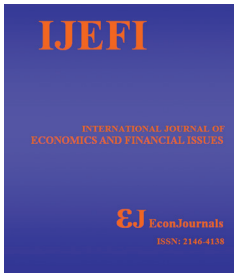

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Impact of the Agricultural Sector on Unemployment, Inequality and Rural Poverty: A Panel Regression Analysis in Indonesian Provinces

Suparman Suparman[1]*, Maskuri Sutomo[1], Chairil Anwar[1], Fahrudin Zain Olilingo[2]

[1]Department of Economics, Faculty of Economics and Business, Universitas Tadulako, Palu, Indonesia, [2]Department of Economics, Faculty of Economics, Universitas Negeri Gorontalo, Gorontalo, Indonesia. *Email: suparman.feuntad@gmail.com

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ABSTRACT

This study examined how the agricultural sector impacted unemployment, income inequality, and rural poverty across Indonesia's provinces from 2015 to 2021. Using data from the Central Bureau of Statistics (BPS) and a panel regression model, the research analyzed the relationships between these factors. It also explored the structural changes caused by the COVID-19 pandemic in 2020-2021. The findings showed that the agricultural sector's Gross Regional Domestic Product (GRDP), farmer exchange rates, and informal labor significantly influenced unemployment and income inequality in rural areas. However, the pandemic did not have a major effect on income inequality or poverty levels in these areas. The GRDP and value-added in agriculture played a crucial role in reducing rural poverty. The findings also showed that the COVID-19 pandemic did not directly increase or decrease the number of poor people, but it affected informal agricultural workers due to physical distancing measures. The research highlighted the agricultural sector's importance in addressing unemployment and inequality during the pandemic in Indonesia.

Keywords: Unemployment, Agricultural Sector, Inequality, Rural Poverty, Structural Break
JEL Classifications: Q12, O15, E24

1. INTRODUCTION

Indonesia is a country dominated by the availability and reliance on the resources of the Agricultural Sector. However, on the flip side, it remains a country grappling with a complex issue: the persistently ongoing open unemployment rate. In general, unemployment is understood as a classical developmental problem, and this issue is faced by nearly every nation, especially developing countries. Statistically, it is indicated that service-oriented workers and industries in developing countries contribute to about two-thirds of unemployment, according to Standing (1983). Unemployment is more severe in underdeveloped countries and developing nations.

Unemployment is regarded as an inhumane economic issue, arising as a consequence of a country's inability to effectively harness or develop the potential of its workforce (Baah-Boateng, 2016). It is a primary cause of socioeconomic challenges faced by numerous countries in the African region, particularly in South Africa (Olowu et al., 2019). These findings align with Douglason and Gbosi's (2006) research, which highlights fundamental structural changes in Nigeria's economy post-independence. Despite the nation's evolution over time, it has struggled to generate better economic conditions and sustainable development. Unemployment conditions worsened during the oil-rich era, with economic growth and substantial profits concentrated in urban areas, benefiting only those who could improve their living standards through urban employment and wages.

Currently, unemployment is not merely an issue plaguing most developing countries; it has become a ticking time bomb for

entire nations and a persistent concern for governments at various levels (Ayinde et al., 2016; Fawole and Ozkan, 2019). Efforts to mitigate the negative impacts of unemployment, which have led to unemployment alleviation becoming a major concern in developing and underdeveloped nations, including Nigeria, are crucial. The unprecedented commitment of governments to seriously address job creation needs presents a favorable opportunity to implement strategies and policies for massive job creation, particularly within the agricultural sector.

According to Steger (2000), the reduction of unemployment rates occurring in certain situations is a result of a relatively favorable increase in Gross Domestic Product (GDP) within the Agricultural Sector. This study demonstrates that the increased value added by the agricultural sector to the GDP can lead to higher average economic growth by boosting GDP growth, increasing investment, and rapidly reducing unemployment. Several researchers have explored the relationship between economic variables and agriculture, as highlighted by Tijani et al. (2015). They examined government expenditures on agriculture in Nigeria and their influence on economic growth, using a time series econometric model and error correction modeling (ECM) during the period from 1970 to 2006. The research states that agriculture has a positive correlation with economic growth and budget allocation through capital spending, supported by financial performance development, and has broad potential to enhance economic growth.

Meanwhile, income inequality among individuals is a social and political issue prevalent in the agricultural sector. This disparity is particularly prominent in the agricultural sector due to the direct payment proportions of agricultural income sharply increasing over time (Schmid et al., 2006; Von Witzke and Noleppa, 2007; Mishra et al., 2009). Researchers assert that the responsibility of policymakers for income distribution among farmers has heightened the distributive effect of income composition changes, as agricultural policy reforms have received insufficient attention. In recent years, a significant amount of literature has focused on researching inequality observed in rural areas in the Western world. This can be seen in studies conducted by Reimer (2004), which emphasize restricted access to village assets such as housing; Satsangi et al. (2010), Gkartzios and Shucksmith (2015), and Sutherland (2019) focusing on transportation; Shergold and Parkhurst's (2012) research on the digital divide (internet and communication technology); and Park's study (2017) addressing welfare issues.

The agricultural sector is believed to be one of the buffer sectors in facing economic crises, including health crises (such as the COVID-19 pandemic) in Indonesia. Therefore, this research becomes highly significant in testing the strength of the agricultural sector in supporting job creation and preventing deeper crises due to the COVID-19 pandemic. The health crisis caused by COVID-19 has impacted the employment and unemployment conditions in Indonesia, according to data from the Central Bureau of Statistics (BPS). The labor force in August 2020 totaled 138.22 million people, an increase of 2.36 million people compared to August 2019. Alongside the rise in the labor force, the Labor Force Participation Rate (LFPR) also increased by 0.24% points. Meanwhile, the Open Unemployment Rate (OUR) was 7.07%, an increase of 1.84% points compared to August 2019. However, the employed population decreased by 0.31 million people in August 2020. The primary sector experiencing the largest increase in percentage was the agricultural sector, by 2.23% points.

Referring to the BPS data, there were 29.12 million people or 14.28% of the working-age population affected by COVID-19, comprising 2.56 million people unemployed due to COVID-19, 0.76 million people not in the labor force (NILF) due to COVID-19, 1.77 million people not working due to COVID-19, and 24.03 million people employed but experiencing reduced working hours due to COVID-19. On the other hand, a challenge faced by the agricultural sector is its low productivity, which subsequently affects the welfare of workers in the sector. The impact of COVID-19, based on BPS data in August 2020, resulted in an average monthly wage of only 1.97 million Indonesian Rupiah for laborers in the agricultural sector. This figure is below the national average monthly wage for laborers, which had reached 2.76 million Indonesian Rupiah. This means that during the COVID-19 pandemic period, there was a decrease in the average income of laborers in Indonesia.

Based on the BPS data for the year 2021, the Gini ratio in rural areas as of September 2021 was 0.314. This figure decreased compared to the Gini ratio in March 2021, which was 0.315. Meanwhile, the level of inequality indicated by the Gini ratio in September 2020 was 0.319. Moreover, the percentage of the rural population living in poverty was 13.10% in March 2021, which decreased to 12.53% in September 2021. This research aims to examine the impact of the agricultural sector on the level of open unemployment, income inequality, and rural poverty in the provinces of Indonesia during the period from 2015 to 2021. A novel aspect of this study is testing the influence of structural changes (structural break) due to the COVID-19 pandemic in the years 2020-2021.

2. LITERATURE REVIEW

Unemployment is a concept with multiple interpretations and is viewed based on the concepts presented by researchers (Fawole and Ozkan, 2019). However, generally speaking about the definition of unemployment, according to the International Labour Organization (ILO), unemployment refers to individuals who are economically active and willing to work but do not have a job, including those who have lost their jobs and those who are voluntarily unemployed (World Bank, 1998). The same notion is expressed by Gbosi (2006), defining unemployment as a situation where individuals who are willing to work at prevailing wages cannot find employment. Unemployment is categorized as a serious obstacle to social progress. Moreover, unemployment represents a wastage of a country's labor resources, leading to decreased welfare due to lower output. Unemployment also results in lower income and well-being. Several researchers point out that unemployment is a significant issue in various countries, especially in African nations (Rama, 1998; ToluWase, 2010), with specific research conducted in Nigeria (Oladeji, 1994; Umoh, 1996; ToluWase, 2010).

In general, unemployment poses a threat to economic resources or as a welfare loss, diminishing its potential as a source of social and political instability. With a substantial magnitude, the proportion of underutilized labor force leads to total output falling below its potential, resulting in costs manifested in the form of lost output. Ogbe (1986) identifies these costs, including the loss of significant human resources, whether in terms of energy or acquired knowledge and skills that remain untapped. Furthermore, it has economic welfare costs when unemployed individuals become demoralized and suffer from income loss and loss of self-esteem during extended periods of unemployment. In any country with a very high unemployment rate, it leads to various social problems such as corruption and theft (Ward, 2015).

Nwagwu (2014) categorizes unemployment as economically active individuals who do not have a job but are willing and actively seeking employment, including those who have lost their jobs or those who are voluntarily taking a break from work. Meanwhile, Shadare and Elegbede (2012) describe unemployment as individuals who are part of the workforce, able to work, but unable to secure employment, as well as those who have lost their jobs and are actively seeking reemployment. Fadeyi et al. (2015) examined the long-term relationship between macroeconomic fundamentals, agricultural value added to GDP, and agricultural trade balance in South Africa using cointegration analysis and vector error correction model (VECM). Their findings revealed that in the long run, exchange rate, agricultural production price, agricultural production, and disposable income all have significant impacts on the trade balance.

Bravo-Ortega and Lederman (2005) conducted a study using panel data with the generalized method of moments and Granger causality technique with data from 1960 to 2000 to test the effects of agricultural growth. Their findings indicated that in developing countries, a positive change in agricultural GDP contributes to non-agricultural GDP, while the opposite scenario occurs in developed countries. Nevertheless, the general conclusion that food security is key to economic stability, and agriculture can be an important factor in enhancing growth, the extent to which agricultural value can contribute to a country's economic growth remains uncertain (Agboola and Bacilar, 2014). Additionally, research was also conducted by Gardner (2005), Dethier and Effenberger (2012) who also examined the relationship between the agricultural sector and other economic variables. Other studies explored the relationship between the agricultural sector and unemployment in South Africa (Yu, 2013; Festus et al., 2016). The findings of the research conducted by Festus et al. (2016) indicated that during the post-apartheid events in South Africa, the unemployment rate increased between 1995 and 2015 due to an insufficient number of available jobs compared to the number of job seekers.

3. METHODOLOGY

This study utilizes secondary data sourced from the Central Bureau of Statistics (BPS) for the 2015-2021 period, with data based on the levels of provinces in Indonesia. Indonesia, a vast archipelagic nation, is organized into several provinces, each classified based on the major islands that constitute the country. The provincial divisions align with the geographical regions, reflecting diverse geographical landscapes and socio-economic conditions across the Indonesian archipelago. Among these provinces, based on the latest division in 2021, there are 34 provinces in Indonesia. Sumatra encompasses regions such as Aceh, North Sumatra, and West Sumatra, while Java includes populous areas like Jakarta and Central Java. Borneo, known as Kalimantan, is divided into West, Central, South, and East Kalimantan. Sulawesi comprises provinces such as North Sulawesi and South Sulawesi. Bali and Nusa Tenggara encompass Bali, West Nusa Tenggara, and East Nusa Tenggara. The Maluku Islands include Maluku and North Maluku, and Papua and West Papua cover the easternmost regions of West Papua and Papua.

The equation model that examines the relationship between the agricultural sector and unemployment, income inequality, and poverty adopts the model developed by (Dethier and Effenberger, 2012; Todaro and Smith, 2015; Gollin et al., 2014; De Janvry and Sadoulet, 2010; Chen and Ravallion, 2007). The analytical method used is the panel regression model, where the panel data regression equation is employed with three common effect model (CEM) methods: fixed effect model (FEM), random effect model (REM), and analysis is carried out using a simultaneous equation model. The best estimation model to predict the relationship of each of these variables is as follows (Table 1).

The operational definitions of the variables used in this model are as follows:

1. UN_RATE (Unemployment Rate): This represents the open unemployment rate, indicating the percentage of unemployed individuals in 33 provinces in Indonesia, excluding the DKI Jakarta province, for the years 2015-2021 (expressed in percentage form).
2. GR_RURAL (Rural Gini Ratio): This variable is the Gini ratio or Gini coefficient, illustrating the level of inequality in rural areas across 33 provinces in Indonesia, excluding DKI Jakarta, for the period 2015-2021 (presented in ratio form).
3. P0_RURAL (Rural Poverty): This variable represents the number of individuals living in poverty in rural areas within the 33 provinces of Indonesia, excluding DKI Jakarta, from 2015 to 2021 (measured in units of thousands of people).
4. AGRI (agriculture sector): This variable stands for the value of the 2010 Gross Regional Domestic Product (GRDP) at constant prices in the agricultural sector across 33 provinces in Indonesia, excluding DKI Jakarta, for the years 2015-2021 (measured in billions of rupiah).
5. AGRI-VA (agriculture value added): It represents the value added in the agricultural sector in 33 provinces in Indonesia, excluding DKI Jakarta, from 2015 to 2021 (measured in billions of rupiah).
6. AGRI_IW (agriculture informal worker): This variable identifies informal workers employed in the agricultural sector in 33 provinces in Indonesia, excluding DKI Jakarta, from 2015 to 2021 (measured in billions of rupiah).
7. FER (farmer exchange rate): This variable reflects the farmer exchange rate, indicating the difference between the value received and the value paid by farmers in 33 provinces in

Table 1: Panel regression equation

Model 1	$log\ (Un\_Rate)_{it}=\gamma it+\gamma_1 log\ (Agri)_{it}+\gamma_2 log\ (Agri\_VA)_{it}+\gamma_3 log\ (Agri\_IW)_{it}+\gamma_4 log\ (FER)_{it}+\gamma 5DCovid\_1_{it}+\varepsilon_{it}$
Model 2	$log\ (GR\_Rural)_{it}=\gamma it+\gamma_1 log\ (Agri)_{it}+\gamma_2 log\ (Agri\_VA)_{it}+\gamma_3 log\ (Agri\_IW)_{it}+\gamma_4 log\ (FER)_{it}+\gamma 5DCovid\_1_{it}+\varepsilon_{it}$
Model 3	$log\ (P0\_Rural)_{it}=\gamma it+\gamma_1 log\ (Agri)_{it}+\gamma_2 log\ (Agri\_VA)_{it}+\gamma_3 log\ (Agri\_IW)_{it}+\gamma_4 log\ (FER)_{it}+\gamma 5DCovid\_1it+\varepsilon it$
Model 4	$log\ (Agri)_{it}=\gamma it+\gamma_1 log\ (Agri\_VA)_{it}+\gamma_2 log\ (Agri\_IW)_{it}+\gamma_3 log\ (FER)_{it}+\gamma_4 DCovid\_1_{it}+\varepsilon_{it}$
Model 5	$log\ (Agri\_IW)_{it}=\gamma it+\gamma_1 log\ (Agri\_VA)_{it}+\gamma_2 log\ (FER)_{it}+\gamma_3 DCovid\_1_{it}+\varepsilon_{it}$

Indonesia, excluding DKI Jakarta, for the years 2015-2021 (expressed in index form).

8. DCOVID_19: This is a dummy variable indicating the occurrence of the COVID-19 pandemic, where 0 denotes no COVID-19, and 1 signifies the presence of COVID-19.

4. EMPIRICAL RESULTS

4.1. Model 1 Estimation Results

Based on empirical results using the panel regression equation model that incorporates these three models, the estimated results of panel regression model 1 are obtained and described in Table 2.

Referring to the outcomes of panel regression model 1, it can be stated that the most suitable model is the fixed effect model (FEM), as evidenced by its goodness of fit values (the highest R-squared value, F-statistic). The FEM model successfully estimates the effect of independent variables on the dependent variable.

The LOG(AGRI) variable demonstrates a negative and significant effect on the LOG(UN_RATE) variable. This implies that a higher GRDP value at constant prices of 2020 of the agricultural sector at the provincial level in Indonesia corresponds to a lower open unemployment rate at the provincial level.

The LOG(FER) variable exhibits a negative and significant effect on the LOG(UN_RATE) variable. In other words, a higher farmer exchange rate in the agricultural sector at the provincial level in Indonesia corresponds to a lower open unemployment rate at the provincial level.

The DCOVID_19 variable shows a positive and significant effect on the LOG(UN_RATE) variable. This means that a higher incidence of the COVID-19 pandemic at the provincial level in Indonesia corresponds to a higher open unemployment rate at the provincial level.

Furthermore, based on the results of this estimation, it is evident that the structural break condition (COVID-19) that occurred in Indonesia during the last 2 years (2020-2021) has had an impact on increasing open unemployment.

4.2. Model 2 Estimation Results

Based on the empirical results using the panel regression equation model encompassing three models, the estimated panel regression model 2 results are obtained and described in Table 3.

Table 2: Panel model 1 regression results

Independent variable	Independent variable: LOG (UN-RATE)		
	CEM	FEM	REM
C	6.004660	17.42175	7.738353
LOG (AGRI)	0.036163	−1.261568***	−0.047423
LOG (AGRI_IW)	−0.620845**	−0.440711	−0.554034
LOG (AGRI_VA)	0.112749**	0.026011	−0.041518
LOG (FER)	−0.876432**	−0.359768**	−0.541598***
DCOVID_19	0.147346***	0.252144***	0.167332***
R-squared	0.135046	0.840918	0.139071
Adjusted R-squared	0.115652	0.810101	0.119768
F-statistic	6.963413	27.28750	7.204516

***) Significant at α=1%; **) Significant at α=5%; *) Significant at α=10%

Table 3: Panel model 2 regression results

Independent variable	Independent variable: LOG (GR-RURAL)		
	CEM	FEM	REM
C	−4.814097	−0.462064	−1.530082
LOG (AGRI)	0.003366	−0.094194*	−0.011994
LOG (AGRI_IW)	0.790965***	0.258857**	0.344292***
LOG (AGRI_VA)	0.024256	−0.017187	−0.023028**
LOG (FER)	−0.076873	−0.133786***	−0.141685***
DCOVID_19	−0.033144*	−0.009862	−0.016472**
R-squared	0.257005	0.920410	0.171395
Adjusted R-square	0.240346	0.904992	0.152816
F-statistics	15.42730	59.69756	9.225396

***) Significant at α=1%; **) Significant at α=5%; *) Significant at α=10%

Referring to the outcomes of panel regression model 2, it can be stated that the most effective model is the fixed effect model (FEM), as evidenced by its goodness of fit values (the highest R-squared value, F-statistic). The FEM model successfully estimates the effect of independent variables on the dependent variable, as follows.

The LOG(AGRI) variable exhibits a negative and significant effect on the LOG(GR_RURAL) variable. This indicates that a higher GRDP value at constant prices of 2020 in the Agriculture Sector at the provincial level in Indonesia correlates with a lower level of income inequality at the provincial level.

The LOG(AGRI_IW) variable demonstrates a positive and significant effect on the LOG(GR_RURAL) variable. In other words, a higher number of informal workers in the agricultural sector at the provincial level in Indonesia corresponds to a higher level of income inequality at the provincial level.

The LOG(FER) variable shows a negative and significant effect on the LOG(GR_RURAL) variable. This implies that a higher exchange rate of farmers in the agricultural sector at the provincial level in Indonesia is associated with a lower level of income inequality at the provincial level. Furthermore, based on these estimations, it is evident that the structural break of the COVID-19 pandemic in Indonesia over the past 2 years (2020-2021) has not had an impact on increasing or decreasing the level of income inequality in rural areas in Indonesia.

4.3. Model 3 Estimation Results

Based on the empirical results using the panel regression equation model that incorporates these three models, the

estimated results of panel regression model 3 are obtained and described in Table 4.

Referring to the outcomes of panel regression model 3, it can be stated that the most suitable model is the fixed effect model (FEM), as evidenced by its goodness of fit values (the highest R-squared value, F-statistic). The FEM model successfully estimates the effect of independent variables on the dependent variable.

The LOG(AGRI) variable exhibits a negative and significant effect on the LOG(P0_RURAL) variable. This implies that a higher GRDP value at constant prices of 2020 of the agricultural sector at the provincial level in Indonesia corresponds to a lower number of poor people at the provincial level.

The LOG(AGRI_VA) variable demonstrates a negative and significant effect on the LOG(P0_RURAL) variable. In other words, a higher added value (value added) in the agricultural sector at the provincial level in Indonesia corresponds to a lower number of poor people at the provincial level.

Furthermore, based on the results of this estimation, it is evident that the structural break of the COVID-19 pandemic in Indonesia over the past 2 years (2020-2021) has not had an impact on increasing or decreasing the number of poor people in rural areas in Indonesia.

4.4. Model 4 Estimation Results

Based on the empirical results using the panel regression equation model that incorporates these three models, the estimated results of panel regression model 4 are obtained and described in Table 5.

Referring to the results of panel regression model 4, it can be argued that the most suitable model is the fixed effect model (FEM), as evidenced by its goodness of fit values (the highest R-squared value, F-statistic). The FEM model successfully estimates the effect of independent variables on the dependent variable.

The LOG(AGRI_VA) variable shows a positive and significant effect on the LOG(AGRI) variable. This implies that a higher added value (value added) in the agricultural sector at the provincial level in Indonesia corresponds to a higher GRDP value at constant prices of 2010 of the agricultural sector at the provincial level.

The LOG(FER) variable exhibits a positive and significant effect on the LOG(GR_AGRI) variable. In other words, a higher exchange rate of farmers in the agricultural sector at the provincial level in Indonesia corresponds to a higher GRDP value at constant prices of 2010 of the agricultural sector at the level of provinces in Indonesia.

This condition indicates that the increase in the GRDP value at constant prices of 2010 of the agricultural sector by Provinces in Indonesia is largely determined by changes or increases in value added and farmer exchange rates in the agricultural sector in Indonesia.

4.5. Model 5 Estimation Results

Based on the empirical results using the panel regression equation model that incorporates these three models, the estimated results of panel regression model 5 are obtained and described in Table 6.

Referring to the results of panel regression model 5, it can be argued that the most suitable model is the fixed effect model (FEM), as evidenced by its goodness of fit values (the highest R-squared value, F-statistic). The FEM model successfully estimates the influence of independent variables on the dependent variable, namely as follows:

The DCOVID_19 variable exhibits a positive and significant effect on the LOG(AGRI-IW) variable. This means that the higher the number of cases of the COVID-19 pandemic at the provincial level in Indonesia, the lower the number of informal workers working in the agricultural sector at the provincial level in Indonesia.

This condition arises due to restrictions on physical activity (physical distancing) imposed by the government with various criteria and levels of restrictions on provinces in Indonesia, significantly reducing activities in the agricultural sector at the provincial level. This condition demonstrates that the COVID-19

Table 4: Panel model 3 regression results

Independent variable	Independent variable: LOG (P0_RURAL)		
	CEM	FEM	REM
C	−13.47308	10.54913	3.511583
LOG (AGRI)	0.938922***	−0.372490***	0.324489
LOG (AGRI_IW)	4.494482***	−0.074871	0.276273
LOG (AGRI_VA)	−0.517936***	−0.064316**	−0.127556
LOG (FER)	−0.273966	0.053747	−0.037433
DCOVID_19	−0.087112	−0.018898	−0.067931
R-squared	0.823171	0.996793	0.210516
Adjusted R-squared	0.819206	0.996172	0.192815
F-statistic	207.6212	1604.562	11.89261

***) Significant at α=1%; **) Significant at α=5%; *) Significant at α=10%

Table 5: Panel model 4 regression results

Independent variable	Independent variable: LOG (AGRI)		
	CEM	FEM	REM
C	10.90603	6.752474	6.783862
LOG (AGRI_IW)	−1.745481**	−0.009038	−0.017185
LOG (AGRI_VA)	−0.109551	0.105840***	0.105782***
LOG (FER)	1.931315**	0.323973***	0.325080***
R-squared	0.038619	0.996712	0.267637
Adjusted R-squared	0.025801	0.996116	0.257872
F-statistic	3.012769	1671.814	27.40816

***) Significant at α=1%; **) Significant at α=5%; *) Significant at α=10%

Table 6: Panel model 5 regression results

Independent variable	Independent variable: LOG (AGRI_IW)		
	CEM	FEM	REM
C	6.600553	4.639905	4.813343
LOG (AGRI_VA)	−0.099373***	−0.002359	−0.011183*
LOG (FER)	−0.082183	−0.029904	−0.033597
DCOVID_19	0.030976***	0.011554***	0.013271**
R-squared	0.353571	0.930566	0.039937
Adjusted R-squared	0.345028	0.918103	0.027249
F-statistic	41.38660	74.66897	3.147616

***) Significant at α=1%; **) Significant at α=5%; *) Significant at α=10%

pandemic caused a structural break in the agricultural sector, resulting in a decrease in the workforce engaged in that sector.

5. CONCLUSION

Several important conclusions can be drawn from the estimation results and findings in this study. The Gross Regional Domestic Product (GRDP) of the agricultural sector, farmer exchange rates, and the COVID-19 pandemic, either partially or jointly, have had a significant effect on the open unemployment rate at the provincial level in Indonesia.

Additionally, the GRDP of the agricultural sector, informal labor in the agricultural sector, and farmers' exchange rates, either partially or jointly, have a significant impact on the level of income inequality in rural areas at the provincial level in Indonesia. However, the COVID-19 pandemic that occurred has not significantly affected the distribution of income in rural areas. Moreover, the GRDP of the agricultural sector and value-added in the agricultural sector, either partially or jointly, have a significant effect on the number of poor people in rural areas at the provincial level in Indonesia. Notably, the COVID-19 pandemic has not had an impact on increasing or decreasing the number of poor people in rural areas in Indonesia. Furthermore, value-added and farmer exchange rates in the agricultural sector at the provincial level in Indonesia, either partially or jointly, affect the GRDP of the Indonesian agricultural sector. Lastly, the COVID-19 pandemic that occurred at the provincial level in Indonesia has affected the informal workforce working in the agricultural sector. This impact is attributed to the COVID-19 pandemic in each province, leading to the imposition of physical distancing measures.

The theoretical implications of this research are significant for understanding the dynamics between the agricultural sector, socio-economic factors, and external shocks, especially the COVID-19 pandemic, in the Indonesian context. These findings highlight the complex relationship between the agricultural sector's Gross Regional Domestic Product (GRDP), farmer exchange rates, and the COVID-19 pandemic, underscoring their collective impact on open unemployment rates at the provincial level. Similarly, this research emphasizes the influence of agricultural GDP, informal labor, and farmer exchange rates on income inequality in rural areas, providing insight into the multifaceted nature of this relationship. The insignificant impact of the COVID-19 pandemic on income distribution in rural areas indicates the resilience or adaptability of rural economic structures to external shocks. Furthermore, this study underscores the role of the agricultural sector in determining the prevalence of poverty in rural areas, with the COVID-19 pandemic not significantly altering this dynamic.

This study's limitations stem from its reliance on secondary data obtained from the Central Bureau of Statistics (BPS) for the 2011-2020 period, focusing on the provinces of Indonesia. While the data encompass socio-economic conditions at the provincial level across Indonesia, the study's scope is limited to the available data and may not capture more recent developments after the economic growth recovery following the COVID-19 pandemic. Furthermore, the equation model, adopting well-established models developed by (Dethier and Effenberger, 2012; Todaro and Smith, 2015; Gollin et al., 2014; De Janvry and Sadoulet, 2010; and Chen and Ravallion, 2007), contributes to the study's robustness. However, the research acknowledges that other factors influencing the relationship between the agricultural sector and socio-economic indicators may not be fully accounted for. Future research endeavors could explore additional variables and employ more granular data to enhance the depth and accuracy of the findings, providing a more comprehensive understanding of the intricate dynamics at play.

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