Monetary Transmission through Interest Rate Channel in Vietnam Before and After the Crisis

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ABSTRACT

The paper employs the VAR model to examine the impact of monetary policy on the economy through interest rate channel (IRC) and levels of transmission before and after the 2008 crisis. The results indicate that in the period before the financial crisis, IRC exists in accordance with macroeconomic theory; however, the crisis period, in which increases in SBV monetary policy rates lead to increased inflation, has proved the existence of the cost channel of monetary transmission in Vietnam.

1. INTRODUCTION

1.1 Significance of the Study:

Monetary policy plays a crucial role in the economy. It affects macroeconomic variables through transmission channels, among which interest rate channel (IRC) is considered an important and traditional one for monetary policy. A study of monetary transmission through IRC as well as changes in the transmission process resulted from economic crisis could allow the SBV to make timely adjustments to its operating mechanisms in accordance with the reality.

In addition, the study contributes more empirical evidence to theoretical foundations on monetary transmission in such a small and open economy as Vietnam.

1.2 Subject Matter:

The study focuses on monetary policy and particularly IRC in monetary transmission in Vietnam between 2000 and July 2013. Furthermore, it clarifies the impact of the 2008 financial crisis on monetary transmission through IRC, including lending rate and deposit rate offered by Vietnam's commercial banks.

1.3 Research Objectives:

Based on the aforementioned issues, the study features the following objectives:

- Examining the existence of IRC in monetary transmission in Vietnam through lending rate and deposit rate offered by commercial banks, and

- Investigating the changes in monetary transmission through IRC before and after the crisis.

2. THEORETICAL BASES AND METHODOLOGY

2.1 Theoretical Background:

Monetary policy refers to the actions taken by central banks to influence the money supply or interest rate of the economy (Lico Junior, 2008). With the aim of stabilizing price and promoting economic development, central banks employ such instruments of monetary policy as monetary policy rates, open market operations and required reserve ratio to exert influence on other economic variables. The process is termed as monetary transmission. Previous studies suggest that monetary transmission takes place through various channels, including interest rate channel, exchange rate channel, asset price channel, credit channel and expectation channel as the main ones (Mukherjee &

Bhattacharya, 2011; Dabla-Norris & Floerkemeier, 2006; Mugume, 2011; Disyatat & Vongsinsirikul, 2003; Ries, 2012; Honda, 2004; and others).

According to the Keynesian school of economics, IRC is the main transmission channel of monetary policy (Friedman, 1956), which is further confirmed by a study by Hannan & Liang (1993), demonstrating the existence of IRC in the U.S. The issue is later discussed in such other studies as Taylor (1995) and Cecchetti (1995), substantiating the important role of IRC in monetary transmission. As explained in Keynesian theory, a change in monetary policy should lead to that in money supply, thereby changing the real interest rate and economic output (IS/LM model).

Increase in M → Decrease in i_r → Increase in I → Increase in Y

Where:

M: money supply

i_r: real interest rate

I: investment

Y: output

Although Keynes highlights the fact that firm's investment decisions is determined by real interest rates, decisions on consuming essential, durable goods by households and individuals are also affected by changes in real interest rates. Thus, the interest rate transmission channel of monetary policy is influenced by shocks related to firm's investment and personal consumption of essential durable goods in the private sector.

The importance in monetary transmission through IRC is related to real interest rate rather than nominal one since the former would affect decisions on corporate investment and personal consumption. In addition, interest rate in consideration is the long-term one because the short-term rate exerts little impact on the decisions on corporate investment and personal consumption of durable goods in the private sector, which depend on long-term cash flow and benefits. Then, why are short-term rates main targets of the central bank? This could be explained by the term structure of interest rates and sticky prices. Suppose the central bank wants to expand the money supply, it would reduce short-term rates (the short-term sticky prices always lead to changes in a long term only), and short-term nominal interest rate would decrease.

According to the theory of the term structure of interest rates, long-term interest rate is the estimated future values of short-term ones; therefore, when the latter reduces, the

former is expected to reduce accordingly (Buttiglone et al., 1997; Cook & Haln, 1989; Evans & Marshall, 1998; Favero et al., 1996; Haldane & Read, 2000; Kuttner, 2001; Lindberg et al., 1997; and other studies). Reduced long-term rates stimulate investment and consumption of durable goods, thereby increasing the aggregate demand and output.

However, a recent study by Mengesha & Holmes (2013) addresses an exception: No evidence for the existence of IRC in Eritrea, an African low-income economy, is found. The reason is that the country's financial system has yet to develop, therefore the commercial banking system almost dominates all operations of the economy, allowing such a credit channel of commercial banks to be indispensable. In Eritrea, the main tool of monetary policy is required reserve ratio; Bank of Eritrea also employs treasury bills as an instrument. In addition, the rediscount rate is not used as a monetary policy instrument in Eritrea. Since the rediscount window is inoperative and both the lending and deposit rates are rigid, the interest rate channel is ineffective (Mengesha & Holmes, 2013). In some other countries such as Kenya, Uganda and Tanzania, the IRC does not play an important role in monetary transmission (Buigut, 2009), which also results from underdeveloped financial markets in these countries.

Ramlogan (2007) argues that monetary policy may affect various economic fields via interest rates and credit channels, and an effective transmission through IRC requires a developed financial market. In developed and highly competitive markets as in UK or the U.S., IRC is the most important channel (Engert et al., 1999; and Allen & Gale, 2000, 2004), whereas in underdeveloped ones as in Trinidad Tibago, the credit channel is more important (Ramlogan, 2007). According to Romer & Romer (1990), the transmission through IRC requires two conditions:

First, all commercial banks lack ability to hedge against changes in their reserve capital caused by changes in monetary policy.

Second, no other type of asset would replace cash as the means of payment.

In Vietnam today, the stock market has yet to develop; its supply of capital to the economy is not significant enough. Meanwhile, the system of commercial banks plays a crucial role in facilitating flows of capital while the outstanding loan compared to the GDP keeps growing over years (up to 123.1% by 2012) as illustrated in the following table:

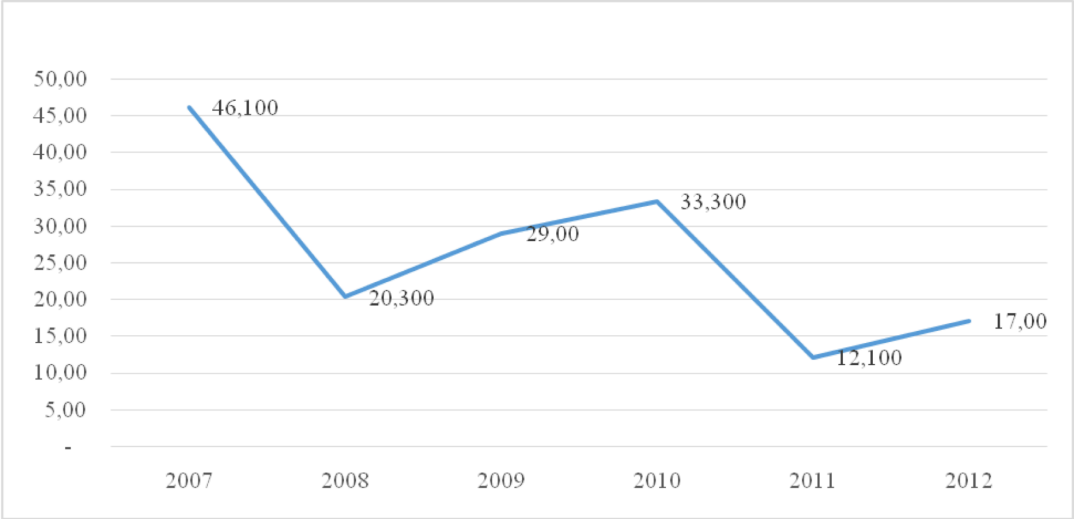
Table 1. Outstanding Loan of Vietnam's Commercial Bank System/GDP in 2007–2012(VND bil.)

Year	2007	2008	2009	2010	2011	2012
GDP	1,096,780	1,400,693	2,039,686	2,689,527	3,062,549	3,276,927
Outstanding Loan	1,143,715	1,485,038	1,658,389	1,980,914	2,535,008	2,662,519
As % of GDP	95.9%	94.3%	123.0%	135.8%	120.8%	123.1%

Source: ADB (2013), Vietnam Key Indicators.

In addition to that, Vietnam is an open economy with high demand for cash and annual growth of money supply is commonly high even though it tends to decrease in 2011 and 2012.

Figure 1. Growth Rate of M2 in Vietnam in 2007 – 2012



Source: ADB (2013), Vietnam Key Indicators.

Accordingly, macroeconomic conditions show that IRC can exist and act as an important transmission channel of monetary policy. On such basis, the research concerns the transmission channel through market rates (lending and borrowing rates) offered by commercial banks and further evaluates the impact of financial crisis on the transmission through IRC, phased over the two periods: 2000–2007 (before the crisis) and 2008–2013 (after the crisis).

2.2 Data and Methodology:

Research model:

The VAR (Vector Autoregression) model introduced by Sims (1980) is widely applied by macroeconomists to quantify the dynamic response of a group of macroeconomic variables without demanding powerful conditions to identify macro shocks. VAR model then became one of the most common models to be applied to time series data. VAR model is used to measure the dependence and linear correlations between various variables of time series data, especially in measuring interactions between macro variables of time series data since such macroeconomic data, according to Sims (1980), have the following characteristics:

- Macroeconomic factors often come up with autocorrelation; thus, values of previous periods tend to affect those of current ones. The autocorrelation usually makes macro variables fluctuate and have some lag orders.

- Macro variables often interact in a network model, i.e. all variables interact with one another in the form of network; therefore, any macro variable can be affected by the others and vice versa.

A change in monetary policy influences market rate and subsequently, other variables in the economy; however, as responses of the variables to the policy-related shocks are different, it is important that levels as well as length of the responses be well clarified. Additionally, researchers may need to predict future variance of the studied variables to adequately demonstrate the impacts of shocks on the predicted future variance of the variable and offer control solutions. VAR model provides two tools for dealing with the issue: Impulse response function (IRF) helps measure the degree of response as well as lag order of the response of the studied variable to shocks in other variables, and variance decomposition supports the analysis of contribution from factors to prediction of variation of variance of future studied variables.

To examine the transmission mechanism of monetary policy through IRC in Vietnam, the VAR (Vector AutoRegression) model applied by Bernanke & Blinder (1992), Sims (1980, 1992) and many others is employed in this study. Specifically, when the monetary policy produces impacts through the interest rate channel, such impacts will be transmitted from monetary policy rates to lending and borrowing rates. VAR features the following form:

$$y_t = B(L)y_t + u_t \qquad (1)$$

where: y_t is a vector n x 1 of economic variables, including the following variables in order: VNIBOR (inter-bank average interest rate – SBV), LER (average lending rate of commercial banks – SBV) or DER (average deposit rate of commercial banks – SBV), CPI (consumer price index – IMF); B(L) is structure matrix of lagged variables to k; and u_t is vector n x 1 of errors.

However, policy rate and market rate often respond in the same direction, thereby being possibly cointegrated. Stationarity and cointegration are tested to figure out whether the data are suitable for VAR model. If the latter exists, VECM model is employed instead of VAR. According to Friedman (1956), an increase in policy rate will bring about that in market rate (including borrowing and lending rates of commercial banks) and transmission reduces investment and inflation accordingly. In brief, the expected relationship between monetary policy rates and market rates is positive and between these and the one with inflation is negative.

Data:

The data are collected from SBV (inter-bank average rate) and GSO (CPI) and IMF (average lending rate and average borrowing rate) from January 2000 to July 2013. Regarding policy interest rates, there are three types in Vietnam: inter-bank average rate (VNIBOR), refinancing rate and rediscount rate; however, the second and third types are not efficient while operations in inter-bank market is the main channel in implementing the monetary policy. Therefore, the first type is employed by the authors of this study in the context of Vietnam as a representative of monetary policy rates. This practice is very common among many central banks in the world (Disyatat & Vongsinsirikul, 2003).

Applying VAR model to the two periods (before and after the crisis), the authors collected monthly data and investigate the monetary transmission in Vietnam through lending and borrowing rates of commercial banks to inflation.

Data is described statistically in Table 2.

Table 2. Statistical Description of Data

Variable/Criterion	VNIBOR	LER	DER	CPI
January 2000 – December 2007				
Mean	6.730625	10.20292	6.308229	4.581431
Median	6.855000	10.20000	6.540000	4.501648

Max	8.740000	11.40000	7.680000	12.54776
Min	5.180000	8.460000	3.540000	-2.739748
Standard deviation	0.771388	0.902285	1.271599	3.959221
Skewness	-0.211485	-0.296374	-0.942552	-0.314421
Kurtosis	2.574286	1.743131	2.901517	1.920458
Jarque-Bera	1.440545	7.724278	14.25327	6.243411
P-value	0.486620	0.021023	0.000803	0.044082
Obs.	96	96	96	96
January 2008 – July 2013				
Mean	9.912090	14.80551	10.47895	12.64978
Median	8.900000	14.60000	10.85000	10.52070
Max	17.57000	20.25000	17.16000	28.35694
Min	3.620000	10.07000	6.540000	-5.830000
Standard deviation	3.385513	2.795319	2.635734	7.662913
Skewness	0.294703	0.135555	0.619814	0.367557
Kurtosis	2.268128	2.029339	3.006548	2.364152
Jarque-Bera	2.465140	2.835452	4.290009	2.637276
P-value	0.291542	0.242264	0.117068	0.267499
Obs.	67	67	67	67

Source: Authors' calculations

The values of monetary policy rates, lending rate, borrowing rate and inflation after the crisis are all higher than those before the crisis.

Description of the test for the stationarity of the data is illustrated in Table 3.

Table 3. Unit Root Tests on the Dataset

Variable	Dickey – Fuller unit root test (zero-order)		Dickey – Fuller unit root test (first-order)		Conclusion
	T – statistic	*P – value*	*T – statistic*	*P – value*	
January 2000 – December 2007					
VNIBOR	-3.004489	0.0380			Zero-order stationary
LER	-1.001428	0.7503	-8.956079	0.0000	First-order stationary
DER	-2.089629	0.2493	-8.844660	0.0000	First-order stationary
CPI	-0.426920	0.8991	-5.015976	0.0001	First-order stationary
January 2008 – July 2013					
VNIBOR	-1.732664	0.4104	-9.811286	0.0000	First-order stationary
LER	-2.638637	0.0906	-5.416370	0.0000	First-order stationary
DER	-2.974987	0.0426			Zero-order stationary
CPI	-1.480353	0.5374	-3.947427	0.0033	First-order stationary

Source: Results collected from Eviews 6.

The results of unit root tests show that the variables have different order of stationarity; therefore, the difference of variables that are first-order stationary is needed while other variables that are zero-order stationary are kept intact and VAR model is applied. New symbols for the variables and data processing are presented in Table 4.

Table 4. Data Processing for VAR Model

Variable	Conclusion	Process	New symbol
January 2000 – December 2007			
VNIBOR	Zero-order stationary	Intact	VNIBOR
LER	First-order stationary	First-order difference	DLER
DER	First-order stationary	First-order difference	DDER
CPI	First-order stationary	First-order difference	DCPI
January 2008 – July 2013			

VNIBOR	First-order stationary	First-order difference	DVNIBOR
LER	First-order stationary	First-order difference	DLER
DER	Zero-order stationary	Intact	CDER
CPI	First-order stationary	First-order difference	DCPI

Source: Authors' calculations from Eviews 6.

To determine the relationships between the variables before including them in the VAR model, Granger causality test is conducted with results presented in Table 5.

Table 5: Results of Granger Causality Tests

Variable	$H0_1$: VNIBOR does not Granger-cause other variables		$H0_2$: Variables do not Granger-cause DCPI	
	F-Statistic	**p-value**	**F-Statistic**	**p-value**
January 2000 – December 2007				
DLER	2.94829	0.0249	2.82251	0.0301
DDER	6.25726	0.0002	1.55300	0.1947
DCPI	1.23021	0.3045		
January 2008 – July 2013				
DLER	0.87670	0.5077	2.73097	0.0365
DER	2.11642	0.0787	1.19360	0.3258
DCPI	1.31874	0.2714		

Source: Authors' calculations with Eviews 6.

The results of the Granger causality tests indicates that on the one hand, in the period before the crisis, VNIBOR exerts a significantly strong impact on lending and borrowing rates but does not affect CPI. Of lending and borrowing rates, only the former affects inflation. On the other hand, after the crisis (2008 – July 2013), monetary policy rates affect the borrowing rate, whereas the latter does not affect inflation anymore. In the next section, VAR model is used for testing and clarifying this fact.

3. RESULTS AND DISCUSSION

3.1 VAR Model Applied to the Period Before the Crisis:

Lag order of monthly data from January 2000 to December 2007 is tested according to Lag Length Criteria prepared by Eviews 6 and the appropriate lag order of 4 is found.

Table 6. Selection of Lag Order Criteria for VAR

Model with DLER

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-183.1678	NA	0.021080	4.654194	4.743520	4.690008
1	-19.66115	310.6626	0.000443	0.791529	1.148833*	0.934782*
2	-11.65206	14.61658	0.000455	0.816302	1.441583	1.066995
3	4.115504	27.59324	0.000385	0.647112	1.540372	1.005246
4	16.01460	19.93098*	0.000360*	0.574635*	1.735873	1.040209
5	21.51446	8.799775	0.000396	0.662139	2.091355	1.235152
6	24.65558	4.790215	0.000463	0.808610	2.505804	1.489064
7	30.58228	8.593717	0.000508	0.885443	2.850615	1.673337
8	33.29447	3.729265	0.000608	1.042638	3.275788	1.937972

* indicates lag order selected by the criterion

Model with DDER

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-185.3672	NA	0.022271	4.709179	4.798505	4.744992
1	-1.777916	348.8196	0.000283*	0.344448*	0.701752*	0.487701*
2	3.921797	10.40198	0.000308	0.426955	1.052237	0.677649
3	14.37728	18.29709	0.000298	0.390568	1.283828	0.748702
4	24.96501	17.73446*	0.000288	0.350875	1.512113	0.816448
5	31.18298	9.948744	0.000311	0.420426	1.849642	0.993439
6	42.19385	16.79159	0.000299	0.370154	2.067348	1.050607
7	49.96637	11.27014	0.000313	0.400841	2.366013	1.188735
8	57.27016	10.04271	0.000334	0.443246	2.676396	1.338580

Source: Authors' calculations employing Eviews 6.

Model VAR (4) applied to lending rate and borrowing rate in turn gives the following results:

Table 7. Results of VAR with DLER and DDER

Independent variable	**VNIBOR**	**DLER**	**DCPI**
Intercept	1.351096**	-0.174824	1.166512*
VNIBOR(-1)	0.876550***	0.060213	0.004339
VNIBOR(-2)	-0.018843	0.053337	-0.130871
VNIBOR(-3)	-0.030246	0.007239	0.017052
VNIBOR(-4)	-0.025182	-0.096470*	-0.049249
DLER(-1)	0.087119	0.044626	-0.379333
DLER(-2)	0.260323	-0.022291	0.036820
DLER(-3)	-0.641016***	-0.012906	-0.430152*
DLER(-4)	0.173187	0.097506	0.545084*
DCPI(-1)	0.194354*	0.003966	0.351262**
DCPI(-2)	0.077167	0.067680	0.067109
DCPI(-3)	-0.153400	-0.112891**	0.149941
DCPI(-4)	-0.054422	0.123500**	-0.057620
Independent variable	**VNIBOR**	**DDER**	**DCPI**
Intercept	1.482934**	-0.072406	1.405239**
VNIBOR(-1)	0.829780***	0.125833***	-0.104139
VNIBOR(-2)	-0.007606	0.023903	0.042279
VNIBOR(-3)	0.052112	-0.033125	0.019638
VNIBOR(-4)	-0.091792	-0.101962*	-0.148849
DDER(-1)	0.047332	-0.060712	-0.646079**
DDER(-2)	-0.171210	-0.008337	-0.093690
DDER(-3)	0.063358	0.126729	0.127175
DDER(-4)	0.070027	-0.056493	0.085351

DCPI(-1)	0.137060	-0.034447	0.306412**
DCPI(-2)	0.149926	0.008361	0.112880
DCPI(-3)	-0.125429	0.100865*	0.096483
DCPI(-4)	-0.084651	-0.028436	-0.012423

*, **, and *** denote significance at 10%, 5%, and 1% respectively

Source: Results from Eviews 6.

The results yielded by VAR model suggest that average inter-bank rate has impact on borrowing and lending rates, whereas borrowing rate affects inflation. A stability test for the two models shows that they satisfy the stability condition.

Table 8. AR Root Tests

Root of VAR Model with DLER	Modulus
0.832843	0.832843
0.637952 - 0.423898i	0.765946
0.637952 + 0.423898i	0.765946
-0.757095	0.757095
0.027719 - 0.752262i	0.752773
0.027719 + 0.752262i	0.752773
-0.406720 - 0.629849i	0.749754
-0.406720 + 0.629849i	0.749754
0.601209 - 0.182688i	0.628353
0.601209 + 0.182688i	0.628353
-0.390302	0.390302
-0.133328	0.133328
Root of VAR Model with DDER	**Modulus**
0.766866	0.766866
0.657885 - 0.206016i	0.689388
0.657885 + 0.206016i	0.689388

-0.388646 - 0.542145i	0.667058
-0.388646 + 0.542145i	0.667058
0.508407 - 0.426289i	0.663475
0.508407 + 0.426289i	0.663475
-0.435167 - 0.371895i	0.572430
-0.435167 + 0.371895i	0.572430
-0.048309 - 0.454846i	0.457404
-0.048309 + 0.454846i	0.457404
-0.279729	0.279729

No root lies outside the unit circle, VAR model satisfies the stability condition

Source: Results from Eviews 6.

The LM Test on VAR model indicates that the model no longer reveals autocorrelation, therefore it is considered appropriate.

Table 9. LM Tests on VAR Model

Model with DLER

Lags	LM-Stat	Prob
1	6.318360	0.7077
2	7.681186	0.5666
3	3.916581	0.9168
4	4.121039	0.9033
5	10.07112	0.3448
6	9.849230	0.3628
7	4.845651	0.8476
8	11.69143	0.2313
9	9.207662	0.4183
10	11.21679	0.2611
11	6.336638	0.7058

12	9.477654	0.3944

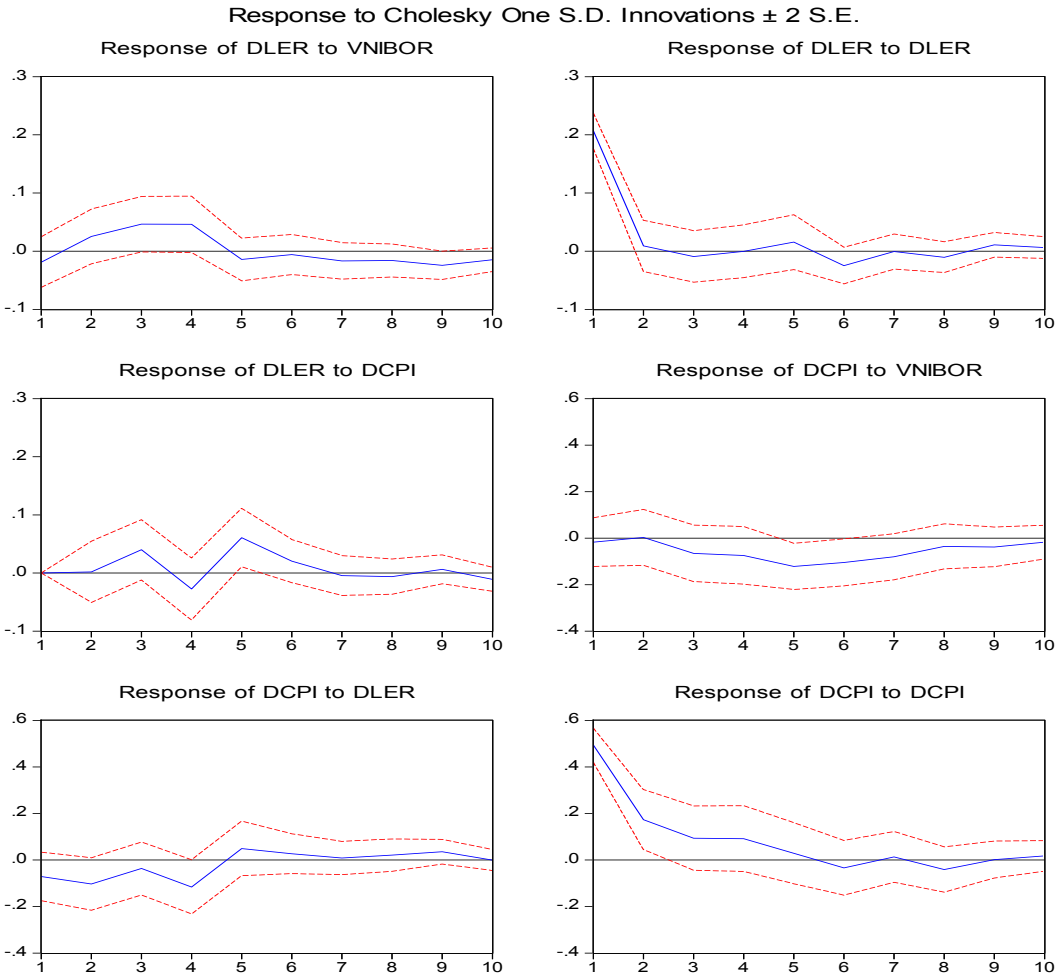
Model with DDER

Lags	LM-Stat	Prob
1	9.436887	0.3980
2	10.37316	0.3211
3	13.48707	0.1418
4	8.144409	0.5197
5	12.47927	0.1876
6	19.31205	0.0227
7	8.576477	0.4773
8	10.80499	0.2893
9	8.053794	0.5287
10	4.451709	0.8793
11	5.263013	0.8108
12	4.969552	0.8370

Source: Results from Eviews 6.

Applying the impulse response function to test monetary transmission through IRC to inflation yields results for DLER and DDER, illustrated in Figures 2 and 3 respectively.

Figure 2. Impulse Response Function for VAR with DLER

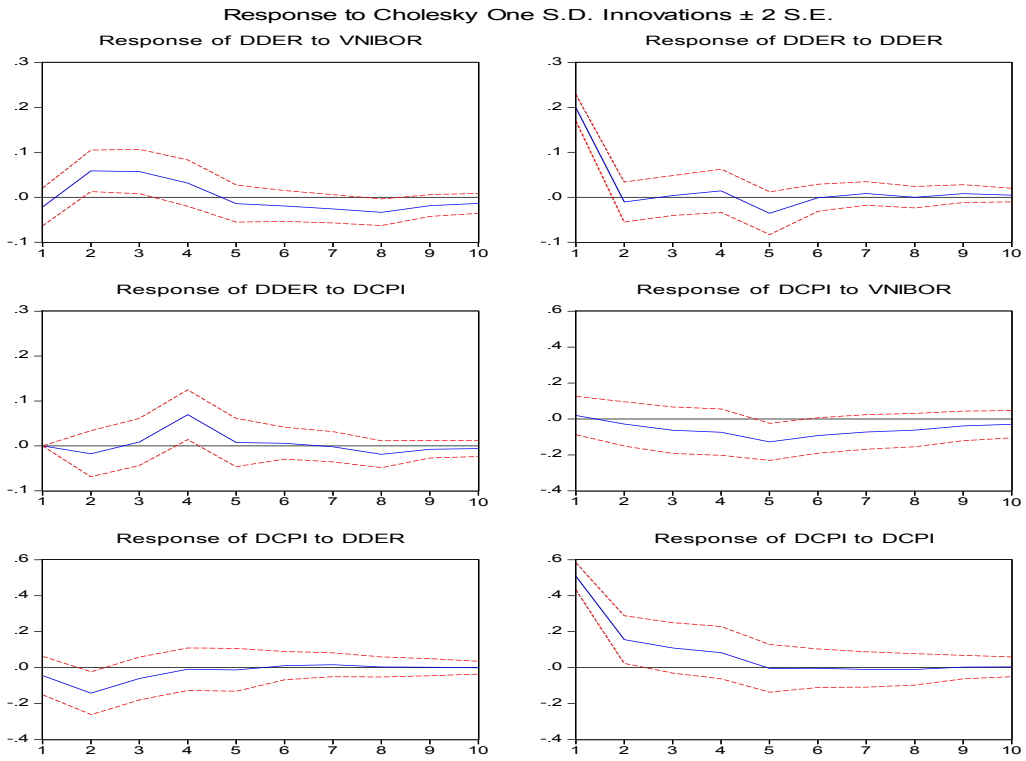


Source: IRF Results from Eviews 6.

The results of impulse response function suggest that lending rate responds positively to the shock caused by increases in monetary policy rates (namely VNIBOR) and with the lag of one month, which reflects the role played by IRC in monetary transmission in Vietnam before the crisis. In contrast, inflation has an immediate response to the shock caused by a higher lending rate and a two-month lagged response to the monetary policy rates. Thus, it can be concluded that in Vietnam, IRC exists in the period before the crisis through lending rate. An increase in

monetary policy rates will boost lending rate and control inflation, and the transmission from policy rates to lending rate experiences a lag length of one month and a two-month lag to inflation. The transmission process, however, ends after a lapse of five months.

Figure 3. Impulse Response Function for VAR with DDER



Source: IRF Results from Eviews 6.

Through borrowing rate channel, monetary transmission transpires faster, and response of inflation is similar to that to the lending rate channel. Yet, the process would be faster and end more quickly when response from CPI stops in the fourth month.

Accordingly, before the crisis, IRC exists in both lending and borrowing rates, whereas the response of borrowing rate takes place and ceases faster than that from lending rate. To examine IRC after the crisis, VAR is applied to the dataset from January 2008 to December 2010, the results of which is presented in the next section.

3.2 VAR Model Applied to the Period after the Crisis:

A test of lag criteria reveals that a lag order of 2 is appropriate.

Table 10. Selection of Lag Criteria for VAR

Model with DLER

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-386.9105	NA	88.53478	12.99702	13.10173	13.03798
1	-306.8547	149.4376	8.293336	10.62849	11.04736*	10.79233*
2	-294.6712	21.52408*	7.477851*	10.52237*	11.25540	10.80910
3	-291.6027	5.114283	9.169423	10.72009	11.76726	11.12970
4	-283.7915	12.23749	9.650609	10.75972	12.12104	11.29221
5	-278.8226	7.287739	11.24683	10.89409	12.56956	11.54946
6	-272.7870	8.248586	12.76743	10.99290	12.98253	11.77115

Model with DER

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-231.3628	NA	14.10502	11.16013	11.28425	11.20563
1	-178.8844	94.96091	1.782186	9.089735	9.586212*	9.271713
2	-164.2626	24.36971*	1.374121	8.822029	9.690864	9.140491*
3	-159.7099	6.937446	1.730008	9.033805	10.27500	9.488751
4	-149.4572	14.15846	1.687912	8.974154	10.58770	9.565584
5	-138.5171	13.54487	1.631439	8.881769	10.86768	9.609683
6	-123.7218	16.20442	1.355299	8.605800	10.96407	9.470198

Source: Results from Eviews 6.

VAR(2) is designed for DLER and DER in the period 2008–2013 with the results illustrated in Table 11.

Table 11. Results of VAR Model for DLER and DER

Independent variable	DVNIBOR	DLER	DCPI
DVNIBOR(-1)	-0.239410	0.008004	0.196759*

DVNIBOR(-2)	0.221048	0.040397	0.070792
DLER(-1)	-0.207617	0.786543***	-0.768641***
DLER(-2)	0.092306	0.107540	0.808953***
DCPI(-1)	0.318127*	0.085457	0.609181***
DCPI(-2)	-0.076984	-0.069374	0.178558
C	1.302695	1.102546	-0.541259
	DVNIBOR	**DER**	**DCPI**
DVNIBOR(-1)	-0.429643***	0.181259**	0.345184
DVNIBOR(-2)	0.053646	0.224773**	0.254756
DER(-1)	0.376141**	1.112148***	0.272709
DER(-2)	-0.580011***	-0.284932**	-0.274817
DCPI(-1)	0.203236***	0.074357*	-0.174697
DCPI(-2)	0.106512	0.051410	0.129982
C	2.164341***	1.848095***	-0.076726

*, **, and *** denote significance at 10%, 5%, and 1% respectively

Source: Results from Eviews 6.

The results of the AR root tests for stability of the model shows that both models satisfy stability requirement.

Table 12. Tests of the Models' Stability

Root of VAR with DLER	Modulus
0.927041	0.927041
0.847907	0.847907
-0.610904	0.610904
0.356204	0.356204
-0.181967 - 0.215415i	0.281985
-0.181967 + 0.215415i	0.281985

No root lies outside the unit circle, this VAR model satisfies the stability condition

Root of VAR with DLER	**Modulus**
0.808123 - 0.300660i	0.862241
0.808123 + 0.300660i	0.862241
-0.397010 - 0.217444i	0.452658
-0.397010 + 0.217444i	0.452658
-0.449757	0.449757
0.135340	0.135340

No root lies outside the unit circle, this VAR model satisfies the stability condition

Source: Results from Eviews 6.

The LM test on autocorrelation suggests that each VAR model is appropriate because no further autocorrelation is found.

Table 13. LM Tests for VAR Model

Model with DLER

Lags	LM-Stat	Prob
1	14.15657	0.1169
2	8.764308	0.4593
3	6.932171	0.6442
4	14.61168	0.1022
5	9.131839	0.4252
6	9.864631	0.3616
7	12.62929	0.1801
8	12.75983	0.1738

Model with DER

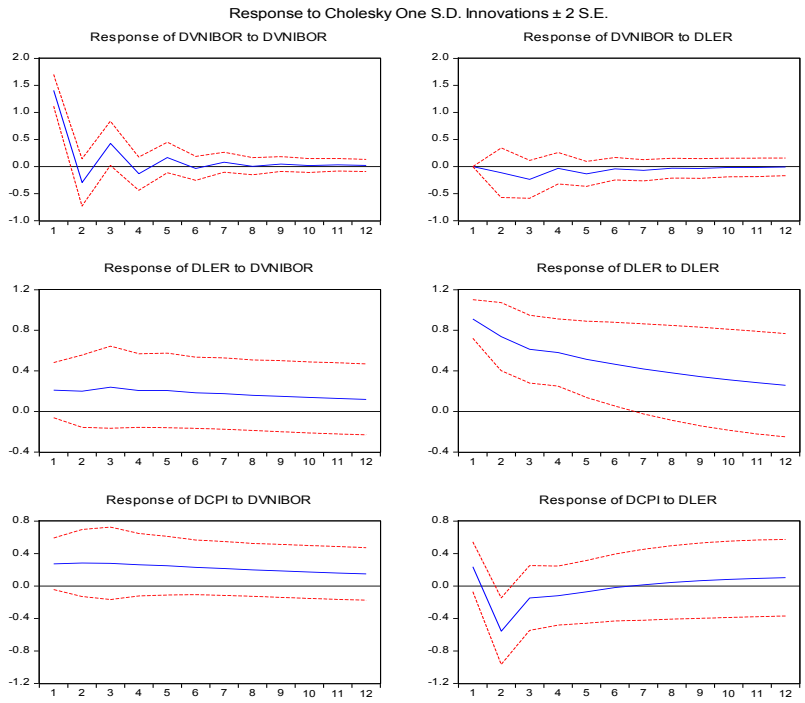
Lags	**LM-Stat**	**Prob**
1	11.36865	0.2513
2	11.29732	0.2559

3	5.665168	0.7729
4	8.880593	0.4484
5	7.967176	0.5375
6	7.414719	0.5940
7	7.309952	0.6049
8	4.334793	0.8880

Source: Results from Eviews 6.

Impulse response function is applied successively to VAR with DLER and DER, the results are presented in Figure 4 and 5 respectively.

Figure 4. Results of Impulse Response Function for VAR with DLER

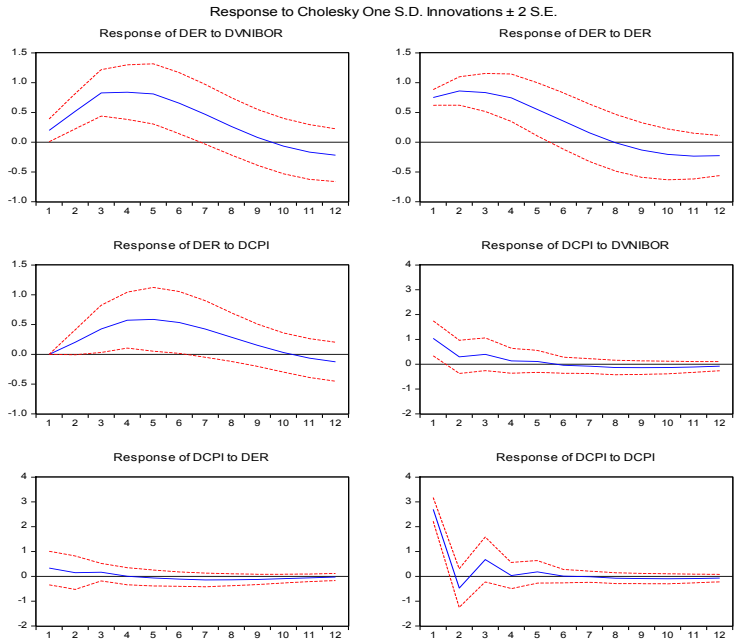


Source: Results from Eviews 6.

The results obtained from the period 2008–2013 are different from those from 2000–2007. In this period, lending rate responds vigorously to shocks of increases in monetary policy rates and tends not to cease, whereas inflation responds positively to monetary policy rates but negatively to lending rate in a short term. In other words,

shock-generating increases in monetary policy rates lead to short-term increases in market rates and falls in inflation rate. This reflects a short-term existence of IRC during the crisis. Long-term increases in inflation along with increases in monetary policy rates might be subject to the cost channel in monetary transmission. Regarding borrowing rates offered by commercial banks, the impulse respond function produces the following results.

Figure 5. Results of Impulse Response Function for VAR with DER



Source: Results from Eviews 6.

The IRC reflected in borrowing rates in the period 2008–2013 also reveals some results partly similar to and partly different from result produced by the IRC in the lending rate channel, which implies that inflation positively responds to shock-generating increases in monetary policy rates and gradually descends until a cessation in the sixth term. On the other hand, borrowing rate forcefully responds to shock in monetary policy rates but fades in a long run.

In sum, IRC changed quite dramatically after the crisis in comparison with that before the crisis. It also accompanies cost channel in monetary transmission (increased interest rate leads to increased inflation).

4. CONCLUSION AND POLICY RECOMMENDATION

4.1 Conclusion:

The VAR model shows that:

- Before the crisis, IRC exists in accordance with the theory in the context of Vietnam through both lending and borrowing rates by commercial banks. Inflation decreases when monetary policy rates increase. Monetary transmission though IRC takes place quickly and ceases after around five months.

After the crisis, monetary policy rates are no longer transmitted significantly through lending and borrowing rates as theoretically suggested. When shock-generating increases in monetary policy rates take place, both lending and borrowing rates increase, whereas inflation also even increases instead of decreasing. Hence, increased monetary policy rates results in increased inflation, which indicates that the cost channel in monetary policy exists in the period 2008–2013. Study by Tillmann (2008) concerning the new-Keynesian Phillips curve suggests that higher interest rates increase the marginal cost of production and inflation in Britain. Other studies also confirm that monetary policy affects demand side of the economy by changing the real rates thereby affecting investment and consumption in all sectors; while Barth & Ramey (2001) considers the effect on the supply side or cost channel of transmission mechanism. By such, the authors recommend an expansion of this research in the future to clarify the cost channel in monetary transmission in Vietnam.

4.2 Policy Recommendation:

From the above research results, in order that monetary policy in Vietnam can be well implemented to achieve the set goals especially in the current period, these following issues should be taken into account:

Interest rate policy affects borrowing and lending rates of commercial bank system after the crisis although it is not transmitted as vigorously as it was before and comes up with a certain lag. Therefore, the SBV, in regulating and changing interest rate policy, should anticipate the impact of monetary policy shocks on market rates and depositors and borrowers. During the crisis when increased policy rates causes market rates and production cost to rise, the SBV, instead of raising interest rates, should stabilize monetary policy rates, which will yield better effects.

However, in the present context, interest rates tend to drop for credit growth; SBV should frequently control the market rates when setting borrowing rate ceiling to

minimize the risk of reflation. Between 2011 and 2013, interest rates were lowered to help firms access bank loans. In such conditions, the SBV should have controlled lending and borrowing rates in compliance with monetary policy to avoid adverse responses and guarantee a drop in these rates as well as firms' input costs, thereby stimulating production in the economy■

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