DETERMINANTS OF STRUCTURAL TRANSFORMATION IN ASEAN

Kalies Sirieh Puspitowati
Diponegoro University
Email: puspitowati.kalies@gmail.com

Deden Dinar Iskandar
Diponegoro University
Email: deden_dinar@live.undip.ac.id

Received: January 2020; Accepted: May 2020; Available online: July 2020

Abstract

This study aims to analyze the determinants of the structural transformation in ASEAN countries. This study uses quantitative panel data from 9 countries in ASEAN from 2000 to 2017, thus makes up for 162 observations. This study employs panel data regression analysis with fixed effect model approach. In this study, the shifting of sectoral value added away from agriculture sectors indicates structural transformation. In particular, sectoral value added consists of the industrial value added and service value added. The results of this study shows that dependency ratio, income per capita, education, and trade significantly affect the increase of industrial value added during observation period. On the other hand, total population, dependency ratio, income per capita, education, control of corruption, and trade significantly increase the service value added over time.

Keywords: Structural Transformation; ASEAN; Industrial Value Added; Service Value Added; Control of Corruption.

Abstrak

Penelitian ini bertujuan untuk menganalisis faktor-faktor penentu transformasi struktural di negara-negara ASEAN. Studi ini menggunakan data panel kuantitatif dari 9 negara di ASEAN dari tahun 2000 hingga 2017, sehingga menghasilkan 162 observasi. Penelitian ini menggunakan analisis regresi data panel dengan pendekatan fixed effect model. Dalam studi ini, pergeseran sectoral value added dari sektor pertanian ke sektor lainnya menunjukkan transformasi struktural. Secara khusus, sectoral value added terdiri dari sectoral value added sektor industri dan sectoral value added sektor jasa. Hasil penelitian ini menunjukkan bahwa dependency ratio, pendapatan per kapita, pendidikan, dan perdagangan secara signifikan mempengaruhi peningkatan value added sektor industri selama periode pengamatan. Di sisi lain, total populasi, dependency ratio, pendapatan per kapita, pendidikan, Control of Corruption, dan perdagangan secara signifikan berhasil meningkatkan value added sektor jasa dari waktu ke waktu.

Kata Kunci: *Transformasi Struktural, ASEAN; Nilai Tambah Sektor Industri; Nilai Tambah Sektor Jasa; Control of Corruption.*

How to Cite: Puspitowati, K. S., & Iskandar, D. D. (2020). Determinants of Structural Transformation in ASEAN. *Media Ekonomi dan Manajemen, 35*(2), 137-149. doi: http://dx.doi.org/10.24856/mem.v35i2.1396.

INTRODUCTION

Economic development is defined as a process that causes an increase in income per capita in the long term. Economic development has four main dimensions, namely growth, poverty alleviation, economic change or transformation, and sustainable development from an agrarian society to an industrial society. Djojohadikusumo (1994) explained that economic development is a process of transformation characterized by changes in economic structure, namely changes in the basis of economic activity as well as in the economic structure of the community concerned. To achieve economic development, modernization of economic activities is needed in order to accelerate economic growth and income distribution. The transformation of the economic structure is a manifestation of the modernization of economic activity which is one indicator of regional economic development. Structural transformation is a prerequisite for increasing and sustaining growth and poverty reduction, as well as supporting the sustainability of development itself.

The transformation of the economic structure from traditional to modern is defined as an economic change related to the composition of labor absorption, production, trade, and other factors that are needed continuously to increase income and social welfare through increasing income per capita (Chenery & Syrquin, 1986).

Meanwhile, according to Todaro et al. (2011), economic structure transformation is the process of changing the structure of the economy from the agricultural sector to the industrial or service sectors which in each sector undergoes different changes. The process of changing the economic structure is characterized by: (1) decrease in the share of the primary sector (agriculture), (2) an increasing share of the secondary sector (industry), and (3) the share of the tertiary sector (services) also contributed to increase in line with economic growth. Developing countries in the ASEAN (Association of Southeast Asian Nations) have now demonstrated structural transformation. Countries undergoing structural transformation are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Thailand and Vietnam.

In the long run, economic development will bring fundamental changes in the structure of the economy. Changes in economic structure are important because the primary sector is highly dependent on limited natural resources and low productivity. Kuncoro (2010) argues that industrialization is a strategy to increase productivity and efficiency in the use of production factors. This is in line with the opinion of world economists that efficient allocation of resources is important to maintain long-term output growth. In addition, structural transformation is important in the context of increasing and sustaining growth, poverty reduction, as well as supporting the sustainability of development. Many factors can affect structural transformation, namely population, dependency ratio, income per capita, percentage of agricultural land area to total land area, education, control of corruption and trade.

LITERATURE REVIEW

Structural Transformation

Economic structure can be interpreted as the composition of each economic sector in the economy. Sectorial economic structure can be seen by the three-dimensional approaches: (1) approach according to origin (source of income), (2) approach according to the use of the income (disposible of income), and (3) approach is based on two economic systems that run side by side in one area (dual income system).

The approach used in this research is the source of income approach or the production side approach. This approach

 p-ISSN: 0854-1442 (Print) e-ISSN: 2503-4464 (Online)

calculates the amount of value added (products) produced by production units or business fields. Economy by economic sector consists of seven sectors: (1) Agriculture, hunting, forestry, fishing, (2) Mining, Manufacturing, Utilities; (3) Manufacturing; (4) Construction; (5) Wholesale, retail trade, restaurants and hotels; (6) Transport. storage and communication; (7) Other Activities (World Bank, 2019). Economic sectors can be grouped into three categories, namely primary, secondary, and tertiary.

The pattern of economic structure is the distribution pattern of sectoral economic activities. In terms of production, the pattern of economic structure in the long run there is a tendency for changes in the contribution of the agricultural sector (primary) slowly be replaced by the contribution of non-primary sectors.

Tambunan (2001) states that economic development in the long term following the growth of national income will bring a fundamental change in the structure of the economy, from a traditional economy with the agricultural sector as the main sector to a modern economy dominated by non-primary sectors especially dynamic manufacturing industries as the main engine of economic growth.

Structural Changes theory explained in the discussion of the mechanism of economic transformation experienced by the developing countries, firstly subsistence and focused on the agricultural sector towards a more modern economic structure and is dominated by the industrial and services sectors (Todaro et al., 2011).

Hollis Chenery (Structural Transformation Theory)

Chenery theory, known as the pattern of development theory, focuses on structural changes in the stages of the process of economic change in developing countries, which have been transformed from traditional agriculture (subsistence) to the industrial sector as the main engine driving economic growth. According to Chenery, in line with the increase in income per capita, the economy will shift from the agricultural sector to the industrial sector.

In developing countries, many countries are also experiencing rapid economic transition in the last three decades, although the patterns and processes differ between countries. This difference in pattern is caused by differences between countries in the number of internal factors as follows: (a) The initial conditions and structure of the domestic economy. A country whose initial industrialization already has basic industries, such as machinery, iron and steel, will undergo a faster industrialization process than a country that only has light industries, such as textiles, apparel, footwear, food, and drinks. (b) The size of the domestic market. Domestic market size is determined by a combination of the number of population and the level of real per capita income. (c) The pattern of income distribution. Although the level of the average per capita income increased rapidly, but if the distribution is very lame, the increase in income is not very meaningful for the growth of the industry except industries that make simple products such as food and beverages, shoes and apparel (textiles). (d) Characteristics and Industrialization. The industrial development strategy adopted, the type of industry favored, the pattern of industrial development, and the incentives provided. (e) The existence of natural resources. There is a tendency that countries that have abundant natural resources have lower economic growth or being late in industrializing or failing to diversify the economy (structural changes) than a country that is poor in natural resources. (f) Foreign trade policy. The facts show that countries that implement closed economic policies

(inward looking policy), the pattern and results of their industrialization are different from countries that apply open economic policies (outward looking policy).

Previous Research

Previous studies have shown mixed results. The results of research by Branson, Guerrero, and Gunter (1998) show that income per capita and population are the dominant factors affecting changes in economic structure. Whereas Lestari (2004) shows that, income per capita and population have a significant impact on economic growth in East Java, both in terms of expenditure and production side.

The results of research by Norris, Thomas, Verdu, and Chen (2013) show that, land area and arable land have a significant negative affect on the service and manufacturing sectors. Dependency ratios have a negative effect on the manufacturing sectors, and have a positive effect on the service sector. The population has a positive effect on the manufacturing sector.

Rajhi (2014) shows that income per capita has a positive effect on the share of value added in the service sector (world, OECD, America Latin), and negative effect on the share of value added in the service sector (Asia, Africa). Income per capita has a positive effect on the share of value added in the industrial sector (world).

Hypothesis

The hypothesis used in this research are population, income per capita, ratio of agricultural land area, education, control of corruption, and trade have a positive and significant effect on the industrial value added and service value added. The dependency ratio has a negative and significant effect on the industrial value added and service value added.

RESEARCH METHODS

Data Type and Data Sources

The data used in this research is secondary data. Data sources are from the World Bank, namely industrial value added, service value added, total population, dependency ratio, per capita income, ratio of agricultural land area to total land area, education, corruption control, and trade (% of GDP). The data taken is pooling data, the period 2000-2017 for 9 developing countries which are members of the Association of Southeast Asian Nations (ASEAN).

Analysis Method

The analytical method used in this research is panel data regression analysis. Panel data regression is a regression technique that combines time series with cross-section (Basuki & Prawoto, 2016). The data processing is done using EViews 10 software.

Model equations using cross section are shown by:

$$Y_i = \beta_1 + \beta_2 X_i + \varepsilon_i \; ; i = 1,2, \dots, N \ldots\ldots (1)$$

Where "N" is the amount of cross section. While the equation of the model with time series can be written as follows:

$$Y_t = \beta_1 + \beta_2 X_t + \varepsilon_t \; ; i = 1,2, \dots, T \ldots\ldots (2)$$

Where "T" is the amount of time series. So that the panel data equation which is a combination of cross section and time series can be written as follows:

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$i = 1, 2, ..., N \; ; t = 1, 2, ..., T$

In the model, Y is the dependent variable while X is the independent variable. N indicates the number of observations while T indicates the amount of time analyzed. So that the variables in this study are applied in a model as follows:

 p-ISSN: 0854-1442 (Print) e-ISSN: 2503-4464 (Online)

$$INDUSTRY_{it} = \beta_0 + \beta_1 LPOP_{it} + \beta_2 DR_{it} + \beta_3 GDP\_PC_{it} + \beta_4 AGRICULTURAL\_LAND_{it} + \beta_5 EDU_{it} + \beta_6 CORRUP_{it} + \beta_7 TRADE_{it} + e_{it} \quad (4)$$

$$SERVICES_{it} = \gamma_0 + \gamma_1 LPOP_{it} + \gamma_2 DR_{it} + \gamma_3 GDP\_PC_{it} + \gamma_4 AGRICULTURAL\_LAND_{it} + \gamma_5 EDU_{it} + \gamma_6 CORRUP_{it} + \gamma_7 TRADE_{it} + e_{it} \quad (5)$$

Where:

INDUSTRY: industrial value added
SERVICES : service value added
LPOP : total population (log)
DR : dependency ratio
GDP_PC : income per capita
AGRICULTURAL_LAND : ratio of agricultural land area to total land area
EDU : education
CORRUP : control of corruption
TRADE : trade
$\alpha_0, \beta_0, \gamma_0$: intercept/ constant
$\alpha_{1-7}, \beta_{1-7}, \gamma_{1-7}$: coefficient
e_{it} : component error when t
i : 1,2....,9 (9 developing countries in ASEAN)
t : 1,2,3..,18 (time series data 2000-2017).

Model Specification Test

Test Model Specifications with Chow Test

The specification test aims to determine the panel data analysis model to be used. Chow test is used to choose between Fixed Effect Models or Common Effect Models that should be used.

H_0: Common Effect

H_a: Fixed Effect

If the results of this specification test show a Chi-square probability of more than 0.05, the model chosen is the common effect. Conversely, if the Chi-square probability is less than 0.05, the model that should be used is fixed effect. When the chosen model is fixed effect, it needs to be tested again, namely the Hausmann test to find out whether it is better to use the Fixed Effect Model (FEM) or Random Effect Model (REM).

Test Model Specifications with the Hausmann Test

This test aims to determine the model that should be used, namely the Fixed Effect Model (FEM) or Random Effect Model (REM). In FEM each object has a different intercept, but the intercept of each object does not change over time. This is called time-invariant. Whereas in REM, intercepts (together) represent the average value of all intercepts (cross section) and the component represents the (random) deviation of individual intercepts to that average value (Gujarati, 2013). The hypothesis in the Hausmann test is as follows:

H_o: Random Effect Model

H_a: Fixed Effect Model

If hypothesis 0 is rejected, then the conclusion is better to use FEM. Because REM is likely to be correlated with one or more independent variables. Conversely, if H_a is rejected, then the model that should be used is REM.

RESULT AND DISCUSSION

The structural transformation in an economy can be seen from the change in sectoral contributions of each sector. In addition, to sharpen the analysis and refine the information it is necessary to analyze the factors that cause structural transformation.

The Chenery-Syrquin equation is used to analyze the factors that influence changes in the contribution of the industrial sector and the service sector to the formation of GDP. Using panel data from 9 developing countries in ASEAN over the period 2000-2017. The model estimation is carried out with the fixed effect model and the random effect model.

To choose the best estimation from the two models, the Hausman test is performed.

Changes in the Industrial Value Added

After conducting the Hausman test, the Chi-Square probability value is smaller than 0.05, meaning that the model estimation method is done using the Fixed Effect Model.

Based on Table 1 it can be seen that the factors that influence changes in industrial value added have a coefficient of determination (R^2) of 0.96. This means that the independent variable in the model is able to explain 96 percent of the variation of the dependent variable and 4 percent is explained by other variables outside the model.

F-table of the regression equation for degree of freedom for numerator (dfn) = 6 (k-1) = (7-1) and degree of freedom for denominator (dfd) = 155 (n-k) = (162-7) with a significance level of α 5% is 2.16. The F-statistic value of 228.28 is greater than the F-table value of 2.16, so it can be concluded that the variable population, dependency ratio, income per capita, ratio of land area to total land area, education, control of corruption, and trade simultaneously significant effect on the industry value added.

T-table of the regression equation for degree of freedom (df) = 155 (n-k) = (162-7) with a significance level of 5% of 1.6547. The t-statistic value of each variable obtained from the estimation results are as Table 2.

Table 1. Fixed Effect Model Estimation Results
Dependent Variable: INDUSTRI (Industrial Value Added)

Independent Variable	**Coefficient**
C (Constant)	18.21365
	(0.094437)
LPOP (Total Population)	2.903219
	(0.261876)
DR (Dependency Ratio)	-0,.491459
	(-4.543502)*
GDP_PC (Income per Capita)	0.001322
	(4.347746)*
AGRICULTURAL_LAND (Ratio of Agricultural Land Area to Total Land Area)	-0.275137
	(-1.153348)
EDU (Education)	-0,.374509
	(-4.675646)*
CORRUP (Control of Corruption)	0.005915
	(0.004566)
TRADE (Trade)	0.136426
	(7.432674)*
R-squared	0,.959106
F-statistic	228.2784
Prob(F-statistic)	0.000000

Note: ( ) is a t-statistic value
* Significant at the 5% level
Source: Author (2019)

p-ISSN: 0854-1442 (Print) e-ISSN: 2503-4464 (Online)

Table 2. T-statistic Value of Regression Equation

Variable	t-statistic	t-table	Information
LPOP	0,261876	1,6547	Not Significant
DR	-4,543502		Significant
GDP_PC	4,347746		Significant
AGRICULTURAL_LAND	-1,153348		Not Significant
EDU	-4,675646		Significant
CORRUP	0,004566		Not Significant
TRADE	7,432674		Significant

Source: Author (2019)

The t-statistic value of the total population is 0.261876, smaller than the t-table value. The hypothesis that the total population has a positive and significant effect on the industrial value added is rejected. The total population has no significant effect on the industrial value added. This is not in accordance with the results of research conducted by Norris (2013) that the population has a positive effect on the industrial value added, similar thing is also found in research conducted by Romli et al. (2016) that the level of population has a significant effect on changes in the industrial value added.

The t-statistic value of the dependency ratio is -4.543502, greater than the t-table value. The hypothesis that the dependency ratio has a significant effect on the industrial value added is accepted, but with a different coefficient direction. Dependency ratio has a negative significant effect on the industrial value added. The increase in the dependency ratio of 1% would lower the industrial value added amounted to 0.491459%. This is not in accordance with the results of research conducted by Norris (2013) that the dependency ratio should have a negative effect on the industrial value added. An increase in the unproductive elderly population will increase government spending on pensions and health, so that government spending in other sectors such as the investment sector will decrease. Declining government spending on investment can reduce growth. Increasing unproductive elderly population also reduces labor supply. Assuming a constant level of productivity, a decrease in the number of inputs will reduce the output produced. In other words, changes in aging will have an impact on slowing the progress or growth of industrial sector output.

The t-statistic value of the income per capita is 4.347746, greater than the t-table value. The hypothesis that the income per capita has a positive and significant effect on the industrial value added is accepted. Income per capita has a positive and significant effect on the industrial value added. An increase in income per capita by 1% will increase the industrial value added amounted to 0.001322%. The results of this study are in accordance with the analysis of Chenery-Syrquin developmental patterns, an increase in income per capita will increase industrial value added. This increase was caused by changes in consumption patterns, where there was a shift in consumption patterns from food items to high value manufactured goods as a result of human limitations in consuming food items. This fact is also supported by Engel's law which states that the elasticity of demand as a result of increasing non-elastic income for foodstuffs (agriculture) and elastic for manufactured goods and services. Identical to the results of the above study, research by Haraguchi and Rezonja (2011), which examined the economic structure of countries in the world, concluded that income per capita was positively correlated with the industrial value added. Similar results were obtained from studies of Tarp et al. (2002).

The t-statistic value of the ratio of agricultural land area to total land area from

the estimation results of the fixed effect model is -1.153348, smaller than the t-table value of 1.6547. The hypothesis that the ratio of agricultural land area to total land area has a negative and significant effect on the industrial value added is rejected. The ratio of agricultural land area to total land area does not significantly affect the added industrial value added. This is not in accordance with the results of research conducted by Norris (2013) that the ratio of agricultural land area to total land area have a significant negative effect on the industrial value added.

The t-statistic value of the education is -4.675646, greater than the t-table value. The hypothesis that the educational has a significant effect on the industrial value added is accepted, but with a different direction of the coefficient. Education has a significant negative effect on the industrial value added. An increase in tertiary education graduates by 1% will reduce the industrial value added by 0.374509%. This is consistent with the results of research conducted by Jha (2016) that education has a negative effect on the industrial value added. Education has an important influence on the output growth of the industrial sector. The level of education of a person is influenced by the level of productivity of goods and services. A high level of education will affect the quality of performance in the company so that it is expected to produce a productive output. However, the level of education with low quality will actually have a negative effect on the industrial value added.

The t-statistic value of the control of corruption from the estimation of the fixed effect model is 0.004566, smaller than the t-table value. The hypothesis that the control of corruption has a positive and significant effect on the industrial value added is rejected. Control of corruption does not affect growth. This can occur due to other variables that are not measured. The effect of control of corruption on growth depends on how economic freedom in an area. In a country with high economic freedom, control of corruption has a positive effect on the growth of industrial sector output. Whereas in a country with low economic freedom, control of corruption causes slowing growth in industrial sector output. The reason is that control of corruption in ASEAN does not significantly affect the output growth of the industrial sector because ASEAN conditions are very diverse and each country has its own regulations. There are many countries with many regulations so that economic freedom is low. Whereas countries with fewer regulations in the economy show higher economic freedom.

The t-statistic value of the trade from the estimation results of the fixed effect model is -7.432674, greater than the t-table value. The hypothesis that trade have a positive and significant effect on the industrial value added is accepted. Trade has a significant positive effect on the industrial value added. An increase in trade of 1% will increase the industrial value added by 0.136426%. The results of this study are consistent with research conducted by Norris (2013) that trade openness has a significant positive effect on the industrial sector. This is in accordance with the theory of international trade from Adam Smith and David Ricardo that each country must conduct international trade to encourage the growth of sectoral output. A country can get many benefits from international trade, including obtaining goods or services that are inefficient or cannot even be produced in their own country, benefit from specialization, have a wider market, transfer technology from developed countries, etc.

Changes in the Services Value Added

After conducting the Hausman test, the Chi-Square probability value is smaller than 0.05, meaning that the model estimation method is done using the Fixed Effect Model.

 p-ISSN: 0854-1442 (Print) e-ISSN: 2503-4464 (Online)

Tabel 3. Fixed Effect Model Estimation Results
Dependent Variable: JASA (Service Value Added)

Independent Variable	Coefficient
C (Constant)	-527.6524
	(-6.181097)
LPOP (Total Population)	32.61964
	(6.647631)*
DR (Dependency Ratio)	0.208980
	(4.364969)*
GDP_PC (Income per Capita)	-0.000556
	(-4.135312)*
AGRICULTURAL_LAND (Ratio of Agricultural Land Area to Total Land Area)	0.020281
	(0.192074)
EDU (Education)	0.133303
	(3,.760034)*
CORRUP (Control of Corruption)	2,.337852
	(4.076646)*
TRADE (Trade)	-0.033510
	(-4.124773)*
R-squared	0.961118
F-statistic	240.5982
Prob(F-statistic)	0.000000

Note: ( ) is a t-statistic value
* Significant at the 5% level
Source: Author (2019)

Based on Table 3 it can be seen that the factors that influence changes in service value added have a coefficient of determination (R^2) of 0.96. This means that the independent variable in the model is able to explain 96 percent of the variation of the dependent variable and 4 percent is explained by other variables outside the model.

F-table value of the regression equation for degree of freedom for numerator (dfn) = 6 (k-1) = (7-1) and degree of freedom for denominator (dfd) = 155 (n-k) = (162-7) with a significance level of α 5% of 2.16. The F-statistic value of 240.5982 is greater than the F-table value of 2.16, so it can be concluded that the variable population, dependency ratio, income per capita, ratio of land area to total land area, education, control of corruption, and trade simultaneously has a significant effect on the service value added.

T-table value of the regression equation for degree of freedom (df) = 155 (n-k) = (162-7) with a significance level of 5% of 1.6547. The t-statistic value of each variable obtained from the estimation results are as follows:

Table 4. T-statistic Value of Regression Equation

Variable	t-statistic	t-table	Information
LPOP	6.647631	1.6547	Significant
DR	4.364969		Significant
GDP_PC	-4.135312		Significant
AGRICULTURAL_LAND	0.192074		Not Significant
EDU	3.760034		Significant
CORRUP	4.076646		Significant
TRADE	-4.124773		Significant

Source: Author (2019)

The t-statistic value of the total population from the estimation of the fixed effect model is 6.647631, greater than the t-table value. The hypothesis that the total population has a positive and significant effect on the service value added is accepted. The total population has a significant positive effect on the service value added. An increase in population of 1% will increase the service value added by 32.61964%. The population level represents the size of the market, the higher the population level, the greater the value added that can be generated by the service sector. The results of this study are in line with the results of research conducted by Francis et al. (2015) where the population has a significant influence on increasing the value added of the service sector. High population is not a problem, but an important element that will spur economic development. A higher population is a potential market which is a source of demand for various types of goods and services that will drive various economic activities. So that it can create economies of scale of production that benefit all parties, reduce production costs, and create a supply of resources or supply of cheap labor in sufficient quantities so that it will stimulate higher levels of industrial production or aggregate production.

The t-statistic value of the dependency ratio is 4.364969, greater than the t-table value. The hypothesis that the dependent ratio has a positive and significant effect on the service value added is accepted. Dependency ratio has a significant positive effect on the service value added. An increase in the dependency ratio of 1% will increase the service value added by 0.208980%. The results of this study are in accordance with research conducted by Norris (2013) that the dependency ratio has a positive effect on the service value added. This is because the greater the burden of the non-productive population must be borne by the productive age population. With increasing dependency, income generated by the productive age population will decrease, then economic activities such as consumption, investment, etc. will also be reduced. However, on the positive side, increasing the number of elderly does not mean an increase in dependency. Elderly in this case are elderly over the age of 65 years but still working. Many of them still support their children and grandchildren financially. In addition, the possibility of this elderly person is healthier and more productive than the generation of the elderly in the past can reduce the growth rate of health care costs so as to reduce the burden on the state budget.

The t-statistic value of the income per capita is -4,135312, greater than the t-table value. The hypothesis that the income per capita has a significant effect on the service value added is accepted, but with a different coefficient direction. Income per capita has a significant negative effect on the service value added. An increase in income per capita by 1% will reduce the service value added by 0,000556%. This is somewhat different from the Chenery-Syrquin development pattern which states that an increase in income per capita will significantly increase the service value added. This seems to be closely related to the consumption patterns of the people who still allocate income for industrial goods and have not been allocated to the service sector.

The t-statistic value of the ratio of agricultural land area to total land area from the estimation of the fixed effect model is 0.192074, smaller than the t-table value of 1.6547. The hypothesis that the ratio of agricultural land area to total land area has a negative and significant effect on the service value added is rejected. The ratio of agricultural land area to total land area does not significantly affect the service value added. This is not in accordance with the results of research conducted by Norris (2013), the ratio of

 p-ISSN: 0854-1442 (Print) e-ISSN: 2503-4464 (Online)

agricultural land area has a significant negative effect on the service value added.

The t-statistic value of the education is 3.760034, greater than the t-table value. The hypothesis that the educational has a significant effect on the service value added is accepted, but with a different coefficient direction. Education has a significant positive effect on the service value added. An increase in tertiary education graduates by 1% will increase the service value added by 0.133303%. This is consistent with the results of research conducted by Jha (2016) that education has a positive effect on the service value added. A high level of human development will affect the economy through increasing the capabilities of the population and the consequence is also on their productivity and creativity.

The t-statistic value of the control of corruption variable from the estimation of is 4.076646, greater than the t-table value. The hypothesis that the control of corruption variable has a positive and significant effect on the service value added is accepted. Control of corruption has a significant positive effect on the service value added. An increase in control of corruption by 1% will increase the service value added by 2.333852%. High control of corruption shows that the country is clean from corruption, while low control of corruption shows that the country has a high level of corruption. This is not in accordance with the hypothesis that control of corruption has a positive effect on the service value added. When a project needs to get permission from many people who each have the power to veto, the cost of corruption increases and output growth decreases. Myrdal (1968) said that corrupt officials can use their power to delay and hinder projects so that he can get more bribes.

The t-statistic value of the trade from the estimation results of the fixed effect model is -4.124773, greater than the t-table value. The hypothesis that the trade has a significant effect on the service value added is accepted, but with a different direction of the coefficient. Trade has a significant negative effect on the service value added. An increase in trade of 1% will reduce the service value added by 0.033510%. This is different from the results of research conducted by Norris (2013) that trade has no effect on the service value added. The policy of trade openness that is too high in developing countries will have a negative impact, especially for countries that have a high level of economic resilience.

CONCLUSION AND RECOMMENDATION

Based on the results of the analysis and discussion previously described, the conclusions that can be drawn from this study include: The occurrence of structural transformation in an economy can be seen from the sectoral contribution of each sector to the economy. Structural transformation has taken place in developing countries in ASEAN which is marked by the increasing contribution of the industrial and service sectors. Structural transformation which is measured by using the industrial value added as the dependent variable, is significantly influenced by the dependency ratio, income per capita, education, and trade. Structural transformation which is measured by using the service value added as the dependent variable, is significantly influenced by the population, dependency ratio, income per capita, education, control of corruption, and trade. Significant variables for all models are dependency ratio, income per capita, education, and trade.

The results of this study also show an interesting thing, namely that there are different directions from the variables in the sectoral model of industries and services value added. This means that there is an indication of the trade off effect of the variables that affect the structural transfor-

mation between the industrial and service sectors. In simple terms this can be interpreted that if a variable drives the structural transformation of the agricultural sector towards the service sector by increasing the service value added, then at the same time the variable also decreases the sectoral industrial value added. This phenomenon can be investigated in further research, where structural transformation is not seen as a movement of dominance of sectoral contributions from the agricultural sector to the industrial sector and the service sector, but can be redefined as a movement from the industrial sector to the service sector.

Based on this research, control of corruption does not have a significant influence on the industrial value added, so the government must reduce the number of corruption by increasing transparency, providing strict penalties for perpetrators and increasing public participation. Education has a negative effect on the industrial value added. To achieve harmony between education and sectoral output growth, the government should prioritize improving education quality.

An increase in the dependency ratio can increase the growth of service sector output due to the large number of elderly people who are still working to meet the needs of life for themselves as well as their families, it would be better if the central government provides empowerment programs for the elderly who work such as vocational training, business assistance, and business expansion in accordance with the elderly workforce. By doing this program, it is hoped that the elderly can be more focused on work that is not too heavy for them.

In this study, other endogenous variables that are actually interesting to study are not included in the model, due to data and time limitations.

REFERENCES

Basuki, A. T. & Prawoto, N. (2016). *Analisis Regresi Dalam Penelitian Ekonomi & Bisnis: Dilengkapi Aplikasi SPSS & EVIEWS*. Depok: PT Rajagrafindo Persada.

Busse, M., Ceren Erdogan, C., & Mühlen, H. (2018). Structural Transformation And its Relevance for Economic Growth in Sub-Saharan Africa. *Wiley Working Paper*.

Chenery, H. & Syrquin, M. (1986). Patterns of Development, 1950-1970. *Oxford: Oxford University Press*.

Norris, Dabla., E., Thomas, A., Garcia-Verdu, R., & Chen, Y. (2013). Benchmarking structural transformation across the world. *International Monetary Fund Working Paper*.

Djojohadikusumo, S. (1994). *Perkembangan Pemikiran Ekonomi: Dasar Teori Ekonomi Pertumbuhan dan Ekonomi Pembangunan*. Jakarta: PT Pustaka LP3ES Indonesia.

El-hadj & Bah, M. (2011). Structural Transformation Paths Across Countries. *New Zealand: Emerging Markets Finance & Trade Working Papers, 47*(2), 5–19.

Gujarati, D. N. (2013). *Dasar-dasar Ekonometrika*. Jakarta: Salemba Empat.

Haraguchi, N & Rezonja, G. (2011). Emerging Patterns of Manufacturing Structural Change. *United Nations Industrial Development Organization, Vienna*.

Ingham, B., Chirijevskis, A., & Carmichael, F. (2009). Implication of An Increasing Old Age Dependency Ratio: The UK and Latvian Experiences Compared. *Pensions: An International Journal,14* (4), 221-230.

 p-ISSN: 0854-1442 (Print) e-ISSN: 2503-4464 (Online)

Jha, R., & Afrin, S. (2016). Pattern and Determinants of Structural Transformation in Africa. *Trade and Development Working Papers*.

Kuncoro, M. (2010). *Masalah, Kebijakan, dan Politik, Ekonomika Pembangunan*. Jakarta: Erlangga.

Martins, P. M. G.. (2018). Structural Change: Pace, Patterns and Determinants. *Wiley Working Paper*.

Myrdal, G. (1968). Asian Drama in Inquiry Into The Poverty of Nation. *Volume III. Pinguin Books Ltd, Hagrmondsworth*.

Nickell, S., Redding, S. & Swaffield, J. (2008). The Uneven Pace of Deindustrialization in the OECD. *Labour Markets and Globalisation Programmes of the ESRC funded Centre for Economic Performance at the London School of Economics*.

Rodrik, D. & Subramanian, A. (2003). The Primacy of Institutions (And What This Does And Does Not Mean). *World Bank's World Development Report 2003: Sustainable Development in a Dynamic World*.

Romer, P.M. (1986). Increasing Returns and Long-run Growth. *Journal of Political Economy. 94*, 1002-38.

Romli, M. S., Hutagaol, M. P., & Priyarsono, D. S. (2016). Structural Transformation: Factors and its Impact on Income Disparity in Madura. *Jurnal Ekonomi dan Kebijakan Pembangunan*, 25-44.

Sahay, A. & Ciarliz, T. (2018). Innovation, Structural Change, and Inclusion. A Cross Country PVAR Analysis. *International Monetary Fund Working Paper*.

Tambunan, T. (2001). *Perekonomian Indonesia: Teori dan Temuan Empiris*. Jakarta.

Tarp, F,, Channing, A., Henning, T., Sherman, R., & Rasmus, H. (2002). Facing the Development Challenge in Mozambique; An Economywide Perspective. Washington. *International food policy research institute*.

Todaro, M. P, Stephen C., &Smith, S. C. (2011). *Pembangunan Ekonomi di Dunia Ketiga*. Jakarta: Erlangga.