Zero Lower Bound for Exit Policy to Scarring Pandemic Effect on Indonesia's National Economy

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Abstract. Developed countries adopted a Zero Lower Bound (ZLB) policy as an option to accelerate economic recovery. In this study, the authors aim to systematize and assess existing data to build simulations of ZLB implementation in Indonesia. The data use 12 indicators from 2017-2021. Data are analyzed using Autoregressive Distributed Lag Model (ARDL). The results of data processing show that there are an upward trend in 2022, especially for the inflation rate, consumer price index, capacity utilization, residential property price index, broad money, and production index. Other indicators such as lending facilities, investment realization and savings facilities tend to be flat. Meanwhile, other indicators such as unemployment, average wages, and the exchange rate show downward trend. This research also provides updates on the possibility of implementing ZLB policy recommendations in Indonesia and can be used as exit policies for the scarring effect of the pandemic on the Indonesia's national economy.

Keywords: Zero Lower Bound-1; Autoregressive Distributed Lag Model (ARDL)-2; National Economy-3, Exit Policy-4

1 Introduction

Indonesia's inflation is still below to the target in 2021. This condition clearly has an effect on the low level of credit which is indicated by the high level of undisbursement loans. Another effect is the increase in third party funds due to restrained public consumption desires. It makes business actors wait and see and postpone applying for financing loans to banks. On the other hand, Banks also receive an additional "burden" in the form of interest that must be paid to depositors.

Several countries implemented ZLB to increase inflation and encourage people's purchasing. Japan tried to recover the asset bubble exploded by implementing ZLB in 1991. The United States (US) charged interest rates of up to 0.25% (approach to 0%) to stretch the economy in US after the subprime mortgage crisis that hit US. The Fed also implemented a ZLB with additional money printing policies to inject liquidity into the financial system. This increased the confidence of economic players and lowered US long-term interest rates which had skyrocketed. This has an impact on reducing borrowing costs and providing direct financing to the real sector. The policy of low interest rate was also implemented at the Central Banks of other G20 countries such as People's Bank of China which trying to stimulate the economy from the impact of a prolonged economic downtrend.

Monetary authorities in Indonesia have implemented low interest rates by setting a reference rate of 3.5% until the end of 2021. Several real sectors asked for support to obtain a 0% interest rate scheme such as micro, small and medium enterprises as well as new and renewable energy. ZLB will be used by banks to innovate services to increase fee-based services [1]. It will have good implications for the normalization of conditions in Indonesia amidst the post-pandemic Covid-19 economic downtrend. Therefore, this paper will simulate the possibility of implementing the ZLB policy in Indonesia, specifically mitigating the scarring effect of the pandemic on the Indonesia National Economy.

2 Literature Review

The ZLB policy implications for macroeconomics [2], [3]. However, discussions on this matter are rarely carried out in emerging market countries [4], [5]. ZLB has an impact to macroeconomic problem that arises when the nominal short-term interest rate is close to zero or even at zero [6]–[9].

Low interest rate policy, several developed countries have implemented this policy. Japan, for example, has had interest rates approach to ZLB over the past twenty years. UK, US and Germany reunited approach to ZLB in recently. The monetary policy implications in these countries are large-scale asset purchases [10]. It will certainly have good implications for the normalization of conditions in Indonesia in the midst of the economic downturn, but the alarm still needs to be set in the form of implementing fiscal policy, tax implementation, and quantitative easing to reduce negative impacts [11], [12], [13].

Negative demand shock as an impact of ZLB implementation can be solved by balance-sheet policies [14]. Rising inflation and output gap can be solved by make forward guidance and ZLB [14], [15]. Banks have the potential to ditch their reserves for large-scale currency storage. It can be solved by Central banks can thwart these efforts by taxation and regulation of "undue" currency holdings levels [16][17]. Liquidity trap can be solved by The government released the ZLB implementation guide [16]. Domestic agents face uninsured cumulative or unusual risks can be solved by Allows the Central Bank to select foreign portfolio exchange assets and characterizes the optimal composition [18]. Long term stagnation can be solved by Huge discretionary fiscal stimulus during a recession [19]

A negative interest rate option is the option taken when ZLB is applied to submit aggregate demand [20], [21]. The current phenomenon in both developed and developing countries is that inflation is always below the target, up to 1.5% but it at least be able to guide the relevant market response to be done [22].

3 Methodology

Data used in this paper are monthly secondary data from 2017-2021. Variabel used in this paper are inflation rate, consumer price index, capacity utilization, residential property price index, broad money, production index, lending facility, realization of investment, deposit facility, unemployment, average wage, exchange rate, and interest rate. Data are analyzed by Autoregressive Distributed Lag (ADL) Model analysis.

The autoregressive distributed lag model of order p and n, ADL(p,n), is defined for a scalar variable Y_t as

$$Y_t = \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{i=0}^{n} \beta_i' X_{t-i} + \varepsilon_t$$

Where ε_t is a scalar zero mean error term and X_t is a K-dimensional column vector process. The coefficients α_i are scalars while are β_i' row vectors. Using the lag operator L applied to each component of a vector, $L^k X_t = X_{t-k}$. The determination of the lag is determined in stages from $k = 1$ until the lag variable k is not significant [23].

The autoregressive distributed lag analysis was performed with dependent variables (Y) are Production Index, Inflation Rate, Exchange Rate, Realization of Investment, Average Wage, Unemployment, Capacity Utilization, Residential Property Price Index, Broad Money, Customer Price Index, Deposit Facility, and Lending Facility. The independent variable (X) is interest rate. Furthermore, the independent variable is conditioned to be 0 to be used in predicting the results of the dependent variable in 2022 by considering the time series. The time (t) used is 1 to 60 months.

The next step is to estimate each dependent variable if it is conditioned simultaneously. The simultaneous condition used is the complement of the dependent variable used as the independent variable. If the p-value on the ADL variable is less than 0.1 then the variable will give the impact to dependent variable. The effect of the independent variables on the dependent variable can be measured using R^2. An R^2 value of more than 60%, that means the independent has significant impact the dependent variable [24], [25],[26].

4 Result and Discussion

The analysis used in this study is (ADL) Model. The R^2 is as shown in **Table 1**. R^2 describes the percentage impact of the (0% interest rate) on each dependent variable. The R^2 result on the production index shows a yield of 40.29% for partial analysis, which means that the 0% interest rate has no significant effect on the production index.

The next step is to examine the variables simultaneously. The p-value of less than 10% is defined as the independent variable so that the resulting data is in **Table 1** (column No. 3). The R^2 obtained in the Autoregressive Distributed Lag Model analysis above can be seen in **Table 1** (column No. 4). R^2 on production and exchange rate indices show results of 55.95% and 27.59%. It means broad money and 0% interest rates do not have significant effect to the exchange rate. Interest rates do not have significant effect to the production index. The R^2 of the simultaneous analysis (87,5%) is higher on average than the partial analysis (86,5%) so that the analysis used is simultaneous analysis.

Table 1. R^2 for each Dependent Variable

Dependent Variable	Partial	Simultaneous	
	R^2 (%)	Independent Variables	R^2 (%)
Inflation	99,36	Broad Money	93,90
Customer Price Index	89,74	Average Wage and Capacity Utilization	98,97
Lending Facility	99,86	Average Wage, Unemployment, Residential Property Price Index, and Deposit Facility	98,32
Deposit Facility	98,51	Average Wage, Unemployment, Broad Money, and Deposit Facility,	98,96
Exchange Rate	72,14	Broad Money	27,59
Realisation of Investment	78,32	Average Wage and Capacity Utilization	93,44

Average Wage	99,94	Unemployment, Customer Price Index, Deposit Facility, and Lending Facility	96,07
Unemployment	82,20	Average Wage, Customer Price Index, Deposit Facility, and Lending Facility	99,72
Capacity Utilization	78,06	Realisation of Investment	89,30
gResidential Property Price Index	99,57	Lending Facility	99,21
Broad Money	99,98	Inflation	98,51
Production Index	40,29	-	55,95

The ADL Model analysis are carried out simultaneously to obtain forecast results as shown in **Figure 1**. The upward trend occurred in the inflation, consumer price index, capacity utilization, residential property price index, broad money, exchange rate and production index. Meanwhile, the downward trend occurred in average wages and unemployment. Then, a stable trend is shown in the lending facility and deposit facility. Investment realization increases slowly and tends to be stable.
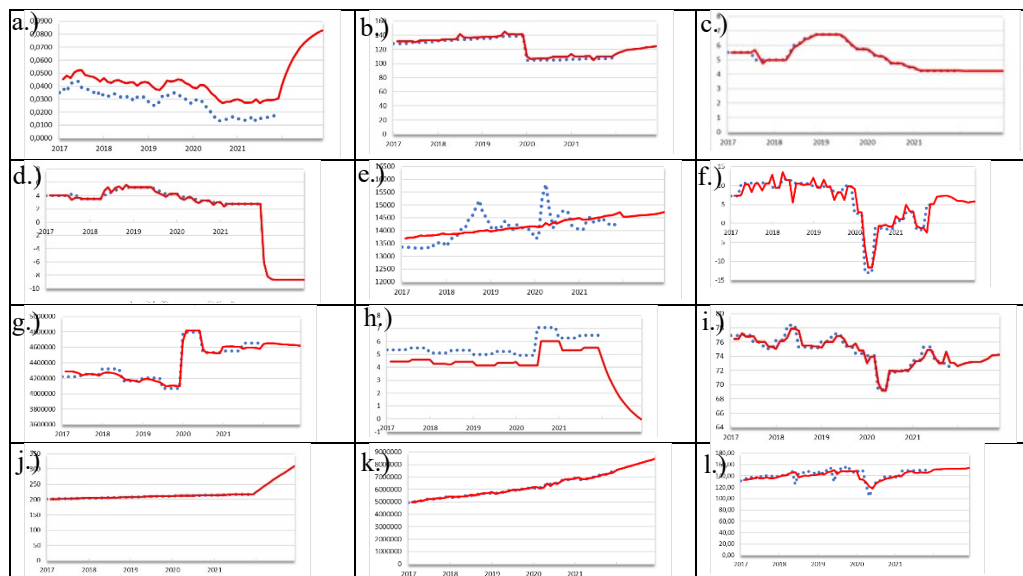
Fig. 1. Forecasting when ZLB is applied simultaneosly (a. Inflation, b. Customer Price Index, c. Lending Facility, d. Deposit Facility, e. Exchange Rate, f. Realisation of Investment, g. Average Wage, h. Unemployment, i. Capacity Utilization, j. Residential Property Price Index, k. Broad Money, and l. Production Index)

5 Conclusion

The simulation is carried out by relying on the possibility of applying the ZLB policy in Indonesia using autoregressive distributed lag analysis. The simulation process is more accurate with simultaneous data processing. This can be seen from the higher average simultaneous R^2. The upward trend occurred in the inflation rate, consumer price index, capacity utilization,

residential property price index, broad money, exchange rate and production index. Meanwhile, the downward trend occurred in average wages and unemployment. Then, a stable trend is shown in the lending facility and deposit facility. Investment realization increases slowly and tends to be stable.

Some of the negative impacts can be seen from the possibility of implementing the ZLB policy for Indonesia in 2022. However, those problems can be anticipated by policy collaboration with the fiscal authority. The implementation of the ZLB policy also provides a positive side that is expected in efforts to recover the economy, such as an increase in capacity utilization, and a decrease in unemployment. Another thing that can be considered positive from the ZLB policy is the decrease in the average wage. This study also fills a gap in the literature that has never previously discussed the possibility of implementing ZLB in emerging countries.

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