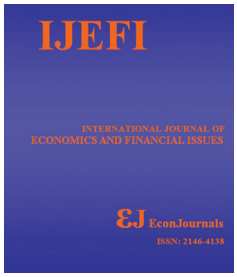

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The Effect of Monetary Policy on Economic Growth in Lao PDR

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ABSTRACT

The empirical analysis of this study examines the dynamic effect of monetary policy on economic growth in Lao PDR. This study uses Vector Autoregressive Model (VAR) and quarterly data from the first quarter of 1995 to the last quarter of 2018. The empirical results show a notable effect of monetary policy on economic growth in the Lao economy. An expansionary monetary leads to lower on interest rate, and increase aggregate credit and prices in the Lao economy. However, economic growth is found to be negative in responding to expansionary monetary policy.

Keywords: Monetary policy, Economic growth, Lao PDR
JEL Classifications: E31, E44, E52, G18

1. INTRODUCTION

Monetary policy is a key factor of macroeconomic management in both developed and developing economies. A clear understanding of the transmission mechanism of monetary policy is also virtual that significantly effect the success of monetary policy implementation (Anowor and Okorie, 2016) and Srithilat and Sun (2017a). Numerous of economist and researchers has been devoted on finding evidence for monetary policy effectiveness and its impact on macroeconomic by employing data from difference countries (Mengesha and Holmes, 2013, 2013; Partachi and Mija, 2015). The most frequency mentioned of monetary transmission channels in the previous literature including interest rate channel, credit channel, exchange rate channel, asset price channel and expectation channel (Afandi, 2005; Bhuiyan, 2012; Boivin et al., 2010; Bredin and O'Reilly, 2004; Carlyn, 2004; Loayza and Schmidt-Hebbel, 2002; Maliszewski, 2005; Suzuki, 2004).

Although, there are a voluminous literature on the effect of monetary policy and its transmission mechanism channel on economic in developed and developing economies, the existing literature were mostly conducted in the well-developed financial market one. There is lack of literature and consensus about effect of monetary policy and its transmission channels shock to the real sector in the economies with underdeveloped financial market. Particularly, in countries where financial markets are at the early stage of economic development and not well functioning (Nguyen, 2014; de Mello and Pisu, 2010). The understanding of any change of monetary mechanism on macroeconomic variables assist policy maker in deciding select an appropriate policy instrument in order to promote higher investment and faster pace of economic in the future.

This paper present an empirical analysis of the effect of monetary policy on economic growth in Lao PDR, which its economy was relatively close compare to its neighbouring countries and the financial market is on the first stage of its development (Dat et al., 2012) (Srithilat et al., 2018). There have been various regimes of monetary policy in Lao PDR sometimes, monetary policy is either tight or at the other time. Conducting monetary policy mostly relied on direct instrument in order to serve the government economic goal and economic liquidity. Despite,

there is a few researchers study on monetary policy of in Lao PDR including (Xaiyavong, 2015), (Srithilat and Sun, 2017b), but the existing literature does not explained dynamic relationship between monetary policy and price and output. To the best of my knowledge, this study on monetary policy in Laos is the first empirical study that used dynamic analysis approach with the high frequency data to investigate the dynamic effect of monetary policy and economic growth in Lao PDR. This study uses the quarterly time series data for the span period of 1995-2018 and the Vector Autoregressive Model. The empirical results show a notable effect of monetary policy on economic growth in the Lao economy. An expansionary monetary leads to lower on interest rate, and increase aggregate credit and prices in the economy. However, economic growth is found to be negative in responding to expansionary monetary policy.

2. LITERATURE REVIEW

Economic growth has always been one of the most important goals of every countries' macroeconomic management, and it also become a key topic that the government and policy makers placed as prioritized question in several decades. Therefore, there are numerous evidences and literatures on the effect of monetary policy has been addressed which can mainly grouped as the Keynesian school and Monetarist school. The Monetarist believes that: money can affect real economic variable only in the short run, via increasing aggregate demand and employment and only nominal magnitude of growth. Meanwhile, the typical Keynesian rejected the Monetarism's view rather hold on the change in money supply in circulation affects an interest rate and investment in the economy which therefore changing in the real output in the long-run. The first empirical study that support the Monetarist's views includes (Friedman, 1968) pointed that monetary policy has very small impact on the real economic activities, it only determined a long-run path of inflation. (Boschen and Mills, 1995) examines an empirical analysis in the United States and found that changes in the money supply have no long-term impact on GDP, but it affected only price and inflation. However, the Monetarist's views can be seen that there are two main aspects in explaining the relationship between the expansionary monetary policy and output in the economy. In the long run, the money supply has no impact on the GDP, that is, the currency is neutral in the long run. The long-term changes in economic growth come from actual factors other than monetary policy. In the short run, the money supply can have a certain impact on GDP. (Sylvie, 2015) analysis the impact of monetary policy in Rwanda using Johansen cointegration and VECM. The results of this study confirmed an existence of long run relationship run from interest rate and money supply to economic growth.

As far as the role of monetary policy has been concerned, it is necessary analysis the effectiveness of monetary policy through its transmission channels. Loayza and Schmidt-Hebbel (2002) The transmission mechanism of monetary policy work through the various channel and difference variables across countries. Moreover, the speed intensity measuring the effectiveness of each transmission channel is also a difference depending on the specific factors. Floerkemeier and Floerkemeier (2006) Suggests that the exact nature of transmitted channel differ across the countries depending on the specific elements. The major of monetary policy transmission channel are the interest rate, bank lending, the balance sheet, the asset price, the exchange rate, the expectation and others channels. Bain and Howells (2003), Carlyn (2007) analyze the impact of monetary policy on economic growth in Jamaica, Tobago, Barbados and Guyana. These countries are under development on financial market and capital market. To answer the question of monetary transmission in those countries, he has utilised the benchmark VAR model developed by Sims (1986) with the variables of the monetary instrument include the reserve requirement ratio, bank deposit interest rate, loan interest rate, effective exchange rate, CPI and output. The finding in this empirical study implies that the credit channel and exchange rate channel are found to be more significantly crucial than asset price channel in all mentioned countries, in transmitting the impulse from the financial sector to the real sectors. Kim and Roubini (2000) presents the empirical study on the effects of monetary policy on the exchange rate for the major industrial countries G-7 (United State, Germany, Japan, United Kingdom, France, Italy, and Canada). The authors aim to explain the effects of monetary policy on the exchange rate of each country by extended the structural VAR approach of Sims and Zha (1995) for the open economy by eliminating the weakness of the unrestricted VAR approach as it cannot identify the structure shock of monetary policy innovation. The identification scheme in this empirical work was successful in explaining the sock of monetary and solving the puzzles and anomalies which normally occurred as the effect of monetary policy shocks. However, some of the puzzles had still been existed and could not be clearly been identified such as liquidity puzzle. It is found that the effect of money on output is statistically and significant, but the magnitude changing is very small.

If we talk about Asia, The empirical on monetary policy transmission in Southeast Asia economies, the case of Thailand has been done by Disyatat and Vongsinsirikul (2003), Kubo (2008). Disyatat and Vongsinsirikul (2003) Analysis the monetary policy and its transmission in Thailand using VAR approach with a small basic model including real output GDP, CPI, and short-term interest rate with each channel of monetary policy and the foreign exchange Bath/USD as an exogenous variable. This study using a quarterly data with seasonal adjustment from quarterly data from 1993 to 2001. The finding consistent the same result in other countries which confirm that interest rate is the powerful transmission channel, meanwhile exchange rate and asset price channel has been less significant. The later study on monetary transmission mechanism by Kubo (2008) has focused on the credit channel in case of Thailand. The span of data was focused on the post of 2000 (2000-2006) and using the monthly data from the Bank of Thailand BOT. To capture the dynamic response of domestic macroeconomic variable to the monetary policy shock, the authors have employed the Structure Vector Autoregressive (SVAR) model with five variables includes: the industrial production index, consumer price index CPI, the producer price index, inter-bank lending rate and private aggregate. The results suggest that the relative strong of credit channel is the crucial element behind the successfulness of BOT conducting monetary

policy in Thailand. Moreover, the BOT can play a significant role in controlling the price fluctuation and economic instability through interest rate channel. Vo and Nguyen (2017) examine three channels of monetary policy transmission in Vietnamese economy including the traditional interest rate channel, the exchange rate channel and the asset price channel. This study uses the monthly data spanning from the 1st month of 2003 to the last month of 2012. Vo and Nguyen (2017) uses three external variables namely the world oil price, the U.S interest rate and the U.S output with four domestic variable in the designed model. To capture the transmission mechanism of channels of monetary policy, analysis procedures is designed to test those channels separately. The results show that interest rate channel is the most effectively transmitting Vietnamese economy than exchange and asset price channel.

If we talk about Laos, Xaiyavong (2015) Analysis the macroeconomic policy in the presence of currency substitution in Lao PDR, suggest that change in money have a negative effect on the level of real output in the long-run. Also, a permanent rise in the level of M2 from 20% to 50% cause real GDP to decline by 1.5%. This finding therefore confirms that expansionary monetary policy unlikely to stimulate on economic development in Laos' economy. This find was confirmed by a later empirical study by Srithilat and Sun (2017b), who investigate the impact of monetary policy on economic development in Laos. The authors using the annual time series data from 1989 to 2015 and Vector Error Correction Model (VECM) to examine the long run and short-run association between variables. The finding reveals that aggregate money has a negatively significant on economic development in the long-run. Also, interest rate and exchange rate are found to be an effective element in boosting economic development in the long-run. The evidence of Granger causality suggests that there exists the bidirectional direction between economic development and exchange rate in Lao PDR.

3. ECONOMIC GROWTH, MONEY SUPPLY AND INFLATION IN LAO PDR

After the Lao PDR transitioned from a centralized economy to a market-based economic system in 1986, the Lao economy was steadily expanding, stabilizing, changing its economic structure, enabling international trade to promote economic growth as well as economic growth. Although the Lao PDR has experienced economic crisis in 1997-1999, Lao PDR's economic growth rate has remained at an average growth rate of 6.7% from 1990 to 2000, up from 7.2% since 2000 to present. In addition, inflation and exchange rates are still very low and controllable, which is generally lower than the economic growth rates shown in the Figure 1. Lao PDR was one of the countries affected by the financial crisis during 1997-1999 which resulted in the rapid growth of M2 and inflation over 100% during this period; While the rate of economic growth has continued to grow steadily since 1997. It has been shown that Lao PDR is affected by an economy that is generally smaller than other countries, which can be explained by several factors: (1). The reason that Lao PDR's economy is affected less than other countries is because the Lao PDR is in the early stages of opening a country where the economic and commercial background has not been fully opened compared to other surrounding countries. (2). The dependence on external sources of finance in the Lao PDR is still low compared to the surrounding countries. (3). Business lending loans to the business sector also have a high level of non-performing loans, on average <10% of gross domestic product. (4). Lao PDR. At that time, there was no stock market which was an important channel which made the migration of funds easily to negative effect on domestic investment and economic growth.

4. DATA AND METHODOLOGY

This study of the effect of monetary policy on economic growth of Lao PDR will use quarterly data from the first quarter of 1995 to the fourth quarter of 2018 (totally 96 quarters). The data was obtained from a variety of sources such as the International Monetary Fund (IMF), the World Bank and the Bank of Lao PDR. The reasons of selecting data during the period to be used in the study due to (1) Since the year 1995 the economy of Laos are eliminated from the Pattern of center-planning economy to market-oriented economy and finance sector has clearly separated between central banks and commercial bank, and another reason to choose during the period due to the a viability of the data

According to a review of the literatures and theories relating to the transmission mechanism of monetary policy show that monetary policy plays an important role in boosting economic growth and economic stability in many countries. King and Levine (1993), Sylvie (2015) is based on the assumption of Keynesian IS-LM function and therefore, the specific model can be formulated as below:

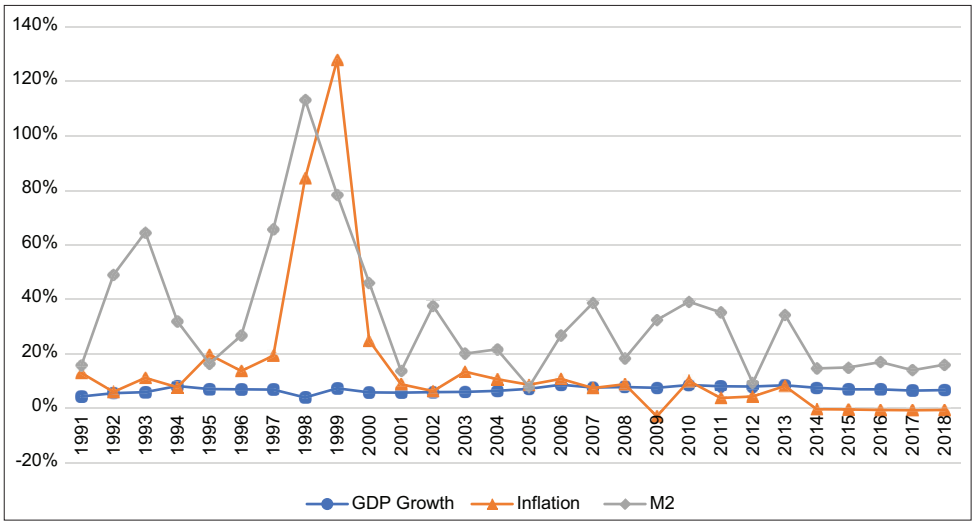
$$GDP=f(M2,IRL,Credit,CPI) \quad (1)$$

Where *GDP*: Gross domestic product is a real economic growth variable that reflects the impact of monetary policy on the economy, *M2* is money supply growth, *IRL* is a loan interest rate, Credit is total credit to the economic sector growth, and *CPI* is inflation rate. The study use s Vector Autoregressive Model (VAR) which widely used to analysis the impact of monetary policy in several studies including Mishkin (1995), Vo and Nguyen (2017) and Disyatat and Vongsinsirikul (2003). The model can be written as below:

$$By_t = \Gamma_0 + \sum_{i=1}^{p} \Gamma_i y_{t-1} + u_t$$

Where y_t: is the vector of Endogenous variables, size n × 1
$y_t=(M2,IRL,Credit,CPI,GDP)$
B: Is coefficient matrix of Endogenous variables at the time y_t with n × n where the value above diagonal is equal to 1
Γ_0: Is the vector sizes n × 1
Γ_i: Is coefficient matrix of Endogenous variables at the time y_{t-i}, size n × n
u_i: Is the vector of Disturbance Term, white noise size n × 1

Figure 1: Economic growth, Money supply and Inflation in Lao PDR



Source: WDI, and Bank of Lao PDR.

Such VAR models cannot be used in the form of Ordinary Least Square (OLS) because the endogenous contemporaneous effects allow the coefficients to be correlated with the disturbance term in the equation. Therefore, estimating the value with the least two forces will make the estimated relationship values less clear and wrong. Therefore, it is necessary to convert the initial VAR model to reduced form by multiplying and to be able to rewrite it as follows:

$$y_t = A_0 + \sum_{i=1}^{p} A_i y_{t-1} + e_t$$

Where: $A_0 = B^{-1}\Gamma_0$

$$A_i = B^{-1}\Gamma_i$$

$$e_t = B^{-1}u_t$$

Which, A_i is similar with $A_i(L)$, as lag value of other endogenous variables.

5. RESULTS AND DISCUSSIONS

5.1. Unit Root Test Results

Analysis using time series data generally require a Unit Root Test to obtain an approximation of the mean and standard deviation of time (Unit Root). Therefore, in this study has now tested the data availability by using Augment -Dickey-Fuller (ADF) (Dickey and Fuller, 1979) method to ensure that the data used in the model analysis are stationary at the level I (0) that is suitable for VAR model. Data testing results are presented in Table 1.

This test is to find an optimum Lag to be used in the model which shown in Table 2. Test results show that the appropriate Lag to use in analyzing the effect of monetary policy on economic growth of Lao PDR using models VAR is only 2 because statistical tests LR, FPE and AIC illustrates the importance of statistical matching Lag = 2. So, 2 is appropriate to be used in the analysis.

5.2. Impulse Response Function Analysis Results

The impacts or shocks to monetary policy using the Impulse Response Function are the effects of the central bank adopting an expansionary monetary policy by increasing money supply in the economy. The size of shocks are measured by the standard deviation of the corresponding orthogonal error obtained from VAR model.

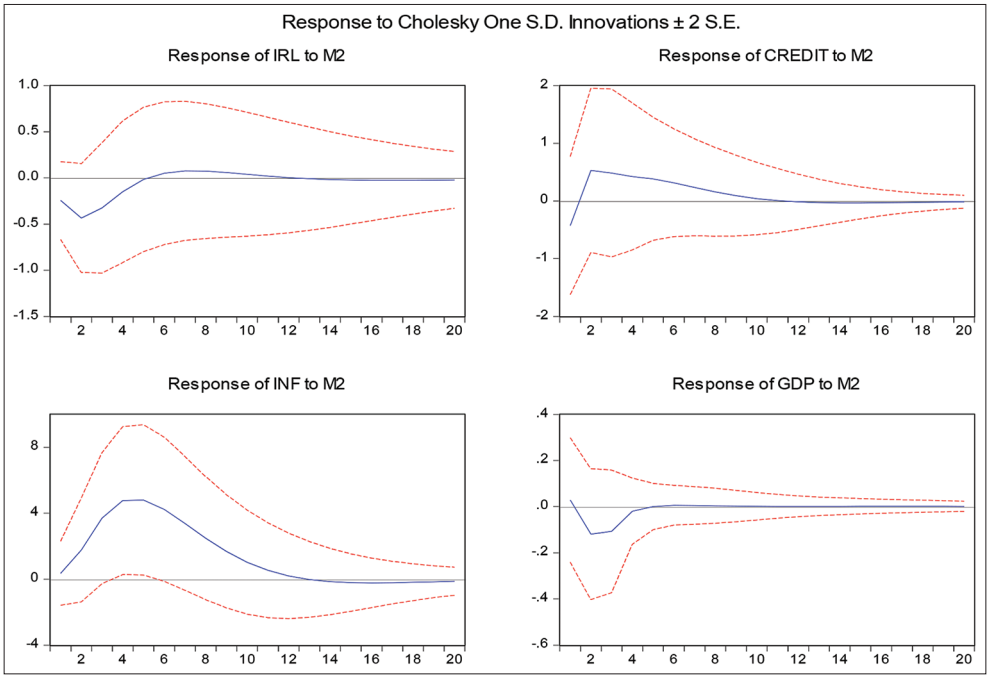
5.2.1. Impulse response of IRL, Credit, CPI and GDP to M2

As shown in Figure 2, a positive shock of money supply or an expansionary monetary policy leads to declining on and loan interest rates (IRL), increasing on aggregate credit, and inflation rate(CPI) almost immediately. Interest rate decrease response to expansionary monetary policy shock from the beginning period and become to the origin at the fifth quarter. While inflation and credit to the private sector response positively to the shock of expansionary monetary policy for a longer period and become to the origin at quarter 12. However, response of GDP was negatively to the expansionary monetary policy in the short run. It confirms that when the central bank increase money supply, it only cause the price level to increase, suggesting a demand driven inflationary, but does not increase on the real GDP in Lao PDR.

5.2.2. Impulse response of Credit, CPI, GDP and M2 to IRL

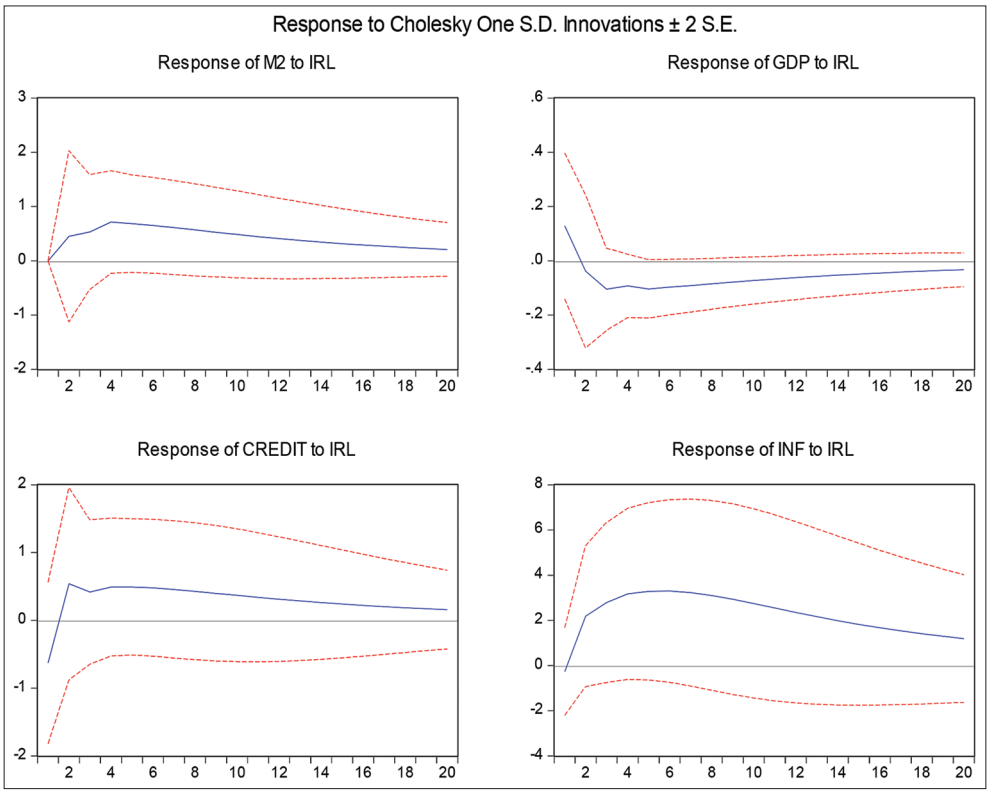
A positive shock to interest rate (IRL) is interpreted as tightening of Lao PDR monetary policy. Figure 3 shows the impact of Lao monetary policy shock on domestic variables namely aggregate credit, inflation rate and economic growth. The results illustrates that the contractionary monetary policy seem to have dampening effect economic growth in Laos resulting in the reduction of domestic interest rate. Economic growth (GDP) tends to decline is negatively response to interest rate (IRD) shock. It shows that when the central bank to use a contractionary monetary policy by

Figure 2: Impulse response of IRL, Credit, CPI and GDP to M2



Source: Calculated by author.

Figure 3: Impulse response of Credit, CPI, GDP and M2 to IRL



Source: Author's caculation.

decreasing money supply will leads to increase on interest rate in the economy. An increasing of interest rate increase cost of investment, cost of transaction, and therefore leads to decrease on economic growth GDP after the third quarter. However, a positive shock of interest rate on price and inflation tends to move in the same direction as it is increasing since the initiative period through

Table 1: Unit root test results and Lag selection

Variables	Level		First Different	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
GDP	−7.823*** [0]	−8.766*** [0]	−8.210 *** [2]	−8.229*** [2]
M2	−5.608*** [0]	−5.939*** [0]	−6.6145 *** [5]	−6.5734 *** [5]
Credit	−4.4135*** [0]	−4.555*** [3]	−8.9866 *** [1]	−8.991*** [5]
CPI	−2.934** [1]	−3.432** [1]	−6.636949*** [0]	−7.126907*** [0]
IRL	−0.836325 [1]	−4.0632*** [0]	−7.172486*** [3]	−7.126907*** [3]

Source: Calculated by author. ***Significant level at 1%, **Significant level at 5%. The Value in [ ] is lag length

Table 2: Lag selections

Lag	LogL	LR	FPE	AIC
0	−6.4734	NA	9.04E-07	0.273176
1	782.5892	1465.402	1.14E-14	−17.91879
2	851.4059	119.6100*	4.03e-15*	−18.96205*
3	866.8266	24.96676	5.15E-15	−18.73397
4	876.1991	14.0587	7.70E-15	−18.36188

Source: Calculated by author

Table 3: Variance decomposition analysis

Variance Decomposition of M2						
Period	S.E.	M2	IRL	CREDIT	CPI	GDP
1	7.100684	100	0	0	0	0
2	7.780758	96.75107	0.339651	0.504232	2.118454	0.286588
3	7.985674	93.19552	0.764615	2.244601	3.495369	0.299897
4	8.150364	90.06719	1.503332	4.154968	3.965552	0.308962
5	8.269202	87.85096	2.14418	5.566713	4.123806	0.314344
6	8.35179	86.30423	2.711051	6.518942	4.149572	0.316203
7	8.409202	85.20831	3.201433	7.14416	4.13101	0.315082
8	8.449313	84.4279	3.624254	7.530173	4.10449	0.313182
9	8.477724	83.86879	3.985446	7.752674	4.081641	0.31145
10	8.49828	83.46382	4.29213	7.86955	4.064369	0.310134
11	8.513575	83.16465	4.551231	7.922893	4.052001	0.309224
12	8.525331	82.93718	4.769431	7.940992	4.043688	0.308708
13	8.534672	82.75826	4.952867	7.94144	4.038826	0.308603
14	8.542313	82.61286	5.107015	7.934291	4.036916	0.30892
15	8.548706	82.49154	5.236629	7.924768	4.037423	0.309636
16	8.554135	82.38854	5.345759	7.915277	4.039749	0.310679
17	8.558784	82.30022	5.437804	7.906739	4.043283	0.311953
18	8.562779	82.22422	5.515588	7.899369	4.047477	0.313351
19	8.566213	82.15879	5.581443	7.893101	4.051887	0.314778
20	8.569162	82.10256	5.637293	7.887785	4.056197	0.31616
Variance Decomposition of GDP						
Period	S.E.	M2	IRL	CREDIT	INF	GDP
1	1.997064	0.052056	1.022144	1.188181	0.018416	97.7192
2	2.748631	0.895766	1.068238	3.53412	0.256164	94.24571
3	3.357739	1.541326	1.680929	3.522282	0.253398	93.00207
4	3.825747	1.554494	2.162937	3.515425	0.28261	92.48453
5	4.197732	1.543801	2.763934	3.494976	0.328003	91.86929
6	4.49318	1.536376	3.28122	3.478365	0.387467	91.31657
7	4.729112	1.52937	3.737097	3.460642	0.447534	90.82536
8	4.918436	1.52284	4.124025	3.44475	0.503289	90.4051
9	5.071523	1.51694	4.453471	3.43086	0.551736	90.04699
10	5.196341	1.511819	4.733106	3.41899	0.592521	89.74356
11	5.298952	1.507451	4.97067	3.40891	0.626251	89.48672
12	5.383936	1.503759	5.172507	3.400375	0.653972	89.26939
13	5.454773	1.500654	5.344033	3.393152	0.676764	89.0854
14	5.514132	1.498052	5.489812	3.38704	0.695594	88.9295
15	5.564086	1.495875	5.613715	3.381868	0.711255	88.79729
16	5.606266	1.494052	5.719031	3.377492	0.724374	88.68505
17	5.641974	1.492524	5.808553	3.373789	0.735436	88.5897
18	5.672258	1.49124	5.88466	3.370656	0.744816	88.50863
19	5.697977	1.490157	5.949369	3.368006	0.752803	88.43966
20	5.719838	1.489241	6.004399	3.365762	0.759623	88.38098

(Contd...)

Table 3: (*Continued*)

Variance Decomposition of GCREDIT						
Period	**S.E.**	**GM2**	**IRL**	**GCREDIT**	**INF**	**GGDP**
1	5.649425	0.567633	1.24321	98.18916	0	0
2	6.568745	1.072555	1.596467	96.74077	0.021696	0.568517
3	7.035374	1.40649	1.745883	95.91446	0.328819	0.604344
4	7.321948	1.632399	2.059346	95.15818	0.549506	0.600568
5	7.503222	1.815263	2.390831	94.54785	0.663031	0.583023
6	7.619127	1.932354	2.712522	94.08165	0.704481	0.568994
7	7.69381	1.988609	3.009621	93.73017	0.711931	0.559669
8	7.742165	2.005314	3.276913	93.45558	0.708328	0.553868
9	7.773667	2.003048	3.512599	93.23061	0.703429	0.550312
10	7.794431	1.995196	3.717213	93.0398	0.699753	0.548042
11	7.808396	1.988122	3.892775	92.87539	0.697268	0.546446
12	7.818082	1.983643	4.042127	92.73338	0.695633	0.545213
13	7.825076	1.981441	4.168453	92.61106	0.694804	0.544243
14	7.830361	1.980603	4.274938	92.50599	0.694921	0.543547
15	7.834532	1.980337	4.364561	92.41585	0.696095	0.543153
16	7.837944	1.980166	4.439986	92.3385	0.698285	0.543066
17	7.840807	1.979889	4.503522	92.27203	0.701301	0.543252
18	7.843245	1.979468	4.557127	92.21488	0.704867	0.543654
19	7.845337	1.978942	4.602435	92.16573	0.708692	0.5442
20	7.847136	1.978368	4.640801	92.12348	0.712524	0.544823
Variance Decomposition of INF						
Period	**S.E.**	**GM2**	**IRL**	**GCREDIT**	**INF**	**GGDP**
1	9.16424	0.147654	0.088703	0.190362	99.57328	0
2	14.73288	1.495152	2.225414	0.182341	95.21293	0.88416
3	18.88165	4.745568	3.528415	0.851579	88.96653	1.907906
4	21.85719	8.29474	4.738736	1.813574	82.42374	2.729207
5	23.90042	10.98224	5.850225	3.14858	76.82606	3.1929
6	25.2664	12.63043	6.936964	4.689591	72.35469	3.388329
7	26.17419	13.43594	7.982292	6.221221	68.93632	3.424226
8	26.78352	13.69263	8.960746	7.552317	66.40705	3.387252
9	27.20003	13.65885	9.850234	8.580973	64.58084	3.329107
10	27.49051	13.51159	10.63982	9.293825	63.28064	3.274128
11	27.69703	13.34838	11.32809	9.73691	62.35659	3.230031
12	27.84684	13.20999	11.92004	9.980289	61.69285	3.19682
13	27.95808	13.10517	12.42411	10.09248	61.20612	3.172127
14	28.04303	13.02881	12.85022	10.12775	60.83962	3.153598
15	28.10991	12.97248	13.20859	10.1233	60.55607	3.139555
16	28.16416	12.92895	13.50904	10.10172	60.33137	3.128927
17	28.20927	12.89336	13.7606	10.07514	60.14989	3.121002
18	28.24744	12.86299	13.97126	10.04926	60.00125	3.115238
19	28.28007	12.83645	14.14793	10.02619	59.87826	3.111171
20	28.30811	12.81308	14.29641	10.00636	59.77575	3.108391

Source: Calculated by author

out the horizontal. This results show that there is a price puzzle in explaining the effect of monetary policy in Lao PDR[1].

5.3. Variance Decomposition Analysis of GDP

This part of the study will use the Variance Decomposition method to analyze how endogenous variables volatility of economic growth (GDP), inflation (CPI), aggregate credit (Credit), and money supply (M2), These variables are not only determined by variables in the equation system but are also determined by other related economic variables. Therefore, it is assumed that other variables are outside the equations.

The results using the Variance Decomposition method are presented in Tables 3, which shows the volatility in the economic growth (GDP) and Other variables. It shows that in the first quarter, real income fluctuations are 100% influenced by itself, but over time, real income will have a slightly effect on itself as other variables gradually take on an increasing role. Particularly in quarter 15, real national income determines its volatility by 88%, while the variable defining the real national income (GDP) is an aggregate credit of the economy, and secondary to the interest rate, which accounts for 3% and 6% respectively. In other variables such as volume (M2), inflation (CPI) is relatively small at 0.5% and 0.3% respectively.

6. CONCLUSION AND RECOMMENDATION

The empirical analysis of this study examines the dynamic effect of monetary policy and economic growth of Lao PDR. Overall, the study of the effect of the monetary policy in Lao PDR has not received much attention. Recent studies have also described the general relationship and does not fit the type of information that

1 A price puzzle is prevalent in empirical finding in the monetary literature

makes it impossible to clearly understand the dynamic mechanism of the monetary policy. In my study uses Vector Autoregressive Model (VAR) and quarterly data from the first quarter of 1995 to the last quarter of 2018 with macroeconomic variables including economic growth, inflation rate, aggregate economic sector, money supply and the interest rate. These variables was used to check for stationarity by using Augment Dickey-Fuller (ADF) Unit root test approach. The unit root test results shows that all variables are stationary at the level I(0) with a confidence level of 99%. The empirical results show a notable effect of monetary policy on economic growth in the Lao economy. An expansionary monetary leads to lower on interest rate, and increase aggregate credit and prices in the economy. However, economic growth is found to be negative in responding to expansionary monetary policy. The results are in line with the ideas and theories of many economists who have described the neutral functions of money, such as the quantitative theory of Classical economists (Friedman, 1968) C. A. Sims, 1986) and some empirical study (Boschen and Mills, 1995; Sylvie, 2015).

According to the result of study, (1) Policy maker needs to be carefully considered in conducting monetary policy in stimulating economic growth, because increase of money supply cause only in inflation, (2) Non-performing loan or NPL is still a main problem which hiding the effect of credit channel to the real economic sectors. Therefore, induce NPL is always a good choice to increase efficiency of monetary policy in Lao PDR.

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