

Research article

Government Bonds and Central Bank Assets in Global Crisis Mitigation Efforts in Indonesia

Chenny Seftarita*, Suriani, Ferayanti, Fitriyani, Asri Diana

Department of Development Economics, Faculty of Economics and Business, Universitas Syiah Kuala, Aceh, Indonesia

*Corresponding author email: chenny@usk.ac.id**ABSTRACT**

This study investigates the integrated effectiveness of government bonds and central bank assets within Indonesia's policy mix for mitigating global crises, an area often examined in isolation. Our primary objective is to quantify the short and long-run impacts of these instruments on Indonesia's economic growth during periods of global economic turbulence. Utilizing quarterly data spanning 2009 to 2021, we employ an Autoregressive Distributed Lag (ARDL) model. Empirical results reveal that both government bonds and central bank assets positively influence economic growth in both the short and long run. In the short run, these instruments are effective in stimulating economic activity and cushioning the immediate impacts of a global crisis. However, the long-run analysis indicates that while their supportive role persists, over-reliance, particularly through sustained fiscal deficits, can lead to a weakening of macroeconomic performance. Practical implications—prudent and balanced management of fiscal and monetary policies is essential to ensure long-term economic stability. Improving the quality of public spending is essential in strengthening debt governance, and encouraging close collaboration between fiscal and monetary authorities to optimize crisis mitigation strategies and promote sustainable growth.

ARTICLE INFO*Article history:*Received: December 16th, 2024Revised: June 17th, 2025Accepted: June 21st, 2025Published: June 30th, 2025*Keywords:*

Government bonds; Central bank assets; Economic growth; Crisis mitigation

JEL classification:

E52

E55

F01

G18

G31

Citation:Seftarita, C., Suriani., Ferayanti., Fitriyani., & Diana, A. (2025). Government Bonds and Central Bank Assets in Global Crisis Mitigation Efforts in Indonesia. *Jurnal Ekonomi Pembangunan*, 23(1), 85-98. DOI: 10.29259/jep.v23i1.23286**Copyright © 2025** The Authors. Published by JEP is licensed under a CC BY-SA 4.0 International License**1. INTRODUCTION**

Indonesia, characterized as an open and highly integrated economy, is inherently vulnerable to global and regional economic crises. This susceptibility to external shocks profoundly impacts its economic performance, as evidenced by several historical events. The 1997-1998 Asian Financial Crisis stands out as a severe episode, during which Indonesia faced extreme currency depreciation, soaring inflation, and a significant economic contraction. Similarly, the global financial crisis of 2008, originating in the United States, led to a repricing of risks in the global money markets, resulting in a liquidity shortage that affected emerging markets like Indonesia (Basri & Siregar, 2009; and Pradipto et al., 2011), causing a notable slowdown in Indonesia's economic growth and a decline in financial sector stability. More recently, the COVID-19 pandemic that emerged in late 2019 triggered another crisis, leading to negative economic growth due to restrictions on the mass movement policy in various countries (Di Mauro, 2020; and Ajmal et al., 2021). Consequently, Indonesia's economic growth significantly dropped to -5.32% in the second quarter and -3.49% in the third quarter of 2020, as depicted in Figure 1. To combat economic downturns, the Indonesian government and central bank have historically implemented a range of policy measures, including fiscal stimulus and monetary easing (Simorangkir & Adamanti, 2010). A core component of their crisis mitigation strategy has involved the strategic use of government bonds and the expansion of central bank assets.

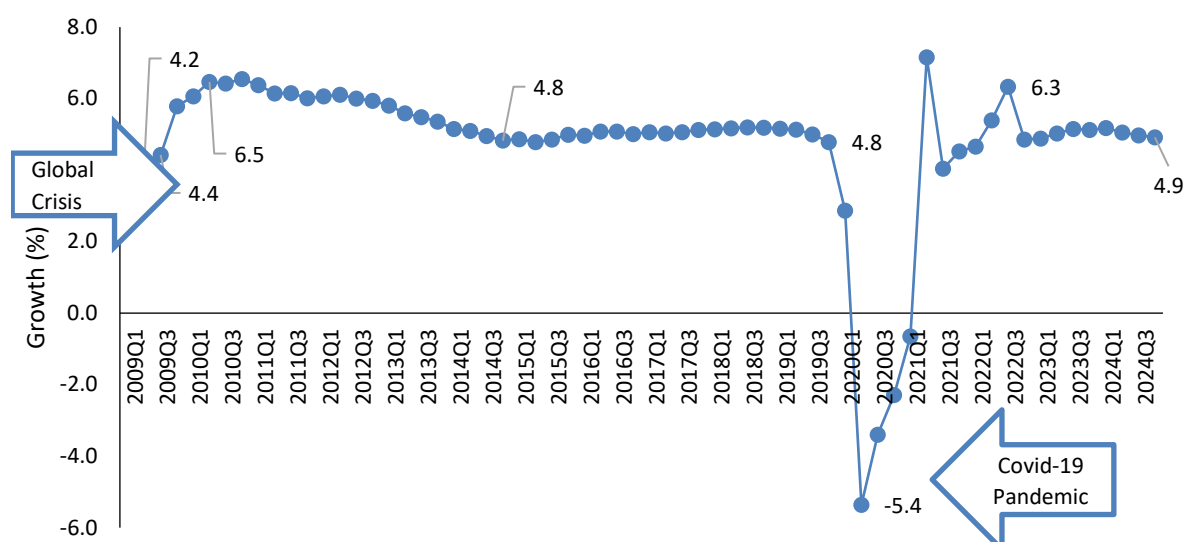


Figure 1. Indonesia's Economic Growth, 2008-2020

Source: Bank Indonesia, 2020

During crises, the Indonesian government typically increases the supply of debt securities to finance budget deficits and mitigate economic fallout. In turn, Bank Indonesia often absorbs this excess supply. Within a business cycle framework, government bonds act as a fiscal tool to stimulate economic activity, particularly during contractions. By issuing bonds to increase public spending, the government can boost aggregate demand and support economic recovery (Blanchard & Leigh, 2013). Simultaneously, central banks may hold government securities through quantitative easing or open market operations to help stabilize exchange rates and manage inflation as part of their short run monetary policy response (Bernanke, 2020; and Gagnon et al., 2011). Consequently, both government bonds and central bank assets are closely linked to business cycle fluctuations, which are primarily reflected in key indicators such as GDP growth and inflation.

Economic growth fluctuations are key indicators of the business cycle (Dornbusch et al., 2011), with inflation and unemployment often shifting during periods of expansion and recession (Blanchard, 2017). Economic shocks can trigger crises (Bernanke, 2013), as seen during the COVID-19 pandemic, where severe recessions in multiple countries significantly impacted economic performance and financial stability. This period saw a dramatic decline in global financial markets, comparable to the 2008-2009 financial crisis (Ajmal et al., 2021). The COVID-19 pandemic specifically led to a decline in aggregate demand and a shock to fundamental risks, causing a sharp downturn in equity markets where stocks and bonds are traded (McKibbin & Fernando, 2020). In response to such significant economic disruptions, crisis mitigation through both fiscal and monetary policy becomes a critical macroeconomic tool. Fiscal policy involves the government increasing public spending, implementing tax cuts, and issuing debt to stimulate aggregate demand and maintain socioeconomic stability. This fiscal stimulus aims to halt economic decline and create jobs, particularly during the contraction phase of the business cycle (Blanchard & Leigh, 2013). Concurrently, monetary policy, managed by the central bank, includes interest rate reductions, liquidity injections through quantitative easing, and foreign exchange market interventions to stabilize exchange rates and control inflation (Bernanke, 2020).

Existing study offers diverse perspectives on the impact of fiscal and monetary policy responses (Basri & Siregar, 2009; Simorangkir & Adamanti, 2010; Resosudarmo et al., 2020; and Silalahi & Chawwa, 2012). For instance, one study using an interregional computable general equilibrium model found that stimulus policies has a positive short and long-run economic impact on Indonesia (Resosudarmo et al., 2020). This finding contrasts with earlier study by Albatel (2003); Giavazzi (2003); and Hagen & Mundschenk (2003), who concluded that fiscal policy is effective in influencing macroeconomic variables in the long-run, but can reduce the effectiveness of the monetary policy in the short run. Further complicating the picture, study by Baita et al. (2023) identified a negative relationship between government bonds and economic growth in both the long and short run, while

study by Mulawan (2014) found that government bonds significantly affect inflation in the short run. Study by Olaoye et al. (2020) using an error correction model (ECM) approach, observed varied results from expansionary and contractionary government policies on growth; specifically, the cumulative effect of the shock on expansionary government spending was positive and statistically significant on economic growth in ECOWAS countries, whereas the cumulative effect of contractionary government policies is negative and statistically significant on economic growth.

More broadly, study by Wahidin et al. (2021) examined the effect of bonds on economic growth in 44 countries before and after the 2008 global financial crisis (1990-2017), revealing mixed effects. Prior to the crisis, the bond market positively impacted economic growth, but its influence became diverse afterward. Similarly, Makun (2021) conducted research in Fiji from 1980 to 2018 using an ARDL model, concluding a negative long-run effect between foreign debt and economic growth, with external debt having a stronger negative impact. This suggests that high public debt can hinder growth if it exceeds a certain threshold, advising governments to reduce unproductive spending and enhance fiscal management to maintain debt stability. In contrast, study by Weale & Wieladek (2016) found that central bank purchases of government bonds positively affected real GDP and inflation. However, study by El Mosaid & Boutti (2014) in Malaysia found no relationship between interest rates and inflation with conventional Sukuk and bonds

Recent studies offer nuanced insights into the effects of external debt and economic shocks. Study by Elkhalfi et al. (2024), for instance, found a nonlinear relationship between external debt and economic growth in developing countries, incorporating raw material price volatility and trade openness as variables that stimulate global economic risk. Similarly, study by Triatmanto et al. (2023) examined the contributions of foreign debt, foreign direct investment, and human capital investment to economic growth in Indonesia, Thailand, Vietnam, and the Philippines using a Panel Vector Auto-regression Model (PVAR). Their findings contradict the common hypothesis, indicating that an increase in external debt and foreign direct investment has an adverse effect on economic growth across all four countries. Furthermore, study by Ayoub et al. (2024) observed that external debt positively impacts unemployment and life expectancy but negatively impacts national income, a trend that persists in the short run, except for unemployment, which experiences a negative impact. These findings underscore the vulnerability of economies to shocks, as study by Bernanke (2013) noted that shocks in the economy can trigger a crisis. The economic recession induced by the COVID-19 pandemic, for example, severely impacted global economic performance and financial stability, leading to a sharp decline in global financial markets equivalent to the 2008-2009 financial crisis (Ajmal et al., 2021). This aligns with study by Levine & Zervos (1998) observation that the demand for bonds will decline amid a crisis. Even with policies like the European Central Bank's (ECB) Pandemic Emergency Purchase Program (PEPP), countries with high debt-to-GDP ratios remain susceptible to significant interest rate spikes and a greater risk of default (Carnazza & Liberati, 2021). In Indonesia, where government bonds largely dominate the budget deficit, the crisis exacerbated this trend. In 2020, Indonesian government bonds surged by almost 40%, with Bank Indonesia's ownership of these debt securities increasing rapidly by 94.52%. This upward trajectory continued into 2021, with a 14% growth rate and Bank Indonesia's ownership rising by 30.4%. These debt securities are used to recover the economy from the threat of a crisis (Bank Indonesia, 2022).

Indonesia's inherent vulnerability to external shocks, such as global financial crises, pandemics, or geopolitical tensions, makes this study particularly remarkable to address. Its reliance on foreign capital, commodities, and trade amplifies this susceptibility. This research is critical because it specifically examines Indonesia's capacity to manage global economic crises by optimizing the use of government bonds and central bank assets. It aims to provide practical insights into how Indonesia can bolster its economic resilience, devise innovative crisis management strategies, and maintain financial stability in an increasingly interconnected global landscape. While substantial research exists on fiscal and monetary responses during global crises, studies exploring the interaction between government debt instruments and central bank assets in Indonesia remain limited. Most analyses tend to focus on either government bond issuance or foreign exchange reserves in isolation, without investigating how these tools operate in concert during periods of financial stress. Crucially, the role of Bank Indonesia as a direct holder of government bonds has

received little attention, despite being a critical aspect of the country's crisis response. Furthermore, there's a scarcity of empirical studies that integrate government securities, foreign debt, and central bank assets into a single framework capturing both fiscal and monetary dynamics. This gap is particularly relevant during heightened global uncertainty, such as the 2008 Global Financial Crisis and the COVID-19 pandemic. To bridge this, the study incorporates a crisis dummy variable to better capture shifts in policy behavior during these episodes.

By focusing on Indonesia as a case study, this research offers a fresh perspective on how an emerging economy navigates complex policy trade-offs using both fiscal and monetary tools. The novelty lies in this integrated approach, particularly in highlighting the strategic role of central bank-held bonds in crisis mitigation. By filling existing literature gaps and offering actionable policy recommendations, this research holds the potential to not only benefit Indonesia but also serve as a model for other emerging economies facing similar challenges. Thus, the objective of this study is to analyze the short- and long-run effects of fiscal and monetary instruments—specifically government bonds, external debt, and central bank assets—on Indonesia's economic growth, with a particular focus on their role in navigating global crises. By employing the Autoregressive Distributed Lag (ARDL) model, this research tests the effectiveness of these policies across multiple crisis episodes. Dummy variables representing global crisis shocks are included to capture shifts in policy responses and their delayed transmission to the real economy. The study contributes significantly to the literature by offering the comprehensive and time-sensitive analysis of macroeconomic instruments during crises—something that remains limited in current research on emerging markets. The remainder of this article is structured as follows: section 2 details the methodology employed in this study, followed by section 3, which presents the Results and Discussion of our empirical findings, and finally, section 4 offers the Conclusion and policy implications.

2. RESEARCH METHODS

2.1. Data

This study investigates the effectiveness of various policy instruments in supporting economic growth, which serves as the primary indicator of the business cycle and a key signal of crisis presence. For fiscal instruments, the data includes the nominal value of government bonds and the value of government external debt denominated in foreign currencies. Meanwhile, the value of government securities held by Bank Indonesia and foreign exchange assets managed by Bank Indonesia are used as proxies for monetary policy in controlling the rupiah exchange rate. Economic growth data serves as the dependent variable, indicating crisis mitigation efforts in Indonesia. The specific data utilized in this study are detailed presented in Table 1 as follows.

Table 1. Data Definitions and Sources

Variables	Definition	Source
<i>GDP_growth</i>	Indonesia's economic growth rate (in percentage)	FRED
<i>SUN</i>	Nominal value of government bonds (in billions of rupiah)	BI, FRED
<i>ULN</i>	Value of government external debt denominated in foreign currency (in billions of rupiah)	BI, FRED
<i>SBN_BI</i>	Value of government securities owned by Bank Indonesia (in billions of rupiah)	BI, FRED
<i>RESERVE</i>	Foreign exchange assets managed by Bank Indonesia (in billions of rupiah)	BI
<i>D_crisis</i>	Dummy (1 if a global crisis occurs, otherwise 0)	Authors

This study posits that crisis mitigation efforts in Indonesia are implemented through fiscal and monetary policy interventions. The fiscal instruments commonly utilized by the government include debt, both in government bond issuance and external debt. Meanwhile, monetary instruments are primarily employed to stabilize the exchange rate of the rupiah. This stabilization is conducted indirectly through interventions in the foreign exchange market using existing foreign exchange reserves. Additionally, Bank Indonesia participates in the buying and selling of government

securities to strengthen the rupiah. Therefore, this study utilizes secondary time series data from the first quarter of 2009 to the fourth quarter of 2021, sourced from Bank Indonesia (BI), Federal Reserve Economic Data (FRED), and the Financial Services Authority (OJK).

2.2. Model Specification

This study aims to explore the relationships between variables, specifically examining how fiscal and monetary policy instruments influence economic growth as an indicator of crisis mitigation. To achieve this, the Autoregressive Distributed Lag (ARDL) model will be employed, a widely recognized econometric technique for analyzing both short run and long-run relationships among time series variables. Introduced by Pesaran & Shin (1999), the ARDL model is remarkably flexible, as it accommodates variables with different integration orders—specifically $I(0)$ and $I(1)$ —provided none are integrated at the second order, $I(2)$. The strength of this approach lies in its ability to model dynamic interactions by incorporating lags of both the dependent and independent variables. The general form of the ARDL model can be written as:

$$Y_t = \alpha_0 + \sum (\alpha_i Y_{t-i}) + \sum (\beta_j X_{t-j}) + \varepsilon_t \quad (1)$$

where, Y_t represents the dependent variable at time t ; X_{t-j} denotes the lagged values of the independent variable; α_0 is the intercept term; α_i, β_j are the coefficients of the lagged variables; p, q indicate the optimal number of lags, typically chosen using criteria like AIC or BIC; ε_t is the error term, assumed to follow a white noise process.

The ARDL framework allows researchers to capture short run dynamics through lagged terms and assess long-run equilibrium relationships when cointegration exists, often verified using the bounds testing procedure. When such cointegration is found, the model can be extended into an Error Correction Model (ECM) to reflect how quickly deviations from the long-run equilibrium are corrected over time. To analyze the relationship between variables, we apply a dynamic model that can involve data from the present and the past. According to Gujarati (2012), the autoregressive model is a model that uses one or more past data from the dependent variable in the independent variable section. This study uses quarterly data from 2009 to 2021. This research uses the ARDL (Autoregressive Distributed Lag) model. The ARDL model used in this study was obtained from Chowdury (2012) and transformed into Eq. (2) and (3) as follows:

$$\begin{aligned} \Delta GDP_growth = & \varepsilon_0 + \sum_{i=1}^p \phi_i \Delta GDP_growth_{t-i} + \sum_{i=1}^p \varphi_i \Delta SUN_{t-i} + \sum_{i=1}^p \eta_i \Delta SBN_BI_{t-i} + \\ & \sum_{i=1}^p \omega_i \Delta D_Crisis_{t-i} + \lambda_1 GDP_growth_{t-1} + \lambda_2 SUN_{t-1} + \lambda_3 SBN_BI_{t-1} + \\ & \lambda_4 D_crisis_{t-1} + u_t \end{aligned} \quad (2)$$

$$\begin{aligned} \Delta GDP_growth = & \varepsilon_0 + \sum_{i=1}^p \phi_i \Delta GDP_growth_{t-i} + \sum_{i=1}^p \gamma_i \Delta ULN_{t-i} + \sum_{i=1}^p \eta_i \Delta RESERVE_{t-i} + \\ & \sum_{i=1}^p \omega_i \Delta D_crisis_{t-i} + \lambda_1 GDP_growth_{t-1} + \lambda_2 ULN_{t-1} + \lambda_3 RESERVE_{t-1} + \\ & \lambda_4 D_crisis_{t-1} + u_t \end{aligned} \quad (3)$$

where, the dependent variable used is GDP_growth represent economic growth; the independent variables used are consist of SUN represent government securities; ULN represent foreign debt; SBN_BI represent government bonds owned by Bank Indonesia; $RESERVE$ represent foreign exchange reserves as a proxy for central bank assets; and D_crisis is a crisis dummy, namely the global crisis and the Covid 19 pandemic. $\phi, \varphi, \gamma, \eta, \rho, \omega$ indicates short run relationships, $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ indicates long-run relationships, t is time, and u_t is the error term. The model is regressed separately where equation (2) analysis the government bonds and central bank assets in the form of government debt securities ownership and their effect on economic growth. Equation (3) focus on direct foreign debt and central bank assets in the form of foreign exchange reserves and their effect on economic growth. In the ARDL model, several tests were carried out, including (1) stationarity test, (2) residual diagnostics test, and (3) model stability test.

3. RESULTS AND DISCUSSION

3.1. Results

Table 2 reports the result of unit root test, we use the Augmented Dickey-Fuller test. Based on the results, we found that the all variable is stationary at the first difference ($I(1)$), which is indicated by the t-statistic value greater than the critical value, and significant level at 5%.

Table 2. The Results of Unit Root test

Variables	Statistic	
	Level	First difference
<i>GDP_growth</i>	-3.281*	-4.205***
<i>SUN</i>	2.931	-4.101***
<i>SBN</i>	2.122	-12.056***
<i>ULN</i>	-3.408*	-9.411***
<i>RESERVE</i>	-2.638	-5.466***

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively

Table 3 presents the residual diagnostics tests, specifically the normality, autocorrelation, multicollinearity, and heteroscedasticity tests. Tests are carried out separately in Eq. (2) and (3). Based on the test results, both models are free from the residual violation problem and can be used as estimation models. The Breusch-Pagan-Godfrey test results for equation (2) indicate no evidence of heteroskedasticity, with an F-statistic of 0.926 and the p-value of 0.563. Likewise, the heteroskedasticity test for Eq. (3), using the Breusch-Pagan-Godfrey method, shows no indication of heteroskedasticity, evidence of an F-statistic of 1.001 and the p-value of 0.4776 exceeds the 5% significance level, meaning the null hypothesis of homoskedasticity is accepted. This indicates that the residuals have constant variance, fulfilling a key classical regression assumption. As a result, the model's estimates are efficient and reliable for further analysis. This supports the reliability and efficiency of the regression estimates for further interpretation or decision-making.

The Breusch-Godfrey serial LM test for Eq. (2) shows no autocorrelation up to the second lag. This is evident from the F-statistic of 0.0912 and p-value of 0.9131 exceeding the 5% significance level. Likewise, equation (3) confirms the absence of autocorrelation up to lag 2, as indicated by the F-statistic of 0.3292 and p-value of 0.7217. This indicates that the residuals are random and do not follow a repeating pattern, meeting the main classical regression assumptions and supporting the reliability of the model. Therefore, the null hypothesis of no autocorrelation is accepted, indicating that the residuals are random and the model meets the main residual assumptions, ensuring reliable and efficient estimation. Further, the normality test conducted to assess the distribution of residuals in the regression model follows a normal distribution. For Eq. (2), the Jarque-Bera test produces a statistic of 0.3039 with a p-value of 0.8590, which exceeds the 5% significance level. Likewise, for equation (3) the Jarque-Bera test produces a statistic value of 2.581 and a p-value of 0.275, which exceeds the 5% significance level. This indicates that there is insufficient evidence to reject the null hypothesis, which means that the residual distribution is assumed to be normally distributed. This confirms that the normality assumption in the model is met, thus supporting the validity of the statistical test used in the model.

Next, we tested the stability of the model, the models in equations (2) and (3) have also met the requirements of the model stability test using CUSUM and CUSUM of Squares. This can be seen in Figure 2 and 3, where the model used is stable. The CUSUM and CUSUM of Squares graphs are still within the 5% significance limit.

Table 3 shows the short run estimation results based on the estimation results in Eq. (2) and (3). As a result, there is a short run relationship between economic growth variables, government debt, central bank assets, and the global crisis dummy. This can be seen from the value of the error correction term (ECT), which was recorded as negative and significant in both models. This condition shows that government debt and central bank assets have a significant influence in controlling the crisis in the short run.

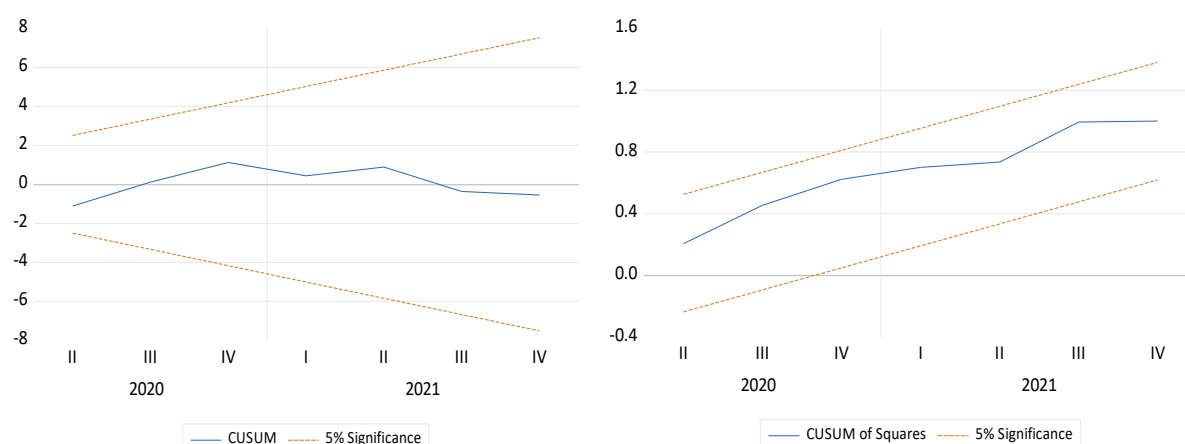


Figure 2. Model Stability test using CUSUM and CUSUM of squares for Equation (2)

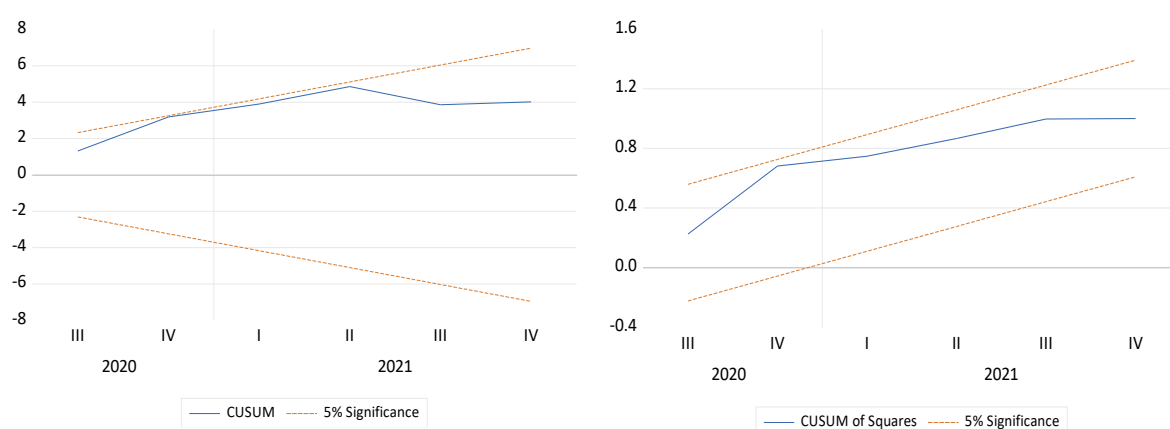


Figure 3. Model Stability test using CUSUM and CUSUM of squares for Equation (3)

The provided Table 3 presents the estimation results of an ARDL model, examining the determinants of Economic growth, which is the dependent variable. The table shows two equations, Eq (2) and Eq (3), with both long- and short run coefficients, along with their significance levels. Our findings show that the impact is significant on economic growth in the long run, although its existence varies in both equations. In Equation (2), the constant term is positive and significant, implying that 6.013% indicates the base rate of economic growth when other factors are assumed constant. The SUN has a negative sign and a significant impact in the long run, implying that a 1% increase in government bonds will cause long-run economic growth to contract by $-1.58\text{E-}06\%$. Interestingly, the SBN_BI shows a long-run coefficient that has a negative sign and a significant effect, implying that a 1% increase in government securities will cause long-run economic growth to contract by $-7.80\text{E-}07\%$, which has a similar marginal dampening effect. The $\Delta(D_crisis)$ is highly significant and negative, implying that the increase in the global crisis has a substantial and detrimental long-run impact on economic growth of -10.019% .

Turning to Equation (3) for the long run, the constant remains positive and highly significant, implying that long-run economic growth will increase by 7.551% when other factors are held constant. The ULN emerges as a significant factor in this equation, with a negative coefficient of $-1.40\text{E-}05$, implying that higher external debt can negatively impact long-run economic growth. RESERVE also shows a negative and significant coefficient, which is an interesting finding since it is expected that reserves are positively associated with stability and economic growth will decline by $-4.08\text{E-}06$. Similar to Equation (2), the D_crisis dummy is negative and significant, implying that an increase in the global crisis in the long run negatively impacts economic growth by -4.933 . The long-run results consistently highlight the adverse impact of the global crisis on economic growth. The influence of various financial instruments such as government bonds, foreign debt, and foreign

exchange reserves shows a predominantly negative relationship to long-run economic growth, although with very small coefficients in some cases, indicating that an increase in all of them does not necessarily result in better long-run growth and in some cases, can be a hindrance.

Table 3. The Estimation Results Using ARDL Model

Dependent variable = GDP_growth		
Variables	Eq (2) Coefficient	Eq (3) Coefficient
Long run		
<i>Constants</i>	6.013***	7.551***
<i>SUN</i>	-1.58E-06*	
<i>SBN</i>	-7.80E-07	
<i>ULN</i>	-	-1.40E-05*
<i>RESERVE</i>	-	-4.08E-06
<i>D_crisis</i>	-10.019***	-4.933***
Short run		
$\Delta(\text{GDP_growth}_{t-1})$		0.281***
$\Delta(\text{SUN})$	2.05E-06	-
$\Delta(\text{SUN}_{t-1})$	1.03E-05***	-
$\Delta(\text{SUN}_{t-2})$	1.50E-05***	-
$\Delta(\text{SUN}_{t-3})$	-1.10E-05***	-
$\Delta(\text{ULN})$	-	-9.36E-05***
$\Delta(\text{ULN}_{t-1})$	-	8.57E-05***
$\Delta(\text{ULN}_{t-2})$	-	7.28E-05***
$\Delta(\text{SBN})$	7.95E-06***	-
$\Delta(\text{D_crisis})$	0.702	0.631
$\Delta(\text{D_crisis}_{t-1})$	2.214***	-
$\Delta(\text{D_crisis}_{t-2})$	-1.173***	-
<i>ECT</i>	-0.569***	-0.956***
<i>R²</i>	0.8623	0.8172
<i>Adjusted R²</i>	0.8340	0.7959
<i>Bound F-test</i>	7.6977***	26.7476***
Diagnostics test	F-stat	F-stat
<i>Normality</i>	0.3039	2.5812
<i>Breusch-Pagan-Godfrey</i>	0.9269	1.0005
<i>Breusch-Godfrey Serial LM</i>	0.0912	0.3292

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The marks in brackets are p-values

Short run dynamics show how changes in independent variables and time lags affect economic growth. In Equation (2), short run changes in the $\Delta(\text{SUN})$ show varying impacts, positive and significant impacts, implying that a 1% change in bonds will increase short run growth by 2.05E-06, in SUN lags 1 and 2 also have positive and significant impacts, but in lag 3 a negative and significant impact is found. This shows a complex dynamic where an initial increase in government bonds can stimulate short run growth, but this impact reverses in the next period. The $\Delta(\text{SBN})$ has a positive and significant impact in the short run, implying that a 1% increase in SBN will increase growth by 7.95E-06%. The $\Delta(\text{D_crisis})$ shows an interesting short run effect, namely there is a positive but insignificant effect, meanwhile, evidence of a positive and significant effect at lag 1, but not at lag 2 which shows a negative and significant effect, implying a delayed short run impact and then potentially reversing from the crisis. Meanwhile, in Eq. (3), lagged economic growth has a positive and significant impact, indicating that past economic growth positively affects current short-run growth by 0.281%. Changes in external debt show a negative and significant impact, while lags 1 and 2 of external debt show positive and significant impacts, implying that the short-run dynamics are nuanced, where an immediate increase in external debt may be detrimental, but the lagged effects may be positive. The short-run impact of changes in the *D_crisis* variable is positive but insignificant.

The error correction term (ECT) in Eq. (2) is negative and significant, implying that about 57% of the imbalances from the previous period shock are corrected in the current period, indicating a

relatively rapid adjustment process towards the long-run equilibrium. Likewise, Eq. (3) is negative and significant, implying a very rapid adjustment process where almost all or about 96% of the imbalances from the previous period are corrected in the current period, indicating a strong pullback to the long-run equilibrium.

3.2. Discussions

The estimation results of Eq. (2) provide critical insights into the short run dynamics of fiscal and monetary interventions in Indonesia's economy, particularly during periods of external shocks. The results show that in the short run, changes in the issuance of government bonds are not statistically significant. However, their effects become strongly positive and significant at the first and second lags, suggesting that deficit financing through bonds can boost economic activity in subsequent periods—supporting the crowding-in hypothesis (Elmendorf & Mankiw, 1999; and Law et al., 2021). This lag effect also supports the view that fiscal policy often operates with implementation delays, particularly in developing countries where bureaucratic processes and institutional inefficiencies may slow down the disbursement of public funds (Ilzetzki et al., 2013). However, by the third lag, the effect of government bonds turns negative, indicating that the stimulus impact may fade over time, implying the crowding-out pressures over time. This could reflect rising interest payments, investor concerns about debt sustainability, or reduced private sector confidence in the face of prolonged government borrowing. Such findings are echoed in studies by Barro (1991); and Reinhart & Rogoff (2010), who argue that the expansionary benefits of fiscal policy may be reversed if accompanied by unsustainable debt levels. In contrast, changes in central bank holdings of government bonds have a strong, positive, and significant impact on economic growth, underscoring the effectiveness of expansionary monetary policy. This aligns with Bhattarai et al. (2021), who find that quantitative easing positively influences output in developing economies.

The global crisis dummy variable shows delayed and mixed effects, with significant positive and negative impacts at the first and second lags, respectively. This suggests that economic responses to crises are not immediate and may reflect adjustment dynamics over time (Furceri & Zdzienicka, 2012). Initially, stimulus and policy measures may lift economic activity, but subsequent structural weaknesses—such as labor market scarring, investment hesitancy, or trade disruptions—can reverse early gains. This interpretation resonates with Furceri & Zdzienicka (2012), who emphasize that the long-lasting effects of crises often materialize gradually, depending on the strength of institutional responses and the resilience of the macroeconomic framework. Lastly, the ECT has negative and significant confirms a stable long-run relationship among the variables, with about 56.9% of any disequilibrium corrected each quarter, indicating effective long-run adjustment in the ARDL model. This finding reinforces the suitability of the ARDL model for analyzing macroeconomic relationships in Indonesia, as it captures both short-run dynamics and long-run convergence. It also highlights the country's capacity for macroeconomic recovery. The results offer robust evidence that while fiscal and monetary policies are essential for short run stabilization, their effectiveness varies over time and must be managed with careful attention to debt sustainability, timing, and coordination. The inclusion of crisis-period analysis adds further value by showing how policy effectiveness shifts under economic stress, contributing to the broader literature on countercyclical policy in emerging markets (Frankel et al., 2013).

The estimation of Eq. (3) shows that the lagged economic growth variable has a positive and significant effect, indicating that past growth positively influences current growth—consistent with the idea of growth inertia, where past performance significantly influences present outcomes (Aghion & Howitt, 2006). Similarly, Romer & Romer (2019), also emphasize that macroeconomic stability and strong policy frameworks contribute to growth persistence, especially in emerging markets. The current change in external debt has negatively and significantly affects growth, supporting the debt overhang theory (Krugman, 1988; and Dawood et al., 2024). This implies that when debt levels become burdensome, they deter investment by creating uncertainty about future taxation and repayment burdens. The adverse effect in the short run also reflects the front-loaded costs of debt service, exchange rate vulnerability, and declining investor confidence, especially in

countries with high foreign currency exposure. According to Chudik et al. (2017); and Egert (2015), the nonlinear relationship between debt and growth is more pronounced in emerging economies, where the thresholds for harmful debt effects are lower due to weaker institutional buffers. However, its impact becomes positive and significant at one- and two-period lags, suggesting that while external debt initially burdens the economy, it may support growth later when channeled into productive uses. This result is in line with Calderón and Fuentes (2016), who argue that the long-run growth impact of external debt in developing economies depends on how effectively borrowed resources are allocated and whether they are accompanied by governance reforms.

The crisis dummy variable has a positive but statistically insignificant effect, implying that short run crisis impacts may be muted by effective policy responses or emerge over the medium term (Cerra & Saxena, 2008). Likewise, Blanchard & Pisani-Ferry (2020) highlighted that the effectiveness of countercyclical fiscal and monetary measures can reduce the visible impact of crises in the short run. Additionally, crisis effects often manifest more fully over the medium term. Finally, error correction term has significant, indicates a strong long-run equilibrium relationship and a rapid adjustment process toward that equilibrium. This is a noteworthy signal of macroeconomic flexibility, suggesting that the country has the policy space and institutional capacity to return to equilibrium after disturbances. Recent studies, such as Dell’Erba et al. (2023), affirm that economies with credible policy frameworks and sound debt management can recover more rapidly from fiscal shocks.

The bound test of equations (2) and (3) shows a long-run relationship between variables. This can be seen from the F-statistic bound test has significant level at the 5% both for $I(0)$ and $I(1)$. The existence of this long-run relationship shows that efforts to mitigate the crisis with government debt and central bank assets will have an impact in the long-run. The presence of this long-run relationship suggests that policies involving government debt and central bank balance sheets not only influence short-run stabilization (as shown in earlier estimates) but also shape structural growth dynamics over time. When viewed partially at the long-run estimation results, Eq. (2) and (3) show that government debt by issuing government bonds and foreign debt negatively and significantly affect economic growth. Government debts will burden the government’s finances so that the government’s performance in accelerating the economy continues to decline. Debt that continues to grow has the potential to cause a default. This aligns with the research findings of Carnazza & Liberati (2021); and Makun (2021). Furthermore, the crisis also has a negative and significant effect. The economic crisis will cause a decline in macroeconomic performance in the long-run. The negative and significant coefficient of the crisis dummy variable in both models also reflects the enduring impact of global shocks on Indonesia’s long-run macroeconomic performance. The variable of central bank assets has no significant effect on economic growth. This is consistent with the standard monetary policy transmission literature, which emphasizes that central bank interventions—such as quantitative easing or liquidity injections—are primarily designed to stabilize the economy in the short run rather than drive long-run growth (Bernanke, 2020).

4. CONCLUSIONS

This study analyzes the effectiveness of government bonds and central bank assets as part of the policy mix in mitigating the global crisis in Indonesia. The findings of this study highlight the dynamic and multifaceted role of fiscal and monetary policy instruments in managing economic fluctuations during periods of global crisis. In the short run, both government bond issuance and central bank asset expansion appear to support economic recovery, with significant positive effects observed after a lag. This reflects the stimulative nature of well-timed fiscal and monetary interventions. However, the long-run estimates suggest that persistent reliance on debt financing—whether through domestic government bonds or external borrowing—can pose risks to macroeconomic stability. These results reinforce the notion that while short run stimulus is necessary during crises, it must be complemented with prudent long-run fiscal management. The dummy variable for crisis conditions was found to be statistically insignificant, suggesting that immediate crisis effects may be mitigated by responsive policies, though long-run impacts could still emerge. The presence of a significant and negative error correction term in both estimated models

confirms that Indonesia's economy is capable of adjusting toward a stable long-run equilibrium following short run disturbances, though the speed and magnitude of this adjustment vary depending on the instruments used.

This study recommends that, in the short run, the government should continue to leverage fiscal and monetary instruments to stimulate the economy during crisis periods, while ensuring that public spending remains targeted, transparent, and growth-oriented. Strengthening public investment governance, enhancing debt transparency, and reinforcing fiscal discipline are critical to avoid the adverse effects of excessive borrowing. Moreover, stronger constructive collaboration between Bank Indonesia and fiscal authorities is vital to ensure a balanced policy mix that supports both macroeconomic stability and growth. Finally, building fiscal buffers and enhancing crisis preparedness through early warning systems will improve Indonesia's resilience in facing future external shocks.

Acknowledgment: The author would like to thank the institute for research and community service (LPPM) Universitas Syiah Kuala for providing the opportunity and financial support to carry out this *Merdeka Belajar Kampus Merdeka (MBKM)* grant research.

Authors Contribution: C. S. conceived of the presented idea, developed the theory, and took the lead in writing the manuscript; S.S. wrote the novelty of this research connecting the previous studies and the results to the final manuscript; F.F. contributed to literature review and previous research, and helped in writing the final manuscript; F.F. contributed to the data and interpreting analysis results, helped in writing the final manuscript; A. D. contributed to the data estimation and methodology, helped in writing the final manuscript

Conflict of interest: The authors declare no conflict of interest.

REFERENCES

- Aghion, P., & Howitt, P. (2006). Appropriate Growth Policy: A Unifying Framework. *Journal of the European Economic Association*, 4(2–3), 269–314. <https://doi.org/10.1162/jeea.2006.4.2-3.269>
- Ajmal, M. M., Khan, M., & Shad, M. K. (2021). The global economic cost of coronavirus pandemic: current and future implications. *Public Administration and Policy*, 24(3), 290-305. <http://dx.doi.org/10.1108/PAP-10-2021-0054>
- Albatel, H. A. (2003). Government Activity and Policy and Economic Development in Saudi Arabia. *Journal of Economics and Administrative Sciences*. 17(1), 1–28. <https://doi.org/10.1108/10264116200300007>
- Auerbach, A. J., & Gorodnichenko, Y. (2017). Fiscal Stimulus and Fiscal Sustainability. *Brookings Papers on Economic Activity*, 2017(1), 183–255. <https://doi.org/10.2139/ssrn.2977301>
- Ayoub, A., Wani, T. A., & Sultan, A. (2024). External Debt Crisis & Socio-Economic Fallout: Evidence from The BRICS Nations. *Regional Science Policy and Practice*, 16(6), 100029. <https://doi.org/10.1016/j.rspp.2024.100029>
- Baita, A. J., Malami, H. U., & Al-Faryan, M. A. S. (2023). Fiscal policy and sukuk market development in OIC countries. *Journal of Islamic Accounting and Business Research*, 14(8), 1216-1231. <http://dx.doi.org/10.1108/JIABR-06-2022-0159>
- Bank Indonesia. (2022). *Statistik Ekonomi dan Keuangan Indonesia*. Retrieved from <https://www.bi.go.id>
- Barro, R. J. (1991). Economic Growth In A Cross Section of Countries. *The Quarterly Journal of Economics*, 106(2), 407–443. <https://doi.org/10.2307/2937943>
- Basri, M. C., & Siregar, R. Y. (2009). Navigating Policy Responses at The National Level in The Midst of The Global Financial Crisis: The Experience of Indonesia. *Asian Economic Papers*, 8(3), 1–35. <https://doi.org/10.1162/asep.2009.8.3.1>
- Bernanke, B. S. (2013). Monitoring the Financial System. Speech at the 49th Annual Conference on Bank Structure and Competition, Federal Reserve Bank of Chicago.
- Bernanke, B. S. (2020). The New Tools of Monetary Policy. *American Economic Review*, 110(4), 943–983. <https://doi.org/10.1257/aer.110.4.943>

- Bhattarai, S., Chatterjee, A., & Park, W. Y. (2021). Effects of US Quantitative Easing on Emerging Market Economies. *Journal of Economic Dynamics and Control*, 122, 104031. <https://doi.org/10.1016/j.jedc.2020.104031>
- Blanchard, O. (2017). *Macroeconomics* (7th ed.). Pearson.
- Blanchard, O., & Leigh, D. (2013). Growth forecast errors and fiscal multipliers. *American Economic Review*, 103(3), 117–120. <https://doi.org/10.1257/aer.103.3.117>
- Calderón, C., & Fuentes, J. R. (2016). *Do capital inflows boost economic growth? The role of macroeconomic policies*. World Bank Policy Research Working Paper No. 7715. <https://doi.org/10.1596/1813-9450-7715>
- Carnazza, G., & Liberati, P. (2021). The Asymmetric Impact of The Pandemic Crisis on Interest Rates on Public Debt in The Eurozone. *Journal of Policy Modeling*, 43(3), 521–542. <https://doi.org/10.1016/j.jpolmod.2021.04.001>
- Cerra, V., & Saxena, S. C. (2008). Growth dynamics: The Myth of Economic Recovery. *American Economic Review*, 98(1), 439–457. <https://doi.org/10.1257/aer.98.1.439>
- Chowdhury, K. (2012). Modeling The Dynamics, Structural Breaks, and The Determinants of The Real Exchange Rate of Australia. *Journal of International Financial Markets, Institutions & Money*, 22(2), 343–358. <https://doi.org/10.1016/j.intfin.2011.10.004>
- Chudik, A., Mohaddes, K., Pesaran, M. H., & Raissi, M. (2017). Is There a Debt-Threshold Effect on Output Growth? *Review of Economics and Statistics*, 99(1), 135–150. https://doi.org/10.1162/REST_a_00593
- Dawood, M., Feng, Z. R., Ilyas, M., & Abbas, G. (2024). External debt, transmission channels, and economic growth: Evidence of debt overhang and crowding-out effect. *Sage Open*, 14(3), 21582440241263626. <http://dx.doi.org/10.1177/21582440241263626>
- Dell’Erba, S., Hausmann, R., & Panizza, U. (2023). Fiscal Deficits and Macroeconomic Stability: Lessons from Emerging Markets. *Journal of International Economics*, 141, 103763. <https://doi.org/10.1016/j.jinteco.2023.103763>
- Di Mauro, B. W. (2020). Macroeconomics of The Flu. In R. Baldwin & B. Weder di Mauro (Eds.), *Economics in the time of COVID-19*, 31–46. CEPR Press. <https://cepr.org/publications/books-and-reports/economics-time-covid-19>
- Dornbusch, R., Fischer, S., & Startz, R. (2011). *Macroeconomics* (11th ed.). McGraw-Hill Education.
- Egert, B. (2015). The 90% Public Debt Threshold: The Rise and Fall of A Stylized Fact. *Applied Economics*, 47(34–35), 3756–3770. <https://doi.org/10.1080/00036846.2015.1013658>
- El Mosaid, F., & Boutti, R. (2014). Sukuk and bond performance in Malaysia. *International Journal of Economics and Finance*, 6(2), 226–234. <http://dx.doi.org/10.5539/ijef.v6n2p226>
- Elkhalfi, O., Chaabita, R., Benboubker, M., Ghoujdami, M., Zahraoui, K., El Alaoui, H., Laalam, S., Belhaj, I., & Hammouch, H. (2024). The Impact of External Debt On Economic Growth: The Case of Emerging Countries. *Research in Globalization*, 9, 1–10. <https://doi.org/10.1016/j.resglo.2024.100248>
- Elmendorf, D. W., & Mankiw, N. G. (1999). Government Debt. In J. B. Taylor & M. Woodford (Eds.), *Handbook of Macroeconomics*, 1615–1669. Elsevier. [https://doi.org/10.1016/S1574-0048\(99\)10038-7](https://doi.org/10.1016/S1574-0048(99)10038-7)
- Frankel, J. A., Vegh, C. A., & Vuletin, G. (2013). On Graduation from Fiscal Procyclicality. *Journal of Development Economics*, 100(1), 32–47. <https://doi.org/10.1016/j.jdevco.2012.07.001>
- Furceri, D., & Zdzienicka, A. (2012). How Costly are Debt Crises? *Journal of International Money and Finance*, 31(4), 726–742. <https://doi.org/10.1016/j.jimonfin.2012.01.012>
- Gagnon, J., Raskin, M., Remache, J., & Sack, B. (2011). The Financial Market Effects of The Federal Reserve’s Large-Scale Asset Purchases. *International Journal of Central Banking*, 7(1), 3–43. <https://doi.org/10.17016/FEDS.2020.047r1>
- Giavazzi, F. (2003). Inflation Targeting and The Fiscal Policy Regime: The Experience in Brazil. *Bank of England Quarterly Bulletin, Autumn 2003*, 43(3), 334–342.
- Gujarati, D. N. (2012). *Basic econometrics* (4th ed.). McGraw-Hill Education.
- Hagen, VJ., & Mundschenk, S. (2003). Fiscal and Monetary Policy Coordination in EMU. *International Journal of Finance & Economics*, 8(4), 279–295. <https://doi.org/10.1002/ijfe.215>

- Ilzetzki, E., Mendoza, E. G., & Végh, C. A. (2013). How Big (Small?) Are Fiscal Multipliers? *Journal of Monetary Economics*, 60(2), 239–254. <https://doi.org/10.1016/j.jmoneco.2012.10.011>
- Iman, H. (2011). Financial Fragility and Monetary Policy in Indonesia. *Journal of Indonesian Economy and Business*, 26(1), 45–58.
- Inayah, R., Wibowo, A., & Syafruddin, M. (2023). The Effectiveness of Government Bonds to Finance Public Infrastructure in Indonesia. *Indonesian Treasury Review*, 8(1), 10–22.
- Krugman, P. (1988). Financing Vs. Forgiving a Debt Overhang. *Journal of Development Economics*, 29(3), 253–268. [https://doi.org/10.1016/0304-3878\(88\)90044-2](https://doi.org/10.1016/0304-3878(88)90044-2)
- Law, S. H., Ng, C. H., Kutan, A. M., & Law, Z. K. (2021). Public debt and economic growth in developing countries: Nonlinearity and threshold analysis. *Economic Modelling*, 98, 26-40. <https://doi.org/10.1016/j.econmod.2021.02.004>
- Levine, R., & Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. *American Economic Review*, 88(3), 537–558. <https://doi.org/10.1596/1813-9450-1690>
- Makun, K. (2021). External Debt and Economic Growth in Pacific Island Countries: A Linear and Nonlinear Analysis of Fiji Islands. *Journal of Economic Asymmetries*, 23, e00197. <https://doi.org/10.1016/j.jeca.2021.e00197>
- McKibbin, W. J., & Fernando, R. (2021). The Global Macroeconomic Impacts of COVID-19: Seven Scenarios. *Asian Economic Papers*, 20(2), 2–30. https://doi.org/10.1162/asep_a_00796
- Mulawan, F. (2014). The Relationship of Inflation, Interest Rates, and Government Bonds in Indonesia. *FEB-Unibraw Research*, 1–20. <https://doi.org/10.33555/ijembm.v6i2.112>
- Naiborhu, S. (2020). Fiscal Policy and Debt Sustainability in Indonesia. *Journal of Economic Policy and Studies*, 6(2), 121–136. <https://ejournal.uksw.edu/jeb/article/view/3770>
- Olaoye, O. O., Eluwole, O. O., Ayesha, A., & Afolabi, O. O. (2020). Government Spending and Economic Growth in ECOWAS: An Asymmetric Analysis. *Journal of Economic Asymmetries*, 22, e00180. <https://doi.org/10.1016/j.jeca.2020.e00180>
- Pesaran, M. H., & Shin, Y. (1999). An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis. In S. Strom (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, 31, 371–413. Cambridge University Press. <https://doi.org/10.1017/ccol0521633230.011>
- Pradipto, R., Rokhim, R., Sahadewo, G. A., Ulpah, M., Sasmitasiwi, B., & Faradynawati, I. A. (2011). *A bridge too Far: The Strive to Establish a Financial Service Regulatory Authority (OJK) in Indonesia* (Working paper). SSRN. <https://doi.org/10.2139/ssrn.1878565>.
- Reinhart, C. M., & Rogoff, K. S. (2010). Growth in A Time of Debt. *American Economic Review: Papers & Proceedings*, 100(2), 573–578. <https://doi.org/10.1257/aer.100.2.573>
- Resosudarmo, B. P., Abdurrohman, Yusuf, A. A., & Hartono, D. (2021). Spatial Impacts of Fiscal Stimulus Policies During The 2009 Global Financial Crisis in Indonesia. *Asia-Pacific Journal of Regional Science*, 5(1), 305–326. <https://doi.org/10.1007/s41685-020-00176-2>
- Romer, C. D., & Romer, D. H. (2019). Fiscal Space and The Aftermath of Financial Crises: How It Matters And Why. *Brookings Papers on Economic Activity*, 2019(1), 143–210. <https://doi.org/10.2139/ssrn.3357165>
- Silalahi, T., & Chawwa, T. (2012). Relative Effectiveness of Indonesian Policy Choices During The Financial Crisis. *Buletin Ekonomi Moneter dan Perbankan*, 14(2), 177–219. <https://doi.org/10.21098/bemp.v14i2.462>
- Simorangkir, I., & Adamanti, J. (2010). The Role of Fiscal Stimulus and Monetary Easing in The Indonesian Economy During The Global Financial Crisis: Financial Computable General Equilibrium Approach. *Buletin Ekonomi Moneter dan Perbankan*, 13(2), 165–189. <https://doi.org/10.21098/bemp.v13i2.389>
- Sriyanto, A., Murwani, S., & Sofilda, E. (2021). Government Stimulus Policy Effects to Foster Indonesia's Economic Growth: Evidence From Seventeen Years' Experience. *Signifikan: Jurnal Ilmu Ekonomi*, 10(1), 63–76. <https://doi.org/10.15408/sjie.v10i1.15480>
- Triatmanto, B., Bawono, S., & Wahyuni, N. (2023). The Contribution and Influence of Total External Debt, FDI, And HCI on Economic Growth in Indonesia, Thailand, Vietnam, and Philippines. *Research in Globalization*, 7, 100163. <https://doi.org/10.1016/j.resglo.2023.100163>

- Wahidin, D., Akimov, A., & Roca, E. (2021). The Impact of Bond Market Development on Economic Growth Before and After The Global Financial Crisis: Evidence From Developed And Developing Countries. *International Review of Financial Analysis*, 77, 101865. <https://doi.org/10.1016/j.irfa.2021.101865>
- Weale, M., & Wieladek, T. (2016). What Are the Macroeconomic Effects of Asset Purchases? *Journal of Monetary Economics*, 79, 81–93. <https://doi.org/10.1016/j.jmoneco.2016.04.004>