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Analysis of Indonesia's Gross Domestic Product Review of Macroeconomic Variables

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Abstract

First, the impact of family spending; second, the effect of state debt; and third, the effect of zakat revenue on Indonesia's GDP are the goals of this research. The information used for this research is derived from secondary sources, including the websites of the Indonesian Statistics Center, the National Amil Zakat Agency, and the Ministry of Finance. A total of forty observations were gathered from these sources between 2012 and 2021. This research made use of statistical analysis techniques and the Error Correction Model (ECM) for its analysis. For the period 2012-2021, at the 0.000 level of significance, the results show that household spending, state debt, and zakat earnings all have a positive effect on Indonesia's GDP. On the other hand, zakat revenue is a short-term variable that significantly affects Indonesia's GDP from 2012 to 2021, while partially state debt has no long-term or short-term influence. R2 = 0.7997, or 79.97 percent, is the coefficient of determination.

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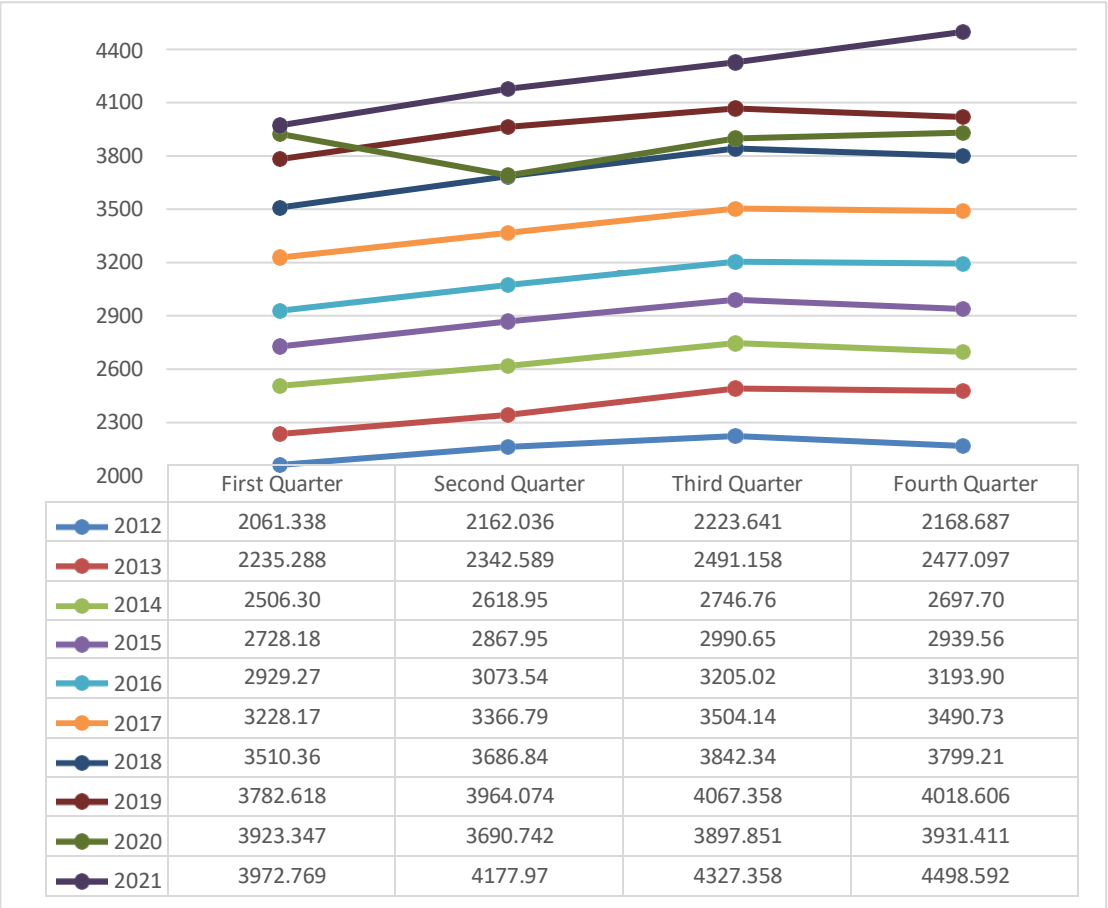
INTRODUCTION

Significant fluctuations are seen in Indonesia's gross domestic output between 2012 and 2021. There was a total GDP of 2.061,338 thousand trillion in 2012. In 2018, Indonesia's GDP reached a staggering 3.799,213 thousand trillion. But in 2019, a new virus called COVID-19 emerged and the world was hit by a pandemic. This result in a decline of GDP from 401,606 trillion in 2019 to 3.931,441 trillion the following year (BPS, 2022)

The 2019 coronavirus (COVID-19) pandemic has impacted many people around the world in terms of health, economy and culture. Starting March 1, 2020, WHO declared COVID- 19 a temporary global emergency whose impact will be difficult to overcome in the long term. According to Murwiati et al. (2022), there are three ways to measure the effect of COVID-19 on household welfare. One way is through the transmission of health and socioeconomic effects on the population. The second way is through the price channel, which can have an impact on the state of key commodities. Finally, there is the long-term human capital pathway (Murwiati et al. 2022) .

GDP can be measured by the aggregate expenditure approach which is influenced by investment, consumption, government spending, and also exports minus imports. (Yuniarti et al., 2020) Domestic consumption, state debt, and zakat payments are the macroeconomic factors studied here. Improving domestic conditions in Indonesia, such as people's income and infrastructure facilities, can boost gross domestic product growth. This cannot happen unless the government has access to a large amount of money for spending and borrowing (Changyong et al., 2012) The people will definitely benefit from the money as it can facilitate the recovery of economic circulation, resulting in increased output. When looking at GDP from an expenditure perspective, the use of funds to meet consumer needs is crucial, both at the household and government levels. The distribution of funds for consumption ensures the continuity of economic activity, which in turn can grow the economy, so consumption has a significant influence on the level of GDP (Swaramarinda, Darma; Indriani, 2011) .

The state of the economy in Indonesia has become disproportionate due to the fall in gross domestic product, and this has resulted in the economic position of the population getting worse as the income base is lost. One of the negative consequences of a cut in people's income is a decrease in household spending. As a result, there is a one-way relationship between consumption and GDP (Hidayat & Astuti, 2021) . A decrease in consumer spending may have an adverse impact on GDP. Government funding can be used to implement direct relief programs to affected areas and to combat the spread of the COVID-19 virus, both of which can help restore the situation (Ministry of Finance, 2020) , Data published by the Indonesian Ministry of Finance shows that the country has a shortfall in the state budget, at the time of the research year the deficit was located at the amount of -296 trillion rupiah and in the following year there was a shortfall that rose to 651.6 trillion rupiah, but in the following year until the end of the research year it appears that the shortfall realized was 775.1 trillion rupiah. Although Indonesia adheres to a deficit budget policy, namely a spending system that is greater than the amount of state revenue so that it can expand economic activities in an effort to lead a developed country, the application to meet the shortfall still uses debt as a source (Ministry of Finance, 2021)

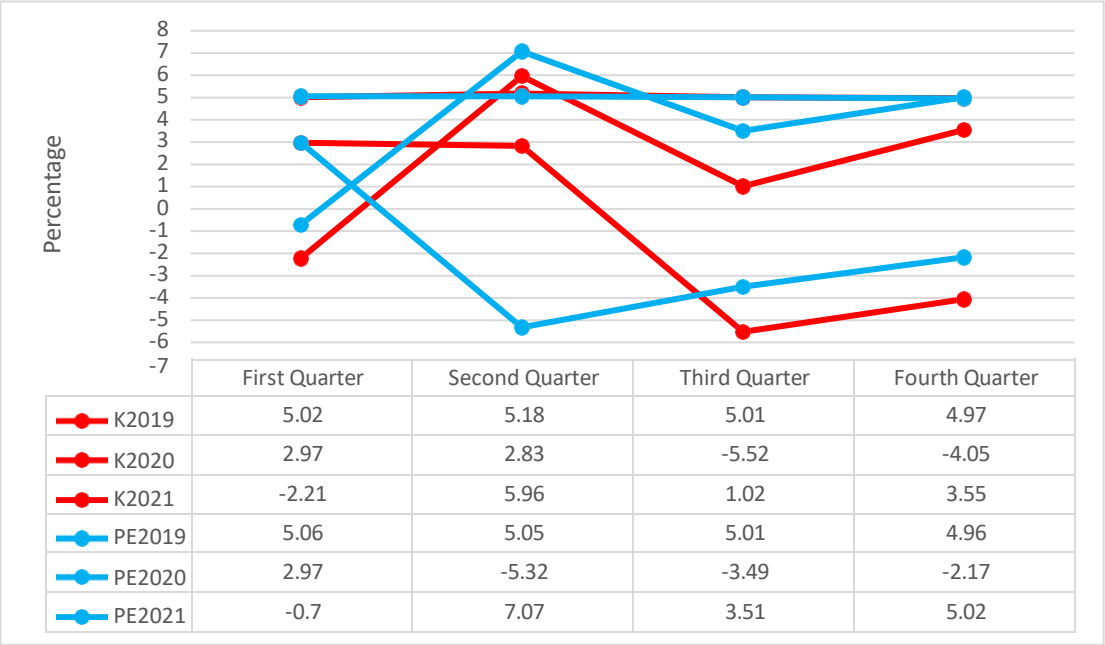


	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
2012	2061.338	2162.036	2223.641	2168.687
2013	2235.288	2342.589	2491.158	2477.097
2014	2506.30	2618.95	2746.76	2697.70
2015	2728.18	2867.95	2990.65	2939.56
2016	2929.27	3073.54	3205.02	3193.90
2017	3228.17	3366.79	3504.14	3490.73
2018	3510.36	3686.84	3842.34	3799.21
2019	3782.618	3964.074	4067.358	4018.606
2020	3923.347	3690.742	3897.851	3931.411
2021	3972.769	4177.97	4327.358	4498.592

Source: BPS Indonesia, 2022

Figure 1: Graph of GDP Growth Rate by Expenditure 2012-2021

Figure 1 states that the largest GDP of 4498.592 trillion rupiah was reached in the 4th quarter of 2021. The COVID-19 pandemic, which began in the 4th quarter of 2019 and continued until the second quarter of 2020, had a significant impact on the Indonesian economy, causing a decrease in GDP of 3690.742 trillion rupiah. The economic situation in Indonesia has become disproportionate due to the decline in gross domestic product, and this has an impact on the economic position of the population which is getting worse along with the loss of income base. One of the negative consequences of a cut in people's income is a decrease in household spending. This means that there is a one-way or harmonious relationship between consumption and GDP.

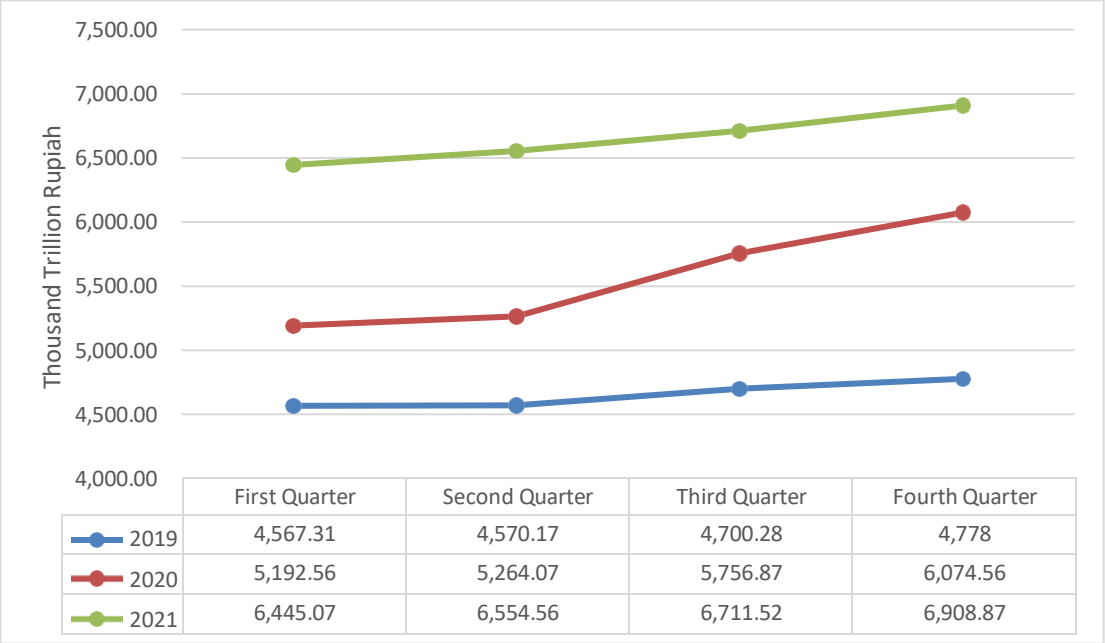


	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
K2019	5.02	5.18	5.01	4.97
K2020	2.97	2.83	-5.52	-4.05
K2021	-2.21	5.96	1.02	3.55
PE2019	5.06	5.05	5.01	4.96
PE2020	2.97	-5.32	-3.49	-2.17
PE2021	-0.7	7.07	3.51	5.02

Source: BPS Indonesia, 2022

Figure 2: Household Consumption Growth 2019-2021

The development of household consumption in Indonesia experienced fluctuations throughout 2019-2020, as shown in Figure 2. The upward trend in household spending continued throughout the second quarter of 2019-2020. However, household consumption fell sharply by 5.52 percent in the third quarter of 2020. Reduced spending has an impact on the Indonesian economy. The decline in people's income and purchasing power triggered this decline. Worsening social inequality and poverty are inevitable if this trend continues. Consumption expenditure is positively and significantly related to GDP, according to previous research by (Afiftah et al., 2017) As spending increases GDP, it can also help revive the economy.



	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
2019	4,567.31	4,570.17	4,700.28	4,778
2020	5,192.56	5,264.07	5,756.87	6,074.56
2021	6,445.07	6,554.56	6,711.52	6,908.87

Source: Indonesian Ministry of Finance, 2022

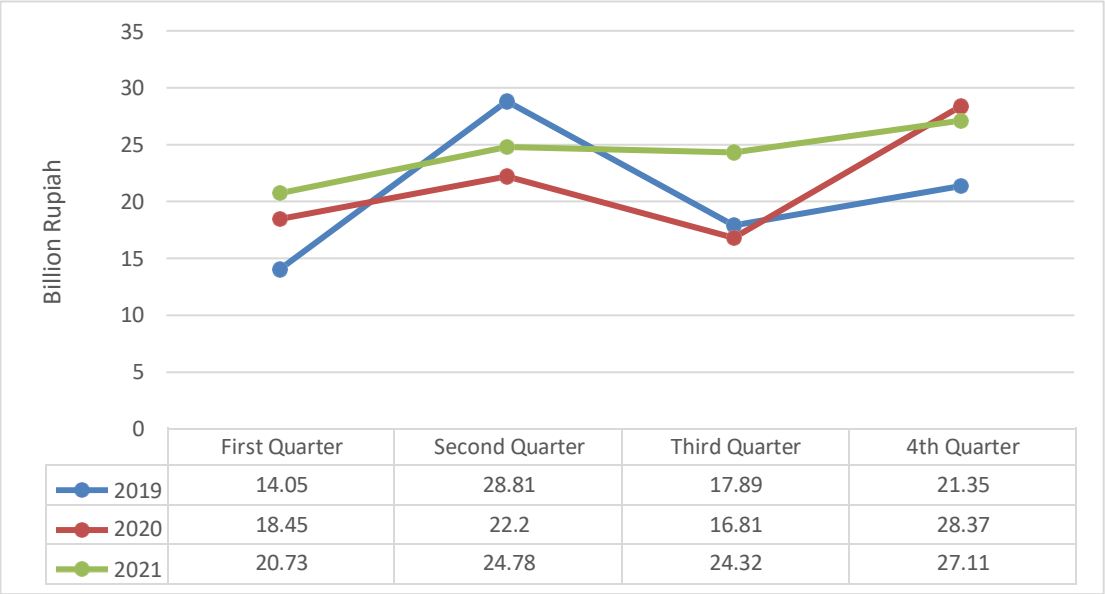
Figure 3: Statistics on the Development of Indonesia's State Debt 2019-2021

This increase in borrowing is due to a shift in Indonesia's debt, as shown in Figure 3. Compared to the previous borrowing of> 6,074 trillion rupiahs, 2021 appears to be the year of the largest borrowing achievement, which amounted to 6,908 trillion rupiahs. Therefore, it is clear that

Indonesia's state budget follows the country's deficit budget policy. The disbursement of loans for development budget needs and the expected growth of the Indonesian economy are two ways the Indonesian state stimulates the economy (Ministry of Finance, 2021) .

The additional budget can be used to restore the country's infrastructure and economic situation, according to an analysis conducted by (Changyong et al., 2012)). This is especially true after the economic crisis that affected the economy in various aspects. With the additional budget, the economy can recover from the crisis and economic development can also revive, making state debt an instrument of economic development.

The ever-increasing state debt poses a serious danger to the Indonesian economy, making it a problem. Excessive state debt increases the likelihood of macroeconomic instability, lowers investor confidence in the government, and results in high interest payments (Basten et al., 2021) . Understanding the impact of Indonesia's state debt on GDP, after accounting for variables such as consumption and tithe income, is crucial.



	First Quarter	Second Quarter	Third Quarter	4th Quarter
2019	14.05	28.81	17.89	21.35
2020	18.45	22.2	16.81	28.37
2021	20.73	24.78	24.32	27.11

Source: BAZNAS, 2022

Figure 4: Zakat Revenue Data 2019-2021

The graph in Figure 4 states the change of BAZNAS zakat income over time. According to research, investment made possible by zakat money has the potential to trigger economic growth (Ben Jedidia & Guerbouj, 2021) In addition, the zakat factor can also affect economic growth because the money collected can be used to fulfill certain needs, which in turn can encourage the economic progress of a country. Besides zakat, there are other options to reduce poverty, and future GDP growth may be driven by a combination of low poverty rate and high income (Munandar et al., 2020) . The problem with zakat income is that although its growth continues to rise, there is still a lot of unutilized potential. The potential of zakat in Indonesia is estimated to be worth Rp, according to statistics from the World Zakat Forum. In 2020, the potential reached 217 trillion, but only about sixteen percent was handled efficiently and effectively (World Zakat Forum, 2019) If zakat is not used effectively, it can slow down Indonesia's GDP growth.

RESEARCH METHODOLOGY

This analysis uses secondary data derived from quarterly *time-series* data covering the period from the first quarter of 2012 to the fourth quarter of 2021. The records are obtained from various research objects in Indonesia, including the Central Bureau of Statistics, the Ministry of Finance, and BAZNAS. Zakat income, state debt, GDP, and household expenditure in Indonesia are the variables used in this analysis. The analysis method applied ECM.

This study utilizes the unit root test, this investigation utilizes the unit root test to

establish whether the data is stationary. *Augmented Dickey-Fuller* (ADF) test is the procedure used to conduct the unit root test. When using the *Augmented Dicky-Fuller* (ADF) approach, one checks if the data is stationary by comparing the value of the ADF statistic with an important value known as the *MacKinnon* critical values (α =1%, α =5%, α =10%). Data is considered stationary if P-value< α.

Next we need to know whether the data is cointegrated or not after it is confirmed that it is not stationary at the first difference level. One way to find out whether a model has a long-term relationship (cointegration relationship) is to apply a cointegration test. In this analysis, the *Engle-Granger* (EG) test technique is used to test for cointegration. Dickey-Fuller created the *Engle-Granger* (EG) cointegration testing technique by combining the DF and ADF tests. The *Engle-Granger* (EG) cointegration testing technique involves running an OLS regression on the test variables and then obtaining the residual values. Checking the value of the residual coefficient/ECT is the next step. The data or variables are considered cointegrated and an error correction model (ECM) can be estimated if the residual coefficient/ECT value is statistically< the alpha value.

Although Sargan was the first to propose the ECM model, Hendri refined it, and Engle-Granger made it famous. Among its many applications, ECM estimation excels when dealing with non-stationary data and unpredictable regressions. Once the stationary and cointegration tests are passed, ECM estimation can begin. Adding a new variable called Error Correction Term (ECT) into the equation is the first stage in ECM estimation. The reason why this is important is because the short-run variables will be measured based on the ECT. Consequently, a negative and statistically significant ECT is required for a good and valid ECM. Time-series data that passes the cointegration test and is stationary in the first differentiation can be analyzed using ECM (Widarjono, 2018). The cointegration equation for this analysis is:

$Y_t = \beta 0 + \beta 1 C_t + \beta 2 D_t + \beta 3 Z_{(t)} +$

Ket:

Y	= GDP
C	= Household Consumption (Trillion Rupiah)
D	= Government Debt (IDR Trillion)
Z	= Zakat Revenue (Trillion Rupiah)
β0	= Constant
β1, β2, β3	= Coefficient
t	= Period
et	= Error term

The model of the ECM estimation in this analysis is :

$\Delta Y_t = \beta 0 + \beta 1 \Delta C_t + \beta 2 \Delta D_t + \beta 3 \Delta Z_{(t)} + + \beta 4 \Delta ECT_t + et$

Ket:

ΔY	= Change in GDP
ΔC	= Change in Household Consumption (Trillion Rupiah)
ΔD	= Change in State Debt (Trillion Rupiah)
ΔZ	= Change in Zakat Revenue (Trillion Rupiah)
β0	= Constant
β1, β2, β3	= Coefficien
t	= Period
et	= Error term
ECT	= $Residual_{t-1}$

To check whether the findings of the ECM estimation do not contradict the classical assumptions, classical assumption testing is used after the ECM estimation but before the short-run and long-run analysis. The most commonly run classical assumption tests are normality, autocorrelation, heteroscedasticity and multicollinearity tests. If we break down each of these traditional assumption tests, we find:

To determine whether the residuals of the research model follow a normal distribution, a normality test is used. A normal or near normal residual distribution is an indicator of a strong

regression model. Researchers in this study used the *Skewness-Kurtosis* test to look for signs of normal residuals.

When looking for heteroscedasticity in a regression model, the purpose of this test is to identify instances when residuals differ between observations. The estimator obtained will not be effective in either small or large samples if the variables in the regression model are heteroscedastic. The *Breusch-Pagan-Godfrey* test can be used to establish whether the residuals exhibit heteroscedasticity in the model.

Finding out whether the independent variables in the regression model are perfectly or precisely linearly related is the purpose of identifying multicollinearity. The extent of VIF or tolerance value indicates signs of multicollinearity.

The purpose of the autocorrelation test is to find out whether the errors of period t (this year) and period t-1 (last year) are correlated in a linear regression model. This problem is known as an autocorrelation problem if there is a correlation. One way to see if there is autocorrelation is to use the *Durbin-Watson* test.

This study uses operational concepts and measurement variables, namely:

1. Indonesia's GDP is a quantitative indicator that reflects expenditure in the year under study. From 2012 to 2021, BPS provides data used for the expenditure side of Indonesia's GDP, which is updated quarterly.
2. Spending on products and services to meet family needs is said to be household consumption in this analysis (Sadono, 2016). The data used are quarterly estimates of Indonesian household consumption expenditure collected from BPS between 2012 and 2021.
3. State debt is the overall government debt reported by the Ministry of Finance for the purposes of this study. The information used comes from Indonesia's State Debt 2012-2021, with quarterly updates provided by the Ministry of Finance.
4. For the purpose of this study, "zakat revenue" refers to the total amount of zakat revenue reported by BAZNAS. Indonesia's Zakat Receipts (quarterly) during 2012-2021 obtained from BAZNAS are the statistics used.

RESULTS AND DISCUSSION

Stationarity Test. One of the first steps in running an ECM model is to check stationarity. Table 1 contains the application. Table 1 shows that the unit root test at the probability value level does not show stationary results, therefore a test at the first difference level is required. At the 1st difference level, all four variables expressed a probability value of< 5% so that the next test could be carried out.

Table 1. Stationarity Test Results

Variables	Level Level t-statistic	Prob.	Level 1st Difference t-statistic	Prob.
Y	-0.154	0.9438	-5.406	0.0000
C	-1.068	0.7278	-6.655	0.0000
D	3.104	1.0000	-5.635	0.0000
Z	-3.062	0.0295	-8.434	0.0000

When using the *Augmented Dickey-Fuller* (ADF) technique to test the degree of integration with a *MacKinnon* critical value of 5%, we find that all variables in the first difference set (or first difference) are stationary, except one. Therefore, ECM testing can utilize the data.

Cointegration Test Results. The variables to be examined are first regressed using OLS and the residual values are used to conduct a cointegration test using the *Engle-Granger* (EG) technique in this study. After that, check the residual values; data or variables are considered cointegrated if the residual coefficient value is negative and statistically significant.

Table 2. Cointegration Test Results

Variables	Coefficient	Std Error	t-Statistic	Prob.	Adjusted R^2
C	1.567315	.0919191	17.05	0.000	0.9888
D	.0481119	.0280911	1.71	0.095	
Z	.058461	.0513625	1.14	0.263	
_cons	184.2569	84.33101	2.18	0.035	

A new equation is obtained as below:

$Y_t = 184.2569 + 1.567315C_t + .0481119D_t + .058461Z_{(t}$

Table 2 shows the results of the cointegration test which can be used to determine the residual values of the regression equation. The *Augmented Dickey-Fuller* (ADF) test will then be applied to these residual values to see if they are stable at the integration level, indicating that the variables are cointegrated:

Table 3. ECT Stationary Test Results at Level

Variables	ADF Test Value	MacKinnon Critical Value 5%	Prob.	Description
Residuals	-4.948	-2.972	0.0000	Stationer

Table 3 shows the results of the *Engle-Granger* (EG) cointegration test with the ADF test which shows that prob. It can be stated that there is cointegration between the variables because the residuals are stable at the level, specifically because 0.0000 < 0.05, which is less than the alpha value of 5%.

ECM Model Estimation

Table 4. ECM Estimation Results

Variables	Coefficient	Std Error	t-Statistic	Prob.	Adjusted R^2
D(C)	2.10981	.1954739	10.79	0.000	0.7997
D(D)	.0469204	.068791	0.68	0.500	
D(Z)	.0581653	.0254308	2.29	0.029	
ECT	-.7359244	84.33101	-5.36	0.000	
_cons	-13.07108	13.83958	-0.94	0.352	

The ECT (*Error Correction Term*) coefficient value captured in this study is -0.7359244 and the probability value is 0.0000 < α = 5% (0.05). The validity of the Engle Granger ECM model is supported by the negative and statistically significant ECT/residual-1 coefficient value in this investigation. Here is another way to view the regression findings of the *Engle Granger* ECM in Table 4:

$\Delta Y_t = -13.07108 + 2.10981\Delta C_t + .0469204\Delta D_{(t)} + .0581653\Delta Z_{(t)} + -.7359244\Delta ECT_{(t}$

Table 4 shows the estimated value of the ECT coefficient which is -0.7359244. This shows that short-term equilibrium fluctuations will be corrected towards long-term stability. The adjustment process is in the first quarter which reaches about 73.59% of the total, and in the following quarter which reaches about 26.41%.

Classical Assumption Test Results

a) Normality Test

Variables	Obs	Pr(*skewness*)	Pr(*kurtosis*)	Adj chi2(2)	Prob > Chi2
ect	40	0.5646	0.1485	2.59	0.2742

It can be seen that the Prob> Chi2 value> alpha 5% (a = 0.05) is 0.2742> 0.05, so it can be stated that the residuals in the analysis model are normally distributed.

b) Heteroscedasticity Test

chi2(1)	Prob > chi2
0.94	0.3324

It can be seen that the probability value of Chi-Square > alpha (α = 0.05) is 0.3324 > 0.05, so it can be stated that the model is free from heteroscedasticity problems.

c) Multicollinearity Detection

Variables	VIF	1/VIF
D(Z)	1.35	0.740803
D(C)	1.26	0.790778
D(D)	1.09	0.913266
ECT	1.04	0.958112

It can be seen that the VIF value of all variables< 10, so there is no multicollinearity problem detected in the data in the ECM model of this analysis.

d) Autocorrelation Test

Durbin-Watson (5.35)
2.087531

It can be seen that the Durbin-Watson value is between dU and 4-dU, namely 2.087531. so it can be stated that Ha is accepted and the model is free from autocorrelation problems.

CONCLUSIONS AND SUGGESTIONS

Conclusion

The analysis on Indonesia's GDP, state debt, household consumption, and zakat revenue from 2012 to 2021 yields mixed findings. The cointegration test reveals a statistically significant relationship between household expenditure and Indonesian GDP. Meanwhile, the state debt and zakat revenue variables have a positive but insignificant effect on Indonesia's GDP. This means that only household consumption has a long- term relationship on Indonesia's GDP.

In general, the ECM model estimation results shows the short-run relationship between each variable. The ECM estimation analysis reveals that zakat income and household consumption have a statistically significant and favorable impact on Indonesia's GDP. Meanwhile, the state debt variable has a positive but insignificant impact on Indonesia's GDP. This means that only household consumption and zakat income variables have a short-term relationship with Indonesia's GDP in the year of the study period.

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