

## The Impact of Economic and Social Factors on ASEAN Logistics Performance

Yayik Masuarah<sup>1</sup>, Indra Suhendra<sup>2</sup>, Umayatu Suiroh S.<sup>3</sup>.  
<sup>1,2,3</sup>Economic Development, Sultan Ageng Tirtayasa University, Indonesia  
E-mail: [yamasuarah@gmail.com](mailto:yamasuarah@gmail.com)

Received: May, 2020; Accepted: February, 2021; Published: April, 2021  
Permalink/DOI: <http://dx.doi.org/10.17977/um002v13i12021p036>

---

### Abstract

Logistics has acquired an important role in the economy due to an increase in the volume of foreign trade of countries which will lead to reduced barriers experienced in foreign trade. The Logistics Performance Index (LPI) is an indicator of the logistics performance assessment and trading activities of a country. This research aimed to understand the economic and social variables which include investment, port infrastructure, and labour on the Logistics Performance Index (LPI) in ASEAN countries. The decider of the sample is based on Crosssection and Time series data of eight countries in ASEAN on the 2015-2018 period. Source of research data were obtained from the World Bank and International Monetary Fund (IMF). This study uses panel data analysis method with a fixed-effect model. Based on the results of the partial test (t-test), the investment variable showed a positive effect on the logistics performance. While for labor and economic stability are negative effects on the logistics performance. And port infrastructure is no effect on the logistics performance. Also, based on simultaneous results (F-Test) indicates investment, port infrastructure, labour and economic stability have a significant effect on the Logistics Performance. Based on this research, governments in ASEAN countries need to pay attention to and make improvements to their country's logistics performance through the economic and social sectors as well as other sectors.

**Keywords:** *Panel Data Analyst, Logistics Performance Index (LPI), Investment, Port Infrastructure, Labor and Economic Stability*

**JEL Classification:** E7 F19 C12

---

### INTRODUCTION

The most important indicator to show the level of development of a country is the economic indicator. If economic indicators move in a positive direction, it will have a positive influence on the country economically, socially, culturally and psychologically. One of the most important factors in changing economic indicators is logistics. In recent years logistics has gained an important role because if the volume of foreign trade of countries increases will cause the reduction of obstacles experienced in foreign trade. To that end, countries must have a system of domestic and foreign trade that is sustainable, and this trade

must be supported by logistical strategies that guarantee the sustainability of prosperity. An efficient and well-performing logistics system is a key factor in sustainable economic growth. (Çemberci, Civelek, & Canbolat, 2015)

According to Malthus, production and distribution play a role in economic development. He considers production and distribution as two main elements of welfare. If the two are combined in the correct proportions, this will improve the welfare of a country in a short time. But if the two are run separately or combined in incorrect proportions, then it will take several thousand years to improve welfare. Therefore, Malthus places more emphasis on maximum production and optimum allocation of resource use, to improve the welfare of a country in the short term. (Jhingan, 2013)

Logistics management is part of the process of distribution of goods. Managing logistics can be considered as a supply chain process consisting of planning, implementing, and controlling the flow of goods, services, and information effectively and efficiently from the origin to the end in order to meet consumer demand. (Wulan, 2018)

Determination of the multidimensional value of logistical performance, the Logistic Performance Index (LPI) according to Worldbank, is an international measuring indicator that focuses on measuring all trade activities and transport facilities of several countries, and also includes, helping them identify key obstacles, and opportunities and development logistics performance. (Lauri Ojala & Celebi, 2015)

The performance of a country's logistics sector can be evaluated based on the value of the Logistics Performance Index (LPI) determined by the results of a World Bank survey of logistics professionals working in multinational freight forwarding companies and large express shipping service companies. The Logistics Performance Index (LPI) consists of 2 two-part surveys, the first part is the International LPI survey conducted in eight countries that make international trade the most important economic sector. And the second part is the domestic LPI survey conducted in each country that is a respondent. In general, the value of LPI is at the lowest value interval is one (1) with very low criteria, and the highest value is five (5) with very high criteria (Arvis et al., 2018). These criteria intervals are explained in the second Chapter of table 1 of the World Bank's Logistics Performance Index criteria. The following are data on the development of the Logistics Performance Index (LPI) by countries in ASEAN:

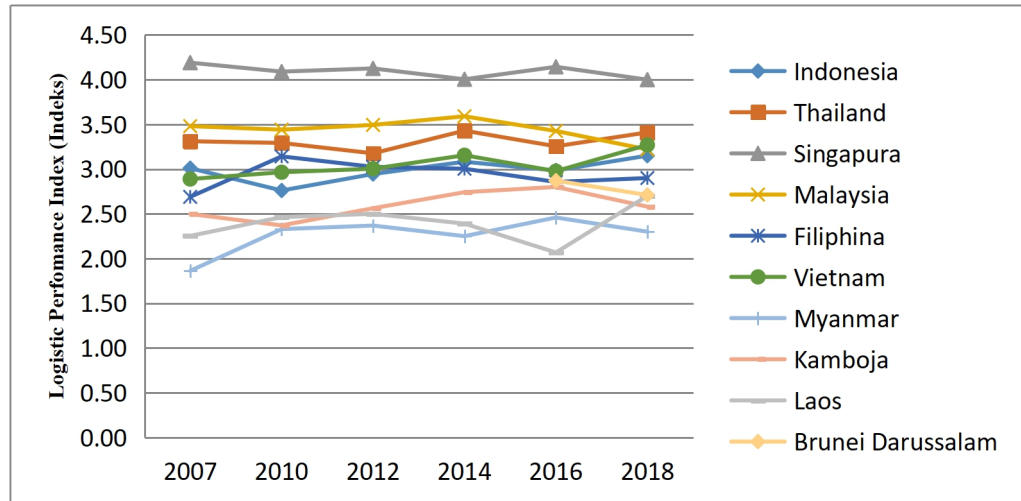


Figure 1 : LPI Value in ASEAN Countries in 2007-2018  
Source: World Bank 2019

Figure 1 shows the average value of the Logistics Performance Index (LPI) in ASEAN countries over the period from 2007 where the LPI was formed until 2018 per two years. Based on this picture, it can be seen that most ASEAN countries have LPI values below three (3). It can be concluded that the quality of logistics in ASEAN is still not good. Also, this illustrates that there are still obstacles to international trade as well as inadequate utilization of opportunities that can improve logistics performance in each ASEAN country. The lack of good logistics in ASEAN can also lead to high logistics costs, and then high commodity prices will be accepted by the community as consumers. This, of course, will make the purchasing power of the people themselves go down with high commodity prices that must be paid. Declining purchasing power illustrates the economy is in bad condition.

ASEAN from 2015 began to make improvements and economic development, especially in the field of infrastructure development and the relief of barriers to international trade, in order to better distribute commodities for the welfare of its people through the establishment of the ASEAN Economic Community (AEC). Based on that statement and figure 1, In the most ASEAN countries, after the establishment of the ASEAN Economic Community (AEC), from 2015 to 2019, they still have a Logistics Performance Index (LPI) value below three, which means that it is not good and there is still a need for improvement in logistics performance in each country.

## LITERATURE REVIEW

The main objective of this study is to determine the effect of economic and social variables on logistics performance with an integrated view. The intended economic and social variables are investment, infrastructure, labour and economic stability. Logistics itself can be understood as a service network that supports the physical movement of goods, cross-border trade, and border-bound trade. It consists of a series of activities outside transportation, including warehousing, brokerage, express delivery, terminal operations, and management of data and related information. (Arvis et al., 2018)

### **Logistic Performance Index (LPI)**

Determination of the multidimensional value of logistical performance, the Logistic Performance Index (LPI) according to Worldbank, is an international measurement indicator that focuses on measuring all trade activities and transport line facilities of several countries, and also includes, helping them identify key obstacles, and opportunities and development of logistics performance (Lauri Ojala & Celebi, 2015). The Logistic Performance Index has a value interval with the following criteria:

Table 1. Kriteria Logistic Performance Index menurut Worldbank

Interval Value	Criteria	Description
1	Very Low	The logistics performance is very low. The meaning is the availability of facilities needed to smooth the process of moving goods is still very low.
2	Low	Low logistics performance. The meaning is the availability of facilities needed to smooth the process of moving goods is still low.
3	Passable	The logistics performance is Passable. The meaning is the availability of facilities needed to smooth the process of moving goods is still quite good.
4	High	High logistics performance. The meaning is the availability of facilities needed to smooth the process of moving goods is still high.
5	Very High	Logistics performance is very high. The meaning is the availability of facilities needed to smooth the process of moving goods is still very high.

Source: Arvis, Ojala etc, 2018:62

### **Investment**

Investment can be categorized as part of national income (national income) or national expenditure (national expenditure) which is specifically intended to produce capital goods in a certain period (Todaro & Smith, 2006). According to Rostow (Jhingan, 2013), the stages in economic growth are the process of forming the take-off preconditions, from traditional societies that go in the direction of economic development. Later private and government economic sectors will begin to be willing to encourage savings and dare to take risks in pursuit of the benefits of modernization. Banks and other financial institutions have sprung up providing capital. In addition, investment has increased in transportation and in the field of raw materials which have economic appeal for other nations. The range of trade, in and out also becomes broad. Of course, this illustrates that investment has an influence on logistics performance. But based on the results of Guner and Coskun (2012), investment does not correlate with the Logistics Performance Index (LPI) or the logistics performance of a country.

### ***Port Infrastructure***

According to Triatmojo (2009), the port is a gateway to enter a region or country and as a means of connecting infrastructure between regions, between islands, or even between countries, continents and nations. The port has an area of influence (hinterland), that is, an area that has interests in economic, social, and other relations with the port. The transportation system is considered as a factor of production and as one of the main determinants for deciding the location of facility construction. Transportation infrastructure has a significant impact on productivity and business cost structures. For example, better port and inland connections can reduce the expenditure required for the construction of a distribution network or the transportation of raw materials (Lauri Ojala & Celebi, 2015). In addition, research conducted by Wong & Tang (2018), Katip, Universitesi, & Harun, (2011) and Su (2017) infrastructure significantly influence logistics performance. But in the study of Civelek, Çemberci, & Çelebi (2015) Port infrastructure has no effect on logistical performance, or has a weak correlation.

### ***Labor***

Workers are people of working age who are ready to do work, including those who are already working, those who are looking for work, those who are in school, and those who manage the household (Ritonga & Firdaus, 2007). According to Malthus (Jhingan, 2013), the condition of the distribution level decline can be caused by consumer demand. Low consumer demand will increase the supply of commodities and decrease production, so companies do not experience losses this can be overcome by reducing production costs one of which is reducing the amount of labor. Based on research by Wong & Tang (2018) and Katip, Universitesi, & Harun, (2011), labor has a positive and significant effect on logistics performance.

### ***Economic Stability***

One of the macro-economic indicators to see the stability of a country's economy is through inflation because changes in this indicator will have an impact on the dynamics of economic growth. Stable inflation is a prerequisite for sustainable economic growth that will ultimately be beneficial for improving the welfare of the community (Pohan, 2008). RI Presidential Regulation No. 61 of 2019, to stabilize macroeconomic stability requires macroeconomic policies that can be implemented through well-coordinated monetary and physical policies, in order to strengthen and improve market functions, one of which is the goods and services market, namely trade. In the research of Katip, Universitesi, & Harun, (2011), labor has a significant effect on logistical performance. But in the study of Birol Erkan (2014) labor did not affect logistical performance.

## **METHOD**

Objects that are the scope of this research include the logistical performance seen through the Logistic Performance Index (LPI) in eight) ASEAN Countries, the percentage value of total investment to the GDP of these countries, the quality of port infrastructure from the shipping lane index (Liner Shipping Connectivity index), The percentage of labor in the service sector of the total

labor value, as well as the value of economic stability with a broad range of prices using inflation. The data used are secondary data in an annual form from 2015 to 2018.

The study was conducted in 8 ASEAN countries because Brunei Darussalam only had a Logistic Performance Index (LPI) in 2016 and 2018, making it impossible to study. In addition, Laos is a country surrounded by land so it does not have a port. Therefore, there is no data for the shipping lane index as an indicator of the quality of port infrastructure.

The type of data used in this study is quantitative data, that is data measured on a numerical scale (number). Quantitative data here is in the form of panel data which is a combination of time-series data from 2015 to 2018 and cross-section data for eight ASEAN countries namely Indonesia, Thailand, Singapore, Vietnam, Philippines, Malaysia, Myanmar and Cambodia. The data source used in this study is secondary data obtained from World Bank publications

This study uses a panel regression analysis. According to Gujarati and Porter (2015), there are three types of data available for empirical analysis, namely: time-series data, cross-section data and data pool (a combination of time series data and cross-section data). In panel data, the same individual units (for example a family or company or state) are surveyed from time to time. The equation model in this study is as follows:

$$LPI_{it} = \beta_0 + \beta_1 INV_{it} + \beta_2 INFR_{it} + \beta_3 LAB_{it} + \beta_4 ES_{it} + \varepsilon_{it}$$

Explanation :

LPI : Logistic Performance Index (LPI) (Index)

INV : Investment (USD)

INFR : Port Infrastructure (Index)

LAB : Labor (%)

ES : Economic Stability (%)

$\beta_0$  : Interception; Y value when X = 0 (constant price)

$\beta_1, \beta_n$  : Regression coefficients of each independent variable;

$\varepsilon$  : Error

i : Number of observations (cross section)

t : Time

## RESULTS AND DISCUSSION

### Selection of Model Estimates

To determine the best model that can be used, researchers must test the selection of regression estimation techniques. There are two ways in selecting estimation techniques to determine the most appropriate model for estimating panel data parameters, as follows:

#### 1. Chow-Test

Chow test is a test to compare common effect models with fixed effects (Widarjono, 2007). The chow test in this study used the eviews 9.0 program. The statistical hypothesis formed in the chow test is as follows:

$H_0 : \rho_{value} > \alpha$  Common effect model

$H_1 : \rho_{value} > \alpha$  Fixed effect model

Tabel 2. The Result of Chow Test

Effect Test	Statistic	d.f	Prob.
Cross-section F	8,922686	(7,20)	0,0001
Cross-section Chi-square	45,330129	7	0,0000

Source: Eviews 9.0

Based on Table 4.1 shows that the value of Prob. Chi Square cross-section  $< \alpha$  (5%) or  $0.0000 < 0.05$ , the model used is the Fixed Effect Model (FEM).

## 2. Hauman-Test

This test compares the fixed effect model with random effects in determining the best model to use as a panel data regression model (D. N. Gujarati & Porter, 2015). Hausman test uses a program similar to the chow test, the Eviews 9.0 program. The statistical hypothesis formed in the Muslim holiday test is as follows:

Table 3. The Result Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	60,164718	4	0.0000

Source: Eviews 9.0

Based on Table 3 shows that the value of Prob. Random cross-section  $< \alpha$  (5%) or  $0.0000 < 0.05$ , the model used is the Fixed Effect Model (FEM).

Based on the results of testing the best model selection, namely the chow test and the Hausman test, it can be concluded that the best panel data regression estimation model that can be used for this research model is the Fixed Effect Model (FEM).

Tabel 4. The Results Panel Data Regression Estimation

Variable	Coefficient
C	4,691938
INV	0,028997
INFR	0,004411
LAB	-0,050357
ES	-0,026282

Source: Eviews 9.0

Based on the FEM panel data regression estimation results, the previous panel equation can be interpreted as follows:

$$LPI_{it} = 4,622459 + 0,042950INV_{it} + 0,003913INFR_{it} - 0,038359LAB_{it} - 0,055339ES_{it} + \varepsilon_{it}$$

Explanation :

LPI : Logistic Performance Index (LPI) (Index)

INV : Investment (USD)

INFR : Port Infrastructure (Index)

LAB : Labor (%)

- ES : Economic Stability (%)
- $\beta_0$  : Interception; Y value when X = 0 (constant price)
- $\beta_1, \beta_n$  : Regression coefficients of each independent variable;
- $\varepsilon$  : Error
- i : Number of observations (cross section)
- t : Time

In the regression model that uses the Fixed Effect Model (FEM), the results of panel data regression using the eviews 8.0 program, the coefficients for each cross-section for each country are obtained as follows:

Tabel 5. Interception Value (Constant) at the Country Level in ASEAN

Variable	Coefficient (C)	Coefficient (C <sub>i</sub> )	C + C <sub>i</sub>
Philippines		0,296395	4,918854
Indonesia		-0,444067	4,178392
Cambodia		-0,474223	4,148236
Malaysia	4,622459	0,713816	5,336275
Myanmar		-1,617919	3,004540
Singapore		2,406295	7,028754
Thailand		0,062767	4,685226
Vietnam		-0,943064	3,679395

Source: Eviews 9.0

With the equation of each country is as follows:

1. Philippines :  $LPI_{it} = 4.918854 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$
2. Indonesia :  $LPI_{it} = 4.178392 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$
3. Cambodia :  $LPI_{it} = 4.148236 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$
4. Malaysia :  $LPI_{it} = 5.336275 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$
5. Myanmar :  $LPI_{it} = 3.004540 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$
6. Singapore :  $LPI_{it} = 7.028754 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$
7. Thailand :  $LPI_{it} = 4.685226 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$
8. Vietnam :  $LPI_{it} = 3.679395 + 0.042950INV_{it} + 0.003913INFR_{it} - 0.055339LAB_{it} - 0.038359ES_{it} + \varepsilon_{it}$

From the interception crossing values in each ASEAN country that are the object of research, namely the Philippines, Indonesia, Cambodia, Malaysia, Myanmar, Singapore, Thailand and Vietnam, it can be seen that six countries have intercept values above the high category of four and the remaining two countries



have values Intercept above enough categories namely three. This means that the Logistics Performace Index (LPI) in ASEAN countries will increase when influenced by investment, port infrastructure, labor and economic stability. This certainly has a good impact on the performance of logistics as well as a country's national and international trade.

### Normality Test

Normality test is used to test the frequency distribution of the observed data whether the data is normally distributed or not. To test data that is normally distributed or not is done by the Jarque-Bera (JB) statistical test. To see whether the data is normally distributed or not, if the value of Jarque-Bera > Chi-Square, then the data can be said to be normally distributed and vice versa (D. N. Gujarati & Porter, 2015). Based on the picture below, it can be seen that the Jarqua-Bera value is 0.927639. When compared with the Chi-Square table, Jarqua-Bera  $0.927639 < 40.11327$  means that the data is normally distributed so that it can proceed to the next test.

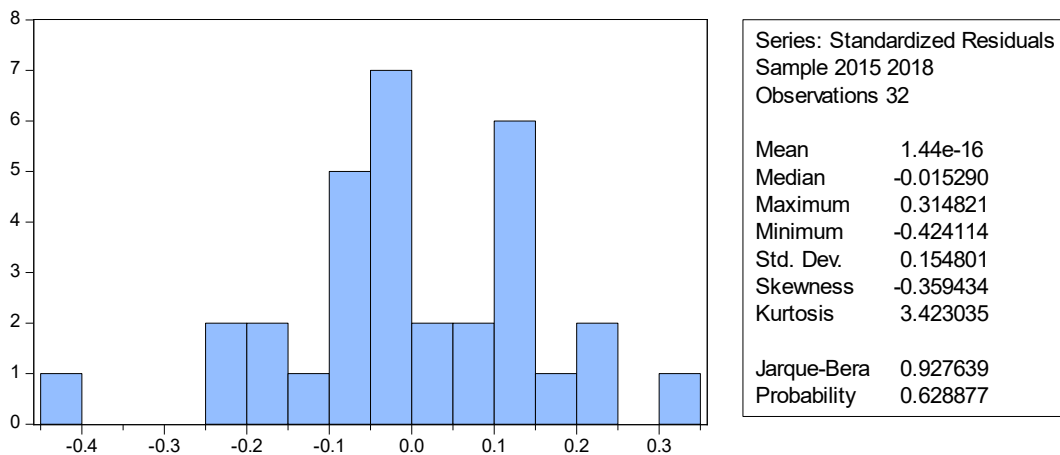


Figure 2 : The Result of Normality Test  
Source: Eviews 9.0

### Testing of Classic Assumptions

#### 1) The Result of Multicollinearity Test

Multicollinearity test aims to test whether the regression model found a correlation between independent variables. In a good regression model, the independent variables actually do not occur correlation (D. N. Gujarati & Porter, 2015). Based on Table 4.4, it can be seen that the correlation value between variables is smaller than 0.8. With the provisions of Correlation Matrix  $< 0.80$ , it means that among the independent variables namely investment, port infrastructure, labor, and economic stability there is no multicollinearity.

Tabel 6. Matrix Correlation Value

Variable	INV	INFR	LAB	ES
INV	1.000000	-0.1593487	-0.233165	0.703902
INFR	-0.159348	1.000000	0.760528	-0.489411
LAB	-0.233165	0.760528	1.000000	-0.548669
ES	0.703902	-0.489411	-0.548669	1.000000

Source: Eviews 9.0

## 2) The Result of Heteroscedasticity Test

Heteroscedasticity testing is done to test whether the variants of the two observations in the study are the same (homogeneous) for all dependent variables with independent variables so that the estimation results are not biased (Widarjono, 2007). To detect the existence of heteroscedasticity using the white test that is by comparing the chi square count must be smaller than the chi square table, then heteroscedasticity does not occur (D. N. Gujarati & Porter, 2015). Based on the table below, it can be seen that the calculated chi-square value <chi-square table or  $31.522912 < 40.11327$  so that it can be concluded that the equation in this study does not have a heteroscedasticity problem. The results of heteroscedasticity testing are as follows:

Table 7. The Result of Heteroscedasticity Test

Number of Data (n)	R-squared	Number of Variable (k)	Chi-square hitung (n x R-squared)	Chi-square tabel	Result
32	0.985091	5	31.522912	40.11327	There's No Heterokedasticity

Source: Eviews 9.0

## 3) The Result of Autocorrelation Test

Autocorrelation test aims to ensure there is no correlation between one disturbance variable with another disturbance variable (Gujarati & Porter, 2015:32). In this study, the autocorrelation test was detected using the Durbin Watson method (DW test), with the estimated testing that is if  $dU \leq d \leq dU$ , then there is no autocorrelation problem ( $d$  = Durbin-Watson statistical value  $dU$  = upper limit of Durbin-Watson table) (D. N. Gujarati & Porter, 2015). According to the research of Prasanti (2015) and Haryati (2016), if there is an autocorrelation with no weight, the weighting method can be done. Based on the table below, it can be seen that the value of  $dU \leq d \leq dU$  or  $1.7323 < 2,000728 < 2.2677$  with Cross-section weight, so it can be concluded that the equation in this study does not have an autocorrelation problem. The results of heteroscedasticity testing are as follows:

Table 8. The Result of Autocorrelation Test

FEM of Panel	dU	d	4-dU	Estimation	Result
Method					
No weight	1.7323	1.578532	2.2677	1.578532 < 1.7323 < 2.2677	There is Autocorelation
Cross-section weights	1.7323	2.000728	2.2677	1.7323 < 2.000728 < 2.2677	There's No Autocorelation

Source: Eviews 9.0

### Testing of Hypotesis

#### 1) sst-Test (Partial)

T-statistic test is a test to show the influence of individual independent variables, namely investment, port infrastructure, labor and economic stability, which are in the model of the dependent variable, namely the Logistics Performance Index (LPI) in ASEAN countries. The test is known from the statistical value of each variable. If the value of  $t_{\text{statistics}} > t_{\text{table}}$  OR  $-t_{\text{statistic}} < -t_{\text{table}}$  at a significance level of 0.975 ( $1 - \alpha / 2 = 0.025$ ), then rejecting  $H_0$ , means partially the investment, port infrastructure, labor and economic stability variables of the Logistics Performance Index (LPI) in ASEAN countries.

#### *Investment*

The results of partial testing indicate that the investment variable of 3.139879 is greater than the table of 2.373417 ( $t_{\text{statistic}} > t_{\text{table}}$ ). Then the decision taken is to reject  $H_0$ . That is, there is an influence between investment variables on the partial Logistics Performance Index (LPI) in 8 ASEAN Countries in 2015-2018 assuming other variables are considered *ceteris paribus*. Then the investment probability of 0.0052 is smaller than alpha divided by two ( $\alpha / 2 = 0.025$ ), meaning that there is a significant influence between investment variables on Logistics Performance Index (LPI) in 8 ASEAN countries in 2015-2018.

#### *Port Infrastructure*

The partial test results show that the characteristics of the port infrastructure variable are 1.207256 smaller than the table of 2.373417 ( $t_{\text{statistics}} < t_{\text{table}}$ ). Then the decision taken is not rejecting  $H_0$ . That is, there is no influence between investment variables on the partial Logistics Performance Index (LPI) variable in 8 ASEAN Countries in 2015-2018 assuming other variables are considered *ceteris paribus*. Then a significant test is not necessary, because there is no influence.

#### *Labor*

The results of partial testing indicate that the variable of labor variable is -2.419714 smaller than the table of -2.373417 ( $-t_{\text{statistic}} < -t_{\text{table}}$ ). Then the decision taken is to reject  $H_0$ . That is, there is an influence between the labor variables on the variable Logistics Performance Index (LPI) partially in 8 ASEAN Countries in 2015-2018 assuming other variables are considered *ceteris paribus*. Then the investment probability of 0.0252 is smaller than alpha divided by two ( $\alpha / 2 = 0.025$ ), meaning that there is no significant influence between the variables of

political stability on Logistics Performance Index (LPI) in 8 ASEAN countries in 2015-2018.

### ***Economic Stability***

The results of partial testing indicate that the variable of political stability variable is -2.888481 smaller than the table of -2.373417 ( $-t_{\text{statistic}} < -t_{\text{table}}$ ). Then the decision taken is to reject  $H_0$ . That is, there is an influence between political stability variables on the Logistics Performance Index (LPI) partially in 8 ASEAN Countries in 2015-2018 assuming other variables are considered *ceteris paribus*. Then the investment probability of 0.0091 is smaller than alpha divided by two ( $\alpha / 2 = 0.025$ ), meaning that there is a significant influence between labor variables on Logistics Performance Index (LPI) in 8 ASEAN countries in 2015-2018.

### 2) F-Test (Simultaneous)

F-statistic Test is used to determine whether there is a simultaneous influence between the independent variables on the dependent variable. If the value of  $F_{\text{statistik}} > F_{\text{table}}$  at a significance level of 0.95 ( $\alpha = 0.05$ ), then reject  $H_0$ , means that simultaneously (together) all independent variables significantly influence the dependent variable.

Based on the results of simultaneous testing it can be seen that the F table value is 2.727765 and the Statistics value is 120.1377 with a significance value of 0.000000 at  $\alpha = 5\%$ . Because the value of  $F_{\text{statistics}} > F_{\text{table}}$  and significance value are less than 0.05 (Probability  $< 0.05$ ),  $H_0$  is rejected, so this study proves that investment, port infrastructure, labor and economic stability simultaneously influence the dependent variable, namely Logistics Performance Index (LPI) in ASEAN Countries 2015-2018.

### **Coefficient of Determination**

The coefficient of determination ( $R^2$ ) is a tool to measure the magnitude of the influence of the independent variable on the dependent variable. The magnitude of the coefficient of determination ranges from the numbers 0 to 1, the closer to zero the magnitude of the coefficient of determination of a regression equation, the smaller the effect of all independent variables on the dependent variable. Conversely, the greater the coefficient of determination approaches 1, the greater the effect of all independent variables on the dependent variable. The results of the  $R^2$  test in this study obtained the  $R^2$  value of 0.985091. This explains that variations of the independent variables namely Investment, Port Infrastructure, Labor and Economic Stability are able to explain changes in the Logistics Performance Index (LPI) variable. Thus, the analysis model is said to meet the BLUE criteria. Or the magnitude of the effect of Investment, Port Infrastructure, Labor and Economic Stability on the Logistic Performance Index (LPI) of  $0.985091 \times 100 = 98.5091$  per cent, while the remaining 1.4909 per cent is influenced by other factors not included in this research.

### **Effect of Investment on Logistics Performance Index (LPI)**

The investment variable shows a significant positive sign on the Logistics Performance Index (LPI) in ASEAN countries in 2015-2018. This result is

following Rostow's statement in Jhingan (2013) regarding the economic growth of take-off conditions, from traditional economic societies that are walking in the direction of economic development. Where humans will continue to work hard to achieve personal profit and prosperity. So that people will emerge who promote savings and dare to take risks in the pursuit of the benefits of modernization. Banks and other financial institutions have sprung up to provide capital, investment has also increased in the field of transportation and in the field of raw materials that have economic appeal for other nations. In addition, Lauri Ojala and Celebi (2015) also stated that FDI as part of the investment would be able to increase trade and transportation services in a country. The rising investment will increase logistics supply capacity, as well as variations in logistics supply, whose main goal is to reduce logistics costs to a minimum.

But the results of this study are not in accordance with previous research conducted by Samet Guner & Erman Coskun in 2012 under the title "Comparison of the Impacts of Economic and Social Factors on Countries Logistics Performance: A Study with 26 OECD Countries" concludes that there is no influence and the correlation between investment and logistics Performance Index (LPI).

#### **Effect of Port Infrastructure on Logistics Performance Index (LPI)**

Port infrastructure variable shows a positive sign but does not affect the Logistics Performance Index (LPI) in ASEAN countries in 2015-2018. This result is not in accordance with the statement of Lauri Ojala and Celebi (2015) in his book stating that infrastructure has a significant impact on productivity and business cost structures. For example, better port and inland connections can reduce the expenditure needed to build a distribution network or transport raw materials. The absence of the influence of port infrastructure on the Logistics Performance Index (LPI) can be due to the measurement of LPI itself not only covering port infrastructure services but also includes airport infrastructure services, train stations and other ground transportation services. So it can be concluded that port infrastructure is only a small part of the infrastructure that can affect LPI. This means that infrastructure such as airports, train stations and other transportation has a greater percentage in influencing a country's LPI or logistics performance than port infrastructure.

The results of this study are in accordance with Murat Cemberci et al (2015) entitled "The Moderator Effect of the Global Competitiveness Index on Dimensions of Logistics Performance Index" which states that port infrastructure has no effect on the logistics performance of a country, even the correlation between the two is weak.

#### **Effect of Labor on Logistics Performance Index (LPI)**

The investment variable shows a significant negative sign on the Logistics Performance Index (LPI) in ASEAN countries in 2015-2018. This result is not in accordance with the statement of Malthus in Jhingan (2013), the condition of the rise in the level of distribution can be caused by consumer demand. Low consumer demand will increase the supply of commodities and decrease production, so companies do not experience losses this can be overcome by reducing production costs one of which is reducing the amount of labor.

According to Malthus workers should move in the same direction in influencing LPI. Where when labor increases LPI will also increase, and vice versa. The negative effect between labor on LPI can occur because an increase in labor in the service sector actually makes an inefficient distribution of goods, this illustrates that distribution services in ASEAN are capital intensive or capital intensive. As we know the process of distribution services continues to increase in quality, one of which is the use of technology so that human labor begins to be replaced by machines. This means that increasing use of technology certainly makes the distribution of goods more efficient. Conversely, an increase in the use of labor that describes labor-intensive will make the process of distribution of goods inefficient.

The results of this study are also not in accordance with research conducted by Wai Peng Wong & Chor Foon Tang in 2018 with the title "The Major Determinants of Logistics Performance in a Global Perspective: Evidence from Panel Data Analysis" that the Workforce has a positive effect on logistics performance.

### **Effect of Economic Stability on Logistics Performance Index (LPI)**

The investment variable shows an insignificant negative sign on the Logistics Performance Index (LPI) in ASEAN countries in 2015-2018. The negative influence between economic stability on logistics performance can occur due to the use of inflation as an indicator of economic stability. Where the use of inflation in accordance with Mishkin's statement (Mishkin, 2004) in his book, which is one of the macroeconomic indicators to see the stability of a country's economy is inflation. Because changes in this indicator will have an impact on the dynamics of economic growth. In an economic perspective, inflation is a monetary phenomenon in a country, where the rise and fall of inflation tend to result in economic turmoil. Price increases in general (inflation) will affect the costs in the service sector, one of which is the cost of transporting the distribution of goods. Thus, the higher logistics costs incurred in the distribution process illustrate the inefficiency of LPI or logistics performance. The results of this study are consistent with Pohan's statement (2008) in his book that high inflation rates damage the economic structure and weaken the economic performance of a country. Weakening economic sectors, especially those relating to the real sector. The impact of inflation is not only in the economic field but also in social and political. The economic performance here can include trading activities and the transportation or distribution of goods.

The results of this study are not consistent with research conducted by Burmaoglu Serbat & Sesen Harun in 2015 with the title "Analyzing the Dependency Between National Logistics Performance and Competitiveness: Which Logistics Competence is Core for National Strategy" that economic stability has a significant effect on the Logistics Performance Index (LPI) or logistical performance.

### **CONCLUSION**

Using the Panel Data Analysis test, this study revealed that economic and social factors have effect positif and negative to logistic performance. Based on the results of the analysis and discussion of the data, investment has a positive and

significant effect on the Logistics Performance Index (LPI) in ASEAN countries. This implies that both the government and the private sector must continue to increase domestic and foreign of investment, so that capital will be created for trade and goods transportation or distribution services. Aside from that, labor and economic stability indicate that there is a negative influence on the Logistics Performance Index (LPI) in ASEAN countries, which means that these two variables show a decrease in logistics performance when an increase occurs. whereas the increase in the value of these two variables has a positive impact on the economy. So that for further research, the writer suggests trying the values of these two variables which are more specific than those used by the author. And for port infrastructure has no effect on the Logistics Performance Index (LPI), but still in this case both the private sector and the government must continue to improve the overall infrastructure so that distribution is efficient and logistics costs are spent to a minimum.

In the future, this research can be carried out by looking at the logistics performance of the Corona Virus pandemic, so the authors suggest adding a variable related to global business competitiveness, namely the Global Competitiveness Index (GCI). Because in a new normal state like now due to the COVID-19 pandemic, a country's economy, especially trade, has decreased, so it is necessary to see how the country's economic competition was during and after the existence of this new protocol.

## REFERENCES

- Arvis, J.-F., Ojala, L., Wiederer, C., Shepherd, B., Raj, A., Dairabayeva, K., & Kiiski, T. (2018). Connecting to Compete 2018. *Connecting to Compete 2018*. <https://doi.org/10.1596/29971>
- Çemberci, M., Civelek, M. E., & Canbolat, N. (2015). The Moderator Effect of Global Competitiveness Index on Dimensions of Logistics Performance Index. *Procedia - Social and Behavioral Sciences*, 195, 1514–1524. <https://doi.org/10.1016/j.sbspro.2015.06.453>
- CIVELEK, M. E., ÇEMBERCI, M., & ÇELEBI, Ü. (2015). the Mediator Effect of Foreign Direct Investments on the Relation Between Logistics Performance and Economic Growth. *Journal of Global Strategic Management*, 1(9), 17–17. <https://doi.org/10.20460/jgsm.2015915624>
- Erkan, Birol. 2014. "The Importance and Determinants of Logistics Performance of Selected Countries" vol. 3. JEIEFB. ISSN: 2306-367X.
- Gujarati, D. N., & Porter, D. C. (2015). *Dasar-Dasar Ekonometrika (Buku 1&2)*. Jakarta: Salemba Empat.
- Guner, S., & Coskun, E. (2012). Comparison of impacts of economic and social factors on countries' logistics performances: a study with 26 oecd countries. *Research in Logistics & Production*, 2(4), 330–343.
- Haryati, O. A. (2016). Regresi Data Panel dengan Metode Cross Section Weighted.
- Jhingan, M. L. (2013). *Ekonomi Pembangunan dan Perencanaan*. Jakarta: Rajawali Press.
- Katip, I., Universitesi, C., & Harun, S. (2011). Analyzing the Dependency Between National Logistics Performance and Competitiveness: Which

- Logistics Competence is Core for National Strategy? *Journal of Competitiveness*, 2011(4), 4–22.
- Lauri Ojala, & Celebi, D. (2015). The World Bank ' s Logistics Performance Index ( LPI ) and drivers of logistics performance. *International Transport Forum*, (February).
- Mishkin, F. S. (2004). *The Economic of Money, Banking and Financial Markets (Seventh Edition)*. New York: Person Adition Wesley Longman.
- Pohan, A. (2008). *Ekonomi Moneter (Buku II edisi I)*. Yogyakarta: BPFE UGM.
- Prasanti, T. A. (2015). Aplikasi Regresi Data Panel untuk Pemodelan Tingkat Pengangguran Terbuka Kabupaten/Kota di Provinsi Jawa Tengah. *Jurnal Gaussian*, 4 No. 2.
- Ritonga, M., & Firdaus, Y. (2007). *Ekonomi SMA Jilid 2*. Jakarta: PT. Phibeta.
- Su, S. I. (2017). National Logistics Performance Benchmarking, 15(1).
- Todaro, M. P., & Smith, S. C. (2006). *Ekonomi Pembangunan (edisi kesembilan, jilid I)*. Jakarta: Erlangga.
- Triatmojo, B. (2009). *Pelabuhan*. Yogyakarta: Beta Offset.
- Widarjono, A. (2007). *Ekonometrika Teori dan Aplikasi*. Yogyakarta: FE UII.
- Wong, W. P., & Tang, C. F. (2018). The major determinants of logistic performance in a global perspective: evidence from panel data analysis. *International Journal of Logistics Research and Applications*, 21(4), 431–443. <https://doi.org/10.1080/13675567.2018.1438377>
- World Bank. 2019. Data Catalog. <[www.worldbank.org](http://www.worldbank.org)>
- Wulan, D. A. dkk. (2018). Strategi Pemasaran Perusahaan Logistik.