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Does Foreign Direct Investment Affect Agricultural Value Add in Cambodia? Study with ARDL Approach

Abstract

This study looks at how macroeconomic factors including Foreign Direct Investment and GDP relate in the long and short term to the agricultural sector which is the pillar of the Cambodian economy. We use the World Bank as a supplementary source for statistics data, namely data from 2000 to 2020. We find that the variables we expect to have varying relationships with exports in Cambodia, in the short term the previous year's agricultural value added is the dominant factor influencing this year's agricultural value added, followed by foreign direct investment. The ARDL test found that when foreign direct investment increases, it will provide a positive sentiment toward increasing the added value of agriculture in Cambodia; Accordingly, the gross domestic product variable is also the same. This shows that in Cambodia foreign direct investment remains the dominant factor affecting the added value of agriculture both in the long and short term, but other variables have a better effect in the short term on the added value of agriculture in Cambodia.

Background

Harrod-Domar argues that investment is a condition that must be met so that an economy can achieve robust growth or steady growth in the long term (Asafo-Agyei & Kodongo, 2022). The investment will have a multiplier effect on a country's economy, both in terms of aggregate supply and aggregate demand (Dankyi, Abban, Yusheng, & Coulibaly, 2022; Götz & Jankowska, 2022). Thus, investment is one of the important determinants that determine economic progress in a country (Magazzino & Mele, 2022; Mensah & Mensah, 2021).

The development of FDI, which fluctuates from year to year and tends to increase, is anticipated to contribute to longer-term and short-term increases in economic growth, is expected to reduce unemployment (Sahoo & Dash, 2022), with the foreign investment it is hoped that employment will increase because currently, foreign investment began to enter in various sectors, especially in the agricultural sector (Sánchez, Cicowiez, & Ortega, 2022; Sadeghi, Shahrestani, Kiani, & Torabi, 2020).

The impact of FDI on agricultural land in developing nations, a practice known as land grabbing, has an impact on food security in the host country, and it is possible that this impact varies depending on the place of origin of the investors (Rashid, Bakar, & Razak, 2016). Due to domestic organizational practices to adhere to human rights and hold to account farmland behavior, along with positive spillovers, by increasing the area used for agricultural production, foreign direct investment in agriculture by investors from wealthy nations improves food security. Contrarily, institutional pressure inside such nations to promote national interests and government policy goals, as well as negative spillover effects, lead FDI in farm by investors from developing countries to have a negative impact on food security by lowering the amount of agricultural land (Santangelo, 2018).

The agricultural sector has a strategic role in national development, including absorbing labor, contributing to GDP, a source of foreign exchange, industrial raw materials, a source of food and nutrition, and encouraging the movement of other real economic sectors (Feher, et al., 2022). Experience shows that the agricultural sector is proven to be able to support the national economy during an economic crisis (Kong, et al., 2021; Mamba & Ali, 2022). This experience provides a valuable lesson that depending on economic activities that are not resource-based are very vulnerable to external environmental shocks and dynamics (Raza, Wu, & Lin, 2022). This study looks at how

macroeconomic factors including Foreign Direct Investment and GDP relate in the long and short term to the agricultural sector which is the pillar of the Cambodian economy.

Research Methods

We use the World Bank as an additional source of statistical data, namely data from 2000 to 2020. Two alternative time series models will be used to investigate the following variables. In this study, economic growth is measured using national GDP. The factors in this study include GDP and FDI because they show a long and short-term relationship between the two variables, with the added value of agriculture as the dependent variable. This is the econometric model we use:

$$AVA_t = \beta_0 + \beta_1 AVA_{t-1} + \beta_2 AVA_{t-2} + \beta_3 AVA_{t-3} + \beta_5 AVA_{t-4} + \beta_6 GDP_t + \beta_7 GDP_{t-1} + \beta_8 GDP_{t-2} + \beta_9 GDP_{t-3} + \beta_9 GDP_{t-4} + \beta_{10} FDI_t + \beta_{11} FDI_{t-1} + \beta_{12} FDI_{t-2} + \beta_{13} FDI_{t-3} + \beta_{14} FDI_t-4 + et$$

Where the Agriculture value add is AVA, the gross domestic product is GDP, the foreign direct investment is FDI, the error term is e, and time series is t.

Dynamic ARDL was used in the study. Zhang et al. (2021) claim that ARDL is a regression method that includes the lag of both the dependent and independent variables simultaneously. Using this model can analyze long-term relationships when the explanatory variables are a mixture of 1(1) and 1(0).

Table 1. Descriptive variable

Variable	Explanation	Data type
Foreign direct investment	Foreign direct investment is investment activity by foreign or foreign investors to do business in Indonesia.	Percent
Agriculture value add	The net output of the agriculture industry is calculated by adding all the outputs and subtracting all the intermediate inputs. The estimation excludes the degradation and exhaustion of natural resources as well as the wear and strain on man-made assets.	Percent
GDP	The entire market worth of all the products and services a nation produces during a certain time period is measured by its GDP.	Percent

Result and Discussion

Table 1 presents descriptive data based on the study's factors.

Table 2. Descriptive data

|	AVA	FDI	GDP
Mean	29.61721	3.709415	7.226089
Median	30.71006	4.054763	7.142571
Maximum	35.91870	7.028893	13.25009
Minimum	20.71187	1.817908	-3.096007
Std. Dev.	4.556949	1.195764	3.448108
Skewness	-0.617489	0.630598	-1.402324
Kurtosis	2.155627	3.945786	5.817277
Jarque-Bera	1.958370	2.174484	13.82771
Probability	0.375617	0.337145	0.000994
Sum	621.9614	77.89771	151.7479
Sum Sq. Dev.	415.3158	28.59703	237.7890
Observations	21	21	21

Mean, min, max, and standard deviation are used to express the findings of descriptive statistics. AVA Minimum 20.71, AVA Maximum 35.91, and AVA Standard Deviation 4.55. FDI Minimum 1.81, FDI Maximum 7.02, FDI Standard Deviation 1.19, etc. The ARDL model should not be used to forecast the value without first performing a stationary test. When considering the error component, which includes any potential for autocorrelation, the ADF algorithm may determine if a series is stationary or not. These are the outcomes:

Table 2. Stationarity test

	Unit Root	ADF Test stat.	Signif.	Be told
Gross Domestic Product (GDP)	Level	-1.431593	0.5451	
	First Diff	-3.051408	0.0490	Stationer
Agriculture value add (AVA)	Level	-1.235647	0.6349	
	First Diff	-3.165526	0.0385	Stationer
Foreign Direct Investment (FDI)	Level	-7.791961	0.0000	Stationer

From the table above, it can be concluded that FDI data are stationary in the level data, GDP and AVA data are stationary in the first difference data. We may continue with the ARDL estimate because all the data are stationer.

Picture 1. AIC Optimum Lag Test

Akaike Information Criteria (top 20 models)
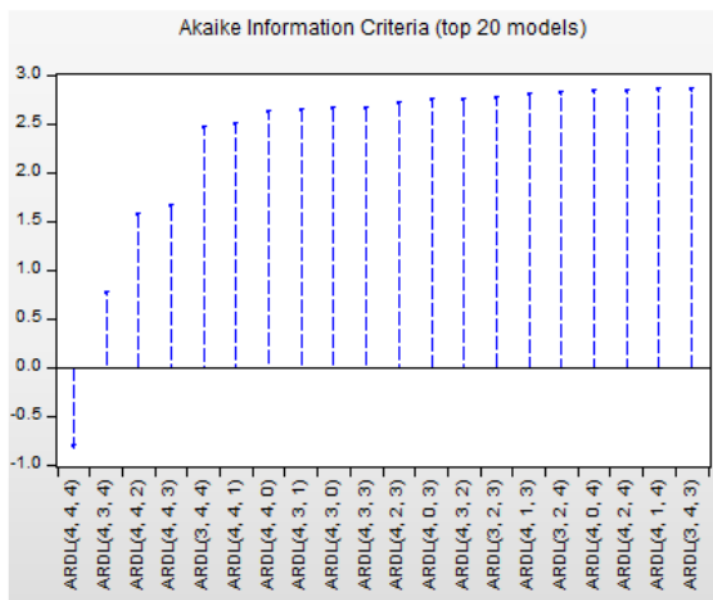
In order to determine which lag should be utilized in the subsequent test, optimal lag testing is conducted; the most suggested lag is 4,4,4 as seen in the accompanying graph.

Tabel 3. Bounds test

Stat. Test	Value	Signif.	I(0)	I(1)
F-stat.	21.27011	10 percent	2.63	3.35
K	2	5 percent	3.1	3.87
		2.5 percent	3.55	4.38
		1 percent	4.13	5

Asympotic : n=1000

According to the Limit test results shown in Table 4. This shows that the four variables under study—Agriculture value add, foreign direct investment, and GDP—are cointegrated throughout time or move in the same direction because the F statistic value is higher than I(0) and I(1).

Tabel 4. ARDL results

	Coeff.	Std. Error	t-Stat.	Prob.*
D(AVA(-1))	-1.902082	0.393334	-4.835793	0.1298
D(AVA(-2))	2.042595	0.287170	7.112840	0.0889
D(AVA(-3))	2.150657	0.500948	4.293171	0.1457
D(AVA(-4))	-1.955680	0.364191	-5.369926	0.1172
D(GDP)	-0.543116	0.044751	-12.13644	0.0523
D(GDP(-1))	-0.746859	0.157666	-4.736978	0.1324
D(GDP(-2))	0.160623	0.135235	1.187732	0.4455

D(GDP(-3))	-0.931228	0.140363	-6.634425	0.0952
D(GDP(-4))	-0.128331	0.060545	-2.119596	0.2806
FDI	2.934160	0.444235	6.604976	0.0957
FDI(-1)	2.101659	0.359071	5.853044	0.1077
FDI(-2)	1.760086	0.386093	4.558714	0.1375
FDI(-3)	-0.506781	0.238632	-2.123693	0.2802
FDI(-4)	1.662378	0.473348	3.511955	0.1766
C	-33.25339	5.623299	-5.913502	0.1066
R-sq.	0.998420	Adj R-sq.		0.976305

Foreign direct investment and economic growth, the two independent variables in the ARDL model, have an R-squared value of 0.998, which means they can explain 99.8% of the dependent variable i.e. agricultural value added. This demonstrates how well the research paradigm works for research.

Judging from the ARDL estimation results, because the variables AVA and AVA(-1) show a t-statistic of -4.835793 which is greater than the coefficient -1.902082, this implies that a factor influencing the present agricultural added value is the agricultural added value factor from the prior year. The variables AVA and GDP(-2) show a t-statistic of 1.187732, which is greater than the coefficient of 0.160623, this means that the GDP factor two years earlier affects the current added value of agriculture, which if there is an increase in GDP by 1%, will cause an increase agricultural value added by 33%. This shows that in Cambodia, the influence of economic growth represented by gross domestic product in previous years is one of the strong factors affecting the added value of agriculture this year. Other variables such as foreign direct investment also have a direct relationship with agricultural value added in Cambodia.

Table 5. Model test results in the long and short term

	Coeff.	Std. Error	t-Stat.	Prob.
C	-33.25339	5.623299	-5.913502	0.1066
D(AVA(-1))*	-0.664510	0.099699	-6.665188	0.0948
D(GDP(-1))	-2.188912	0.305709	-7.160119	0.0883
FDI(-1)	7.951502	1.384944	5.741390	0.1098
D(AVA(-1), 2)	-2.237572	0.389380	-5.746507	0.1097
D(AVA(-2), 2)	-0.194977	0.161444	-1.207705	0.4403
D(AVA(-3), 2)	1.955680	0.364191	5.369926	0.1172
D(GDP, 2)	-0.543116	0.044751	-12.13644	0.0523
D(GDP(-1), 2)	0.898936	0.172963	5.197289	0.1210
D(GDP(-2), 2)	1.059560	0.153115	6.920029	0.0914
D(GDP(-3), 2)	0.128331	0.060545	2.119596	0.2806
D(FDI)	2.934160	0.444235	6.604976	0.0957
D(FDI(-1))	-2.915683	0.653228	-4.463499	0.1403
D(FDI(-2))	-1.155597	0.336454	-3.434633	0.1804
D(FDI(-3))	-1.662378	0.473348	-3.511955	0.1766

In order to be able to carry out an economic analysis of the effect of gross domestic product and foreign direct investment on agricultural added value, it is not enough to be based only on short-term

information, but it is necessary to analyze the long-term effects. From the long-term ARDL estimation results, as shown in Table 5, it can be seen that the FDI variable has the largest coefficient, namely 7.951502. Then followed by the added value of agriculture in the previous year which had a coefficient value of 2.237572. This means that in the long run, the FDI variable plays a greater role in increasing agricultural-added value, followed by the previous year's agricultural value-added variable and GDP.

Conclusion

We find that the variables we expect to have varying relationships with exports in Cambodia, in the short term the previous year's agricultural value added is the dominant factor influencing this year's agricultural value added, followed by foreign direct investment. The ARDL test found that when foreign direct investment increases, it will provide a positive sentiment toward increasing the added value of agriculture in Cambodia; Accordingly, the gross domestic product variable is also the same. This shows that in Cambodia foreign direct investment remains the dominant factor affecting the added value of agriculture both in the long and short term, but other variables have a better effect in the short term on the added value of agriculture in Cambodia.

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