ANALYSIS OF ECONOMIC BEHAVIOR OF VIEWING FROM MARKET ASPECTS IN CENTRAL SULAWESI

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ABSTRACT

This study aims to analyze the economic behavior of rice from the market aspect in Central Sulawesi. The data used in this research is the type of time series 1971-2018. Data analysis was performed using an econometric model built in the form of simultaneous equations. The equation consists of 15 endogenous variables and 15 exogenous variableswith a lag of 9 variables. Furthermore, the model is estimated by the method2SLS and historical simulations for the period 1972-1980, years 1981-2001, and the period 2002-2018.The results showed that: (1) Year-end rice stocks were responsive to changes in market operating ratios both in the short and long term, namely 2,394% and 3,637%. (2) The amount of rice procurement was responsive to changes in time both in the short and long term, namely 1,050% and 1,007%, while the amount of rice imports was also responsive to changes in retail rice prices, namely 1,588% and 2,460%. (3) The amount of Bulog's rice release and retail rice prices are also responsive to changes in rice consumption, grain prices, and to production in the long run, namely 1,584%, 1,143% and 1,274%, respectively. (4) The farmer-level unhulled rice price is responsive to changes in the government purchase price in the long run, namely 1.24%.

Keywords: Combination of policies, government purchase prices, producer surplus, consumer surplus, welfare of rice farmers

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PRELIMINARY

Food security of a country is said to be good if all the population of a country at any time can have access to food in a volume and quality suitable for a productive and healthy life. Every individual's access to adequate food is a universal human right. Therefore, the extent to which a country respects the human rights of its citizens can be measured from its food security, even food security is used as an important indicator for the success of national development, in addition to indicators of economic growth and income distribution (Saragih, 2001). Rice food has a very strategic role in stabilizing food security, economic security and national political stability. The rice food crop development strategy pursued so far is the construction of technical irrigation, use of superior varieties, intensive fertilization, control of pests and diseases, and post-harvest handling. It aims to: (1) increase farmers' income and welfare; (2) overcome rice food shortages; and (3) stabilizing the price of rice food in the market.

Rice for the Indonesian people and countries in Asia is not just a food or economic commodity, but is a political and security commodity. Suryanaet. al. (2001) stated that the majority of Indonesians still want a stable supply (supply) and price of rice, available at all times, evenly distributed and at affordable prices. This condition shows that rice is still a

strategic commodity politically. Experience in 1966 and 1998 shows that political shocks can turn into devastating political crises because food prices spike rapidly. Currently, the annual population growth is around 3 million people, so if there is a shortage of rice there will be insecurity because rice is the staple food for the Indonesian people. The Indonesian population experiences a growth rate of around 1.49% per year so that the demand for rice will always increase (Krisnamurthi, 2002). If domestic production cannot meet domestic demand, rice will be imported from abroad.

The national rice policy demands that each region be more proactive in realizing these national goals, including in the Central Sulawesi Province. Based on historical data (1971-2018), the development of rice production in Central Sulawesi fluctuates and tends to experience a higher increase compared to the level of public consumption. This shows that there has been a surplus of rice production in Central Sulawesi. The rice surplus is traded between regions and between islands, including to the Provinces of Gorontalo, North Maluku, East Kalimantan and North Kalimantan. Therefore, in the future it is very possible for Central Sulawesi to become a center for rice production in Eastern Indonesia. The increase in the amount of rice production was caused by an increase in the harvested area of rice which has increased every year, with an average increase of 2.5% (BPS, 2019). Other factors indirectly affecting the increase in production consist of: (1) irrigation facilities and infrastructure; (2) rainfall; (3) intensity of pest and disease attacks; and (4) use of production facilities. An increase or decrease in these factors will have an impact on the increase or decrease in rice production, either directly or indirectly.

From the consumption aspect, the increase in population is a factor that causes an increase in the amount of rice consumption. Since 1971-2018, there has been an increase in population with an average growth of 2.76% per year. In addition, another factor that affects the amount of rice consumption is the per capita income of the population. The population per capita income of Central Sulawesi has increased every year, namely by 12.96%. Therefore, increasing population and income per capita will have a positive impact on increasing the amount of rice consumption. However, there has been a decrease in rice consumption in the years 1997-1998, 2000-2001, 2003-2004, and 2014-2015 (Ministry of Agriculture and BPS, 2019). The decrease in the amount of rice consumption is thought to be caused by an increase in consumption of other foods,

Nationally, rice is the staple food of 98% of Indonesia's population (Riyadi, 2002), as well as in Central Sulawesi Province. In the component of consumption expenditure for Indonesians, rice has the highest weight. Therefore, national inflation is strongly influenced by changes in rice prices (Sutomo, 2005). Furthermore, rice has a strategic role in strengthening food security, economic resilience and national political resilience / stabilization (Suryana, et al., 2001). According to Timmer (1975) it is concluded that in Java, 31% of the cost of living of the population is spent on consuming rice and as a wage item. These two things make rice one of the cost push inflation factors.

The economic behavior of rice in terms of market aspects is influenced by many complex factors. In the research model Putri, et al., (2013; Septiadi, et al., (2016); Siswanto, et al., (2018); and Rifiana da Budiwati (2019) describe that demand/consumption of rice, rice stocks, rice procurement, release rice, retail rice prices, rice imports, imported rice prices, unhulled rice prices, and government purchase prices are all factors that influence the

economic policy of rice in several regions in Indonesia. This economic behavior is important to know so that stakeholders can easily make decisions. This paper aims to analyze the economic behavior of rice from a market aspect in Central Sulawesi.

RESEARCH METHODS

The data used in this research is secondary data type with time series type. Time series data or time series are used, namely for 48 years (1971 to 2018) in aggregate. The research data is sourced from the Central Statistics Agency (BPS) of Central Sulawesi Province and the Central BPS, the Logistics Agency (Bulog), the Ministry of Agriculture, Bank Indonesia, and other agencies related to the data needs in this study.

Data analysis was performed using an econometric model built in the form of simultaneous equations. The equation consists of 15 endogenous variables and 15 exogenous variableswith a lag of 9 variables. Furthermore, the model is estimated by the method2SLS.The econometric model that was built refers to the research results of Putri, et al., (2013); Septiadi, et al., (2016); Siswanto, et al., (2018); and Rifiana and Budiwati (2019) as follows:

QSBIt = PBI_t- JBBt + SBATt + JIBt - EXPORTS. …… .. …… ..... …… .... (1)

SBATt = a0 + a1HBERt + a2JLGBt + a3JIBt + a4 (OP / LOP) t + a5SBATt-1 + Ut ..... (2)

JIBt = b0 + b1HIBIRt + b2ERt + b3SBATt-1 + b4 (HBER-LHBER) t + b5PBIt + b6JIBt-1 + Ut .. (3)

HIBIRt = c0 + c1 (HBDR-LHBDR) t + c2 (TARIF-LTARIF) t + c3HIBIRt-1 + Ut… ..... (4)

DBINt = d0 + d1HBERt + d2HJTPRt + d3JPIt + d4PPPt + d5DBINt-1 + Ut …… ..... (5)

JBBt = $PROB_t$ * PBSTt..... .... (6)

JPGBt = e0 + e1HGTPRt + e2SBATt + e3TAPBt + e4PBSTt + e5INFt + e6TWt + e_7JPGBt-1 + Ut .... (7)

JLGBt = f0 + f1DBINt + f2SBATt-1 + f3 ((JPGB-LJPGB) / LJPGB) t + f4LJGBt-1 + Ut …… ..... (8)

HBERt = g0 + g1HGTPRt + g2PBIt + g3TWt + g4HBERt-1 + Ut ……. …… .....(9)

MPBIt = $HBER_t$ - HGTPRt * Kt..... ..... (10)

PUPPt = ($HGTPR_t$* YPPt) - (HPURt * JPUt) - (HTSPRt * JTSPt) - (HPSRt * JPSt) - UTKRt - BPKRt - BPIRt - SHARt - BPLNRt ……. …… .... (11)

HGTPRt= h0 + h1 (HIBIRt * ERt) + h2HPPRt + h3MPBIt + h4PPIt + h5HGTPRt-1 + Ut ..... (12)

HPPRt = i0 + i1HBDRt-1 + i2ERt + i3HPPRt-1 + Ut …… ..... …… ..… ... …… ..… … (13)

PPMRt = $TARIFFR_t$ * JIBt… ... …… .... …… (14)

DEVISAt = HIBIRt * JIBt …… ....… (15)

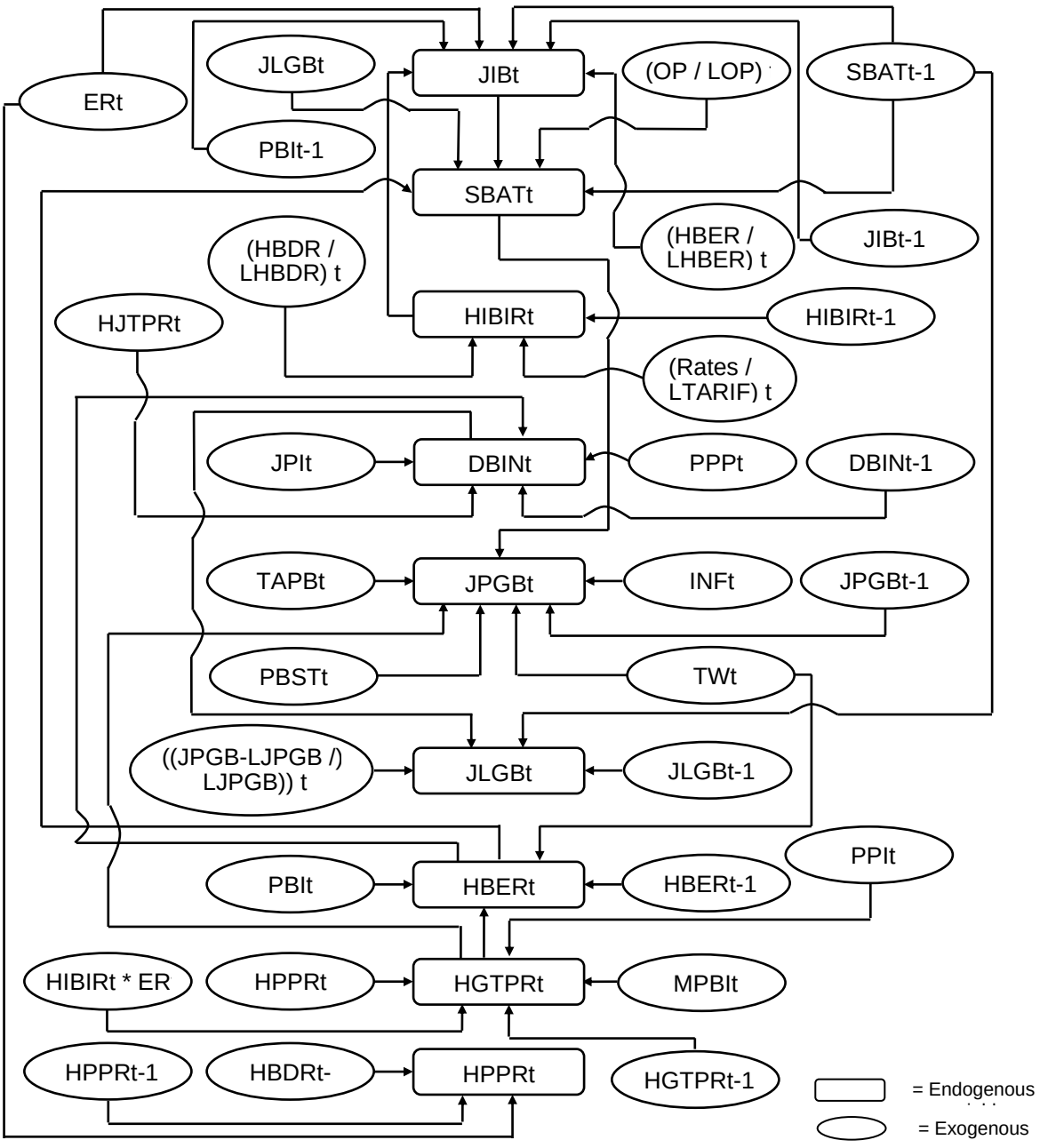

Figure 1. Flow diagram of the relationship between variables

Information:

QSBIt = Supply of rice (Kg)
PBIt = Rice production (Kg)
JBBt = Amount of rice for seed, usage other / shrinkage (Kg)
SBATt = Year-end rice stock in Bulog (Kg)
JIBt = Amount of imported rice (Kg)
EKSPORt = Amount of rice exports (Kg)
DBINt = The amount of rice consumption for food (Kg)
JIBt-1 = Lag in the amount of rice imports
HIBIRt = The import price of rice
HBDRt = World rice price (US $ /Kg), deflated with the base year Indonesian CPI (2010 = 100)
LHBDR = World rice price lag
TARIFFRt= Indonesian rice import tariff (Rp/Kg)
LTARIFR= Lag in rice import tariffs
HIBIRt-1 = Lag in the import price of rice
MPBIt = Marketing margin of rice (Rp/Kg)

JPIt = Total population of Central Sulawesi (Soul)
PPPt = Sulawesi population income Middle (Rp)
LHBER = Lag in retail rice price
DBINt-1 = Lag the amount of rice consumption for food
JBB = Amount of rice for seed, usage others, shrinkage and scattered (Kg)
PROBt = Proportion of rice to seed, usage other / shrinkage (%)
PBSTt = Central Sulawesi rice production (Kg)
SBATt = Year-end rice stock (Kg)
HBERt = The retail price of rice (Rp/Kg), deflated with the consumer price index (CPI) base year (2010 = 100)
JLGBt = Amount of release of grain/rice (Kg)
OPt = Bulog market operations (Kg)
LOPt = Bulog market operation lag
SBATt-1 = Year-end rice stock lag in Bulog
Ut = Disturb variable
JPGBt = Amount of unhulled rice / rice (Kg)
TAPBt = Total procurement budget grain / rice (Rp)
INFt = General inflation rate (%)
TWt = Time trend of time
JPGBt-1 = Lag in the amount of grain / rice procurement
JLGBt = The amount of unhulled rice / rice
LJGBt-1 = Lag amount of unhulled grain / rice
HBERt-1 = Sulawesi retail rice price lag Middle
LHBER = Amount of imported rice (Kg)
HIBIRt = The import price of rice (Rp / Kg), deflated with the CPI base year (2010 = 100)
ERt = Rupiah exchange rate against Dollar (Rp / US $)
Kt = Conversion rate
PUPPt = Rice farmer farming income (Rp / Ha)
HGTPRt = Price of grain at farmer level (Rp/Kg), deflated by the base year CPI (2010 = 100)
HJTPRt = Farmer level maize price (Rp/Kg), deflated by the base year CPI (2010 = 100)
YPPt = Rice productivity (Kg /Ha)
HPURt = Price of urea fertilizer (Rp / Kg), deflation with the CPI base year (2010 = 100)
JTSPt = Total use of TSP (Kg / Ha)
HTSPRt = TSP price (Rp / Kg), deflated by Base year CPI (2010 = 100)
JPSt = Amount of pesticide use (Kg /Ha)
HPSRt = Pesticide price (Rp / Kg), deflation with the CPI base year (2010 = 100)
UTKRt = Labor wages (Rp /Ha)
BPKRt = Cost of manure (Rp /Ha)
BPIRt = Irrigation irrigation costs (Rp /Ha)
SHARt = The cost of renting animals and tools (Rp / Ha)
BPLNRt = Other costs (Rp / Ha)
HGTPRt = Price of rice for Sulawesi farmers Middle (Rp /Kg)
HPPRt = Government Purchase Price (Rp/Kg), deflated by the base year CPI (2010 = 100)
HGTPRt-1 = Lag in farmer-level grain prices Central Sulawesi
HPPRt-1 = Government Purchase Price Lag (Rp / Kg)
PPMRt = Government revenue (Rp)
DEVISA = Foreign exchange revenue (US $)

Furthermore, elasticity measurements are carried out to see the response of endogenous variables in an equation to changes that occur in exogenous variables that affect them (Nicholson and Snyder, 2010). If the elasticity value is greater than one (E> 1), it is said that the endogenous variable is inelastic (responsive) to changes in exogenous variables, while the elasticity value between zero and one (0 <E <1) means the endogenous variable is inelastic (unresponsive).

$$E(Xi)sr = (\alpha_i)(\frac{\dot{X}_{it}}{\bar{Y}_t}) \quad \text{(16)}$$

$$E(Xi)lr = (\frac{E(Xi)sr}{1-an}) \quad \text{(17)}$$

Information:
$E(Xi)sr$ = Short-run elasticity of variable X_i
α_i = Exogenous variable regression coefficient Xi
$\dot{X}_{it}$ = The mean of the exogenous variables Xi
$\bar{Y}_t$ = Average endogenous variables Yt
E(Xi)lr = Elasticity in the long run
an = Lag variable regression coefficient

RESULTS AND DISCUSSION

The results of the model evaluation show that all the structural equations built have met economic criteria, statistical criteria, and econometric criteria. Based on economic criteria, the model being evaluated shows that all the signs and the magnitude of the expected parameters on the exogenous variables in the equation are in accordance with the hypothesis.HasThe prediction of rice market behavior in Central Sulawesi in this study is quite good. This can be seen from the value of the coefficient of determination (R2) of each behavior equation, which ranges from 0.262 to 0.987, where the equation for the amount of rice imports (JIB) has the lowest R2 value while the rice consumption equation (DBIN) has the highest R2 value. This condition shows that in general the explanatory variables (exogenous variables) in the behavior equation are able to explain endogenous variables well. Meanwhile, based on the durbin-h statistical test, it is known that all equations in the model do not have serial correlation problems. According to Pyndick and Rubinfeld (1991),

Based on the results of the F test statistically, the calculated F-probability value in each equation ranges from <.000 to 0.047. This value indicates that all exogenous variables have a positive influence on endogenous variables. This means that the variation of the explanatory variables in each behavior equation is able to explain well the variation of the endogenous variables at the 99.99% and 99.95% confidence levels. Meanwhile, the t statistical results show that there are several explanatory variables that are not significant or have no significant effect on the endogenous variables at the error level α = 0.05 (*), α = 0.1 (**), α = 0.15 (***), and α = 0.20 (****).the model in this study can describe fenomena rice market behavior.in Central Sulawesi.

1. Rice Consumption Demand

The results of the analysis show that the retail rice price variable (HBER) shows a negative effect on rice consumption demand, while the population size variable and rice consumption lag have a positive effect (α = 20% and 5%). Furthermore, if viewed from the value of its elasticity, it can be said that the total demand for rice consumption is not responsive (inelastic) to changes in the retail rice price variable and population, both in the short and long term. This indicates that although these variables have an effect, the impact of the changes is relatively small. A 1% increase in the price of rice will reduce the demand for rice for consumption by 0.074% in the short term and by 0.252% in the long term. Meanwhile, for the population variable, every 1% increase will increase the total demand for rice consumption by 0.277% in the short term and by 0.950% in the long term. This phenomenon is in accordance with the research results of Setiawan, et al. (2016), however, in this study, cassava was added as a substitute commodity. These results are also relevant to the research results of Riyanto et al. (2013) regarding the demand for rice in the Jambi Province and the results of research by Rifiana and Budiwati (2019), where the retail rice price has a negative and significant relationship to the total demand for rice. These results are also relevant to the research results of Riyanto et al. (2013) regarding the demand for rice in the Jambi Province and the results of research by Rifiana and Budiwati (2019), where

the retail rice price has a negative and significant relationship to the total demand for rice. These results are also relevant to the research results of Riyanto et al. (2013) regarding the demand for rice in the Jambi Province and the results of research by Rifiana and Budiwati (2019), where the retail rice price has a negative and significant relationship to the total demand for rice.

Table 1. Estimated results of parameters for rice consumption demand

Variable	Estimated Parameters	Pr> | t |	Elasticity		Variable Label
			Short-term	Long-term	
Intercept	16246170	0.028	-	-	*Intercept*
HBER	-6416,230	0.179 ****	-0.074	-0.252	The retail price of rice in Central Sulawesi
HJTPR	2475	0.733	-	-	Prices of corn
JPI	35,859	0.008 *	0.277	0.950	The population of Central Sulawesi
PPP	0.514	0.340	-	-	Central Sulawesi residents' income
LDBIN	0.708	<.000 *	-	-	*Lag* consumption of rice

R2 = 0.987; Pr> F = <.000; Dw = 3.078; Dh = 1.7338

2. End of Year Rice Stock

Table 2 shows that the variable volume of rice released by Bulog (JLGB) and market operation ratio (OP2) shows a negative effect on year-end rice stocks, while the lag variable year-end rice stocks shows a positive effect (α = 5% and 15%). The results of this study, especially on the rice price variable, are relevant to the research results of Rifiana and Abdurrahman (2018), but there are differences in the probability value.

Table 2. Estimated results of year-end rice stock parameters

Variable	Estimated Parameters	Pr> | t |	Elasticity		Variable Label
			Short-term	Long-term	
Intercept	9808233	0.016	-	-	*Intercept*
HBER	284,744	0.511	-	-	Retail price of rice
JLGB	-0,270	0.016 *	-0394	-0.598	The amount released by Bulog
JIB	-0.005	0.483	-	-	Amount of imported rice
OP2	-4974225	0.123 ***	2,394	3,637	Market operation ratio
LSBAT	0.342	0.019 *	-	-	*Lag* end of year rice stock

R2 = 0.656; Pr> F = <.000; Dw = 1,841; Dh = 5,171

When viewed from the value of its elasticity, it can be said that the end of year rice stock is not responsive (inelastic) to changes in the variable of the amount of rice released by Bulog, both in the short and long term. This indicates that although these variables have an effect, the impact of the changes does not occur quickly. A change in the quantity of Bulog's rice releases by 1% will reduce the year-end rice stock by 0.394% in the short term and 0.598% in the long term. Meanwhile, year-end rice stocks responded (elastically) to changes

in market operating ratios, both in the short and long term. This indicates that the market operating ratios have a rapid effect on changes in rice stocks at the end of the year. Increase in market operating ratio by 1%, will increase rice stock at the end of the year by 2,394% in the short term and 3,637% in the term with the aim of maintaining the stability of the rice stock at Bulog. The results of this study are relevant to the results of research by Tanko and Alidu (2016) which found that the variable amount of rice imports has a negative and significant relationship with rice stocks in North Gana Province, and is responsive to changes in endogenous variables.

3. Number of Bulog Rice Procurement

Table 3 shows that the farmer-level grain price (HGTPR) and inflation rate (INF) variables show a negative effect on the amount of rice procured by Bulog, while the Bulog total budget variable and time trend show a positive effect (α = 5%). On the other hand, the research results of Rifiana and Budiwati (2019) found that rice stock and production were positively and significantly related to rice procurement.

Table 3. Results of estimation parameters for the quantity of rice procurement by Bulog

Variable	Estimated Parameters	Pr> | t |	Elasticity		Variable Label
			Short-term	Long-term	
Intercept	11011408	0.000	-	-	*Intercept*
HGTPR	-6155.62	0.011 *	-0.527	-0.506	Farm-level grain prices
SBAT	0.065137	0.784	-	-	End of year rice stock
TAPB	0.000072	0.000 *	0.309	0.296	Bulog's total budget
PBI	-0.03323	0.367	-	-	Central Sulawesi rice production
INF	-265054	0.000 *	-0.158	-0.152	Inflation rate
TW	772053.9	0.024 *	1,050	1,007	*Trend* time
LJPGB	-0.04232	0.731	-	-	*Lag* procurement of rice

R2 = 0.867; Pr> F = <.000; Dw = 1.399; Dh = 118,630

If seen from the value of elasticity, it can be said that the amount of rice procured by Bulog is not responsive (inelastic) to changes in the variable price of grain at the farmer level, inflation rate, and the total budget of Bulog in the short and long term. The results of this study are different from the results of research by Tanko and Alidu (2016) in North Gana Province, where the variable price of grain/rice has a positive and responsive effect on changes in rice procurement.

4. Bulog's Rice Release Amount

Table 4 shows that the variable rice consumption (DBIN) and the amount of rice released by Bulog in the previous year (LJLGB) showed a positive effect on the amount of rice released by Bulog (α = 5%). Meanwhile, the research results of Rifiana and Abdurrahman (2018) as well as Rifiana and Budiwati (2019), also found that the amount of Bulog's rice releases in the previous year and year-end rice stocks had a positive and significant relationship to the distribution / release of rice.

When viewed from the value of its elasticity, it can be said that the amount of rice released by Bulog is not responsive (inelastic) to changes in consumption demand in the short term, but responsive (elastic) in the long run. An increase in the amount of assumed consumption by 1% will only increase the amount of rice released by 0.628% in the short term while consumption demand assumes a rapid (relatively large) impact on the amount of rice released by Bulog.

Table 4. The estimation results of the parameters for the amount of rice released by Bulog

Variable	Estimated Parameters	Pr> | t |	Elasticity		Variable Label
			Short-term	Long-term	
Intercept	-2692733	0.219	-	-	*Intercept*
DBIN	0.071714	0.005 *	0.628	1,584	Consume rice
LSBAT	-0.164	0.252	-	-	Year-end rice stock lag
JPGB3	205913	0.571	-	-	Bulog's rice procurement growth
LJLGB	0.604	<.000 *	-	-	*Lag* release of rice

R2 = 0.905; Pr> F = <.000; Dw = 1,895; Dh = 2.201

5. Retail Price of Rice

Table 5 shows that the farmer-level rice price (HGTPR) variable, rice production (PBI) and the previous year's retail rice price (LHBER) have a positive effect on retail rice prices, while the time trend variable (TW) has a negative effect (α = 5%). When viewed from the value of elasticity, it can be said that in the short run the total retail price of rice is not responsive (inelastic) to changes in the price of grain at the farm level and changes in rice production. An increase in the price of grain at the farm level and rice production by 1% will increase the retail price of rice by 0.638% and 0.712% in the short term, respectively. Meanwhile in the long term, retail rice prices are responsive to changes in grain prices and rice production.

Table 5. Estimation results of retail rice price parameters

Variable	Estimated Parameters	Pr> | t |	Elasticity		Variable Label
			Short-term	Long-term	
Intercept	-444,556	0.000	-	-	*Intercept*
HGTPR	1.024311	0.000 *	0.638	1,143	Farm-level grain prices
PBI	8.27E-06	0.000 *	0.712	1,274	Central Sulawesi rice production
TW	-45.1241	0.006 *	-0.446	-0,799	*Trend* time
LHBER	0.441491	<.000 *	-	-	*Lag* retail rice price

R2 = 0.987; Pr> F = <.000; Dw = 1.689; Dh = 3,521

These findings are reinforced by the results of research by Septiadi, et al. (2016), where the farmer-level grain price variable has a positive but unresponsive relationship to the retail rice price, both in the short and long term, while the rice production variable shows a negative relationship. The same thing was also found in the research results of Rifiana and

Budiwati (2019), where the two variables (grain price and rice production) were significant for retail rice prices and were not responsive to changes in rice prices.

6. Total Imports of Rice

Table 6 shows that the variable changes in the retail price of rice (HBE1) and the amount of rice imports in the previous year (LJIB) have a positive effect on the total imports of rice (α = 15% and 5%). If viewed from the value of its elasticity, it can be said that the variable amount of rice imports is responsive to changes in retail rice prices both in the short term and in the long term. An increase in the change in retail rice price by 1% will increase the amount of rice imports by 1,588% in the short term and by 2,460% in the long term. This shows that the variable amount of rice imports has a rapid impact on changes in retail rice prices.

Table 6. The estimation results of the parameter of the amount of rice imports

Variable	Estimated Parameters	Pr> | t |	Elasticity		Variable Label
			Short-term	Long-term	
Intercept	8,260,613	0.112	-	-	*Intercept*
LIPS	-212,978	0.938	-	-	The price of imported rice
ER	919,436	0.356	-	-	Exchange rate
LSBAT	-0.330	0.447	-	-	Year-end rice stock lag
HBE1	7434,288	0.115 ***	1,588	2,460	Changes in retail rice prices
PBI	-0.00263	0.953	-	-	Central Sulawesi rice production
LJIB	0.355	0.027 *	-	-	*Lag* the amount of imported rice

R2 = 0.262; Pr> F = 0.047; Dw = 1,926; Dh = 4,890

The results of this study are corroborated by the results of research by Septiadi, et al. (2016) and Rifiana and Budiwati (2019), where the retail rice price variable has a positive and significant relationship with the amount of rice imports but is not responsive to changes, both in the short and long term. On the other hand, the research results of Yulnita and Yeniwati (2019) show that rice production has a significant effect on Indonesia's rice imports.

7. Price of Imported Rice

Table 7 shows that the variable changes in world rice prices (HBD1), changes in import tariffs, and the previous year's imported rice prices (LHIBIR) show a positive effect on imported rice prices (α = 5%). Imported rice prices are responsive (elastic) to changes in import tariff variables in the short term. An increase in import tariff changes by 1% will increase the price of imported rice by 1197.97% in the short term. This indicates that the import tariff variable has an impact on changes quickly in the short term on the price of imported rice. Meanwhile, in the long run, the price of imported rice is not responsive (inelastic).

Table 7. Estimation results of imported rice price parameters

Variable	Estimated Parameters	Pr> | t |		Elasticity		Variable Label
				Short-term	Long-term	
Intercept	-7,218	0.932		-	-	*Intercept*
HBD1	0.301	0.001	*	0.703	-35,661	Changes in world rice prices
TARIFF	3,528	<.000	*	1197,970	-60,740	Changes in import tariffs
R1						
LIPS	1,020	<.000	*	-	-	*Lag* the price of imported rice

R2 = 0.950; Pr> F = <.000; Dw = 2.209; Dh = 1,003

An increase in import tariff changes by 1% will reduce the price of imported rice by 60,740% in the long run. This indicates that the import tariff variable has a relatively large impact in the long run on the decline in the price of imported rice. The results of this study are in line with the results of research by Septiadi, et al. (2016), where the duna rice price variable has a positive and significant relationship with the price of imported rice, and is responsive to changes in the long term but not responsive in the short term.

8. Farmer Level Grain Prices

Table 8 shows that the variable government purchase price (HPPR) and the previous year's farmer-level grain price (LHGTPR) have a positive effect on farmer-level grain prices, while the rice production variable (PPI) has a negative effect (α = 5%). The positive effect of the government purchase price on the price of grain at the farm level is understandable because the basic price policy for output is oriented towards the protection of farmers or producers. The determination of the basic price for unhulled rice has been carried out since 1969/1970 with the aim of stimulating production (Amang and Sawit, 1999) and then updated by setting the basic price for government purchases since 2002 (Krisnamurthi, 2003).

Table 8. Estimated results of farmer-level grain price parameters

Variable	Estimated Parameters	Pr> | t |		Elasticity		Variable Label
				Short-term	Long-term	
Intercept	213,492	0.075		-	-	*Intercept*
LIPS	0.028	0.758		-	-	The price of imported rice
HPPR	0848	0.001	*	0.772	1,204	Government purchase price
MPBI	-0.018	0879		-	-	Rice marketing margin
PPI	-9.20E-07	0.023	*	-0.202	-0.314	Central Sulawesi rice production
LHGTPR	0.359	0.005	*	-	-	*Lag* farmer-level grain prices

R2 = 0.964; Pr> F = <.000; Dw = 1,782; Dh = 4,809

If viewed from the value of elasticity, it can be said that in the short run the farmer-level rice price is not responsive (inelastic) to changes in government purchase prices in the short term. An increase in the government purchase price of 1% will increase the price of grain at

the farm level by 0.772% in the short term. This shows that although these variables have an effect, the impact of the changes is relatively small. Meanwhile, in the long run the farmer-level grain price is responsive to changes in government purchase prices, where an increase in government purchase price of 1% will increase the price of grain at the farm level by 1,204% in the long run. This shows that these variables have an impact on changes rapidly on the price of grain at the farm level. Furthermore, even though rice production variables have an effect, the impact of the changes does not respond to the price of grain at the farmer level both in the short and long term. An increase in rice production by 1% will reduce the price of grain at the farm level by 0.202% in the short term and 0.314% in the long term, respectively.

9. Government Purchase Prices

Table 9 shows that the variable world rice price (HBDR) and the previous year's government purchase price (LHPPR) show a positive influence on government purchasing price policy (α = 5%).

Table 9. Estimated results of government purchase price parameters

Variable	Estimated Parameters	Pr> | t |		Elasticity		Variable Label
				Short-term	Long-term	
Intercept	-46,399	0.149		-	-	*Intercept*
HBDR	0.132	<.000	*	0.0001	0.001	World rice prices
ER	0.006	0.412		-	-	Exchange rate
LHPPR	0.805	<.000	*	-	-	*Lag* government purchase price

R2 = 0.981; Pr> F = <.000; Dw = 1,782; Dh = 2,216

When viewed from the value of its elasticity, it can be said that both in the short term and in the long run the government purchase price is not responsive (inelastic) to changes in world rice prices. An increase in world rice prices by 1% will increase the government purchase price by 0.0001% in the short term and by 0.001 in the long term.

This shows that although these variables have an effect, the impact of the changes is very small. The results of this study are relevant to the research results of Siswanto et al. (2018) but gave different estimation results on the world rice price variable, where the world rice price variable had a negative relationship with the increase in government purchase prices. A 1% increase in government purchase prices will reduce world rice prices by 0.317%. This can be triggered by a reduction in the amount of domestic imports and a reduction in aggregate world demand for rice.

CONCLUSION

Analysis of rice economic behavior in Central Sulawesi shows that: (1) Year-end rice stocks are responsive to market operations while the amount of rice procured is responsive to time changes in both the short and long term. (2) The amount of rice released by Bulog is responsive to the total consumption of rice, while the retail price of rice is responsive to the price and production of grain in the long run. (3) The amount of rice imports is responsive to changes in retail rice prices, while imported rice prices are responsive to changes in import tariffs, both in the short and long term. (4) The price of grain at the farmer level is responsive to the government purchase price in the long run. Therefore, local government policies must always be in favor of farmers, especially in terms of providing incentives,

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