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Effect of the farmer term of trade and farmworkers wages on rural unemployment and poverty in Indonesia

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ABSTRACT

This study aims to determine the determinants of the welfare of agricultural sector workers who come from poor households in rural areas. The exchange rate of farmers and the wages of farm laborers will affect the level of employment in the agricultural sector, which in turn will affect the level of rural poverty. The methodology used in this study uses a panel data regression model with a recursive equation model. The best model for unemployment estimation is the random effect model, while the best model for poverty estimation is the fixed effect model. The results showed that the daily wage of farm laborers had a significant negative effect on unemployment. This may be due to the fact that higher wages will increase the number of workers who are willing to work in the agricultural sector, so unemployment will fall. While the unemployment variable has a significant positive effect on the level of rural poverty. The practical implication of these research findings is that to reduce poverty in rural areas, efforts from the government are needed to increase the wages of farm laborers, as the government sets minimum wages in the formal sector. The higher daily wages of agricultural laborers will attract unemployed people in villages to work in the agricultural sector.

Contribution/ Originality: This study discusses topical rural poverty and the agricultural sector. This research uses a recursive model in the estimation equation. This is done with the understanding that the impact of farm labor pay rates on rural poverty is not direct but rather occurs through the rural unemployment rate initially.

1. INTRODUCTION

Poverty is related to income level, social, environmental, and even empowerment aspects and participation levels (Nanga, 2006). Therefore, poverty should not only be viewed from the perspective of low income but also from many interrelated aspects. Consequently, poverty should be understood to be multidimensional. In other words, poverty can be measured in two dimensions: the income or wealth dimension and the non-financial dimension. Moreover, poverty is caused by isolation. Many poor people are economically powerless because they are remote and isolated (Ginanjar, 2006). The poverty reduction trend happens in Indonesia (Yani, Restiatun, & Suradi, 2022). However, there is a high disparity between poverty in rural and urban areas. The poverty in rural areas is usually reflected in a sizeable poor household population (Julius & Bawane, 2011), with the main livelihood as farmers (Abro, Alemu, & Hanjra, 2014; Rodríguez-Pose & Hardy, 2015; Warto, 2015). Meanwhile, in Africa, it is estimated that 75% of the population living in extreme poverty lives in rural areas (Livingston, Schonberger, & Delaney, 2011). In Indonesia, the poverty rate in rural areas reaches 12.53 percent, while in cities, it reaches 7.60 percent. Nevertheless, the village's

decrease in poverty is faster than in the city. The poverty rate in villages decreases by 0.57 percent, while the poverty rate in cities decreases by 0.29 percent (Ulya, 2022). There are a great number of poor people or households involved in agricultural activities in rural areas, so attention to the farmers' welfare is considered very strategic (Saragih, 2017). According to Ruauw (2010), most of the Indonesian population employs existing natural resources to meet their needs as farmers. So the role of the government in the development of the agricultural sector is needed to reduce rural poverty (see Purnomo, Sari, Emawati, & Rahayu (2023)). However, there is very little research focusing on the role of the agricultural sector in economic development and poverty alleviation (Cervantes-Godoy & Dewbre, 2010).

The poverty rate is usually in line with the unemployment rate. If the unemployment rate falls, the poverty rate will also drop. The number of people living in poverty would have been reduced by about 10 percent if all unemployment among household heads had been eliminated (Corcoran & Hill, 1980). Based on data from the Central Bureau of Statistic of Indonesia (2020), the number of open jobs in August 2019 amounted to 8.13 million (5.23%), and in August 2020, it rose to 9.77 million (7.07%). An increased amount of poverty follows the rise in the unemployment rate. The total number of poor people in Indonesia in September 2019 was 24.79 million (9.22%), and in September 2020, it climbed up to 27.55 million (10.19%). The Central Bureau of Statistic of Indonesia (2020) noted that 49.41% of poor households earn their livelihoods from the agricultural sector. When compared to other sources of income that poor households own, this one is the highest.

Rural unemployment is generally related to the availability of occupations in rural areas, especially agriculture. It is related to the income obtained from working as a farmer. The level of wages and prices of agricultural commodities is a determining factor in the demand and supply of labour in rural areas. Based on the Central Bureau of Statistics data in 2019, the open unemployment rate in rural areas was 3.92%, and the urban unemployment rate was 6.29%. In 2020, the urban unemployment rate moved upward to 8.98%, and the rural unemployment rate amounted to 4.71%. In 2019, the rural poverty rate was 12.60%, and the urban poverty rate was 6.56%. Furthermore, in 2020, there was a decrease in the rural poverty rate to 13.20%, while the urban poverty rate increased to 7.88%. High unemployment will increase poverty (Rohmah, Suratno, & Kuswanto, 2021). This rural poverty is inseparable from the low wages of farm workers in rural areas (Basriwijaya & Maryoni, 2015). This low wage for farmworkers is certainly inseparable from the low exchange rate of agricultural commodities. On the other hand, high farmworkers' wages will affect the low level of labour absorption and increase unemployment and rural poverty (Bicerli & Kocaman, 2019). But Hasiholan, Hamzah, Sofilda, & Hariyanti (2023) found that the wage rate has a negative and significant effect on the unemployment rate. However, there are differences in sensitivity, both in magnitude and direction, between wage rates and employment or unemployment in the agricultural and non-agricultural sectors (see Gallipoli, Yedid-Levi, & Fonseca (2016)).

The relationship between poverty, trade, and agriculture is very complex. The agricultural sector has a vital role in the lives of poor households, both as the primary source of livelihood and as a staple consumption expenditure. Trade in agricultural and non-agricultural commodities will determine poverty levels and food sovereignty (FAO, 2005). An indicator of decent living in rural areas is the farmers' term of trade (FToT). The Farmers' term of trade will determine the level of consumption expenditure, which is determined by the ratio of the price to be paid for goods and services consumed by the farmers to the level of income received by the farmers and labourers. If the farmers' term of trade has a downward trend, the farmers' welfare will not be achieved (Central Bureau of Statistic of Indonesia, 2020). Farmers' wages are an indicator of welfare as they show the ability of farmers' purchasing power (Hendriadi, 2017; Simatupang & Maulana, 2008; Warto, 2015). The low Indonesian farmers' terms of trade are one of the poverty contributors in rural areas of Indonesia.

The decline in agricultural contributions to employment and national income is a consequence of economic development (Byerlee, De Janvry, & Sadoulet, 2009; Cervantes-Godoy & Dewbre, 2010; Timmer, 1988). This will affect the higher income elasticity of non-agricultural commodities and services, where there will be a faster increase in the demand for manufactured goods than for food commodities or agricultural commodities. Judging from the

poverty and agriculture sides, this reality will always be associated with the low level of poverty alleviation for poor households that depend on the agricultural sector for their lives. This fact is supported by the findings of Warr (2001), who conducted research in Indonesia, Thailand, Malaysia, and the Philippines and found that the services sector had a more significant influence on poverty alleviation than the agricultural sector. It is a paradox, as the sector that becomes the lifeblood of most poor households only has a low ability to alleviate poverty. According to DFID (2004), historically, there has been a strong correlation between poverty reduction and the differential in agricultural sector performance, especially the agricultural sector productivity growth rate.

The development efforts of the agricultural sector are a strategic way to reduce poverty. According to the Agricultural Economic Outlook 2021, the agricultural sector is projected to grow by 3.30% to 4.27%. The global agricultural sector in 2021 will be faced with several opportunities and challenges. These opportunities and challenges include climate anomalies, technology implementation, demographic bonuses, Human Resources (HR) regeneration, and food diversification. Furthermore, other challenges include increasing food access, handling food insecurity, institutions, financial and data access, the small budget *for research and development* (R&D), increases in the real wages of farm workers, land transfer functions, as well as logistical opportunities and challenges (The Coordinating Ministry for the Economy of the Republic of Indonesia, 2021). Demographic bonuses must be adequately managed because improper management will only bring about new unemployment and increase poverty. If these challenges and opportunities can be managed and handled correctly, agricultural sector productivity and farmers' incomes will increase, and there will be a decreased trend of farmers' poverty. Increasing agricultural sector productivity, especially for small farmers, is a key to reducing rural poverty and creating food security for farmers and non-agricultural households. At the same time, the growth of non-agricultural activities (although they are often related to agriculture) is an essential aspect of poverty alleviation in rural areas. According to research conducted by Ravallion, Chen, & Sangraula (2007) and Ligon & Sadoulet (2007), when there is an increase of 1% in the agricultural sector's contribution to Gross Domestic Product (GDP), it will have an impact on increasing income, totalling 6% for 10% of the poorest households. This is supported by the findings of Montalvo & Ravallion (2009) that the primary sector is the driving force behind China's spectacular success in reducing poverty compared to the secondary or tertiary sectors. According to (Hendayana, 2001), the higher the FToT, the better the farmer's profit or position in terms of income. Nasution (2021) said that the high farmers' trade term will increase the human development index. It can be said that income growth in agriculture, either through increased agricultural sector productivity and wages or improved agricultural commodity terms of trade, is more effective in reducing poverty than growth in other sectors because: 1) poverty tends to be higher in the agricultural and rural population than elsewhere; and 2) most of the poor live in rural areas and they depend on agriculture for a living. Bresciani & Valdés (2007) frame an analysis of the relationship between agriculture and poverty in three main channels, which include: 1) the labour market; 2) agricultural income; and 3) food prices. When the direct and indirect effects of agricultural growth are taken into account, the growth in the sector reduces poverty more than the growth in the non-agricultural sector. However, small farmers tend to receive lower prices than the final price since they are mostly scattered in the countryside and usually cannot take advantage of the consolidation and scale of sales of their agricultural products. Moreover, small farmers have no choice except to sell their agricultural products to intermediaries who can take advantage of this situation. In general, the unemployment rate, median wages, and wage inequality are all significant determinants of poverty (Citibeats, 2022). The Centre for Technical Cooperation (CTA) (2010) found that small farmers living in rural areas of Africa who were able to sell surplus harvests received less than 20 percent of the price paid by consumers for their products, with the remainder eroded by high transaction costs and post-harvest losses.

2. RESEARCH METHOD

The object of this study was 32 out of 34 provinces in Indonesia. The data used in this study were 11 years of secondary data, starting from 2009 to 2020. The Special District of the Capital City of Jakarta Province and North

Kalimantan Province were not used as the object of this research. DKI Jakarta is not used as a research object due to the absence of a village; meanwhile, considering that North Kalimantan Province is a new province and was formed in 2012, data availability is inadequate there. Hence, it is not used as a research object. All the data used in this research were taken from the Central Bureau of Statistics, several editions. Table 1 presents the variables used in this study and their operational definitions.

Table 1. Operational definitions of research variables.

Variable	Definition	Unit
Rural poverty	The number of poor people living in rural areas in 32 provinces during 2009-2020	Percent
Rural unemployment	The number of working-age people (15 years and older) living in rural areas in 32 provinces who are not working and are looking for work throughout 2009 – 2020	Percent
Farmers' term of trade	An index that describes the income from agricultural commodities received by farmers and the price of other consumables paid by farmers living in rural areas in 32 provinces who are not working and are looking for work throughout 2009-2020.	Index
Real wages of farmer worker	Nominal wages received by farmworkers living in rural areas in 32 provinces who are not working and are looking for work throughout 2009 – 2020	IDR

Note: IDR is The Indonesian currency.

The Data analysis method in this study used panel data regression analysis with the Pooled Least Square (PLS) technique. The model is estimated using panel data for all provinces in Indonesia.

The mathematical model formulated is as follows:

$$Unemp_{it} = \beta_0 + \beta_1 ToT_{it} + \beta_2 Wage_{it} + \mathrm{e}_{it} \quad (1)$$

$$Pov_{it} = \alpha_0 + \alpha_1 Unemp_{it} + z \quad (2)$$

Substitute (1) to (2)

$$Pov_{it} = \alpha_0 + \alpha_1 (\beta_0 + \beta_1 ToT_{it} + \beta_2 Wage_{it} + \mathrm{e}_{it}) + z_{it}$$

$$Pov_{it} = (\alpha_0 + \alpha_1\beta_0) + \alpha_1\beta_1 ToT_{it} + \alpha_1\beta_2 Wage_{it} + (\alpha_1\mathrm{e}_{it} + z_{it})$$

$$Pov_{it} = \gamma_0 + \gamma_1 ToT_{it} + \gamma_2 Wage_{it} + \varepsilon_{it} \quad (3)$$

Where:

Unempl : Rural unemployment.
ToT : Farmers' term of trade.
Wage : Real wage of farmer labours.
Pov : Rural poverty rate.

3. RESULTS AND DISCUSSION

3.1. Results

There are many interrelated factors that contribute to poverty, including limited assets, resources, infrastructure, access, and isolation. The evidence for this analysis is the existence of significant differences seen in data on urban and rural poverty. A large number of rural poor in Indonesia are spread throughout areas with different conditions. The highest rural poverty is in eastern Indonesia. In addition to West Papua Province and Papua Province, a high level of rural poverty occurs in Maluku Province (27.06%), East Nusa Tenggara Province (25.26%), and Gorontalo Province (24.32%). The lowest rural poverty is located in Western Indonesia, such as Bali Province (5.40%), Central Kalimantan (5.50%), and South Kalimantan (5.76%). There were fifteen provinces in 2020 whose poverty was above

the national poverty level, for instance Aceh, South Sumatra, Bengkulu, Lampung, Central Java, Yogyakarta, East Java, West Nusa Tenggara, East Nusa Tenggara, Central Sulawesi, Southeast Sulawesi, Gorontalo, Maluku, West Papua, and Papua. There is a decrease in poverty levels in all provinces in Indonesia during observation; however, the implementation of development carried out in all regions has not been able to shift the position of each region in the poverty level ranking. Provinces with high poverty rates and average poverty rates above the national average remained unchanged.

Based on the residential aspect, the urban unemployment rate is higher than the rural one. The open unemployment rate in Indonesia in 2009 was 7.87%, while the urban open unemployment rate was 10.66% and the rural open unemployment rate was 5.82%. In 2020, the open unemployment rate in Indonesia dropped to 7.07%, with a total urban open unemployment rate of 8.98% and a rural open unemployment rate of 4.71%. In 2009, the lowest rural open unemployment rate was in Bali (2.24%), and the highest was in Banten (14.12%). Meanwhile, in 2020, the lowest rural open unemployment rate was in Yogyakarta (2.18%), and the highest was in Banten Province (10.65%).

In 2009, several provinces with a high rural open unemployment rate above the national average rate, namely Aceh, West Sumatra, Riau, Riau Islands, West Java, Central Java, Banten, East Kalimantan, North Sulawesi, South Sulawesi, and Maluku. In 2020, there were only six provinces with a rural open unemployment rate above the national average, such as Aceh, Riau Islands, West Java, Central Java, Banten, and North Sulawesi. Some provinces changed their position with the rural open unemployment rate (in 2019) above the national average; meanwhile, in 2020, they were below the national average rate. Those provinces are West Sumatra, Riau, East Kalimantan, South Sulawesi, and Maluku.

The farmers' term of trade (FToT) describes farmers' welfare level. FToTs that are below 100 fall into the low category. It describes the value received from the agricultural sector as lower than the value of consumption that farmers should pay. FToT above 100 belongs to the high category. This illustrates that the value of the agricultural sector received by the farmer is higher than the value of the consumption that should be paid by the farmer. There was an increasing trend of FToT in 2020 at 103.25, while in 2009 it was 102.17. Throughout the observation, there was a decrease in FToT in several provinces in Indonesia. In 2009, there were thirteen provinces with FToT below 100, and in 2020, there were also 13 provinces with FToT below 100, but in different provinces. In 2009, the lowest FToT was in Jambi with an FToT of 94.14, and the highest was in Lampung with an FToT of 107.96. In 2020, the lowest FToT was in Bali Province, totaling 94.27, and the highest FToT was in Riau Province, around 118.79. Provinces with FToT below 100 in 2020 were Aceh, South Sumatra, Lampung, Riau Islands, Bali, East Nusa Tenggara, North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, Maluku, and North Maluku. Provinces other than those provinces have FToT above 100.

The daily wage of rural farmworkers is the income received by farmworkers because they work as labours on agricultural land owned by others in rural areas of Indonesia. The level of farmers' welfare determines the wages they receive, which can have an impact on unemployment. On average, the wage of farmer labour is increasing every year. The average daily wage of farmworkers in Indonesia is Indonesian Rupiah currency (IDR) 30.063,00, and in 2020 it will rise to IDR 56.237,00. The wages of farmworkers in Indonesia varied, and there has been an upward trend throughout the observation period. In 2009, the province with the lowest wage was Central Kalimantan Province, with a daily wage of IDR 18.318,00, and the highest wage was in Papua Province, with a daily wage amount of IDR 52.365,00. In 2020, the lowest labor wage occurred in Maluku Province with a daily wage of IDR 2.109,00, and the highest daily wage occurred in East Kalimantan Province with a total of IDR 77.562,00.

Farmworkers' wages in Indonesia have not yet guaranteed the level of farmers' welfare because the daily wage received by farmers is lower than the provincial minimum wage set by the government. East Kalimantan is the province with the highest labour wage of IDR 2.016.612, 00. The total wage is still under the provincial minimum wage if it is multiplied by 26 working days per month. There are 13 provinces with farmworkers' wages above the national farmworkers' wages in 2020. Those provinces are Aceh, North Sumatra, West Sumatra, Riau, Jambi, and

Bangka Belitung Islands. Bali, Central Kalimantan, East Kalimantan, North Sulawesi, Central Sulawesi, South Sulawesi, and West Sulawesi.

Before regression is carried out on the relationship between the research variables, the classical assumption test is conducted on the data from each research variable used in this study to produce the BLUE estimation results. According to the result, it is known that the data from each variable used in this study passed the classical assumption test. Using Equation 1 and Equation 2 presented in the research methodology, a nested test was carried out to find out the most superior model. The Random Effect Model is the best model to perform the estimation for Equation 1. While the best model to perform estimation for Equation 2 is the Fixed Effect Model. Table 2 presents the estimation results for the two regression equations.

Table 2. Estimation results for Equation 1 and Equation 2.

Variables / Equations	$Unemp_{it} = \beta 0 + \beta 1 ToT_{it} + \beta 2 Wage_{it} + e_{it}$			$Povit = \alpha 0 + \alpha 1 \widehat{Unemp}_{it} + z_{it}$		
	Coefficient	T-statistics	Prob.	Coefficient	T-Statistic	Prob.
Constanta	6.377	5.756	0.000	11.568	25.332	0.000
ToT	-0.005	-0.470	0.638	-	-	-
Wage	-3.71E-05	-7.224*	0.0000	-	-	-
$\widehat{Unemp}$ *	-	-	-	0.748653	7.336*	0.000
R-squared	0.846			0.957		
Prob (F-stat)	0.000			0.000		

Note: *Denote significantly at $\alpha = 0.01$.

It is clear from the regression results that the level of farmworkers' wages has a significant negative impact on rural unemployment. The higher the wage of farmworkers, the lower rural unemployment. The higher the wage of farmworkers, the lower the level of rural unemployment, *ceteris paribus*. Although it is significant, the magnitude of labor wages to rural unemployment is minimal, which is only 3.71E-05, and this effect can be said to not matter. This might be a result of the rising wages of farmworkers, which increase workers' willingness to work in the agricultural sector and lower the unemployment rate. This means that at a low labour wage level, many labour forces choose voluntary unemployment. The findings of this study on the relationship between farmworkers' wages and rural unemployment differ from research findings conducted by Bicerli & Kocaman (2019), which found a significant negative relationship between farmworkers' wages and labour absorption, but are supported by Hasiholan et al. (2023), which found a significant negative relationship between wage rate and unemployment.

Farmers' terms of trade do not significantly affect the rural unemployment rate. The farmers' terms of trade do not affect the level of labor absorption in the agricultural sector. However, it cannot be denied that the farmers' terms of trade will affect the welfare of the agricultural sector's business. Farmers' terms of trade have more effect on agricultural landowners' welfare, but they have a more negligible effect on the farmers' welfare. For landowners, the amount of labor employed is determined by farmworkers' high or low wages, not by farmers' terms of trade. The higher the farmers' terms of trade, the better the welfare of farmers and landowners will be.

In Equation 2, it can be seen that unemployment significantly affects the level of rural poverty. The higher the rural unemployment, the higher the level of rural poverty. Any increase in rural unemployment by 15% will increase the rural poor by 0.748653%. Based on the estimation results, farm workers' wages must increase to improve the farmers' welfare and alleviate rural poverty. Increasing farmworkers' wages will increase the rural workforce willing to work in the agricultural sector, *ceteris paribus*, so that rural unemployment decreases. This finding is in line with research findings from Corcoran & Hill (1980). As a result, there will be an increase in income for farmworkers, which will be accompanied by a decrease in rural poverty. This is in line with the Message from The Coordinating Ministry for the Economy of the Republic of Indonesia (2021).

3.2. Discussion

The limitation of this research lies in selecting research objects: farmers. This study does not differentiate between landowning farmers and smallholder farmers. The welfare determinants of these two research objects are different; if they are not separated between smallholder farmers and landowner farmers, the conclusions drawn from the research results will be confusing. For future research, it should be possible to separate the research objects of smallholder farmers and landowner farmers.

4. CONCLUSIONS

Based on the results from research about the effect of farmer terms of trade, the daily wage of farmer workers, and unemployment on rural poverty in Indonesia using a recursive equation, it can be concluded as follows: Farmer's terms of trade are insignificant to the level of rural unemployment. This may be due to the fact that NTP is more influential on land-owning farmers than working farmers. While the concept of unemployment is more related to working farmers.

The daily wage of farmer workers has a significantly positive effect on the level of unemployment. This may be due to an increasing willingness to work. The higher the wages of daily farmers, the more workers who were previously unemployed are willing to work in the agricultural sector.

Furthermore, the unemployment rate has a significant negative effect on the level of rural poverty. The higher the unemployment rate, the higher the poverty rate. An increase in the daily wage rate should be carried out. This, in addition to attracting the willingness of previously unemployed workers to work, is also to increase the income of workers who have worked so that it has an impact on reducing poverty levels. So, the influence of the daily wage rate of agricultural laborers can directly or indirectly affect the level of rural poverty. The indirect effect is through an increase in the absorption of labor in the agricultural sector due to an increase in the willingness to work in the agricultural sector, while the direct effect is through an increase in the purchasing power of working farm laborers due to an increase in their daily wages.

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