

CONVERSION OF AGRICULTURAL SECTOR INTO MANUFACTURING SECTOR IN ACEH PROVINCE

Yasrizal¹

Faculty of Economics, Teuku Umar University, Indonesia

Email : yasrizal@utu.ac.id

Muliadi²

Faculty of Engineering, Syiah Kuala University, Indonesia

Email : mulyadi_abi@unsyiah.ac.id

Damrus³

Faculty of Economics, Teuku Umar University, Indonesia

Abstract

The change in labor structure and quality from the agricultural sector to the industrial sector has created prospects for expanded job opportunities, which are much more important year-on-year in comparison with the agricultural sector. Moreover, the manufacturing sector also offers resources for its employees to boost their health. The workforce experienced an average annual decrease of -1.69 percent from 1994 to 2017, but the manufacturing sector experienced a 6.44 percent rise in jobs. This thesis is a secondary study using time series data collected from the Aceh Province Central Statistical Agency (BPS). The model is structured in the form of simultaneous equations consisting of 6 structural equations and 2 identity equations. The model is an Econometrics model that is used to classify the variables affecting the movement of labor to the manufacturing sector in the agricultural sector. The results of the study indicate that salaries in the industrial sector are higher than wages in the agricultural sector, which is what encourages workers in the agricultural sector to tend to migrate to the industrial sector (transformation). The industrial sector consumes more labor than the agricultural sector with every rise in the number of industries in Aceh Province. Seen by the growth of 1 Aceh industrial unit capable of employing hundreds of employees.

Keywords: *Transformation Model, Agricultural Sector Workforce, Industrial Sector Workforce*

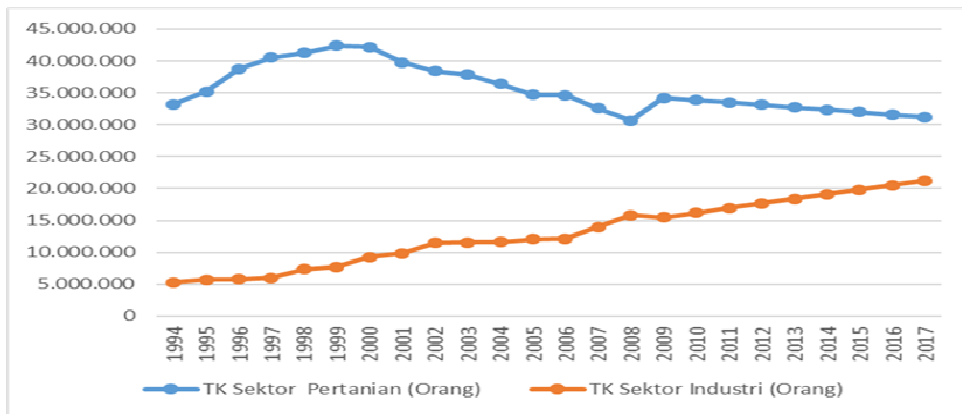
A. Introduction

The main goal of economic development is to increase employment in an effort to reduce unemployment, especially for developing countries (National Economic and Development Authority 2017) (Nafziger 2012) (Nafziger 2012). Indonesia as a developing country is experiencing problems in economic development where the absorption of labor is smaller than the creation of jobs (Ishatono and Raharjo 2016).

According to (Yılmaz, Calikoglu, and Kosan 2019) (Alomari 2016) There are several reasons why this is happening, namely First, population growth is higher in developing countries, which exceeds capital growth or the level of social welfare. Second, there is still a very low population of young people or knowledge about the use of labor, more individuals are workers compared to job creators. Third, the industrial structure in developing countries still has a low level of diversification of economic factors, as well as the level of expertise possessed by residents who have not yet entered the industrial world.

According to (Central Statistical Agency 2019) Absorption of labor continues to experience significant changes in line with the national development process, especially from the informal sector to the formal sector and from the primary sector to the manufacturing and service sectors. This can be seen as follows in Graph 1.

Graph 1. Population Aged 25 Years and Over Working According to Business Fields in Indonesia, 1994-2017



Source: Central Bureau of Statistics, Statistics Indonesia 2019.

The agricultural sector workforce was around 33,209,344 people in 1994, and that number then decreased to 31,222,562 people in 2017. In comparison, those working in the industrial sector increased from 5,276,898 people to 21,268,705 people in the same period.

Judging from the growth in the 1994-2017 period, the growth of the workforce in the agricultural sector continued to decline, and it was reported that the growth of the workforce in the agricultural sector was -1.69 percent from 1994-2017. This is because there has been a systemic shift from the agricultural sector workforce to other industries that are more promising for income, and industry has become one of the sectors they are targeting. In the same period as a result of this structural shift, the growth of the labor force in the industrial sector experienced a significant increase of 6.44 percent.

Over time, the shift from the agricultural sector to the industrial sector in terms of the composition and quality of the workforce has created opportunities to increase employment opportunities that are far more significant from year to year compared to the agricultural sector. (Sholihah, Syaparuddin, and Nurhayani 2017) (Yasrizal, 2018). In addition,

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the increase in workers' welfare is also provided by the industrial sector (Indonesia 2003). This situation is also appreciated by employees of agricultural companies who, compared to the industrial sector, are less able to meet their daily needs (Malu 2015) (Soegandhi, Sutanto, and Setiawan 2013).

The author can formulate the problem to be studied based on the research history described above, namely: What factors influenced the transformation of the workforce in the agricultural sector to the industrial sector in Aceh Province during the 1994-2017 period.

B. Method

1. Research sites

This research was conducted in Aceh Province. The research objective focuses on workers in the agricultural and manufacturing sectors. Although labor demand, labor supply, wages and unemployment rates in the agricultural and industrial sectors are included in the scope of the study. The purpose of this study is to examine the transformation of the agricultural sector workforce into the industrial sector in Aceh Province during the 1994-2017 period.

The data used is secondary in nature (Time Series data) or periodically from year to year available at the relevant agencies, namely from 1994 to 2017 collected through the Aceh Province Central Bureau of Statistics (BPS).

2. Analysis Models

In general, in the form of simultaneous equations consisting of 6 structural equations and 2 identity equations, the model is constructed. The formula is for the Econometrics model, which is used to evaluate the

factors influencing the movement of labor to the industrial sector in the agricultural sector (Charles, Hurst, and Schwartz 2019) (United States Department of Labor 2019) (Kuralbayeva and Stefanski 2013), consists of the equation:

Demand for Labor in the Agricultural Sector (DTKP)

The demand for labor in the agricultural sector is influenced by the level of wages in the agricultural sector (WP) and the area of agricultural land (TP) (Duarte and Restuccia 2010):

$$DTKP = a_0 + a_1 WP_t + a_2 TP_t + U_{1t}$$

Parameters expected (hypothesis): : $a_1 < 0$ dan $a_2 > 0$

Industrial Sector Labor Demand (DTKI)

Industrial sector labor demand is influenced by wage rates in the industrial sector (WI) and the number of industries (JI):

$$DTKI = a_0 + a_1 WI_t + a_2 JI_t + U_{2t}$$

Parameters expected (hypothesis): $a_1 < 0$ dan $a_2 > 0$

Agricultural Sector Labor Supply (STKP)

The supply of labor in the agricultural sector is influenced by the agricultural sector labor wage (WP), population (JP), industrial sector labor wages (WI):

$$STKP = a_0 + a_1 WP_t + a_2 JP_t + a_3 WI_t + U_{3t}$$

Parameters expected (hypothesis): $a_1 > 0$, $a_2 > 0$ dan $a_3 < 0$

Industrial Sector Labor Offerings (STKI)

Industrial sector labor supply is influenced by industrial sector labor wages (WI), population lag (LJP), agricultural sector labor wages (WP) and industrial sector labor supply lag (STKI).

$$STKI = a_0 + a_1 WI_t + a_2 LJP_t + a_3 WP + U_{4t}$$

Parameters expected (hypothesis): $a_1 > 0$, $a_2 > 0$ dan $a_3 > 0$

Agricultural Sector Labor Wages (WP)

The agricultural sector labor wages are affected by the demand for agricultural sector labor (DTKP), the lag in agricultural sector labor supply (LSTKP) and minimum living necessities (KHM):

$$WP = a_0 + a_1 DTKP_t + a_2 LSTKP_t + a_3 KHM_t + U_{5t}$$

Parameters expected (hypothesis): $a_1 > 0$, $a_2 < 0$ dan $a_3 > 0$

Industrial Sector Labor Wages (WI)

The agricultural sector labor wages are influenced by the demand for agricultural sector labor (DTKI), the agricultural sector labor supply (STKI) and the minimum living necessities (KHM):

$$WI = a_0 + a_1 DTKI_t + a_2 STKI_t + a_3 KHM_t + WP a_4 + U_{6t}$$

Parameters expected (hypothesis): $a_1 > 0$, $a_2 < 0$, $a_3 > 0$ dan $a_4 > 0$

Agricultural Sector Labor Unemployment

Agricultural sector labor unemployment is the difference between the supply of labor in the agricultural sector and the demand for labor in the agricultural sector.

$$UTKP = STKP - DTKP$$

Industrial Sector Labor Unemployment

Agricultural sector unemployment is the difference between the supply of labor in the industrial sector and the demand for labor in the industrial sector.

$$UTKI = STKI - DTKI$$

Model Identification and Estimation Methods

Structural econometric models simultaneously require model identification before deciding on the model prediction process. By using order conditions as mandatory requirements, and ranking conditions as adequacy conditions (Jaya and Sumertajaya 2008) (Kruschke 2013), a structural equation model can be defined. The order state system is:

$$(KM) > (G-1)$$

where :

K = Total variables in the model, ie *endogenous variables* and predetermined variables

M = The number of endogenous and exogenous variables included in one particular equation in the model

G = Total equations in the model, namely the number of endogenous variables in the model.

The condition of an equation in the model following the order condition method is:

$(K - M) > (G - 1)$; the equation concerned is identified as redundant (*overidentified*)

$(K - M) < (G - 1)$; the corresponding equation cannot be identified (*unidentified*)

$(K - M) = (G - 1)$; the corresponding equation can be identified exactly (*exactly identified*).

In order to predict the parameters of each structural equation must be exactly identified or over identified.

From the specified model specifications, it can be seen that the total endogenous variables are 8 (four) variables, consisting of:

- a. 6 (three) structural equations
- b. 2 (one) identical identity

To predict the parameters, the identification results for each structural equation must be correctly identified or overidentified. $K = 12$, $M = 4$ and $G = 8$ in this study. So this shows that each structural equation is over-identified based on the order condition criteria in this analysis. The best model estimation method in this study is 2SLS, based on statistical and economic criteria, because it can produce more efficient parameter estimation values.

C. Finding and Discussion

1. The Agricultural Sector Labor Demand Equation

The results of the demand for labor in the agricultural sector show that wages are earned by workers in the agricultural sector and in the agricultural land sector. This can be seen from the value of the determinant coefficient (R^2) of 26.46 percent which indicates that the independent variable of 26.46 percent can describe the demand for labor in the agricultural sector and other variables show the remainder of 73.54 percent.

As shown in Table 1, the estimated value of the labor demand equation in the agricultural sector shows that a large proportion of agricultural land also affects the demand for labor in the agricultural sector. With an average parameter value of 0.027872 the area of agricultural land has a positive impact on the demand for agricultural

labor, meaning that an increase in the area of 1000 hectares of agricultural land in Aceh Province will increase the demand for labor in the agricultural sector to 28 people.

Table 1. Estimated Results of the Equation of Labor Demand for the Agricultural Sector in Aceh Province

Variable Name	Variable	Estimation Parameter	T hits	Prob
Agricultural Sector	DTKP			
Kindergarten Demand				
intercept		801603	1.373	0.1997
Agricultural Sector	WP	-0.130850	-1.655	0.1289
Kindergarten Wages	TP	0.027872	0.261	0.7997
Agricultural Land Area				
R2 = 0.2646 Fhit = 1.7990 DW = 1.993				

Source: 2019 BPS data processed

The projected results for the wages of labor in the agricultural sector have a negative impact on the demand for labor in the agricultural sector, with an estimated value of -0.130850, which means that the quantity of labor demanded will decrease by 131 per 1000 rupees increase in wages. This shows that in line with previous hypotheses and theories, wage increases in the agricultural sector have a large effect on labor demand.

In this situation, because of the prevailing wage increases, business owners in the agricultural sector are unable to accommodate as many workers as possible. This causes a slowdown in the growth of the agricultural sector, so that many workers in the agricultural sector will switch professions to find work in industry or other sectors that are expected to be able to absorb these workers.

Industry Sector Labor Demand Equation

Estimation of Labor Demand in the Industrial Sector Table 2 shows that the demand for labor in the industrial sector is partly negatively affected by the wages of industrial workers and the number of industries. This can be seen from the value of the determinant coefficient (R²) of 62.74 percent, which means that the independent variable 62.74 percent can explain the demand for labor in the agricultural sector and other variables explain the remaining 26.46 percent. It is also concluded that this finding is in line with the hypothesis presented in this report, based on economic theory of labor issues, where an increase in wages will reduce the demand for labor.

The wage value of employees in the industrial sector is -0.003728, meaning that an increase in salary of 1,000 rupiah will reduce the level of demand for labor for 4 people in the industrial sector. This condition indicates that an increase in wages in the industrial sector will have a negative impact on the demand for labor, so that job opportunities in the industrial sector will decrease, especially in Aceh Province.

Table 2. Estimated Results of the Equation of Industrial Sector Labor Demand in ProAceh vince

Variable Name	Variable	Estimation Parameter	T hits	Prob
Industrial Sector	DTC			
Kindergarten Demand				
intercept		47382	2,162	0.0559
Industrial Sector	WI	-0.003728	-0.248	0.8091
Kindergarten Wages	JI	343.600032	2,361	0.0399
Number of Industries				
R ² = 0.6274 Fhit = 8.419 DW = 1.838				

Source: 2019 BPS data processed

Meanwhile, the estimated value of the variable number of industries has a positive effect on the demand for labor in the industrial sector, namely 343.60003, meaning that every 1 unit increase in the number of industries will increase the demand for labor by 344 individuals. In general, it can be said how much influence the industrial sector in Aceh Province has on the workforce. This situation will have a direct impact on job prospects in the manufacturing sector. Proven to be able to absorb hundreds of workers with the addition of 1 unit of a large manufacturing company in Aceh.

Agricultural Sector Labor Supply Equation

The results of the agricultural labor supply equation shown in Table 3 show that the supply of agricultural labor is partly influenced by the agricultural labor wage, the resident labor wage and the industrial sector labor wage. This can be seen from the value of the determinant coefficient (R^2) of 38.12 percent, which means that 38 percent of the independent variable can affect the demand for labor in the agricultural sector and the remaining 60.88 percent is influenced by other variables that are not included.

Table 3. Estimated Results of Equalization of Labor Supply in the Agricultural Sector in Aceh Province

Variable Name	Variable	Estimation Parameter	T hits	Prob
Agriculture Sector Kindergarten Offers	STKP			
intercept		952538	2,564	0.0305
Agricultural Sector Kindergarten Wages	WP	0.181073	1,985	0.0784
Total population	JP	-0.003812	-0.041	0.9684
Industrial Sector Kindergarten Wages	WI	-0.055961	-1.035	0.3276

 $R^2 = 0.3812$ $F_{hit} = 1.848$ $DW = 2.345$

Source: 2019 BPS data processed

The value of labor in the agricultural sector has a positive impact on the supply of labor in the agricultural sector, this is also in line with the theory adopted based on the economic theory of labor issues. With a value of 0.181073, which means an increase in wages of 1000 rupees, the supply of labor in the agricultural sector will increase by 181 people. In this case, if agricultural wages increase, workers will be attracted to enter the labor market to increase the supply of labor in Aceh province.

The value of the population projection parameter has a negative effect on the supply of labor in the agricultural sector, even though this parameter is not in line with the hypothesis and theory, but there is another side that allows it to contradict the hypothesis. The parameter value is -0.003812, which means that every increase in the population of 1000 people reduces the supply of labor to 4 people in the agricultural sector, because the possibility of population growth lies in the population who are not in the labor force. So this is what allows an increase in population to have a detrimental effect on the labor supply.

In addition, the value of the industrial sector labor wage parameter is -0.055961, which means that the industrial sector labor wage has a negative impact on the agricultural sector labor supply, with each increase in the industrial sector labor wage. the industrial sector by 1,000 rupees reduces the labor supply of 56 people in the agricultural sector.

Industrial Labor Supply Equation

Table 4 is estimated based on the industrial labor equation, based on the estimation results which show that part of the wages of the industrial sector, the backwardness of the population and the wages of labor in the agricultural sector, have a major impact on the supply of the industrial sector. This can be seen from the coefficient of determination (R²) of 76.71 percent, which means that 77 percent of the independent variables can affect the agricultural sector workforce and the other 23 percent are influenced by other variables.

Table 4. Estimates of Equalization of Labor Supply in the Industrial Sector in Aceh Province.

Variable Name	Variable	Estimation Parameter	T hits	Prob
Industrial Sector	STKI			
Kindergarten Offers				
intercept		953422	5,460	0.0004
Industrial Sector	WI	0.022635	0.790	0.4497
Kindergarten Wages	LJP	-0.216103	-4,736	0.0011
Population lag	WP	0.023447	0.550	0.5954
Agricultural Sector				
Kindergarten Wages				
R ² = 0.7671 Fhit = 9.882 DW = 1.864				

Source: 2019 BPS data processed

Industrial sector labor wages have a positive relationship with labor supply in the industrial sector with an average parameter value of 0.022635, meaning that every increase in industrial sector labor wages of 1,000 rupees will increase labor supply in the industrial sector by 23 people.

Although the lag population has a negative impact on labor supply in the industrial sector, this contradicts the hypothesis that the average value of the parameter is -0.216103, which implies that every 1,000 increase in the lag population will reduce the labor supply in the industrial sector. workforce to 216 people in the industrial sector. Underdevelopment of the population has a large impact on the demand for labor in the region at the real level ($= 0.15$) based on test scores. This will happen because with population growth, the proportion of non-labor force population will be higher, so that the entire labor force in the manufacturing sector will not be affected by an increase in population.

With an estimated value of 0.023447, the wages of labor in the agricultural sector have a positive relationship with the supply of labor in the industrial sector, meaning that every 1,000 rupee increase in labor in the agricultural sector will increase the supply of labor in the industrial sector. as many as 23 people. When compared with the agricultural sector, it can be seen that the attractiveness of wages in the industrial sector is much higher than that of the agricultural sector, so that the agricultural sector's labor supply response to the industrial sector is stronger than the agricultural sector's labor supply response to the industrial sector. industrial sector to agriculture with the same increase in wages.

Agricultural Sector Labor Wage Equation

The estimated results of the agricultural sector labor wage equation can be seen in Table 5, which shows that part of the agricultural sector labor wages is influenced by the demand for labor in the agricultural sector, lagging behind the supply of labor in the agricultural sector. agricultural sector and minimum subsistence needs. This can be

seen by the value of 77.57 percent of the determinant coefficient (R^2), which means that the independent variable is 78 percent that can affect the workers of the agricultural sector, and other factors impact the remaining 22.43 percent.

The parameter value of the average demand for labor in the agricultural sector is 1.170521, which means that an increase in the demand for labor in the agricultural sector by 1,000 people will increase the wages of labor in the agricultural sector by 1,171 rupiah.

Table 5. Estimating Results of the Equalization of Labor in the Agricultural Sector in Aceh Province.

Variable Name	Variable	Estimation Parameter	T hits	Prob
Agricultural Sector Kindergarten	WP			
Wages		-417020	-0.385	0.7095
intercept	DTKP	1.170521	1.258	0.2400
Agricultural Sector Kindergarten	LSTKP	-0.487270	-0.468	0.6507
Demand	KHM	0.790327	4,110	0.0026
Agricultural Sector Kindergarten				
Supply Lag				
Minimum Life Needs				
R2 = 0.7757 Fhit = 10.373 DW = 2.531				

Source: 2019 BPS data processed

The value of the labor supply in the agricultural sector is - 0.487270, which means that every increase in the supply of labor in the agricultural sector by 1000 people in the previous year will reduce the wages of labor in the agricultural sector by 487 rupiah. Due to the increase in labor force, the owner of the agricultural business will decrease the labor wage.

The minimum subsistence requirement has a positive effect on labor wages in the agricultural sector with a parameter value of 0.790327, meaning that if there is an increase in the minimum subsistence requirement of 1000 rupiah, the wage for labor in the agricultural sector will increase by 790 rupiah. Salaries in the agricultural sector must also increase, in addition to improving minimum living conditions, because employers must meet the living needs of the workers themselves and their families. Furthermore, the Minimum Living Needs (KHM) is one of the pillars in setting the minimum wage, so that if the minimum living needs increase, the Provincial Minimum Wage will be increased by the government.

Industrial Sector Labor Wage Equation

The results of the parameter estimation of the industrial sector's labor equation show that some of the industrial sector's labor income, supply of labor in the industrial sector, supply of labor in the industrial sector, minimum living needs. And the labor market for agriculture. This can be seen from the value of the determinant coefficient (R^2) of 80.42 percent, which means that 78 percent of the independent variables can affect the agricultural sector workforce and the remaining 19.58 percent from other variables.

Based on Table 6, the demand for industrial labor in the industrial sector has a positive impact on the salaries of industrial workers with an estimated value of 3,557,625, which means that the demand for labor in each industrial sector increases by 1,000 people with a salary. in that sector it rose 3,558 rupees. This situation is achieved because this sector has to increase its wages in order to attract labor to this sector.

The estimated result of the value of labor supply from the

industrial sector parameter is -0.240255, which means that every increase in the industrial sector labor supply to 1000 people will reduce the wages of industrial workers by 240 rupiah. This shows an increase in the labor force in the industrial sector by 1,000 people, reducing labor wages by only 240 rupiah. The supply of labor in the industrial sector is not the same as 1,000 workers, when viewed from the decline in the wage rate.

With a parameter value of 0.146507, the sector's subsistence needs have a positive impact on industrial workers, meaning that every increase in minimum subsistence needs of 1000 rupiah will increase the wages of the industrial sector by 147 rupiah. This shows that the minimum life of the people of Aceh is needed in every world. In accordance with the needs of workers and workers' families, then the habit of labor wages will increase.

The beneficial impact on labor wages in the manufacturing sector is an increase in labor wages in the agricultural sector. This can be seen from the parameter 1.132966 which means that every 1,000 rupiah increase in agricultural labor wages will increase industrial sector labor wages by 1,133 rupiah. This situation illustrates that income in the manufacturing sector is higher than in the agricultural sector.

Table 6. Estimating Results of Industrial Sector Labor Equalization in Aceh Province.

Variable Name	Variable	Estimation Parameter	T hits	Prob
Industrial Sector	WI			
Kindergarten Wages		0.437016	1.509	0.1657
intercept	DTC	3.557625	1,000	0.3433
Industrial Sector	STKI	-0.240255	-0.158	0.8777
Kindergarten Demand	KHM	0.146507	0.359	0.7276
Industrial Sector	WP	1.132966	2,030	0.0729

Kindergarten Offers
Minimum Life Needs
Kindergarten wages in the
agricultural sector

$R^2 = 0.8042$ $F_{hit} = 9.244$ $DW = 2.191$

Source: 2019 BPS data processed

Thus the influence of high and low labor wages in the main employment sector, especially in Aceh Province, has a significant impact on the workforce. On the other hand, agricultural sector workers shift jobs from the high wages of industrial sector labor relative to agricultural sector workers to industrial sector workers. However, this fact shows that there is a tendency for individuals to increase their income and welfare by shifting the business sector from agriculture to the industrial business sector which is believed by the community to contribute to their economic problems.

Compared to the demand for labor in the agricultural sector and the demand for labor in the industrial sector, the same increase in wages in each sector can be seen to have a different impact on wage increases in each sector. In the manufacturing sector, wage increases are much larger than in the agricultural sector. This is what causes workers in the agricultural sector to choose to migrate (transform) to the industrial sector because wages in the agricultural sector are higher than what they believe will increase their standard of living in the agricultural sector.

D. Conclusion

Wages in the industrial sector are higher than wages in the agricultural sector, this is what causes workers in the agricultural sector to

choose to migrate to the industrial sector (transformation). The special attraction for workers to compete for work in this industry is the high pay in this manufacturing sector. In these two industries, the disparity in the amount of labor wages will attract a large number of workers to move from the agricultural sector to the industrial sector.

The industrial sector absorbs more labor from the agricultural sector for each increase in the number of industries in Aceh Province. You can see the growth of 1 industrial unit in Aceh that can absorb hundreds of workers.

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