

Food Stability Analysis In East Java

Lutfi Asnan Qodri, Dwi Wulandari, Hadi Sumarsono

Abstract: Fluctuations in food prices can cause uncertainty about estimated public spending. The purpose of this study is to show the relationship between the price of basic necessities to the total population, the average production amount of community income, and the exchange rate of farmers (NTP) in East Java. Because this matter concerns the interests of all people in meeting their basic needs. The method used is quantitative using the Vector Error Correction Model (VECM). The results can be concluded that Farmer Exchange Rates (NTP) significantly influences the stability of rice and sugar prices in East Java. The population also has a significant influence on the price of cooking oil in East Java.

Keywords: Price of Rice, Price of Sugar, Cooking Oil Prices, Volatility Price, Vector Error Correction Model

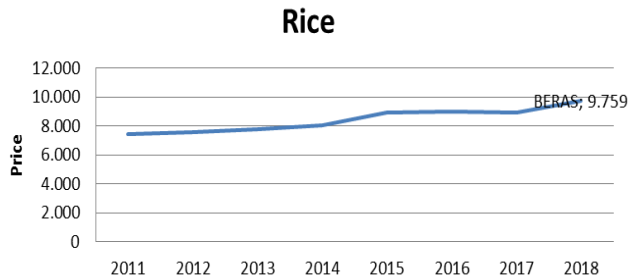
1. INTRODUCTION

Food price stability is one of important things in a country's economic development. One of the efforts to make good money is through food prices. Controlling food prices is needed to support a stability of prices of basic commodities. Trostle (2008) explains that food prices in the world such as grains and vegetable oil which are the two main commodities in households have experienced a very significant price increase, starting from 2007-2008 has increased prices by 60 percent, this is almost happening in all parts of the world. The situation that occurs in developing countries, especially in Indonesia is different. Furceri et al. (2016) the majority of domestic food production is consumed in the same region, hence the agricultural and weather conditions that occur in the region affect the stability of food prices themselves. Besides these factors, several other factors are market structure, taxes, and subsidies. Arezki et al. (2017) explained that in Africa and Asia the region has its own challenges in maintaining food price stability. Ethiopia has experienced the worst extreme drought in recent years. Rainy weather which is expected to supply more than 80 percent of Ethiopian agricultural output and employ 85 percent of the workforce must be drastically reduced. This is also exacerbated by the impact of the 2015-2016 El-Nino storm in Asia even more severe than in certain locations, such as in the highlands of Cambodia, Central and Southern India, central and Southern Philippines, Central and Northeast Thailand, and Countries other Pacific island nations.

Indonesia has a legal regarding policies in the form of Law Number 7 of 1996, Law Number 18 of 2012 concerning food and Law Number 7 of 2014 concerning trade, Minister of Trade Regulation on Management of government rice reserves for price stability article 2 paragraph 1 of 2018. This law is intended to anticipate and serve as the basis for making a policy to control price stability at both the central and regional levels. This policy is aimed at anticipating fluctuating food prices. Because this can be detrimental to producers as suppliers of goods, traders as sellers, and also consumers as buyers of these goods. In addition, the aim is

to reduce fluctuations in food prices on the market. Because when fluctuations are precisely uncontrolled which has an impact on soaring food prices, especially food, which results in a decrease in people's purchasing power. Sari (2010) Problems of increasingly expensive and unpredictable food prices that can have an impact on fluctuations that can increase the risk for traders, consumers, producers and the government. According to Meier and Baldwin (1957); Azizah et al. (2018); Sari (2010) mentioned that an overpopulation will actually be a problem when it cannot be controlled, because if the population continues to increase drastically each year it will have an effect on existing food availability. On the other hand this will have an impact on increasing the number of poor people due to high competition for jobs. Likewise in East Java according to data from Indonesia Statistics East Java Province has a population of 39.3 Million in 2017. By placing Surabaya as the city with the most population. Azizah et al. (2018) population growth in East Java will cause serious problems for welfare and development, so the increase in population must be balanced with the support of good economic growth in order to continue to achieve a food stability as a whole. Trisnowati and Budiwinarto (2013) Income has a positive effect on the proportion of expenditure for rice groups with the greatest elasticity value and is elastic in nature. However, it is inversely proportional to the theory that has been submitted by Engel (2011) states that an increase in income will increase the welfare of the community so that the share of household food consumption expenditure will decrease. The share of food expenditure for rice, chili peppers and shallots has tended to show a good trend because people still use their income to buy these food commodities. According to Prabowo (2014) stated in his research classifying 20 basic commodities, of the top 3 commodities based on the first community expenditure is the commodity of rice, cooking oil, granulated sugar. The three staples are primary commodities for the majority of Indonesian people. Rice commodity is one of the important commodities that has an impact on social, economic and political stability. According to Sari (2010) rice commodity is a major factor that can also affect the stability of prices of other goods. this is the reason why the government established the "Badan Urusan Logistik" (Bulog) at the provincial level and the "Depot Logistik" (Dolog) at the provincial level, this is aimed at managing price stability and availability, especially national rice.

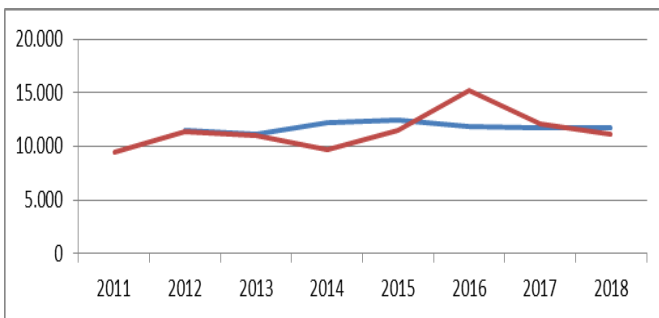
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Source : Siskaperbapo (2019)

Figure 1. East Java rice price movements 2011-2018

Based on the Figure 1, it can be seen that the price of rice has a continuous upward trend, recorded starting in 2011 which stood at Rp. 6,500 and at Rp. 9,700.- per kilos in 2018. The price of rice, which is a primary commodity and basic needs for almost the majority of Indonesian people, makes commodities the most important factor among other food commodities. Therefore, it is with cooking oil commodities. Cooking oil ranks second based on public expenditure on basic commodities after rice. Until now, palm oil and coconut oil have become the main raw materials in making cooking oil. Related to the stability of the price of cooking oil in East Java, especially regarding price stability, is one of the focuses of the East Java government's current policy. This aims to maintain the quality of life worthiness of the people of East Java for what is consumed. The government is expected to be able to regulate cooking oil price control regulations to remain stable and affordable.



Source : Siskaperbapo (2019)

Figure 2. Price movements of Edible Oil and Sugar in East Java 2011-2018

Based on the Figure 2, it can be concluded that the price of domestic cooking oil and sugar is fluctuating. In particular the price of sugar was estimated at Rp. 16,000 in 2016. This caused uncertainty over the increase in selling prices of the Sugar itself. One of the causes of this uncertainty is the important sugar from other countries which is not directly related to domestic sugar. Domestic sugar prices tend to be less competitive in price, foreign sugar production is more effective and modern compared to domestic sugar production. One of the commodities most needed by the people of Indonesia, especially East Java, is Granulated Sugar. East Java people since the Dutch colonial era have been able to produce sugar commodities made from sugar cane. Since the first century, it is estimated that the people of East Java have had a sugar industry. With a very long time span, the

condition of the sugar industry which was originally able to produce independently since 1967 Indonesia actually became an importer of sugar. According to Pambudy (2003) in 1920 Indonesia became one of the largest sugar producers in the world, but ironically it actually declined in the period 1967 until now where that has changed and is inversely proportional. According to Prabowo (2014), the commodity of Rice, Cooking Oil and Sugar is the top three commodities traded by the public so far. From various causes of price fluctuations due to various factors ranging from the total population, the number of factors of production of these goods, the average value of income, the exchange rate of farmers.

2 METHOD

This study uses explanatory research using time series data and from January 2014 to December 2018. This time was chosen because during this time frequent volatility in food price stability, especially in the province of East Java. The data used are sourced from the Information System of Availability and Development of Staples (Siskaperbapo), East Java Agriculture Office and East Java. This study uses explanatory research using time series data and from January 2014 to December 2018. This time was chosen because during this time frequent volatility in food price stability, especially in the province of East Java. The data used is sourced from the Information System of Availability and Development of Staples (Siskaperbapo), the Office of Agriculture in East Java and the Central Statistics Agency of East Java.

Table 1. Secondary Data Variables and Sources.

No	Variable	Symbol	Source
1	Price of Rice	HB	Siskaperbapo
2	Price of Cooking Oil	HMG	Siskaperbapo
3	Price of Sugar	HGP	Siskaperbapo
4	Total Population	JP	BPS Jatim
5	Amount of Rice Production	JPB	Dinas Pertanian Jatim
6	Average Income	RRP	BPS Jatim
7	Farmer Exchange Rates	NTP	BPS Jatim

Source: Data processed

There are several stage in study consisting of stationarity test, cointegration test, and VECM test. In more detail, stationary test is estimated using ADF test (Augmented Dicky Fuller Test) which can be seen using following formulation.

$$\Delta Y_t = a_0 + z_t + a_1 Y_{t-1} + \sum_{i=1}^p a_i \Delta Y_{t-1} + \epsilon_t$$

It's mean a_0 is a constant, t is a deterministic trend, ϵ is the error term. If the autoregressive of Y (Y_{t-1}) contains a unit root (unit root), then the ratio t (t ratio) for a_1 should be consistent with the hypothesis $a_1 = 0$.

$$\lambda_{Trace}(r) = -T \sum_{i=r+1}^g \ln(1 - \lambda_i)$$

$$\lambda_{Max}(r, r + 1) = -T \ln(1 - \lambda_{r+1})$$

It's mean λ_i is estimated with ordered eigenvalue. The

standard approach for Johansen's maximum likelihood. First, estimating Trace and Maximum Eigenvalue statistics, then comparing the appropriate critical values. In this cointegration test, if there is a cointegration between variables or the rank of cointegration is higher than zero, the Vector Error Correction Model can be conducted.

3 RESULT AND DISCUSSION

The result of the stationarity test using the Augmented Dickey Fuller (ADF test) is presented in the table 3. All stationary variables in the first degree are different except the Farmer Tujar Value (NTP) variable. Furthermore, to equalize the stationarity level, the NTP was also tested using the first degree different levels and the results showed that the variables were on the same degree.

Table 2.

Data Stationary Test Results with the ADF Test

Variable	Conclusion
HB	Stationary in First Different
HGP	Stationary in First Different
HMG	Stationary in First Different
JPB	Stationary in First Different
JP	Stationary in First Different
RRP	Stationary in First Different
NTP	Stationary in Level

Source: Data processed

Furthermore, the data were followed the next test using Johansen Cointegration test to know the relationship between variables in the long run.

Table 3.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.557162	90.30058	69.81889	0.0005
At most 1	0.290397	43.87118	47.85613	0.1127
At most 2	0.235452	24.31732	29.79707	0.1874
At most 3	0.121542	9.014514	15.49471	0.3640
At most 4	0.028158	1.628036	3.841466	0.2020

Table 4.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.402921	58.21232	47.85613	0.0040
At most 1	0.263522	29.33280	29.79707	0.0565
At most 2	0.195428	12.20377	15.49471	0.1474
At most 3	0.000479	0.026855	3.841466	0.8698

Table 5.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.398746	48.81844	47.85613	0.0405
At most 1	0.207428	19.82042	29.79707	0.4351
At most 2	0.099983	6.569490	15.49471	0.6282
At most 3	0.009863	0.565009	3.841466	0.4522

From the results of the analysis using the Vector Error Correction Model (VECM) it can be seen the long-term and also the short-term relationship between the commodity prices of Rice (HB), Granulated Sugar (HGP), Cooking Oil (HMG), Total Population (JP), Total Rice Production (JPB), Average Income (RRP, and Farmer Exchange Rate) The following results of the analysis use the VECM model that explained in the Table 6.

Table 6.

VECM Test Results for Rice Prices

Variable	Price of Rice	
	Coefficient	t-statistic
CointEq1	0.03	3.22
Short Run		
D(HB(-1))	0.31	2.28
D(JP2(-1))	-1.04	-0.91
D(JPB2(-1))	-0.07	-3.08
D(RRP2(-1))	-0.06	-0.80
D(NTP(-1))	0.14	1.17
Long Run		
JP2(-1)	40.95	3.35
JPB2(-1)	2.59	6.49
RRP2(-1)	0.30	0.44
NTP(-1)	-0.35	-0.92

Note: Significant at the 5% level = 2.0

Source: Data processing with Eview

The results of the Vector Error Correction Model analysis in the short-term conditions of rice prices have a positive effect on the critical value of five percent of 0.314. This means that in the short term if there is a 1 percent increase in the price of rice in the previous month it will raise the price of rice by 0.314 percent in the current month. Considering this is in accordance with research by Sugiyanto & Hadiwigeno (2012) that East Java is also a rice barn where when prices in East Java are low rice suppliers can sell it to other provinces so there is potential for reduced supply in East Java. The coefficient of Total Population (JP) is -1,049 and influential but not significant, meaning that an increase in Population Number (JP) of 1 percent in the previous month will reduce the price of rice by -1,049 percent in the current month. Likewise with the variable Number of Rice Production (JPB) which has a negative and significant effect with a coefficient of -0.07 percent. It's means is that if the amount of rice production increases 1 percent in the previous month it will reduce the price of rice by -0.07 percent in the current month. The variable (RRP) also had an insignificant negative effect of -0.06, meaning that when the average income increased 1 percent in the previous month the price of rice would decrease by 0.06 percent in the current month. While Farmer Exchange Rates (NTP) have a significant positive effect with a coefficient of 0.14. which means that when the Farmer Exchange Rate has increased 1 percent in the previous month, the Farmer Exchange Rate (NTP) will increase by 0.14 percent in the current month. In the long

run the Total Population (JP) variable has a significant positive effect where when the Total Population (JP) increases 1 percent will increase the price of rice by 40.1 percent. This is in line with research by Serra & Gill (2012) that the principle of demand when the number of residents more and more needs for staple foods will increase which makes the selling price increases. Variable Number of Rice Production (JPB) in the long run has a significant positive effect with a coefficient of 2.59 percent. Which means that when the number of rice production (JPB) increases by one percent it will raise the price by 2.59 percent. While the average revenue (RRP) variable also has an insignificant positive effect with a coefficient value of 0.30 percent. Where when (RRP) increases 1 percent it will increase the price of rice by 0.30 percent. In contrast to the Farmer Exchange Rate variable (NTP) which has no significant negative effect with a coefficient of -0.35 percent, which means that when Farmer Exchange Rate Rises by 1 percent it will reduce the price of rice by -0.35 percent. This is in line with research by Malian, A.H., Mardianto, S., & Ariani, M (2016) where this relates to the low rice price policy which is actually detrimental to farmers and unable to encourage the industrial sector to compete on the world stage.

Table 7.*VECM Test Results for Sugar and Cooking Oil*

Variable	Price of Sugar		Price of Cooking Oil	
	Coefficient	t-statistic	Coefficient	t-statistic
CointEq1	-0.06	-2.35	-0.01	-0.039
Short Run				
D(HGP(-1))	0.43	3.28	-	-
D(HMG(-1))	-	-	-0.15	-1.02
D(JP2(-1))	1.8	0.66	0.48	0.39
D(RRP2(-1))	0.27	1.46	-0.04	-0.43
D(NTP(-1))	-0.02	-0.28	0.06	1.82
Long Run				
JP2(-1)	25.3	1.92	14.9	3.79
RRP2(-1)	-2.92	-3.11	-0.58	-2.3
NTP(-1)	1.02	2.61	0.10	0.9

Note: Significant at the 5% level = 2.0

Source: Data processing with Eview

The estimation results of the Vector Error Correction Model on Sugar Prices (HGP) in the short run show (Table 9) the variable Sugar Prices (HGP) has a significant positive effect which means that when the Price of Sugar (HGP) has increased 1 percent in the previous month will increase (HGP) by 0.43 percent in the current month. Variable Population has an insignificant positive effect, which means when (JP) increases by 1 percent in the previous month will increase (HGP) by 0.43 percent in the current month. Variable Average Revenue also has an insignificant positive effect where when (RRP) rises by 1 percent in the previous month it will increase (HGP) by 0.27 percent in the current month. Inversely proportional to the variable (NTP) which has a significant negative effect, which means that when (NTP) increases by 1 percent in the previous month will decrease (HGP) by 0.02 percent in the current month. In the long run the number of population has a significant positive effect with a coefficient of 25.3 percent, which means that in the long run when the population rises 1 percent it will increase (HGP) by 25.3 percent. In line with research conducted by Yusuf & Aulia (2010) that the population affects the

demand for sugar in Indonesia. Inversely proportional to (RRP) which has a significant negative effect where when (RRP) rises 1 percent it will decrease (HGP) by -2.92 percent. As for the variable (NTP) has a significant positive effect which can be concluded that when (NTP) rises 1 percent it will increase (HGP) by 1.02 percent. This is interrelated with Zaini's research (2008) that the problem of the expansion of sugarcane area which is mostly done by smallholder farmers causes problems related to sugarcane farmers' income which has implications for productivity and government policies related to input factors. Table 9 also shows the results of VECM analysis of Cooking Oil prices (HMG) in the short term Total Population (JP) has insignificant influence with a coefficient of 0.48 percent, which means an increase of 1 percent (JP) in the previous month will increase (HMG) by 0.48 percent in the current month. In the long run, the Variable Population Oil Price (JP) has a significant positive effect with a coefficient of 14.9, which means that every 1 percent increase (JP) will increase the Cooking Oil Price by 14.9 percent. Rice in this case is an element of primary primary needs and has a very strategic value. Besides that, rice is also one of the main pillars in the movement of the economic control system in East Java. East Java Province is one of the national rice barns, Sutijo, B. (2012) states that the availability of rice in East Java shows the availability status of a surplus that has decreased every year. But on the other hand the factor of population growth that continues to increase must also be a readiness, especially for policy makers to always maintain the passokan production of rice itself which can have an impact on price stability. Conservation of agricultural land into buildings is almost rife which can have implications for decreasing the amount of production from rice itself. According to Timmer (2011) The best solution to deal with price fluctuations is to maximize stock better. Gouel & Jean (2012) research on policies taken by developing countries to stabilize the price of food commodities, one of which is to maintain the availability of food production. According to Tarimo & Takamura (1998) explains that granulated sugar is a commodity that is no less important than the commodity of rice. According to Hartono (2012) & Nurliza (2017) states that the increasing number of population affects the demand for sugar. In addition, according to Koo & Taylor (211) If you look at the case of consumption of sugar per capita needs of the Indonesian people is 14.5 kg per capita per year. This results in a pattern of sugar production which must be increased by 1.5 times more to always meet domestic needs. According to Yunitasari et al. (2015) sugarcane farmers' income in East Java also needs to get attention. Farmer exchange rate is one of the important indicators in measuring the welfare of farmers, especially sugar cane farmers. Cooking oil is one of the important commodities, in this case cooking oil is the third largest commodity based on public expenditure indicators. According to Astuty, et al (2018) the level of income has a positive effect on demand for cooking oil in Aceh. Although cooking oil can be regarded

4 CONCLUSION

Based on the results of research on the analysis of food price stability in East Java, it can be concluded that the

amount of Rice Production and Farmer Exchange Rate (NTP) can have a significant influence on the stability of the selling price of rice commodities in East Java. Community income and NTP can have a significant influence on the price stability of Granulated Sugar in East Java. Population and community income have a significant effect on the stability of cooking oil prices in East Java.

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