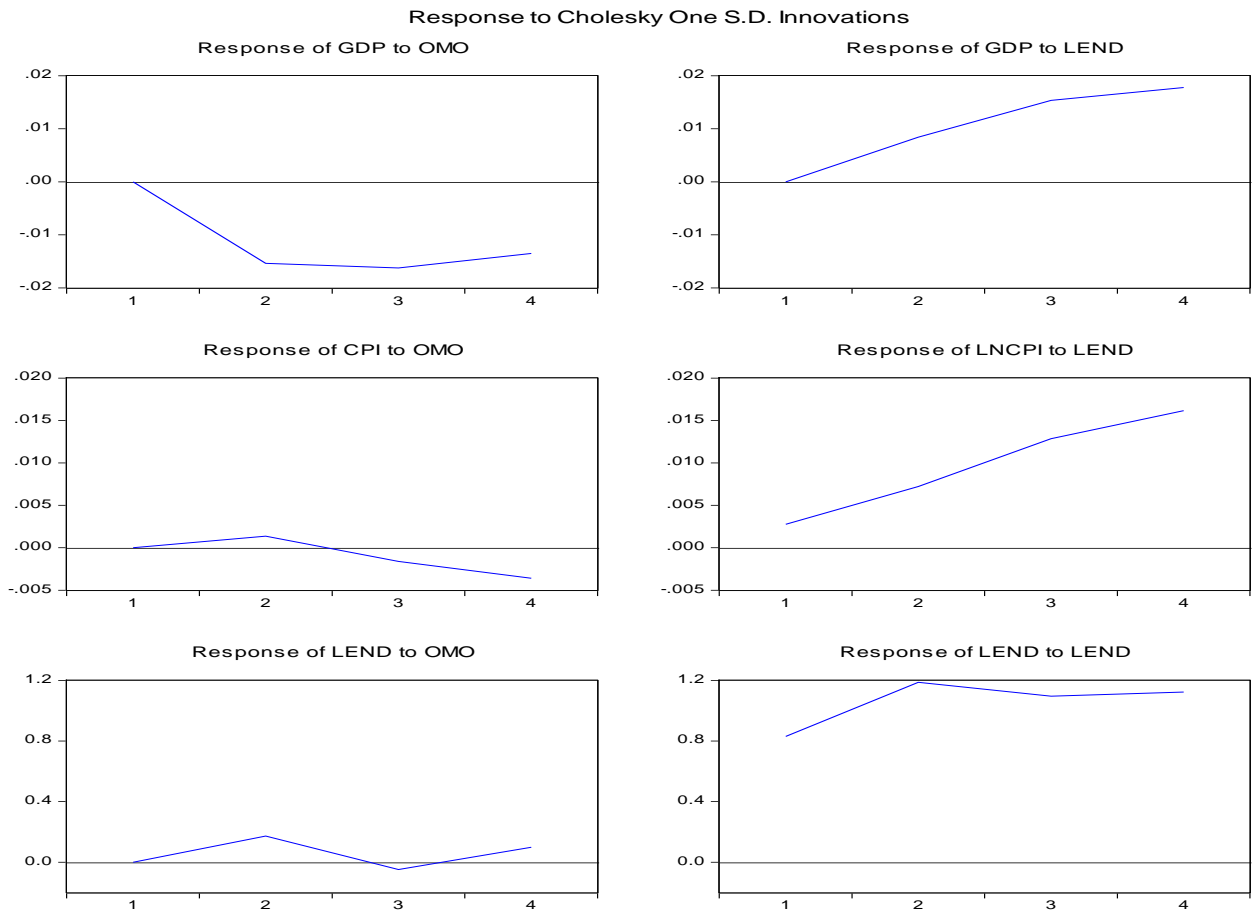
According to the results in Graph 1, an increase in OMO interest rate will has negative effects on GDP. Lending rate will increase for the first two quarters and then decrease since third quarter.

5. Concluding remarks

This paper presents a review on the interest rate channel of monetary policy transmission in affecting GDP and CPI. There is a general belief that monetary policy actions are transmitted to the economy through their effect on market interest rates. The empirical analysis conducted makes use the VAR methodology. The results from the impulse response analysis have shown that a change in repo rate (proxy for policy rate) causes a change in lending rate. Repo rate also has impact on GDP, an increase in repo rate lead to a reduction of GDP growth rate. As a result of this study it can be said that interest rate channel is an effective monetary policy transmission mechanism on real variables.

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