Transmission of Monetary Policy to Bank Lending Rate in Indonesia

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Abstract. This study aims to find out how quickly Indonesian lending rates react to shifts in policy interest rates. The level of transmission is estimated using VECM, while the time-varying speed of adjustment is estimated using MAL. The findings show the same incomplete pass-through for working capital loans and investment rates in long-term and short-term. Working capital and investment rates takes quite a slow time in responding to policy interest rates change. This study tests empirically the existence of asymmetrical behavior of lending interest rate adjustment in Indonesia. These findings are important for policymakers to know how long the credit rate response to monetary policy is.

Keywords: Policy Rate, Lending rate, incomplete pass-through, adjustment

1 Introduction

The Central Bank will take certain policies to achieve economic goals, which is called monetary policy (Mishkin, 2009). When monetary policy is implemented, the policy interest rate (BI Rate) is used by the ITF as a monetary policy signal, and the Inflation Targeting Framework becomes a monetary policy target [1]. One way that Indonesia transmits policy is through the interest rate channel. The Central Bank uses policy rates to alter interbank money market rates, which in turn have an impact on bank interest rates and economic expansion [2]. The economy can benefit from monetary policy if the transmission mechanism is functioning well. Other interest rate changes must wait a certain amount of time after monetary policy is transmitted [3] .

For effective monetary policy operations, any change in the policy rate should be followed by complete and symmetric adjustment [4]. But some findings found incomplete and asymmetric pass-through [5][6]. In banking interest rates, there is asymmetric adjustment behavior where lending rates rise faster than deposit rates when policy rates rise. Meanwhile, when policy rates fall, deposit rates tend to fall faster than lending rates [7]. Lending rates seem more rigid than deposit rates [8]. According to [9], the financial system, including the level of financial market growth, the existence of impediments to competition, and the ownership structure of the bank sector, is related to the rigidity of lending rates, which is significant in comparison to money market rates.

Several studies examined asymmetric adjustment in lending rates in various countries such as the UK, US, Europe, and Hong Kong[10], [11]. Mishra *et al.*, [12] also discovered how lending rates in different countries responded to monetary policy. Compared to different countries, low-

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income countries with less established financial infrastructure have a substantially poorer transmission of monetary policy shocks to bank lending rates.

As an alternative to the previous description, this article measures the speed at which changes in retail interest rates, particularly lending rates, occur in reaction to changes in monetary policy rates in Indonesia. The data used are lending rates and policy rates taken on a monthly basis from January 2012 to July 2016. When the data is prepared, the long-run transmission is determined using cointegration, and the short-run transmission is determined using the Vector Error Correction Model approach. Finally, we use Mean Adjusted Lag (MAL) to determine how quickly the lending rate adjusts to shifts in the policy rate.

Literature Review

One of the key foundations for economic policy is the transmission mechanism for monetary policy. The central bank's monetary policy decisions have an impact on a range of financial and economic operations and ultimately help the organization reach its objective [1]. In the interest rate channel method used for transmitting monetary policy, the policy rate will affect short-term interest rates (SBI and PUAB), which will then affect credit and savings rates. The demand for investments and consumption will therefore be impacted, leading to inflation and overall demand [13].

The level of interest rate transmission can be seen in two parts, namely long-term and short-term pass-through. An interest rate channel with a high percentage of long-term pass-through is seen to be more effective and should ought to be close to one or complete. In contrast, incomplete pass- through on bank products frequently exhibits short-term pass-through [14]. Because of unequal adjustment events, interest rate pass-through is frequently inflexible. Neumark & Sharpe [15] and Hannan & Berger [16] identify two main causes of asymmetry issues, including collusive pricing and unfavorable customer responses. Rigidity in raising deposit rates and lowering lending rates is implied by collusive pricing. On the other hand, negative consumer responses suggest that loan rates will remain high and deposit rates will remain low. A policy rate reduction or loose monetary policy takes longer to work than a policy rate raise or tight monetary policy because transmission is unequal [13].

Previous studies have found different pass-through results across countries. Hefferman (1997) observed how lending rates changed in response to shifts in the UK's central bank base rate. The result is that the adjustment process is highly variable, characterized by imperfect competition. While in Germany, Weth [17] analyzed the relationship between bank lending rates and money market interest rates. The speed of adjustment was influenced by factors such as the size of the credit institution, financing conditions, and the size of the firm's business with non-bank firms. Lending rates are less flexible than deposit rates when it comes to reacting to short-term shifts in policy rates. A growing literature in recent years suggests that pass-through may be incomplete, asymmetric, and slow-moving[3], [18].

2 Method

The research data used are policy interest rates, namely BIRATE and lending rates consisting of working capital, investment, and consumption loans. The data is taken monthly from January 2012 to July 2016 and obtained from the Indonesian Financial Economic Statistics (SEKI)

module released through the Bank Indonesia website every month. SEKI itself has been adjusted to the standardization of international methodology so that it can be compared with other countries.

This study measures transmission lending rates in the long term and short term. In order to look into how the policy rate and lending rate relate to each other over the long run, we adopt the rationale of Rouseas (1985) defining price fixing (interest rate), and perform regression with the following equation:

$$LR_t = \gamma + \alpha_1 BIRATE_t + \varepsilon_t$$

Where LR present lending rate, γ is the bank profit margin assuming constant, α_1 is the level transmission in the long term, the policy rate is BIRATE, and the error term is ε_t. When $\alpha_1 \geq 1$ is called a complete transmission, and $\alpha_1 < 1$ is called an incomplete transmission

Second, to examine the short-term analysis between the changing of lending rates when the policy rate changes, an error correction model (ECM) is used. Previous studies also used the same method such as Velickovski (2010), and Nyangu *et al.*[19]. Often the loan interest rate and policy interest rate result in nonstationary, if equation (1) is regressed called cointegration by Engle and Grangers [20], then the regression is spurious. ECM is used to eliminate the spurious regression. This is carried out following the execution of the unit root test, and if the lending rate and policy rate variables only indicate cointegration. ECM equation is as follows

$\Delta LR_t = \gamma + \alpha_0 BIRATE_t + \alpha_2(LR_{t-1} - \gamma - \alpha_1 BIRATE_{t-1}) + \varepsilon_t$

Where Δ denoted as the first difference, α_0 is the level of transmission in the short term, when the banking interest rate deviates from long-term equilibrium, the coefficient of the error correction term (α_2) indicates how quickly things return to normal. component ($LR_{t-1} - \gamma - \alpha_1 BIRATE_{t-1}$) as error correction term ε_{t-1}

The mean adjusted lag, or MAL, measures how rapidly lending rates adjust to shifts in policy interest rates. Hendry [21] defines MAL as follows:

$$MAL = \frac{\alpha_0 - 1}{\alpha_1 \times \alpha_2}$$

The result of a high MAL value suggest that the lending rate is being adjusted slowly or rigidity, whereas when the result of a low MAL value indicates that the rate is being adjusted quickly.

3 Results and Discussion

The fluctuating pattern of the benchmark interest rate (BIRATE) and lending rates for loans for consumption, working capital, and investment is shown in Figure 1. Initial observations show a similar movement pattern between policy rates and bank loans. However, the consumption interest rate shows a slightly different movement pattern from the policy rate. This may be due to the elasticity of demand for consumption loans, which is different from working capital and investment loans.

Descriptive statistics for lending rates are shown in Table 1. The rates charged on bank loans and policy rates are significantly different. This can be seen in the mean value of each credit, the lowest investment credit is followed by working capital credit and the highest mean consumption credit. The lowest standard deviation value is held by investment loans then consumption loans and the highest is working capital loans. This indicates that the volatility of

investment loans is relatively more rigid than other loans. These three types of loans also appear to have standard deviations below the policy rate (BIRATE).

Table 2 provides a summary of the stationarity or unit root test results. To ascertain stationary and integration levels, the unit root test employs PP Test and KPSS Test. All variables are stationary at the first difference I(1), according to the unit root test results, but not at the level. The results of choosing the ideal lag duration for every bank lending rate are shown in Table 3. LR, FPE, AIC, SC, and HQ are the best criterion for calculating lag.

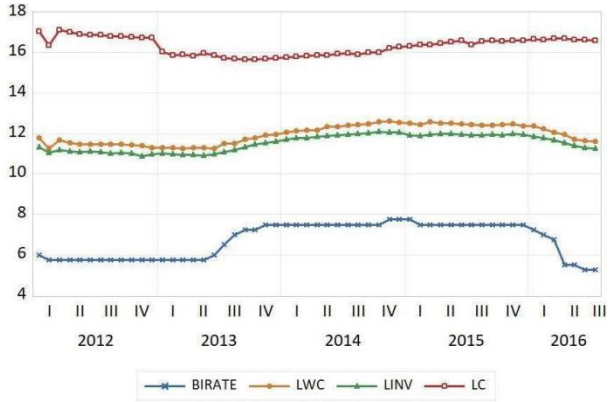

Figure 1. Policy Rate and Lending Rate

Table 1.
Descriptive Statistic

	Mean	**Median**	**Max**	**Min**	**Std. Dev**
BIRATE	6,73	7,25	7,75	5,25	0,88
LWC	11,95	11,96	12,61	11,24	0,47
LINV	11,53	11,62	12,09	10,88	0,41
LC	16,32	16,40	17,10	15,67	0,43

Table 2.
Unit Root Test

	PP Test Level 1st difference		**KPSS Test Level 1st difference**	
BIRATE	0,75	0,00	0,43	0,38
LWC	0,72	0,00	0,55	0,27
LINV	0,72	0,00	0,56	0,28
LC	0,33	0,00	0,20	0,26

Table 3.
Lag Selected

	LR	FPE	AIC	SC	HQ	Lag Selected
LWC	17,48*	0*	-3,21*	-2,82*	-3,06*	3
LINV	12,41*	0*	-3,46*	-3,08*	-3,32*	2
LC	227,137*	0*	-1,56*	-1,33*	-1,48*	1

Table 4.
Johansen Cointegration Hypothesis

	λtrace	λmax
H0	Cointegration Equation ≤ r	
	Cointegration Equation= r H1	
	Cointegration Equation > r	
	Cointegration Equation = r+1	

Table 5.
Combination Trace Statistic and Max- Eigen Statistic

	λtrace	λmax
No CE/None	Reject *H*0	
		Reject *H*0
At Least 1 CE	Accept *H*0	
		Accept *H*0

To determine if policy rate and credit have a long-term connection, the cointegration test is applied. Johansen cointegration test is conducted in this paper with the hypothesis as per Table 4. To obtain robust results, the cointegration test results should be in Table 5.
The findings of the Johansen cointegration test with the optimal lag previously chosen (in Table 3) between the policy rate and lending rate are shown in Table 7. Table 7 shows that the policy rate and the loan rate for consumption do not cointegrate. Meanwhile, there is cointegration between policy rate and working capital and investment lending rates thus the next step can be done, which is to estimate the error correction model with the specifications in Table 8.

Table 7.
Johansen Cointegration Test Result

λtrace	λ^{trace} (*None*)	(At Least 1 CE)	λ^{max} (*None*)	λmax (At Least 1 CE)

Variable	Assumption				
LWC					
		1. Accept	Accept	Accept	Accept
		2. Reject	Accept	Reject	Accept
		3. Reject	Accept	Reject	Accept
		4. Reject	Accept	Reject	Accept
		5. Reject	Accept	Reject	Accept
LINV					
		1. Accept	Accept	Accept	Accept
		2. Reject	Accept	Reject	Accept
		3. Reject	Accept	Reject	Accept
		4. Reject	Accept	Reject	Accept
		5. Reject	Accept	Reject	Accept

Table 8.
Specification for error-correction model estimation

Dependent Variable	Independent Variable	Lag	Assumption
LWC	BIRATE	3	2
LWC	BIRATE	3	3
LWC	BIRATE	3	4
LWC	BIRATE	3	5
LINV	BIRATE	2	2
LINV	BIRATE	2	3

Having established that long-term cointegration exists, Table 9 displays the calculated coefficients of the long-term relationship between the lending rate and the policy rate. $\alpha 1 < 1$ indicates rigidity or slowness in interest rate transmission or incomplete. The results show that all bank lending rates—consumption, investment, and working capital—are not fully passed through over the long run and react less to changes in policy rates. The degree of long-term pass-through from policy rates to working capital lending rates is higher than investment lending rates. This indicates that the rates on investment loans are less flexible and more fixed in relation to shifts in policy rates. This suggests that lending rates are not essentially impacted by monetary policy. This conclusion is consistent with the findings of Liu et al. (2018) and Hamzah & Handri (2017), who discovered partial pass-through outcomes in the Chinese and Indonesian markets.
Table 9 displays the findings of the estimation of the short-term coefficients $\alpha 0$ between policy interest rates and bank lending rates using VECM. All of short-term lending rate transmission coefficients are significant and incomplete transmission in adjusting for shifts in the policy rate. Compared to investment interest rates, working capital interest rates are more restrictive. This could be due to the higher elasticity or demand for working capital loans. Bank lending rates are not responding well to shifts in policy rates.
The speed of transmission interest rate channel can be measured using MAL with the help of coefficients $\alpha 0$, $\alpha 1$, and $\alpha 2$ based on Equation ECM. Estimated coefficient value $\alpha 2$ (error correction term) is defined as the percentage of the mean reverting process when the deviation occurs in one period from the long-term equilibrium also known as the speed of adjustment [22]. If the value is positive, the system is moving away from equilibrium; conversely, negative and significant values point to a correction towards long-term equilibrium.

Table 9.
Lending Rate Dependent Variable

	Dependent Variable		Lah Assumtion Variable	Long Term α_1		Short Term α_0	ECT α_2	
Pass-Through	LWCBIRATE		3	2	0,64*	0,15*	0,15*	5
	LWC		3	3	0,64*	0,15*	0,15*	5
	LWC	3	4	0,75*	0,16*	0,16*	4	
	LWC	3	5	0,75*	0,16*	0,16*	4	
	LINV	2	2	0,57*	0,13*	0,13*	7	
	LINV	2	3	0,57*	0,13*	0,13*	7	

The Mean Adjusted Lag (MAL) measures the number of months that the lending rate will take to respond to changes in the policy rate. A high MAL number denotes either great stiffness or a slow rate of adjustment. According to the findings, investment loan rates react to shifts in policy rates more slowly—roughly seven months. The average reaction time of working capital rates to shifts in policy rates is about 4-5 months. According to Sander and Kleimeier [23], Hofmann and Mizen [24], and de Bondt [25], lending rates respond slowly to changes in policy rates. These findings are consistent with their observations.

This paper is limited to covering the transmission of monetary policy on lending rates, while other interest rates such as deposits have not been discussed. In addition, the data period can still be longer and more recent. Recommendations that I can propose for monetary policy makers can further consider the transmission of monetary policy through the level of pass-through and the speed when bank rate adjustments react to fluctuation in policy rates. Meanwhile in future, academics can enrich insights into monetary policy transmission by adding observation data, using other methods besides VECM, adding determinant factors that can affect monetary policy transmission.

4. Conclusion

This paper explains the transmission of monetary policy that will affect Indonesian lending rates in Indonesia. Three primary problems have guided our study of the level transmission from policy rates to lending rates: long-run, short-run, and speed of lending rate adjustment in response to policy rate changes.

The results based on the estimated vector error correction model for lending rates found significant pass-through in the long-run, but incomplete transmission in working capital and investment lending rates. This suggest that lending rates are not directly affected by monetary policy. Both the working capital and investment lending rates showed a considerable pass-through in the short- term analysis. However, the working capital lending rate has a larger demand elasticity than the investment lending rate. Additionally, different results are obtained when estimating the lending rate adjustment time in response to changes in policy rates. The response time of lending rates is influenced by policy rate fluctuations; working capital lending

rates require an average of 4-5 months to respond, while investment lending rates require a longer period of time—roughly 7 months.
Variations in banking products, especially credit, have different pass-through results and transmission times for monetary policy. Shifts in policy rates are less responsive and have less of an effect on bank lending rates. Additionally, it takes longer for monetary policies to be transmitted or it has less of an impact on bank lending rates.

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References

[1] F. Warjiyo, "Mekanisme Transmisi Kebijakan Moneter di Indonesia," Bank Indones. Seri Kebanksentralan, no. 11.

[2] L. X. Li, D. K. Si, and X. Ge, "China's interest rate pass-through after the interest rate liberalization: Evidence from a nonlinear autoregressive distributed lag model," Int. Rev. Econ. Financ., vol. 73, pp. 257–274.

[3] B. S. Chong, M. H. Liu, and K. Shrestha, "Monetary transmission via the administered interest rate channel," J. Bank. Financ., vol. 30, pp. 1467–1484.

[4] N. Apergis and A. Cooray, "Asymmetric Interest Rate Pass-Through In The US, The UK and Australia: New Evidence From Selected Individual Banks," J. Macroecon., vol. 45, pp. 155–172.

[5] M. N. Gigineishvili and F. Kacaribu, "Determinants of Interest Rate Pass-through: Do Macroeconomic Handayani, F.A."

[6] A. Binning, H. C. Bjornland, and J. Maih, "Is Monetary Policy Always Effective?"

[7] G. Bondt, B. Mojon, and N. Valla, "Term Structure and the Sluggishness of Retail Bank Interest Rates in Euro Area Countries," Work. Pap., vol. 518.

[8] F. Handayani, F.A. Kacaribu, "Asymmetric transmission of monetary policy to interest rates: empirical evidence from Indonesia. Bulletin of Monetary Economics and Banking," Bull. Monet. Econ. Bank., vol. 24, no. 1, pp. 119 – 150, 2021.

[9] C. Cottarelli and A. Kourelis, "Financial structure, bank lending rates, and the transmission mechanism of monetary policy," IMF Staff Pap., vol. 41, pp. 587–623.

[10] R. Becker, D. R. Osborn, and D. Yildirim, "A threshold cointegration analysis of interest rate pass-through to UK mortgage rates," Econ. Model., vol. 29, no. 6, pp. 2504–2513.

[11] B. Yu, S. E. Chun, and J. Kim, “Some evidence on the asymmetry of interest rate pass-through in Asian economies,” Korea World Econ., vol. 14, no. 2, pp. 207–233.

[12] P. Mishra, P. Montiel, P. Pedroni, and A. Spilimbergo, “Monetary policy and bank lending rates in low-income countries: heterogeneous panel estimates,” J. Dev. Econ, vol. 111, pp. 117–131.

[13] K. Liu, Mishkin, and F. S, “Chinese shadow banking: the case of trust fund,” J. Econ. Issues.

[14] H. I. Aydin, “Interest Rate Pass-Through in Turkey,” Cent. bank Repub. Turkey Work. Pap., no. 0705.

[15] D. Neumark and S. Sharpe, “Market structure and the nature of price rigidity,” Q. J. Econ., vol. 107, pp. 657–680.

[16] T. H. Hannan and A. N. Berger, “The rigidity of prices: evidence from the banking industry.”

[17] M. A. Weth, “The Pass-Through from Market Interest Rates to Bank Lending Rates in Germany (March,” Dtsch. Bundesbank Econ. Res. Cent. Discuss. Pap., no. 11/02, [Online]. Available: https://ssrn.com/abstract=320112

[18] V. A, Belke j, beckmann f, “Interest rate pass-through in the EMU–New Bennouna.”

[19] N. M. Nyangu, F. W. Waweru, and N. Marwa, “Symmetric and asymmetric adjustment of bank deposit interest rates: empirical evidence from Kenya,” Int. J. Emerg. Mark., doi: 10.1108/IJOEM-03-2020-0289.

[20] R. F. Engle and C. W. J. Granger, “Co-Integration and Error Correction: Representation, Estimation, and Testing,” Econometrica, vol. 55, no. 2, pp. 251–276.

[21] D. Hendry, Dynamic Econometrics. Oxford University Press.

[22] B. Wibowo and E. Lazuardi, “Empirical Evidence of Monetary Policy Transmission Mechanism: Indonesia Banking Sector Interest Rate Passthrough,” J. Ekon. dan Pembang. Indones., vol. 16, pp. 187–204.

[23] H. Sander and S. Kleimeier, “Asymmetric adjustment of commercial bank interest rates in the euro area: an empirical investigation into interest rate pass-through,” Kredit und Kap., vol. 35, no. 2, pp. 161–192.

[24] B. Hofmann and P. Mizen, “Interest Rate Pass-Through and Monetary Transmission: Evidence from Individual Financial Institutions Retail Rates,” Economica, vol. 71, no. 281, pp. 99–123.

[25] G. Bondt, “Interest rate pass-through: empirical results for the Euro Area,” Ger. Econ. Rev., vol. 6, pp. 37–78.