The Role of Leading Commodities in Agricultural Sector on Security Food and Poverty at Food Barn in Banten Province

*Samsul Arifin

Economics of Development Departement
University of Sultan Ageng Tirtayasa
Serang 42118, Banten Province, Indonesia

*samsularifin@untirta.ac.id

Sayifullah

Economics of Development Departement
University of Sultan Ageng Tirtayasa
Serang 42118, Banten Province, Indonesia

sayifullah@untirta.ac.id

Abstract – **The purpose of this study are, first, to prove the interconnectedness of Banten and National economies. Second, to prove the relationship between poverty and food security.This study used pool data of 4 districts in Banten Province by using dynamic simultaneous equation model to analyze 2 blocks of econometric model. First block is poverty block, measured by number of poor people and income per capita of agricultural sector, and second block is food security block, measured by energy and protein consumption and rice production.The result of the study prove that the economic relationship of Banten and National is very strong. Existing poverty are significantly affected by per capita income. Food security is significantly affected by the amount of per capita income. This provides an explanation that poverty and food security have interrelated relationships. The leading commodities in the food sector that have the potential to be an alternative to support food security are corn and sugar palm. Efforts to improve food security and decrease the number of poor people through increasing rice production have become a significant way in the Banten region through maintaining rice prices that given the positive elastic price response to production in the short term but inelastic disincentives in the long run.**

Keywords: Leading Commodities in the Agricultural Sector, Poverty, Pool Data, Simultaneous Equation

I. INTRODUCTION

A. Problem Background

In many theories about economic development it was stated that the priority of development is to eradicate poverty. Economic development within high economic growth must be able to reduce poverty, income disparities, and unemployment rates [1]. According to the Central Statistics Agency (BPS), poverty is the condition of a person who can only meet his food needs less than 2100 calories per capita per day,meanwhile World Bank stated that poverty is a condition of not achieving a decent life with an income of USD 1.00 per day as quoted in wiwiek (2009) [2].

Data on poverty in Indonesia shows an improving situation. In 2018 the percentage of poor people in the village were 60.91%, while in the city it was 39.09% lower than in the village. The data in Table I shows that in Banten province the number of poor people in 2018 reached 661.36 thousand people or 5.25% with details of 393.3 thousand people living in the urban poor and 267.55 thousand people of the rural poor.

TABLE I
THE NUMBER AND PERCENTAGE OF THE PROVINCE'S POOR POPULATION ON THE ISLAND OF JAVA IN MARCH 2018

No.	Province	Number of Poor Population (Thousand Souls)			Percentage
		Urban	Rural	Amount	
1	Jawa Timur	1.457,61	2.874,97	4.332,59	10,98
2	Jawa Tengah	1.716,16	2.181,04	3897,20	11,32
3	Jawa Barat	2.327,87	1.287,92	3.615,79	7,45
4	Banten	393,80	267,55	661,36	5,25
5	DKI Jakarta	373,12	-	373,12	3,57
6	DI Yogyakarta	305,24	154,86	460,10	12,13
	INDONESIA	10.144,37	15.805,43	25.949,80	9,82

Source: Central Statistics Agency 2018, processed.

The living standards of the poor. If the basic needs of all people can be met, it will be able to increase the productivity and income of the poor so that not only reduce poverty but also encourage economic growth [2]. The importance of achieving a reduction in poverty and hunger and achieving food security is based on the condition that household and individual food security in an area is closely related to poverty. Poverty reduction can be done through improving household and individual food security [2].

Improved food security is expected to be in line with the improvement of farmers' income so that the problem of poverty will be overcome [3]. The amendment to the Law on food is clear evidence that the government is serious about the issue [4] [5]. The determination of Indonesia in the year 2045 to become the world's food granary affected the determination of the province of Banten as a national food barn considering that Banten is one of the 10 (ten) highest rice producing provinces in Indonesia and Banten agriculture is still the most potential sector to be developed compared to 33 other provinces exist in Indonesia [6]. The success of the food storage is related to the achievement of food security and efforts to reduce poverty.

1. Does Banten Economic have relationship with national economic?

2. Is the achievement of food security in line with efforts to reduce poverty in Banten Province?

II. LITERATURE REVIEW

A. Poverty

There are many concepts about poverty, one of which is related to economic factors such as the criteria used according to BPS. The poverty measure BPS uses the concept of economic inability to meet basic food and non-food needs measured in terms of expenditure. So the poor are residents who have an average per capita expenditure below the poverty line. According to BPS (2005) the indicators used to see poverty are the level of poverty and poverty gap [2].

UNDP (2001) reviews poverty from two sides, namely in terms of income and in terms of human quality [2]. The level of the poverty line will vary between times because of changes in prices between times, between regions because of differences in the level of expertise between regions and between villages and cities [1].

B. Food Security

The simplest concept of food security is food availability. The most up-to-date concept includes the availability of food as well as the affordability of food both physically and economically, the security factor to the individual food access factors to food as measured by the indicators of community nutritional status which is the final estuary of all food security subsystems. The live healthy, active, and productive in a sustainable manner [4]. Food security is a series of three main components, namely: (1) food availability and stability (food availability and stability), (2) ease of obtaining food (food accessibility), and (3) utilization of food (food utilization) [7].

According to the Food Security Agency (2005a) food security is a food economic system that consists of a supply, distribution and consumption subsystem that interacts continuously [8]. Food security as a system is described in Figure 1, which shows the close relationship between subsystems in the food security system. The concept of food

security changes and the aspects are very broad, so the indicators, methods and data used by researchers to measure food security are also very diverse depending on their objectives and interests. To measure food security both micro and macro levels can be reflected by several indicators that depend on the objectives and interests of the research carried out and the availability of data.

The measurement of food security performance in this study is based on FAO (2011) concerning various dimensions of good macro food security which is a requirement for also micro food security in individuals which is a requirement of adequacy, which includes: rice production, average rice consumption, energy consumption , protein consumption, agricultural sector income, per capita income [7].

C. Previous research

A review of previous research was conducted on several studies on the topic: poverty, food security, the role of the agricultural sector published in scientific articles [10] [11] [12] [13]. The main research that was used as a reference in relation to the method of data analysis was the study with the title of food security and poverty in Aceh Province conducted [2]. Poverty is related to the number of people who are below the poverty line while the poverty line is based on measuring the income / expenditure of the population to meet basic needs so that in this study poverty is measured by the number of poor people and income per capita of the agricultural sector.

III. RESEARCH METHOD

A. Scope

The level of food security in this article uses indicators of energy consumption and protein consumption derived from grain food groups which are one indicator of food fulfillment [3] [2].

B. Data andResearch Location

The type of data used in this study is secondary data obtained from BPS in the form of Banten province and 4 districts in the 2007-2017 period.

C. Methods

To answer the first objective, descriptive analysis was carried out both qualitatively and quantitatively by conducting regional macro studies on economic growth, poverty and food security in Banten and National. The second and third objectives are used an econometric model approach with simultaneous dynamic equation systems.

Food security in this study is measured at the macro level as a condition of achieving food security at the household and individual levels, namely in the form of food production, especially rice, energy consumption, protein and income level per capita in the agricultural sector which illustrates the purchasing power of the community [2]. The overall hypothesis model is explained in the equation:

a. Poverty Block
  1. Number of Poor People Equation
  $$M_{it} = M_0 + M_1 LagM_{it} + M_2 IKAP_{it} + M_3 Pop_{it} + e_{it} \dots\dots\dots\dots\dots\dots\dots\dots \quad (1)$$
  2. Agricultural Sector Income Per Capita Equation
  $$IKAP_{it} = K_1 + K_2 LagIKAP_{it} + K_3 QP_{it} + K_4 L_{it} + K_5 Pop_{it} + e_{it} \dots\dots\dots\dots\dots\dots \quad (2)$$
b. Food Security Block
  1. Rice Production Equation
  $$QP_{it} = Q_0 + Q_1 LagQP_{it} + Q_2 Pg_{it} + Q_3 Lp_{it} + e_{it}$$
  $$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$
  $$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$
  2. EnergyConsumption Equation
  $$QE_{it} = E_1 + E_1 LagCE_{it} + E_2 CB_{it} + E_3 IKAP_{it} + e_{it} \dots\dots\dots\dots\dots\dots\dots\dots$$
  $$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$
  3. ProteinConsumption Equation
  $$CP_{it} = P_0 + P_1 LagCP_{it} + P_2 CE_{it} + P_3 IKAP_{it} + e_{it}$$
  $$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

TABLE II.
INFORMATION OF THE RESEARCH VARIABLES AND UNITS

Notation	Information	Unit
M	Number of Poor Population	Soul
IKAP	Income Per Capita in Agricultural Sector	Thousand rupiah
Pop	Total Population	Soul
L	Total Labor	Soul
Lp	Total Labor inAgricultural Sector	Soul
Qp	Total of Rice Production	Ton
Ce	Energy Consumption	Kilocalori
Cp	Protein Consumption	Gram
Pg	Price of Grain	Rupiah/kilo
lagM	Lag Number of Poor Population	Soul
lagIKAP	Lag Income Per Capita in Agricultural Sector	Thousand rupiah
lagQp	Lag Total of Rice Production	Ton
lagCe	Lag Energy Consumption	Kilocalori
lagCp	Lag Protein Consumption	Gram

D. Identification and Model Estimation

In the model formulation, identification becomes an important issue. If the model is not identified, the parameters cannot be estimated. A model is said to be identified if it is stated in the form of unique statistics, which results in a unique parameter estimation. According to Koutsoyianis (1997) there are two proposals for testing identification, namely the order condition and rank condition that are specified in the structural form of the model [14]. Furthermore, because the model contains simultaneous equations and variable values, the serial correlation test uses the Durbin-h statistic. According to Pindyck and Rubinfeld (1991) serial correlation problems only reduce parameter estimation efficiency and serial correlation does not cause regression parameter bias [15].

IV. RESULTS AND DISCUSSION

A. The interconnectedness of Banten Economic and National

The close relationship between Banten and National is shown by the high correlation coefficient values covering all aspects of the situation ranging from Economic Growth, State of Poverty, The Role of the Agricultural Sector to the Economy and Energy and Protein Consumption. The state of economic growth, poverty and energy and protein consumption in Banten is better than the situation in the National, but not for the contribution of the agricultural sector to the economy. This condition shows that Banten's economy cannot be separated from the situation at the National level and vice versa where the situation in Banten is much better than the National. The small contribution of the agricultural sector to the declining trend that occurred in Banten shows a slowdown in the development of the agricultural sector.
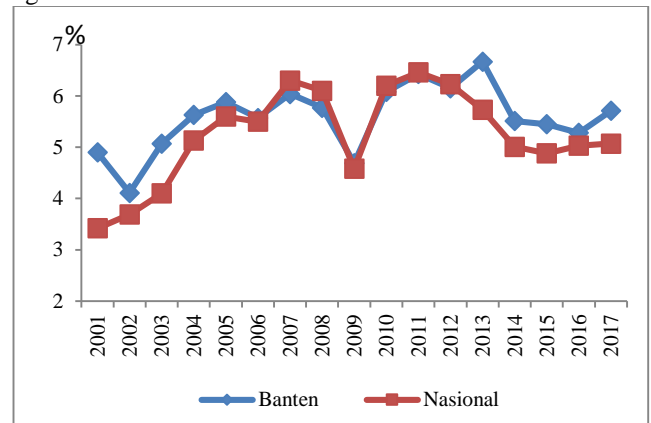

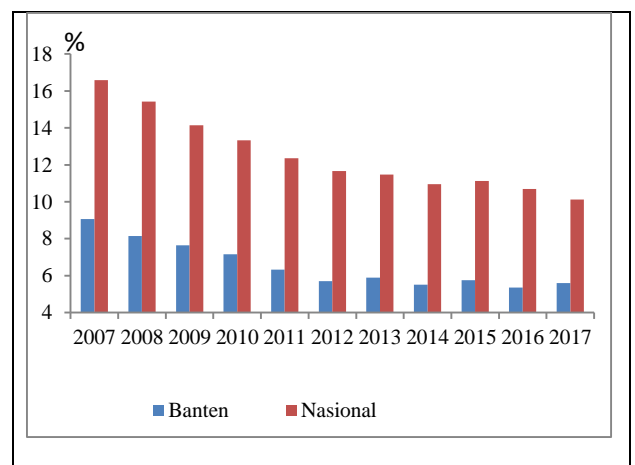Fig. 1 Economic Growth inBantenProvince andIndonesian, Year 2001-2017

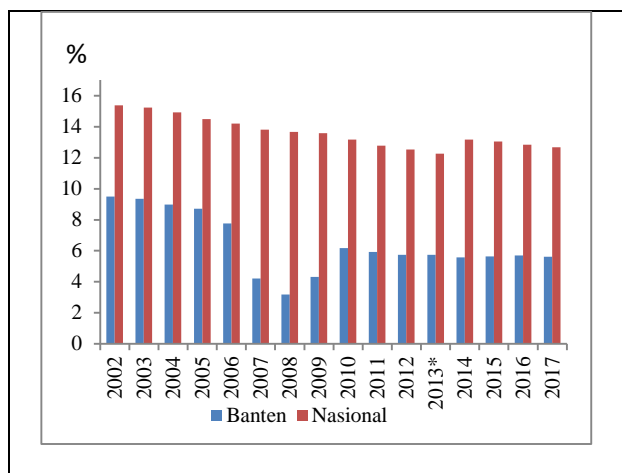Fig. 2 Poor Population in Average of Banten Province andIndonesian, Year 2007-2017

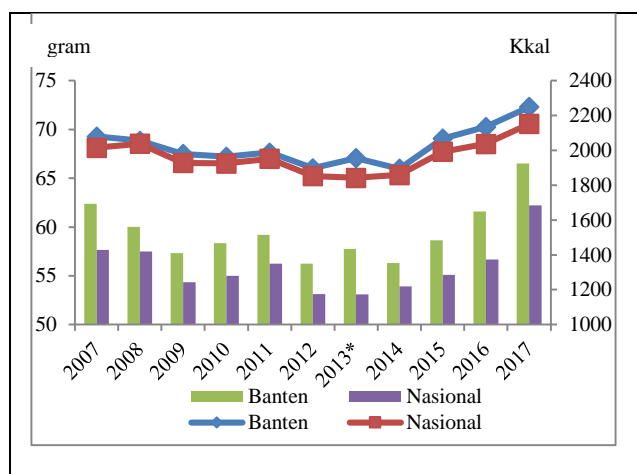Fig. 3 Agricultural Share inBanten Provinceand Indonesian, Tahun 2002-2017

Fig. 4 Energy and Protein Consumption in Banten Province and Indonesian, Years 2007-2017

B. Simultaneous Equation Modelin Poverty dan Food Security

1) Analysisof Model Estimation: In the specification process the model used in this study has undergone several modifications because it found some alleged results that are not consistent with the theory and some alleged parameters that are not real. So that finally obtained a model with the results of parameter estimation that is representative enough to describe the existing phenomenon. The coefficient of determination (R^2) of each structure in the model is relatively high, ranging from 0.932 to 0.99. Thus in general the explanatory variables that are intended in the structural equation in this study are able to explain well the performance of each endogenous variable and all of these explanations have presumptive parameters which are in accordance with the expectations of the existing theory and economic phenomena.

The F statistic value in general is quite high, ranging from 1.739 to 322, so it can be interpreted that the variation

of variables in each structural equation together can explain well the variation of each endogenous variable. The results of the statistic t show that there are several explanatory variables that individually do not have a significant effect on explanatory variables that are individually endogenous when using a significant level of 0.05. But with a more flexible level of significance, that is, using a greater real level of 0.20, it can be seen that most explanatory variables in each structural equation have a significant effect on their respective endogenous variables.

Thus, in general it can be said that the estimation of the model in this study is representative enough to illustrate the economic phenomenon of poverty and food security in Wiwiek Rindayati [2]

2) Results of Structural Equation Identification: In this study total variables (K) were 14 consisting of 5 endogenous variables (G) and 9 predetermined variables consisting of 5 different variables at the time (variable lag) and 4 exogenous variables. The calculation results are as follows:

TABLE III.
NECESSARY CONDITIONFROM EQUATION IN MODEL

No.	Equation	K	G	M	Information
1	Number of Poor Population	14	5	5	Over identified
2	Income Per Capita Agricultur Sector	14	5	4	Over identified
3	Production of Rice	14	5	4	Over identified
4	Energy Consumpt	14	5	3	Over identified
5	Protein Consumpt	14	5	4	Over identified

Source: Result from Calculation Researcher

3) Parameter Estimation of Structural Equation: The existence of heteroscedasticity in the model, seen from the sum of squares of residuals (residual sum square) on the weighted is smaller than the unweighted statistic of all estimated equations. Based on the results of the Durbin-h statistic test (Dh), it is obtained that the Dhitung value on weighted statistics is greater than the critical Dh value which means there is autocorrelation. According to Greene (2003) to overcome the problem of heteroscedasticity and autocorrelation in the estimation model the GLS method is used with cross-section wights and seemingly unrelated regressions (SUR) [16]. The panel data estimation results of the dynamic simultaneous equation model that has been done have eliminated these two problems, the details of the results are as follows:

a. Agricultural Sector Income Per Capita Equation

Agricultural sector income per capita is significantly affected by lag in agricultural sector income. While the population, rice production has no significant effect on the number of poor people.

The insignificance of rice production to the per capita income of the agricultural sector shows that as the main rice production center, the majority of the population is no longer supported by the agricultural sector as the main source of income. The value of elasticity in the short and long term does not experience changes still remain in an inelastic range. This condition shows that the amount of agricultural sector per capita income is not elastic influenced by rice production even very small numbers only 0.0154 shows that if rice production increases by 10 percent, the per capita income of the agricultural sector will increase by 1.54 percent. This is consistent with the agricultural conditions in the research area that rice production is not the only source of income for farmers in the study area, but there are other sources of income from other subsectors in the agricultural sector.

b. Rice Production Equation

Rice production is significantly affected by lags in rice production, rice prices and rice consumption. The increase in rice prices is expected to be an incentive for farmers to increase production. Through the amount of elasticity it is found that in the short term the price increases elastic and becomes the incentive for farmers but not in the long run. The price of rice has a positive and significant effect on rice production, the value of elasticity is relatively large at 1.723 in the short term. These results reinforce the results of previous studies such as Mulyana's (1998) study which said that in Java and Bali, Kalimantan and Sumatra the productivity response to grain prices was more elastic than in Sulawesi [2] . In the long run, rice production is not responsive to price changes, and rice prices are no longer an incentive factor for farmers to produce more. The small response of rice production to price changes due to several constraints, including the limited area of rice plantations where the amount of rice fields is reduced due to the rate of conversion of agricultural land [2].

c. Energy Consumption Equation

Energy consumption is significantly affected by lags in energy consumption and income per capita in the agricultural sector. While the consumption of rice with a level of looseness is widened significantly affecting energy consumption. Energy consumption is positively affected by rice consumption. Energy consumption in this research is per capita Energy Consumption per day (Kilokalori) grain food group. Energy consumption is a derivative of rice consumption, if rice consumption increases, energy consumption will increase because rice is the main source of carbohydrate which is an energy source. Short-term and long-term elasticity values do not experience a consistent change in the un-static range of 0.001 indicating that if rice

consumption increases by 100 percent, energy consumption will decrease by 2 percent. This shows that in addition to masish rice there are other foods as a source of energy in the staple food of the population. Per capita income in the agricultural sector in the short and long term has a significant negative influence describing a society whose income level is high enough and the average energy consumption has exceeded the standard of nutritional adequacy, so an increase in income will actually reduce energy consumption. This reinforces the occurrence of inequality in increasing income per capita in the agricultural sector.

d. Protein Consumption Equation

Protein consumption is significantly affected by energy consumption and rice consumption. While the lag of protein consumption and per capita income in the agricultural sector did not significantly affect protein consumption. Energy consumption has a significant positive effect on protein consumption with an elasticity value of 0.972 in the short term and 0.995 in the long run. In the short term and long term consumption of protein is not elastic to changes in energy consumption. The unidirectional relationship between energy consumption and protein consumption shows that rice as a staple food source contains a relatively balanced composition of energy and protein content, so that an increase in energy consumption is followed by an increase in protein consumption. Protein consumption is negatively affected by rice consumption. Protein consumption in this study is per capita protein consumption per day (grams) of grain food groups. Protein consumption is a derivative of rice consumption, if rice consumption is increased, consumption of protein should increase because rice is the main source of carbohydrates that contain protein sources. Negative results of the influence of consumption of rice with protein consumption illustrate that rice as a source of carbohydrates is not in harmony with energy consumption when rice consumption increases does not result in increased protein consumption. Short-term and long-term elasticity values do not experience consistent changes in the inelastic range. The protein content in the grains group is not enough. This shows that in addition to rice there are still other foods as a source of protein in the staple food of the population.

e. Production of Corn, Sugar Palm dan Milkfish

Portraits of the development of corn, sugar palm and milkfish production as superior commodities for realizing Banten's food security shows that corn and palm sugar have a very fluctuating production pattern which illustrates that

their production is unpredictable considering that it is very dependent on natural conditions. The total rice production shows the dominance of rice yield, while the field rice
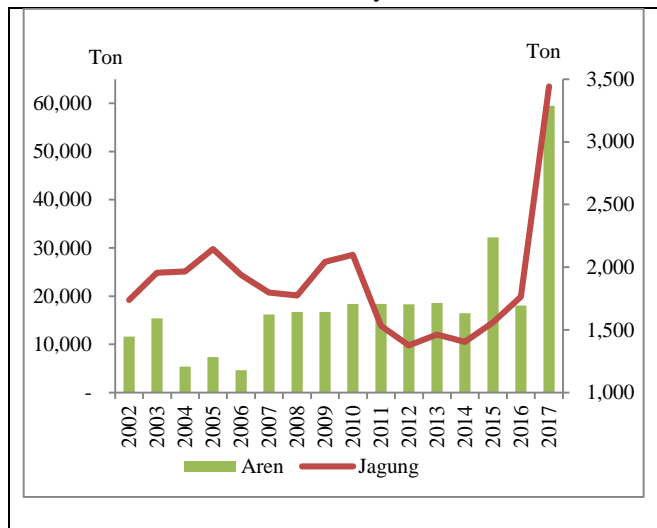

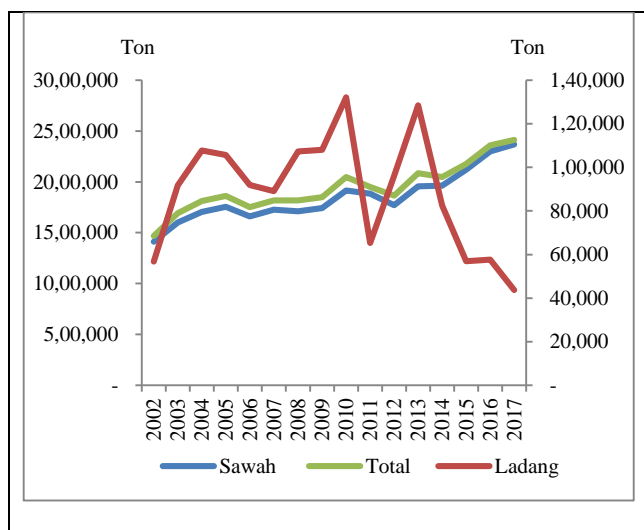Fig. 5 Production of sugar palm and corn Banten, Year 2002-2017

Fig. 6 Production of rice Banten Tahun 2002-2017

V. CONCLUSION AND RECOMMENDATION

The results of the study prove that the interconnectedness of Banten and National economies is very strong related to the conditions of economic growth, poverty and food security. Both existing poverty is significantly affected by income per capita in the agricultural sector. Food security measured through consumption of energy and protein derived from rice are both significantly affected by the amount of income per capita in the agricultural sector which is one of the measures of poverty. This gives an explanation that poverty and food

production is very volatile. Milkfish production data were not available in this study.

security that occur in the Banten region have interrelated relationships. The leading commodities in the food sector that have the potential to be an alternative to support the achievement of food security in the Banten region are corn, sugar palm and milkfish. Efforts to improve food security and decrease the number of poor people through increasing rice production have become a significant way in the Banten region through maintaining rice prices given the positive elastic price response to production in the short term but inelastic disincentives in the long run.

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