Analysis of Labor Absorption
in the Agricultural Sector in Indonesia

Tatik Nur Tri Ani and Nur Hidayah[✉]

Faculty of Economics and Business, Muhammadiyah
University of Surakarta, Surakarta, Indonesia
nh212@ums.ac.id

Abstract. This study examines the factors that affect the absorption of labor in the agricultural sector. The variables in this study consisted of the Gross Regional Domestic Product (GRDP) of the Agricultural Sector, Farmers Exchange Rate (FER), Domestic Investment, and the Provincial Minimum Wage (PMW). This research method uses panel data regression analysis with Fixed Effects Model (FEM) to analyze panel data from 2019 to 2021 in 34 provinces in Indonesia. In this research, we found that the Farmer' Exchange Rate has a negative and significant influence and the Provincial Minimum Wage has a positive and significant influence on the absorption of labor in agricultural sector. Meanwhile, the Gross Regional Domestic Product of the Agricultural Sector and Domestic Investment variable have no influence on the absorption of labor. This study is the first study to examine the influence of gross regional domestic product, farmers exchange rates, provincial minimum wages, and domestic investment on absorption of labor in agricultural sector in 34 provinces in Indonesia from 2019 to 2021.

Keywords: Absorption of Labor Agricultural Sector · Farmers Exchange Rate · Provincial Minimum Wage · Fixed Effects Model (FEM)

1 Introduction

Development in agricultural sector is an interrelated and sustainable process between various fields and sectors in a planned manner towards a better level (Arief, 2008). National development (on agricultural) does not only focus on economic development but on all aspects of community life as a whole, including rural communities (Todaro, 2000). To realize national development, it is necessary to involve assets in the form of natural resources and human resources [1]. Thus, good development is a development that is able to reduce the number of unemployed people by creating wider job opportunities in various fields [2].

Indonesia is an agricultural country that produces food crops so it has the title of a national rice granary country. Abundant wealth if used wisely can support sustainable development [3]. Agriculture is critical to the overall national economy (Kuncoro, 2010). Syaifullah (2018) expressed his opinion, the agricultural sector is the leading sector that is able to encourage Indonesia's economic growth and is the sector that is able to absorb

the largest workforce. There is an expectation that the agricultural sector can create wider and more diverse employment opportunities.

Employment is an important element that supporting the economic development [4]. The labor's absorption in the agricultural sector is the total number of workers that can be absorbed by the particular sector. One of the industries that can encourage national and regional economic development is the agricultural sector [5]. It consists of various leading sub-sectors such as plantations, forestry, food crops, livestock, and fisheries. Currently, this sector is still the leading sector that can absorb the highest workforce [6]. Thus, agricultural sector becomes a supporting sector in the economy as a whole.

Agricultural development as a basic sector is very important to maximize the number of agricultural products to ensure fulfillment of basic needs for food and industry both domestically and abroad. Moreover, improvements in the agricultural sector can expand employment opportunities, especially in rural communities because basically the goal of economic development is to improve people's welfare in a fair and equitable manner [7]. National development is an integral part of the development of each region [8].

There has previously been research about labor absorption's analysis in cultivation sector. Novi (2022) investigated labor absorption in Aceh Province's agricultural sector. The findings indicate that GRDP has an impact on employment [9]. Another research was also conducted by Junrillah (2021), which states that GRDP, PMW, and investment have an influence on labor absorption [10]. Simanjuntak (2018), found that the GRDP had an impact on employment in this sector. Meanwhile, the farmer's exchange rate (FER) and investment have no influence on employment [11].
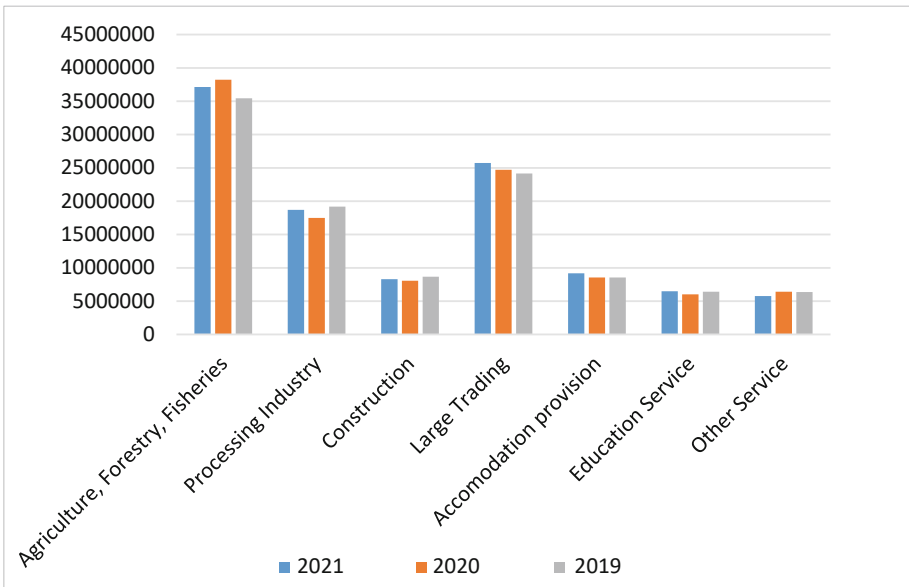

Fig. 1. Workforce Development in 2019 to 2021.

Figure 1 shows the workforce development of the 7 largest sectors in Indonesia from 2019–2021. From the figure, it can be seen that agricultural is the sector that absorbs the most labor among other sectors during the last three years. In 2019, the number of people working in the agricultural sector was 1,009,395 people. Then in the following year, it increased to 1,123,766 people. But in 2021 it will decrease by 0.97%. There was a decrease of 34,691 people working in this sector.

Seeing the contribution of the agricultural sector which has succeeded in absorbing the largest workforce in Indonesia, the researchers are interested in conducting research that aims to examine the elements that influence labor utilization in the agricultural industry in 34 provinces in Indonesia in 2019 to 2021. This research is hoped to provide benefits, broaden insight and knowledge about the agricultural sector workforce. For further researchers, this study is anticipated to serve as another source of information and empirical evidence to conduct research on similar topics so as to produce better research update.

2 Literature Review

2.1 Definition of Labor in the Agricultural Sector

The workforce is defined as total population aged 15 to 64 years old who work to produce a variety of goods or services for their own and the general public's needs [12]. Meanwhile, labor in the agricultural sector is the total population aged over 16 years old who can produce a number of products and services that successfully contribute to the agricultural sector. Absorption of labor in agriculture or cultivation is the number of jobs that have been successfully absorbed by the population in the agricultural sector [13].

The welfare of workers in the agricultural sector plays a fundamental role in ensuring availability of agricultural products. Increasing the expertise of the agricultural sector workforce is needed as an effort to increase economic growth both regionally and nationally [14]. Increased economic growth will have a direct impact on overall development. Likewise, quality development will affect labor productivity [15]. It is expected that the workforce in the sector will increase every year and can compete with other sectors in the domestic and international market.

2.2 Effect of Agricultural Sector GRDP on Labor

According to the Central Bureau of Statistics, Gross Regional Domestic Product (GRDP) is an added value that can be produced by one or all business sectors in a certain region. It can be interpreted as the total value of both goods and services final product, which produces by an economic sector in an area in a certain period. Thus, the GRDP of the agricultural sector is the total value of good and service available for production by the business sector originating from the agricultural sector in a period of one year. GRDP consists of GRDP at constant prices and GRDP at current prices. Gross Regional Domestic Product can be used as an indicator to determine the ability of an area to utilize the potentials of existing natural resources [16].

To identify the regional economy in a certain period of time, you can use the value of the gross regional domestic product as a reference [17]. The magnitude of the output

value of GRDP produced by each region is in accordance with the conditions of natural resources and production factors in that region. The ability to produce output in cultivation sector will play a role in absorbing labor as well as in carrying out agricultural production. So that the greater the output produced by GRDP, the greater the amount of workers that may be absorbed [18].

2.3 Effect of Farmer's Exchange Rate on Labor

The farmer's exchange rate is the ratio of the price index obtained by farmers to the price index paid by farmers during agricultural production sustainability. Farmers' price index is the index of prices paid by consumers for products produced by farmers. While the price index paid is the price paid by farmers to produce agricultural products, such as the purchase of fertilizers and pesticides [19].

Farmer's exchange rate is more than 100 (FER > 10), This means that farmers are paid a higher price than they are paid. This indicates that farmers are making a profit. Meanwhile, if the FER value is less than 100 (FER < 10) shows that farmers are experiencing losses. If the farmer's exchange rate is equal to 100 (FER = 100), this means that the welfare of farmers in that period is constant [20].

Farmers' welfare can be measured using the farmer's exchange rate, especially for farmers who are oriented towards the development of the agricultural sector towards progress [11]. If the welfare of farmers increases, it will encourage agricultural productivity. Thus, labor participation will increase if the welfare of farmers is guaranteed which can be reflected in the value of FER (NTP).

2.4 The Influence of Domestic Investment on Labor

Investment is the main capital in running a production. Investment activities can encourage people to maximize economic activities. Increased investment can encourage the growth of new jobs in a particular sector. Increase national income, expand employment opportunities, and improve people's welfare. Investment can come from domestic (DI) or foreign (FI/PMA). Domestic Investment (DI) is an investment made by the government or private sector originating from Indonesia. Meanwhile, Foreign Investment (FI/PMA) is investment made by foreign investors who invest in the territory of Indonesia [21].

With the investment, it will increase agricultural output now and in the future. This development will later contribute to increase the economic growth and increase the national production. With the encouragement of capital to farmers, the resulting production can increase. Thus, investment is able to create broad job opportunities to absorb more labors in the agricultural sector.

2.5 Effect of Provincial Minimum Wage on Labor

Wages are production costs incurred by producers given to workers for services that have been provided. Provincial Minimum Wage (PMW) is the lowest monthly wage consisting of basic wages and allowances, the amount of which is determined by the governor [22]. The minimum wage for each region is different depending on the respective policies that

apply in the province. The theory of labor demand positions wages as the price of labor. Wages and labor are an inseparable unit [23].

Problems that arise due to the lack of maximum absorption of labor are related to the minimum wage policy. The higher the wage, the higher the expectations of the community to be able to improve their welfare. This encourages people to look for work to get a more prosperous life. Alleviation of labor problems can be done by making policies on wage levels. Policy making takes into account the minimum wage as an effort to improve the welfare of workers [9]. If the implementation of the minimum wage goes well, unemployment will decrease and the workforce will increase.

3   Research Methods

3.1   Types, Sources and Collection of Data

The method of research used in this study is quantitative. Quantitative method produces a research method that is based on numbers and uses statistical analysis. This study makes use of panel data, which was created by combining cross section as well as data time series.

Secondary data was used in this study. This study analyzes the number of workers, GRDP (in agriculture sector), agricultural exchange rates, domestic investment (DI), and the provincial minimum wage (PMW) in 34 provinces in Indonesia in 2019 to 2021. The main source of data was obtained from Indonesia Statistics Board (www.bps.go.id). The research data were analyzed using the selected Fixed influence Model (FEM). The tools used in this study are EViews 9 and Microsoft Excel 2016.

3.2   Analysis Tools and Models

In this study, researchers used panel data regression analysis tools. Panel data regression has several advantages. First, the degree of freedom is considered as it will be greater. Second, panel data is able to overcome the problem of omitting variables (omitted-variables). The estimation stage of the regression model with panel data includes the (1) Common Effects Model (CEM), (2) Fixed Effects Model (FEM), (3)Random Effects Model (REM) approaches; selection of the best estimator with chow test and Hausman test; model goodness test; and test the validity of the influence [24].

The best model in this study is the second one (FEM) with a significance value of 1% and 10%. The panel data regression modal equation is as follows:

$$LogASL_{it} = \beta_0 + \beta_1 LogGRDP + \beta_2 FER_{it} + \beta_3 LogDI_{it} + \beta_4 LogPMW_{it} + \mu_{it}$$

Notes:

ASL   : Agricultural Sector Labor (in person).
GRDP : Agricultural Sector GRDP (billion rupiahs).
FER   : Farmer's Exchange Rate (%).
PMW   : Provincial Minimum Wage (thousand rupiah).
DI   : Domestic Investment (billion rupiah).

4 Result and Discussion

4.1 Research Analysis Results

This study analyzes the effect of research variables by looking for the best model. In panel data regression there are 3 models to test data, namely Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effect Model (REM). To find out the best model used, the Chow test and Hausman test were carried out.

Based on the above results, Chow test show the probability F value of $0.000 < (0.01)$, FEM is better than CEM. Then the Hausman test was carried out. From the Table 1, it

Table 1. Panel Data Regression Results

Variable	CEM		FEM		REM	
	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
C	1,997	0,059	9,429	0,001	4,209	0,000
$LogGRDP$	0,991	0,000	0,477	0,140	1,000	0,000
FER	-0,014	0,009	-0,005	0,098	-0,009	0,000
$LogDI$	-0,048	0,226	0,022	0,418	0,011	0,691
$LogPMW$	-0,474	0,003	0,141	0,006	0,103	0,036
R^2	0,858		0,996		0,666	
Adj. R^2	0,852		0,993		0,653	
F-stat.	146,710		404,348		48,437	
Prob. (F-Stat)	0,000		0,000		0,000	
Model Selection Test:						
(1) Chow Test.						
Cross-section F $(33,64) = 62,245$; Prob.F $= 0,000$						
(2) Hausman Test.						
Cross section random $\chi^2 (4) = 16,643$; Prob. $\chi^2 = 0,003$						

Source: secondary data (modified).

Table 2. FEM Regression Results

$LogASL_{it} = 9,429 + 0,477\ LogGRDP_{it} - 0,005\ FER_{it} + \quad 0,022\ LogDI_{it} - 0,141\ LogPMW_{it}$ $\qquad\qquad\qquad\quad (0,140) \qquad\qquad (0,098)^{***} \qquad (0,418)$ $(0,006)^*$
$R^2 = 0,996$; $DW = 2,600$; $F = 401,849$; Prob.F $= 0,000$

Source: secondary data (modified)

is known the probability value of F is 0.000 < (0.01), so the best model chosen for this research is the Fixed Effects Model (FEM) (Table 2).

4.2   Discussion

F-statistics test is used to determine the influence of independent variables on the dependent variable when they are used in conjunction. The results from the regression test showed that the F-Statistic probability value is 0.000 which is smaller than (0.01). So, it can be concluded that the GRDP of the agricultural sector, the agricultural exchange rate, domestic investment, and PMW simultaneously affect the number of agricultural workers in 34 provinces in Indonesia in 2019 to 2021.

The R-Squared Coefficient of Determination (R^2) was carried out to determine how much the independent variable's ability to explain the dependent variable was. Based on the estimation results, we found the R^2 has a value of 0.996, meaning that 99.6% of the workforce variables are influenced by the GRDP variables, agricultural exchange rates, domestic investment, and the provincial minimum wage. Other variables not included in this study account for the remaining 0.4%.

The t-test is used to assess whether the independent variable has a significant influence on the dependent variable individually or partially. The agricultural sector GRDP variable has a coefficient of 0.504 and the value of Prob. t-statistic of 0.140 is greater than (0.10). Thus, it is concluded that GRDP has no influence on the number of workers.

Moreover, this study supports the findings of Putri et al. (2022), who discovered that GDRP had no influence on employment in Central Java Province in 2016 to 2019 [25]. However, this study contradicts with the study conducted by Junrillah, et al. (2021) who reported that in Batanghari Regency the GRDP of the agricultural sector had an influence on absorption in 2000 to 2018 [10].

The value of the Gross Regional Domestic Product (GDP) is not only obtained based on the number of people working in a region or country, but there are other factors such as domestic political conditions, the world economy, etc. In 2019, all over the world including Indonesia, the Covid-19 virus emerged which caused restrictions on social activities which made it difficult for people to carry out the economic activities. The imposition of these restrictions hinders market access thereby limiting labor productivity [26]. The level of community productivity is low and public health is declining [27]. Thus, it affects the value of GRDP in that year. So that it can be concluded that the amount of GRDP in the agricultural sector has no influence on employment in 2019–2021 in 34 provinces in Indonesia.

The Fixed Effects Model (FEM) shows that the agricultural exchange rate variable has a significant negative influence on the number of agricultural workers. Where the probability value of t-statistic is 0.098 smaller than (0.10) with a coefficient value of -0.005. This means that if the agricultural exchange rate increases by 1%, the number of workers decreases by 0.005%.

Previous research by Avina (2017) demonstrates that the agricultural exchange rate has a negatively significant influence on agricultural labor productivity in the provinces of Sumatra between 2010 and 2014 [28]. A similar study was also found by Halim (2015) who found that farmers' exchange rates have a substantial impact on employment in the sector in Aceh Province [29]. However, the results of this analysis are not similar to

the findings of Simanjuntak (2018), it claims that the agricultural exchange rate had no substantial influence on agricultural employment in Jambi Province from 1995 to 2015 [11].

Farmer's exchange rate describes the level of welfare of farmers. The farmer's exchange rate is generated from the value of the price obtained by the farmer against the price that must be issued by the farmer. The value of the price received by farmers and the value of the production costs incurred for production will affect the interest of the population to work. Thus, FER affects the absorption of labor.

The estimation of the validity's results of the effect, the Domestic Investment (DI) variable has a probability value of t-statistic 0.398 greater than (0.10), meaning that changes in domestic investment have no influence on the number of agricultural workers. This research is supported by Lina (2020) who shows that investment has no significant influence on agricultural resources/employment in Sumbawa Regency [30]. Similar results were also found by Wildan (2018) which stated the same thing [31]. However, this study contradicts the research by Octaviani (2021), which states that investment has an influence on employment.

The amount of labor offered is not proportional to the size of the available jobs. Domestic investment has not been able to encourage capital formation in the agricultural sector so that the workforce has not been able to be fully absorbed. In Indonesia in 2019 to 2021 there was a covid-19 outbreak that affected domestic investors to invest so that the investment value in that year tended to decrease. Likewise, investment in the agricultural sector that has not been maximized results in a lack of capital for farmers to produce. Therefore, domestic investment has no significant influence on employment in the agricultural sector.

The Provincial Minimum Wage (PMW) variable with a t-statistical probability value of 0.006 is smaller than (0.01), so that PMW has a significant and negative influence on the number of workers in the agricultural sector. The coefficient value is 0.142, meaning that if the provincial minimum wage increases by 1%, the number of the agricultural sector will increase by 0.142%.

This study's supported by Atiyatna (2016), who suggests that the provincial minimum wage affects the agricultural sector workforce in South Sumatra Province [32]. This research is also supported by Manurung (2020) who finds that PMW has an influence on employment in North Sulawesi in 2007 to 2019 [33]. Dewi, Rezky Fatma (2016), found that the PMW has the same influence on employment in Tanjung Jabung Barat Regency in 2000 to 2013 [34]. A similar study was also found by Basri and Adi (2021) who stated that the minimum wage has an influence on employment in Jambi Province [35]. However, this study contradicts the findings of Pangastuti (2015), which showed that the minimum wage's has no effect's on employment in Central Java Province in 2008–2012 [18].

Labor and wages are an inseparable unit. The minimum wage affects the welfare of the workforce, the interests of workers, and also wider employment opportunities. If wages increase, job seekers will also increase. Thus, the provincial minimum wage has an impact on agricultural employment.

5   Conclusion

The model was chosen based on the findings of panel data regression analysis using Fixed Effects Model (FEM) and the validity test of the influence on the significant (α) of (0.01) and (0.10), it can be concluded that together the agricultural sector GRDP variable, farmer's exchange rate (FER), provincial minimum wage (PMW), and domestic investment (DI) have an influence on employment or the number of workers in the agricultural sector. Meanwhile, individually, the FER variable has a negative and significant influence on the agricultural employment. While the PMW has a positive and significant influence on the number of workers in the agricultural sector.

The government is expected to be involved in efforts to increase the quantity and quality of agricultural human resources, from production to distribution of agricultural products. The government should make regulations so that employment opportunities and employment in the agricultural sector are more optimally absorbed and pay attention to the existence of farmers by making policies that are able to ensure the welfare of workers in the agricultural sector.

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