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THE NONLINEAR IMPACT OF INFLATION ON ZAKAT COLLECTION IN INDONESIA

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ABSTRACT - Many studies show that zakat collection in Indonesia falls short of its potential. One major factor is the systemic risk faced by muzakki, the zakat payers, due to economic conditions. Given the government's monetary objectives to address systemic risk, such as the unemployment level, these policies theoretically influence zakat collection. This paper examines the impact of inflation and the real exchange rate, as monetary objectives, on zakat collection in Indonesia. Analyzing 45 monthly time series observations with the ARDL bound test, the findings reveal that inflation has a nonlinear effect, boosting zakat collection when the CPI exceeds 105.5. Further, policies increasing the real exchange rate positively affect zakat collection. Additionally, zakat collection during Eid al-Fitr is approximately 1,764% higher compared to other months. The study establishes clear links between monetary policy objectives and zakat collection efficiency, suggesting that monetary policy tools can be leveraged to optimize zakat collection in Indonesia. These findings provide valuable insights for policymakers in harmonizing monetary and zakat collection strategies.
Keywords: Zakat collection, Monetary Policy, Inflation, Nonlinear, Real exchange rate, Eid al-Fitr.

ABSTRAK *- **Dampak Nonlinier Inflasi pada Pengumpulan Zakat di Indonesia.** Sejumlah penelitian menunjukkan bahwa pengumpulan zakat di Indonesia belum sebanding dengan potensinya. Salah satu faktor utamanya adalah risiko sistemik yang dihadapi oleh muzakki, akibat kondisi ekonomi. Sementara itu, pemerintah membuat sejumlah kebijakan moneter untuk menghindari terjadinya risiko tersebut, yang secara teoritis dapat mempengaruhi pengumpulan zakat. Oleh karena itu, penelitian ini bertujuan untuk mengkaji dampak kebijakan moneter, terutama dalam aspek inflasi dan nilai tukar riil, terhadap pengumpulan zakat di Indonesia. Penelitian ini menganalisis 45 observasi data time series bulanan menggunakan ARDL bound test. Temuan penelitian menunjukkan bahwa inflasi memiliki efek nonlinier, di mana peningkatan inflasi meningkatkan pengumpulan zakat ketika tingkat CPI melebihi 105,5. Selanjutnya, kebijakan moneter yang bertujuan meningkatkan nilai tukar riil berdampak positif pada pengumpulan zakat. Selain itu, pengumpulan zakat ketika hari raya Idul Fitri 1,764% lebih tinggi dibandingkan bulan-bulan lainnya. Penelitian ini menunjukkan hubungan signifikan antara kebijakan moneter dengan efisiensi pengumpulan zakat, yang mengindikasikan bahwa instrumen kebijakan moneter dapat dimanfaatkan untuk mengoptimalkan pengumpulan zakat di Indonesia. Temuan ini memberikan masukan yang penting bagi pembuat kebijakan dalam menyelaraskan strategi moneter dengan pengumpulan zakat.*
Kata Kunci: *Pengumpulan Zakat, Kebijakan Moneter, Inflasi, Nonlinier, Nilai Tukar Riil, Idul Fitri.*

INTRODUCTION

Zakat, one of the five pillars of Islam, mandates an obligatory contribution from eligible Muslims (Saad & Haniffa, 2014). This system of wealth redistribution, with the payer (*muzakki*) contributing to the recipient (*mustahik*), has been associated with numerous socio-economic benefits. These include poverty alleviation (Ayuniyyah et al., 2022; Herianingrum et al., 2024), economic growth (Jedida & Guerbouj, 2021), improved welfare (Mawardi et al., 2023), and advancements in human development (Rusanti et al., 2023).

Given its potential impact, zakat collection is a significant undertaking, particularly in Muslim-majority countries, like Indonesia, where governments strive to enhance national development and citizen welfare. Increased zakat collection can translate into greater resources allocated towards these objectives (Ibrahim, 2011). In Indonesia, the official body responsible for zakat collection is BAZNAS (*Badan Amil Zakat Nasional*), the National Board of Zakat of Indonesia. An analysis of monthly time series data from BAZNAS (January 2018 - September 2021), depicted in Figure 1, reveals noteworthy trends.

Figure 1. Monthly Zakat Collection
(Source: BAZNAS Monthly Financial Report, January 2018 - September 2021)

Figure 1 illustrates a steady upward trend in zakat collection, with a trend regression coefficient of 0.0261. Additionally, a seasonal pattern emerges, marked by peaks in specific months (points A to E), coinciding with the Islamic holiday of *Eid al-Fitr*. Despite this growth, existing research indicates that zakat collection remains suboptimal relative to its potential (Pratiwi & Sa'idah, 2022; Beik et al., 2024; Jannah & Banna, 2021; Wahid et al., 2014). The disparity between actual collection and potential capacity is substantial.

BAZNAS (2022) in Outlook Zakat Indonesia 2022 estimated Indonesia's zakat potential at approximately Rp. 327.6 trillion in 2020. However, the 2023 BAZNAS financial report shows a total collection of only Rp. 546.3 billion in 2022. This significant gap underscores the need for strategies to maximize zakat collection.

While previous studies have explored various aspects of zakat collection, including strategic management (Hardiyansyah et al., 2020), digital campaigns (Hudaefi & Beik, 2021), social capital (Syakir et al., 2021), technology integration (Abdul-rahman, et al., 2023), management efficiency (Adinugroho et al., 2024), and individual intentions to pay zakat (Abriyansyah & Rohim, 2023; Mutmainah et al., 2024), these largely focus on micro-level factors. This study addresses a crucial gap in the literature by adopting a macro-level perspective, investigating the influence of macroeconomic conditions on aggregate zakat collection.

As Bacha & Mirakhor (2013) elucidate, individuals in any society face systemic risks, which may impact the ability of *muzakki* to pay zakat. Systemic risk arises from external and internal economic circumstances affecting individuals or society, often reflected in unemployment levels. Since all earned income is subject to zakat (Arifin et al., 2022), higher unemployment leads to lower earned income, consequently reducing zakat collection. This macroeconomic perspective on zakat collection represents a novel approach in this study, distinguishing it from prior research.

Additionally, Bank Indonesia, as the monetary authority, plays a role in influencing systemic risk through its policies and instruments. One of its primary objectives is maintaining Rupiah stability, making inflation a critical macroeconomic variable to manage by targeting specific levels. This approach is known as the Inflation Targeting Framework (ITF). According to the Phillips Curve relationship, inflation can impact unemployment, which in turn affects zakat collection. This study aims to explore this macroeconomic dimension, specifically investigating the impact of inflation, a key target of Bank Indonesia's ITF, on zakat collection.

Furthermore, recognizing the role of exchange rate stability in overall currency stability, this study also examines the relationship between exchange rates and zakat collection. By analyzing these macroeconomic factors, this research seeks to provide insights into how government policies can indirectly influence

aggregate zakat collection. Finally, given the observed seasonality in zakat collection data, the study will also consider the impact of *Eid al-Fitr* on zakat collection trends in Indonesia.

LITERATURE REVIEW

The relationship between inflation, exchange rates, and zakat collection can be understood through the mediating role of unemployment, which represents what Bacha & Mirakhor (2013) termed systemic risk, which plays a significant role in influencing zakat collection in this study. Systemic risk, arising from economic conditions, affects individuals' ability to pay zakat by reducing income levels. This framework provides a theoretical foundation for analyzing the determinants of zakat collection.

Figure 2. Unemployment and Zakat Collection Relationship

As depicted in Figure 2, unemployment negatively impacts zakat collection. Arifin et al. (2022) highlight that all earned income is subject to zakat, with BAZNAS (2024) setting the minimum *nisab* (the threshold for zakat liability) at Rp. 6.86 million. When unemployment rises, fewer individuals meet the *nisab* requirement, and as a result, they are not obligated to pay zakat. Consequently, an increase in the unemployment rate leads to a reduction in zakat collection, underscoring the inverse relationship between these variables.

The Role of Monetary Policy: Inflation and Zakat Collection

Mishkin (2022) defines monetary policy as the management of the money supply and interest rates. This policy can affect stock returns (Jang & So, 2024), agricultural growth (Rivai, 2022), income inequality (Garcia & Cross, 2024), and unemployment (Sanchez, 2012; Bennani, 2023). Mishkin (2022) identifies several objectives of monetary policy, including maintaining price stability, ensuring independent and open market operations, and supporting macroeconomic goals such as growth and employment.

In Indonesia, the primary objective of monetary policy, as set by Bank Indonesia, is to maintain Rupiah stability. This encompasses both price stability (low and stable inflation) and exchange rate stability. To understand the

relationship between inflation and zakat collection, we can examine the dynamics illustrated in Figure 3.

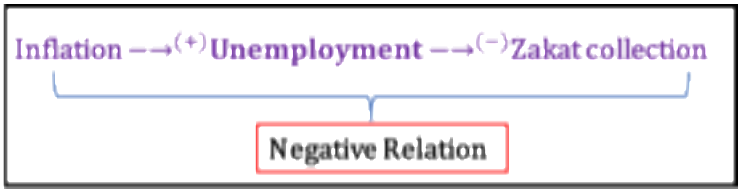

Figure 3. Negative Relationship Between Inflation and Zakat Collection

Based on Figure 3, Mankiw (2012) explains that persistent inflation can lead to higher social costs, increasing poverty and unemployment (positive relationship between inflation and unemployment). Higher unemployment, in turn, reduces zakat collection. Therefore, as inflation rises, zakat collection decreases. This relationship is further explained using the reversed Phillips curve analysis.

The relationship between inflation and unemployment can also be analyzed through the lens of the reversed Phillips curve. Blanchard (2021) describes the traditional Phillips curve relationship as follows:

$$\pi_t = \bar{\pi} + \delta - \alpha U_t \quad (1)$$

Rearranging this equation yields the reversed Phillips curve, illustrating the relationship between inflation (πt) and unemployment (U_t):

$$U_t = \frac{1}{\alpha}\bar{\pi} + \frac{1}{\alpha}\delta - \frac{1}{\alpha}\pi_t \quad (2)$$

In this equation, δ represents other variables positively affecting unemployment, such as unemployment insurance and markup prices (Blanchard, 2021), while $\bar{\pi}$ denotes the average movement of inflation over time. Equation 2 clearly indicates a negative relationship between inflation (π_t) and unemployment (U_t).

Using this framework, the connection between inflation and zakat collection can be articulated as follows:

Figure 4. Positive Relationship Between Inflation and Zakat Collection

As depicted in Figure 4, a positive relationship between inflation and zakat collection can be inferred: as inflation rises, improved economic performance may lead to lower unemployment rates, which in turn enhances zakat collection. This suggests a non-linear relationship between inflation and zakat collection.

The existing literature addressing the impact of inflation on zakat collection is notably limited, with Firmansyah et al. (2021) being a rare exception. Recent studies have primarily focused on the relationship between inflation and unemployment (Combes & Lesuisse, 2022; Gabriel, 2023; Niken et al., 2023; Crump et al., 2024). Therefore, it is essential to investigate the interaction between inflation and zakat collection, and this paper posits the following hypothesis:

H1: Inflation has a significant effect on zakat collection.

Monetary Objective: The Impact of Exchange Rate on Zakat Collection

The relationship between exchange rates and zakat collection can be analyzed through the Mundell-Fleming model and Okun's Law, particularly in light of the previously discussed negative correlation between unemployment and zakat collection. This relationship is illustrated in Figure 5.

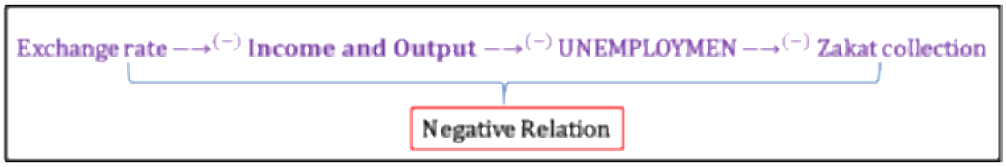

Figure 5. Positive Relationship Between Exchange Rate and Zakat Collection

According to Mankiw (2012), the Mundell-Fleming model posits that an increase in the exchange rate results in a decline in net exports, subsequently leading to decreased income and output (*Y*). Furthermore, Okun's Law

delineates the relationship between income and output (Y_t) and the level of unemployment (U_t) as expressed in the following equation:

$$U_t = 1{,}5\% - 0{,}5\ Y_t \quad (3)$$

As indicated in Equation 3, a reduction in income and output (Y_t) correlates with an increase in unemployment (U_t). This rise in unemployment, in turn, contributes to a decrease in zakat collection. Thus, it can be concluded that the exchange rate exerts a negative impact on zakat collection: as the exchange rate increases, zakat collection tends to decline.

Current literature predominantly addresses the relationship between exchange rates and economic growth (Ameziane & Benyacoub, 2022), trade dynamics (Kayani et al., 2023; Ahmed et al., 2024), and their effects on unemployment and labor productivity (Ali, 2023; Thaba, 2023). Given this context, the necessity for further investigation into the impact of exchange rates on zakat collection is evident. Based on the theoretical framework presented, this paper posits the following hypothesis:

H2: The real exchange rate has a positive effect on zakat collection.

METHODOLOGY

This study employs a quantitative research design using monthly time series data from January 2018 to September 2021, yielding a total of 45 observations. The endpoint of September 2021 was selected due to data availability constraints, reflecting the most recent financial data available from BAZNAS. The primary objective is to investigate the impact of inflation and the real exchange rate on zakat collection in Indonesia, incorporating potential nonlinearities and seasonal effects associated with *Eid al-Fitr*.

Data Sources and Variables

The dependent variable in this study is Zakat Collection (Z), obtained from the monthly financial reports of BAZNAS. The use of the natural logarithm helps to stabilize the variance and interpret the coefficients in terms of elasticities.

The independent variables include:

1. Inflation (*IN*) represented by the Consumer Price Index (CPI) for Indonesia, sourced from the Federal Reserve Economic Data (FRED) of the St. Louis Federal Reserve Bank. Inflation is expected to have a nonlinear effect on zakat collection, hence both the linear and quadratic terms of inflation are included in the model to capture potential nonlinearity.
2. Real Exchange Rate (*RER*) proxied by the Real Broad Effective Exchange Rate, also obtained from FRED. The real exchange rate reflects the relative price of domestic goods to foreign goods and can influence economic conditions that affect zakat collection.

Given the seasonal patterns observed in zakat collection data, a dummy variable is introduced to capture the seasonal effects. According to Black (2010), dummy variables can effectively isolate seasonal influences in time series data. In this study, the dummy variable indicates the occurrence of *Eid al-Fitr*, with a value of 1 assigned to the month in which *Eid al-Fitr* occurs and 0 otherwise. This adjustment is crucial for understanding the behavior of *muzakki* and how their religious observance may influence zakat contributions.

Analytical Framework

To analyze the data, this research employs the Autoregressive Distributed Lag (ARDL) bounds testing approach. This method is preferred for time series analysis because it accommodates variables of different integration orders, specifically *I*(0) and *I*(1), while providing robust estimates even with small sample sizes (Georgescu & Kinnunen, 2024).

Alam & Hossain (2024) emphasize that the ARDL bounds test yields more accurate short-run and long-run statistics compared to alternative methods such as Vector Autoregression (VAR), Vector Error Correction Model (VECM), and Ordinary Least Squares (OLS) regression. Moreover, the ARDL framework does not require the variables to be integrated of order I(2) or higher, making it a versatile choice for this study (Sunal & Yagci, 2024).

Model Specification

To account for the non-linear effects of inflation on zakat collection, the inflation variable is included in a quadratic form. The overall ARDL model can be expressed as follows:

$$\Delta LNZ_t = a_0 + D_{ied} + \sum_{i=1}^{m} a_1 \Delta \mathrm{LNZ}_{t-i} + \sum_{j=1}^{n} a_2 \Delta \mathrm{IN}_{t-j} + \sum_{k=1}^{r} a_3 \Delta IN^2{}_{t-k} + \sum_{k=1}^{r} a_4 \Delta RER_{t-k} + \beta_1 \mathrm{LNZ}_{t-1} + \beta_2 \mathrm{IN}_{t-1} + + \beta_2 IN^2{}_{t-1} + \beta_3 RER_{t-1} + U_t \quad (4)$$

Where:

- *LNZ* denotes the natural logarithm of zakat collection (Z)
- D_{ied} represents the dummy variable for *Eid al-Fitr*
- Δ indicates the difference operator
- *IN* is the inflation variable
- IN^2 captures the quadratic form of inflation
- *RER* is the real exchange rate
- *U* is the error term.

Unit Root Testing

Prior to applying the ARDL model, a unit root test is conducted for each variable to ensure that no variable is integrated of order *I*(2), as the ARDL approach is not applicable in such cases (Singhania & Saini, 2020). The lag length for the model is determined using the Akaike Information Criterion (AIC) and other relevant criteria.

Cointegration Testing

Following the establishment of unit roots, a cointegration test is performed based on Equation 4. If the computed F-statistic exceeds the upper bound critical value, the null hypothesis of no cointegration can be rejected. Upon confirming the existence of cointegration, long-run and short-run coefficients can be estimated using the following equations:

Long-run estimation:

$$LNZ_t = a_0 + D_{ied} + \sum_{i=1}^{m} a_1 \mathrm{LNZ}_{t-i} + \sum_{j=1}^{n} a_2 \mathrm{IN}_{t-j} + \sum_{j=1}^{n} a_3 \mathrm{IN}^2{}_{t-j} + \sum_{k=1}^{r} a_4 \mathrm{RER}_{t-k} + U_t \quad (5)$$

Short-Run Estimation with Error Correction Term (ECT):

$$\Delta LNZ_t = a_0 + D_{ied} + \sum_{i=1}^{m} a_1 \Delta \mathrm{LNZ}_{t-i} + \sum_{j=1}^{n} a_2 \Delta \mathrm{IN}_{t-j} + \sum_{j=1}^{n} a_3 \Delta \mathrm{IN}^2{}_{t-j} + \sum_{k=1}^{r} a_4 \Delta \mathrm{RER}_{t-k} + \theta\, ECT_{t-1} + U_t \quad (6)$$

In these equations, θ indicates the speed of adjustment towards long-run equilibrium from the short run (Deka & Dube, 2021).

Diagnostic Testing

To ensure the reliability of the model, diagnostic tests are conducted to assess autocorrelation, heteroscedasticity, and model specification errors using the Ramsey RESET test. Additionally, cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests are employed to evaluate the stability of the long-run and short-run coefficients (Bahmani-Oskooee & Kanitpong, 2017).

RESULT AND DISCUSSION

Descriptive Statistics

Table 1 presents the descriptive statistics for the variables used in this study: Zakat collection (LnZ), the dummy variable for *Eid al-Fitr* (D_{ied}), inflation (IN), and the Real Exchange Rate (RER). The total number of observations (N) is 45, which meets the minimum threshold of 30 required for performing the ARDL bounds test. This ensures the robustness of the statistical analysis and results.

Table 1. Descriptive Statistics

	LnZ	**D_{ied}**	**IN**	**RER**
Mean	9.88	0.089	114.72	90.22
Median	9.82	0.00	115.22	89.72
Max.	11.4	1	118.37	98.25
Min.	9.05	0	109.69	84.8
Std. Dev	0.57	0.287	2.763	2.74
J-B	10.29	138.1	3.78	3.5
Prob J-B	0.006	0.00	0.15	0.17
N	45	45	45	45

(Source: Author's calculation, 2024)

Zakat Collection

The zakat collection data (LnZ) had an average (mean) value of 9.88, with the highest observed value at 11.4 (equivalent to IDR 97,603.46 million) in July 2021, and the lowest value at 9.05 (equivalent to IDR 8,548.49 million) in March 2018. The spike in zakat collection during July 2021 can be attributed to Indonesia's economic recovery from the COVID-19 pandemic, when charitable giving likely increased as part of community support efforts. The low

point in March 2018 might be explained by the exclusion of zakat from corporate entities in the BAZNAS financial statement during that period.

Dummy Variable for Eid al-Fitr

The dummy variable for *Eid al-Fitr* (D_{ied}) indicates months when *Eid al-Fitr* occurred (coded as 1) and other months (coded as 0). The mean of D_{ied} is 0.089, showing that *Eid al-Fitr* occurred in approximately 9% of the observations. The standard deviation is 0.287, and the variable has the highest Jarque-Bera value (138.1), indicating non-normality in its distribution. This reflects the significant seasonal effect of *Eid al-Fitr* on zakat collection patterns.

Inflation

Inflation (IN), proxied by the Consumer Price Index (CPI), had an average value of 114.72, with a peak of 118.37 and a minimum value of 109.69. A rise in inflation can indicate either a strengthening economy or the risk of overheating. Conversely, the lowest inflation value may suggest economic sluggishness that requires policy intervention to stimulate growth. The Jarque-Bera test result of 3.78 with a probability of 0.15 suggests that the inflation data is normally distributed.

Real Exchange Rate

The real exchange rate (RER) averaged 90.22, with a maximum value of 98.25 and a minimum of 84.8. Exchange rate fluctuations affect Indonesia's export and import activities, where higher exchange rates typically reduce net exports by making domestic goods more expensive abroad, while lower exchange rates enhance competitiveness. The Jarque-Bera value for RER is the lowest among the observed variables (3.5), with a probability of 0.17, suggesting normality in its distribution.

Unit Root Test and Lag Length Selection

The unit root test is conducted to ensure that none of the observed variables are integrated at the second order, or $I(2)$, which would invalidate the use of the ARDL bounds testing approach. As per Bist & Bista (2018), ARDL models can only handle variables that are integrated at levels $I(0)$ or first differences $I(1)$, but not second-order integration $I(2)$.

The unit root test in this study employs the Fisher-ADF test and the Choi Z-stat test, both of which are suitable for small sample sizes and allow for individual time series tests under different assumptions, such as intercept only or intercept with trend. The test results are summarized in Table 2.

Table 2. Unit Root Test Results

	Level *I*(0)	**1st dif. *I*(1)**
Individual intercept	ADF-Fisher Chi Square (prob) (0.000) ADF-Choi Z-stat (prob) (0.000)	ADF-Fisher Chi Square (prob) (0.000) ADF-Choi Z-stat (prob) (0.000)
LNZ	0.0031 (prob.)	0.000 (prob.)
D_{ied}	0.000 (prob.)	0.000 (prob.)
IN	0.1791 (prob.)	0.000 (prob.)
IN^2	0.2216 (prob.)	0.000 (prob.)
RER	0.0253 (prob.)	0.000 (prob.)
Individual intercept and trend	ADF-Fisher Chi Square (prob) (0.000) ADF-Choi Z-stat (prob) (0.00)	ADF-Fisher Chi Square (prob) (0.000) ADF-Choi Z-stat (prob) (0.00)
LNZ	0.0005 (prob.)	0.000 (prob.)
D_{ied}	0.000 (prob.)	0.000 (prob.)
IN	0.5816 (prob.)	0.000 (prob.)
IN^2	0.5408 (prob.)	0.000 (prob.)
RER	0.0706 (prob.)	0.0001 (prob.)

(Source: Author's calculation, 2024)

The ADF-Fisher Chi-square test confirms that none of the variables are integrated at order *I*(2), which allows the use of the ARDL bounds testing approach to analyze the relationship between the dependent and independent variables.

In the ARDL model, selecting the appropriate lag length is crucial to ensuring the accuracy of both short-run and long-run estimates. For this reason, this study employs the Akaike Information Criterion (AIC) along with other estimations, such as the Schwarz Criterion (SC), Hannan-Quinn Criterion (HQ), and Final Prediction Error (FPE), to determine the optimal lag length for the ARDL model. The results are summarized in Table 3.

Table 3. Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-306.3862	NA	5.925072	15.96852	16.18180	16.04504
1	-141.0805	279.7481	0.004500	8.773358	10.05302*	9.232490
2	-111.5880	42.34814	0.003819	8.542975	10.88902	9.384717
3	-86.18817	29.95880	0.004470	8.522470	11.93490	9.746822
4	-63.11778	21.29575	0.007207	8.621425	13.10024	10.22839
5	-33.47940	19.75892	0.011971	8.383559	13.92876	10.37313
6	59.38012	38.09621*	0.001680*	4.903583*	11.51517	7.275765*

Source: Author's estimation using Eviews (2024)

The asterisk (*) indicates the lag order selected by the respective criterion. The Schwarz Criterion (SC) suggests a lag length of 1, whereas the Likelihood Ratio (LR), Final Prediction Error (FPE), AIC, and Hannan-Quinn Criterion (HQ) recommend a maximum lag length of 6. Therefore, this paper adopts a lag length of 6 for the ARDL model.

Testing for Cointegration and Estimation of Short and Long Run Effects

Once the lag length has been determined, the cointegration test can be conducted. This test assesses whether the data can reject the null hypothesis of no cointegration based on the computed F-statistics generated from Equation 4 (Eq. 4). Generally, the null hypothesis of no cointegration can be rejected if the computed F-statistics exceed the upper bound at any significance level. The results of the cointegration test are presented in Table 4.

Table 4. Bounds Test for Cointegration

Computed F-statistics	Significance	Lower Bound	Upper Bound
16.629	10%	2.2	3.09
	5%	2.56	3.49
	2.5%	2.88	3.87
	1%	3.29	4.37

(Source: Author's estimation using Eviews, 2024)

The computed F-statistics tests the null hypothesis of no cointegration. Since the computed F-statistics of 16.629 exceed the upper bound value at all significance levels (10%, 5%, 2.5%, and 1%), the null hypothesis can be rejected. This indicates that there is a significant cointegration relationship among the variables. Following the successful completion of the cointegration

test, the next step is to compute the long-run and short-run estimations based on Equations 5 and 6, respectively. The results are shown in Table 5.

Table 5. ARDL Long-Run and Short-Run Estimation

Long run estimation	
Dependent: LnZ (Zakat collection)	
$\boldsymbol{D_{ied}}$	1.764***
IN	-2.047***
IN^2	0.0097***
RER	2.315***
C	106.04***
Short run estimation	
Dependent: LnZ (Zakat collection)	
$\boldsymbol{\Delta D_{ied}}$ (-1)	0.532***
ΔIN	37.98***
ΔIN^2	-0.153***
ΔRER(-2)	-0.270***
ECT (-1)	-9.59***
Notes: ***,**,* indicate statistical significance at 1, 5, and 10% respectively.	

(Source: Author's estimation using E-views, 2024)

Both the long-run and short-run estimations yield statistically significant results at the 1% level. In the long-run estimation, the dummy variable for incorporating Ramadan and *Eid al-Fitr* indicates that, on average, zakat collected in the month of *Eid al-Fitr* is approximately 1.764% higher than in months without *Eid al-Fitr*. The long-run estimation also reveals nonlinearity in the inflation variable, where the quadratic form of inflation (IN^2) is significant with a positive sign, contrasting with the original inflation variable (IN), which is significant with a negative sign. The real exchange rate (RER) in the long run shows a significant result, indicating that a one-unit increase in the real exchange rate corresponds to an average increase in zakat collection of approximately 2.315%, ceteris paribus.

In the short run, where disequilibrium among all observed independent variables occurs, the ECT(-1) value is -9.59 and statistically significant, as shown in Table 5. According to Nguyen & Ngoc (2020), the time for correction is computed using $1/(|\theta|)$, where $|\theta|$ is the absolute value of the coefficient of ECT. This calculation yields a correction time of 0.104 months (less than a month), indicating an impressively rapid adjustment from the short-run coefficients to the long-run coefficients. This result may also suggest that changes in monetary policy in Indonesia are responded to very quickly.

The regression results pass several diagnostic tests, particularly the heteroscedasticity test (0.484) and the Ramsey RESET test for misspecification (0.632). Furthermore, for serial correlation, this paper employs HAC (Newey-West standard error) to correct standard errors in the presence of autocorrelation, as explained by Gujarati (2021).

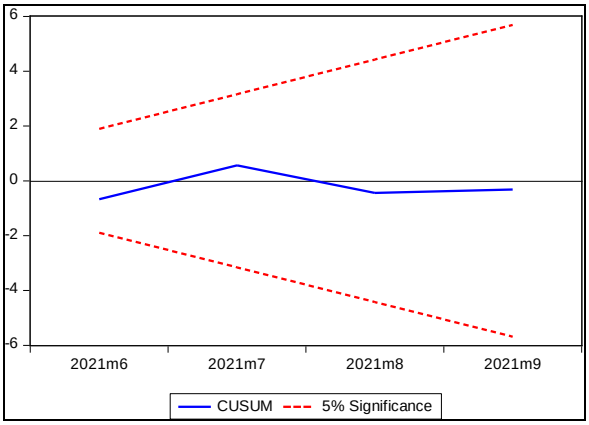

Figure 6. CUSUM.
(Source: Author's estimation using E-views, 2024)

For the parameter stability test, both CUSUM and CUSUMSQ tests are conducted. Turner (2010) explains that these tests are employed to detect parameter stability. The results are depicted in Figure 6 and 7.

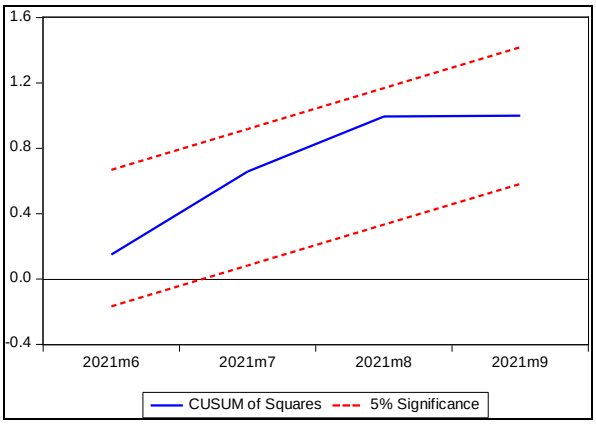

Figure 7. CUSUMSQ
(Source: Author's estimation using E-views, 2024)

Both CUSUM and CUSUMSQ tests confirm parameter stability over time, as the blue lines remain within the critical bounds (the red lines) at the 5%

significance level. This indicates that the parameters of the model are stable and do not exhibit any structural breaks during the period under study.

Discussion

Impact of Inflation and Exchange Rate on Zakat Collection

The long-run estimation reveals significant results regarding inflation, demonstrating a negative relationship with zakat collection (IN) and a positive relationship with squared inflation (IN^2). This confirms the hypothesis of nonlinearity within the variable. Specifically, an increase in inflation, viewed as a social cost that diminishes individual wealth, correlates with a reduction in zakat collection by approximately 2.047%, as indicated in Table 5. However, it is important to note that inflation also reflects economic activity; a sustained increase in inflation can stimulate economic growth, which is often associated with lower unemployment rates. This improved economic condition may subsequently lead to an increase in zakat collection.

The tipping point of this nonlinearity in inflation can be calculated using the estimated regression equation:

$$LnZ = 106.04 - 2.047IN + 0.0097IN^2$$

Following Bradley's (2013) approach, the first derivative of zakat collection with respect to inflation is:

$$\frac{\partial Z}{\partial IN} = -2.047 + 2(0.0097)IN$$

Setting this equal to zero to find the tipping point:

$$-2{,}047 + 2(0.0097)IN = 0$$

Solving for the tipping point of inflation (IN) yields:

$$\frac{2{,}047}{2(0{,}0097)} = 105.51$$

This result suggests that when inflation exceeds 105.51, it begins to positively affect zakat collection. Conversely, if inflation is below this threshold, rising inflation will negatively impact zakat collection. According to data from FRED

Economic Data, Indonesia's CPI in November 2023 was 128.8, which exceeds the tipping point of 105.51. This indicates that the current inflation rate is high enough to potentially boost zakat collection. To maintain this positive effect, policymakers should focus on keeping inflation stable. One key approach would be to strengthen the credibility of Bank Indonesia in achieving inflation targets and enhancing its independence to prevent inflation from rising too quickly or significantly.

The relationship between the real exchange rate (RER) and zakat collection is positive and significant in the long run. In the short run, this relationship is also significant, but with a quick adjustment towards the long-run equilibrium, as indicated by the error correction term (ECT) in Table 5.

Bolukbasi & Civcir (2024) offers a possible explanation for this positive long-run effect of the exchange rate on zakat collection. Their research suggests that the use of imported intermediate inputs boosts exports, leading to higher income and output. This improvement in economic conditions, particularly through reduced unemployment, enhances zakat collection in the long term.

Similarly, Seker et al. (2024) support the idea that importing intermediate goods can increase revenue per product. Thus, an appreciating Rupiah could stimulate economic growth by encouraging imports of intermediate goods that are used in production rather than importing finished goods. This would, in turn, lead to higher zakat collection.

Therefore, BAZNAS can capitalize on the appreciation of the Rupiah to boost zakat collection. The government can also play a role by implementing policies aimed at strengthening the Rupiah, which could improve economic performance and increase zakat contributions. Encouraging the importation of intermediate goods, which are used in domestic production, is another strategy that can support this process.

Eid al-Fitr Effect on Zakat Collection

The intercept from the long-run regression analysis indicates a value of 106.04. This suggests that, in the absence of any changes in the observed independent variables and without the influence of *Eid al-Fitr* (represented as a dummy variable), zakat collection would, on average, increase by approximately 106.04%. This substantial figure can be attributed to the fact that not all seasonal effects influencing zakat collection are captured by the dummy

variable for *Eid al-Fitr*. The study posits that the primary determinant of seasonal patterns in zakat collection is the religiosity of Indonesians, particularly during the holy month of Ramadan.

In this analysis, the seasonal effect is limited to the month in which *Eid al-Fitr* occurs. However, a review of the STL Decomposition for seasonal adjustment reveals that there are multiple time-series data points related to zakat collection that exhibit seasonal characteristics beyond just *Eid al-Fitr*. To address this, we re-estimated the regression model by incorporating all relevant seasonal effects as dummy variables. The results are summarized in Table 6.

Table 6. Seasonal Effects beyond *Eid al-Fitr*

Variable	Coefficient	Standard Error	P-Value
C	9.69	0.174	0.000
Ds*Z	0.049	0.010	0.000
AR(1)	0.594	0.151	0.000
Sigmasq	0.154	0.040	0.000
R-squared:	**51.4**		

(Source: Author's estimation using Eviews, 2024)

As shown in Table 6, after incorporating all seasonal effects beyond *Eid al-Fitr*, the estimated intercept remains positive and statistically significant. This indicates that the seasonal effects captured by the variable $Ds*Z$ can enhance zakat collection by approximately (9.69+0.049)=9.749%. Conversely, if no seasonal effects are present in zakat collection (i.e., without $Ds*Z$), zakat collection would still experience an increase of about 9.69%.

These findings underscore the importance of considering various seasonal influences when analyzing zakat collection, particularly the role of religious observances and their impact on charitable giving during significant periods such as Ramadan and *Eid al-Fitr*.

CONCLUSION

This study explores the impact of inflation and exchange rates on zakat collection, revealing several key findings that have important implications for policymakers and future research. The ARDL long-run regression analysis demonstrates a nonlinear relationship between inflation and zakat collection. Specifically, when the Consumer Price Index (CPI) is below 105.5, zakat collection decreases; conversely, when inflation exceeds this threshold, zakat

collection increases. This indicates that moderate inflation can stimulate charitable contributions. Furthermore, the research highlights that while an increase in the real exchange rate can enhance zakat collection in the long run, it exerts a negative impact in the short run. This suggests that fluctuations in currency value can significantly influence zakat donations, necessitating careful monitoring and management. Additionally, the findings indicate a significant increase in zakat collection during the month of *Eid al-Fitr*, stressing the importance of religious observances in shaping charitable behavior.

These findings provide important implications for policymakers and zakat institutions like BAZNAS. To maximize zakat collection, policymakers should aim to maintain inflation above 105.5 (CPI value) to create conditions favorable for zakat contributions. Additionally, steps should be taken to mitigate the short-term negative effects of exchange rate fluctuations, especially during periods of currency appreciation. Encouraging the import of intermediate goods to stimulate long-run economic growth could also boost zakat collection, given the long-run positive relationship between the exchange rate and zakat.

This research, however, has several limitations that open avenues for future investigation. The study employs a linear ARDL model, which may not fully capture the complex dynamics of inflation and exchange rate effects. Future studies could apply a nonlinear ARDL approach to better account for asymmetries in these relationships. Furthermore, the focus is limited to the impact of monetary variables, such as inflation and exchange rates, on zakat collection. Future research could explore the role of fiscal policies or other macroeconomic instruments, such as government spending or taxation, in enhancing zakat collection. Lastly, while seasonal factors beyond *Eid al-Fitr* were partially incorporated, further research could provide a more detailed exploration of other seasonal effects or cultural factors influencing zakat payments throughout the year.

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