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The Export-Led Growth Hypothesis: Some Evidence from the 8-ASEAN

Cheng-Wen Lee[1], **Budi Hasyim**[2] **and Jan-Yan Lin**[3]

Abstract

This paper examines the validity of the growth hypothesis underlying exports within the context of the developing country sector, given the life of a general marketplace among countries. It used annual data from developing countries in the Association of Southeast Asian Nations (ASEAN) from 2009 to 2018 and analyzed the impact of capital, employment, land and exports on the import sector on agricultural growth. The method used is Estimated generalized least square (EGLS) panel data analysis. The results of the study show that, in an Export Led Growth (ELG) scenario, data exists for analysis in eight ASEAN countries, specifically Brunei, Cambodia, Indonesia, Laos, Malaysia, Thailand, the Philippines and Vietnam. Production input factors (capital, labor and land) have a significant and positive impact on agricultural economic growth, while trade factors (exports and imports) have a negative impact on economic growth. In order to expand the contribution of the agricultural sector, capital, labor and agricultural land must be large enough to have a positive impact on agricultural growth.

JEL classification numbers: J43.
Keywords: Agricultural export, Agricultural growth, Free trade, Developing countries.

[1] Department of International Business, Chung Yuan Christian University, Taiwan, ROC.
[2] Ph.D. Program in Business, Chung Yuan Christian University, Taiwan, ROC. Department of Management, Universitas Borneo Tarakan, Indonesia.
[3] Department of Business Administration, Chung Yuan Christian University, Taiwan, ROC.

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1. Introduction

The agricultural sector is closely related to the existence of poverty. The most important sector in the economy, which is the agricultural division, consumes labours diversely in the most of developed country (Setboonsarng, 2006). While in Southeast Asia (SEA), the agricultural sector also contributes to gross domestic product (GDP), which exceeds 10 percent, and provides employment for more than a third of the population (Fan and Zhuang, 2009). Hence, according to Cervantes and Dewbre (2010); Ching, Dano, and Jhamtani (2009); and Fan and Zhuang (2009), the agricultural sector has an essential essence to reduce poverty and hunger, one of the goals stated in the Millennium Development Goals (MDG) of 2015. Here, it says that 3 out of 4 poor people in SEA live in rural areas and rely on farming. Empirical evidence supported by sectors in 25 countries in 2009 found that an increase in per capita financial returns in the agricultural industry declined the poverty (52 %), implying an increase in the per capita income of the non-farm sector it reduced the poverty rate by thirteen percent, and thirty-five percent could be reduced by increasing remittances. (Cervantes and Dewbre, 2010: 21). So, one way to build a country's economy is to build the agricultural sector. It is simple that the agricultural sector will make it easier to stimulate the economy.

Economic growth is influenced by several production input factors, namely capital, labor, and land. In addition to these factors, there are other factors that directly affect economic growth or national income, namely the trade factor (exports and imports), where exports are the outflow of a number of goods and services from a country to the international market. Exports will directly provide an increase in revenue in a country's income. An increase in the income of a country will result in an increase in the level of GDP. In other words, exports will cause economic growth (Simpar, 2010).

Exports are an essential issue to drive economic growth in emergent nations, as reflected in the export-led growth (ELG) hypothesis (Kang, 2015). As referred to ELG hypothesis, strong exports support developing countries to overcome several barriers to economic growth (Dawson 2005; Sanjuán-López and Dawson 2010). The ELG strategy may be effective in countries with access to large export markets. However, depending on the presence of accessible foreign demand, exports have a significant impact on the economic growth for developing countries.

The ELG strategy of countries will provide a free trade strategy through bilateral or multilateral trade agreements, such as the ASEAN Free Trade Area (AFTA) and the ASEAN Economic Community (AEC), to be more effective than the strategies of other countries. Countries pursue protectionism because of the availability of significant foreign markets. Under these circumstances, developing countries' ELG strategies are expected to be more effective. Hence, this study will analyze the effect of production input factors, such as capital, number of workers, land, and trade factors, such as exports and imports, in the agricultural sector on agricultural growth.

2. Literature review

According to Balaguer and Jorda (2001), based on their study of the ELG hypothesis in Spain, their findings support the ELG hypothesis, especially during the period of economic liberalization. However, their study found that decisions in a country that, if given full attention, are contrary to the ELG hypothesis that is an indirect cause of export output growth. Meanwhile, according to McCombie and Thirlwall (1994), from a theoretical point of view, the rate of economic growth as a whole is determined by the level of autonomous demand growth, that is, in practice, export demand plays an important role in economic growth for a country. According to him, the faster the export growth, the faster the output growth.

On the other hand, the growth-led agriculture (ALG) by Tiffin and Irz (2006) suggest three opinions in favor of the ALG hypothesis. First, it is anticipated that agricultural expansion will contribute to overall economic expansion by lowering agricultural prices (Lewis 1954). Particularly, Lewis (1954) pointed out that low priced of goods can prevent the increase of income, which can lead to overall economic growth. Second, the growth of the agricultural sector offers opportunities to provide capital, which is an important factor for the growth of other sectors. Lastly, agricultural products are generally used as raw materials for other industries in the early stages of development.

Several studies have tried to verify the ALG hypothesis empirically. Tiffin and Irz (2006) tested the ALG hypothesis in 85 developed and developing countries. They used the Granger causality test method and found that the ALG hypothesis was supported in developing countries, while the results were mixed for developed countries, depending on the stage of economic growth. Hidayah, Yulhandri and Susanti (2022) conducted a systematic literature review using 50 articles with specific topics on the role of the agricultural sector in developed and developing countries which found mixed results. In developed countries, the agricultural sector does not have a large influence, while developing countries have a large influence on the economy.

Another hypothesis is that ELG is related to the four theoretical arguments (Dawson, 2005). First, increased exports result in GDP growth through foreign exchange rate. Second, export-generated foreign exchange makes it possible to import and invest in technology and capital goods, which encourages economic expansion. Third, growth in revenue, technological advancement, and economies of scale are all facilitated by competition in the export market. The last argument involves spillover learning by doing. In the export sector, advanced management skills and production technologies have the potential to boost economic growth as a whole.

A number of the relationships between agricultural exports and overall economic growth were identified by Kang (2015), and Seok and Moon (2021). Kang (2015) used a vector error correction model to test the agricultural ELG hypothesis. The author divides total exports into non-agricultural, agricultural (excluding rice) and rice sectors and finds that rice exports lead to economic growth in the main rice-exporting countries Vietnam, Thailand, Pakistan, and India. Seok and Moon (2021),

using the annual data of the Organization for Economic Co-operation and Development (OECD) countries from 1997 to 2016, compared three different subsamples, the European Union (EU) countries among OECD members, and the non-EU countries among OECD members. They used data from 30 developed countries.

Time series analysis and directed acyclic graphs were used in numerous previous studies to test the significance of agricultural growth and exports to overall economic growth. Mostly, a single country is the target of the studies rather than multiple countries. However, Kang (2015) and Seok and Moon (2021) tested their hypotheses using panel time series data, as they did not consider studies investigating the impact of agricultural growth and exports of economic growth in developing countries. By analyzing the causal effects of agricultural exports on agricultural growth in developing countries, the approach of the ELG hypothesis literature would contribute to growth of economic development of emerging countries.

3. Methodology

3.1 Theory and model specifications

The aggregate growth function shows the maximum production amount from a given number of inputs, and can be defined according to the following equation:

$$Y=A\ f\ (K,L,Z) \tag{1}$$

In addition, we include the import variable in the Z vector, Uğur (2008), which illustrates that imports are one of the main drivers of economic growth. The following equation represents our agricultural production function for testing the ELG hypothesis in developing countries and their agricultural sectors.

$$Y=A\ f\ (K,L,T,E,I) \tag{2}$$

After total differentiation and rearrangement, we can derive the following equation:

$$Argicultural\_Growth = \beta 0 + \beta 1 agricultural\_Labor + \beta 2 agricultural\_Capital + \beta 3 agricultural\_Land + \beta 4 agricultural\_Export + \beta 4 agricultural\_Import + \mu it \tag{3}$$

3.2 Variable measurement and data

Six variables to test the ELG hypothesis in the context of the agricultural sector of ASEAN countries are shown in Table 1. The proxy variable for agricultural growth is real agricultural value added (constant 2010 US$). The calculation for labor in employment on agriculture (% of total employment) is included. Agricultural land data for this variable is also obtained from the World Bank. Following Tsen (2010), the gross fixed capital formation is used as a capital input. The agricultural export and import data in the form of an index (2000: 100) were exploited. Considering

data availability, the data set used covers the period between 2009 and 2018.

Table 1: Explanation of variable

Variable	Variable Name	Periods	Data source	Explanation
Y	Agricultural growth	2009-2018	World Bank	Agricultural value added, constant 2015US$
L	Agricultural labor	2009-2018	World Bank	Employment in agriculture (%of total employ)
K	Agricultural capital	2009-2018	World Bank	Gross fixed capital
T	Agricultural land	2009-2018	World Bank	Agricultural land
E	Agricultural export	2009-2018	World Bank	Index(2000:100)
I	Agricultural import	2009-2018	World Bank	Index(2000:100)

We created a panel time series dataset for 8 countries (Brunei Darussalam, Indonesia, Cambodia, Myanmar, Malaysia, the Philippines, Thailand, and Vietnam) and tested the ELG hypothesis for the agricultural sector as the focusing country data.

Table 2: Average annual growth rate of variables in our analysis: 2009-2018 (%)

Country	Agricultural	Country	Agricultural	Country	Agricultural	Country
Brunei Darussalam	-1.618	0.06	0.134	0.025	0.005	0.064
Indonesia	-0.008	-0.01	0.016	0.011	0.037	0.061
Cambodia	0.359	-0.024	0.032	0.004	0.114	0.116
Myanmar	-0.811	0.011	0.018	0.018	0.031	0.044
Malaysia	-1.920	-0.016	0.038	0.004	0.045	0.080
Philippines	-1.057	-0.038	-0.019	-0.007	0.030	0.027
Thailand	-0.201	-0.013	-0.013	0.010	0.041	0.048
Vietnam	0.697	-0.026	-0.026	0.018	0.151	0.119

The average growth rate of the variables in each ASEAN country between 2009 and 2018 is exhibited in Table 2. Most of the variables tend to have similar features, i.e. the size and signs of growth rates are very similar among ASEAN countries. Agricultural growth rates are relatively negative, except for Cambodia and Thailand. Agricultural labor has a negative value in the ASEAN countries, except Myanmar. Meanwhile, the growth rate of land and agricultural capital is positive, except for the Philippines, Thailand and Vietnam. Conversely, the growth rate of exports and imports has a positive impact in all ASEAN countries. In summary, the development is not in the sectoral labor, capital and land due to the growth of trade (exports and imports) as presented in the declining trend, but is in the agricultural sector in most ASEAN countries.

4. Result and discussion

4.1 Descriptive statistics and correlation

Table 3 shows the correlation between the growth rates of the variables in this study. Agricultural growth is negatively correlated with export variables but positively correlated with other variables (Capital, Labor, Land and imports). This finding shows that, although exports and imports are not the main inputs in agricultural production, agricultural trade is for agricultural growth in ASEAN countries.

Table 3: Correlation

	Agricultural growth	**Agricultural labor**	**Agricultural capital**	**Agricultural land**	**Agricultural export**	**Agricultural import**
Agricultural growth	1	-	-	-	-	-
Agricultural labor	0.4657	1	-	-	-	-
Agricultural capital	0.0052	-0.3662	1	-	-	-
Agricultural land	0.2199	0.2559	0.0402	1	-	-
Agricultural export	-0.1383	-0.2181	0.3535	0.4941	1	-
Agricultural import	0.0737	0.2899	-0.3667	-0.0009	-0.4860	1

Table 4: Descriptive statistics

Variable	**Agricultural growth**	**Agricultural labor**	**Agricultural capital**	**Agricultural land**	**Agricultural export**	**Agricultural import**
Mean	1.99	19.90	32.92	23.78	519.18	159.82
Std. Dev.	3.22	30.43	12.75	8.97	242.42	180.74
Min	-10.28	0.01	11.37	2.54	124.91	19.04
Max	14.28	207.25	57.29	33.86	1146.30	685.04

As showed in table 4, descriptive statistics for the six variables of this study show the comparison of the primary production input factors with trade factors. The trade factor standard deviation is higher than the input production factor deviation. However, agricultural growth exhibits a significantly larger deviation than production input factor deviation. This indicates that trade factors could relate to agricultural growth compared to agricultural production input factors as referred to the standard deviation of each factor.

The results of the study on the effect of primary production input factors and agricultural trade factors on the economies of ASEAN member countries are annualized by static panel data analysis. Seok and Moon's research from 2021 is also referred to as the theory of ELG. In this theory, the primary production input factor for the agricultural sector—labor, agricultural capital, and agricultural land—

is the dependent variable that proxies economic growth. However, the independent variable in this study is the trade factor (exports and imports).

First, the best model in this research model is determined using the results of the Chow test and Hausman test. Table 5 shows the results of the Chow test that the cross-section probability value of 0.9828 is more than the real level used in the study, which is 5%. The results conclude that Ho is not rejected, namely the Common Effect Model (CEM) model is better used than Fixed Effect Model (FEM). Then, Table 6 exhibits the Hausman test with a probability value of 0.9769 which indicates more than the real level used as Ho is not rejected, meaning that the REM model is better used than FEM. As indicated in table 7 (Lagrange multiplier test), the Breusch -Pagan probability value is 0.038 which is lower than the real level used in the study, 5%. the results conclude that Ho is rejected indicated that table 8 and table 9 show the best model in this study using Random Effects Model (REM). The REM model used in this study has used cross section weigh (EGLS) and PCSE methods. This weighting is to correct for the occurrence of heteroscedasticity and autocorrelation. The REM model used can be said to be free from violations of these classical assumptions.

Table 5: Chow test Redundant Random Effects Test Equation Untitled Test cross-section fixed effects

Effect Test	Statistic	d.f	Prob.
Cross-section F	0.2067	(7.67)	0.9828
Cross-section Chi-square	1.7092	7	0.9742

Table 6: Hausman Test Correlated Random Effect-Hausman test Equation Untititled Test cross-section random effects

Effect Test	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross-section random	0.8026	5	0.9769

Table 7: Lagrange multiplier (LM) test Lagrange multiplier (LM) test for panel data Sample 2009-2018 Total panel observations: 80Probability in ()

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	3.6248 (0.0569)	0.6722 (0.4123)	4.2970 ((0.0382)
Honda	-1.9039 (0.9715)	-0.8199 (0.7939)	-1.9260 (0.9729)

Table 8: Test the Estimation Model approach

Chow test	Ho : common effect model Ha : fixed effect model	Ho : accepted if cross-section F>0.05 Ha : accepted if cross-section F<0.05
Hausman test	Ho : random effect model Ha : fixed effect model	Ho : accepted if probability > 0.05 Ha : accepted if probability < 0.05
Lagrange Multiplier test	Ho : common effect model Ha : random effect model	Ho : accepted if prob. Breusch-pagan > 0.05 Ha : accepted if prob. Breusch-pagan < 0.05

Table 9: Test results test model

Model test	Probability	Sig.	Result Model
Chow test	0.9828	0.05	CEM
Hausman test	0.9769	0.05	REM
Ligrange Multifier test	0.0382	0.05	REM

Then the t-test (partial) in table 10 shows the study concluded that each independent variable of primary production input factors (variables of capital, labor, and land) had a positive and significant effect on agricultural growth in the eight ASEAN countries with a 95% confidence level. And 90%. Then the trade factor (export and import variables) has a negative effect on agricultural growth. while the results of the f-test resulted in an F-statistical value of 6.291. The F stat value is greater than the F-table value, which is 2.25, so these results indicate that the independent variables, namely the capital variable, the amount of labor, land, imports and exports, simultaneously affect the dependent variable, namely agricultural growth. The result of the coefficient of determination (R-Squared) is 29.82%, that the variables of capital investment, number of workers, land, exports, and imports affect agricultural economic growth in eight ASEAN countries by 29.82%. of the variables outside the model.

Then the classical tests was carried out, namely normality test, multicollinearity test, heteroscedasticity test and autocorrelation test. The results of the normality test can be seen that the Jarque Bera probability value is smaller than the real level used, namely 0.000 < 0.05, meaning that, with large enough sample sizes (> 30 or 40), the violation of the normality assumption should not cause major problems. (Ghasemi, 2012) The results of the multicollinearity test show that all variables have a matrix coefficient value of less than 0.8, so the model does not have a linear relationship between the independent variables or is free from multicollinearity. The heteroscedasticity test using the Glacier Test shows that the model contains heteroscedasticity because the capital t-count value is smaller than the t-table. However, the heteroscedasticity problem can be cured by using the Generalized Least Square (EGLS) method so that the heteroscedasticity problem in the model can be tolerated (Hill, Griffiths, & Lim, 2008). The estimation results from the ELG hypothesis model produce the following value.

Based on the estimation results of primary production input variable factors (capital, labor force and agricultural land) have a positive and significant effect on economic growth. The capital investment coefficient value is 0.0562, every 1% increase in

investment in eight ASEAN countries will increase economic growth by 0.00562% (ceteris paribud). Furthermore, the number of workers as a proxy in the theory of the production function ELG the hypothesis has a positive and significant effect on agricultural economic growth. The labor coefficient value is 0.0483, so every 1% increase in labor will increase of 0.483%. Labor has a positive effect on economic growth similar to the Fayissa, Nsiah and Tadasse (2008) research.

Table 10: Panel EGLS (Cross-section random effects)

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	-0.5012	1.4567	-0.3440	0.7318
Agriculture_Labor	0.0483	0.0126	3.8191	0.0003
Agriculture_Capital	0.0562	0.0293	1.9198	0.0587
Agriculture_Land	0.0857	0.0478	1.7956	0.0766
Agriculture_Export	-0.0039	0.0020	-1.9697	0.0526
Agriculture_Import	-0.0021	0.0022	-0.9590	0.3407
Effect Specification				
			S.D.	Rho
Cross-section random			0.0000	0.0000
Idiosyncratic random			2.8938	1.0000
Weighted Statistics				
R-squared	0.2983	Mean dependent var.	1.9858	
Adjusted R-squared	0.2508	S.D. dependent var.	3.2155	
S.E. of regression	2.7831	Sum. Squared resid	573.1935	
F-statistics	6.2902	Dublin-Watson stat	1.7916	
Prob (F-test)	0.0001			
Unweighted Statistics				
R-squared	0.2983	Mean dependent var.	1.9858	
Sum squared resid	573.1935	Dublin-watson stat	1.7516	

Dependent Variable: Agriculture_Growth
Method: Panel EGLS (Cross-section random effects)
Date: 06/18/22 Time: 20:13
Sample: 2009-2018
Periods included:10
Cross-sections included:8
Total panel (balanced) observation:80
Swamy and Arora estimator of component variance
Source: processed data E-views 9.0, significant variable at the confidence level of 10% (*), 5% (**), 1% (***)

4.2 Discussion

Fayissa, Nsiah and Tadasse (2008) showed that the number of workers has a positive and significant impact on economic growth. Labor is a production input that can increase the economy's output. Economic output is generally proxied by economic growth, so labor as an economic input will increase economic growth. Based on the Cobb-Douglas production function theory, the number of workers is one of the production inputs and a driving factor for the economy.

While the agricultural land variable has a coefficient value of 0.0857, this value

explains that for every 1 percent increase in tourism capital investment there will be an increase in economic growth by 0.857%. The influence of agricultural land on agricultural economic growth produces a positive and significant value. The results are in accordance with the research of Kang (2015) which states that the significant effect of the short-term effects of capital and labor differs between countries. This finding is also corroborated by the research of Seok and Moon (2021) which states that agricultural capital has a significant effect on agricultural growth.

Then the trade factor variables (exports and imports) have a negative effect on agricultural economic growth. The value of the export coefficient is -0.003897 and the import coefficient is -0.002127. Export variable which is significant to agricultural economic growth according to the research. This result is supported by research of Haryati and Hidayat (2015) which states that the long-term relationship between economic growth and exports in Indonesia, Thailand, the Philippines and China is a relationship that has a negative effect.

5. Conclusion and policy implications

Based on the results of the EGLS panel data analysis, there is a hypothetical ELG in the agricultural sector for research in eight ASEAN countries, namely Brunei, Cambodia, Indonesia, Laos, Malaysia, Thailand, the Philippines and Vietnam. The indicators of capital, the number of workers and agricultural land have a significant and positive impact on economic growth, while the export indicators have a negative and significant impact on agricultural growth. Meanwhile, the import variable has an insignificant and negative effect on agricultural economic growth. In order to increase the contribution of the agricultural sector, it requires capital, agricultural labor and large enough land so that it will have a positive impact on agricultural growth. Exports and imports are also factors that are considered in this study that would increase economic growth.

The agricultural sector is confirmed for developing country cases under certain conditions as implied by ELG hypothesis. The special condition assumed in this analysis is the existence of an accessible general market. In other words, the ELG hypothesis is validated when developing countries have access to large common markets. This is natural because most countries are heavily protected by non-tariff barriers, such as quotas, tariff quotas, and food safety regulations. Instead, the establishment of a common market based on bilateral or multilateral free agricultural trade agreements among developing countries. The possible reason for the negative effect of agricultural exports and imports on agricultural growth in ASEAN countries is that agricultural products are short-lived and have inflexible order, which indicate that imports and exports have adverse consequences on *local rates*.

Important implications for policy makers in developing countries. Developing country governments may also be aware of the detrimental effects of establishing a free trade, based on the negative effect of agricultural imports on agricultural growth in developing countries with large free trade. In other words, competitive policies

for free trade agreements have both positive and negative effects on agricultural growth in developing countries. In summary, policy makers in developing countries play an important role in ensuring agricultural growth from trade. In particular, policy makers should thoroughly analyze the effect of free trade agreements on competitive markets and design appropriate trade negotiation strategies based on the analysis as they can be an important factor in exploiting the establishment of free trade among community nations.

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