

# Ardl Panel's Capability In Maintaining Economic Stability During Covid-19 Asean Founder Countries

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## Abstract

The slowdown in the world economy due to the COVID-19 pandemic has become one of the triggers for increased analysis in the economic sector to find the proper steps to protect the economy from the shadow of the crisis. However, most research is still focused on several separate policies, which makes the analysis results still seem bleak. This research was conducted using the ARDL panel approach to analyze the ability of endurance policy to maintain a balance between aggregate demand and supply in ASEFO countries. The data used is secondary data (time series) from 2009 – 2019. The analysis results show that the leading indicators of controlling GDP in ASEFO countries on a panel basis are INF, NPL, GOV, LDR. Meanwhile, the leading indicators of the effectiveness of the variables are INF and GOV. Thus, government spending during the pandemic must still be controlled not to cause inflation which is a threat to the economy.

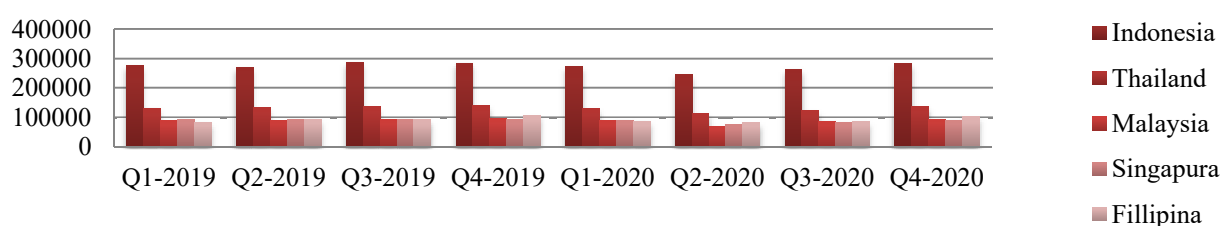
**Keywords:** Endurance Policy, AD-US Balance, Financial System Stability

## I. INTRODUCTION

The COVID-19 pandemic has greatly shaken world trade activities. This decline in trade volume will undoubtedly hurt state revenues. At first glance, sectors such as tourism, transportation, trade are the most affected sectors and are priorities for recovery (Wardhana, 2020). The slowdown in the world economy has pushed several countries into a severe recession, with the possibility of a wide-ranging economic depression increasing (Corbet et al., 2021). China, which has been the center of world goods production as the country of the initial spread of COVID-19, is certainly profoundly shaken by its economy. The pandemic has had a positive and statistically significant impact on economic policy uncertainty in China and Korea (Iyke, 2020). So that there are obstacles to the supply of some supplies of raw materials and other goods in countries in the world, the collection of raw materials that is disrupted will undoubtedly affect production activities for business actors.

In addition, public consumption activities have also decreased due to reduced activities outside the home. This pandemic has caused a severe setback for global economic growth and development (Abodunrin et al., 2020). The COVID-19 pandemic has created unprecedented financial hardships in modern times (Wielen and Barrios, 2020). During the pandemic, social distancing, self-isolation, and travel restrictions have reduced the workforce in all sectors of the economy and caused many jobs to be lost (Nicola et al., 2020). COVID-19 is more than just a health crisis because it has profound social and economic consequences. The impacts of lockdowns and reductions in production and consumption worldwide are amplified by tiered effects through international supply chains (Lenzen et al., 2020). The world stock market also experienced a crash, and the unemployment rate rose to much higher levels (Zhang et al., 2020). As a country that is currently having a demographic bonus, Indonesia is now facing problems due to the threat of an economic crisis due to the COVID-19 virus outbreak that has attacked the whole world (Mahera and Nurwati, 2020)

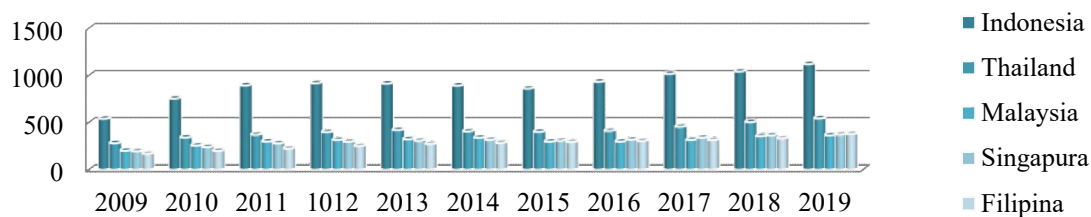
**Fig 1.1.** Tingkat GDP (Juta USD) Negara ASEFO (ASEAN founder) Per-Triwulan Sejak Tahun 2019



Sumber: <https://www.ceicdata.com/id/indicator/nominal-gdp>

The ASEFO economy looks battered by the coronavirus. Even the economy of ASEFO countries in the second quarter became the worst victim of the sudden attack of this pandemic. For example, Indonesia's GDP was 270,088,182 million USD in the 2nd quarter of 2019 and decreased drastically in the same quarter in 2020, only 246,016.019 million USD. Economic activity, which usually runs massively, has slowed down during the pandemic because the flow in the financial system has been hampered (Putra, 2020). Likewise, for the other four countries, even Malaysia experienced a fairly deep decline from 89,460,061 million USD in the 2nd quarter of 2019 and only 69,865,725 million USD in the 2nd quarter of 2020. This was due to the firmness of the Malaysian government in determining regional lockdown to break the chain of the spread of covid 19 in the country's territory. Southeast Asia is geographically close to the virus outbreak. As a region consisting of the majority of developing countries, the economic situation of SEA will be significantly affected by the spread of this Coronavirus (Ginanjari, 2020).

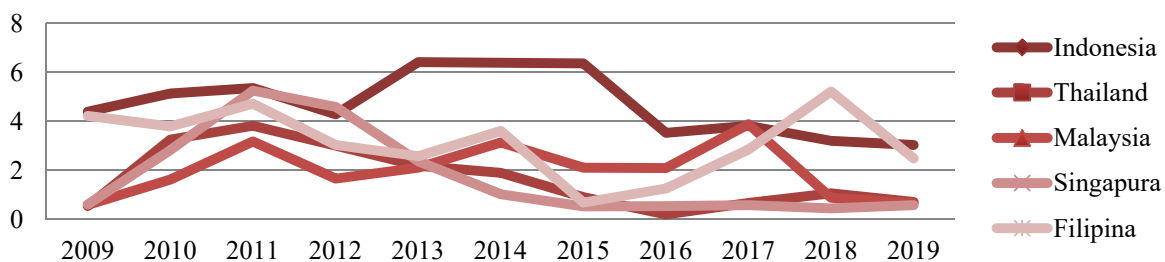
**Fig 1.2.** GDP Level of ASEAN Founding Countries (ASEFO) 2009 – 2019



Source: <https://www.ceicdata.com/en/indicator/nominal-GDP>

In general, GDP in ASEFO countries declined in 2015 and 2014. This condition was the impact of the decline in world commodity prices in 2014, which led to a decrease in exports and caused a slowdown in the world economy and the world economy still not recovering after the financial crisis in 2008. Compared to other major uncertainty events, the 2008 financial crisis had a more significant impact on commodity prices (Huang et al., 2021). However, the GDP figure that declined in the two years recovered and increased in the following year. Not only GDP but inflation is also one of the main priorities in today's economy. Because inflation and the progress of GDP figures have a very close relationship, according to (Tambunan 2014), an inflation rate that is too high will negatively impact economic growth. However, inflation that is too low can also cause financial problems. The following is the development of ASEFO country inflation:

**Fig 1.3.** Annual Inflation Rate of ASEAN Founding Countries (ASEFO) 2009-2019



Source: <https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG>

Esen and Bayrak (2016) state that inflation at a reasonable level will positively impact economic growth, while inflation above the limit will have a negative and significant effect on economic growth. An increase in inflation will generally reduce people's purchasing power. The increase in the prices of goods and services due to the dynamics of inflation will suffocate the public with the high consumption costs that must be incurred. The movement of inflation rates in all ASEAN Founder countries (ASEFO) is very volatile. Singapore experienced a sharp increase in inflation rate in 2016, which increased to 5.25% from two years earlier in 2009 it was only 0.60%. However, this figure tends to decrease; until 2018, it was at 0.44% and increased again in 2019 at 0.57%. In contrast to the Philippines, where the inflation rate has tended to rise from 2015 until 2018 and was at 5.21%, in 2019, it decreased to 2.48%.

## II. LITERATURE REVIEW

According to the classical model, the interaction between the use of labor, real wages, and actual output [n, w, and y] will determine actual aggregate output. The classical school holds that an increase in the general price level automatically increases nominal wages by the same proportion so that real wages do not change. If real wages do not change, the use of labor does not change, so the actual aggregate output does not change. In other words, actual aggregate output is not related to the general price level, so aggregate supply [U.S.] is vertical. According to the classical flow, changes in aggregate production are caused by changes in the marginal productivity of labor, not due to changes in the general price level. Mathematically, the classical static aggregate supply model consists of five equations, namely:

$$\text{Model IS} \quad : y = C[(y - \tau), R] + I(y, R) + g$$

$$\text{Model LM} \quad : M / P = L(y, R)$$

$$\text{Production Function} \quad : y = f(n)$$

$$\text{Marginal Productivity} \quad : f'(n) = w$$

$$\text{Labor Demand} \quad : n = h(w)$$

According to Keynes, nominal wages are adjusted slowly to a certain extent so that the nominal wage rate is not an exogenous variable. The general price level relates to the quantity of labor employed at a given minor wage level. The production function relates to the price level based on  $y = f(n)$  and. The process decreases concerning the number of workers so that the relationship between actual aggregate output [y] and the general price level [P] is positive. This means that an increase in the price level will reduce real wages so that labor use increases and then increases aggregate production. The Keynesian aggregate supply model is as follows: Model I.S.

$$: y = C[(y - \tau), R] + I(y, R) + g$$

$$\text{Model LM} \quad : M / P = L(y, R)$$

$$\text{Production Function} \quad : y = f(n)$$

$$\text{Produktivitas Marginal} \quad : f'(n) = \bar{W} / P$$

$$\text{Labor Demand} \quad : n = h \bar{W} / P$$

The system of equations above will determine five variables, namely variables y, R, n, P, and W, and real household consumption and actual consumption of firms or investments are determined at certain levels of P, y, R, n and W. How do changes in the exogenous variables M, g, and affect the balance of P, y, R, n, c, i and W? On a fixed U.S. schedule, an increase in the money stock will increase the L.M. schedule so that the A.D. schedule increases. An increase in the A.D. schedule will improve the general price level and reduce the supply of real money more minor than the increase in the general price level. As a result, the L.M. schedule returns to the original L.M. schedule. The increase in the general price level is less than the increase in the money stock because the U.S. schedule is neither perfectly inelastic nor vertical. Therefore, the increase in the supply of money is more significant than the increase in prices. As a result, the value of all fundamental economic variables changes, real wages fall, the use of labor increases, and ultimately increases actual aggregate output.

## III. METHODS

This research is classified as associative research. It finds out the relationship between two or more variables and quantitative research because it uses secondary data with the Autoregressive Distributed Lag (ARDL) approach, which can see how the relationship between variables in the long term in each region or country is studied. The research data is ASEFO (ASEAN Founder) country data: Indonesia, Thailand, Malaysia, Singapore, and the Philippines from 2009 – 2019 sourced from the World Bank (World Bank). <http://www.worldbank.org>, International Monetary Fund. <http://www.imf.org>, and CEIC. <http://www.ceicdata.com>. The equation formula used is as follows:

$$GDP = \alpha + \beta_1 INF_{it} + \beta_2 NPL_{it} + \beta_3 JUB_{it} + \beta_4 GOV_{it} + \beta_5 LDR_{it} + e$$

$$GDP_{Indonesiat} = \alpha + \beta_1 INF_{it} + \beta_2 NPL_{it} + \beta_3 JUB_{it} + \beta_4 GOV_{it} + \beta_5 LDR_{it} + e$$

$$GDP_{Thailandt} = \alpha + \beta_1 INF_{it} + \beta_2 NPL_{it} + \beta_3 JUB_{it} + \beta_4 GOV_{it} + \beta_5 LDR_{it} + e$$

$$GDP_{Malaysiat} = \alpha + \beta_1 INF_{it} + \beta_2 NPL_{it} + \beta_3 JUB_{it} + \beta_4 GOV_{it} + \beta_5 LDR_{it} + e$$

$$GDP_{Singapurat} = \alpha + \beta_1 INF_{it} + \beta_2 NPL_{it} + \beta_3 JUB_{it} + \beta_4 GOV_{it} + \beta_5 LDR_{it} + e$$

$$GDP_{Filipinat} = \alpha + \beta_1 INF_{it} + \beta_2 NPL_{it} + \beta_3 JUB_{it} + \beta_4 GOV_{it} + \beta_5 LDR_{it} + e$$

GDP = gross domestic product (Miliar USD)  
 INF = inflation (%)  
 NPL = non performing loans (%)  
 JUB = money (Miliar USD)  
 GOV = government expenditre (Billion USD)  
 LDR = loan to deposit ratio (%)

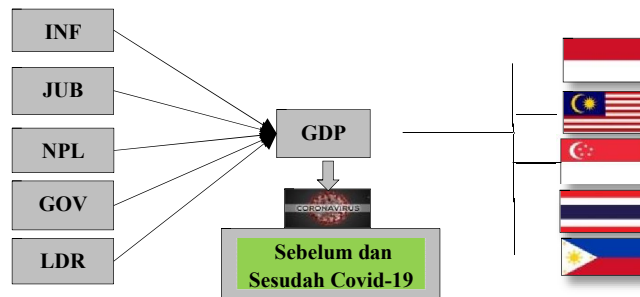


Fig 2.1. ARDL Panel Conceptual Framework

IV. DISCUSSION

The most appropriate analysis to test pooled data, which is a combination of cross-section data (country) with time-series data (annual), is an analysis using a panel model with Auto-Regressive Distributed Lag (ARDL). This is because the ARDL panel results are better than ordinary panels. After all, they can be cointegrated in the long term and have the most suitable lag distribution; in theory, using Eviews 10 software, the following results are obtained:

Tabel 4.1 Output Panel ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
INF	-0.127845	0.000471	-271.6099	0.0000
NPL	4.294452	0.012578	341.4175	0.0000
JUB	0.000687	0.000189	3.634464	0.0024
GOV	-0.203071	0.000680	-298.4454	0.0000
LDR	0.096982	0.000274	353.4783	0.0000
Short Run Equation				
COINTEQ01	-0.020417	0.005888	-3.467652	0.0034
D(INF)	0.010650	0.002647	4.023603	0.0011
D(NPL)	-0.001664	0.040015	-0.041577	0.9674
D(JUB)	0.299170	0.291645	1.025801	0.3212
D(GOV)	0.015662	0.002256	6.941983	0.0000
D(LDR)	0.002293	0.002469	0.928496	0.3679
C	0.397911	0.103054	3.861201	0.0015
Mean dependent var	0.067748	S.D. dependent var	0.077009	
S.E. of regression	0.017610	Akaike info criterion	-9.294769	
Sum squared resid	0.004652	Schwarz criterion	-7.834890	
Log-likelihood	295.6061	Hannan-Quinn criteria.	-8.730222	

\*Note: p-values and any subsequent tests do not account for model Selection.

*Sumber: Output Eviews 2021*

The ARDL Panel model is accepted if the model has a cointegrated lag. The main assumption is that the coefficient value has a negative slope with a significant level of 5%. Based on the results above, it can be seen that the requirements of the ARDL Panel model used have been met: with a negative value, namely -0.02, and significant with a prob value  $<0.05$ , which is worth 0.003, it can be stated that the ARDL panel model used in this study is accepted. Based on the acceptance of the model, the data analysis was carried out on a country-by-country panel. The results of the hard panel test above show that in Indonesia, INF has a positive (0.011) and significant effect on GDP (prob 0.00  $<0.05$ ). NPL has a negative (-0.10) and significant effect on GDP (prob 0.00  $<0.05$ ). JUB has a positive (0.0003) and significant effect on GDP (prob 0.00  $<0.05$ ). GOV has a positive (0.01) and significant effect on (prob 0.00  $<0.05$ ). LDR has a positive (0.01) and significant effect on (prob 0.00  $<0.05$ ). The results of the ardl panel test above show that in Thailand INF has a significant positive (0.01) effect on GDP (prob 0.00  $<0.05$ ). NPL has a significant positive (0.05) effect on (prob 0.00  $<0.05$ ). JUB has a significant positive (0.01) effect on GDP (prob 0.00  $<0.05$ ). GOV has a significant positive (0.02) effect on GDP (prob 0.00  $<0.05$ ). LDR has a significant negative effect (-0.002) on GDP (prob 0.00  $<0.05$ ).

The results of the ardl panel test above show that in Malaysia INF has a significant positive effect (0.01) on GDP (prob 0.00  $<0.05$ ). NPL has a significant positive effect (0.10) on GDP (prob 0.00  $<0.05$ ). JUB has a positive effect (0.04) which is not significant on GDP (prob 0.050  $>0.05$ ). GOV has a significant positive (0.02) effect on GDP (prob 0.00  $<0.05$ ). LDR has a significant negative effect (-0.001) on GDP (prob 0.00  $<0.05$ ). The results of the ardl panel test above show that in Singapore INF has a significant positive effect (0.02) on GDP (prob 0.00  $<0.05$ ). NPL has a significant negative (-0.10) effect on GDP (prob 0.00  $<0.05$ ). JUB has a significant positive effect (1.46) on GDP (prob 0.00  $<0.05$ ). GOV has a significant positive (0.02) effect on GDP (prob 0.00  $<0.05$ ). LDR has a significant positive effect (0.00) on GDP (prob 0.00  $<0.05$ ). The results of the ardl panel test above show that in the Philippines INF has a positive effect (0.01) (prob 0.00  $<0.05$ ). NPL has a significant positive (0.03) effect on GDP (prob 0.00  $<0.05$ ). JUB has a significant negative (-0.02) effect on GDP (prob 0.00  $<0.05$ ). GOV has a significant positive (0.01) effect on GDP (prob 0.00  $<0.05$ ). LDR has a significant negative (-0.00) effect on GDP (prob 0.00  $<0.05$ ) Hasil uji panel ARDL menunjukkan bahwa :

**Tabel 4.2. Panel ARDL**

Variabel	Indonesia	Thailand	Malaysia	Singapura	Filipina	Short run	Long run
INF	1	1	1	1	1	1	1
NPL	1	1	1	1	1	0	1
JUB	1	1	0	1	1	0	1
GOV	1	1	1	1	1	1	1
LDR	1	1	1	1	1	0	1

*Source: Output Eviews 2021*

In Indonesia, Thailand, Singapore, and the Philippines, INF, NPL, JUB, GOV, and LDR significantly influence GDP. Thus, it is known that the leading indicators of controlling the balance of aggregate demand and supply in Indonesia, Thailand, Singapore, and the Philippines are inflation, non-performing loans, money supply, government spending, and loan to deposit ratio. The money supply and government spending significantly affect Indonesia's GDP (Mutia, 2019). In addition, inflation has a significant effect on Indonesia's GDP (Karlina, 2017; Silaban and Fortune, 2020; Sarah and Sulasmiyati, 2018). In Malaysia, INF, NPL, GOV, and LDR have a significant influence on GDP. Meanwhile, JUB does not significantly affect GDP. Thus, it is known that the leading indicators of controlling the balance of aggregate supply and demand in Malaysia are inflation, non-performing loans, government spending, and the loan to deposit ratio. Inflation and government spending has a significant effect on economic growth (Soedjono and Salhab, 2013). On the other hand, an increase in the money supply significantly impacts GDP



(Hameed and Ume-Amen, 2011). However, government spending does not significantly affect the economic growth of the study (Mahzalena and Juliansyah, 2019).

The leading indicators of state effectiveness in controlling the stability of ASEFO countries, including Indonesia, Thailand, Singapore, and the Philippines, are all variables studied, namely INF, NPL, JUB, GOV, and LDR. As for Malaysia, there are four leading indicators of the country's effectiveness in controlling the level of aggregate output, namely INF, NPL, GOV, and LDR. In addition, government spending in both the long and short term does not significantly affect GDP, while inflation is significant in the long term to GDP but not in the short term (Tanjung, 2018). Thus, on a panel basis, it turns out that inflation, non-performing loans, government expenditure, and loan to deposit ratios are also able to become leading indicators for controlling ASEAN Founder (ASEFO) countries, namely Indonesia, Thailand, Malaysia, Singapore, and the Philippines, but for the NPL and LDR variables. Unstable position in short-run and long-run. Inflation significantly affects economic growth (Opeyemi, 2020; Gyamfi et al., 2020). We are pursuing economic growth while maintaining the inflation rate in the long term (Van, 2020). In maintaining the balance of aggregate demand and supply, the role of endurance policy, namely the mix of fiscal, monetary, and macroprudential/macroprudential policies, is vital. Financial system stability must always be considered in economic development so that the balance of aggregate output in the real sector can be sustainable as in the findings in this study that inflation and credit risk, government spending, and liquidity risk are leading indicators of controlling the balance of aggregate output in ASEFO countries.

From the overall results above, it is known that in ASEFO countries, all variables significantly affect the level of GDP in the long term, namely INF, NPL, JUB, GOV, and LDR. Likewise, in a short time, some variables significantly influence GDP in ASEFO countries, namely INF and GOV. Thus, it is known that the leading indicators of the effectiveness of variables in controlling the balance of aggregate demand and supply as seen from the level of stability of aggregate output as reflected in the GDP level of ASEFO countries are INF and GOV. In the results of data processing, the INF and GOV variables are two variables that provide a stable influence, namely the long-term and short-term effects on controlling economic stability, which is assessed from the level of short-run and long-run equilibrium in the results table. In theory, a decrease in the inflation rate will increase economic growth, and conversely, an increase in inflation will reduce economic growth (Utomo, 2013). Inflation has a significant effect on economic growth (Indriyani, 2016). Therefore, inflation is one of the variables that determine the financial system's stability and macroeconomic stability. As a determining factor for people's purchasing power, very high inflation conditions can make the economic slump because the prices of goods and services are generally beyond the reach of the community. The high rate of inflation causes the economy of a region to weaken (Crismanto, 2007).

In addition, inflation that is too low will reduce economic productivity. Prices of goods and services that tend to be inferior will make the economy sluggish and lackluster due to low demand for goods and services. This condition will have dire consequences if it continues for a long time because it can impact decreasing production volume and decreasing need for labor force or even termination of employment. Both of these phenomena will negatively impact the level of balance of aggregate output, so maintaining the inflation rate within a healthy range is very important to support sustainable economic progress. The same is true of government spending. The increase in government spending is in line with the rise in a country's economic activities (Salhab and Soedjono, 2012). Government spending will even significantly affect economic growth, measured using GDP (Saputra, 2012). Government spending that is at the correct number will contribute positively to an increase in aggregate output. Government investment in development can create a multiplier effect on the economy and increase production capacity in the long term. In overcoming economic conditions in recession, the government can increase its spending to stimulate aggregate demand so that production activities also increase and help reduce the unemployment rate. However, in a warming economy, government spending will be reduced to reduce aggregate demand and support the inflation rate to a more stable level. This shows that changes in government spending also play an essential role in economic development. Fiscal policy shocks substantially affect inflation and variations in output growth in the short and long term (Liu et al., 2021).

## V. CONCLUSION

Strengthening of economic fundamentals in ASEFO countries. The leading indicators for controlling the aggregate supply and demand balance in Indonesia, Thailand, Singapore, and the Philippines are inflation, non-performing loans, money supply, government spending, and loan to deposit ratio. Meanwhile, the leading indicators for controlling the balance of aggregate demand and supply in Malaysia are inflation, non-performing loans, government spending, and the loan to deposit ratio.

Panel Fundamental Strengthening. In terms of inflation, non-performing loans, government expenditure, and loan to deposit ratios can become leading indicators for controlling ASEAN Founder (ASEFO) countries, namely Indonesia, Thailand, Malaysia, Singapore, and the Philippines. Still, the NPL and LDR variables are unstable in terms of short runs and long runs. Variable Fundamental Strengthening. The leading indicators of the effectiveness of variables in controlling the balance of aggregate supply and demand as seen from the level of stability of aggregate output as reflected in the GDP level of ASEFO countries are INF and GOV.

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