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THE EFFECT OF INFLATION AND ECONOMIC STRUCTURE CHANGES ON FARMER EXCHANGE VALUE (NTP) IN EASTERN INDONESIA

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ABSRACT

Recently, the relationship between farmer exchange rates and the variables that influence them still leaves debate and various empirical findings. In general, this study aims to 1) analyze inflation's effect on farmers' exchange rates in Eastern Indonesia. 2) Analyze the effect of changes in the agricultural sector's economic structure on the exchange rate of farmers in Eastern Indonesia. 3) Analyze the effect of farmer exchange rates in the previous year on farmer exchange rates in Eastern Indonesia. 4) Analyze the simultaneous effect of the inflation rate, changes in the economic structure, and the previous farmer exchange rate on farmers' exchange rate in Eastern Indonesia.

The analysis method used is descriptive qualitative and quantitative analysis. The quantitative analysis tool used is the Panel Data regression model. The data used is panel data from 12 provinces in Eastern Indonesia for the period 2010-2018. There are several approaches to estimating the panel data regression model, so it is necessary to carry out statistical tests to get the best and efficient regression parameters (BLUE, Best Linear Unbiased Regression). In this study, the panel data estimation technique selected based on the Chow test, LM test, and Hausman test is the Random Effect Model.

The results showed that changes in the agricultural sector structure and the lag of the farmer exchange rate were found to have a positive and significant effect on the exchange rate of farmers, while the inflation rate had a negative and significant effect on the exchange rate of farmers. In the end, local governments have a significant role in improving the agricultural sector's development, leading to increased welfare of farmers. Therefore, the existence of political will that sided with farmers is an essential factor in changing the agricultural sector's welfare.

Keywords: Farmers exchange rate, inflation, structural changes, panel data.

ABSTRAK

Sejauh ini hubungan antara nilai tukar petani dan variabel-variabel yang mempengaruhinya masih menyisakan perdebatan dan beragam temuan empiris. Secara umum, penelitian bertujuan untuk 1) Menganalisis pengaruh inflasi terhadap nilai tukar petani di Kawasan Timur Indonesia. 2) Menganalisis pengaruh perubahan struktur ekonomi di sektor pertanian terhadap nilai tukar petani di Kawasan Timur Indonesia. 3) Menganalisis pengaruh nilai tukar petani tahun sebelumnya terhadap nilai tukar petani di Kawasan Timur Indonesia. 4) Menganalisis pengaruh simultan tingkat inflasi, perubahan struktur ekonomi dan nilai tukar petani sebelumnya terhadap nilai tukar petani di Kawasan Timur Indonesia.

Metode analisis yang digunakan adalah deskriptif kualitatif dan analisis kuantitatif. Alat analisis kuantitatif yang digunakan adalah model regresi Panel Data. Data yang digunakan adalah data panel 12 provinsi di Kawasan Timur Indonesia periode 2010-2018. Terdapat beberapa pendekatan untuk mengestimasi model regresi panel data, sehingga perlu dilakukan serangkaian pengujian statistik untuk mendapatkan parameter regresi yang efisien dan terbaik (BLUE, Best Linear Unbiased Regression). Dalam penelitian ini teknik estimasi panel data terpilih berdasarkan uji Chow, LM test dan Hausman test adalah Random Effect Model.

Hasil penelitian menunjukkan bahwa perubahan struktur sektor pertanian dan lag nilai tukar petani ditemukan memiliki pengaruh positif dan signifikan terhadap nilai tukar petani, sedangkan tingkat inflasi berpengaruh secara negatif dan signifikan terhadap nilai tukar petani. Pada akhirnya pemerintah daerah memiliki peran yang besar dalam perbaikan pembangunan sektor pertanian yang mengarah pada peningkatan kesejahteraan petani. Karena itu adanya political will yang berpihak pada petani merupakan salah satu faktor penting perubahan kesejahteraan di sektor pertanian.

Kata Kunci: Nilai tukar petani, inflasi, perubahan struktur, panel data.

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INTRODUCTION

Development is a multidimensional process that involves various aspects in its implementation (Todaro & Smith, 2011); this suggests that all sectors in development must play an active role in supporting development itself. One of the development problems that have not been resolved to date is food security and poverty. These two problems are closely related, most of the poor are spread out more in rural areas than in urban areas, and from the demographic point of view, the poor are mostly (Wahyudi, 2018). Meanwhile, in terms of food security, these farmers' welfare will directly affect the ability of farmers to produce agricultural commodities.

In fact, in terms of the depth of poverty, poverty in Java is worse in rural areas than in urban areas, with an index value of 1.39. Poverty itself can affect farmers' productivity, reducing the amount of agricultural production and reducing the Farmer Exchange Rate / NTP (Rahmawati, 2020).

The next problem faced is the lack of agricultural land in Java due to industrialization and residential growth. This problem requires a short-term solution, significantly changing agricultural production centers to other areas outside the island of Java. As shown in the diagram above, one of the regions with considerable potential is the Eastern Indonesia region, especially the Sulawesi region.

This shift in production areas has a positive impact on regional economic growth and development in the Eastern Indonesia Region (KTI) because it can create new employment opportunities for people in this region and reduce inequality between regions. The data below shows the conditions of farmer exchange rates in KTI in 2019.

The existing NTP data shows that Eastern Indonesia's agricultural conditions are still not good enough (the average NTP KTI is 99.94), because there are still some areas that have an NTP of less than 100, or there are still many farmers who experience deficits rather than surpluses.

One of the reasons for the low NTP in Eastern Indonesia is the low rate of inflation (the KTI inflation rate is 0.17), which allows low levels of community income, resulting in farmers' low purchasing power.

The data also shows the urgency to spread economic growth to the eastern part of Indonesia to become a stimulus for economic development in Eastern Indonesia. The dynamics of the magnitude of inflation vary widely between cities in Eastern Indonesia. The highest inflation still occurs in several cities, indicating that the supply of production for food, clothing, and shelter needs is still distributed at high costs so that the prices for these goods are still relatively high.

The growth of this new area will directly allow a change in the region's structure to become an area with a focus on industrial development, which is labor-intensive because it can change the aggregate demand and the aggregate supply. This change can occur because the demographic composition of the KTI region primarily works in the

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agricultural sector and its sub-sectors (fisheries, plantations, and others.). It becomes a necessity to see the influence of the inflation rate and changes in the economic structure able to affect NTP in eastern Indonesia.

METHODOLOGY

This study uses macroeconomic analysis tools that are limited to how inflation and economic structure changes affect the Exchange Rate of farmers in Eastern Indonesia.

Judging from the research location's scope, the research is focused on provinces in Eastern Indonesia with considerations of limited time, energy, and cost. The provinces that are the focus / object of research are 1) West Nusa Tenggara, East Nusa Tenggara, 3) North Sulawesi, 4) Central Sulawesi, 5) South Sulawesi, 6) Southeast Sulawesi, 7) Gorontalo, 8) West Sulawesi, 9) Maluku, 10) North Maluku, 11) Papua, 12) West Papua.

This research is focused on data for the 2010-2019 period considering the availability/completeness of the data. This research took place from May to December 2019.

The research period chosen was 2010 to 2016. The research time was started in 2010 considering the need for the number of observations that require long data to solve the degree of freedom, besides, due to consideration of the accuracy or precision and sharpness of the analysis results.

The analysis of the research results includes qualitative and quantitative descriptive analysis, with the following stages:

1. The first stage. Describe the development of NTP, INFLATION, and Changes in Economic Structure in 12 provinces of Eastern Indonesia, using descriptive qualitative analysis methods, namely contribution/share, cross-tabulation, and graphs.
2. The second stage. We analyze the influence of the reciprocal relationship between economic growth and tourism sector development and analysis of economic growth and tourism determinants using quantitative analysis.

Quantitatively, the analysis tool used is the Data Panel (Panel Data Model) as follows:

Quantitatively, to analyze the effect of government spending on human development performance in districts/cities of Maluku Province, panel data regression models are used. The general specifications of the panel data regression model used are as follows:

$NTP = f(INF, SHARE, NTP_{t-1})$ ..... (1)

$$NTP_{it} = \alpha_0 + \beta_1 INF_{it} + \beta_2 Share_{it} + NTP_{it-1} + e_{it} \quad (2)$$

where: NTP is the farmer exchange rate, measured by the farmer exchange rate index. Share is the change in structure in the agricultural sector, measured by the agricultural sector's share value to GRDP (%). NTPit-1 is the farmer exchange rate in the previous year measured by the farmer

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exchange rate lag 1., a0, β1 ... β2 are constant parameters and regression coefficient. e_it Is the error term.

There are three approaches in estimating panel data; first, the Common effect Model (Ordinary Least Square, OLS). Second, the fixed effects model (Least Square dummy variable model, FEM). Third, the random effect model (REM) (Baltagi, 2002; Gujarati, 2009). The approach was chosen among the three techniques, whether the Common Effect Model, Fixed Effect Model (FEM), or the Random Effects Model (REM, will be determined through a statistical test-Chow test, the LM test, and Hausman test. The testing/selection mechanism for the panel data estimation model is as follows (Widarjono, 2010).

RESULT

a) Chow Test

Chow test or redundant fixed effect test is a statistical test that aims to choose whether it is better to use the Common Effect Model or the Fixed Effect Model.

Table 1. Chow Test/ Redundant Fixed Effect Panel Data Test

Redundant Fixed Effects Tests
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.708775	(11,81)	0.0860
Cross-section Chi-square	20.033687	11	0.0449

Source: Data Processing Results

Based on the EViews 10.0 software results, the calculated F-statistic value is 1.71 (rounded). At degrees of freedom (DF) numerator 11 and enumerator 81 at the alpha significance level of 5%, the calculated F-statistic results are not statistically significant at the 95% confidence level because the probability value is> 0.05 (alpha 5%) but significant at alpha 10%. However, the Chi-Square Cross-Section indicator with a statistical value of 20.03 confirms that the test results are statistically significant at alpha 5%. Therefore, the F-statistic is statistically significant at alpha 10%, and the cross-section chi-square is significant at 5% alpha, then H0 (Common Effect Model) is rejected and accepts Ha (FEM), so the panel data regression estimation technique chosen is the Fixed Effect Model (FEM).

b) LM Test

The Hausman test is a statistical test as a basis for our consideration in choosing whether to use the Fixed Effect Model (FEM) or the Random Effect Model (REM). If the value of the calculated chi-square (χ2) is greater than the chi-square (χ2) table or statistically significant at the significance level α = 5%, then there is sufficient evidence to reject the null hypothesis (H0) so that the panel data estimation approach is better to use is the Fixed Effect Model, and vice versa. From the test results with the EViews 10.0 software, the following results were obtained:

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Table 2. LM Test Panel Data

Sample: 2010 2018
Total panel observations: 96
Probability in ()

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	0.970919 (0.3245)	10.38531 (0.0013)	11.35623 (0.0008)
Honda	0.985352 (0.1622)	3.222625 (0.0006)	2.975489 (0.0015)

Source: Data Processing Results

The independent variable or degree of freedom (DF) is three, and the alpha test is 5%. Based on the calculation results, the statistical value of the Breusch-Pagan LM test is 11.35623> 7.814727903 (chi-square table), meaning that the statistical value is statistically significant at alpha 5% so that the statistical decision is to reject H0 (Common Effect Model, OLS) and does not reject Ha (Random Effect Model). This means that the panel data regression model's appropriate estimation technique according to the Lagrange multiplier test or LM test is the Random Effect Model (REM).

c) Hausman Test

The Hausman test is a statistical test as a basis for our consideration in choosing whether to use the Fixed Effect Model (FEM) or the Random Effect Model (REM). If the value of the calculated chi-square ($\chi 2$) is greater than the chi-square ($\chi 2$) table or statistically significant at the significance level α = 5%, then there is sufficient evidence to reject the null hypothesis (H0) so that the panel data estimation approach is better to use is the Fixed Effect Model, and vice versa.

From the test results with the EViews 10.0 software, the following results were obtained:

Table 3. Hausman Test Summary

Correlated Random Effects - Hausman Test
Pool: DATA
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.062408	3	0.2548

Source: Data Processing Results

The table above shows the Hausman test results to determine whether to choose the Fixed Effect Model (FEM) or Random Effect Model (REM) estimation technique to be used. The results obtained Chi-Square statistic 4.0624 and not statistically significant at the significance level α = 5% or rejecting Ha (FEM) and accepting Ho (REM). The indicator is the probability value of Chi-square statistics of 0.255> 0.05 (α = 5%). Thus, it can be concluded that the appropriate panel data estimation model according to the Hausman test is the Random Effect Model (REM).

d) Panel Data Result

Panel data regression analysis using the Random Effect Model (REM) estimation technique is a quantitative approach used to analyze the effect of the inflation rate, changes in the agricultural sector structure, and the lag of farmer exchange rates on the exchange rate of farmers in Eastern Indonesia. The results of panel data regression using the Random

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Effect Model (REM) can be displayed in the following table:

Table 4. Summary of Panel Data Regression Result

Dependent Variable: NTP
Method: Panel EGLS (Cross-section random effects)
Sample: 2010 2018 Adjusted 2011 2018
Periods included: 8
Cross-sections included: 12
Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic		F-statistic	
			t-stat	Prob.	F-stat	Prob.
Constant	14.04867	7.315833	1.920310	0.0579		
INF	-0.212327	0.099000	-2.144727	0.0346		
Share	0.038008	0.022416	1.695550	0.0934	**62.35807**	0,00000
NTP(-1)	0.860627	0.073695	11.67824	0.0000		

R-Squared = 0.670339 *Durbin-Watson Statistic* = 1.965881
Adj. R-Squared = 0.659589

Source: Data Processing Results

The table above provides essential information about the summary of the estimation results of the panel data regression model regarding the relationship between the farmer exchange rate (NTP), changes in the structure of the agricultural sector (SHARE), and lag 1 of the NTP farmer exchange rate), in 12 provinces of Eastern Indonesia, which includes among others, the estimation results of the panel data regression parameters, hypothesis testing (t-test and F-test), the coefficient of determination (R-squared, R2), adjusted R-squared and the Durbin-Watson indicator.

DISCUSSION

The value of the differential intercept from the regression equation shows the effect of each unit cross-section for each province. This effect will differentiate the intercept/constant for the regression equation in each provincial cross-section unit. The difference in intercept for each province shows differences in endowment factors (natural resources and human resources) and differences in government policies of each province, especially in local government policies related to increasing farmer exchange rates, controlling regional inflation rates, increasing the role of the agricultural sector and other policies (Gujarati, 2009).

Based on the table below, as many as 6 (six) provinces in Eastern Indonesia have adverse effects, while six other provinces have positive effects. The value of this effect will differentiate the value of the intercept/constant of each province in Eastern Indonesia. The effect value that will differentiate the regression equation intercept/constant in each provincial cross-section unit is analyzed by adding up the effect value of each province with the standard intercept value of the regression results as shown in the regression equation as follows:

Table 5. Dummy Effects of Regression Equations in 12 Provinces of Eastern Indonesia

No	*Cross Section Unit (Provinsi)*	*Effect*	*Intercept*
1	Nusa Tenggara Barat (NTB)	0.816866	14.865536
2	Nusa Tenggara Timur (NTT)	0.269363	14.318033
3	Sulawesi Utara (SULUT)	-0.323250	13.72542
4	Sulawesi Tengah (SULTENG)	-0.245365	13.803305
5	Sulawesi Selatan (SULSEL)	0.297556	14.346226
6	Sulawesi Tenggara (SULTRA)	-0.541011	13.507659
7	Gorontalo	-0.057371	13.991299
8	Sulawesi Barat (SULBAR)	0.124190	14.17286

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9	Maluku	0.059947	14.108617
10	Maluku Utara (MALUT)	-0.092469	13.956201
11	Papua Barat (PAPBAR)	0.104970	14.15364
12	Papua	-0.413427	13.635243

Source: Data Processing Results (Nilai Common Intercept= -0.075063)

Based on the table above, the regression equation is obtained for 12 provinces in Eastern Indonesia. This equation has the same regression coefficient or slope, while the intercept varies according to the magnitude of the effect on each cross-section unit. The most dominant change in the intercept value in West Nusa Tenggara (NTB), which is 14.865536, it can be interpreted that if the rate of inflation, changes in the structure of the agricultural sector, and lag in the exchange rate of farmers is constant or unchanged, the change in the exchange rate of farmers in Nusa Tenggara West is equal to 14.87% (rounded). The lowest intercept value occurred in Southeast Sulawesi Province (SULTRA), amounting to 13,507659, which is interpreted if the rate of inflation, changes in the structure or share of agricultural sector output, and lags in the exchange rate of farmers are constant or unchanged, the change in the exchange rate of farmers is 13.51% (rounded off).

In an economic growth, the share of the agricultural sector in GDP and employment opportunities has decreased in line with the increase in per capita income. GDP growth is also accompanied by growth in the agricultural sector, which increases rapidly simultaneously and even precedes GDP growth.

The industrial sector is closely dependent on the agricultural sector. A decline in profits will accompany the industrial sector's development if developments in the agricultural sector do not support it. This is because the industrial sector does not produce foodstuffs. The industrial sector cannot develop without being supported by the development of the agricultural sector. From this description, it is easy to understand why the industrial revolution and the agricultural revolution occurred simultaneously and why in a country where the agricultural sector has stagnated, the industrial sector has not developed.

The harmony between the growth of the agricultural sector and the overall economic growth shows that the factors that influence the agricultural sector's growth are related to the overall economic policy.

Changes in the structure that lead to increased productivity and output in the agricultural sector can be a stimulus and accelerator for farmers' exchange rate. This study proves that changes in the structure of the agricultural sector with an indication of an increase in the share of agricultural output have a positive and significant effect on the exchange rate of farmers. The regression coefficient of the change in the agricultural sector structure (SHARE) is denoted by (β2) of 0.038008. The SHARE variable's coefficient value (□2) turns out to have a statistically significant positive effect at the significance level α (alpha) = 10% or the confidence level of 90%. It can be seen by comparing the

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probability value (p-value) of the t-test with a significance level of (alpha) = 10%. The display of the estimation results shows that the t-test results for the regression coefficient of the SHARE variable have a probability value (p-value) of 0.0934 <0.10 (= 10%) or accept the alternative hypothesis (Ha), which states that structural changes with indications of improvement The output share of the agricultural sector has a significant positive effect on the exchange rate of farmers at the alpha significance level of 10% or the confidence level of 90%.

CONCLUSION

Based on the results of the previous research and discussion, the following conclusions can be put forward:

1) This study supports the formulation of the hypothesis, which states that the higher the inflation rate will cause a decrease in the exchange rate of farmers. Statistically, the regression coefficient of the variable rate of inflation (INF) is obtained, which is denoted by (β1) of -0.212327. The INF (β1) variable's coefficient value has a statistically significant positive effect at the significance level (alpha) = 5% or the 95% confidence level. It can be seen by comparing the probability value (p-value) of the t-test with a significance level of α (alpha) = 1%. The regression coefficient of the inflation rate variable (INF) denoted by β1 of -0.212327, it is interpreted that any increase in inflation in Eastern Indonesia of 1 (one)% will result in a decrease in the exchange rate of farmers by 0.21% (rounded), with the assumption that ceteris paribus (other factors are considered constant).

2) Changes in the structure of the agricultural sector, which is characterized by a low level of productivity and a decrease in the contribution/share of the output of the agricultural sector, is also one of the factors that can empirically reduce the exchange rate of farmers with a significant indication of the regression coefficient of the variable change in the structure of the agricultural sector (SHARE) which is denoted with (β2) of 0.038008. The SHARE variable's coefficient value (β2) turns out to have a statistically significant positive effect at the significance level α (alpha) = 10% or the confidence level of 90%. The regression coefficient of the variable change in structure or share of agricultural sector output (β2) of 0.038008 is interpreted as an increase in the output share of the agricultural sector by 1 (one)%, and it will result in an increase in the exchange rate of farmers in Eastern Indonesia by 0.04% (rounded) , assuming ceteris paribus (other factors are considered constant).

3) The success of farmers in obtaining a higher farmer exchange rate in

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previous years has usually been the principal capital in production activities as a continuation of agricultural business and increased farmer welfare. This condition is in line with the empirical findings in this study that support the hypothesis that the farmer exchange rate in the previous year has a positive and significant effect on farmers' exchange rate in Eastern Indonesia. The regression coefficient of the previous year's farmer exchange rate variable (β3) was 0.860627. It is interpreted that each increase in the farmer's exchange rate in the previous year of 1 (one)% will increase the farmer exchange rate in Eastern Indonesia by 0.86% (rounded), assuming ceteris paribus (other factors are held constant).

4) Simultaneously, the inflation rate, structural changes in the agricultural sector, and the lag of farmer exchange rates significantly affect the exchange rate of farmers in Eastern Indonesia during the study period.

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