Interest Rate Transmission on Indonesia's Monetary Policy Analysis: Case of Banking Interest Rate

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Abstract. Indonesia's economic stability should be achieved by implementing monetary and fiscal policies, for instance, setting the interest rate by Bank Indonesia (BI) as policy rate of central bank, which should be followed by other banking institutions. Unfortunately, this interest rate regulation by BI had not been able to achieve the goal of restoring economic stability since it always had long time lag. This happened because the policy of increasing interest rates had not been followed up spontaneously by other banking institutions. In fact, time lag might cause disadvantages such as long-lasting high inflation, increased poverty, and severe economy vulnerability. This research was conducted to analyze the time lag of the transmission of Bank Indonesia's interest rate monetary policy and the response of banking institutions in Indonesia. The method used in this study was survival analysis. The results indicated that the time lag of monetary policy transmission using the interest rate in Indonesia needed to be improved to double adjustment speed to reach the optimal point. The response of banking institutions could be improved because there was still asymmetry response in all aspects including types of interest rates, allocations, and change direction. Meanwhile, from the aspect of ownership, both state-owned and private-owned banks had shown in line response of time lag performance.

1. Introduction

Bank Indonesia was the central bank in Indonesia which had the authority to maintain macroeconomic stability through monetary policy. Monetary policy must be integrated with fiscal policy and real sector policies to achieve optimal and sustainable economic growth. One thing that could be an option was the implementation of expansionary monetary policy.

Expansionary monetary policy meant encouraging maximum economic growth. An example of the time that is usually used to implement this policy is when a country wants to get out of a recession with the ultimate goal of boosting the economy and reducing unemployment. On the other hand, there is a contractionary monetary policy which is generally used when the economy is overheated so that it is necessary to take the best steps for cooling down, for example, when there is a continuous increase in the economy resulting in too high inflation. Inflation that is too high certainly has an impact on poor economic performance and has the potential to increase poverty.

The instruments used in monetary policy were closely related to the amount and circulation of money, one of which was through interest rate regulation. In determining the magnitude and direction of changes

in interest rates, Bank Indonesia tended to refer to certain inflation targets to achieve the goal of price stability and economic growth. The interest rate set by Bank Indonesia was the policy rate that would be used as a reference by all banking institutions in Indonesia in determining each bank's credit and deposit interest rates.

Before 2016, Bank Indonesia used the BI Rate as the 'standard' interest rate. However, since August 2016, Bank Indonesia had changed it to BI7DRR (BI 7 Day Reverse Repo rate). One of the objectives of changing this instrument was to increase the efficiency and effectiveness of monetary policy transmission to achieve optimal goals. Effective transmission of monetary policy (pass through) was measured from the time lag since the policy was appointed until the impact of its determination occurred on the intended economic variable. Therefore, retails needed to follow policy rate immediately to achieve effectiveness of Monetary Policy Transmission Mechanism. This action was called adjustment. Adjustment needed time to be completed which was duration from policy rate to retails and it called time lag adjustment. The longer the time lag, the greater the loss and negative impact on society. According to Gabe (2002), the degree of pass-through interest rates also measured how responsive banks were in changing their interest rates. Meanwhile, the pass-through response speed of official interest rates to banks was the strength of monetary policy transmission. If the banking response took a long time, it could be predicted that monetary policy transmission would not go well. The impact was that the ultimate goal, which was stable inflation, took longer to achieve.

If inflation lasted for a long time, then actually during that time the community continued to incur additional costs for every economic activity done. For people with low incomes, it was very likely that there would be a shift from a vulnerable society to poor people due to eroded savings. In addition, the negative impact of the time lag was that it took longer to recover after a shock occurred. For example, an ineffective policy required a time lag of around 12 months to dampen a shock, so recovery could only start after 12 months. On the other hand, there were more effective policies that could reduce the shock in just 4 months, so recovery should be able to take place after just 4 months.

Time lag also made the country's economy vulnerable to external shocks such as the Covid-19 pandemic, trade wars, international political tensions, etc., even though BI and the government had anticipated this with the Early Warning System. If the time lag occurred for a long period of time, it would be difficult for the government to overcome the shock. Therefore, time lag was crucial and requires special attention apart from the shock itself.

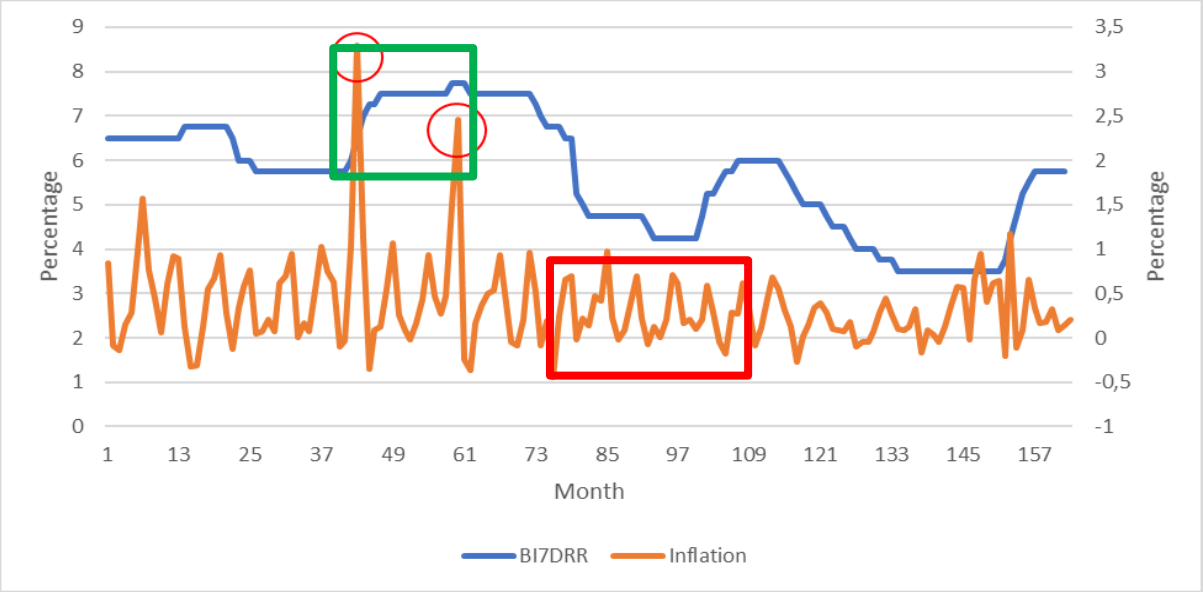

Figure 1. Interest Rate by BI and Inflation Movement Monthly, January 2010-July 2023

Figure 1 shows the movement of BI's interest rates and inflation on a monthly basis from January 2010 to July 2023. It can be seen that there was a relationship pattern with varying time lags. One example was when there was an inflationary shock marked with a red circle. Then, Bank Indonesia responded by increasing the BI7DRR and maintaining it at a high level. As a result, average inflation returned to a low level after several months as shown by the red box in Figure 1. From this figure, it could be roughly estimated that the time lag that occurred was around 30 months, as shown by the distance between the green box (policy set) and the red (inflation subsides). Based on Tomas's study (2013) from 30 developed and post-transition countries, the average transmission time lag that occurred was 29 months. greater financial development was associated with slower transmission. Transmission lags were longer in developed economies (25-50 months) than in transition economies (10-20 months).

According to Glenn H (2012), the time lag is divided into 3 stages, which are recognition lag, implementation lag, and impact lag. Recognition lag is the duration of time that occurs between the start of a shock until the shock is realized by policy makers. This could be overcame using the Early Warning System to minimize time lag. Furthermore, implementation lag is the time span of policy makers in formulating effective policies. In terms of interest rate setting, only Bank Indonesia had an interest and authority as a policy maker. Meanwhile, the impact lag is the time span from the enactment of the policy until it produces results. In this case, not only Bank Indonesia and the government were involved, but also all business actors, especially banking institutions, in responding to the reference interest rates.

Unfortunately, on the other hand, Bank Indonesia could not get all banking institutions in Indonesia to immediately follow the BI7DRR changes, because determining each bank's interest rate also depended on the bank's financial health, such as low NPL (Non-Performing Loans) and liquidity adequate so that the bank could maintain its sustainability. Apart from that, massive and sudden policies or changes could actually cause other negative effects such as shock itself.

Therefore, this research focused on analysing the time lag of the transmission of Bank Indonesia's monetary interest rate policy to its targets, such as banking institutions in Indonesia. The aim of this research was to analyse the time lag in the transmission of reference interest rate policies in Indonesia, analyse the response of banks in Indonesia to changes in reference interest rates, and analyse the rate of adjustment of banking interest rates in Indonesia to reference interest rates. It was hoped that this research could provide a complete picture of the time lag in the transmission of monetary policy on reference interest rates in Indonesia so that it could be used as a consideration for policy makers in determining policies or regulations, especially for the special conditions that occur.

2. Literature Review

Bank Indonesia as the central bank had an important role through monetary policy, such as maintaining economic stability and exchange rates. According to Article 7 Number 3 Year 2004 of the Constitution of Republic of Indonesia about Bank Indonesia, BI had several instruments to formulate monetary policy to achieve the goal of rupiah stability, one of which was the interest rate. However, to achieve this goal, complicated and complex stages should be passed. There were certain mechanisms for each pathway or instrument that would be used to achieve this goal. This was what was called as the Monetary Policy Transmission Mechanism. According to Perry (2004), the Monetary Policy Transmission Mechanism was how Bank Indonesia influenced economic and financial activities to achieve final goals. Meanwhile, John (1995) stated that the monetary transmission mechanism was the process by which monetary policy was transmitted into changes in real Gross Domestic Product (GDP) and inflation.

The monetary policy transmission mechanism also illustrates that every shock or change in monetary policy will always be responded to by changes in the behavior of banks and real sector business actors. According to Aulia (2008), monetary policy is the interaction between the central bank and banking and other financial institutions, as well as other real sector business actors. This interaction is divided into 2 stages, namely interaction in the money market between the central bank and banking and other financial institutions, then continued with interaction between banking and other financial institutions with real sector economic actors. Stephen (1985) in his research stated that changes in the bank's cost of funds interest rate will be passed on in the form of changes in the bank's interest rate to its customers because

it is a change in the bank's marginal cost. This is appropriate to describe the interest rate pass through from policy interest rates to banking interest rates (Niels-Jakob, 2011).

The previous study of Chaidir, Taufiq, et al (2022) were aiming to examine the most optimum transmission time lag between conventional monetary system and Islam monetary system with data period of January 2008 to December 2020 using Vector Auto Regression (VAR) and Vector Error Correction Model (VECM). The result showed that optimum lag needed for Monetary Policy Transmission through conventional and syariah system with inflation as final target was 3 moths. Impulse Response Function (IRF) had achieved equilibrium in the 6 to 10 months.

Therefore, Arturo (2022) study with title Asymmetric Interest Rate Transmission in an inflation targeting framework: The case of Colombia was held to examine interest rate pass-through from monetary policy rate to retail rate in Colombia and explore asymmetries in adjustment process with monthly data from May 2002 until January 2022 using Autoregressive Distributed Lag (ARDL) and Non-Linear Autoregressive Distributed Lag (NARDL). The result showed that policy rate had key role in determining retail deposit and credit rates, but characteristic of pass-through varies across type of product. In credit interest rate, the pass-through need 12 months to be completed and higher pass-through when policy rate increasing. Besides, there was also an asymmetric pass-through in deposit interest rate which was high pass-through when policy rate decreasing.

Since the monetary policy transmission mechanism was a complex process with many channels, the transmission time was required from the time the policy was set until it produced results. According to Nicoletta and Edward (2001), his research stated that the monetary policy transmission mechanism had relatively long and various time lag. Glenn and Anthony (2012) divided the time lag into several parts: recognition lag, implementation lag, and impact lag. Recognition lag was when stakeholders became aware of economic turmoil. Implementation lag was when policy makers formulated policies that would be implemented to reduce the shock. Impact lag was the duration when the policy was implemented until the shock can be reduced. In connection with Aulia (2008) previously, the 2 stages of interaction occurred at impact lag. Based on research by Putri (2016), interest rate pass through interest rates on loans and deposits were not fully responded by banks. This research involved banking groups, such as regional government banks, public banks, national private banks and foreign private banks. This research indicated that there was asymmetric behaviour of banks in responding to changes in reference interest rates.

Research on interest rate pass through was also conducted by Niels-Jakob (2011). However, there was research that considered various bank products, separating corporate and household credit, as well as consumption credit and business credit. In research by Jesús et al (2004) examining pass through on credit interest rates using ARDL (Autoregressive Distributed Lag) concluded that asymmetric behaviour in pass through speed depended on whether the policy interest rate rose or fell. Based on the theory and previous research, the following research framework was built. This framework shows the scheme of this research which was to examine the influence of type of interest, allocation, shareholding, and change direction to the time lag of bank interest adjustment.

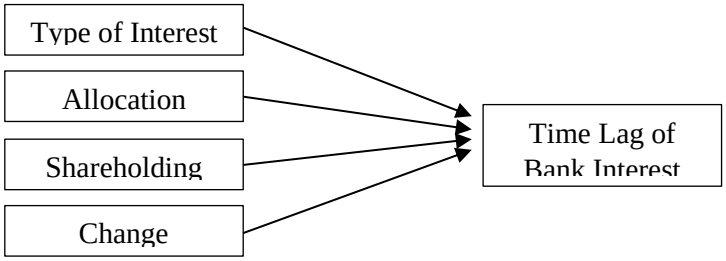

Figure 2. Research Framework

3. Methodology

According to Natsir (2009), speed of adjustment was measured by how long lag time needed for variables to respond policy shock until intermediate or final target achieved. By that definition, this

research conducted data pre-processing. The original data was taken from Bank Indonesia and BPS-Statistics Indonesia about interest rate policy (BI7DRR) and banking interest rate with time frame from January 2010 to June 2023. The data contained information of monthly credit and deposit interest rate level with a few types of banks, loans, and credits. Then, to retrieve time component, the recode and function implementation should be done. Whenever there was a change in interest rate, it would be coded 1. Time lag measured by number of months between code 1 in policy interest rate and banking interest rate. That would be considered as 1 case. So, this function was done in each period coded 1 which total result of 1095 cases. Finally, pre-processing data generated new information about time duration, identity of credit or deposit interest rate, group of banks, direction of changes, etc. Final data was shown in Table 1.

Table 1. Final Data as Pre-processing Result

Case	S(t)	Type of Interest rate	Type of loans/maturity	Group of Banks	Direction
1	2	1	0	0	1
2	7	1	0	0	1
3	4	1	0	0	0
4	8	1	0	0	0
5	14	1	0	0	0
6	5	1	0	0	1
7	5	1	0	0	0
8	4	1	0	0	0
9	1	1	0	0	0
10	18	1	0	0	0

The definition of each variable included Time Lag of Bank Interest adjustment (Y) measured by the approach of the length of time commercial bank interest rates responded to changes in the reference interest rate (months), Type of Interest (X_1) in binary with 1 (credit) and 0 (deposit), Allocation (X_2) in binary and polynomial, which were for credit 1 (Consumption) and 0 (Business), and for deposit were 0 (1 month), 1 (3 months), 2 (6 months), 3 (12 months), and 4 (24 months). Then Shareholding (X_3) in binary were 0 (Government) and 1 (Private), and Change direction (X_4) in binary were 1 (up) and 0 (down).

Based on data, in this study, survival analysis was used to answer the research questions. Survival Analysis in general is about the survival time of an object. However, basically this analysis was about the time between events when they start until they end. So, the interpretation of survival time in this research was the waiting time between changes in Bank Indonesia's reference interest rate and changes in interest rates by commercial banks in Indonesia. In other words, the lower the survival rate, the more cases would respond to changes in the reference interest rate.

The stages carried out in this research are: First, prepared the data including changing the interest rate data into time duration. This was done by giving code 1 if the reference interest rate was smaller than the previous month and giving code 2 if it was bigger. Then calculated the number of periods since the change in the reference interest rate until the change in the commercial bank interest rate. Then, the analysis began with the Kaplan Meier Curve to see the distribution of data based on the survival function. This was done for each variable and at the same time a log rank test was carried out to get the statistical test results. The formula for survival analysis is written on the equation (1).

$$\hat{S}(t_{(j)}) = \prod_{i=1}^{j} P_r[T > \widehat{t_{(i)}} | T \geq t_{(i)}] \tag{1}$$

$\hat{S}(t_{(j)})$ = Cumulative Chance of Survival Time in j period

$P_r[T > t_{(i)}|T \geq t_{(i)}]$ = The probability of survival at time more than i if the probability of survival occurs more than or at i time

Then the analysis continued to construct a regression model using Cox proportional hazard regression. Cox regression model was a hazard function equation (2). This regression was applied to all variables that had previously been tested using a Log minus Log graph to ensure that the proportional hazard assumption was met. Then for variables that did not meet the assumptions, the estimation would continue in the Cox model with variety of time. The regression result that would be interpreted was a result of hazard ratio which compared one hazard function to another. Hazard ratio function is shown as equation (3).

$$h(t, X) = h_0(t)e^{\Sigma_i^k \beta_i X_i} \quad (2)$$

$$HR = \frac{h(t, X_1^*)}{h(t, X_1)} = e^{[\beta_1 (X_1^* - X_1)]} \quad (3)$$

$h(t, X)$ = Hazard Rate
$h_0\ (t)$ = Baseline Hazard
$\beta_i X_i$ = Parameter dan independent variable

4. Results and Analysis

4.1. Non Parametric Analysis

In general, survival analysis was used to answer questions about the probability of an object surviving before an event occurs. Variables that were commonly used in survival analysis were social variables, especially health variables. However, in this study, variable that was used as a survival variable was the time lag of changes in interest rates to the response of commercial banks. So, the short interpretation to be obtained was that the lower the survival rate, the better the action was because the shorter the time lag that occurred. In addition, through the hazard function it could be seen that the higher the hazard rate for each time period, the higher the tendency for adjustments by commercial banks to the reference interest rate to occur in each time period.

Based on the analysis using the Kaplan Meier Curve, there was some information that could be extracted, namely that on average, commercial banks made adjustments to the reference interest rate 5 to 6 months after the reference interest rate was set. However, if 50 percent cut off was used, it could be seen that 50 percent of cases had made adjustments in the first 4 months after the change in the reference interest rate.

Referring to the statement of Senior Deputy Governor of Bank Indonesia, Destry Damayanti on the Press Conference of Board of Governor of Bank Indonesia (2022) the transmission from the reference interest rate to the bank interest rate, in normal times, was estimated to take one to two quarters or 3 months to 6 months. Then, according to the Fiscal Policy Agency of the Indonesian Ministry of Finance, there was no specific research on how long it took for banks to adjust interest rates in response to changes in the BI rate. However, it usually took longer to adjust credit interest rates than deposit rates, at least six months. So, through this comparison it could be indicated that commercial banks in Indonesia had still not reached the optimal point regarding time adjustment to changes in the reference interest rate. This could be caused by several things such as banking NPLs in general, adequacy of liquidity, and competition with competitors. In addition, bank performance must be maintained properly because banks were business entities that were quite vital to the economy, especially state-owned banks. Other information that could be extracted from this Kaplan-Meier analysis was regarding the break down response of each variable to the time lag.

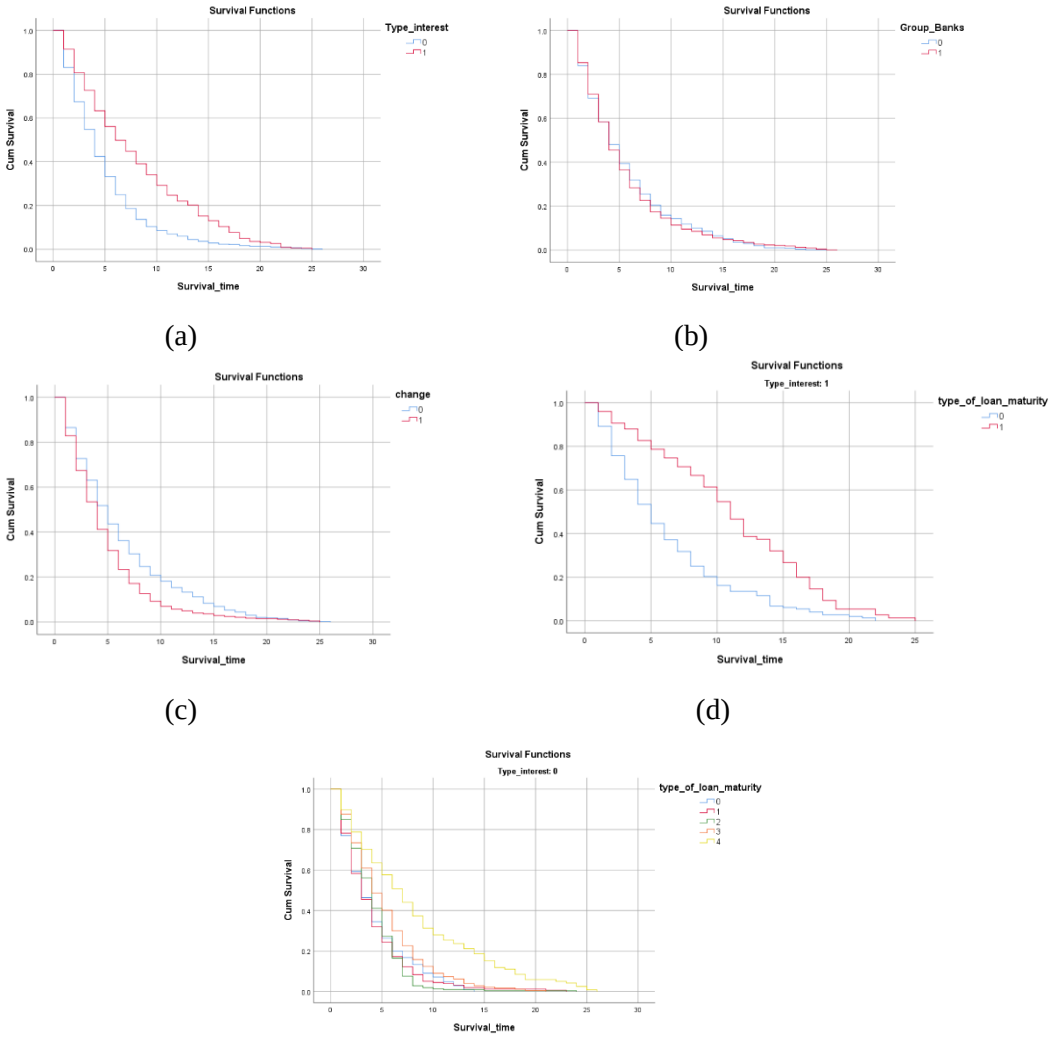

Figure 3. Kaplan Meier Graphs for Each Variables, Type of Interest (a), Bank Group (b), Change (c), Type of Loan Maturity by Type of Interest (d) and (e)

In the type of interest variable (X_1), the credit interest rate (code 1) appeared to have a more rigid response to the reference interest rate than the deposit rate (code 0) with an average time lag of 8 months for credit interest rates, while the deposit rate was 5 months. This was confirmed by the Log rank test that the difference was statistically significant. This also happened with the change direction variable (X_4) that there was a statistically significant difference with the average response time lag for interest rates rising faster, only 4 to 5 months, while when interest rates fell, it was slower, reaching 5 to 6 months.

In terms of lending rates, the Allocation variable (X_2), appeared that the consumption category lending rates (code 1) were very rigid to changes in the reference interest rate than the business capital category with an average time lag of 12 to 13 months. This could certainly be a double-edged sword for people who were paying off KPR (Citizen Housing Credit) by installment. If the floating mortgage interest was low, it would be an opportunity for the public to be able to repay installment with low interest even though the reference interest rate was rising. But if the mortgage interest floating rate was high, then when the reference interest rate declined, people would potentially experience monthly installment losses for up to 1 year because the loan interest rate did not fall when the reference interest rate had fallen. However, if it was related to the previous analysis that the response to changes in

commercial bank interest rates occured more quickly when interest rates rose, overall people who applied for credit had the potential to experience more losses than profits.

In terms of deposit interest rates, variable Allocation (X_2), appeared normal in general, the longer the term or tenor of the deposit, the more rigid it was to change in the reference interest rate. In addition, it could also be seen that the fastest time lag response was right for each deposit tenor category, which were for a 1-month tenor (code 0) at a 1-month time lag, a 3-month tenor (code 1) at a 3-month time lag, and a 6-month tenor (code 2) at a time lag of 6 months. Interesting things could be seen when the time lag period was more than 6 months. It could be seen that the order of time lag response speed from the fastest was the tenor of 6, 3, 1, 12, and 24 months. This could open profit opportunities for customers who chose deposits with a 1-month tenor because they were the most responsive in the initial period but became more rigid than the other 2 tenors after 6 months.

In the shareholding variable (X_3) there was the most striking thing, which was that there was almost no time lag difference between state-owned and private-owned banks with respect to the reference interest rate. However, even though statistically the Log Rank test concluded that the difference was not significant, graphically it still appeared that privately owned banks were slightly superior in speed of responding to changes in the reference interest rate.

The significant difference in time lag between these categories could potentially hamper the effectiveness of monetary policy transmission due to imbalances. Based on the results of the analysis above, if a shock occured that then required Bank Indonesia to raise its reference interest rate, the commercial banks' response would be quicker in raising deposit rates with the aim of absorbing and reducing money circulating in the community. However, on the other hand, credit interest rates had not been adjusted so that the outflow of money had not stopped. This might cause inefficiency because on the one hand it tried to absorb the money supply, but on the other hand the money supply faucet was left open. This might be the reason why monetary policy transmission had a long impact lag.

4.2. Parametric Analysis

Paramteric analysis was carried out using Cox regression to obtain parameter estimates in the form of speed ratios in the form of Hazard Ratio (HR). The analysis would be carried out separately from the other variables, because the categories in the Allocation variable (X_2) are related to the type of Interest variable (X_1). After carrying out analysis using Cox regression proportional hazards by regressing each dependent variables, the results showed that variables X_1 and percent slower in each period in responding to changes in the reference interest rate compared to deposit interest rates. Then regarding the direction of change, it was estimated that an increase in interest rates (X_4, code 1) had probability of 32 percent being responded to be quicker in each period than a decrease in the reference interest rate. Cox Regression's result is shown in Table 2 followed by the dependent variable on equation (4).

Table 2. Cox Regression on $X_1X_3X_4$

Variable	B	SE	Wald	df	Sig.	Exp(B)
X_4	.185	.063	8.484	1	.004	1.203
X_1	-.553	.084	43.274	1	.000	.575
X_3	-.009	.062	.022	1	.882	.991
$X_1 \times X_3 \times X_4$	.535	.192	7.765	1	.005	1.707

$$H(t) = H_0(t)e^{(0.575X_1+0.991X_3+1.203X_4+1.707X_1X_3X_4)} \quad (4)$$

Then the analysis was continued by carrying out Cox proportional Hazard regression by regressing together and adding interaction effects. The result was that only variables X_1 and X_4 significantly affect Y, while variable X_3 did not affect Y statistically. However, it turned out that the interaction effect showed that the effect significantly affected Y, so that it could be said that there were special conditions for variable X_3 to influence Y.

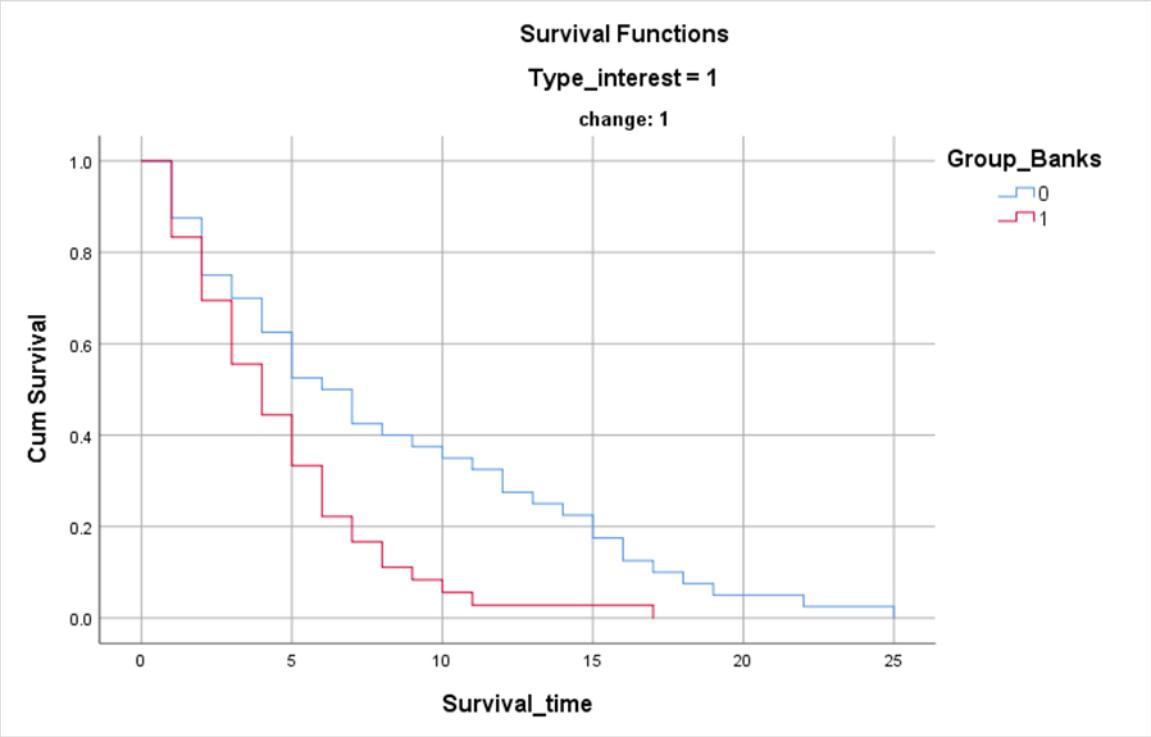

Figure 4. Survival Kaplan Meier Graph of X_3 When X_1 =1 X_4=1

Based on HR results, it was estimated that when there was an increase in the reference interest rate, credit interest rates at private banks had a probability of a time lag response that was 70 percent faster than that of government banks or deposit interest rates or when there was a decrease in the reference interest rate. However, it could be seen that state-owned banks experienced a slowdown in response time lag after a period of 6 months. The slower adjustment to the increase in lending rates would hamper the reduction in the money supply because the outgoing faucet was still open.

Based on HR estimates, it was estimated that in these conditions there was a probability that the response time lag of private banks was 98 percent faster than government-owned banks in each period. So, in general it could be said that government-owned banks left money more slowly than private banks. This was also supported by the trend in deposit interest rates.

Table 3. Cox Regression on X_3 with Time Variety Depedent

X_1	Variable	B	SE	Wald	df	Sig.	Exp(B)
0	X_3	-.674	.289	5.440	1	.020	.510
	X_3*T_COV_	.724	.298	5.925	1	.015	2.063
1	X_3	.165	.276	.356	1	.551	1.179
	X_3*T_COV_	.004	.318	.000	1	.991	1.004

By including the time dependent variable in the model, it was estimated that private banks also had a probability of a time lag response to changes in the reference interest rate of 5.2 percent faster than state-owned banks in the period after 6 months. Meanwhile, for the period of 6 months and earlier, private banks had a probability of 49 percent being slower than state-owned banks.

The next variable was Allocation (X_2) which was the type of each credit interest rate (X_1, code 1) and deposit interest rate (X_2, code 2). Based on tests of the Log Minus Log function, it was known that only the tenor categories of 1 month (code 0), 3 months (code 1), and 6 months (code 2) did not meet the proportional hazard assumption. While the 12 months tenor category (code 3) and 24 months (code

4), as well as the credit interest rate category for working capital (code 0) and consumption (code 1) met the assumptions. Therefore, cox proportional hazard was carried out in categories that met the assumptions only.

Table 4. Cox Regression on X_2

X_1	Variable	B	SE	Wald	df	Sig.	Exp(B)
0	X_2			59.971	4	.000	
	$X_2(1)$	.040	.106	.141	1	.708	1.041
	$X_2(2)$	.021	.098	.044	1	.834	1.021
	$X_2(3)$	-.263	.102	6.571	1	.010	.769
	$X_2(4)$	-.794	.121	43.065	1	.000	.452
1	X_2			24.903	1a	.000	
	$X_2(1)$	-.732	.147	24.903	1	.000	.481

Through this test, the results obtained were that all categories that met the proportional hazard assumption were significant in the model. Based on HR estimates, it could be said that credit interest rates for consumption had a time lag response probability of 52 percent slower in each period than credit interest rates for working/business capital. Then, the 12 months and 24 months tenor deposit interest rates had a probability response time lag of 24 percent and 55 percent slower respectively in each period compared to the 1 month tenor deposit interest rate. Meanwhile, for the deposit interest rate category with a tenor of 1 month (code 0), 3 months (code 1), 6 months (code 2), the results obtained were statistically significant in influencing Y after adding the time dependent variable, namely 6 months. The HR estimation results for the 3 month and 6 months tenors was that there was a probability that the time lag response was 75 percent and 86 percent slower respectively in each period compared to the 1 month tenor deposit interest rate.

5. Conclusion and Recommendation

In general, the transmission of monetary policy using the reference interest rate to reach the intermediate target, which were all commercial banks in Indonesia, was quite good, but it needed to be improved further if the standard used refers to an optimal lag of 3 months because the adjustment speed needed to be almost double to reach the optimal lag of 3 months. By this study was conducted, it was still in the average position of 5 to 6 months.

The banking response to changes in the reference interest rate based on several variables, such as type of interest, allocation and change direction, was considered to be still not optimal because there were many asymmetries in the response. These results were in line with research by Arturo (2022) that monetary policy transmission would be more effective if the response was symmetrical. So whatever direction the reference interest rate moved, the type of credit or deposit interest rate, or any credit category should respond at the same speed. However, in terms of ownership, both state-owned and private-owned banks had shown good time lag response performance and were in line. So it can be said that there was almost no difference between government-owned and private banks in responding to changes in reference interest rates.

Based on the results of this research, in order to improve the performance of monetary policy transmission using interest rates, policy makers were suggested to make rules regarding the maximum time for commercial bank interest rates to be adjusted to the reference interest rate. This had actually also been supported by Bank Indonesia which had changed the system and indicator for the reference interest rate to BI7DRR. Besides, it needed government attention to formulate and finalize Rancangan Undang-Undang tentang PPSK (Pengembangan dan Penguatan Sektor Keuangan) or Omnibus Law Keuangan. House of Representative proposed changes in Article 8AB that commercial banks will be obliged to immediately adjust credit interest rate in less than 7 days after BI7DRR released. In CNBC Indonesia News, Vice Chairman DPR Komisi XI, Amir Uskara, said that this proposal appeared because

every time Bank Indonesia launched policy interest rate, it was not followed immediately by commercial banks. The transmission of credit interest rate even needed 2 quarter to complete. So monetary policy transmission should be implemented better. Then the government was also expected to carry out strict supervision of commercial banks, especially government-owned banks. If it was indicated that there was fraud or non-compliance with the aim of gaining more profit by taking advantage of turbulent economic conditions, strict punishment must be imposed as consequences. It required the support of every business actor, financial and banking institutions to be able to create an effective and efficient monetary policy transmission system so that the goal of optimal and sustainable economic growth could be achieved.

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